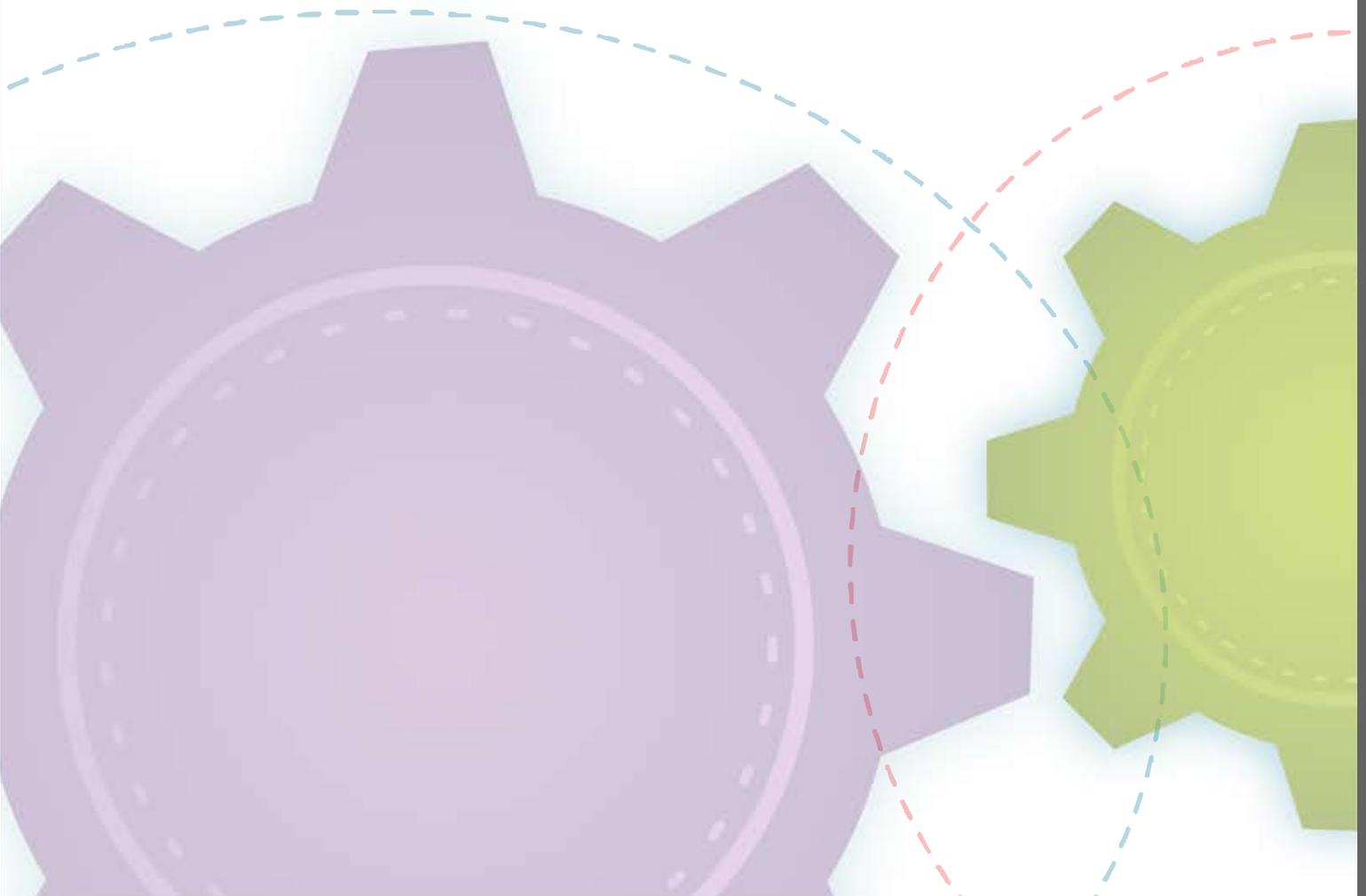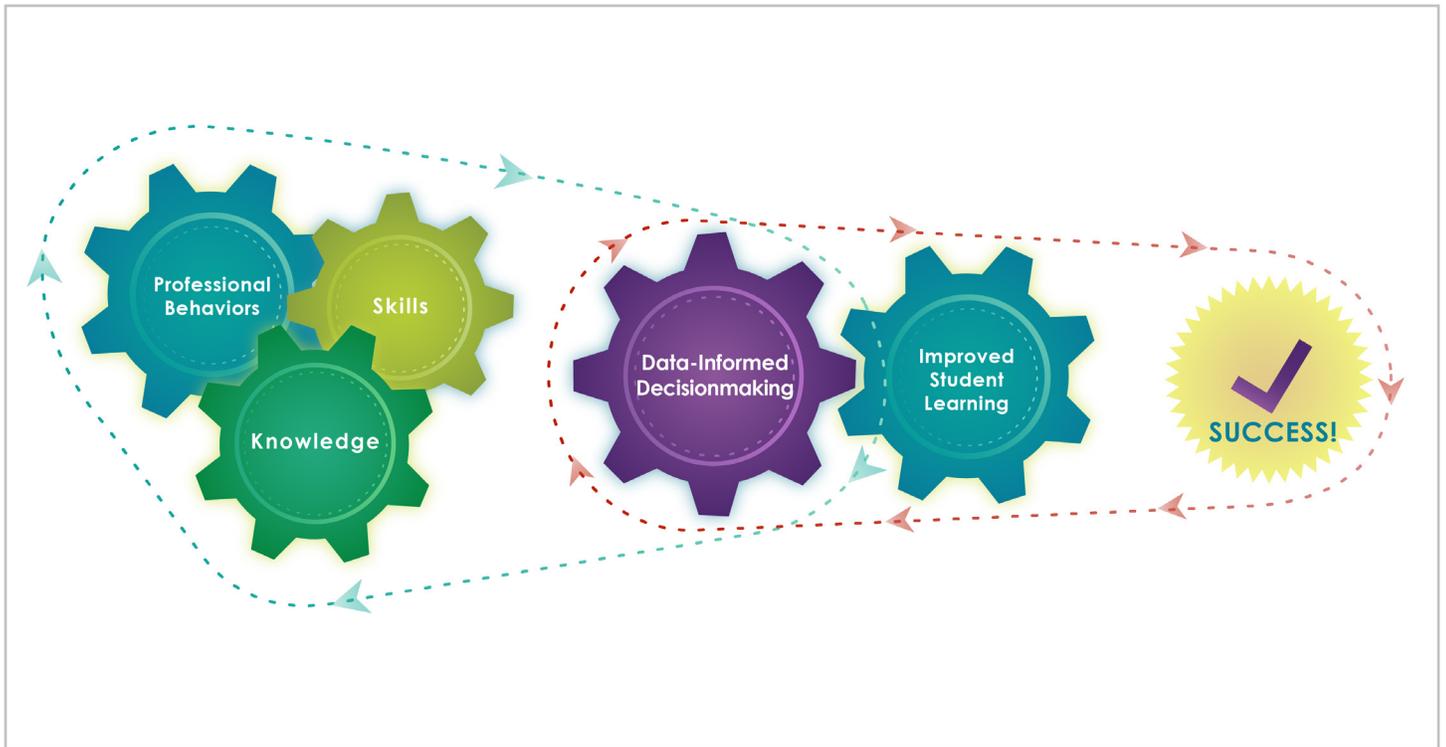SLDS Data Use Standards

