Forum Guide to Data Literacy







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.

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 (SEAs and LEAs) in meeting this purpose. The Cooperative System and the Forum are supported in these endeavors by resources from NCES.

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Foreword

The Forum is pleased to release the *Forum Guide to Data Literacy*. The purpose of this guide is to address how data literacy needs vary among stakeholders, identify best practices that agencies are using to help different audiences understand education data, and describe considerations for each audience to engage with data more fully. This new resource includes case studies to illustrate examples of best practices used in SEAs and LEAs to build a culture that promotes data literacy.

This guide reflects the judgment of data experts with knowledge in the field. There is no mandate to implement any of the recommendations included in the guide.

Publication Objectives

The purpose of this document is to help education agencies build data literacy skills among school staff, students, parents and other caregivers, community groups, school board members, and legislators. This document aims to

- define and discuss the importance of data literacy and how education agencies can foster data literacy among various stakeholder groups;
- discuss the types of education data that various stakeholder groups may use to make informed decisions and how education agencies can make the data easier to interpret;
- present strategies to help agency staff have transparent, ethical, and meaningful conversations about education data with their agency colleagues and other stakeholders, including parents and other caregivers, students, and community members; and
- highlight case studies from SEAs and LEAs that have implemented effective data literacy practices.

Intended Audience

The primary audience for this publication includes SEA, LEA, and school staff involved in using education data to improve student outcomes. This resource may be of interest to a secondary audience that includes policymakers, education program providers, the media, and the public.

Organization of This Resource

This resource includes the following four chapters and appendices:

- **Chapter 1** defines and discusses the importance of data literacy.
- **Chapter 2** includes key aspects of data literacy.
- **Chapter 3** offers considerations for different stakeholder groups to engage with data more fully.
- **Chapter 4** offers case studies from SEAs and LEAs.
- **Appendix A** provides a list of state data literacy training programs and resources.
- **Appendix B** provides a list of Forum products that align with each of the four components of the Data Use Self-Assessment tool.
- **Appendix C** provides some federal resources for using data.
- **Appendix D** includes additional resources.

National Forum on Education Statistics

The work of the Forum is a key aspect of the 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, NCES within IES—a part of ED—established the Forum to improve the collection, reporting, and use of elementary and secondary education statistics. The Forum includes approximately 120 representatives from SEAs and LEAs, 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 local, state, and federal 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 the document a final time, the publication is 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 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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This online publication was developed through the Cooperative System and funded by NCES within IES—a part of ED. The Data Literacy Working Group of the Forum is responsible for the content.

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Contents

Glossary

Accurate data. Data that pass edit checks, follow data quality rules, and contain no known errors. Data accuracy is specific to each data collection and refers to whether data adhere to preset standards and expectations.[1]

Aggregate data. The combination of individual data values into summary data (for example, combining the number of students in each school building into a district total), which often is referred to as "summing the data" or "rolling up the data."[2]

Appreciative inquiry. An asset-based approach to inquiry used in organizations that focuses on discovering and leveraging what already is working well, envisioning and creating a positive future, and implementing changes collaboratively. Appreciative inquiry uses structured interviews, storytelling, and the art of asking questions to identify themes and inspire innovation, diverging from traditional problem-solving approaches by emphasizing what is working and people's aspirations for increasing those positive aspects.

Asset- versus deficit-based thinking. An approach that emphasizes recognizing and leveraging the strengths and positive attributes of people, communities, and students.[3] This approach contrasts with a deficit-based perspective that focuses on weaknesses and areas that need improvement. Asset-based thinking views diversity in thought, culture, and traits as valuable assets. It values teachers, students, and communities for what they bring to the educational environment, emphasizing their talents and potential rather than characterizing them by their shortcomings or what they lack.

Complete data. Data that meet two qualifications: (1) all expected records are entered into the collection system and included in the datasets used for reporting, and (2) each record includes all expected information.[4]

Data governance. Refers to a formal and comprehensive set of policies and practices designed to ensure the effective management of data within an organization—encouraging robust data security, definitions, collection, access, quality, and disposal.[5]

Data. A collection of individual facts or statistics. Data must be analyzed and interpreted in order to have meaning.

Data-informed decision-making. The process of making education decisions based on available data rather than set schedules or prior experiences.[6]

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1 National Forum on Education Statistics. (2023). *Forum Guide to Data Quality* (NFES 2023-086). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved December 11, 2023, from https://nces.ed.gov/forum/pub_2023086.asp.

2 National Forum on Education Statistics. (2016). *Forum Guide to Collecting and Using Disaggregated Data on Racial/Ethnic Subgroups* (NFES 2017-017). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved October 2, 2023, from https://nces.ed.gov/forum/pub_2017017.asp.

3 NYU Steinhardt. *An Asset-Based Approach to Education: What It Is and Why It Matters*. (2018; updated 2023). Retrieved October 3, 2023, from https://teachereducation.steinhardt.nyu.edu/an-asset-based-approach-to-education-what-it-is-and-why-it-matters/.

4 National Forum on Education Statistics. (2023). *Forum Guide to Data Quality* (NFES 2023-086). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved December 11, 2023, from https://nces.ed.gov/forum/pub_2023086.asp.

5 National Forum on Education Statistics. (2020). *Forum Guide to Data Governance* (NFES 2020-083). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved July 25, 2023, from https://nces.ed.gov/forum/pub_2020083.asp.

6 National Forum on Education Statistics. (2019). *Forum Guide to Personalized Learning Data* (NFES2019160). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved July 25, 2023, from https://nces.ed.gov/forum/pub_2019160.asp.

Data literacy. The ability to understand and use data effectively and ethically to inform decisions. Data literacy is composed of a specific skill set and knowledge base that enable education stakeholders to transform data into information and ultimately into actionable knowledge.[7]

Data use. A series of steps that build on one another to achieve a desired goal. With respect to education data, the goal is to take action to improve the education system and student learning.[8]

Data visualization. The transformation of data into information through visual presentation and analysis. Data visualization may culminate in a figure or image, but it should not be viewed simply as a graphical product—rather, it is the process of using a wide range of communications methods, presentation technologies, and media formats to visually reveal the meaning of data to viewers.[9]

De-identified data. Records that have a re-identification code and have enough personally identifiable information removed or obscured so that the remaining information does not identify an individual and there is no reasonable basis to believe that the information can be used to identify an individual. The re-identification code may allow the recipient to match information received from the same source.[10]

Disaggregated data. Data that have been broken down by student population into smaller groupings, based on qualities or characteristics such as gender, racial/ethnic group, or family income.[11]

Implicit bias. The attitudes or stereotypes that affect individuals' understanding, actions, and decisions in an unconscious manner.[12]

Information. Raw data that have been processed to be easier to measure, visualize, and analyze for a specific purpose.

Metadata. Defined most simply as "data about data"—structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an information source. Metadata provide the context in which to interpret data.[13]

Proxy data. Data used to study a situation, phenomenon, or condition for which no direct information—such as instrumental measurements—is available.

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7 Mandinach and Gummer, 2013, as cited in Henderson, J., and Corry, M. (2021). "Data literacy training and use for educational professionals." *Journal of Research in Innovative Teaching and Learning*, *14*(2), 232-244. Retrieved August 3, 2023, from https://doi.org/10.1108/JRIT-11-2019-0074.

8 National Forum on Education Statistics. (2012). *Forum Guide to Taking Action with Education Data* (NFES 2013-801). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved July 25, 2023, from https://nces.ed.gov/forum/pub_2013801.asp.

9 National Forum on Education Statistics. (2016). *Forum Guide to Data Visualization: A Resource for Education Agencies* (NFES 2017-016). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved July 25, 2023, from https://nces.ed.gov/forum/pub_2017016.asp.

10 U.S. Department of Education Student Privacy Policy Office. (n.d.). *Glossary*. Retrieved January 2, 2024, from https://studentprivacy.ed.gov/content/de-identified-data#glossary-node-236.

11 National Forum on Education Statistics. (2016). *Forum Guide to Collecting and Using Disaggregated Data on Racial/Ethnic Subgroups* (NFES 2017-017). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved October 2, 2023, from https://nces.ed.gov/forum/pub_2017017.asp.

12 Staats, C. (2015-2016, Winter). "Understanding Implicit Bias: What Educators Should Know." *American Educator*. Retrieved June 5, 2023, from https://files.eric.ed.gov/fulltext/EJ1086492.pdf.

13 National Forum on Education Statistics. (2021). *Forum Guide to Metadata* (NFES 2021110). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved July 25, 2023, from https://nces.ed.gov/forum/pub_2021110.asp.

Valid data. Data that conform to expectations for reasonable values and accepted norms. Validity also encompasses formatting. Valid data do not contain redundancies, which can affect calculations.[14]

Whole-child data. Student data that include academic, social, emotional, and environmental aspects that provide a holistic understanding of a student's K-12 experience and the factors influencing learning. These data include test scores, attendance, and behavior, as well as students' interests, dispositions, social skills, familial circumstances, cultural influences, special status designations, and housing status, among others.

14 National Forum on Education Statistics. (2023). *Forum Guide to Data Quality* (NFES 2023-086). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved December 11, 2023, from https://nces.ed.gov/forum/pub_2023086.asp.

Chapter 1:
Data Literacy in Education

This chapter defines the concept of data literacy and discusses why data literacy matters for various stakeholder groups. This section also situates data literacy within the broader ecosystem of using data to inform educator decisions and improve student experiences.

Existing data literacy efforts often focus on improving data literacy among education staff. This resource aims to help education agencies promote data literacy skills of key stakeholders, such as agency staff, students, parents and other caregivers, policymakers, and community groups. This resource also suggests strategies to increase educators' ability to have meaningful conversations with a variety of stakeholders regarding the interpretation and use of education data to support students.

Many actions at the federal, state, and local levels highlight the need to increase data literacy. At the federal level, the Foundations for Evidence-Based Policymaking Act of 2018[15] requires public government data be made accessible for the purposes of developing evidence to inform policymaking. State and local education agencies (SEAs and LEAs) have worked to increase data literacy within their workforces, and some SEAs currently offer data literacy training for staff and teachers (see appendix A for a list by state). The U.S. Department of Education (ED) has supported SEAs through a variety of grant programs that can be used to improve data literacy. For example, in 2015, the Statewide Longitudinal Data Systems (SLDS) Grant Program provided funds and technical assistance (TA) for states to carry out projects specifically focused on improving data use, including developing models of data sharing, use, and training for educators, policymakers, and researchers.[16]

What Is Data Literacy?

Data literacy is the practice of examining and understanding data to draw and communicate conclusions and make decisions. Data-literate educators continually, effectively, and appropriately access, interpret, act on, and communicate multiple types of data from classroom, local, state, and other sources to improve outcomes and experiences for students.[17] Data literacy is a learned skill that enables education stakeholders to interpret data and reports that are used for multiple purposes, such as allocating funding, assigning resources for further research and evaluation, or promoting differentiated instruction effectively.

15 Foundations for Evidence-Based Policymaking Act of 2018, P.L. 115-435, 132 Stat. 5529 (2019)

16 U.S. Department of Education Statewide Longitudinal Data Systems Grant Program. (2015). *16 States Win Grants for Longitudinal Data Systems*. Retrieved November 8, 2022, from https://nces.ed.gov/programs/slds/fy15_announcement.asp.

17 Data Quality Campaign. (2014). *Teacher Data Literacy: It's About Time*. Retrieved April 26, 2023, from https://dataqualitycampaign.org/wp-content/uploads/2016/03/DQC-Data-Literacy-Brief.pdf.

Data literacy is needed to assess whether data are meaningful for the intended purpose and audience and what to do based on the information the data provide. The type of data reviewed, and the subsequent decisions made, will depend on the stakeholder. Consider the following examples:

- A teacher may use data to assess student strengths, interests, and challenges to incorporate content in their teaching that piques student interests, builds on their strengths, and addresses challenges.
- An administrator may use data to select an evidence-based curriculum resource tailored to meet a specific student population's need or assess whether resources are being applied equitably throughout their district.
- A parent or other caregiver may use data to learn about challenges that their child faces in a specific subject area so that they can decide whether their child needs tutoring. Additionally, a parent or other caregiver may use data about their child's strengths to decide whether they are a good candidate for a specialty or magnet school. A parent or other caregiver also may use data to inform decisions about their high school student's postsecondary pathways.
- School board members may use data to help analyze key performance indicators regarding the district's academic progress or financial management.
- A community group may use school-level data to determine the subjects and grade levels at which their support will be most useful in affecting student performance and design their programs accordingly.
- The public or media may use data to form opinions on the LEA, which will guide decisions that must be made by the public, such as ballot measures or elections. Additionally, the media report on student progress at the national, SEA, and LEA levels.

Stakeholders require different levels of data literacy based on their roles in the education environment. LEA data analysts need an advanced understanding of how to collect, manage, analyze, interpret, and use data. They also need to be able to take raw data, such as student test scores or individual absences, and transform those data into an organized format that can be presented in multiple ways based on the intended audience. A parent or other caregiver may be interested in understanding the school or district annual report card, interpreting their child's test scores, and understanding how their child is doing socially and emotionally. Parents and other caregivers also may use data to understand their children's needs to request appropriate remediation or acceleration supports.

Why Data Literacy Matters

Data literacy can enhance teaching and learning, support students, and contribute to the overall improvement of the education system by enabling data-informed decision-making and accountability. People who are data literate can distinguish meaningful information from irrelevant data noise, resulting in more comprehensive analyses and actionable solutions based on strong evidence. Data-literate stakeholders examine an array of relevant data, including academic, social, psychological, and environmental factors that influence student learning. These data include test scores, attendance, and behavior, as well as students' interests, dispositions, social skills, familial circumstances, cultural influences, special status designations, and housing status, among others.

Data can provide a shared source of information that can help education stakeholders have effective, data-driven conversations when making tough decisions. With the common language of data, data-literate stakeholders can identify relevant questions, consider different perspectives, and possibly communicate about the cause-and-effect relationships in data.

Increasing data literacy helps educators tailor their strategies and interventions to address various aspects of a student's K-12 experience, fostering a more supportive and inclusive learning environment that prioritizes students' overall development and success. Educators who are data literate have a skill set that could help them impact student outcomes by identifying individual students' strengths and weaknesses, tailoring instruction to meet specific student needs, and more accurately tracking students' progress. Consider these examples:

- Data-literate teachers can use data to inform their instructional strategies, identifying which teaching methods are most effective for their students.
- School administrators and policymakers with data literacy skills can use education data to make informed decisions about curriculum development, resource allocation, and education policies.
- Schools and districts that have access to the necessary data and data literacy can more efficiently allocate resources, including teaching staff, technology, materials, and transportation resources, to areas where they are needed most.

Data Literacy Can Lead to Simple and Effective Solutions

Data literacy can illuminate discrepancies in rates across local and state education agencies (LEAs and SEAs) for common indicators. For example, differing definitions of variables such as mobility, student exits, and poverty indicators impact their reported rates. In some cases, the same term (such as absenteeism) may have different definitions or data calculations across agencies or even schools or departments within the same district. These variations in definitions can make it difficult to compare rates across schools and districts.

At the Maine Department of Education (ME-DOE), chronic absenteeism was a metric that previously could not be examined at the state level because LEAs lacked standard definitions for attendance and absenteeism. The ME-DOE worked to standardize chronic absenteeism to better understand data within and across each district. After one district worked with a standard definition to analyze its absence data, contrary to expectations, the district found that elementary school students—not high schoolers—were most likely to experience chronic absenteeism.

To address chronic absenteeism among elementary students, school administrators talked to families to determine the factors contributing to students' school attendance. The LEA worked directly with families to uncover a range of transportation challenges, including complicating factors such as parents' health.

With an understanding of the root cause of the chronic absenteeism (mostly transportation), the LEA devoted resources to help families get their children to school. Coordinating a bus proved to be complicated, so the LEA used a van with a dedicated driver to solve transportation issues for students whose families needed help getting their children to school. The data helped the district promptly address its absentee issues by helping families get their children to school.

Data-literate staff correctly identified the root cause of chronic absenteeism, which led to simple and successful solutions for both the ME-DOE and the LEA. Knowing how to collect data at the LEA level led to better data collection and analysis to find solutions.

Identify Patterns and Trends in Data

An understanding of data can help education stakeholders discern nuances within the data, identifying underlying issues beyond surface-level observations, possibly uncovering patterns, trends, and potential reasons behind various outcomes.

Data literacy can increase educators' ability to identify positive patterns and trends in student growth that can be correlated to specific program initiatives or changes in schoolwide policies. Educators then can help improve outcomes for students by offering supports tailored to their specific needs and identifying practices and policies that are—or are not—serving certain

groups of students well. For example, a principal may notice that after implementing a new reading comprehension program, there is a notable increase in standardized test scores among struggling readers. Data-literate educators could fine-tune the program further to benefit those students who struggled with reading comprehension.

By using data to identify patterns and trends, stakeholders can take targeted actions to improve student outcomes. For example, if data analysis reveals that a certain student demographic group consistently lags in mathematics proficiency, educators can design and implement interventions tailored to meet the specific learning needs of these students. Moreover, by identifying policies or practices that may inadvertently hinder student progress, educators can adjust or eliminate these barriers to create a more equitable learning environment for all students.

