SLDS Data Use Standards

Knowledge, Skills, and Professional Behaviors for Effective Data Use
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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 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.

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 meaningless.

**Types of Measures**

Knows various types and purposes of **assessments** and other **measures**.

Different experts have different terminology for **measures**. Victoria Bernhardt 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 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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CONCEPTUAL
The knowledge of best practices regarding data use

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.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCOMMODATION</td>
<td>An alteration of environment, format, or equipment that allows an individual to gain access to content and/or complete assigned tasks.</td>
</tr>
<tr>
<td>ANALYSIS</td>
<td>The process of systematically applying statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data.</td>
</tr>
<tr>
<td>ASSESSMENT</td>
<td>The systematic collection, review, and use of information about educational programs undertaken for the purpose of evaluation or improvement.</td>
</tr>
<tr>
<td>BASELINE</td>
<td>The level of performance at the start of data collection that can be used to measure change in indicators in the future.</td>
</tr>
<tr>
<td>BIAS</td>
<td>Anything that produces systematic but unexpected variation resulting in inaccurate results.</td>
</tr>
<tr>
<td>CAUSAL</td>
<td>A type of data analysis used to try to determine a cause-and-effect relationship between variables.</td>
</tr>
<tr>
<td>CONFIDENTIALITY</td>
<td>The responsibility of a person who has access to another individual’s personal data not to share the data without consent.</td>
</tr>
<tr>
<td>CONGRUENT</td>
<td>Matching or in agreement with something.</td>
</tr>
<tr>
<td>CRITICAL EVALUATION/REFLECTION</td>
<td>Disciplined thinking that is informed by evidence.</td>
</tr>
<tr>
<td>CROSS SECTIONAL</td>
<td>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.</td>
</tr>
<tr>
<td>DATA ACQUISITION</td>
<td>The process of collecting or gaining access to and organizing information.</td>
</tr>
<tr>
<td>DATA COLLECTION</td>
<td>The process of gathering and measuring information in a systematic fashion to answer questions.</td>
</tr>
<tr>
<td>DATA DEFINITION</td>
<td>Language for describing data or information structures.</td>
</tr>
<tr>
<td>DATA DOCUMENTATION</td>
<td>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.</td>
</tr>
<tr>
<td>DESCRIPTIVE</td>
<td>A type of data analysis used to describe a set of data using mean, mode, median, distribution, and more.</td>
</tr>
<tr>
<td>FERPA</td>
<td>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.”</td>
</tr>
<tr>
<td>FINDINGS</td>
<td>The principal outcomes of a research project examining data, and what the project data suggested, revealed, or indicated.</td>
</tr>
<tr>
<td>FORMATIVE</td>
<td>Describes information that can be collected and used to improve or inform progress during a learning opportunity.</td>
</tr>
<tr>
<td>GENERALIZABILITY</td>
<td>The ability to infer from specific facts, statistics, examples, or the like to a broader group.</td>
</tr>
<tr>
<td><strong>GROWTH MEASURES</strong></td>
<td>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.</td>
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</tr>
<tr>
<td><strong>HARM</strong></td>
<td>Intentional or unintentional physical or mental damage or injury to subjects as a result of using subjects’ data.</td>
</tr>
<tr>
<td><strong>HIGH-QUALITY DATA</strong></td>
<td>Data that are generally agreed upon as trustworthy and are gathered through a valid and reliable instrument or process.</td>
</tr>
<tr>
<td><strong>HIPAA</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>HUMAN SUBJECTS</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>INFERENTIAL</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>LONGITUDINAL</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>MEASURE</strong></td>
<td>A procedure for assigning symbols, letters, or numbers to properties of variables according to rules.</td>
</tr>
<tr>
<td><strong>MULTIPLE MEASURES</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>PREDICTIVE</strong></td>
<td>A type of data analysis that uses current and historical facts to make predictions about the future.</td>
</tr>
<tr>
<td><strong>PRIVACY</strong></td>
<td>An individual’s right to have his or her personal information kept private. This right is balanced by the need for collection and dissemination.</td>
</tr>
<tr>
<td><strong>PSYCHOLOGICALLY SAFE</strong></td>
<td>A shared belief that the group or context is safe for interpersonal risk taking involved in the collection, analysis, and sharing of data.</td>
</tr>
<tr>
<td><strong>QUALITATIVE</strong></td>
<td>Describes data that are not expressed numerically.</td>
</tr>
<tr>
<td><strong>QUANTITATIVE</strong></td>
<td>Describes data that are expressed numerically.</td>
</tr>
<tr>
<td><strong>RELIABLE</strong></td>
<td>Describes stable and consistent data.</td>
</tr>
<tr>
<td><strong>SCORE DISTRIBUTION</strong></td>
<td>How test scores are plotted along an ordinal or interval-ratio scale.</td>
</tr>
<tr>
<td><strong>SUMMATIVE</strong></td>
<td>Describes assessments used to evaluate learning, skill acquisition, or achievement at the conclusion of a defined instructional period.</td>
</tr>
<tr>
<td><strong>TIME SERIES</strong></td>
<td>Describes data that are collected at regular intervals over a period of time. Useful for understanding change over time.</td>
</tr>
<tr>
<td><strong>TIMELY</strong></td>
<td>Describes data that are collected and analyzed at the most useful time and are not late.</td>
</tr>
<tr>
<td><strong>TREND</strong></td>
<td>The general direction in which something is developing or changing.</td>
</tr>
<tr>
<td><strong>TRIANGULATION</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>VALID</strong></td>
<td>Describes how well a test measures what it is purported to measure.</td>
</tr>
<tr>
<td><strong>VARIABLE</strong></td>
<td>Any characteristic, number, or quantity that can be measured or counted.</td>
</tr>
</tbody>
</table>
# Appendix A: Data Use Standards