Knowledge, Skills, and Professional Behaviors for Effective Data Use

Contents

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.

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 and skills 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 teachers and administrators to effectively use data to inform instructional and programmatic decisions. Each of the three main sections is further divided into subsections, and a glossary of key terms is included to increase clarity.

The resource is intended to inform both 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 Statewide Longitudinal Data System (SLDS) program grantees. 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. The workgroup launched 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.

Authors

This resource was created by the 27 members of the workgroup representing 13 states[1] and facilitated by the SLDS Grant Program State Support Team. Members represent state education agencies, regional service agencies, postsecondary institutions, state P-20W longitudinal data systems, and a local education agency. Appendix A contains the list of workgroup members.

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[1] Hawaii, Illinois, Kansas, Missouri, Montana, Nebraska, New Hampshire, New Jersey, North Dakota, Oklahoma, Oregon, South Dakota, 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 12.*

FUNDAMENTAL
The basic information needed to know how to use the data

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.

> Educators may be familiar with two different methods that help with question formation. The first is the SMART (Specific, Measureable, Achievable, Relevant, and Time-bound) Goals methodology to develop meaningful goals. An example of a non-SMART Goal is, "Our students will be college and career ready," while a SMART example could be, "Prepare 95 percent of our freshmen students to complete all graduation degree requirements within four years." These goals can then be converted into questions such as, "Did we achieve our goal of preparing 95 percent of freshmen for graduating in four years?"
>
> The second method to help with question formation is Student Learning Objectives (SLOs). SLOs are often formed based on questions that are measurable instructional goals established for a specific group of students over a set period of time.