Forum Guide to Taking Action with Education Data

https://nces.ed.gov/forum/pub_2013801.asp

This document is intended as a guide to the skillful and appropriate use of education data. It includes an introduction and three briefs written for educators, school and district leaders, and state program staff. Each brief is designed to provide stakeholders with practical information on the knowledge, skills, and abilities needed to identify, access, interpret, and use education data for action.

Data literacy also can increase awareness around the potential to misinterpret or overinterpret apparent patterns in data. In the example described above, the principal who observes an increase in standardized test scores among struggling readers also would want to consider and rule out other reasons their test scores might have increased before concluding that the new reading comprehension program deserves the credit. The principal also might consider whether those struggling students were assigned to highly effective teachers when they started the program and whether the scores of nonparticipating students increased at the same time.

Finally, stakeholders examining the data should be aware of the possibility that observed patterns have no meaning at all and instead are the result of random variation. There sometimes is a tendency to see patterns and trends where they do not exist.[18] That is why researchers apply sophisticated statistical methods to test whether observed patterns are due to chance. Educators and other stakeholders do not need the expertise to conduct statistical analyses. However, an aspect of data literacy is to be aware of the tendency to attribute patterns to randomness and look for ways to test perceived patterns, perhaps by bringing in additional data that might confirm or deny apparent patterns in data.

Data literacy can illuminate the true meaning of certain data, especially proxy data. For example, the education community historically has relied heavily on free and reduced-price meal (FARM) eligibility data to identify socioeconomically disadvantaged students, schools, areas, and populations. This information affects decisions related to funding, service availability, program eligibility, accountability, and research.

Although FARM eligibility may be appropriate for operating a meals program, it is becoming less suitable to the education community as a proxy for an individual student's socioeconomic status (SES). FARM eligibility is not as beneficial a proxy for SES because it only reflects income (or, in some cases, schoolwide characteristics) rather than other components of SES that are widely acknowledged to be relevant at the individual level, such as the occupational and education backgrounds of parents and other caregivers (https://nces.ed.gov/forum/pub_2015158.asp).

18 Vallone, R., and Tversky, A. (1985). "The Hot Hand in Basketball: On Misperception of Random Sequences." *Cognitive Psychology*, *17*: 295–314. Retrieved April 8, 2024, from https://home.cs.colorado.edu/~mozer/Teaching/syllabi/7782/readings/gilovich vallone tversky.pdf.

Data Literacy Landscape

Data literacy provides stakeholders with the tools necessary to make informed decisions. Stakeholders with data literacy skills know the kind of data they are examining, have an awareness of implicit bias, and understand the context of the data. Data-literate stakeholders must understand the importance of accurate, reliable, valid, and complete data and recognize possible misinterpretations that could arise from data.

The National Forum on Education Statistics (https://nces.ed.gov/forum/) has produced multiple related resources that can help education stakeholders better comprehend and use data. The resources highlighted in this section can help orient readers to the work of data literacy. The following components are critical to understanding data. The extent to which a person needs to develop knowledge and skills in each component depends on their role in the education system.

Figure 1. Key topics that support the development of data literacy are data quality, metadata, data privacy, data ethics, data governance, and data visualizations.

Data Quality

An essential component to data literacy is being able to determine the quality of the data being reviewed. Data literacy helps users recognize potential issues with the data. For example, a data analyst may receive attendance data from a high school that are drastically different from previous attendance submissions with no apparent cause. Data literacy would help the analyst notice the differences.

> ***Forum Guide to Data Quality***
>
> https://nces.ed.gov/forum/pub_2023086.asp
>
> This resource provides best practices from districts and states for maintaining quality data as these agencies regularly review and revise their methods for working with data, as well as their expectations for all staff who are responsible for education data and data quality. This document also highlights the U.S. Department of Education's efforts to improve data quality.

Quality data are

- complete, meaning that they include all the expected or required information;
- valid, meaning that they measure what they purport to measure;
- accurate, meaning that they contain no known errors;
- reliable, meaning that they produce consistent measures over time;
- useful, meaning that they are relevant to the issues in question; and
- timely, meaning that they are available in time to inform decision-making and reporting.

As more people engage with data, the demand for high-quality data grows. In agencies that value quality data, everyone becomes invested in student outcomes and assumes responsibility for upholding data integrity.

Metadata

Metadata are structured information that describe and explain data, making the data easier to find, access, use across data systems, and reuse. Metadata provide relevant context to interpret data, including where the data are stored, when they were collected, which source provided the data, and the data's verification status.

> ***Forum Guide to Metadata***
>
> https://nces.ed.gov/forum/pub_2021110.asp
>
> This guide presents and examines how education agencies can use metadata to improve data quality and promote a better understanding of education data. This resource highlights the uses of metadata from a technical point of view, as well as the perspectives of data management, data reporting and use, and privacy and security. The guide further discusses how to plan and successfully implement a metadata system in an education setting and provides examples of standard metadata items and definitions to assist agencies with standardization.

An understanding of metadata can help stakeholders recognize whether it is appropriate to make comparisons between or across datasets. For example, comparing self-reported data with automatically collected data would be problematic, as the data collection methods (the metadata in this instance) are not the same. Metadata would make clear how different data were collected to ascertain whether the data can be compared appropriately.

Data Privacy

Every person who works with student data has a legal and ethical obligation to protect the privacy of those data and the students the data represent. Student data are about individual people. Collecting, storing, and reporting student data comes with real and perceived risks to the people about whom the data are collected. As such, data privacy needs to be at the forefront of any efforts to increase data literacy.

Because larger and larger datasets are available, coupled with advancements in data science and developments in artificial intelligence, concepts of data de-identification and privacy are an ongoing conversation. Data literacy involves understanding not only which data must be protected, how, and why, but also how data may be combined to reveal more than was intended about the source of data.

Forum Guide to Education Data Privacy

https://nces.ed.gov/forum/pub_2016096.asp

This guide was developed for state and local education agencies (SEAs and LEAs) to use to help school staff protect the confidentiality of student data in instructional and administrative practices. SEAs and LEAs also may find the guide useful in developing privacy programs and related professional development programs.

Student data typically are protected by state and federal privacy laws, including the federal Family Educational Rights and Privacy Act (FERPA). These laws are designed to protect the privacy of student education records and prohibit sharing personally identifiable data, with some exceptions. For example, under FERPA, parents can inspect and view their child's records, and schools are permitted to disclose personally identifiable information (PII) from students' education records to school officials who have a legitimate educational interest in the information.[19]

Stakeholders such as parents and other caregivers, community partners, school board members, and others may be unaware of state and federal regulations governing the privacy and confidentiality of personal information and may request data that cannot be shared publicly. Education staff must understand and uphold laws regarding student privacy. This includes aggregating and de-identifying student data reported to the public to prevent disclosing PII.

Data Ethics

Ethics establish fundamental and critical principles of appropriate and inappropriate management and use of education data. Implicit bias is an important ethical consideration regarding the interpretation and analysis of data. Implicit biases are the attitudes or stereotypes that affect people's unconscious understanding, actions, and decisions. Data literacy can increase educators' ability to make decisions informed by and based on the data, as opposed to basing decisions on assumptions or anecdotal evidence.

Forum Guide to Data Ethics

https://nces.ed.gov/forum/pub_2010801.asp

This resource presents a code of ethics for data management and use in education settings. The guide presents examples, descriptions, and recommendations that arise in real schools, school districts, and state education agencies. The goal of this document is to make ethical principles understandable and actionable to education staff as they work with data in their organizations.

Forum Data Ethics Course

https://nces.ed.gov/forum/dataethics_course.asp

Based on the *Forum Guide to Data Ethics*, this online course focuses on how ethical principles apply to education data. It is intended for anyone who handles data in an education organization.

19 U.S. Department of Education Student Privacy Policy Office. (2021). *A Parent Guide to the Family Educational Rights and Privacy Act (FERPA)*. Retrieved June 5, 2023, from https://studentprivacy.ed.gov/resources/parent-guide-family-educational-rights-and-privacy-act-ferpa.

Data Governance

Data governance is a formal and comprehensive set of policies and practices designed to ensure the effective management of data within an organization. Those policies and practices address robust data security, definitions, collection, access, quality, and disposal. A key component of data literacy is understanding the data governance lifecycle, including what data are collected, how, when, and why.

Forum Guide to Data Governance

https://nces.ed.gov/forum/pub_2020083.asp

This resource highlights the multiple ways that data governance programs can benefit education agencies. It addresses the management, collection, use, and communication of education data; the development of effective and clearly defined data systems and policies to handle the complexity and necessary protection of data; and the continuous monitoring and decision-making needed in a regularly shifting data landscape.

Effective data governance helps ensure the quality of data. Data quality depends on the policies, procedures, and tools that each agency uses to collect, manage, and maintain education data, including the training and support provided to staff members who perform these tasks.

Data Visualization

Data visualization is the process of using a wide range of communication methods, presentation technologies, and media formats to visually reveal the meaning of data to viewers. Data literacy is critical for building effective data visualizations for stakeholders. Likewise, accurate and meaningful data visualizations can help improve data literacy significantly, because different visual representations of data can increase understanding or lead to misinterpretations. For example, manipulating the y-axis on a graphical representation of attendance data can over-emphasize differences between groups of students. In the instance of two similarly sized districts having different attendance rates of 92 percent versus 94 percent, a complete scale of 0-100 on the y-axis would make this difference appear small, whereas a small scale of 90-100 on the y-axis would be inappropriate because it could exaggerate the difference by making it appear larger.

Forum Guide to Data Visualization: A Resource for Education Agencies

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 Data Visualization Online Course

https://nces.ed.gov/forum/dv_course.asp

This online course is based on the *Forum Guide to Data Visualization: A Resource for Education Agencies* and is intended for staff in federal, state, and local education agencies whose responsibilities include any aspect of analyzing data or sharing meaning through data with education stakeholders.

Chapter 2:
Building and Supporting Data Literacy

This chapter discusses the foundations for data literacy, training and professional development, and key considerations for building and supporting data literacy in education agencies.

Data Use

Easy-to-understand data that are readily accessible lead to an increased use of data. Data that are used according to established best practices lead to increased data literacy. Education agencies that promote best practices for data use encourage a shared commitment to using data for decision-making and continuous improvement. Data move beyond compliance-based reporting and are seen as powerful tools for measuring progress, identifying strengths and areas for growth, and making evidence-based decisions. Stakeholders are more likely to use data that are readily accessible and easy to understand.

Figure 2. Data accessibility and data use can lead to increased data literacy.

Effective data use relies on data-literate stakeholders who can access and understand data to inform decision-making. Without data literacy, people may struggle to interpret and apply data accurately, leading to ineffective use or misinterpretation of data. Data literacy flourishes and is supported by data use. When data consistently are valued and used in decision-making, it reinforces the importance of data literacy skills by driving people to acquire those skills.

The California Capital Central Foothill Area Consortium created the Data Use Self-Assessment[20] tool to help districts assess their data use. The tool contains four components that help schools and districts improve data quality, create data systems, develop data practices, and strengthen conversations around data—which all are practices that support data literacy. The four components are the following:

1. *Systems*. The agency ensures that data collection and storing systems are in place, that data can be easily accessed and used for various purposes, and that data are entered in a standardized format and can be validated.
2. *Knowledge*. Multiple staff members have expert-level knowledge of the data system(s); there is a formalized process for staff to get technical support; staff use multiple relevant and valid data sources to inform their work; and staff are proficient in understanding, analyzing, and communicating about data.
3. *Practices*. The agency has a strategic plan with goals; data are used for continuous improvement; and team members have common planning time to discuss data.
4. *Leadership*. A supportive and judgment-free environment that encourages regular conversations about data exists; all staff are empowered to solve problems and improve practices using data; communication around expectations regarding data are transparent; coaching is provided; and staff have the time and resources needed to use data to inform their activities.

Appendix B provides a list of Forum products that align with each of the four components of the Data Use Self-Assessment tool.

20 Capital Central Foothill Area Consortium. (2022). *Data Use Self-Assessment*. Retrieved June 5, 2023, from https://sites.google.com/sjcoe.net/dusatoolkit/hometoolkit.

Data Dashboards Can Increase Data Use

Data dashboards are an effective way to increase data use among local education agencies (LEAs) and education stakeholders. The Kentucky Center for Statistics (KYSTATS) powers a data dashboard for the Kentucky Department of Education's (KDE) High School Feedback Report (HSFR): https://kystats.ky.gov/Latest/HSFR.

KDE recognizes that for data literacy skills to increase, data dashboards need to be readily available and intuitive enough for users to understand. The HSFR dashboard includes three tabs of data visualizations organized by the following topics:

- College-Going and Success;
- College Enrollment and Outcomes; and
- Loans and Wages.

To keep this data dashboard simple, KYSTATS focuses on presenting data trends that are meaningful to educators and giving them the opportunity through the tool to dig deeper into data points specific to their LEA's needs. Data presented in the dashboard include multiple years, allowing for a longitudinal view. The dashboard also includes data that are disaggregated by student demographic groups (for example, race and ethnicity, sex, and free and reduced-price lunch designation) and by high school districts, state house districts, and state senate districts.

An important step is showing education stakeholders the data that are available so that they can use these data to drive actions and decisions that affect students. KYSTATS uses targeted communications by a dedicated staff person to promote the release of the HSFR through multiple methods, including social media, news releases, and email. In addition, staff from KDE and KYSTATS make site visits to LEAs to present portions of the HSFR to district leaders and school counselors at the beginning of the school year. Through these presentations, educators learn how best to use the data dashboard as a tool to meet their specific needs.

Training and Professional Development

State and local education agencies (SEAs and LEAs) recognize the importance of data literacy and have taken steps to enhance it within their workforces. Some SEAs have implemented data literacy training programs for staff and teachers. Additionally, certain states have established collaborations with teacher preparation programs to incorporate data literacy into the training provided to educators. Appendix A of this resource lists some of the efforts of states to increase educator data literacy.

The demand for data literacy skills among teachers is on the rise. To meet this need, agencies can

- have data-literate educators champion the significance of data literacy among their peers;
- encourage educator preparation programs to embed data literacy in their curricula and standards;
- make data literacy a requirement for recertification;
- allocate funding, resources, and dedicated professional development (PD) time for data literacy training; and
- emphasize that data literacy is a core component of a teacher's responsibilities.

Incorporating data literacy into teacher and staff onboarding is an essential strategy that sets clear expectations for data use from the outset. Through this practice, new educators and staff members understand the importance of integrating data into their instructional practices and decision-making processes from the beginning of their roles.

Embedded and ongoing PD plays a critical role in supporting the continuous development of data literacy. Acknowledging that educators and staff members will have varying levels of data literacy and varying needs based on their role, an effective PD program should be tailored to accommodate and support their diverse entry points.

Data Onboarding Trainings Can Increase Data Literacy

The Maine Department of Education (ME-DOE) offers individual and team-based onboarding training to increase data literacy for various users. Defining levels of data users helped the state education agency (SEA) determine what training various users needed. Three levels of data users were identified, with increasingly sophisticated data literacy needs:

- the operational level, composed of data collectors and users;
- the tactical level, composed of middle management staff (people who supervise data users); and
- the strategic level, which includes directors, commissioners, policymakers, and media.

The SEA created a specific training for new data entry staff at local education agencies (LEAs) to use the state reporting system. ME-DOE's priority was to ensure that each LEA had a complete and accurate set of data that was understood by the people responsible for it. ME-DOE's data quality trainer developed tailored approaches to technical assistance (TA) and training by building trust and rapport with districts through actively listening and empathizing with their challenges around data collection and entry. ME-DOE's data quality trainer developed a curriculum of data collection trainings that are customized to the needs of the people being trained and generally include

- demonstrations of the reporting systems;
- defining the datasets available; and
- having conversations with LEA staff about how and why these data are being collected.

In addition to individualized onboarding trainings, ME-DOE has an online helpdesk (https://www.maine.gov/doe/data-reporting/collection/helpdesk) that makes multiple resources available to increase data literacy, including

- instructions for reporting data;
- guides for student enrollment;
- training guides for staff data entry; and
- links to webinars, trainings, and presentations.

ME-DOE data experts have noticed that data users are more inquisitive about data since taking the data onboarding trainings and engaging with the online helpdesk data literacy resources. As understanding of the data deepens, users ask more relevant and thoughtful questions. ME-DOE's onboarding trainings led to an increase in data quality within each district, which has enabled the SEA to make better decisions regarding how to allocate resources across schools.

Professional learning communities (PLCs) can be a valuable resource for SEAs and LEAs. PLCs that use data sometimes are referred to as data teams. Best practices for data use in PLCs include

- employing consistent data-informed frameworks;
- guiding discussions with relevant prompts;
- providing data literacy training;
- promoting data-informed decision-making; and
- using resources like the What Works Clearinghouse (WWC) educator practice guides: https://ies.ed.gov/ncee/wwc/practiceguides.

