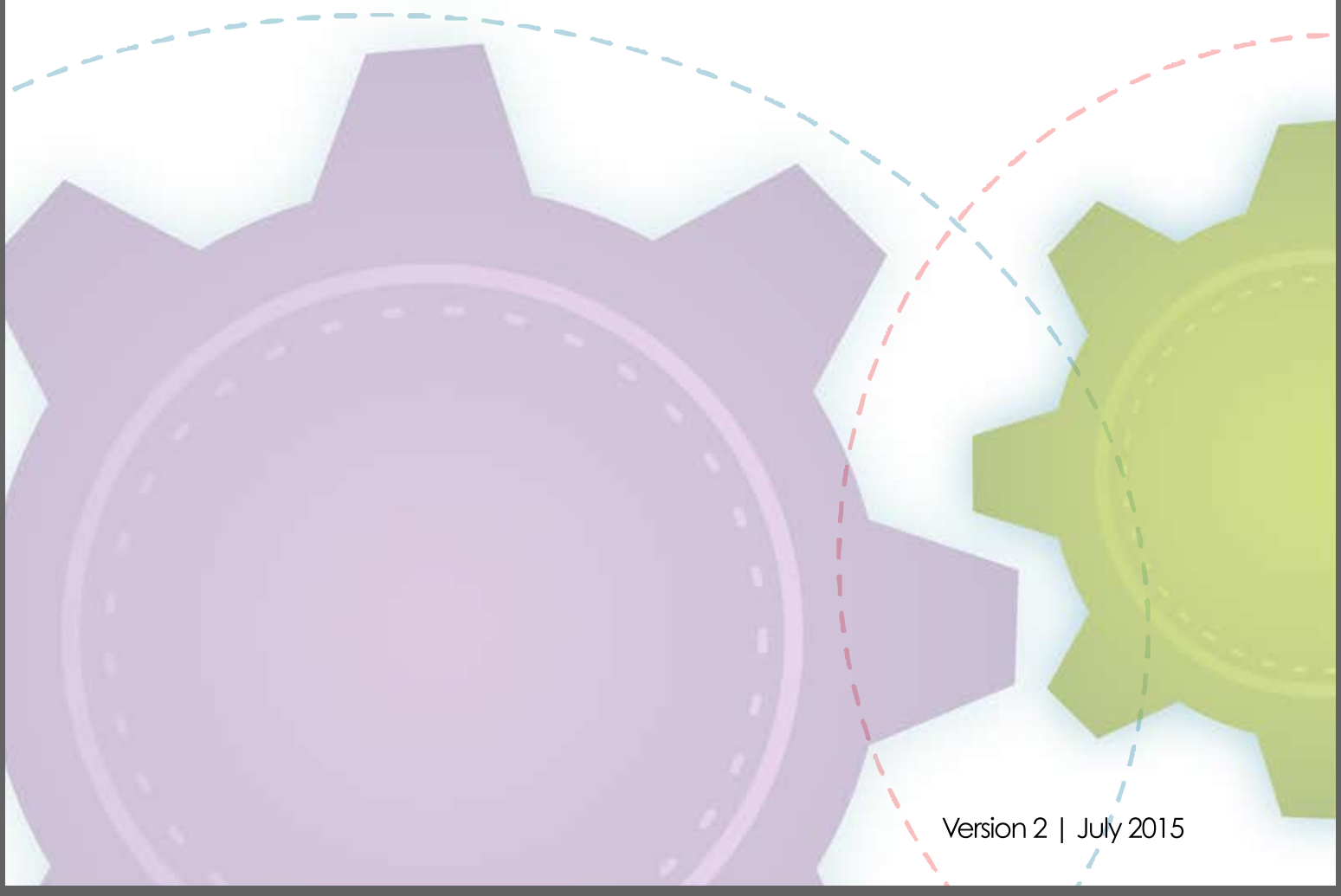
State Support Team

SLDS Data Use Standards

Knowledge, Skills, and Professional Behaviors for Effective Data Use



Version 2 | July 2015

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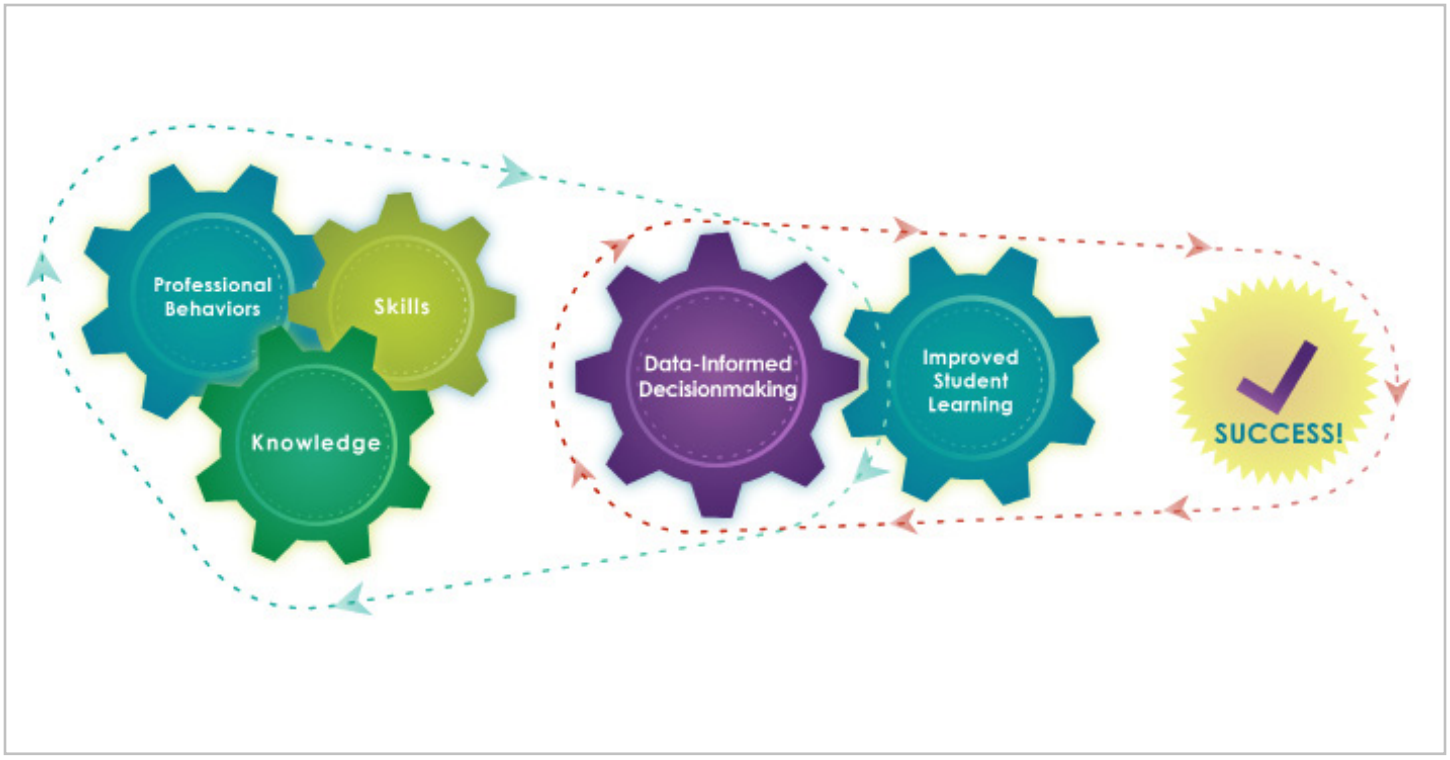

Figure 1. The knowledge, skills, and professional behaviors outlined in this resource help provide educators with the tools they need to make data-informed decisions to improve student learning.

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This publication is available online at *https://slds.grads360.org/#program/data-use-standards.*

Background

The Need

As state and local education agencies increasingly focus on serving educators with their data systems, a common challenge has arisen: identifying the critical knowledge, skills, and behaviors needed by teachers and administrators to use data effectively. Many states are creating data literacy and data use training programs for pre- and in-service educators without a common foundation on which to base the content. In addition, several state education agencies and educator preparation programs have begun communicating about how to create a stronger alignment between pre- and in-service training for educators regarding data use.

Goal and Objectives

Goal: To increase the effective use of data by teachers and administrators to support student learning and success.

Objectives

1. To provide a foundation for states' development of data literacy and data use trainings.
2. To inform and improve the articulation between pre- and in-service data training for teachers and administrators.

Contents and Intended Audiences

This resource details the essential knowledge, skills, and professional behaviors required by educators to effectively use data to inform instructional and programmatic decisions. Each of the three main sections is further divided into subsections that contain individual standards and associated clarifying information (see figure 2). Note that a few standards (e.g., *Data Quality*) appear in more than one section; these standards are indicated with a link icon (🔗).