Data Quality

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

> Data that are two years old are not high quality for immediate action. Data from a survey with a low response rate are not high quality due to incompleteness. Furthermore, inconsistency in when data are collected or reported will affect data quality. Finally, data being used to provide information on outcomes other than the original purpose will affect data quality.

Types of Data

Knows the various types of **QUANTITATIVE**, **QUALITATIVE**, **LONGITUDINAL**, **TIME SERIES**, and **CROSS-SECTIONAL** data and when they are appropriate to use.

> **QUALITATIVE** data are not numeric and can include words, images, sounds, artifacts, etc. 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 senior class, 107 are going on to a four-year institution while 10 students are joining the military and 22 plan to attend a technical institution.

QUANTITATIVE data are broken down into different types: nominal, ordinal, ratio, and interval.
- Nominal data are categorical, discrete data (e.g., gender and race).
- Ordinal data provide an ordering with varying intervals between the numbers (e.g., a rating scale of 1 to 5 on a survey).
- Interval data are like ordinal data, but they have an equal difference between each unit. For example, the difference between 50 and 51 degrees Fahrenheit is the same magnitude as the difference between 96 and 97 degrees Fahrenheit.
- Ratio data are interval data with a natural zero point. For example, height, weight, and time are ratios since a value of 0 would be meaningful.

Types of Measures

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

Different experts have different terminology for **MEASURES**. Victoria Bernhardt[2] describes four measures to understand a school's impact on student achievement: achievement data, demographic data, perception data, and school process data. Learning Point Associates[3] uses the terms achievement data, demographic data, program data, and perception data. These data may come in the forms of **GROWTH MEASURES**, frequencies, averages, and other **QUALITATIVE** and **QUANTITATIVE** measures.

Data Sources

Knows different types of data sources (e.g., entities like the National Center for Education Statistics and levels like classroom, school, district, or state) and the benefits and limitations of using each.

Data Representations

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

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

Types of Analysis

Knows basic types of **ANALYSES** (e.g., **DESCRIPTIVE**, **INFERENTIAL**, **CAUSAL**, **PREDICTIVE**) and when to use them.

Data Analysis Tools

Knows there are different technology tools (e.g., databases, spreadsheets, software, devices) that can help collect, store, and analyze data, and that each has advantages and disadvantages.

Data Collection

Knows that **DATA COLLECTION** can be performed using different methods (e.g., survey, assessment, interview, observation) and at different points in time.

Data Context

Knows the circumstances and purposes for which data are collected.

Data Format

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

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[2] Bernhardt, V.L. (2003). *Using Data to Improve Student Learning in Elementary Schools.* Larchmont, NY: Eye on Education.
[3] Learning Point Associates (2004). *Guide to Using Data in School Improvement Efforts: A Compilation of Knowledge from Data Retreats and Data Use from Learning Point Associates.* Available at *http://www.learningpt.org/pdfs/datause/guidebook.pdf*

Data Assumptions

Knows that assumptions (i.e., things we take for granted) affect the interpretation and usefulness of data.

> In a survey, we assume people answer truthfully.

Data Limitations

Knows that data have limitations (i.e., potential weaknesses not under our control) and these limitations affect the interpretation and usefulness of data.

> When trying to measure achievement, the information is only as good as the test itself. Knowing how this year's third-grade class responded may not be applicable for next year's class.

Data Culture

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

Data Privacy

Knows federal laws (e.g., **FERPA**), state laws, and district policies related to data **PRIVACY**, **CONFIDENTIALITY**, **HUMAN SUBJECT** rights, and appropriate use.

Data Ethics

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

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 12.*

PLANNING

Strategizes for data collection and management

Goals and Questions

Identifies **BASELINE** measure(s), measurement, and goals, and poses questions that can be answered with data.

Alignment

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

Data Management

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

Data Meaning

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

SELECTING

Locates, accesses, develops, and evaluates data sources

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) for **DATA ACQUISITION**.

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.

Development of Measures

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

COLLECTING

Uses appropriate technologies and methods in acquiring data

Facilitation

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

Technology

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

Multiple Measures

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

Modifications

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

ANALYZING

Exhibits the technical skills necessary to examine data

Formatting

Formats data in ways that allow appropriate **ANALYSIS** and identifies data issues that might impact analysis (e.g., missing data, inaccurate data, etc.).

Aligned Analysis

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

Considerations

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

Comparisons

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

INTERPRETING

Constructs meaning from data within a particular context

Locating

Locates data in tables, graphs, and charts.

Representation

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

Patterns

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

Congruency

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

COMMUNICATING

Conveys information about data

Presentation

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

Explanation

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

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).