Appreciative Inquiry: An Asset-Based Approach

Asset-based approaches to data collection, interpretation, and use include data around the child as a whole person. An asset-based approach frames student success in terms of the strengths they bring with them to the learning environment and works to build on those assets (https://dataqualitycampaign.org/asset-framing-students-arent-empty-cups/). For example, viewing student assessment scores with an asset-based lens, rather than through a deficit lens, can help educators see the potential in their students and promote student achievements.

It would be helpful for agencies to include the concept of appreciative inquiry in their training and professional development program. Appreciative inquiry is an asset-based approach that focuses on discovering and leveraging factors that already are working well, envisioning and creating a positive future, and implementing changes collaboratively. Appreciative inquiry uses structured interviews, storytelling, and the art of asking questions to identify themes and inspire innovation. This practice diverges from traditional problem-solving approaches by emphasizing what is working and people's aspirations for increasing those positive aspects.

Finally, it is important to remember that data privacy and confidentiality are critical to protect students' well-being. Schools often collect sensitive data about students and their families. Getting the fullest picture of these data is crucial to inform appropriate funding for schools, among other benefits to districts, schools, students, and families. Staff who collect sensitive data can be trained to do so with compassion and kindness, as this increases the likelihood that students and their families will provide the data accurately and honestly. These strategies collectively contribute to a data-informed education ecosystem that supports educators and ultimately benefits students.

Key Characteristics of Data-Literate Agencies

Data-literate agencies actively embrace data and evidence to enhance understanding, generate new ideas, solve problems, and drive decision-making. In a data-literate agency, administrators articulate and communicate a clear purpose for data collection that encompasses well-defined objectives outlining how the collected data will be used. In addition, education leaders have a comprehensive understanding of relevant data and actively work to increase educators' access to high-quality data on an ongoing basis.

Data-literate organizations actively promote the collection and use of diverse data, including whole-child data. Whole-child data paint a holistic picture of a student. Whole-child outcomes include not only a student's class grades, test scores, grade point average, and discipline record, but also program participation, motivation to learn, persistence, and nonacademic characteristics. Examining whole-child outcomes acknowledges diversity among learners' skills, experiences, and abilities beyond traditional assessments and can provide a deeper understanding of students' needs and experiences.

The following are key characteristics of data-literate agencies:

- Leaders are explicit about the purpose, vision, and details for data collection and use.
- Leaders create a trusting and nonpunitive environment in which data use is expected and prioritized.
- Data literacy skills and expectations are embedded into job descriptions, emphasizing that data literacy is a priority.
- Staff are provided with resources to access and use data, including time to review, analyze, discuss, and interpret data; technology to access data; and professional learning to increase data literacy.

- Data literacy skills are modeled and practiced in meetings.
- Data are presented in a way that makes them accessible, including using plain language, visualizations, and explanations of what to do—and what not to do—with the data.

With data literacy, education agencies can engage in a cycle of continuous improvement. SEAs and LEAs can regularly review data to identify areas for growth and implement changes to enhance education practices. Data-literate educators can communicate student progress to parents and other caregivers effectively, fostering a collaborative relationship between home and school. This can lead to better support for students' learning outside the classroom.

Data Conversations

Data conversations play a vital role in fostering data use and literacy. By regularly engaging in discussions centered on data, educators at all levels of the agency—from senior leaders to frontline staff—become comfortable and proficient in analyzing, interpreting, and applying data-informed insights to their work. Data conversations serve as a platform for exchanging ideas, sharing best practices, and collectively identifying strategies for improvement.

Once agency staff have developed and demonstrated confidence and ability in their data literacy skills, they can integrate education data effectively into their conversations with various stakeholders. It is beneficial to equip teachers and staff with a framework that guides them in engaging in dialogue with students, parents, caregivers, and community members. An essential aspect of these data conversations is to provide the "why" behind the data, explaining the purpose and relevance of the data being shared.

Through data conversations, people develop a shared language and understanding of the data, promoting collaboration and data-informed decision-making. They learn how to interpret and communicate the significance of the data, drawing connections between the data and educational strategies. This integration of data into the organization's culture influences day-to-day operations, planning, and educational initiatives, fostering an environment where data are valued, curiosity is encouraged, and evidence-based decision-making becomes the norm. By establishing a regular rhythm of inquiry, reflection, and continuous improvement through data conversations, SEAs and LEAs can cultivate a robust culture of data use and literacy.

Key Considerations to Building Data Literacy

Educators face common challenges as they develop and support data literacy in their agencies. Being aware of these challenges and some of the ways that other SEAs and LEAs have addressed them can help agencies that are earlier in their data literacy journey to build sustainable data literacy efforts.

Establish Trust in Data

Trust and understanding are crucial for supporting the development of data literacy within an agency. Without trust in the data being presented, stakeholders have little motivation to comprehend the data's meaning. To establish trust in data,

- communicate the vision, purpose, and use of data;
- discuss openly the reasons behind data collection efforts;
- promote nonpunitive and nonevaluative data collections and discussions;
- commit to data quality, as poor data quality can undermine trust;
- engage community members in data conversations to foster ownership and ensure that their needs are considered; and
- demonstrate that data lead to meaningful improvements for students by showing stakeholders the tangible actions being taken because of the data.

Incorporate Data Literacy Into Regular Work

Education leaders can foster a work environment that values learning, collaboration, and improvement by creating a nonpunitive setting with open discussions about data. Data-literate leaders support staff to effectively incorporate data into their work by

- emphasizing continuous improvement and progress through actionable steps;
- using diverse data sources to gain a comprehensive understanding of student strengths and areas for growth;
- providing specific examples of how data have improved opportunities and outcomes for students;
- offering training sessions that guide staff on how to interpret and apply data in their specific roles;
- establishing regular data-sharing mechanisms and forums where staff can discuss data-related insights, challenges, and best practices;
- encouraging staff to collaborate with other educators, parents and other caregivers, and students to ensure data-driven decisions align with diverse perspectives and needs; and
- offering ongoing mentorship or coaching to help staff become more comfortable and proficient in data analysis and interpretation.

Prioritize Sustainability

Building sustainable capacity for data literacy is vital, especially when key staff members leave. To minimize disruption, having multiple leaders involved in data management is helpful. Administrators can prioritize data literacy as a core component by modeling these behaviors and expectations, as well as seeking out PLCs, communities of practice, federal technical assistance (TA) centers like the Regional Educational Laboratories (RELs), and existing, affordable courses or trainings that staff could use to build their data literacy skills. SEAs and LEAs would benefit from talking with leaders at other agencies to see how they have increased staff knowledge effectively and to learn about potential funding sources for staff PD.

Increase Data Access Responsibly

Finding the balance between data transparency and data privacy is crucial, particularly when handling sensitive information that potentially could create negative biases or limit perceptions of students (such as medical records, homelessness status, encounters with law enforcement, and poverty status). Safeguarding student privacy and confidentiality is essential. However, maintaining transparency to promote accountability and foster understanding of students' needs also is important. Achieving this balance ensures that

- student data privacy is ensured;
- confidentiality is maintained; and
- students' overall well-being and educational opportunities are safeguarded.

Some stakeholders may not know about or have access to the data, especially parents and other caregivers and community members. It is important to work with data staff and instructional staff to identify the data needs and interests of various stakeholders. Developing a plan for multiple means of communication, including school or district websites, parent-teacher meetings, school board meetings, and various types of media, can increase stakeholder awareness of the data available to them. Agencies may try to achieve a balance when sharing data with internal and external stakeholders, considering how much detail is necessary to provide context without potentially overwhelming recipients with information.

Responding to both one-time and ongoing requests for data is a complex process that requires sensitivity to privacy while trying to maintain transparency. Some key strategies to address this process include the following:

- Data requests that include a clear question are helpful for SEAs and LEAs to determine which data are appropriate to share. Agencies can develop and implement formal data request processes that require the requester to formulate a clear question they are trying to answer with data.
- Agencies may find it useful to implement systems for tracking data requests and data use.
- Data sharing agreements often include a requirement to submit proof of destruction of data when the data are no longer in use.
- Some agencies use online training resources for staff who work with data, including the Forum's Data Ethics Course (https://nces.ed.gov/forum/dataethics_course.asp) and the U.S. Department of Education (ED) Family Educational Rights and Privacy Act (FERPA) training modules, FERPA 101: For Local Education Agencies (https://studentprivacy.ed.gov/training/ferpa-101-local-education-agencies) and FERPA 201: Data Sharing under FERPA (https://studentprivacy.ed.gov/training/ferpa-201-data-sharing-under-ferpa).

Forum Guide to Supporting Data Access for Researchers: A State Education Agency (SEA) Perspective

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 Supporting Data Access for Researchers: A Local Education Agency (LEA) Perspective

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.

SEAs and LEAs vary in their policies and culture around data sharing, including how often requests are granted or declined, as well as what data are posted publicly:

- Some states have public records laws, and agencies have predetermined criteria that define when data should be shared externally, such as parameters around eligible research projects.
- Agencies may take costs and other resources into consideration to determine their capacity for fulfilling requests.
- States may have defined research agendas that help agencies prioritize data requests based on how well they align with the research agenda.

Chapter 3:
Data Literacy by Audience

This chapter provides examples of the data literacy needs of select stakeholder groups, including students, parents and other caregivers, teachers, school and district administrators, policymakers, and community organizations.

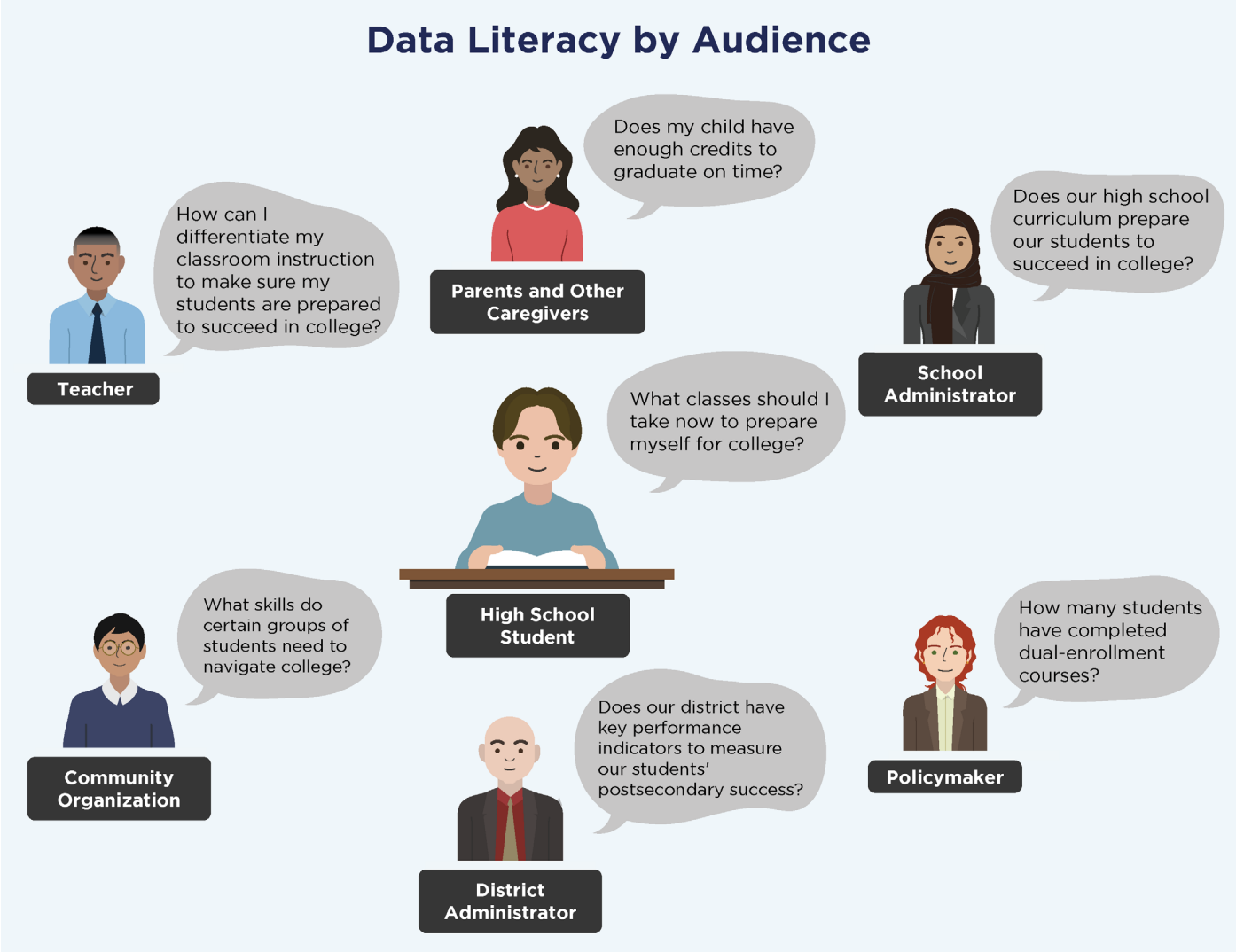

Figure 3. Different education audiences have different data literacy needs

Data Literacy for Students

Students require data literacy skills to effectively interpret and use data related to their academic record and progress, to set realistic goals for their education, to make decisions about their postsecondary pathways, and to become informed citizens. It is important that students can understand their strengths and areas for growth, identify strategies to meet their education goals, and advocate for their education based on data. With the support of educators and counselors, students can become their own data-driven decision-makers. Data literacy can help students actively engage in their learning process, make informed choices, and take ownership of their education journey.

The NCES Kids' Zone (nces.ed.gov/nceskids/about.asp) provides information to help students learn about schools; decide on a college; engage in several games, quizzes, and skill building activities about math, probability, and graphing; and explore interesting facts about education.

National Center for Education Statistics (NCES) Data Help Students, Parents, and Others Make Informed Decisions

NCES publishes data for the public that are easy to access and interpret, providing potentially valuable insights to these key stakeholders to make important decisions about students' futures. For example, Condition of Education (COE) indicators can be shared with high school students to show them

- potential earnings by field of study (https://nces.ed.gov/programs/coe/indicator/sbc/bachelor-degree-holder-outcomes?tid=104);
- their potential costs in tuition and fees by institution type (https://nces.ed.gov/programs/coe/indicator/cua/undergrad-costs?tid=74); and
- their potential loan or debt burden (https://nces.ed.gov/programs/coe/indicator/cub/undergrad-student-loans?tid=74).

NCES also publishes data around openings in teaching positions (https://nces.ed.gov/programs/coe/indicator/tls/elem-sec-teacher-openings?tid=300) in the COE. It is helpful for those considering teaching as a profession to know which subject-matter fields schools are hiring for to inform their decision-making. The COE is updated throughout the year as new data become available and can be accessed at https://nces.ed.gov/programs/coe/.

Additionally, NCES publishes reports on the National Teacher and Principal Survey (NTPS), which asks public and private K-12 schools, principals, and teachers to report on a variety of topics related to their experience in the field, including salary, racial and ethnic demographics, number of classes and students taught, education and training, certifications, working conditions, and school climate, among others. The most recent report can be found at https://nces.ed.gov/pubs2022/2022113.pdf. This survey provides the following contextual information about teachers:

- Regular full-time teachers in public K-12 schools spent an average of 52 hours per week on school-related activities, including 25 hours of paid instruction. Public school teachers were contractually obligated to work an average of 38 hours per week.
- During the 2020-2021 school year, regular full-time teachers in public K-12 schools had a higher average base salary ($61,600) than their equivalent in private schools ($46,400).
- Most public (81-85 percent) and private (84-96 percent) K-12 teachers reported having influence on establishing curriculum, setting performance standards for their students, and determining the content of in-service professional development programs. Additionally, 71 percent of public school teachers and 82 percent of private school teachers reported having influence on setting discipline policy.

These data have the potential to help students and parents and other caregivers to navigate decisions regarding student pathways in the teaching field.

Data Literacy for Parents and Other Caregivers

Parents and other caregivers require data literacy skills to support their child's academic progress effectively. Local education agencies (LEAs) have an important role in supporting parents and other caregivers to have data-informed discussions about their student's education. Developing data literacy skills enables and empowers parents and other caregivers to effectively interpret and understand their child's test reports or report cards, understand the context of the data, and ask relevant questions to their child's teacher. By acquiring these skills, parents and other caregivers can actively engage in their child's education, collaborate with teachers, and make informed decisions based on the data available. Data literacy empowers parents and other caregivers to support their children's learning journeys and ensure that students' education needs are met. Parents and other caregivers could leverage data literacy to provide enrichment, intervention, and other strategies at home that align with their child's learning needs.

> The NCES College Navigator (nces.ed.gov/collegenavigator) is a helpful website for parents and other caregivers, as well as students, to make decisions about their futures. The site enables users to search for colleges by state, degrees offered, tuition, campus setting, acceptance rate, SAT and ACT score requirements, and other factors that are important when selecting a college.

Data Literacy for Teachers

An effective teacher with data literacy skills takes an asset-based approach to examine students' progress and understands the contextual factors that affect academic achievement. Teachers' data literacy needs focus on better understanding their students and creating relevant learning experiences. An equitable approach to data literacy focuses on whole-child data, encompassing diverse data sources that provide a comprehensive view of students. This view includes students' personal histories, data that highlight their strengths and areas for growth, and data around environmental stressors they may be facing, such as homelessness or poverty. Data literacy empowers teachers to make data-informed decisions that optimize learning opportunities for every student.