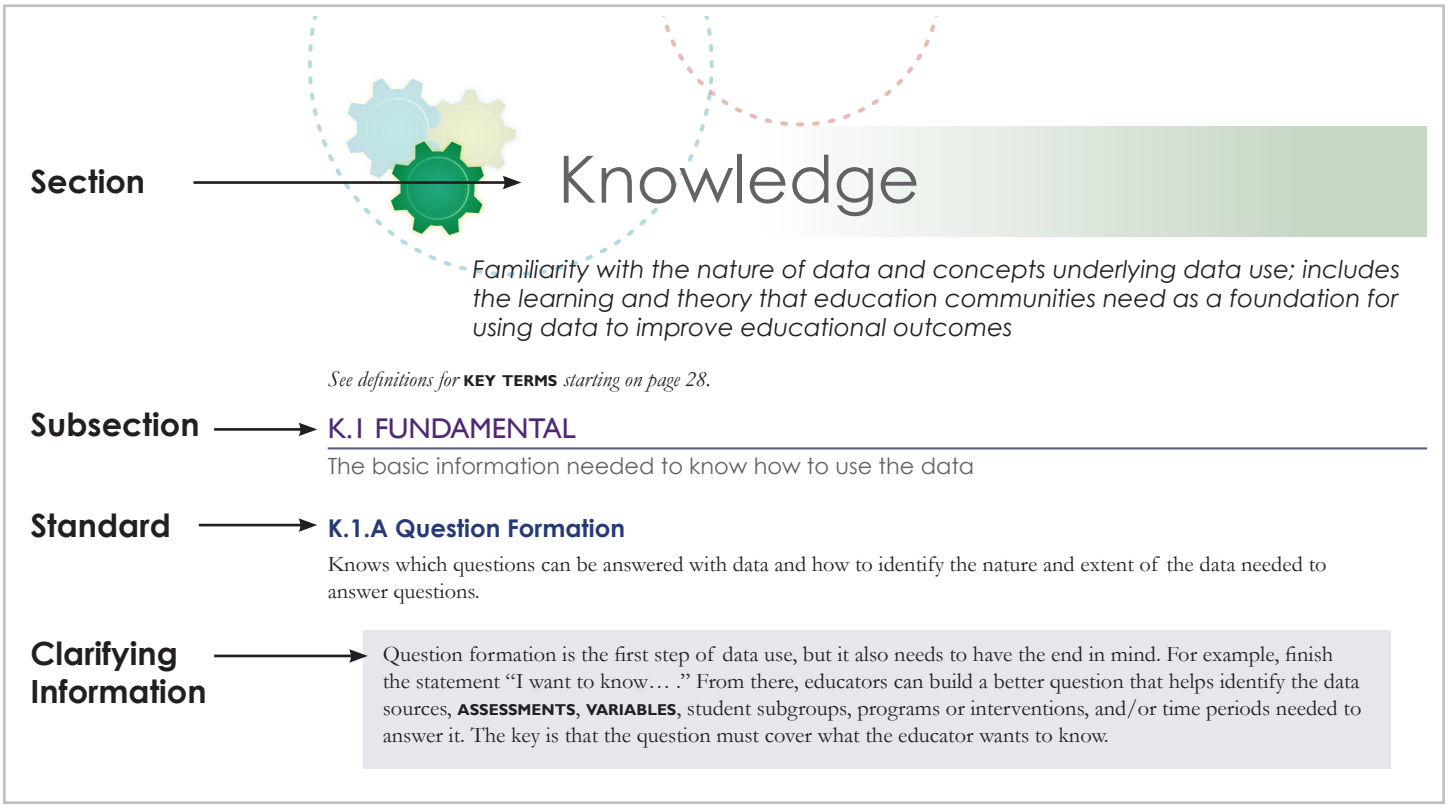

Figure 2. Data use standards are organized into sections and subsections. Each standard is accompanied by clarifying information to illustrate key concepts.

Each section concludes with one or two scenarios that illustrate the standards being applied by educators in real-world situations (see figure 3). A glossary of key terms is included to increase clarity. A companion publication, *SLDS Data Use Standards: Standards in Practice,* contains three case studies that illustrate standards across all three sections being applied by educators in real-world settings.

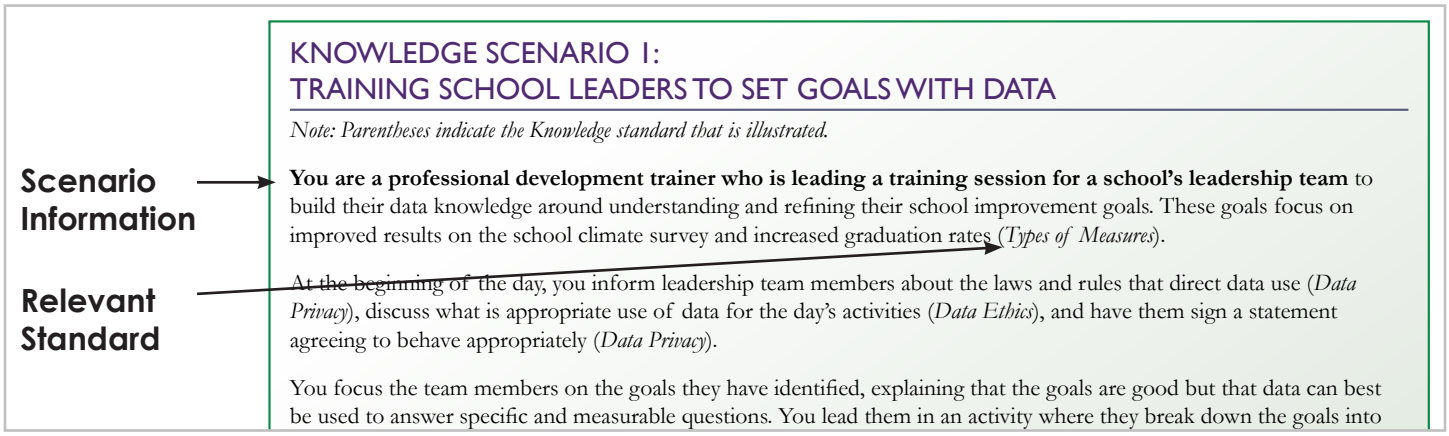

Figure 3. Each section includes scenarios demonstrating how standards can be applied in real-world situations.

This resource is intended to inform pre- and in-service educator training programs. The language is purposefully nontechnical to make it accessible for educators.

Approach

The content of this resource was developed by the Data Use Standards Workgroup of the Statewide Longitudinal Data Systems (SLDS) Grant Program. State agency staff from Hawaii and South Dakota generated the idea for the workgroup. An open invitation to participate was sent to all states via the SLDS listserv, and the workgroup was formed in November 2013.

Timeline

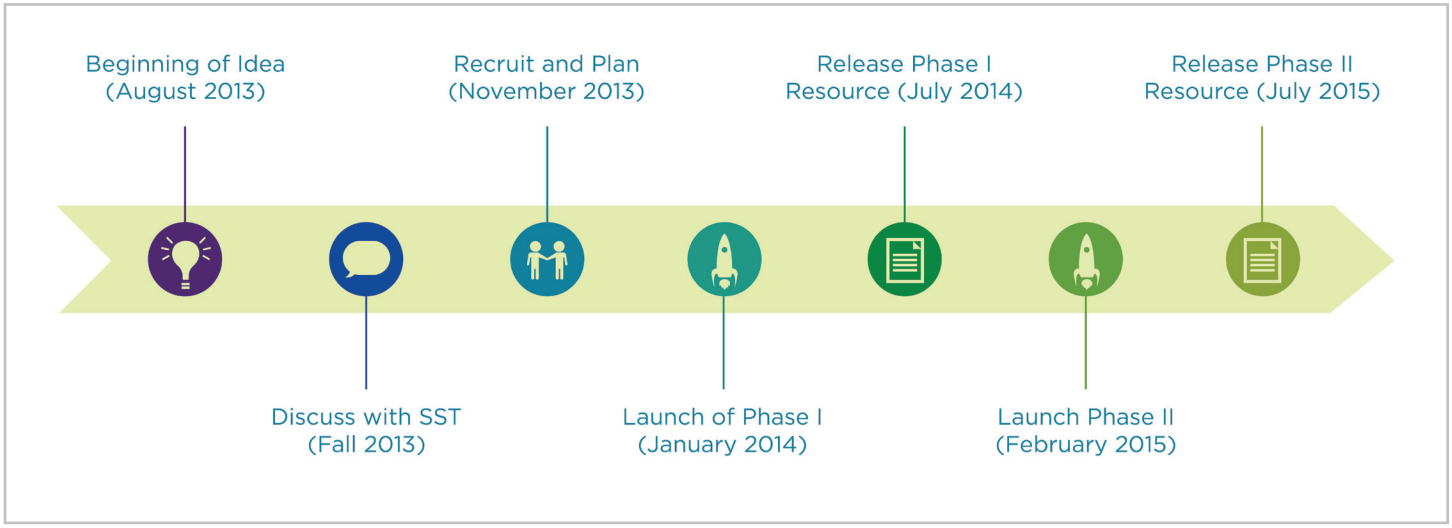

Figure 4. Timeline of the development of SLDS Data Use Standards resources.

Phase I

The workgroup launched Phase I in January 2014 with a two-day, in-person work session to define its goals, create subgroups to execute the work, and establish a project plan for creating this resource. Three subgroups were formed: Knowledge, Skills, and Professional Behaviors. Following the in-person work session, the full workgroup and each subgroup met monthly via webinar or phone call to review progress made and discuss issues that needed to be resolved.

The workgroup conducted a review of national and state educator standards to identify those that include references to data literacy or data use. The content of this resource was then aligned to those existing standards. The workgroup also performed a literature review of research on educator data use to identify common barriers to and facilitators of effective data use. Appendix B contains the list of primary references. Phase I of the workgroup concluded in July 2014 with the release of version 1 of this resource.

Phase II

Phase II began in February 2015 with another in-person work session to define the scope, subgroups, and products that would be created. Prior to the launch of Phase II, workgroup members began vetting the Version 1 resource with more than 10 external stakeholder groups composed of the resource's key audiences.

Phase II includes

1. this revision of the Version 1 resource to: (1) reflect feedback from external vetting; and (2) expand the clarifying information for each standard across all three sections;
2. one or two scenarios for each section of this resource that demonstrate the use of individual-level data and aggregate data in education settings;
3. three case studies that illustrate all three sections of this resource based on work in member organizations; and
4. criteria for and a call to the field to submit real-world case studies of how states have applied the knowledge, skills, and professional behaviors.

A fourth subgroup, Case Studies, was created to lead items 3 and 4, above. In addition, an advisory council was formed of members who conduct research on educator data use.

Authors

This resource was created by the 27 members of the Data Use Standards Workgroup representing 14 states and Guam[1] and facilitated by the SLDS Grant Program State Support Team. Members represent state education agencies, local education agencies, regional service agencies, postsecondary institutions, and state P-20W+ (early childhood through workforce) longitudinal data systems. Appendix A contains the list of workgroup members.