ACTING

Employs appropriate strategies based on findings

Strategies

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

Action Plan

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

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 12.*

ETHICAL USE

Commits to the proper use of data

Data Quality

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

Transparency

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

Representation

Avoids misleading, ambiguous, or inaccurate representations of data.

Ethics

Promotes the ethical use of data among colleagues.

Culture

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

Use

Reports any known data misuse to the proper authority.

RULES AND REGULATIONS

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

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**).

Protection

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

Advocacy for Protections

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

COLLABORATION

Facilitates a collective effort to use and share data

Collaborative Use

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

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.

Outreach

Consistently and actively seeks professional, community, and technological resources within and outside the organization as supports for **ANALYSIS**, reflection, and problem solving.

Prioritization

Prioritizes time to analyze and use data.

CONTINUOUS IMPROVEMENT

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

Problem Solving

Views challenges related to data as opportunities rather than problems and seeks to solve problems.

Improving Outcomes

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

Professional Development

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

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 educational programs undertaken for the purpose of evaluation or improvement.
BASELINE	The level of performance at the start of data collection that can be used to measure change in indicators in the future.
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 between variables.
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.
CRITICAL EVALUATION/REFLECTION	Disciplined thinking that is informed by evidence.
CROSS SECTIONAL	Data that are collected from multiple sectors or sources at the same point in time and then brought together for analysis. Useful for a snapshot at one point in time.
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."
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.
GENERALIZABILITY	The ability to infer from specific facts, statistics, examples, or the like to a broader group.

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.
HUMAN SUBJECTS	U.S. Department of Health and Human Services regulations under 45CFR46.102(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.
LONGITUDINAL	Describes data that are collected on a specific group of people over a period of time. These data are useful for understanding change over time.
MEASURE	A procedure for assigning symbols, letters, or numbers to properties of variables according to rules.
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 kept private. 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	Describes data that are not expressed numerically.
QUANTITATIVE	Describes data that are expressed numerically.
RELIABLE	Describes stable and consistent data.
SCORE DISTRIBUTION	How test scores are plotted 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.
TIME SERIES	Describes data that are collected at regular intervals over a period of time. Useful for understanding change over time.
TIMELY	Describes data that are collected and analyzed at the most useful time and are not late.
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	Describes how well a test measures what it is purported to measure.
VARIABLE	Any characteristic, number, or quantity that can be measured or counted.

Appendix A: Data Use Standards Workgroup Members

State	Name	Organization
Hawaii	Justin Katahira[4]	Hawaii P-20 Partnerships for Education
Hawaii	Jean Osumi	Hawaii P-20 Partnerships for Education
Hawaii	Christine Sorensen Irvine	Pacific Regional Comprehensive Center; University of Hawaii at Manoa
Hawaii	Christina Tydeman	Hawaii State Department of Education
Illinois	Doug Franklin	Illinois Board of Higher Education
Kansas	Eric Punswick	Olathe Public Schools
Kansas	Kimberly Wright	Kansas State Department of Education
Missouri	Tom Ogle	Missouri Department of Elementary and Secondary Education
Montana	Brett Carter	Montana Office of Public Instruction
Nebraska	Sue Anderson	Nebraska Educational Service Unit #3
Nebraska	Russ Masco	Nebraska Department of Education
Nebraska	Dick Meyer	University of Nebraska at Kearney, College of Education
Nebraska	Kathy Vetter	Nebraska Department of Education
North Dakota	Stacy Duffield	North Dakota State University
North Dakota	Steve Snow	North Dakota Department of Instruction
North Dakota	Cory Steiner	Education Technology Council
New Hampshire	Ginny Clifford	New Hampshire Department of Education
New Hampshire	Mike Schwartz	New Hampshire Department of Education
New Jersey	LaShona Burkes	New Jersey Department of Education
Oklahoma	Bryan Duke	University of Central Oklahoma
Oklahoma	James Machell	University of Central Oklahoma
Oklahoma	Susan Pinson	Oklahoma State Department of Education
Oregon	Mickey Garrison	Oregon Department of Education
South Dakota	Marcus Bevier[5]	South Dakota Department of Education
South Dakota	Sara Kock[6]	South Dakota Department of Education
Washington	Melissa Beard	Education Research and Data Center
Washington	Jim DePaepe	Central Washington University
Facilitator	Corey Chatis	SLDS Grant Program State Support Team

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[4] Professional Behaviors Subgroup Lead

[5] Skills Subgroup Lead

[6] Knowledge Subgroup Lead

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[7] Additional resources were consulted in addition to those listed here. The listed resources had the greatest influence on the document.

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