Data literacy skills for teachers include

- comprehending and interacting with data and analytics;
- understanding how to use data ethically and effectively to inform practices and decision-making processes; and
- effectively communicating findings to achieve clearly stated agency goals.

By using data effectively, teachers gain valuable insights into their students' backgrounds, abilities, and unique circumstances. This understanding allows them to create inclusive and personalized learning environments that address individual needs, fostering academic growth and success. Data literacy equips teachers with the tools and knowledge to leverage data effectively, enabling them to adapt their instructional approaches and provide targeted support to students, ultimately enhancing their educational experiences and outcomes.

Data Literacy for School Administrators

School administrators have specific data literacy needs to fulfill their role in understanding data use and supporting various stakeholders. These needs include being able to interpret aggregated data, gain insights into their school's performance across different contexts, and use these insights to make informed decisions on resource allocation. Data literacy empowers school administrators to identify and address gaps between student groups, ensuring that resources are allocated where most needed, thus fostering more effective and equitable

education. Incorporating data analytics into existing tools, such as student information systems, equips school administrators with the necessary tools and resources to access and use data effectively in decision-making processes. By leveraging these tools, school administrators can extract meaningful insights and translate them into actionable strategies.

Agency staff help teachers understand and use whole-child data. This helps teachers analyze data to identify patterns, trends, and individual needs, allowing them to differentiate instruction and tailor interventions to overcome challenges and support students' strengths.

Data Literacy for District Administrators

To manage a school district effectively, district administrators must understand data to make decisions that affect the district. Data literacy for district administrators is focused on understanding multiple datasets and sources to make informed decisions.

District administrators have a responsibility to

- break down information silos by integrating data into comprehensive data systems;
- ensure that data are readily accessible to address questions and inform decision-making at all levels; and
- present data in a format that the public or members of the media can understand.

District administrators can leverage data literacy to develop key performance indicators to measure district progress and use formative data to make continuous improvement.

Data Literacy for Policymakers

Policymakers have specific data literacy needs to effectively fulfill their roles in shaping education policies and decision-making. For example, understanding important state data is crucial for informed policymaking. Data literacy equips policymakers, such as school board members and legislators, with the skills to navigate and interpret complex data, providing insights into education trends, achievement gaps, and equity issues. With a solid understanding of data, policymakers can make evidence-based decisions, identify areas for improvement, and allocate resources effectively. Proficiency in data analysis and interpretation enables them to advocate for evidence-based policies, support equitable education opportunities, and positively impact students, teachers, and the broader education community.

Data Literacy for Community Organizations

Community organizations promote awareness about data resources that the public can access to identify inequities or areas where community partnerships could make a difference. Community organizations have a unique perspective and can make suggestions to education agencies to help align programs with the needs of the community. Community organizations also can work with LEAs to support students. By building collaborative relationships with education agencies, community organizations can use education data to assess how their programs affect student outcomes and whether those outcomes meet LEA goals.

Data literacy empowers community organizations to analyze and understand data within the context of their specific community needs. They can use this knowledge to advocate for equitable educational opportunities, informed policy decisions, and strategic community initiatives. By building their data literacy skills, community organizations can learn to ask staff at state education agencies (SEAs) and LEAs the right questions to effectively engage with data resources, collaborate with stakeholders, and drive positive educational outcomes and community development.

Community organizations could consider forming advisory groups that work with LEAs to look at student data, advocating for additional resources. Community organizations often have systems and structures in place to secure private funding (in the form of grants or donations) that could be leveraged to serve students. In addition, community organizations could leverage relationships with local businesses to help LEAs understand what skills and knowledge are in high demand among employers.

Chapter 4: Case Studies from State and Local Education Agencies (SEAs and LEAs)

This chapter features case studies from education agencies about how SEAs and LEAs have developed and built the data literacy skills of key stakeholder groups, including the challenges faced, best practices used, and lessons learned.

Georgia Department of Education: Building a Statewide Data Literacy Framework

The Georgia Department of Education (GaDOE) is creating a framework to build capacity as an SEA to increase data literacy among agency staff and LEAs. The proposed data literacy framework (DLF) will address the diversity of data literacy needs and experience levels among Georgia educators and will consist of

- a series of role-based data literacy skill sets for staff;
- a process to support data-informed decision-making; and
- training and technical assistance (TA) resources to support data literacy and data-informed decision-making.

The DLF will be designed in collaboration with SEA and LEA staff with the understanding that data literacy is an ever-evolving skill set and LEA staff need ongoing support to get value out of their data. The DLF also will address high staff turnover by providing new and experienced staff with a common baseline for effective data use. Data literacy expectations, training, and access to tools to support using data to inform decisions will be an integral part of the onboarding and ongoing professional development (PD) of educators in Georgia.

GaDOE is leveraging state funds to hire a full-time coordinator to increase data use and data literacy. The data use coordinator will build the DLF and teach LEA staff how to use the framework to make decisions that impact districts, schools, programs, and students. The data use coordinator will work with internal and external stakeholders across the state to focus on developing the three key components of the DLF:

- determining what is required to be data literate and develop skill sets for data literacy;

The Georgia Department of Education defines data literacy as the ability to leverage data for effective decision-making. Within that definition are two parallel paths:

- For education practitioners and parents and other caregivers, data literacy is being able to look at a broad spectrum of data and incorporate them into decision-making.
- For data experts, data literacy is more technical and includes being able to build products and services that support educators in using data to make decisions.

- developing a data-informed decision-making process; and
- creating and delivering training and TA to LEA staff on all applications, products, and services related to the data literacy skill sets and data-informed decision-making process.

Determine Data Literacy Skill Sets

The first step in GaDOE's DLF is to work with SEA and LEA staff to develop a data literacy skill set to support agency staff to work with education data. Initial meetings with SEA staff in the Policy Division, Accountability Division, and Office of School and District Improvement will help the SEA determine the overall vision for the DLF. SEA staff with knowledge and interest in data literacy will reference preexisting efforts within the field to develop a comprehensive and cohesive vision for how the DLF will be created and implemented.

Once a vision has been established, GaDOE will bring together SEA and LEA staff with a variety of roles in the education system—from data experts whose role is to build data systems, to practitioners such as principals and teachers who use data. This group will work together in ongoing meetings that will feature open-ended and divergent discussions to determine the data literacy skills that various education stakeholders in Georgia need to positively impact students. Some topics this group will explore and standardize for the state include

- a catalog of role-based data literacy skills;
- data quality processes and procedures; and
- how data literacy can help educators focus on adding value to the classroom.

Develop a Data-Informed Decision-Making Process

Supporting the end users' ability to receive insights from the data is as important as building the framework. The second step in GaDOE's DLF is to outline a data-informed decision-making (DIDM) process that can be used alongside the data literacy skill set. Data literacy skills are a prerequisite to making data-informed decisions successfully. The DIDM process will enable educators to apply their data literacy skills to make decisions that directly impact student success. The goal is to incorporate the DIDM process across all program areas at the agency and to support adoption among interested LEAs. Standardizing how SEA and LEA staff talk about data creates consistency in how educators from different departments and fields (for example, from school accountability to school nutrition) implement the DIDM process.

Provide Training and Technical Assistance

The third step in GaDOE's DLF is to provide ongoing training and TA to help staff and educators understand and use the data literacy skill sets, the DIDM process, and any tools or resources that are developed to support the DIDM process.

A central aspect of the training program will be providing micro-courses and learning paths designed for targeted SEA and LEA roles. These professional learning opportunities would be housed on the GaDOE learning management system that provides courses to Georgia educators. Separate micro-courses will train educators on the content of the DLF and how to use it to make data-informed decisions. Training videos will include key staff from various positions throughout GaDOE explaining how they use and implement the framework in their work.

In addition to the micro-courses, GaDOE will have staff train educators to use data dashboards and applications that already exist or will be developed in response to the DLF.

Key Considerations

As the SEA builds out the DLF, it is considering the impact of the growth of artificial intelligence (AI) data products in education. Part of the development of GaDOE's DLF will be to figure out

how to adapt the DLF responsibly to the changing landscape of tools and systems for accessing and using data. AI in education may influence the data literacy skills and PD needs of staff. For example, AI could impact how educators use data and the extent to which educators need to understand how to manipulate or interpret the data versus develop literacy around potential AI products they will interface with to understand and use data. AI may introduce a shift in the way agencies engage with data—for example, from staff entering data into a spreadsheet, to having them write queries through natural language to make meaning out of data.

Another key consideration for GaDOE is that education practitioners need practical and immediately applicable skills when working with education data. Rather than concentrating on the minute technical aspects of working with data, GaDOE will focus training on what is most helpful to educators—the data products and skills that will help them in meaningful ways in their day-to-day work with students.

An important step in ensuring that the DLF meets educators' needs for practical and applicable skills is to involve LEA staff at the outset. GaDOE is making it a priority to develop and implement the DLF in partnership with districts to build capacity. This will help instill in LEAs a sense of ownership that they are contributing to this communal effort, lessening the perception that the DLF is a new mandate from the state. The beginning phases of building the DLF will require meaningful partnerships and key relationships with staff at different levels across the state. Furthermore, GaDOE will allow larger districts that have their own framework to opt out of the state framework. GaDOE's mission is to ensure that every educator in Georgia has the supports needed to leverage data to make meaning. If a district has made those supports available already, it will not be required to use the GaDOE DLF.

Conclusion

GaDOE's development of the DLF will ensure that the current and future needs of educators throughout the state are met by keeping in mind the potential impact of AI, the practical and immediate needs of practitioners, and the importance of SEA-LEA partnerships. The DLF will address the LEA staff need for ongoing support to get value out of their data, providing new and experienced staff with a common baseline and expectations for using data to make decisions. Through the DLF, data literacy expectations, training, and access to tools to support using data to inform decisions will become integral parts of the onboarding and ongoing PD of educators in Georgia.

Loudoun County Public Schools (VA): Data Literacy for Data-Informed Decision-Making

Loudoun County Public Schools (VA) (LCPS), located in the greater Washington, D.C., metropolitan area, has established a multifaceted approach to enhance data literacy across groups of stakeholders that involves robust data governance, incorporating data discussions into all levels of the agency, and creating user-friendly data visualizations. By promoting data literacy at all levels of the agency and ensuring access to timely, well-defined data that are presented clearly, LCPS is empowering stakeholders to make informed decisions that positively impact student learning and educational outcomes.

> Loudoun County Public Schools (VA) (LCPS) defines data governance as the systems, policies, and procedures that an organization follows to manage the access and availability of data assets.
>
> LCPS defines data literacy as the ability to access, understand, and communicate with data to make better decisions.
>
> In LCPS, sound data governance and clear data visualizations are the foundation for fostering data literacy.

LCPS's data literacy efforts are rooted in an ongoing commitment to continuous quality improvements that enhance the educational experience of all students. LCPS has a wealth of data from various sources and expects teachers, school administrators, and district administrators to use data to support student learning, justify school initiatives, assess program effectiveness, and inform budgeting and staffing decisions. The foundational understanding that "data are only as powerful as what we do with them" drives LCPS to increase data literacy. LCPS emphasizes that data literacy extends beyond understanding assessment scores; it is about comprehending the actions that can be taken to support student progress.

LCPS focuses on improving stakeholder data literacy in the context of using data to support educator actions. For example, LCPS has offered workshops on interpreting specific data tied to student assessments: the Multi-Tiered System of Supports (MTSS) team provides training on analyzing data points to identify suitable tiered supports for students, and the research office offers specialized guidance on comprehending climate survey data. Additionally, efforts are made to enhance knowledge, access, and skills in using the tools through instructional videos and step-by-step guides.

Data Governance

Data governance is pivotal in enhancing data literacy at LCPS by establishing a strong foundation for data management and understanding. LCPS's data governance framework includes developing a data dictionary, cataloging data sources, and standardizing data definitions. Before these efforts, data were received from various sources with differing measurements, which created confusion around how to interpret and use data, negatively impacting the development of data literacy. Without agreed-upon definitions, even seemingly straightforward questions, such as determining the number of teachers in an educational institution, took time. Data governance guides how to define this question's parameters—do teachers include budgeted employees, part-time employees, licensed and certified teachers, or only some of these groups? LCPS found that clarifying who is included in the definition of a teacher is essential. Well-defined data eliminate ambiguity and provide clear parameters for analysis and decision-making.

By developing consensus on data definitions, meticulously identifying data sources, and determining reporting timeframes, LCPS has streamlined multiple data sources into a single analytical source. LCPS has a wealth of student, school, and district performance data. With improved data governance, LCPS fosters a culture in which stakeholders can differentiate effectively between various datasets. For example, educators may access Virginia Standards of Learning assessment scores in the division's Integrated Assessment Dashboard and consider those scores relative to other student demographic information and assessment scores, ultimately boosting data literacy across the organization. Improved data governance structures enable LCPS to increase data literacy by expanding the focus on data collection to include data analysis and reporting.

The data governance team ensures that data are timely, accurate, and well defined, enabling effective planning, resource allocation, and interventions that positively impact students' educational experiences and outcomes and improve district operations. In addition, stakeholders have access to data that have been vetted and verified thoroughly, ensuring that those data provide a reliable basis for decision-making. The emphasis is on making data not only accessible but also comprehensible.

Data Discussions

LCPS has created structures and systems for educators to engage in conversations around student data. These data discussions are tied to specific student assessments and engage teachers and administrators in using data to make informed decisions.

A **universal screener** is an assessment tool administered uniformly to all students to evaluate the performance and abilities of students within a particular group, such as a school, grade level, or district. They are designed to provide educators with a broad overview of student performance across various areas, such as reading, mathematics, and language skills. The results of the universal screener help educators identify students who may be struggling academically or who may benefit from further assessment or intervention.

LCPS presents streamlined data to teachers through an integrated assessment dashboard and offers opportunities for them to dive deep into the data during data conversations that are structured around action. Data dialogues happen in a regular and frequent cadence, with in-depth conversations following the LCPS universal screening schedule and ongoing conversations continuing during existing teacher collaboration times. The universal screener is an assessment tool administered to students at the school year's beginning, middle, and end. Teachers use the results of those screenings to have structured conversations around student needs.

LCPS offers PD and technical support to teachers specific to interpreting the universal screener results—ensuring that teachers understand the difference between a percentage and a percentile, for example—and enables them to act to improve student outcomes. After teachers analyze the data, they shift their discussions to focus on a decision tree related to LCPS's MTSS for students in a lower percentile. Those students then take a diagnostic assessment to determine the appropriate actions teachers and school support staff can take to support students. Data literacy enables teachers to understand that a student falling behind will need more than average growth to catch up, influencing educators' actions to help that student progress academically.

Percentage Versus Percentile

A percentage represents a quantity out of 100. A percentile displays position or rank.

For example, if a student scores 90 percent on a math test, that means they got 90 out of 100 possible points. If a student places in the 90th percentile for math within their district, that means they perform higher on math tests than 90 percent of their peers.

In addition to structured data conversations around the universal screener, LCPS developed professional learning communities (PLCs) and collaborative learning teams (CLTs) in each school that engage in weekly data dialogues. These PLCs and CLTs are nonhierarchical teams of educators that have varying perspectives, an approach that fosters collaboration and encourages diverse insights. Bringing a range of people, including teachers and subject matter experts (SMEs), to data discussions helps to move the process forward and ensure a holistic approach to decision-making and allocating resources.

Cyclical data dialogues that follow the universal screener schedule often are facilitated by division-level facilitators and include the following structured process:

1. **Activate**: Set aside dedicated time to look at the data.
2. **Engage**: Note any assumptions but avoid conclusions.
3. **Analyze**: Look at the facts of what the data are saying but avoid answering questions.
4. **Infer**: Begin to draw conclusions from the data.
5. **Hypothesize**: Devise actionable strategies to impact student outcomes.

Structured data conversations have enabled LCPS to break down data silos, increase transparency in discussions, and facilitate the exchange of ideas. As a result, LCPS has seen a more consistent, collaborative, and informed approach to using data, ultimately leading to more informed decision-making processes and increased data literacy among educators.

Data Visualizations

LCPS enhances data literacy among its stakeholders by incorporating data literacy and storytelling principles into all presentations and visualizations. Recognizing the need to communicate complex data effectively to audiences with varying levels of data knowledge, LCPS prioritizes clarity and accessibility in its visualizations. One key strategy involves using driving questions within data visualizations, designed strategically to guide the viewer's interpretation of the data and encourage them to think critically about its significance. For example, in a data visualization about student performance, a driving question could be: "What factors are contributing to the improvement in math scores among elementary school students?" This question encourages viewers to explore the data to identify factors such as teaching methods, student demographics, or curriculum changes that may explain the trend.

Best Practices

The impact of LCPS's data literacy efforts is evident in improved data-related discussions and increased use of data. LCPS has identified the following best practices for increasing data literacy among various stakeholders.