[1] California, Guam, Hawaii, Idaho, Illinois, Kansas, Montana, Nebraska, New Hampshire, New York, North Dakota, Oklahoma, South Dakota, Tennessee, and Washington.

Knowledge

Familiarity with the nature of data and concepts underlying data use; includes the learning and theory that education communities need as a foundation for using data to improve educational outcomes

See definitions for **KEY TERMS** *starting on page 28.*

K.1 FUNDAMENTAL

The basic information needed to know how to use the data

K.1.A Question Formation

Knows which questions can be answered with data and how to identify the nature and extent of the data needed to answer questions.

Question formation is the first step of data use, but it also needs to have the end in mind. For example, finish the statement "I want to know… ." From there, educators can build a better question that helps identify the data sources, **ASSESSMENTS**, **VARIABLES**, student subgroups, programs or interventions, and/or time periods needed to answer it. The key is that the question must cover what the educator wants to know.

K.1.B Data Quality

Knows that **HIGH-QUALITY DATA** are based on **VALID** data that are **RELIABLE**, accurate, **TIMELY**, and complete.

To be valid and meaningful to educators, data must be many things, including accurate and reliable. For example, if an educator uses a rubric to grade an assignment, the rubric must accurately measure the skills being assessed (**VALIDITY**). If the same rubric is used by another educator, then both educators must interpret the rubric the same way so that students receive comparable grades regardless of who scored their assignment (**RELIABILITY**).

See also B.1.A Data Quality

K.1.C Types of Data

Knows that data come in two main forms— **QUANTITATIVE** and **QUALITATIVE**—and that, within these forms, there are other categories.

Qualitative data are not numeric and can include words, images, sounds, and artifacts. For example, through interviewing parents, it could be determined that the school climate was considered safe and the school supported career or college readiness. Quantitative data are numeric. For example, a review of students' records could show that out of 152 students in the high school senior class, 107 are going on to a four-year postsecondary institution while 10 students are joining the military and 22 plan to attend a technical institution.

K.1.D Types of Measures

Knows various types and purposes of **ASSESSMENTS** and other **MEASURES**.

Five categories of data measures are commonly used by educators: achievement data, perception data, demographic data, school process data, and program data. These categories may be organized, grouped, or labeled differently depending on which data **ANALYSIS** approach is selected. These measures are often used to understand a school's impact on student outcomes. Educators then describe and interpret these measures using averages, frequencies, growth calculations, and many more methods.

K.1.E Data Metric

Knows that **MEASURES** can be broken down into data metrics, which are calculated for **ANALYSIS** and monitored for changes.

Educators use various data metrics every day, from average daily attendance to grade point average (GPA). How these metrics are calculated is very important. For example, graduation rate is a common metric. Some education agencies calculate this rate by finding the percentage of seniors who graduated. Others look back to find out what percentage of entering freshmen graduated four years later. Understanding the calculations and differences in metrics is important to putting the data into context.

K.1.F Data Sources

Knows different types of data sources and the benefits and limitations of using each.

Educators have many different types of data sources available to them. For example, educators may want to determine college-going rates for students. They can either work with their local institutions to gather data or seek out data from a third-party partner, such as the National Student Clearinghouse. Educators need to know the benefits and limitations of each data source so they can pick the source most appropriate for their purpose.

K.1.G Data Representations

Knows common ways of representing and reporting data through various types of tables, charts, graphs, etc.

Sometimes educators want to observe data in a visual format. For example, graduation rate **TREND** data may be best displayed in a line graph, and achievement data may be best displayed in a stacked bar graph. However, when exact values are needed, data tables may be the best option.

See also S.5.B Representation *and* B.1.C. Representation

K.2 PROCESSING

The knowledge needed to understand actions that can be taken with data

K.2.A Types of Analysis

Knows basic types of **ANALYSES** and when to use them.

A common error for educators is to confuse **CORRELATION** with causation. Just because two traits or characteristics are frequently found together does not mean that one of the traits causes the other trait to be present. For example, if data show that all sixth-grade boys at a given school who read Book A scored proficient on statewide reading **ASSESSMENTS**, it would be inappropriate to conclude that all sixth-grade boys would be proficient if required to read Book A.

K.2.B Data Analysis Tools

Knows there are different technology tools that can help collect, store, and analyze data, and that each has advantages and disadvantages.

As an educator's data use skills develop, the types of data **ANALYSIS** tools available for use are likely to expand. While common software may be adequate for analyzing classroom datasets, users of large datasets benefit from specialized software designed to ensure the accuracy, flexibility, speed, and ease of analyses. It is important to consider which tool is most beneficial for the intended purpose before preparing the data for analysis. Using a rudimentary tool for complex analyses may introduce inadvertent errors, result in inaccurate **FINDINGS**, or incur additional work on the part of the individual.

K.2.C Data Collection

Knows that **DATA COLLECTION** can be performed using different methods and at different points in time.

When deciding to collect data for **ANALYSIS**, understanding the foundational components—especially how the data will be used—is critical to determining how the data will be collected. Certain data types lend themselves to particular data collection methods. For example, surveys or interviews are more suitable than **ASSESSMENTS** and observations for collecting data about how safe students feel at school; however, assessments and observations are more suitable for collecting data about students' academic performances.

K.2.D Data Context

Knows the circumstances and purposes for which data are collected.

How data are collected can change the meaning of the data. Rather than starting a new **DATA COLLECTION**, an educator might choose to use an existing dataset. Before using an existing dataset in an **ANALYSIS**, the educator should know why the data were collected and what limitations apply to those data. For example, using self-reported or anecdotal data collected at the beginning of the school year for pre-test or **BASELINE** purposes in place of culminating high-stakes proficiency scores for students would introduce conflicting purposes.

K.2.E Data Format

Knows that organizing data is important and affects how questions are answered.

Different purposes for data **ANALYSIS** require data to be entered in different configurations accordingly. For example, if the question has a **FORMATIVE** purpose, the data need to be organized in a manner that provides actionable results (e.g., organized to produce individual student-level data versus classroom-level data). Educators benefit from knowing how the data need to be organized for the intended purpose and analysis tool prior to beginning their **DATA COLLECTION**.

See also S.4.A Formatting

K.3 CONSIDERATIONS

The knowledge of best practices regarding data use

K.3.A Data Assumptions

Knows that assumptions affect the interpretation and usefulness of data.

There are many things an educator may take for granted when collecting or analyzing data. For example, an educator may assume people answer truthfully on a survey. In reality, some respondents may have inflated or deflated their responses based on how the survey will be used. Another educator may assume that a test accurately assesses students' skills, but a student could have cheated on the test.

K.3.B Data Limitations

Knows that data have limitations and that these limitations affect the interpretation and usefulness of data.

Even though data can help answer many questions, there are potential weaknesses in data that are not under the user's control. For example, when trying to measure student achievement, the data are only as good as the test itself. When conducting a parent survey on school climate, responses may be affected by the family's ability to access the Internet as well as their language and reading skills.

K.3.C Data Culture

Knows best practices that contribute to a culture that values data and research-based solutions.

Educators are encouraged by a culture that promotes effective data use within the classroom, across teams or departments, and throughout the school or district. For example, educators can set the example for others by incorporating data discussions into team or staff meetings. Educators can also stay informed of current research so they can implement ideas that worked for others into their own work.

See also B.1.E Culture

K.3.D Privacy and Security

Knows federal laws, state laws, and district policies related to data **PRIVACY**, security, **CONFIDENTIALITY**, **HUMAN SUBJECT** rights, and appropriate use.

There are many regulations and policies that govern how data are used and secured. One overarching federal law is the Family Educational Rights and Privacy Act (**FERPA**). This law protects the privacy of student education records and gives parents and students certain rights with respect to education records. Education researchers abide by ethical principles for the protection of human subject rights. This ensures that the rights, welfare, and wellbeing of students, teachers, and/or their data are protected if they are involved in academic research.

K.3.E Data Ethics

Knows ethical practices regarding the appropriate use of data when sharing information and reporting to others.

While laws set the legal parameters that govern data use, ethics establish the fundamental principles of "right and wrong" that are critical to the appropriate management and use of education data. Local policies help enforce ethical practices, but ethics are also an individual's professional responsibility. For example, an educator using data ethically would be careful not to make judgments about people based solely on data. He or she would also take steps to minimize any possible **BIAS** or errors in a data presentation.

See also B.1.D. Ethics

KNOWLEDGE SCENARIO 1: TRAINING SCHOOL LEADERS TO SET GOALS WITH DATA

Note: Parentheses indicate the Knowledge standard that is illustrated.

You are a professional development trainer who is leading a training session for a school's leadership team to build their data knowledge around understanding and refining their school improvement goals. These goals focus on improved results on the school climate survey and increased graduation rates (*Types of Measures*).

At the beginning of the day, you inform leadership team members about the laws and rules that direct data use (*Data Privacy*), discuss what is appropriate use of data for the day's activities (*Data Ethics*), and have them sign a statement agreeing to behave appropriately (*Data Privacy*).

You focus the team members on the goals they have identified, explaining that the goals are good but that data can best be used to answer specific and measurable questions. You lead them in an activity where they break down the goals into specific questions (*Question Formation*). A goal related to high school graduation was refined into two questions. The first focused on the full student population: "For the past four years, what percentage of 12th graders graduated in four years?" The second focused on a targeted subgroup of students: "How does the graduation rate of English Language Learners compare to students who were non-English Language Learners for the past four years?" A goal to improve the school climate was refined to focus on differences between the general student population and those students who were chronically absent, or absent 10 percent or more of school days. The group agreed to the questions, "What are the trends in school climate for the entire school population over the past four years?" and "How does attendance correlate with school climate?"

You ask the participants what data they have that tells them whether they met these goals (*Data Sources*). Leadership team members explain that they know which students graduate in four years because they already have a report in their student information system that is easy to understand (*Data Format*). The school climate survey is distributed to students in the spring of every year (*Data Collection*). Team members can access the results using multiple spreadsheets in Microsoft Excel (*Data Analysis Tools*).