## Workgroup Members

<table>
<thead>
<tr>
<th>State</th>
<th>Name</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawaii</td>
<td>Justin Katahira*</td>
<td>Hawaii P-20 Partnerships for Education</td>
</tr>
<tr>
<td>Hawaii</td>
<td>Jean Osumi</td>
<td>Hawaii P-20 Partnerships for Education</td>
</tr>
<tr>
<td>Hawaii</td>
<td>Christine Sorensen Irvine</td>
<td>Pacific Regional Comprehensive Center; University of Hawaii at Manoa</td>
</tr>
<tr>
<td>Hawaii</td>
<td>Christina Tydeman</td>
<td>Hawaii State Department of Education</td>
</tr>
<tr>
<td>Illinois</td>
<td>Doug Franklin</td>
<td>Illinois Board of Higher Education</td>
</tr>
<tr>
<td>Kansas</td>
<td>Eric Punswick</td>
<td>Olathe Public Schools</td>
</tr>
<tr>
<td>Kansas</td>
<td>Kimberly Wright</td>
<td>Kansas State Department of Education</td>
</tr>
<tr>
<td>Missouri</td>
<td>Tom Ogle</td>
<td>Missouri Department of Elementary and Secondary Education</td>
</tr>
<tr>
<td>Montana</td>
<td>Brett Carter</td>
<td>Montana Office of Public Instruction</td>
</tr>
<tr>
<td>Nebraska</td>
<td>Sue Anderson</td>
<td>Nebraska Educational Service Unit #3</td>
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<td>Nebraska</td>
<td>Russ Masco</td>
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<td>North Dakota State University</td>
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<td>North Dakota</td>
<td>Steve Snow</td>
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<td>North Dakota</td>
<td>Cory Steiner</td>
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<td>New Hampshire</td>
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<td>New Hampshire</td>
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<td>Bryan Duke</td>
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<td>Oklahoma</td>
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<td>University of Central Oklahoma</td>
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<td>Jim DePaepe</td>
<td>Central Washington University</td>
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<tr>
<td>Facilitator</td>
<td>Corey Chatis</td>
<td>SLDS Grant Program State Support Team</td>
</tr>
</tbody>
</table>

* Professional Behaviors Subgroup Lead

* Skills Subgroup Lead

* Knowledge Subgroup Lead
Appendix B: Bibliography of Resources Consulted


Oregon Direct Access to Achievement (DATA) Project (2012). *Certification Resources*. Available at http://www.oregondataproject.org/content/certification-resources

Oregon Direct Access to Achievement (DATA) Project (2014). *Data Retreat Resources*. Available at http://www.oregondataproject.org/content/data-retreat-resources

* Additional resources were consulted in addition to those listed here. The listed resources had the greatest influence on the document.
Teacher Leadership Exploratory Consortium (2012). *Teacher Leader Model Standards, Domain V: Promoting the Use of Assessments and Data for School and District Improvement*. Available at [http://www.teacherleaderstandards.org/the_standards_domain_5](http://www.teacherleaderstandards.org/the_standards_domain_5)