Defining Role-Differentiated Data Literacy Expectations. LCPS has distinct expectations for data literacy tailored to the different roles of staff, including the following:

- Data owners, experts in their respective domains, are expected to formulate business rules and establish definitions governing data use. Data owners make decisions regarding access, management, and the appropriate use of data.
- Decision-makers, including school and district leaders, are expected to use data to make decisions about resource allocations. Support staff are granted access to raw data to facilitate their responsibilities.
- Data operators handle data input and are expected to resolve data discrepancies and enter data in a timely manner to support operations.
- Consumers, including educators, administrators, and staff, are pivotal in extracting meaning from data and implementing informed actions.

This differentiation in data literacy expectations based on staff roles helps ensure that everyone in the organization can contribute effectively to data-driven decision-making. School and district administrators are expected to use data to justify school/district initiatives and support budgeting, staffing, and assessing program effectiveness.

Emphasizing Collaboration and Curiosity. LCPS has found that fostering collaboration and curiosity is vital to success. Nonhierarchical teams are formed to provide diverse perspectives, including SMEs invited to meetings, not just directors. A governance team spanning all organizational levels eliminates silos, facilitating sharing of insights and knowledge.

Documenting Conversations and Decisions. Documenting conversations and decisions related to data work is essential. This practice adds visibility to the data process, fosters a shared understanding, and serves as a reference point for ongoing work. Continued documentation provides a baseline for future discussions.

Meeting Stakeholders at Their Data Literacy Level. Recognizing that although data staff interact with data regularly, many consumers may not share the same familiarity, which drives

LCPS to create intuitive and user-friendly visualizations. Meeting stakeholders at their respective data literacy levels ensures that data are approachable and meaningful to all.

Conclusion

LCPS has undertaken a comprehensive and multifaceted approach to enhance data literacy across its educational landscape. Through robust data governance practices, inclusive data discussions at all organizational levels, and the creation of accessible data visualizations, LCPS has empowered its stakeholders to make informed decisions that positively impact student learning and educational outcomes. LCPS's commitment to continuous quality improvement and emphasis on clarity, collaboration, and curiosity have transformed data into a powerful tool for educators and administrators.

Meriden Board of Education (CT): Leveraging Data Literacy to Consider Diverse Datasets

Meriden Board of Education (MBE) in Connecticut has developed a data collection and use infrastructure to help educators use reliable whole-child data[21] alongside traditional student success metrics to inform decisions around supporting students. MBE has developed student surveys that collect whole-child data, including student interests in and out of school, information about personal backgrounds, and motivations to learn different academic subjects. To support educators in interpreting and using student survey results, MBE offers several tools to increase data literacy around the measures. Through these efforts, MBE staff have learned to use multiple and diverse data to foster an educational experience that considers the holistic well-being of students and the impact that has on student behavior and achievement.

An important component of data literacy is being able to situate data within a larger context, which can help educators use data to design interventions that suit the unique needs of individual students, cohorts, and student subgroups. Contextual factors (for example, students' access to housing, belief in their ability to learn, or personal interests) impact students' academic achievement and social well-being. However, stakeholders sometimes prioritize data collections related to student discipline (for example, the number and types of suspension incidents), attendance, and academic achievement (for example, test scores). Although these metrics are of central concern for school districts, they do not provide the full context of student performance or behavior. To provide a fuller context of students' experiences, MBE developed measures and a robust data system to collect, analyze, and use whole-child data that could illuminate root causes of student behavior and barriers to learning. Including these additional data points, such as health, family, and environment outside of school, for example, has the potential to illustrate more information about a student's capabilities and challenges than traditional student outcome metrics alone.

Whole School, Whole Community, Whole Child (WSCC)

https://portal.ct.gov/SDE/WSCC/Whole-School-Whole-Community-Whole-Child

The Connecticut State Department of Education follows the Whole School, Whole Community, Whole Child (WSCC) approach developed by the Centers for Disease Control and Prevention (CDC) and Association for Supervision and Curriculum Development (ASCD). The sectors of education, public health, and school health often serve the same children in the same settings (at school, for example). The CDC and ASCD have worked from two previous resources to develop a model "to engage students, family, staff, and the community-at-large to improve the cognitive, physical, social, and emotional development of every child."

21 Connecticut State Department of Education. (n.d.) *Whole School, Whole Community, Whole Child*. Connecticut's Official State Website. Retrieved May 1, 2024, from https://portal.ct.gov/SDE/WSCC/Whole-School-Whole-Community-Whole-Child.

MBE Student Surveys

MBE's whole-child data efforts are focused around using results from two student surveys to develop targeted strategies that address specific challenges students face, many of which are external to the school system:

1. Getting to Know You (GTKY) survey, and
2. MBE's school climate survey for students (SCSS).[22]

The GTKY survey asks students what they like to do outside of school, how they feel about specific school subjects (math, reading, social studies, and science), how much effort they contribute to their academics, their general interest in school, and their motivation to learn different and rigorous coursework. The survey answers help teachers

- develop positive teacher-student relationships based on student interests;
- identify disengaged students by subject area before the school year begins; and
- produce diagnostic student-engagement reports to promote discussions about classroom practices and guide interventions.

The SCSS identifies social-emotional barriers that could affect a student's ability and motivation to learn, as indicated by nine factor-based scales. A higher scale score represents a more positive adjustment to school, while a lower scale score could indicate that the student is experiencing a barrier that may interfere with their school success. These scales are leading indicators that can help educators mitigate future academic achievement and behavioral issues. The survey includes automated reports designed to help staff intervene with students who experience identified barriers.

These surveys are administered in the fall (SCSS) and spring (GTKY) of each school year to students in grades 4 to 12. Annual data collections allow MBE staff to monitor changes in students' perceptions of school climate, well-being, and subject engagement, among others, adding to the fuller picture of student progress and analysis regarding the success of targeted interventions.

Increasing Data Literacy to Use Whole-Child Data

Before each school year, MBE provides teachers with interactive reports designed to make the survey data easy to understand, increasing educators' ability to use the data to help students. Teachers access the GTKY survey through an online portal of classroom resources designed, in part, to increase data literacy among MBE educators. A welcome page explains survey metrics: Higher scales mean a student is engaged, and a lower scale means the student is disengaged. The welcome page also provides context for teachers, as well as guidance that these data are not meant to set teacher expectations of student behavior, motivation, or academic performance; rather, teachers should use the data to inform support for individual students, including differentiating lessons to further student success.

In reviewing survey results, numeric scales are transformed into text in reports to make it easier for educators to interpret. In addition, each component of the SCSS has a link that provides definitions of each scale measurement. Selected staff also can drill down into individual student survey responses by clicking on their individual scores. The SCSS also includes automated reports designed to help staff intervene with students who experience identified barriers. By offering these supports, MBE is increasing teacher data literacy, enabling teachers to use the survey measures to discuss school and classroom practices and their effects on students.

22 Gage, N. A., Larson, A., Sugai, G., & Chafouleas, S. M. (2016). "Student Perceptions of School Climate as Predictors of Office Discipline Referrals." *American Educational Research Journal*, *53*(3): 492-515. Retrieved January 1, 2024, from https://doi.org/10.3102/0002831216637349.

These survey data also are available to teachers and administrators in MBE's electronic office referral system for disruptive student behavior. When a teacher submits a behavior referral, the online form includes the student's name, a field for describing the disruptive behavior, and a "student info" button that links to information about the student. This information includes any previous office referrals for that student and the student's responses to the SCSS and the GTKY surveys.

Data from these two surveys offer more information about a student's interests, struggles, and strengths than traditional metrics. MBE staff can use these data to make connections, for example, between a student struggling to focus during math class (as reported by teacher observation), their lack of motivation to learn math (as reported by MBE whole-child data collections), and low math test scores (as reported by traditional metrics). When reviewing an office referral form, a school principal can use data from the two surveys to better understand the context of a student's behavior before deciding on disciplinary action.

The student surveys also provide information about student cohorts. For example, one cohort of fourth-grade students reported overall confidence in their math ability and a belief that math was important, which was reflected in the cohort's math test scores. However, by seventh grade, this same student cohort reported that they disliked math, which showed up in math class as decreased engagement, achievement, and, in some cases, an increase in classroom disruptions. Whole-child data measures were examined alongside traditional achievement measures, which helped to inform MBE's decision to provide targeted interventions to support student motivation alongside traditional tutoring supports.

Conclusion

Expanding the types of data collected about students and investing in data literacy for educators can help teachers, administrators, and policymakers better understand student needs. Data about student interests, family circumstances, and attitudes toward school may help inform educators and administrators about the potential underlying causes of student behavior and performance, allowing for more effective interventions and support systems. Understanding a student's interests, struggles, and personal experiences allows educators to design targeted strategies for improvement, fostering a more positive school experience.

MBE staff can situate diverse datasets within the context of a student's unique circumstances to draw connections between student behavior, motivation, and academic performance, using both whole-child data and traditional metrics. MBE's interactive survey reports and user-friendly interfaces facilitate the interpretation of student survey data, making it accessible for teachers to use in their classrooms. The transformation of numeric scales into text and the inclusion of scale definitions enhance educators' ability to understand and use these data in the decision-making process. This level of data literacy has allowed MBE staff to tailor interventions to meet the unique needs of students.

Pasco County Schools (FL): Building High School Students' Data Literacy Skills

Pasco County Schools (FL) (PCS) has been promoting a culture of data use, data literacy, and data-informed decision-making for several years. As far back as 2002, PCS has had MTSS specialists collaborate with school staff to understand student data and make instructional decisions. At the district level, PCS communicates a shared vision of what questions need to be answered with the data and the specific data that need to be collected to answer those questions. The district's instructional team of about 100 people regularly holds calibration meetings, during which staff intentionally examine datasets and reports, identify relevant data, and learn how to use data to make decisions. The instructional team primarily reviews academic data and subject-based assessment data to understand where students are and inform changes

to curricula and instruction. The team also may review behavioral and nonacademic data, when relevant and available.

In addition to these efforts, PCS has several extracurricular opportunities to help students build their data literacy skills. The You+Lead[23] program brought students and school leaders together to improve schools through a youth-led research project. In addition to this program, a small group of students participate in the PCS's District Vision and Success Plan[24] committee meetings to discuss the progress of the district in meeting the goals of the success plan. PCS values what students bring to the conversation regarding their education, as student voice helps push educators and ground leaders in preparing students to succeed.

You+Lead Program

PCS was part of a pilot program by Impact Florida, a nonprofit organization that focuses on supporting education leaders and teachers with the knowledge and resources they need to ensure that excellent teaching and learning is realized consistently in all Florida schools.[25] The pilot program sought to bring students and education leaders together to improve schools through a program called You+Lead. This model of student engagement aims to build youth agency and voice, with the added potential to increase data literacy among students. You+Lead differs from other student engagement models in that it equips students to lead a structured process under the guidance of a teacher to provide data-driven, representative feedback to school leaders about the challenges students are facing. In this process, students

- learn research methods;
- gather data and feedback from their peers around a self-selected research question;
- build their capacity to collect and analyze data on school climate and culture; and
- present their findings to school and district leaders.

The primary goals of the program are to engage a diverse group of students and improve schools, with an additional outcome of increasing students' abilities to collect, analyze, and present data for the purpose of creating positive change in their schools.

PCS and another district in the state each piloted the You+Lead program in two of their high schools during the 2022-2023 school year. Planning for the project started in spring 2022, when district leaders chose two schools that exhibited grassroots momentum for change within the school community. District leaders worked with the school principals to ensure that they were

- committed to the process;
- receptive to taking action to address changes that may be identified by the students; and
- willing to support the teacher and students in taking time out of regular instruction to work on their research.

Principals and leaders picked a teacher in each school with a background in research and data analysis to serve as a faculty youth advisor and guide students through the process. The faculty youth advisors received training over the summer to prepare them to facilitate the program and a stipend for their time. District-level staff, including a program lead, support staff, and an evaluator, supported the faculty youth advisors.

Student recruitment began in fall 2022 and targeted students who were marginalized, disengaged, or struggling academically. School leaders provided information on the program to generate interest among the student body and find students who were interested in the

23 Impact Florida. (n.d.). *You+Lead Cadre*. Retrieved June 30, 2023, from https://impactfl.org/you-lead-cadre/.
24 Pasco County Schools. (n.d.). *Pasco County Schools Success Plan*. Retrieved June 30, 2023, from https://www.pasco.k12.fl.us/comm/page/success_plan.
25 Impact Florida. (n.d.). *What we do*. Retrieved June 30, 2023, from https://impactfl.org/.

opportunity to make a change in their school. About 30 PCS students across the two schools were recruited at the start of the program; however, participation dropped over the school year.

Throughout the school year, staff met regularly to discuss the progress of the program and strategies for supporting and engaging students. Participating students worked on their research one to three times per month during their faculty youth advisors' planning time. In addition to regular meetings, there were four full-day program sessions. Two of these full-day sessions brought students from both PCS high schools together, and the other two sessions brought together participating students from all four high schools across the two districts. During the first three full-day sessions, students had an opportunity to dive deep into their research. In the final session, the students presented their findings to the other three schools. The program culminated in students presenting their findings to their own principal and district leaders, with one school presenting to the faculty and the other presenting to the District Vision and Success Plan Committee.

As of 2023, PCS is working with Impact Florida to evaluate the success of the program and decide if it is feasible and desirable to run the program in upcoming school years. While data literacy was not the primary motivator of this program, PCS leaders have found that participating students learned critical data literacy concepts, including the following:

- You+Lead participants learned how to collaboratively develop a research question that is important to them and come up with a plan to answer that question using data.
- Students learned about different sources and types of data, as well as how to select the appropriate data to answer their research questions. For example, they explored the difference between survey data, demographic data, and attendance data.
- Participants learned about representativeness and sample size. For example, one of the student groups only received three responses to its initial survey. Those students had to consider whether such a small response could be considered a representative sample of the student body and how to interpret the results. They concluded that three opinions did not represent the entire student body. Participants decided to use two secondary data sources, which were surveys of the student body with similar types of questions. From these combined data survey responses, student researchers identified trends in the data to answer their research question.
- Participants gained a better understanding of how to interpret data as a consumer, and learned to be more critical and discerning about data that are shared with them.

District Vision and Success Plan Committee

PCS's District Vision and Success plan serves as the district's strategic plan and is organized around four success pillars, each of which is supported by specific projects, programs, and performance metrics. Those pillars include student achievement, staff success, value to taxpayers, and community connections. The District Vision and Success Plan Committee has a variety of stakeholders who help define and monitor the projects, programs, and performance metrics that support the four pillars. The committee is composed of about 50 people, including school board members, teachers, administrators, parents, business and community leaders, and high school students.

The committee meets three times a year and includes time for analyses of annual, quarterly, and semester performance metrics for each of the four success pillars. The committee discusses these data in small groups, which provides all committee members—including students—an opportunity to use and build their data literacy skills. In addition to reviewing metrics around each pillar, presenters use data to explore a specific legislative or policy issue

in depth. Because committee members review school- or district-level student data during these meetings, they often look to the student members of the committee for insight into what the data represent in practice.

The committee has shown a commitment to uplifting the voices of students by hosting a student panel at one of the three annual meetings, which can lead to concrete action to improve students' experiences. For example, at one meeting students expressed concerns that traffic around the school made it difficult to get to school on time. Hearing the students' concerns, a fellow committee member called the transportation department, and in the following months, the department began planning construction to implement changes that would correct the traffic issues.

Lessons Learned and Looking Ahead

Student participation in the You+Lead program and the District Vision and Success Plan Committee supports PCS's long-term goal for students to take ownership of their education data and be active participants in their learning. These extracurricular opportunities also have expanded the reach of the district's efforts to increase students' data literacy skills. PCS leaders found that the You+Lead program is a more accessible hands-on learning experience for students to engage in research activities and interpret data than traditional classroom learning of research methods. Looking ahead, PCS is aiming for all teachers to feel comfortable with data so that they can build their students' data literacy skills.

Puerto Rico Department of Education: Developing Data Literacy Through a Culture of Data Use

Education in Puerto Rico has faced several major disruptions in recent years. Hurricane Maria in 2017, seismic events in January 2020, and the COVID-19 pandemic underscored the need for innovative approaches to enhance academic achievement. Responding to these challenges, the Puerto Rico Department of Education (PRDE) has prioritized the implementation of data-driven approaches and the promotion of data literacy.

The Puerto Rico Department of Education (PRDE) launched two significant documents during the 2021-2022 school year.

The **Strategic Plan 2021-2026** outlines how educators will implement strategies to improve the academic performance of students. The use of data for decision-making is highlighted as a key strategy for enhancing academic achievement.

The **Academic Recovery Plan** serves as a framework for developing action plans, projects, initiatives, and interventions aimed at the academic recovery of all students in Puerto Rico. A goal of this plan is to establish a data collection and analysis process to inform the development of action plans for each identified subgroup of students.

The Puerto Rico Department of Education's (PRDE's) strategic plan defines data literacy as the ability to understand, analyze, interpret, and effectively use data within the education context.

In this context, PRDE teachers aim to address the distinct needs of individual students and use data to adjust education practices to better meet those needs.

PRDE embarked on a comprehensive strategy, starting with measuring through surveys the existing data literacy levels for school administrators and teachers. PRDE has implemented data use training programs, workshops, and educational resources to empower staff with crucial data literacy skills, covering topics such as data analysis, visualization, and statistical analysis. PRDE has fostered a culture valuing data-driven decision-making, emphasizing seamless integration of data into daily work processes.