One person raised the concern that the school climate survey does not contain attendance data (*Data Limitations*). With these data unavailable, the group decided to drop the question that focused on the correlation between attendance and school climate. Another person expressed concerns that the graduation rate may not be accurate because of special education students who stay with the school until they age out (*Data Assumptions*). Acknowledging this, the group confirmed that the four-year graduation rate would still be the best, yet not ideal, measure as it is used by the district and state to determine supports and consequences (*Data Context*). Others expressed concerns about the accuracy of the school climate survey, as 30 percent of students did not take the survey (*Data Quality*). The group decided that it would discuss how to better increase the response rate next year.

You explain that the next step is to determine what they need to do to analyze the data. Members agreed that the questions lend themselves to descriptive analysis, where averages and frequencies are used to help understand the data (*Types of Analysis*). One member suggested that the group could look at predicting the likelihood a student will graduate in four years based on whether they are an English Language Learner or not. Other group members expressed concern that such an analysis would exclude many other factors influencing whether or not a student graduates and could therefore be interpreted incorrectly. The group determined that this analysis would not be appropriate for the purposes of its work or for results reported to the school board (*Data Ethics*).

KNOWLEDGE SCENARIO 2: TEACHING FUTURE EDUCATORS TO USE DATA IN THE CLASSROOM

Note: Parentheses indicate the Knowledge standard that is illustrated.

You are a professor who trains future teachers on how to use data. Your course is required as a part of the curriculum, so the course must apply to both general education teachers as well as content subject teachers, from arts to world languages.

You come up with a classroom example through which you will lead the class over the course of the term to explain the process of data use from beginning to end. In the example, a high school World History teacher thinks certain students excel more than others. The teacher does not see any specific reason for this discrepancy in knowledge base and asks the question, "Is there a difference in the backgrounds of the students that seem to do better in this class?" (*Question Formation*). The teacher would then look at the school, the district, the state, and other sources of data to try to find valid and reliable data (*Data Quality*) about her students' backgrounds. The teacher may find quantitative data that include grades in previous history courses or data on the number of history classes students have taken. The teacher could conduct a survey asking students how often they have seen similar information in the past. The teacher should also look at demographic characteristics like student gender and whether or not the student is receiving support services. Finally, the teacher could examine the types of history classes taken by the students in past years (*Types of Data*).

Once you finish explaining the processes of question formation and data collection, you move through the example to the next stage of data use. For this class, you have chosen to use the data program SPSS to conduct the analysis (*Data Analysis Tools*). After preparing some fictional data based on the data elements mentioned above, you instruct your class to open their datasets and then instruct them on how to use graphs to visualize the data elements (*Data Representations*) and how to calculate averages to look at trends in the data (e.g., "Do students who have taken two or more high school history classes before perform better, on average?"). You reinforce that the teacher needs to be mindful of the different types of classes that were taken (*Data Context*) when looking at the results of this analysis (*Types of Analysis*). You further explain that there are many other types of analysis that can be conducted to incorporate all the data you have collected and to predict which students may have trouble in the class (*Types of Analysis*). You also explain that this sample of data could be used to make generalizations about student success in history outside of your classroom (*Types of Analysis*).

Following the analysis section of the class, you conduct a section which covers how data can be misinterpreted because assessments may not measure actual knowledge (*Data Assumptions*), how data may not extend to some other students outside the World History teacher's classroom (*Data Limitations*), and how the use of data should include an inclusive culture so that best practices can be followed by all data users (*Data Culture*).

Finally, you close the class with a section on data privacy and ethics. You cover FERPA and other applicable state laws and also go through the process of when and how to apply to an institutional review board for human subjects protection applications. You emphasize that data use is a powerful tool in education and that the ethics surrounding data use need full respect.

Skills

The ability to access, collect, analyze, interpret, act on, and communicate about data using appropriate tools and representations in a manner appropriate for the educator's professional role and responsibility

See definitions for **KEY TERMS** *starting on page 28.*

S.1 PLANNING

Strategizes for data collection and management

S.1.A Goals and Questions

Identifies **BASELINE MEASURE(S)** and poses questions that can be answered with data.

Focus on setting goals that are specific (include who, what, when, where), measurable (numerically or **DESCRIPTIVELY**), achievable (considers resources needed and is realistic), relevant (consistent with the mission), and time-bound (has realistic deadlines). The baseline measure is the starting point, and the measurement is the means of determining whether the goal has been met. Once the goal is set, questions answerable with data can be asked to inform progress on the goal.

S.1.B Alignment

Aligns question(s), type of data needed, and measurement tools (e.g., **ASSESSMENTS**, surveys, etc.) with goals and objectives.

Once the question (matched with the goal) is asked, the data must be appropriate to answer the question and the measurement tool must be adequate to gather the data needed to answer the question.

Goal	Objective	Question	Data	Measure
All students are proficient in expository writing.	All students will have at least one opportunity each month to practice expository writing.	What is the level of student proficiency in expository writing?	Samples of expository writing from all students.	Rubric to assess the expository writing.

Table 1. Aligning data and measurement tools to a specific goal.

S.1.C Data Management

Develops and implements a consistent and ethical **DATA COLLECTION** plan with procedures for data management and **DATA DOCUMENTATION**.

Educators can develop a data collection plan that includes who will collect data, when it will be collected, how it will be collected, how it will be stored and analyzed, what the data mean (data documentation), and what procedures will be used to ensure accurate data. Ethical considerations include such things as keeping individual student data confidential, putting mechanisms in place to ensure data security, and providing adequate training for those who collect and for those who analyze the data.

S.1.D Data Meaning

Identifies different types of data and can explain specific **DATA DEFINITIONS** and how data are collected and formatted.

> Data definition means that educators can explain how the **MEASURE** was defined. For example, proficiency in reading might be defined as scoring above 75 percent on an identified reading test. Educators must understand how data were collected, what data were collected, how they were stored, and what the data mean.

S.2 SELECTING

Locates, accesses, develops, and evaluates data sources

S.2.A Data Discovery and Data Acquisition

Identifies and locates appropriate data sources and can access the data from various sources (e.g., classroom, school, district, state sources) for **DATA ACQUISITION**.

> Data are available at different levels and in various formats. At the classroom level, teachers might access individual student data related to performance and demographics kept on a spreadsheet. The school might have data on factors such as school attendance and graduation data housed in a web-based platform. At the district or state level, there could be databases that include information from across schools. Different permissions might be needed to access information at different levels, and the educator knows who to ask about the existence of and how to get access to different types of data.

S.2.B Critical Evaluation

Knows how to perform **CRITICAL EVALUATION** on data sources for reputability, quality (including **VALIDITY** and **RELIABILITY**), relevancy, and ability to address the identified need.

> Educators look at sources of data with a critical eye and ask questions about the data and their source, including: Is the source of the data a reputable organization or institution? Are the data relevant to the information need? Does the instrument used to collect the data have adequate reliability? Is the instrument a **VALID MEASURE** of what it purports to measure, and was it used to collect data from the audience for which it was intended?

S.2.C Development of Measures

When necessary, designs **ASSESSMENTS**, tests, surveys, questionnaires, and other **MEASURES** in order to gather data appropriate to answer education questions.

> At times, educators may want to gather information using tools specific to their needs, and available measures do not provide the information of interest. For example, surveys for parents or questionnaires for students related to particular school factors, or assessments targeted to specific classroom instruction may need to be developed. When educators need these tools, they also require skills in such things as survey design to develop them. Any measurements developed should undergo **CRITICAL EVALUATION** for data quality purposes.

S.3 COLLECTING

Uses appropriate technologies and methods in acquiring data

S.3.A Facilitation

Collects data in ways that ensure **VALID**, **RELIABLE** data and that minimize **BIAS**.

Problems can occur while data are being collected. For example, if a teacher gives tests to different students or groups of students under different circumstances, such as providing hints to one group or having a study session immediately before the test for one group, the **RELIABILITY** of the data may be questionable. If an **ASSESSMENT** designed for use at the high school level is given to sixth graders, the **VALIDITY** of the assessment is in question. If questions on a survey use scales that are unbalanced (strongly agree, agree, slightly agree, disagree), the resulting data could be biased.

S.3.B Technology

Uses appropriate technologies to collect, access, and store data.

Educators need to be able to use technology in various ways related to data. Examples include gathering data using online **ASSESSMENTS**, accessing district-level data via a web-based tool, or storing student information in a spreadsheet or database.

S.3.C Multiple Measures

Uses **MULTIPLE MEASURES** (e.g., **FORMATIVE**, **SUMMATIVE**, **GROWTH MEASURES**, etc.), appropriately.

Educators should not rely on a single **MEASURE** to determine student performance and must be able to connect information from various sources. For example, **SUMMATIVE ASSESSMENT** data should be compared to and interpreted in the context of **FORMATIVE ASSESSMENTS** and classroom observation. Summative data should also be looked at in relationship to initial **BASELINE** data.

S.3.D Modifications

Makes appropriate modifications and **ACCOMMODATIONS** in **MEASURES** and collection conditions.

Accommodations are used to enhance access for individuals, such as altering the testing environment or altering the **ASSESSMENT** format. Examples include providing extended testing time for a student with a learning disability or allowing speech-to-text applications to be used by students with writing difficulties. Modifications change the expectations, such as shortening a test for some students or using a different scoring rubric or grading scale based on individual student needs.

S.4 ANALYZING

Exhibits the technical skills necessary to examine data

S.4.A Formatting

Formats data in ways that allow appropriate **ANALYSIS**.

Educators can organize data in a pre-established format appropriate for the type of analysis to be conducted. Data can be in numeric format, such as in spreadsheets or databases, or in text format. It is important to translate

text data (agree/disagree scales for example, or yes/no) into numeric data to allow for **QUANTITATIVE** analysis. Labeling of data is important as well as indicating the type of data (date, currency, general number, percent, etc.) and if using general numbers, specifying the number of decimals to be used. Educators understand, for example, if wanting to compare pre- and post-test data (matched data), an identifier should match the data, or pre- and post-test data can be entered on the same horizontal row (for example in a spreadsheet).

See also K.2.E Data Format

S.4.B Data Cleaning

Identifies data issues that might impact **ANALYSIS** (e.g., missing data, inaccurate data, etc.)

Before beginning analysis, data must be examined to identify errors. For example, numerical data should be assessed for outliers by examining the range of values, where data falling outside the expected range could be data errors. For nominal data, **DESCRIPTIVE** analysis of all categories could help identify erroneous categories or misspellings of the same category type (e.g., in an examination of gender you may find the following categories: female, femal, male, mail). Inaccurate data should be corrected prior to analysis.

S.4.C Aligned Analysis

Using appropriate technologies, conducts **ANALYSES** suitable for the type of data collected, the **VARIABLES** identified, and the questions or hypotheses posed.

Identifying the percentage of students within performance categories on an **ASSESSMENT** or aggregate scores from a group is **DESCRIPTIVE** analysis and thus describes performance across a population. Descriptive analysis is the most common and simplest type of analysis. To identify relationships between **MEASURES**, a **CORRELATIONAL** analysis may be used. **INFERENTIAL** analysis will show significant group differences and **PREDICTIVE** analysis will demonstrate how one measure can be used to predict outcomes on another measure. Excel spreadsheets or statistical packages can be used for many of these analyses but will likely require training to use effectively.

S.4.D Considerations

Appropriately considers **SCORE DISTRIBUTION**, means, proportions, and other statistical and contextual information during **ANALYSIS**.

In an analysis of group performance, a set of extremely high or extremely low scores can skew aggregate scores, such as a group mean, in a high or low direction, respectively, thus making the group average less representative of the group overall. This is a particular danger when scores are aggregated across smaller groups of individuals because each individual score will have more influence on the aggregate score (mean). In such cases, it may be more appropriate to identify the middle score (median) or the most common score (mode) of a group to understand the group's overall performance.

S.4.E Comparisons

Compares various data for **TRIANGULATION** and progress monitoring (e.g., comparing **BASELINE** and current data, comparing numeric and verbal data, etc.).

Data from multiple data sources should be examined for consistency in performance outcomes to help inform instructional and intervention decisions. Data can also be assessed over time to identify performance changes in relation to instructional and intervention programs put in place. **QUALITATIVE** (verbal) data can be compared to **QUANTITATIVE** (numeric) data to see whether the qualitative data support the quantitative **FINDINGS**.

S.5 INTERPRETING

Constructs meaning from data within a particular context

S.5.A Locating

Locates data in tables, graphs, and charts.

Educators need to be able to locate data presented in various forms. In the bar chart below (figure 5), the designators on the horizontal axis stand for specific subscales on a reading test for third grade. The red shading indicates students who did not meet standards on those subscales. Educators can identify which of the subscales had the highest percentage of students who did not meet the expectations.

Figure 5. Third-grade reading assessment scores, by subscale indicator.

S.5.B Representation

Recognizes when data are misrepresented or used in misleading or inappropriate ways.

The educator is able to avoid representing data in misleading or inappropriate ways, such as using percentages with small sample sizes, or comparing school-level data using percentages between a large and a small school. Other examples of representing data in misleading ways would be using a graph where the y axis does not start at zero, not providing a scale on the x axis of a graph, or removing outlier scores on a scatterplot. The educator is able to determine when others make inferences from data that were not intended for that particular purpose.

See also K.1.6 Data Representations *and* B.1.C Representation

S.5.C Patterns

Identifies patterns, **TRENDS**, and gaps in data and suggests reasons for their occurrence.

Educators can look at data, see patterns and trends, and begin to think about potential reasons for those patterns that can then be explored further. For example, in the chart below, the green line shows the percentage of Limited English Proficient (LEP) students meeting or exceeding a test standard, while the blue line shows the percentage of non-LEP students meeting or exceeding the same standard. In looking at the pattern, it appears that data were not collected for LEP students prior to 2008. Between 2008 and 2011, there was improvement in the performance of LEP students so that it was similar to that of non-LEP students in 2011.

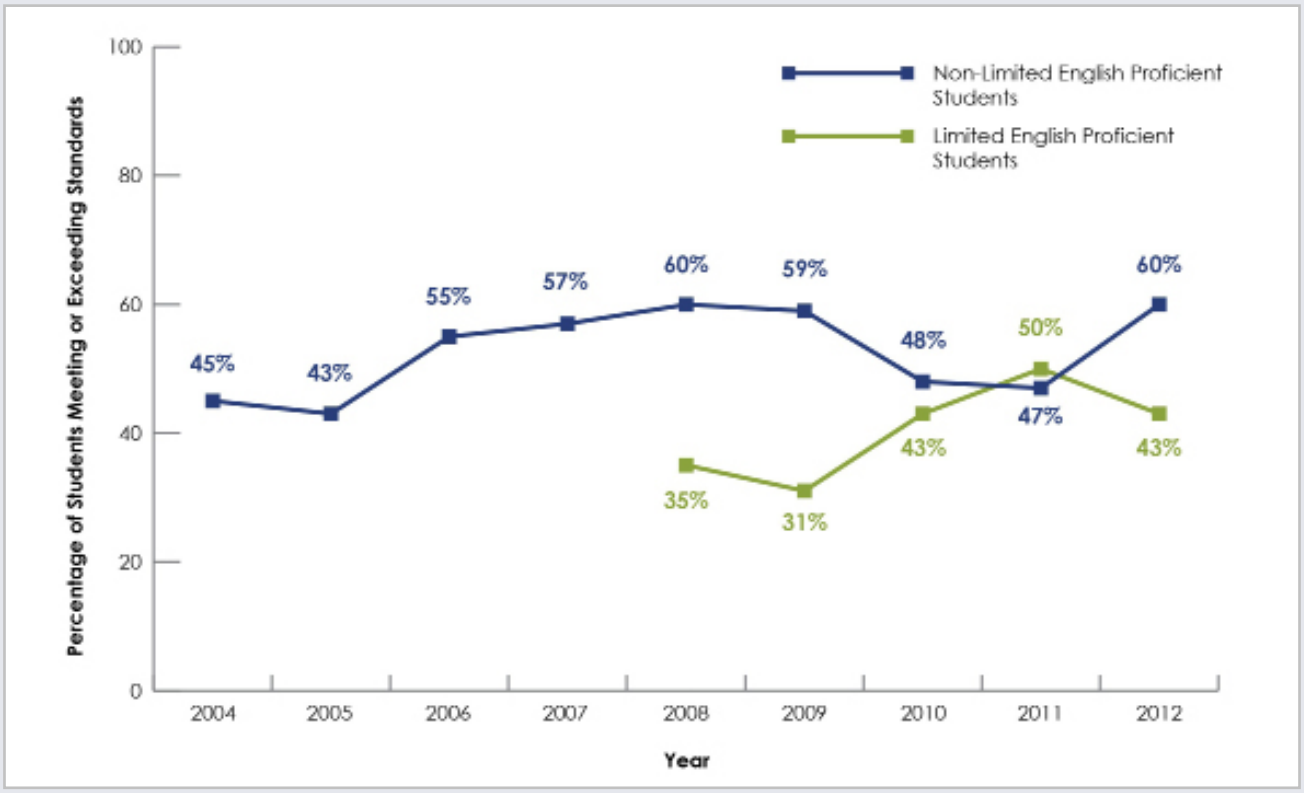

Figure 6. Proficiency rates of LEP and non-LEP students.

S.5.D Congruency

Interprets data **CONGRUENT** with statistical rules (e.g., **SCORE DISTRIBUTION**, impact of extreme scores, and relationship between sample size and **GENERALIZABILITY**).

Educators interpret data such as mean scores by looking at more than just the scores themselves. For example, mean scores can be influenced by such things as extreme scores or bi-modal distributions (i.e., groups of students scoring at the high and low ends of a scale with few scores in the middle) and may not be an accurate reflection of average performance in those situations. Educators do not make statements generalizing data to a larger population without ensuring that there was an adequate sample size and that the sample was representative of the larger group. They do not imply a **CAUSAL** relationship based on **CORRELATION** data.

S.6 COMMUNICATING

Conveys information about data

S.6.A Presentation

Presents and displays data in various forms, both visually and in text, using appropriate technologies.

> Educators must be able to prepare such things as frequency tables, bar charts, line graphs, pictographs, and other visualizations, as well as summaries of **QUALITATIVE** data and text-based descriptions of data using standard and accepted practices in the field. They must use appropriate technologies (e.g., Microsoft Excel or chart functions in word processing programs) to develop professional-looking representations of data.

S.6.B Explanation

Explains different data representations and distinguishing features (e.g., histograms, bar charts, contingency tables).

> Educators should be able to explain to others how different ways of representing data are used for different purposes. For example, line graphs can show change over time, pictographs can show frequencies or compare items or ideas, pie charts can show percentages, scatter plots can show relationship direction and strength of relationships, etc.

S.6.C Multiple Audiences

Communicates effectively about data, interprets **FINDINGS**, and explains progress toward goals to a variety of constituent groups (e.g., students, families, and colleagues).

> Educators must be able to explain data and interpret findings in different ways to meet the needs of different audiences. For example, how a school communicates with parents and the community about third-grade reading performance may be different from how teachers communicate with one another about the same data. More simplified representations of the data with brief descriptions might be provided for public consumption, while the teachers may be presented with more detailed information such as performance on subscales, performance ranges, and differences in performance across different groups.

S.7 ACTING

Employs appropriate strategies based on findings

S.7.A Strategies

Identifies appropriate strategies grounded in evidence to address the needs and goals identified during data **ANALYSIS**.

> Educators use high-quality sources of information to help identify potential strategies to address needs or to reach goals. These sources can include studies reported by reputable sources, government reports, or strategies supported by theory or logic models.

S.7.B Action Plan

Develops and implements an action plan that includes provisions for evaluating the plan's effectiveness, and can clearly articulate the link between the data, **FINDINGS**, and plan to appropriate audiences.