Regional Educational Offices

PRDE is divided into seven regional educational offices (REOs), each of which oversees its region's schools. The REOs are responsible for the collection, analysis, and use of education data; and developing, coordinating, and delivering data training to the schools in the region.

PRDE oversees the data literacy efforts of the REOs through seminars, conferences, and monthly planning meetings. These meetings take place in person and virtually to ensure the widest possible participation of teachers and parents across the island. PRDE's Assessment and Measurement Unit (AMU) supports the REOs by

- maintaining a public-facing web page with guides and information for parents and other stakeholders;
- ensuring the clarity and accessibility of reported data; and
- developing work plans for each region that are tailored to their specific goals.

The following are links to resources that highlight successes of the partnership between Regional Educational Laboratory-Northeast and Islands (REL-NEI) and the Puerto Rico Department of Education (PRDE):

- Puerto Rico Research Partnership to Promote the Use of Education Data: https://ies.ed.gov/ncee/edlabs/regions/northeast/EducationData
- Data Coaching in Puerto Rico: Reflecting on and Celebrating the Work: https://ies.ed.gov/ncee/rel/Products/Region/northeast/Blog/100345
- Partnership Project Supports New Data Coaches in Puerto Rico: https://ies.ed.gov/ncee/rel/Products/Region/northeast/Blog/50180

Data Coaches

In 2017, PRDE took a pivotal step in boosting data literacy by establishing data coaches through the Data Working for Students initiative (DaTE), in collaboration with the Regional Educational Laboratory–Northeast and Islands (REL-NEI). DaTE aimed to guide educators to use data to inform classroom practice and improve student outcomes by distributing data responsibilities, providing training, and implementing technology use. Data coaches and academic facilitators collaborated with school directors to gather and analyze data, creating short-term and long-term plans to address specific school needs.

DaTE began with identifying 15 schools with low academic performance and training 15 teachers as data coaches to support these schools. In the second phase, two teachers from each identified school volunteered and received training in data use, differentiated instruction, and the utility of data walls to improve students' areas of need. Each education region established a dedicated data team supporting teaching practices in data use.

Data Walls

Data walls can encourage a shared sense of purpose within schools and among teachers and staff. A low-tech solution to data sharing, a data wall is a repository (typically a whiteboard or similar surface) that features student achievement and progress data in a secure location that is accessible only by school staff. Anonymized as necessary, these student data are posted at the school level, as opposed to by grade or classroom. Teachers and staff can observe these schoolwide student data and prepare to raise and address data questions and conclusions at regular meetings.

By considering student data as a whole body rather than on a class-by-class basis, educators can gain a shared sense of ownership and responsibility for the performance of the entire school. The growth and development of any student becomes a positive outcome to be celebrated by all, building morale and motivation to support the achievements of more students.

PRDE facilitated training for school principals and communities on data collection, analysis, and use, emphasizing the use of data platforms. AMU's introduction of the *Guide for the Effective Use of Data* renewed the initiative, incorporating strategies like the data walls. Effective dialogues, a structured data research cycle, and the development of support tools, including priority standards and analysis templates, further supported teachers in making data-driven decisions. This comprehensive approach empowered education communities and fostered a data-driven culture.

Data Teams

PRDE established data teams at the SEA level to further promote a culture of data use and data-based decision-making. Data teams are composed of education leaders who guide regional and school-based data users through the collaborative data inquiry process for continuous improvement. PRDE data teams engage LEAs in interpreting and responding to data, aiming to enhance the learning outcomes of all students. At the regional level, data teams build capacity for academic facilitators in effective data use and developing action plans based on data. At the school level, data teams support educators by

- ensuring school leaders make relevant data accessible to educators;
- facilitating data interpretation for instructional changes; and
- involving teachers in the data inquiry cycle to ensure effective, standards-based, objective-oriented, and results-focused student learning instruction.

Successes

As of 2023, PRDE has implemented a system of 239 regional data coaches and 238 data teams across several regions in Puerto Rico, including Arecibo, Caguas, Humacao, Ponce, and San Juan. Data coaches and data teams ensure that educators have access to support and guidance to use data effectively to inform instructional strategies, identify areas for improvement, and tailor interventions to meet the diverse needs of students. Data coaches and data teams are instrumental in fostering a culture of data-driven decision-making across Puerto Rico's education system.

Beyond being collected, analyzed, and presented, data can yield the most positive results when educators share and discuss their data with one another. High-quality data and data sharing are paramount to Puerto Rico's data literacy efforts. Continuous monitoring of individuals' progress, coupled with constructive feedback, played a crucial role in skill development. PRDE celebrated significant milestones in data literacy, serving as motivation for others to enhance their skills. Sharing success stories and case studies illustrated the tangible benefits of an improved data literacy culture.

The 2021–22 standardized test results demonstrated improvements in student achievement and overall school success. PRDE responded to ongoing transformations, with regions sharing achievements positively influencing others and acting as mutual learning resources and support centers to facilitate the replication of successful practices. The achievements of high-performing regions—such as the Caguas region, a top performer that introduced data teams in all schools—become shared triumphs, with steps and practices available for other regions to replicate.

Promoting data literacy within school communities has generated interest among principals, teachers, and regional data personnel. Strategies based on data team dialogues and analyses are developed within schools. The regional data team and the AMU actively contribute to academic program orientations, visits, and meetings at the school level. There is noticeable inclusivity in using data platforms and growing interest in accessing, managing, and comprehending data and understanding its impact on the community.

Summary

PRDE has navigated numerous challenges in the education landscape, responding with a strategic focus on data-driven approaches and the promotion of data literacy. Through a comprehensive strategy, PRDE assessed existing data literacy levels, implemented training programs, and fostered a culture valuing data-driven decision-making. The establishment of data coaches and data teams through DaTE helped to cultivate a robust culture of data use across the island at the regional and school levels. PRDE helped motivate all regions to use data to inform education decisions by sharing successes among regions. The ongoing commitment to data literacy, mutual learning among regions, and support centers has facilitated the replication of successful practices, contributing to improved academic achievement across Puerto Rico.

Rhode Island Department of Elementary and Secondary Education: Building Data Literacy Around School Report Card Data

The Rhode Island Department of Elementary and Secondary Education (RIDE) redesigned its school report card web page and provides TA to LEAs to interpret and act on these data, fostering data literacy among Rhode Island's education stakeholders. The SEA set out to make it easier for stakeholders to interpret and use school report card data to make data-informed decisions for the benefit of students. Supported by a request from the governor's office to make the school report card website easier to navigate and understand, RIDE implemented a collaborative approach to create a data dashboard that made the school report card website landing page more user-friendly. The new landing page allows educators, parents and other caregivers, and policymakers an accessible way to comprehend complex data more effectively.

Alongside these efforts, RIDE developed an extensive TA initiative to further enhance user understanding of the school report cards. These efforts have increased data literacy at LEAs by providing in-depth explanations of report card data that is specific to each school.

Creating a User-Friendly School Report Card Landing Page

RIDE's project team of 10 agency staff engaged LEAs, community groups, and parent groups for 2 years to prepare the original school report card design for a 2018 launch in alignment with accountability measures under the Every Student Succeeds Act (ESSA). The goal of the school report card was to make it easier for students, educators, and families to get information about their school's performance. In fall 2022, RIDE responded to a request from the governor's office to simplify the school report card landing page. The updated school report card website is compliant with the rules and regulations set forth by the state for reporting school accountability data and is aligned with the state's expectations for transparency and accountability in education.

The following are links to specific sections of the report card website:

- Rhode Island Department of Elementary and Secondary Education (RIDE) report card landing page: https://reportcard.ride.ri.gov/
- Overview for students and families: https://ride.ri.gov/students-families/ri-public-schools/school-district-report-cards
- Report card user guide: https://ride.ri.gov/sites/g/files/xkgbur806/files/Portals/0/Uploads/Documents/Information-and-Accountability-User-Friendly-Data/Accountability/Accountability-for-parents_FINAL.pdf

Implementing results from usability testing and stakeholder feedback, the project team redesigned the school report card website landing page to include the following improvements and updates:

- A more streamlined layout with clearer visualizations and easier-to-read data points and statistics.

- Making graph formats and design elements consistent created a unified visual language, making it easier for users to compare and interpret data across different schools and districts.
- Standardizing colors used in data visualizations increased accessibility for all users, including those with color blindness or visual impairments.

- A data dashboard that displays key data points that matter most to stakeholders, such as student performance, school-level spending, and accountability. An important feature of the dashboard is how users can click on the high-level data points to access more detailed information and visualizations.

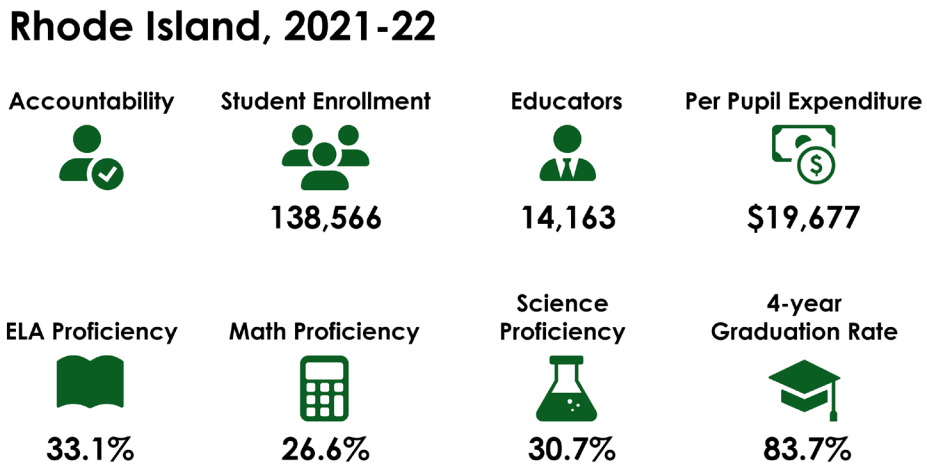

Figure 4. The main dashboard for the Rhode Island Report Card displays high level statistics in several areas.

Source: Rhode Island Department of Education. (n.d.). *Rhode Island 2021-2022 Report Card*. Retrieved July 3, 2023, from https://reportcard.ride.ri.gov/202122/StateProfile.

RIDE publishes school report cards annually, typically in November or December for the previous school year (for example, the 2021-2022 school report card data were published in November 2022). Of particular interest to LEAs is the "Accountability" tab[26] of the school report card website. This includes data used to evaluate school performance, such as test scores, graduation rates, student suspensions, and chronic absenteeism for students and teachers. These diverse data points make up a school's Star Rating, which indicates overall school success. The Star Rating makes it easy for users to make comparisons quickly between schools. Such comparisons provide valuable insights into areas of strength and potential weaknesses, allowing LEAs to identify best practices and areas that may require improvement. This benchmarking process also can help LEAs make informed decisions to enhance teaching methods, student support services, and overall school strategies.

Validating information for dozens of datasets requires RIDE's database administrator and accountability specialist to clean and add the data to a centralized data warehouse. Consolidating and centralizing data from various sources into one repository allows for consistent and reliable reporting across schools and districts and ensures data integrity and accuracy. Those

26 Rhode Island Department of Education. (n.d.). *Rhode Island 2021-2022 Report Card*. Retrieved August 30, 2023, from https://reportcard.ride.ri.gov/202122/StateAccountability.

responsible for the school report card dashboard and reports need to coordinate with multiple RIDE offices to have chart designs approved. This coordination ensures accurate and consistent reporting presented in a standardized format with which stakeholders are familiar.

TA for LEAs to Use School Report Card Data

RIDE implements TA sessions following the publication of school report cards from late fall through early spring, typically December to March. These sessions aim to foster data literacy, promote data-informed decision-making, and empower LEAs to make actionable change that benefits students.

TA sessions range from schoolwide presentations for teaching staff during PD days to one-on-one or small group discussions. The content of the TA sessions depends on the request of the LEA and can include either a general overview of the statewide report card system, an in-depth understanding of the school's specific report card data, or both. In-depth TA sessions could include data calculation methodologies and insights into areas for improvement, including where student subgroups may be underperforming.

TA sessions happen in person, as Rhode Island's small size makes field visits a more realistic option for RIDE. Visiting schools helps the SEA gain a better understanding of the specific challenges that LEAs face. Likewise, in-person TA sessions enable the SEA to build a stronger connection to the student-level work being done and gain a deeper understanding of the LEA's unique circumstances and needs. This increased perspective aids in data quality measures and enables SEA staff to continue to produce reports that are relevant to the the work being done at the LEA.

To ensure the success of TA sessions, RIDE implements two exemplary practices:

1. **Form-Based Meeting Scheduling**: Using a request form to schedule field-based meetings with LEAs has proven to be effective. The request form allows RIDE to collect relevant information about who will attend the TA sessions, questions that attendees have in advance of the meeting, and specific areas of the school report card they are interested in diving deeper into, and specific concerns they may have. Gathering this information in advance enables RIDE to better prepare for meetings, customize presentation materials, and allocate appropriate staff members to attend.
2. **Strategic Partnerships With Other Offices**: RIDE will coordinate with the Office of School and District Improvement, for example, to connect report card data with available support services for LEAs. This collaboration ensures that the data are linked effectively to resources and assistance that can help LEAs improve educational outcomes. Collaborations with other offices also facilitate a holistic approach to using the data for improvement efforts.

RIDE's efforts to enhance accessibility and understanding of the school report card have yielded positive outcomes. For example, an LEA with low English Language (EL) proficiency scores used the report card data to convince the school board to hire additional EL teachers. This example demonstrates how the improved school report card landing page and engagement with LEAs helped a superintendent use data to inform a funding decision that led to increased support for students with a measurable need.

Best Practices

Through its experience, RIDE has identified and implemented some key best practices for updating and maintaining a data dashboard and for helping LEAs more fully use their school report card data.

The following are best practices for designing and maintaining a school report card data dashboard:

- Provide stakeholders with timely access to the most up-to-date information on school performance and accountability by maintaining a consistent publication schedule for report card data.
- Consolidate data into a centralized data warehouse to ensure consistency across dashboards and reliable and accurate reporting.
- Standardize the design of dashboards, including colors and fonts, to create a consistent look and feel. This will help users to familiarize themselves with the visual layout of the web page, enabling easier interpretation of the data. Additionally, adhering to accessible color palettes promotes inclusivity and accessibility, ensuring that all users can engage effectively with data.
- Provide contextual information about the data whenever possible to help users gain a deeper understanding of the data. Using interactive features, such as hover tooltips, facilitate access to additional relevant information.
- Involve stakeholders throughout the dashboard design process to ensure the development of a product that is relevant to users' needs. This ensures that report card data are used by educators to inform their decisions.

The following are best practices for helping LEAs more fully use their school report card data:

- Provide superintendents and principals with advance access to their report card so they can familiarize themselves with the data to prepare for discussions with their stakeholders (including teachers, school board members, parents and other caregivers, and the media, among others).
- Tailor presentations to the specific needs and interests of stakeholders to help create a more engaging and relevant discussion. This approach ensures that information is presented in a manner that resonates with the audience, motivating them to increase data literacy.
- Prioritize listening attentively to LEAs' concerns over providing explanations of the data. Understanding LEA challenges is essential for building trust and fosters a collaborative and respectful environment, which is essential for building data literacy.
- Have clear and open lines of communication with district- and school-level staff to foster trust for using data to inform educational decisions.
- Make meeting coordination with LEAs easier by using a scheduling assistant.

Summary

By prioritizing user understanding, RIDE successfully enhanced the school report card experience. Through engaging key stakeholders, RIDE developed a data dashboard to meet its specific and varying needs, create standardized graphs and colors to increase accessibility and familiarity, and ensure compliance with state and federal laws and regulations. Through a simplified landing page and collaborative engagement with LEAs, RIDE not only made the data more accessible but also empowered education stakeholders to effectively use the report card data for actionable improvements. RIDE's efforts demonstrate the importance of continuous improvement in education reporting systems and ongoing data conversations to increasing data literacy and use.

San Bernardino City Unified School District (CA): Improving Data Literacy Through Discussions and Dashboards

The San Bernardino City Unified School District (SBCUSD) in California implemented multiple strategies to increase data literacy among its education leaders and teachers, including introducing a structured protocol for analyzing data, launching a near-real-time data dashboard, and hosting monthly leadership meetings to discuss data. These strategies help staff use data to improve teaching and impact student outcomes by developing site capacity to understand and act on data.

Data Analysis Protocol (DAP)

Launched in 2017, the SBCUSD Data Analysis Protocol (DAP) grew out of the need to develop a structured process for working with data to inform decision-making within the district. The DAP is a four-step process to analyze data, making data more accessible and actionable for educators to improve teaching and learning:

1. **Research**: View and analyze the dataset to determine how outcomes changed.
2. **Recall**: Look back on programs and practices that impacted these outcomes.
3. **Reflect**: Make connections between how the programs and practices that were implemented changed student outcomes.
4. **Respond**: Implement targeted programs and practices to positively impact student outcomes.