Educators can explain to others the link between the data (for example, male students score significantly lower than female students on a third-grade reading **ASSESSMENT**), an interpretation of the data (literature suggests that male students are engaged by different types of reading material than female students), and a choice of action (the educator plans to use more non-fiction and graphic novels in reading instruction). Educators can also develop an action plan that explains who will do what in a specific timeframe, what resources are needed for each action, potential issues in implementation, and how progress will be evaluated, as shown in the sample plan below.

Goal: To improve reading performance of third-grade male students

Action Step	Timeline	Staff Responsible	Resources Needed	Possible Issues
Include in our second- and third-grade reading curriculum nonfiction books focused on sports and hobbies/skills (e.g., carpentry, mechanics) and graphic novels.	**June – July** Curriculum specialist identifies appropriate reading materials. **August** Materials purchased. **September – November** Curriculum specialist works with teachers to develop lesson plans. **January – June** Teachers implement new lesson plans.	• Curriculum specialist • Second- and third-grade teachers	• Funds to purchase materials • Professional development time for teachers	Determining which books will be removed from the curriculum to make room for the new materials.

Table 2. Sample action plan to improve reading scores for third-grade male students.

Evaluation: Male and female students' scores on in-class assignments will be compared. State test scores in reading will be reviewed to determine if the performance gap has decreased.

SKILLS SCENARIO: IMPROVING READING SCORES FOR THIRD-GRADERS

Note: Parentheses indicate the Skills standard that is illustrated.

You are a teacher at a small elementary school with a principal and 10 teachers. All of you work together to make decisions about how to improve the performance of students at your school.

In fall 2014, you review summative data from the state's required annual testing for the past few years and notice that third-grade scores on the state reading assessment from 2012, 2013, and 2014 are lower than desired, with only about 60 to 65 percent of students meeting or exceeding the standards. As a group, you decide that by the end of 2016, at least 70 percent of third-grade students will meet or exceed the state reading test standards (*Goals and Questions*).

To better understand potential explanations for the problem, you and your colleagues come up with a set of questions answerable with data (*Goals and Questions*). Are there common demographic characteristics among students who did not perform well on the test? Are there certain parts of the test—or subscales—where students did less well? You take these questions and develop a table to align the questions with the data needed to answer them (*Alignment*) and discuss where the needed data can be found (*Data Discovery and Data Acquisition*).

Goal	Questions	Data Needed	Data Location	Measure
Improve reading performance of students in Grade 3 so that by the end of 2016, 70 percent meet or exceed standards	• Are there common demographic characteristics among students who did not perform well on the test? • Were there certain parts of the tests where students had problems?	• Student performance data matched to demographic data. • Subscale scores on the reading test.	• District has state test data and the ability to match it with demographic information. • The school's state test report contains sub-score results.	• State reading test scores for different groups (male/female; low socioeconomic status / not low socioeconomic status; Limited English Proficient / non-Limited English Proficient) • State reading test subscale scores.

Table 3. Questions, data, and measures related to the goal of improving third-grade reading proficiency.

The baseline measure is the 64 percent of students whose scores meet or exceed the standards in reading overall on the 2014 state test. You plan to compare this baseline to results in 2015 and 2016 to determine progress toward the goal (*Comparisons*). You also want to compare subscale information. The group looks more closely at the subscale data and locates key information and patterns in both table and graph forms (*Locating*, *Patterns*) and can explain to one another the key features of each (*Explanation*). You can describe what each score actually measures (*Data Meaning*). For example, the subscale on reading comprehension is determined by how many of the 10 comprehension questions a student answers correctly after reading a passage.

Figure 7. Third-grade reading assessment scores, by subscale indicator.

You review a bar chart of student performance on reading assessments (see figure 7, previous page) and see that for subscale R.3.3.2.1 (reading comprehension), 68 percent of students did not meet the criteria. The pattern indicates that reading comprehension is an area where students are performing well below other areas, which answers your question about whether there are certain parts of the test where students did less well. You also know that the distribution of scores is a key consideration when interpreting data, so you review the students' score distribution for the 10 items that make up the comprehension score. You notice that the majority of items show a skewed distribution, with most students scoring at the lower end.

Area	Objective	Number of Items	Percent Meeting or Exceeding Standards
Reading Overall	R.3.1.1.1	75	64
Vocabulary Development	R.3.2.1.1	12	59
Word Identification	R.3.2.2.1	14	30
Reading Strategies	R.3.3.1.1	10	40
Reading Comprehension	R.3.3.2.1	10	3
Reading Fluency	R.3.3.3.1	9	47
Literary Elements	R.2.4.1.1	8	52
Literary Techniques	R.3.4.2.1	6	46
Literature	R.3.4.3.1	6	54

Table 4. Third-grade reading results from 2014.

Based on this interpretation, you decide to develop an action plan for the teachers in grades 1 through 3 to work together to focus on improving reading comprehension (*Action Plan*). You consult the district reading specialist, search the Internet, and review some research articles to determine how you might address reading comprehension (*Strategies*). Your research identifies several strategies that have proven effective for improving reading comprehension, including comprehension monitoring, cooperative learning, and the use of graphic organizers.

Your action plan includes monitoring comprehension development using formative assessments developed by the teachers in each grade level. You decide to use a technology tool to collect these formative assessments across classrooms to ensure consistency and to review data together to minimize bias (*Technology*, *Facilitation*). You realize that two students who have writing difficulties may need accommodation allowing the use of speech-to-text software for the assessment (*Modifications*). You also decide to implement cooperative learning strategies to improve comprehension.

In addition to the formative assessments focused on comprehension, you and your colleagues agree to assess the students' overall reading levels each year using a standardized test to look at their growth across the three grades. You select four possible tests to review and go through a process of critical evaluation before deciding on one you believe best meets your needs and has the most evidence of validity and reliability. You also agree that the participating teachers will develop two data presentations each year to share the findings (*Presentation*), one with more detailed analysis for the teachers and principal and one to share with parents and students (*Multiple Audiences*).

Back in your classroom, you decide that in addition to reviewing each student's formative assessment and growth data, you will look at data from the cooperative learning groups since you know that using multiple measures can help better understand where issues are occurring. You ask your third grade collaborative groups to use an online discussion tool that allows you to monitor their discussions. You develop a rubric as a measurement tool (*Development of Measures*) to review the discussion and assess the depth of comprehension exhibited by each student. You will score the group discussions and individual contributions and maintain the scores in an Excel spreadsheet (*Data Management*, *Technology*). You know that as you develop your spreadsheet, you need to consider the best formatting for the data that will allow analysis later and you must consider the type of data you will be collecting (e.g., nominal, ordinal, interval, or ratio) to ensure that your analysis is aligned.

Professional Behaviors

Habits of professional action based on values and beliefs that underlie an educator's practice as it is related to data use

See definitions for **KEY TERMS** *starting on page 28.*

B.1 ETHICAL USE

Commits to the proper use of data

Educators collect and use data about students, staff, and schools. Laws set the legal parameters that govern data use, and ethics establish fundamental principles of right and wrong in the management and use of data. Especially in the age of technological tools, it is important that educators understand and practice ethical data use. Throughout this section, strong words may be used, such as "should" and "essential." The intent is to emphasize that educators need to interact with data in a way that honors laws, protects **CONFIDENTIALITY**, preserves an educator's integrity, and encourages appropriate use of data to improve instruction.

B.1.A Data Quality

Strives to use, contribute, and maintain **HIGH-QUALITY DATA**.

Elements of data quality include consistency, accuracy, integrity, relevancy, timeliness, completeness, **VALIDITY**, and **RELIABILITY**, which can be affected by multiple factors in the **ASSESSMENT**, collection, and **ANALYSIS** processes. Data quality can be supported through well-developed assessments, assessments used for their intended purpose, representative samples, careful collection, and well-defined analysis procedures that involve clean and accurate data. For example, district officials may wonder if the number of tardies and absences correlate with student grades earned in classes. The superintendent could call for all schools to submit student-level data, including tardies and absences by course and course grades. However, each school might define tardies and absences differently, creating a data quality problem.

See also K.1.B Data Quality

B.1.B Transparency

Ensures the transparency of the collection, **ANALYSIS**, and sharing of data.

Educators clearly communicate to appropriate stakeholders the manner and extent to which data will be collected, analyzed, reported, and distributed. For example, after determining an appropriate intervention for a student, an RTI (response to intervention) team member who is the student's primary teacher may send a notice to the student's parents or guardian explaining how the intervention was determined and what **ASSESSMENT** data were used to make the determination.

B.1.C Representation

Avoids misleading, ambiguous, or inaccurate representations of data.

Educators who participate in training related to presenting and reading data become educated consumers of data and know how to share data accurately and professionally with others. For example, when presenting results as percentages, an educator should indicate the population or sample size. If state **ASSESSMENT** results show that 50 percent of assessment items were answered correctly for a standard, it would be misleading not to provide the total number of items, especially if the number is low.

See also K.1.G Data Representations *and* S.5.B Representation

B.1.D Ethics

Promotes the ethical use of data among colleagues.

Educators participate in training about their ethical responsibilities in accessing, using, sharing, and managing education data. A culture of **PRIVACY** and security is established with specific procedures and protocols that all members of a school community follow. For example, a school principal facilitates a staff meeting that includes administrators, teachers, paraprofessionals, and office staff. Collectively, the school staff identifies key principles of ethical conduct and develops specific policies and procedures for specific actions to take if the ethical code is violated. If a teacher inadvertently leaves student-level data on a printer that is accessible by students, a follow-up procedure for a first breach may be a notice from the principal reiterating proper security procedures. Each member of the school community develops a job-specific code of ethics that applies to individual work situations.

For more information, see *The Forum Guide to Data Ethics* from the National Forum on Education Statistics, *http://nces.ed.gov/pubs2010/2010801.pdf*.

See also K.3.E Data Ethics

B.1.E Culture

Ensures that data use is grounded in a framework of values and norms.

Data use is complex work. A culture of data use is established through leadership, norm setting, and time devoted to data use. Individuals working in isolation within a school or organization may work for a short-term project but is not sustainable and will not lead to organizational improvements.