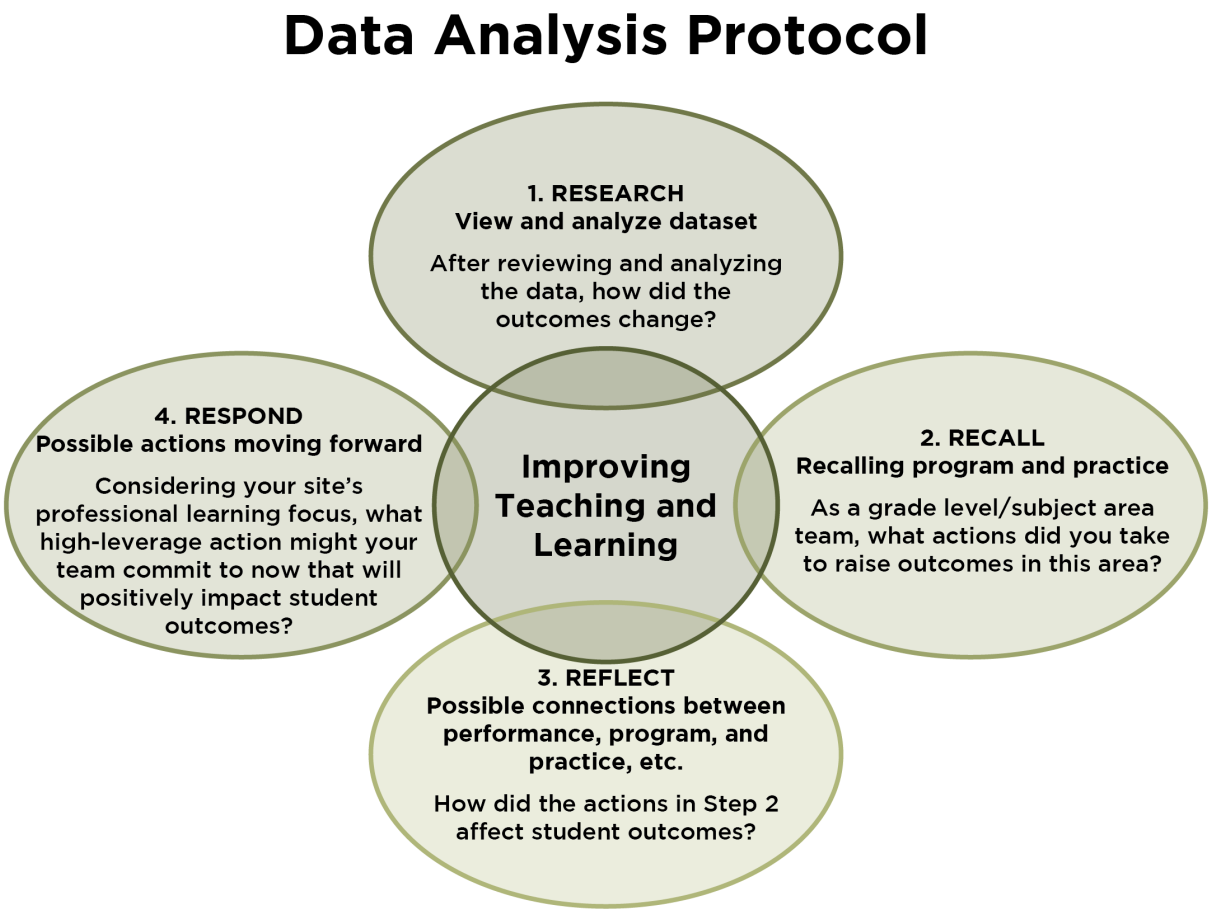

Figure 5. The SBCUSD Data Analysis Protocol contains four steps to help educators improve teaching and learning.

The DAP initially was used as a structured tool for school leaders and teachers to discuss district key performance indicators (KPIs). SBCUSD took a comprehensive approach to introducing the DAP to schools, providing training sessions with resources to support the ongoing use of the protocol. To begin, the rollout of the DAP process was facilitated by an accountability manager who was responsible for communicating the purpose of the DAP, providing training to district and school leaders, and offering on-site support to use the DAP.

District and school leaders were supplied with training videos designed to familiarize school data teams with he DAP process. School leaders also went through standardized resources that included sample responses to the four questions in the DAP. Data teams at the school level used the four-part process to review and systematically analyze data around each of the district's KPIs. The school data team summarized its findings for site leadership, who then identified actions to support the suggestions of the data team.

SBCUSD emphasizes the importance of starting small and focused when introducing a new data analysis initiative. Initially, there was an ambitious attempt to encompass every KPI measured by the district. However, evaluations of the DAP process after the first year of implementation made it clear that including every KPI was too time consuming and broad for educators to implement meaningfully. Instead, taking an incremental approach (for example, beginning with one or two key KPIs and gradually expanding from there) led to more targeted and sustainable actions to benefit students. To streamline the process and increase buy-in, SBCUSD reduced the frequency of completing the DAP and removed the requirement to address every KPI. Core KPIs, such as attendance and standardized test scores, remained central to the process. In addition, tools and documents were reviewed and refined to make them more accessible and user-friendly for school leaders. As principals grew more comfortable with the protocol, participation increased during the 2018-2019 school year.

The DAP process has been an important step in creating a shared data analysis process for the district. This process has enhanced data literacy within SBCUSD by making administrators and educators more aware of various data points and by providing a structured framework for talking about and analyzing those data. This strategic approach ensures that data discussions are targeted, informed, and ultimately contribute to the district's overarching goal of improving student outcomes. By providing this structured and methodical framework, the DAP has increased data literacy and facilitated more meaningful and productive discussions around data analysis.

Near-Real-Time Data Dashboards

SBCUSD also has increased stakeholder access to education data by moving away from reliance on static monthly reports and launching a near-real-time data dashboard. The dashboard serves as a central hub for educators and administrators, providing timely access to school- and student-level data, including attendance, discipline, school-level assessment data, and data from the annual universal screener for reading and math.

SBCUSD Universal Screener

In 2021, SBCUSD introduced a universal screener for reading and math that enables educators to track students' progress over time, identify growth patterns, and pinpoint areas that need improvement. This comprehensive assessment has created a common language around data discussions with SBCUSD, offering the potential for valuable long-term data insights. SBCUSD conducted training sessions that asked educators to review the universal screener assessment report through the lens of three basic questions:

1. What are the data saying?
2. What are you going to do for the students who are below target?
3. What are you going to do to extend the learning for those who have achieved their targets?

The data dashboard consolidates data from multiple sources into a single, user-friendly platform. This streamlining of data access simplifies the process for educators; they no longer need to navigate multiple datasets and sources, increasing the likelihood that they will be able to use data to inform decisions around student supports. The dashboard further enhances data literacy by making complex data more understandable and engaging. The district has taken deliberate steps to simplify data interpretation, ensuring that educators easily can understand what the numbers mean. Principals have transformed data into actionable insights, for example, by creating specialized student groups and monitoring their progress over time across various data points. This tracking capability facilitates long-term planning and intervention strategies.

Access to near-real-time information through a dynamic data dashboard has given SBCUSD educators current insights into their school's performance and the ability to drill down into specific student information. The SBCUSD data dashboard has increased educator capacity to identify students in need of support, allowing for timely interventions that could have a more immediate impact on student performance and outcomes. Principals can use the dashboard to identify students who may be below target and in need of additional support. In addition, principals can identify students who have achieved their academic goals and explore ways to extend their learning.

The data dashboard has increased school leaders' data literacy around chronic absenteeism and informed strategies to reduce its impact. Before the dashboard, educators relied on a rate-based view of absenteeism based on statewide data trends from the previous year. This lag in data reporting made it difficult for school leaders to impact students. With the dashboard, SBCUSD staff can access week-to-week and month-to-month data specific to their students. Moreover, the dashboard presents a chronic absenteeism card on the screen that categorizes students into different chronic absenteeism groups, providing a clearer understanding of the impact of chronic absenteeism on specific groups of students. The dashboard also offers insights into trends and reasons behind absenteeism, enabling school leaders to address the root causes of chronic absenteeism.

The introduction of a districtwide data dashboarding system improved data accessibility and timeliness and simplified the data analysis process. Clearly presenting relevant, timely data has increased SBCUSD staff data literacy to make connections between various data points, allowing educators to identify patterns and correlations effectively.

Monthly Data Conversations With Leadership

In response to district leadership identifying data review as a priority, SBCUSD hosts monthly administrative principal meetings at the district's PD center. For the purposes of meeting, principals are divided into eight clusters based on geographic locations within the district. Each cluster has a designated lead point of contact. The primary focus of each cluster's meeting is on using a variety of datasets to guide education strategies and initiatives.

SBCUSD frames the monthly principal meetings as PLCs. PLC meetings start with reading and discussion sessions before delving into data analysis. This format provides school leaders with dedicated time to examine data, engage in conversations with their peers, and ask pertinent questions. Engaging in data analysis within a peer group environment can relieve some pressure associated with data interpretation. Educators with varying levels of expertise collaborate, exchange insights, and collectively explore data-related challenges. Additionally, experts are invited to these monthly data conversations to provide insights on specific data-related issues, further enhancing participants' data literacy.

Summary

PLCs are a structured forum for SBCUSD educators and administrators to navigate their school's data and have in-depth conversations to inform decision-making. Engaging with data from the districtwide dashboard through the DAP process enhanced leadership's data literacy, fostering a culture of collaborative, data-informed decision-making that ultimately benefits students. School site administrators and teachers used the DAP process for 2 years before the COVID-19 pandemic put a pause on in-person learning and temporarily shifted educator focus to providing instruction online. The formal DAP process described here was on hold as of the 2022-2023 school year. SBCUSD continues to work to build data literacy among its school leaders through districtwide data dashboards and data review structures and processes.

Utah State Board of Education: Using Data to Inform Systemic Change

The Utah State Board of Education (USBE) has been implementing a statewide data literacy initiative called Assessment to Achievement (A2A) since the 2014-2015 school year.[27] A2A is a cohort-based, ongoing professional learning program for teachers and administrators to build their capacity to use data to improve student learning and outcomes.[28]

Participating schools form an Administrative Transformation Team (ATT) and a School Transformation Team (STT) to engage in year-round professional learning sessions (PLSs) over the course of 4 years to build staff capacity to examine student data and data around instructional and collaborative practices. The 4-year commitment allows participants to build data literacy skills from one year to the next and to examine how education practices affect student outcomes. n addition, the multi-year commitment allows these data-driven practices to make a sustainable impact on the school community and student learning.

A2A's focus is for education practitioners to become knowledgeable about and comfortable with data to make informed decisions about education practices that improve student learning. A2A helps participants understand what data are available, the differences between datasets, and how to examine various kinds of data.

A2A Program Logistics

A2A is a voluntary program open to all schools in Utah. A typical A2A cohort includes 10-13 schools with 10-12 participants in each school. The A2A program consists of PLSs that happen 4 times a year, and three site visits:

- The first PLS is the summer kickoff, which lasts 3 days.
- Subsequent PLSs are 2 days each (first day with just the ATT and second day with ATT and the STT) and happen in the fall, winter, and spring.
- Site visits happen in between PLS.
- Site visits are conducted by a staff member from USBE and a staff member from a vendor consultant who helps to administer the program.

The STT includes 8-10 data coaches, specialists, and teacher leaders who work together to implement the A2A program directly. The ATT includes up to five district leaders or school administrators who support the implementation of the program by establishing systems and providing the support needed to drive the school toward academic success. The STT and ATT

27 Utah State Board of Education. (n.d.). *Resources, Assessment to Achievement*. Retrieved on March 4, 2024, from https://www.schools.utah.gov/assessment/resources#Assessment%20to%20Achievement.

28 Groth, C., and Auletto, A. (2020). *Assessment to Achievement: Impacting Learning and Growth in Utah Schools, Annual Evaluation Report (2019-2020)*. Salt Lake City, UT: Utah Education Policy Center. Retrieved on January 5, 2024, from https://www.uepc.utah.edu/our-work/assessment-to-achievement-2020/.

work together to develop the vision for transformation. The STT directly implements the vision, and the ATT supports the implementation.

The first day of the summer kickoff is with the school's ATT to train them to develop teachers into data leaders. The ATT selects teacher leaders from the school to comprise the STT. On the second and third days of the summer kickoff, the ATT and the STT meet to analyze and interpret their data, which include summative assessments and baseline data collected from school staff related to data and collaborative practices. Based on these data, the two teams determine the changes they would like to make and how to implement them.

PLSs emphasize a train-the-trainer approach, cultivating data literacy leadership within schools that can help implement program principles and develop a culture of data literacy. Each session is focused on the project objectives of the project objectives of collaboration, data use, and instruction. Participants have structured planning time at the close of each PLS and an opportunity to receive personalized coaching and feedback on how they are implementing action plans in real-time. Site visit coaches take a collaborative approach to working with A2A participants by emphasizing what is working well and providing guidance on how to improve and refine practices.

A2A Program Content

USBE works with a vendor to support training content development, as well as much of the scheduling and logistics around events. The vendor maintains the A2A online learning sites and meets with USBE staff weekly. During meetings and related communication between meetings, the A2A program managers, including the vendor, discuss the goals of the program and the needs of each school. During some sessions, they develop a scope and sequence for the 4-year program and each year within that time frame. Based on these meetings, the vendor creates an outline of content for the PLSs and site visits. USBE staff then review and respond to the draft. The draft goes through several rounds of review and updates before it is finalized.

Participants examine student data and data on their own teaching, collaboration, and data use practices. Participants learn when, why, and how to look at student-level data. They learn about large-scale summative assessment data, as well as intermediate data and short-term data, such as those from daily assessments. In addition to promoting data literacy around student data, the program empowers school staff to collect and analyze data on collaborative and instructional practices within the classroom. They learn to collect data on classroom strategies and collaborative practices, analyze those data, and make small changes in strategy based on what they have learned.

Each A2A PLS is tailored to the needs of the school. During A2A PLSs, participants use the following Data Analysis Protocols (https://sites.google.com/view/a2a-cohort-3-learning-space/resource-library) to learn how to work with, interpret, and talk about data, as well as identify potential uses:

- "What Do You See, What Do You Make of It?" protocol guides team members through a process of talking about the data without yet making inferences.
- "SWOT Analysis" protocol enables teams to analyze data and identify strengths, weaknesses, outliers, and trends in each dataset.
- "Analyzing Common Short-Term Data" protocol helps teams to identify common misconceptions in student work and determine next instructional steps.
- "What Do We Know? Suspect? Need to Find Out?" protocol helps teams analyze either a student performance dataset or implementation dataset and determines next steps to take based upon critical issues they identified through the process.

Discussion Protocols from the Assessment to Achievement (A2A) Cohort 3 Learning Space

Each A2A cohort has a dedicated online learning space that brings together materials and resources for each professional learning session. In addition, the learning space has a resource library to help educators implement what they have learned. The following and additional protocols are available at https://sites.google.com/view/a2a-cohort-3-learning-space/home.

Success Analysis Protocol: Teams analyze and learn from the success of a teacher or team and consider how it can be replicated or applied in other settings.

Constructivist Protocol: Teams identify and share exceptional work to reinforce and replicate effective practices among a team.

Consultancy Protocol: This protocol helps an individual or team think more expansively and problem-solve about a specific dilemma.

Multiple Perspectives Protocol: During this protocol, team members will have the opportunity to share personal thoughts/ideas, based on specific points of view, as well as actively consider different points of view on a given topic.

Iterative Programming

USBE collects data about A2A program efficacy that are analyzed and used to improve how they work with schools. The A2A program measures school team outcomes, as well as data on the A2A program. These data include

- large-scale summative assessments to measure how student achievement is affected by the program;
- anecdotal data collected through school surveys at the end of each PLS; and
- observation data collected during site visits and team meetings.

Data collected from previous cohorts shows that 3 years into the A2A program, participating schools' student proficiency increased by nearly four times than that of non-A2A schools in Utah. In the more recent cohort of A2A schools, feedback from teachers and administrators shows that

- 92 percent of teacher respondents believe that their own instruction is more effective because of A2A; and
- both school leader and teacher participants report that their school now has a culture that prioritizes student growth.

In addition, across 81 schools and 16 LEAs completing the 4-year A2A program with USBE,

- 86 percent of teachers report that their school-based teams are functioning more effectively;
- 92 percent indicate that their own instruction is more effective; and
- 90 percent of teachers and administrators affirm that they use data more effectively to identify student learning gaps.

Best Practices

USBE consistently measures the efficacy of the A2A program and uses those data to inform practices. It has identified several A2A best practices:

- Film mock meetings of a PLC to demonstrate to data learners how a data meeting may proceed.
- Use and analyze available data to inform program practices.
- Participation by school leadership is critical to the A2A program's success.
- A program this large requires sustained funding and, likely, legislative support.
- People working on such a large program need to understand
    - the teaching and assessment process;
    - change management;
    - how the school collects, stores, and uses data; and
    - how data-informed decision-making works in the classroom.

Conclusion

USBE's A2A program focuses on building data literacy skills among educators through a comprehensive, 4-year professional learning program. A2A has empowered teachers and administrators to make informed decisions about educational practices that directly impact student learning and outcomes. The program's structured approach, including the ATT and STT, emphasizes collaboration, data use, and improving instruction, fostering a culture of data literacy within participating schools. The A2A program's voluntary nature, coupled with a tailored curriculum and site visits, has facilitated an effective train-the-trainer approach, creating data leaders within schools. Evidenced by the positive feedback from current cohorts and the growth in student proficiency in previous cohorts, A2A is a model for leveraging data to drive systemic change in education. USBE's commitment to iterative programming, collecting and analyzing data on program efficacy, and identifying best practices ensures the ongoing success and sustainability of this effective program.

Appendix A: State Data Literacy Training Programs and Resources

Alaska

https://education.alaska.gov/information-exchange-blog/-btb-assessment-data-literacy-professional-learning-2021

The Alaska Department of Education & Early Development offered a free Assessment & Data Literacy Professional Learning Series from late 2021 into 2022. Sessions were open to teachers, teacher leaders, coaches, and administrators. Educators who participated in at least six sessions were eligible for one college credit.

Colorado

https://www.cde.state.co.us/educatortalent/dlrtequityforteachersandstudents

The Colorado Department of Education includes on its website a number of resources and guidelines to train agency staff in working with student demographic and academic data. In addition, in 2018 Colorado was one of nine states chosen to take part in the Council of Chief State School Officers' Diverse and Learner-Ready Teacher initiative (DLRT), which emphasized data literacy as key in helping educators understand students' needs and identities.

Delaware

https://www.doe.k12.de.us/cms/lib/DE01922744/Centricity/Domain/363/EdInsightDashboard.pdf

The Delaware Department of Education (DDOE) manages the state's statewide longitudinal data system (SLDS), called the Education Insight Dashboard (EID). DDOE provides data literacy training to ensure that all Delaware educators and administrators can properly enter and manage EID data and interpret data reports with accuracy.

Florida

https://ceedar.education.ufl.edu/

In Florida, the University of Florida's Collaboration for Effective Educator Development, Accountability, and Reform (CEEDAR) Center is working to "support students with disabilities in achieving college- and career-ready standards by building the capacity of state personnel preparation systems to prepare teachers and leaders to implement evidence-based practices within multi-tiered systems of support." This effort includes work to enable state and local education agencies (SEAs and LEAs) to use and understand multiple data sources.

Illinois

https://www.isbe.net/Pages/Assessment-Webinars.aspx

The Illinois State Board of Education, through its Assessment Department, offers to all stakeholders a range of webinars on topics including "interpreting assessment results, increasing the knowledge of what students need to know and can do, and synthesizing assessment results to provide awareness of student learning in order to be effective in the classroom." The department offers professional development credits as an incentive for participation in live or recorded webinars.

Indiana

https://www.in.gov/mph/

The Indiana Management Performance Hub offers data proficiency training to all state employees through monthly lessons delivered via email.

Iowa

https://educateiowa.gov/data-reporting/edinsight-data-warehouse

The Iowa Department of Education maintains EdInsight, the state's education data warehouse. In conjunction with EdInsight, a network of trainers and site coordinators work with the state's area education agencies to provide "professional development in data use and literacy as well as EdInsight reporting and analysis training."

Kentucky

https://education.ky.gov/school/stratclsgap/contassessment/Pages/default.aspx

The Kentucky Department of Education website features a 30-60-90-Day Plan for Assessment Literacy for Principals, accompanied by an Assessment Literacy for Principals diagnostic tool, through which schools may download helpful resources once they have determined their assessment literacy needs and developed a plan to address them.

Louisiana

https://www.louisianabelieves.com/resources/library/pandemic-relief-guidance-and-resources-library

The Louisiana Department of Education has included upskilling in data literacy as part of its 2022–2023 Academic Recovery and Acceleration plan.

Maine

https://www.maine.gov/doe/MTSS

The Maine Department of Education offers an extensive library of professional learning resources for educators on multi-tiered systems of supports. In addition, the statewide organization Partners in Data Literacy, developed to increase levels of data literacy among Maine's students, has used its website to create an online space open to teachers and students, bringing the opportunity for data literacy expertise to all.

Maryland

https://cdo.maryland.gov/data-literacy/

In 2019, in year 4 of an ongoing State Systemic Improvement Plan, the Maryland State Board of Education started instructional coaching and data literacy training in a group of pilot districts.

Massachusetts

https://www.doe.mass.edu/accountability/toolkit/district-data-toolkit.pdf

The Massachusetts Department of Elementary & Secondary Education offers a seven-module District Data Team Toolkit to take the state's LEAs through the process of understanding the need for and function of a data team, increasing data literacy of district staff, establishing a data team, and implementing and assessing the necessary actions. The first course available is Data Science for Managers. At a higher level, the Massachusetts Data Office works to facilitate effective and secure data sharing across all state agencies.

Minnesota

https://testing123.education.mn.gov/cs/groups/communications/documents/document/zxn0/mdaw/~edisp/test000456.pdf

COMPASS is a statewide education collaboration among the Minnesota Department of Education, Minnesota Service Cooperatives, and Regional Centers for Excellence. COMPASS seeks to support educators and school leaders in their journey to use data across all levels of the system (classroom, school, district, and state) to make decisions.

Montana

https://opi.mt.gov/Portals/182/Page%20Files/Data%20Reporting/Data%20Informed%20GEMS%20Intro%20Downloadable%20Packet.pdf

The Montana Office of Public Instruction maintains Growth & Enhancement of Montana Students (GEMS), Montana's SLDS, and through its website offers a GEMS course in online and downloadable packet formats, a tutorial video series, and a custom-made Early Warning System free to any Montana public school through the SLDS.

Nebraska

https://www.education.ne.gov/dataservices/slds/data-cadre/

The Data Cadre is a collaborative professional development effort between the Nebraska Department of Education and the Educational Service Units Coordinating Council. One of the cadre's goals is to provide a statewide system of professional development training for data analysis that reaches every district. Resources include data literacy training: https://www.education.ne.gov/dataservices/slds/data-cadre/july-2014-data-literacy-training/.

North Dakota

https://www.edutech.nd.gov/training

The North Dakota Department of Public Instruction works with EduTech, an in-state technology services provider, to offer educators a broad complement of technical and digital training courses. Course-takers may earn professional development credits from this training.

Oregon

https://www.oregon.gov/ode/about-us/Pages/Data%20Partnerships/DATA-Project.aspx

The Oregon Department of Education, with support from the Institute of Education Sciences (IES), launched its Direct Access to Achievement (DATA) program in 2007 to run for a 4-year performance period under the terms of its SLDS grant. The Oregon DATA Project is a statewide initiative designed to improve student achievement through informed use of data. The DATA Project is launching a multi-tiered program of professional development focused on teaching educators how to collect, analyze, and use appropriate data. The project's three main training strands will provide statewide training and support for data-driven decision-making.

Rhode Island

https://ride.ri.gov/instruction-assessment/instructional-initiatives-resources/data-use-pd

The Rhode Island Department of Elementary and Secondary Education provides educators a Data Use Professional Development series to develop the knowledge, tools, and structures to use data effectively to inform instruction. Small cohorts of educators from each school and district representatives collaborate in a yearlong professional development series to learn how to analyze relevant student data to inform educational decisions and increase student achievement outcomes. Educators also work with a data coach who provides on-site, tailored support in using data.

South Carolina

https://ed.sc.gov/educators/educator-effectiveness/professional-learning/data-literacy/

The South Carolina Department of Education offers the Data Literacy for Instructional Leaders training series, composed of online courses, tools, and professional learning activities. The series is competency-based and aligned to "Expanded Program for Assisting, Developing, and Evaluating Principal Performance (PADEPP) standards. Participants are encouraged to complete the professional learning activity (PLA) associated with each session to apply what they have learned and reflect on process and practice. PLAs across the series can be used to fulfill the professional development plan criterion of PADEPP Standard 9. All series material was piloted and tested in Richland School District Two during the 2017-2018 school year.

South Dakota

https://doe.sd.gov/Assessment/DLI.aspx

The South Dakota Department of Education launched its Assessment & Data Literacy Initiative in 2022. The goal of the initiative is to cultivate assessment and data literacy among South Dakota educators, school and district leaders, and preservice teachers in order to improve student learning. This goal will be accomplished through a series of training meetings, professional learning modules, independent practice and application activities, follow-up discussions and coaching, and strategic planning for scaling and sustaining the work within schools and districts over time.

Vermont

https://education.vermont.gov/educator-licensure/professional-learning

The Vermont Agency of Education has offered a Data Literacy Professional Development Workshop series since April 2021 that aims to help districts use data more effectively to address their school improvement needs.

Wisconsin

https://dpi.wi.gov/strategic-assessment/professional-learning/assessment-and-data-literacy-e-learning-series

The Wisconsin Department of Public Instruction offers the Assessment and Data Literacy E-Learning Series, with a three-part emphasis on assessment literacy, data literacy, and strategy assessment systems. Participants learn why data literacy is essential and how to use local and state assessment data to inform practices and improve student achievement.

Wyoming

https://edu.wyoming.gov/downloads/communications/memos/2022/2022-074-Assessment-Data-Literacy-PD-PDF.pdf

The Wyoming Department of Education offered in 2022 a pair of data literacy professional development opportunities, focused on the effects of the COVID-19 pandemic.

Appendix B: National Forum on Education Statistics (Forum) Resources for Data Use

The following resources from the Forum align with each of the four components identified in the Data Use Self-Assessment tool discussed in Chapter 2: Building and Supporting Data Literacy. The resources listed below are not a comprehensive list of Forum resources; there are more guides, online courses, and videos available on the Forum website. All Forum resources are available at https://nces.ed.gov/forum/publications.asp.

Systems

- *Forum Guide to Metadata*
- *Forum Guide to Data Governance*
- *Forum Guide to Facility Information Management: A Resource for State and Local Education Agencies*
- *Forum Guide to Understanding the School Courses for the Exchange of Data (SCED) Classification System*
- *Traveling Through Time: The Forum Guide to Longitudinal Data Systems Series*
- *Forum Guide to Cybersecurity: Safeguarding Your Data*
- *Forum Guide to Exit Codes*

Knowledge

- *Forum Guide to Staff Records*
- *Forum Guide to Collecting and Using Attendance Data*
- *Forum Guide to Education Data Privacy*
- *Forum Guide to Discipline Data*
- *Using Education Indicators: A Forum Guide for State and Local Education Agencies*
- *Forum Guide to Alternative Measures of Socioeconomic Status in Education Data Systems*
- *Forum Guide to College and Career Ready Data*
- *Forum Guide to Virtual Education Data: A Resource for Education Agencies*

Practices

- *Forum Guide to Planning for, Collecting, and Managing Data About Students Displaced by a Crisis*
- *Forum Guide to Supporting Data Access for Researchers: A State Education Agency Perspective*
- *Forum Guide to Supporting Data Access for Researchers: A Local Education Agency Perspective*
- *Forum Guide to Data Ethics*

- *Forum Guide to Data Visualization: A Resource for Education Agencies*
- Forum Data Visualization Online Course
- *Forum Guide to Early Warning Systems*
- *Forum Guide to Personalized Learning Data*
- *Forum Guide to Collecting and Using Disaggregated Data on Racial/Ethnic Subgroups*

Leadership

- *Forum Guide to Data Quality*
- *Forum Curriculum for Improving Education Data: A Resource for Local Education Agencies*
- *Forum Guide to Taking Action with Education Data*

Appendix C:
Federal Resources for Data Use

Research Data Gov

https://www.researchdatagov.org/

This resource is a web portal for discovering and requesting access to restricted-use data from federal statistical agencies. Once researchers identify datasets of interest, they can use the standard application process (SAP), a new government-wide effort that allows researchers easy one-stop access to those restricted-use data (https://ncses.nsf.gov/about/standard-application-process). Applicants can use the SAP to apply for access to data from multiple agencies for the same project and track the application as it moves through the review process.

SLDS Data Use Standards: Standards in Practice

https://files.eric.ed.gov/fulltext/ED595125.pdf

This resource contains three case studies that illustrate the essential knowledge, skills, and professional behaviors necessary to use data effectively being applied by educators in real-world settings. It is a companion publication to SLDS Data Use Standards: Knowledge, Skills, and Professional Behaviors for Effective Data Use. This resource is intended to inform pre- and in-service educator training programs.

The U.S. Department of Education Data Inventory (ED Data Inventory)

https://datainventory.ed.gov/

This resource describes all data reported to ED, with the exception of personnel and administrative data. It includes data collected as part of grant activities, along with statistical data collected to allow publication of valuable statistics about the state of education in the United States. The ED Data Inventory includes descriptive information about each data collection, along with information on the specific data elements in individual collections.

The U.S. Department of Education Data Strategy

https://www2.ed.gov/about/offices/list/opepd/ocdo/ed-data-strategy.pdf

ED's Data Strategy was adopted to establish a shared language across different roles and offices and to promote essential awareness in four areas of relevant skills: evidence, analytics, visualization, and decision-making. The strategy includes an objective for ED to develop and implement a data literacy program to ensure all staff can speak information and data.

The U.S. Government's Open Data

data.gov

This resource is the U.S. government's open data site that helps the public and policymakers to make informed decisions using publicly available data. Stakeholders can use this website to view federal metadata and explore the most viewed datasets, recently added datasets, and geospatial data.

What Works Clearinghouse Educator Practice Guides

https://ies.ed.gov/ncee/wwc/Search/Products?productType=1

These guides offer evidence-based recommendations for educators to improve student outcomes.

Additional federal resources for data use can be found in chapter 3 of this guide.

Appendix D: Additional Resources

Navigating the Landscape of Data Literacy: It IS Complex

https://files.eric.ed.gov/fulltext/ED582807.pdf

This white paper reports on a project that was intended to develop a working or operational definition of data literacy. The project consisted of two components: an analysis of professional development texts on data literacy and a meeting of experts from the fields of research, policy, professional development, and funding who inform the field of data-driven decision-making.

Resources to Support Asset Framing

https://dataqualitycampaign.org/resource/why-it-matters-to-look-at-students-assets-instead-of-focusing-on-deficits/

A series of blog posts to help those closest to students understand their conscious and unconscious biases when talking about the problems students face and how to address them to ensure equity.

Teaching and Assessing Data Literacy: Resource Guide for Supporting Pre-Service and In-Service Teachers

https://ceedar.education.ufl.edu/wp-content/uploads/2021/02/NAU_Teaching_and_Assessing_Data_Literacy_Resource_Guide_for_Supporting_Pre-Service_and_In-Service_Teachers_August_2020_Updated_2162021.pdf

This guide is intended to support instructors as they develop data literacy learning objectives, instruction, and measures.

Teacher Data Literacy: It's About Time

https://dataqualitycampaign.org/resource/teacher-data-literacy-time/

The brief discusses an urgent need to support teacher data literacy through state policy.

The Consumer's Guide to Data

https://dataqualitycampaign.org/wp-content/uploads/2021/06/DQC-Consumers-Guide-to-Data.pdf

This resource breaks down what it means to build trust in data. It provides practical tips to help education data stakeholders make meaning from numbers to uncover biases, understand how to foster trust in data, and act based on the information.

The Global Data Literacy Benchmark: 2022

https://www.datatothepeople.org/_files/ugd/1ff4ae_954f76bb1b0f4913bb38301403fd3d94.pdf

This resource includes a framework for what data-literate people should be able to know about and do with data.

Regional Educational Laboratory (REL) Program Resources

A Community of Practice to Build a Culture of Data Use

https://ies.ed.gov/ncee/rel/Products/Region/pacific/Blog/106969

This blog post from the REL Pacific defines a culture of data use and describes efforts to support capacity building across the region through a Data Culture Community of Practice. The community of practice offers Pacific region education leaders an opportunity for collective learning, sharing, and problem-solving related to establishing and sustaining a high-quality culture of data use within their schools and systems.

Culturally Responsive Data Literacy: Integration into Practice in Schools and Districts

https://ies.ed.gov/ncee/edlabs/regions/midatlantic/app/Docs/Events/RELMA_culturally_responsive_data_literacy_webinar_slides_508.pdf

This presentation covers data literacy, culturally responsive pedagogy, and culturally responsive data literacy and how to apply these concepts in districts.

Supporting a Culture of Data Literacy and Use to Improve Instructional Quality

https://ies.ed.gov/ncee/rel/regions/pacific/pdf/pa_factsheet_cultureofdataliteracy.pdf

This fact sheet provides educators and leaders with some key considerations for developing an effective culture of data use that can help improve instruction and student support services.

Toolkit for a Workshop on Building a Culture of Data Use

https://ies.ed.gov/ncee/rel/Products/Region/northeast/Publication/3633

This toolkit helps school and district teams apply research to practice as they establish and support a culture of data use in their educational setting.

Using Data to Promote Culturally Responsive Teaching

https://ies.ed.gov/ncee/rel/Products/Resource/1203

This workshop series produced by REL Northeast & Islands in 2020 introduced the importance of developing data literacy to promote culturally responsive teaching and to provide teacher preparation programs with a roadmap for how to begin teaching data literacy to promote equity.

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