See also K.3.C Data Culture

B.1.F Use

Reports any known data misuse to the proper authority.

Educators understand and follow locally determined protocols (e.g., those developed at the school, district, or state level) for documenting and communicating concerns about **DATA COLLECTION**, **ANALYSIS**, reporting, and distribution, as well as for destroying data properly. Professionals also identify appropriate authorities, as per the protocols, to contact regarding concerns of data misuse. For example, concerns regarding data use should be communicated through a chain of command (see figure 8, next page). Issues should be resolved efficiently at the lowest possible level and judiciously so that the rights and **PRIVACY** of all individuals are protected.

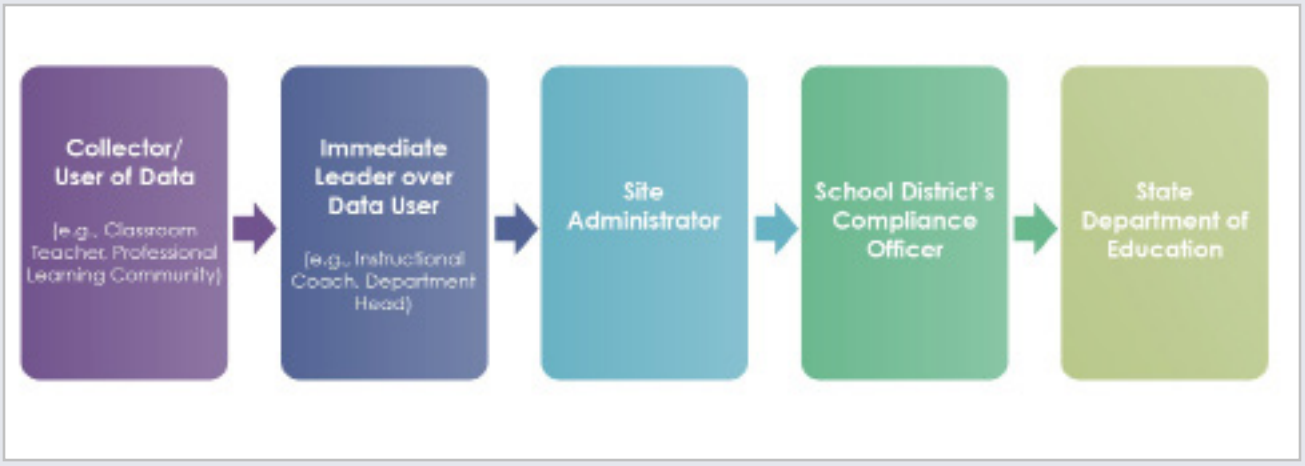

Figure 8. Communication tree for data use issues.

B.2 RULES AND REGULATIONS

Acts in accordance with the legal, social, and economic considerations involved in the use of data

B.2.A Rules and Laws

Acts according to national, state, and local organizational rules and laws regarding the collection and use of data (e.g., **HIPAA**, **FERPA**).

Educators are aware of the rules and laws governing data use and sharing. To the extent possible, there should be a person in every district or school who has high-level and current knowledge of relevant rules and laws to guide ethical and legal use of data. For example, results of individual student **ASSESSMENTS** can be shared only with those who have an educational right to know, such as the student, educators at the school who work with the student, and the student's legal guardian(s).

B.2.B Protection

Protects **HUMAN SUBJECTS** from **HARM** during and after using subjects' data.

Educators understand and follow federal and state laws and regulations in maintaining, using, and releasing student information. They protect the integrity and accuracy of student data and demonstrate **CONFIDENTIALITY** and **PRIVACY** at all times. For example, in addition to **FERPA** requirements, the Individuals with Disabilities Education Act (IDEA) provides privacy protection to students who are receiving special education services. Additionally, as schools use third-party applications to assist with classroom instruction, it is important that a district employee reviews the terms of service to ensure the third party meets any and all state and federal requirements. Every school must have one individual responsible for

1. ensuring the confidentiality of any personally identifiable information (PII);
2. training all personnel who are collecting or using PII on policies about confidentiality, privacy, and FERPA; and
3. maintaining a current list of all personnel who have access to PII. (34 CFR 300.572)

See the *Forum Guide to Protecting the Privacy of Student Information: State and Local Education Agencies*, *http://nces.ed.gov/pubs2004/2004330.pdf*

B.2.C Advocacy for Protections

Advocates for changes to existing laws or policies when needed to ensure the proper protection and use of data.

Occasionally, it might be necessary to update or change existing laws or policies in order to adequately protect students and educators while maintaining the ability to use their data for continuous improvement. Creating a case for improving existing laws to better protect students and educators can help policymakers understand the nature of and need for changes.

B.3 COLLABORATION

Facilitates a collective effort to use and share data

B.3.A Collaborative Use

Works effectively with colleagues to collect, analyze, and disseminate data.

Collaborating with others to collect, analyze, and disseminate data can provide additional perspectives, lessen redundancies, allow for shared workload, and create a systematic approach to continuous improvement. For example, a Professional Learning Community (PLC) team meets to analyze students' performance on state **ASSESSMENTS**. To help focus collaboration, a protocol is established that outlines exactly which data to examine in the reports, what the data mean, and how to measure students' performance levels. This sets the stage for identifying intervention strategies that support student learning.

B.3.B Collaborative Climate

Creates and supports a climate of trust and **CRITICAL REFLECTION** in order to engage colleagues in challenging but **PSYCHOLOGICALLY SAFE** conversations about data.

Team members must be honest with one another. Being honest includes being forthcoming with information, forgoing exaggerations, demonstrating personal integrity, and being willing to acknowledge mistakes and address any "elephants in the room." All members must be willing to share information and ideas, as well as to listen respectfully—through both verbal and nonverbal communication—and consider differing perspectives and solutions offered in discussions. Establishing group norms allows for consistent expectations as to how group members interact with one another. All of these elements establish trust—the hallmark of a collaborative climate.

B.3.C Outreach

Consistently and actively seeks professional, community, and technological resources within and outside the organization to support **ANALYSIS**, **CRITICAL REFLECTION**, and problem solving.

Reaching out to others and seeking resources is a way for educators to introduce new ideas, test ideas of their own, and keep current with regional, national, and international ideas that can positively affect their practice and the practice of others. Outreach also helps to perpetuate a collaborative climate and continuous improvement within an organization.

B.3.D Prioritization

Prioritizes time to analyze and use data.

Schools are constantly balancing multiple priorities. Data use can be integrated into existing school initiatives or incorporated into new initiatives. Leaders should encourage the use of data during staff or team meetings. All educators should view data use as a necessary part of teaching.

B.4 CONTINUOUS IMPROVEMENT

Embraces the challenge of evidence-based, continuous improvement and change through the use of data

B.4.A Problem Solving

Views challenges related to data as opportunities rather than as problems.

Many challenges exist on the way to creating systems in which educators effectively use accurate **MEASURES**. Creativity, collaboration, and innovation can address perceived barriers (e.g., access to accurate and **TIMELY** data, establishment of data teams, or fiscal and human resource allocation) and lead to the design of efficient processes and solution-oriented results.

B.4.B Improving Outcomes

Seeks to understand and use data to improve and advance outcomes for oneself and others over time.

Data are collected and used to demonstrate improvements for both students and educators. For example, prior to implementing a new program, educators can discuss the data needed to measure the program's impact on educator or student achievement. They can then create a plan to collect and use data to improve program outcomes.

B.4.C Professional Development

Recognizes needs and aligns professional development for oneself and others to build skills around data use.

Schools that embed knowledge, skills, and professional behaviors with data use throughout the organization promote a continuous cycle of learning. Staff meetings can include time for knowledge building; district and school professional development plans can contain data use training; and educator preparation programs can contain data use instruction. Educators should build data use training into their own plans.

PROFESSIONAL BEHAVIORS SCENARIO: PLANNING INTERVENTIONS FOR SEVENTH-GRADE MATH STUDENTS

Note: Parentheses indicate the Professional Behaviors standard that is illustrated.

You are a teacher at a small suburban middle school that has launched data teams and an intervention initiative to provide targeted math instruction for all seventh-grade students regardless of their performance level. Your school has scheduled intervention blocks four days a week for targeted instruction (*Problem Solving*).

Leadership and ownership of data use practices must start with the building principal, and all educators involved in the process must collectively build a culture that creates a safe environment to use data (*Culture*, *Collaborative Climate*). To encourage data use, the principal has prioritized staff and student time for the interventions, ensured that educators have scheduled planning time to analyze data (*Prioritization*, *Collaborative Use*), and required staff development activities related to action research or other aspects of data use (*Professional Development*).

The school's intervention team includes a cross section of educators beyond the seventh-grade math teachers (*Collaborative Use*), as many of the concepts in seventh-grade math can be reinforced in other subjects and additional educators are often required to assist with interventions (*Problem Solving*). Special education teachers, other core content teachers, and teachers of art, music, and physical education offer professional input on students they serve and help brainstorm interventions that might apply not only to math classes, but also to other classes.

Your first intervention team meeting is spent establishing and agreeing to meeting norms. Setting norms helps to guide and focus your team's work and create a positive working environment (*Collaborative Climate*, *Ethics*, *Culture*). Your team then determines which assessment data will be used to identify individual student needs, spends time analyzing and interpreting the data (*Data Quality*), and establishes how the data should be used (*Data Quality*, *Representation*).

When considering the use of assessment data, your team discusses the fact that national assessments often are not intended for skill analysis at the student level. It may be that a national assessment can measure overall grade-level competency (*Aggregate Data*) but is not valid or reliable at the skill level (*Representation*). You decide to reach out to assessment experts to understand the purpose and validity of the data from specific assessments (*Professional Development*). The school principal allows you to take the necessary time for this work and incorporates reports, updates, and conversations about this effort at staff meetings, parent meetings, and other meetings (*Culture*, *Outreach*, *Prioritization*).

One of the challenges of determining interventions is effectively using data to accurately identify the needs of each student (*Problem Solving*). You recognize that it is important for your team to have data that can evaluate the full spectrum of students, from those needing remediation to students needing more challenges. Once you determine the students' needs, your team collaboratively identifies how the interventions can be implemented (*Collaborative Climate*) and by whom. For example, fractions can be incorporated not only in math class, but also in art or physical education classes. This creates multiple opportunities for students to interact with fraction concepts in several classes (*Collaborative Use*).

As your intervention team discusses students, you consciously avoid using unnecessarily negative words like "slow" or "incapable" to describe students. Instead, you focus on what the data are telling you and use constructive criticism and feedback both in verbal discussions about each student's work and in each student's documentation (*Ethics*). For example, you might use phrases such as "challenged," "needs more practice in," or "may not understand yet." Throughout the process, your team works to understand and review, as necessary, any relevant legal requirements, such as the privacy requirements associated with special education information used in determining interventions (*Rules and Laws*). In addition, your team members work to understand the appropriate policies to secure data. For example, leaving a flip chart in a public space with student names and performance is inappropriate (*Rules and Laws*, *Protections*). If rules are violated, you provide a safe environment for staff members to identify the issues and bring them forward for resolution (*Use*, *Culture*).

When student interventions are determined, you reach out to parents via email or mail. The communications include a description of the assessment data that was used to determine the intervention (*Transparency*), as well as the specific interventions that will be used. It also includes information about how the parent can play a role in improving their student's learning (*Collaborative Culture*).

As is frequently the case with school initiatives, demonstrating professional behaviors should be an interactive and iterative process where teams are constantly revisiting each student's performance, the effectiveness of current interventions, and the need to adjust instruction as necessary (*Improving Outcomes*). Data use professional behaviors are ingrained in all aspects of a successful school culture.

Key Terms

As they are related to data or data use

KEY TERMS *are designated throughout the document.*

ACCOMMODATION	An alteration of environment, format, or equipment that allows an individual to gain access to content and/or complete assigned tasks.
ANALYSIS	The process of systematically applying statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data.
ASSESSMENT	The systematic collection, review, and use of information about education programs undertaken for the purpose of evaluation or improvement. *Assessment* can also refer to an instrument, tool, or method of obtaining information from tests or other sources about the achievement or abilities of individuals (adapted from the National Council on Measurement in Education's Glossary of Important Assessment and Measurement Terms, *https://www.ncme.org/ncme/NCME/Resource_Center/Glossary/NCME/Resource_Center/Glossary1.aspx*).
BASELINE	The level of performance at the start of data collection that can be used to measure change in indicators in the future.
BASELINE MEASURES	Variables or metrics used to identify an individual or group's initial level of performance at the start of the data collection process prior to a program or intervention.
BIAS	Anything that produces systematic but unexpected variation resulting in inaccurate results.
CAUSAL	A type of data analysis used to try to determine a cause-and-effect relationship.
CONFIDENTIALITY	The responsibility of a person who has access to another individual's personal data not to share the data without consent.
CONGRUENT	Matching or in agreement with something.
CORRELATION	Describes when two variables are related, but where the relationship may not be causal. A positive correlation occurs when the values of two variables increase together (e.g., years of education and income). A negative correlation occurs when one variable increases while the other decreases (e.g., number of absences and grades).
CRITICAL EVALUATION/REFLECTION	Disciplined thinking that is informed by evidence.
DATA ACQUISITION	The process of collecting or gaining access to and organizing information.
DATA COLLECTION	The process of gathering and measuring information in a systematic fashion to answer questions.
DATA DEFINITION	Language for describing data or information structures.
DATA DOCUMENTATION	Information on the context of data collection, including collection methods (e.g., sampling, instruments, technology used); data sources; data validation and modification; and data confidentiality, access, and use conditions.
DESCRIPTIVE	A type of data analysis used to describe a set of data using mean, mode, median, distribution, and more.

FERPA	The Family Educational Rights and Privacy Act (FERPA) (20 U.S.C. § 1232g; 34 CFR Part 99) is a federal law that protects the privacy of student education records. The law applies to all schools that receive funds under an applicable program of the U.S. Department of Education. FERPA gives parents certain rights with respect to their children's education records. These rights transfer to the student when he or she reaches the age of 18 or attends a school beyond the high-school level. Students to whom the rights have transferred are "eligible students." Learn more at *http://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html*.
FINDINGS	The principal outcomes of a research project examining data, and what the project data suggested, revealed, or indicated.
FORMATIVE	Describes information that can be collected and used to improve or inform progress during a learning opportunity.
FORMATIVE ASSESSMENTS	Tools or procedures used to collect information used to improve or inform progress during a learning opportunity. Also known as "assessments for learning."
GENERALIZABILITY	The extent to which inferences from specific facts, statistics, and/or real-world examples can be applied to broader groups or populations.
GROWTH MEASURES	Measures comparing the relative change in performance of one person on a specific test with the change in performance of all others on the same test.
HARM	Intentional or unintentional physical or mental damage or injury to subjects as a result of using subjects' data.
HIGH-QUALITY DATA	Data that are generally agreed upon as trustworthy and are gathered through a valid and reliable instrument or process.
HIPAA	The Health Insurance Portability and Accountability Act of 1996. The HIPAA Privacy Rule standards implemented by the U.S. Department of Health and Human Services address the use and disclosure of individuals' health information—called "protected health information" by organizations subject to the Privacy Rule ("covered entities")—as well as standards for individuals' privacy rights to understand and control how their health information is used. Learn more at *https://www.hhs.gov/hipaa/for-professionals/privacy/*.
HUMAN SUBJECTS	U.S. Department of Health and Human Services regulations under 45 CFR 46.102(f) define a human subject as a living individual about whom an investigator conducting research obtains (1) data through intervention or interaction with the individual; or (2) identifiable private information.
INFERENTIAL	A type of data analysis where a sample of data is used to say something about a larger population. This analysis usually requires some type of statistical model (e.g., two-sample t-test, z-test, two-sample z-test for proportions, ANOVA, chi square).
MEASURE	A specific calculation, score, or classification that accurately represents the variable or characteristic being analyzed.
MULTIPLE MEASURES	A variety of measures, such as standardized test results, classroom assessments, tasks and projects, grades, and teacher evaluation, used to provide a complete picture of a student's academic achievement.
PREDICTIVE	A type of data analysis that uses current and historical facts to make predictions about the future.
PRIVACY	An individual's right to have his or her personal information protected from being accessed by others without permission. This right is balanced by the need for collection and dissemination.
PSYCHOLOGICALLY SAFE	A shared belief that the group or context is safe for interpersonal risk taking involved in the collection, analysis, and sharing of data.

QUALITATIVE	Data that are not expressed numerically (e.g., interviews, student projects, student behavior, videos).
QUANTITATIVE	Data that are expressed numerically (e.g., assessment scores, GPA, attendance, enrollment, surveys).
RELIABILITY	The degree to which an assessment tool produces stable and consistent results given similar conditions.
RELIABLE	Stable and consistent results.
SCORE DISTRIBUTION	The dispersion of test scores plotted by frequency along an ordinal or interval-ratio scale.
SUMMATIVE	Describes assessments used to evaluate learning, skill acquisition, or achievement at the conclusion of a defined instructional period.
SUMMATIVE ASSESSMENTS	Tools or procedures used to collect information to evaluate learning, skill acquisition, or achievement at the conclusion of a defined instructional period. Also known as "assessments of learning."
TIMELY	Data that are collected, analyzed, and reported at the most useful time allowing future decisions or actions to be made.
TREND	The general direction in which something is developing or changing.
TRIANGULATION	Using more than one approach to answer a research question, or using more than one instrument or way of measuring something to increase confidence in the findings.
VALID	Measures what it is supposed to measure.
VALIDITY	The degree to which an assessment tool measures what it is supposed to measure.
VARIABLE	Any characteristic, number, or quantity that can be measured or counted.

Appendix A: Data Use Standards Workgroup Members

State	Name	Organization
California	Christina Tydeman	Dominican University of California
Guam	Zeni Natividad	Guam Department of Education
Hawaii	Justin Katahira[2]	Hawaii P-20 Partnerships for Education
Hawaii	Christine Sorensen Irvine	Pacific Regional Comprehensive Center; University of Hawaii at Manoa
Idaho	Andy Mehl	Idaho Board of Higher Education
Illinois	Doug Franklin	Illinois Board of Higher Education
Kansas	Eric Punswick	Olathe Public Schools
Kansas	Lori Adams	Kansas State Department of Education
Montana	Brett Carter	Montana Office of Public Instruction
Nebraska	Russ Masco[3]	Nebraska Department of Education
Nebraska	Dick Meyer[3]	University of Nebraska at Kearney, College of Education
New Hampshire	Irene Koffink	New Hampshire Department of Education
New Hampshire	Mike Schwartz	New Hampshire Department of Education
New York	David Weinberger	Yonkers Public Schools
North Dakota	Nathan Anderson	Mid-Dakota Education Cooperative
North Dakota	Magdalena Brockel	Missouri River Educational Cooperative
North Dakota	Stacy Duffield	North Dakota State University
North Dakota	Amy Engelhard	Education Technology Council
North Dakota	Jen Glasheen	Southeast Education Cooperative
North Dakota	Steve Snow	North Dakota Department of Instruction
Oklahoma	Bryan Duke	University of Central Oklahoma
Oklahoma	James Machell	University of Central Oklahoma
Oklahoma	Susan Pinson	Oklahoma State Department of Education
South Dakota	Sara Kock[4]	South Dakota Department of Education
Tennessee	Margie Johnson[5]	Metro Nashville Public Schools
Washington	Melissa Beard	Education Research and Data Center
Washington	Jim DePaepe	Central Washington University
Facilitator	Corey Chatis	SLDS Grant Program State Support Team

[2] Professional Behaviors Subgroup Lead

[3] Skills Subgroup Co-Lead

[4] Knowledge Subgroup Lead

[5] Case Studies Subgroup Lead

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