



SLDS Spotlight

Data Use Through Visualizations and Narratives

Data, on their own, may not tell a story to the untrained eye. It takes analytical skills and an understanding of the data to draw out meaningful information. Visualizations and narratives—graphs, charts, etc.—can help users reach a deeper understanding of the education environment by revealing the patterns and trends.

Data visualizations help users focus on information that matters most, see patterns, make connections, and draw conclusions from data. **Data narratives** use engaging prose to relay insights gained through data analysis. Data visualizations and data narratives help users experience the data in a way that “levels the playing field,” making the data accessible to all users—not just those with advanced analytic skills.

In this Statewide Longitudinal Data Systems (SLDS) Spotlight, Georgia, Oregon, and Rhode Island share insights on developing resources and tools to create useful data visualizations and narratives, while training educators and others to use data effectively and creatively.

Rhode Island DataHUB



The Rhode Island DataHUB is an online, open source resource for anyone—policymakers, educators, parents, etc.—interested in using data to answer key questions about Rhode Island residents, focusing on a number of topics (education, juvenile justice, health, etc.). The site allows users to select data of interest and visualize them in charts, graphs, and maps. The Rhode Island DataHUB website also includes a number of tools for a variety of users, including a data dictionary, data catalogs, reports (for mid-level users), and a web-based visualization tool that allows users to explore and interact with more graphic visualizations and “data stories.”¹

The DataHUB brings together data sets from multiple federal, state, and local sources, including Rhode Island Department of Education (RIDE); Providence Public schools; Rhode Island Department of Health; Rhode Island Department of Children, Youth and Families; Rhode Island Office of Higher Education; and Rhode Island Department of Corrections. Through the DataHub, RIDE partners with other agencies and organizations to enhance data-driven decisionmaking on behalf of Rhode Island residents.

Rhode Island began development of the DataHUB in 2008 with federal funding through the Safe and Drug-Free Schools grant, and development continues under their SLDS grant. The state partnered with the Providence Plan (ProvPlan) organization, which maintains the largest data warehouse in Rhode Island. As a public/private organization, ProvPlan is considered the “data Switzerland” of the state, a third-party entity that links data and makes it accessible and useful to others.

¹ Data Stories are pre-packaged narratives created by Rhode Island that use data to tell stories through text, interactive graphics, and prose to answer essential questions.

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For more information on the IES SLDS Grant Program, additional SLDS publications, or for support with system development or use, please visit <http://nces.ed.gov/programs/SLDS>.



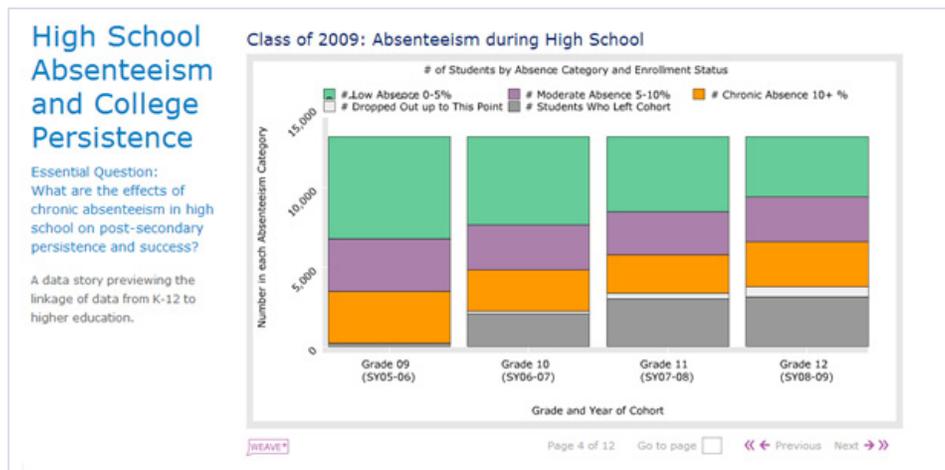


Figure 1. Snapshot of Rhode Island DataHUB data story

Answering Key Questions Through “Data Stories”

Data Stories are a key innovation of the Rhode Island DataHUB. These guided tours through selected data include interactive slideshows designed to illuminate answers to important policy questions. Participating state agencies lead or assist in the creation of these data stories that address stakeholders’ questions about education, health, adolescent risk factors, and demographics.

“This tool was about reaching everybody in Rhode Island,” said Peg Votta of the Rhode Island Department of Education. “Not just for educators, but community members, policymakers, administrators, and parents.”

Invented first by a journalist working with state analysts, these stories build a series of images, with both text and data to develop wisdom and knowledge out of the mere information. The story begins with a framing “essential question” posed by the agency participants (see Figure 1). The first page of any data story displays national data, related research, and relevant policies to give the question a context. For example, the data story above answers the question, “What are the effects of chronic absenteeism in high school on postsecondary persistence and success?” The story uses interactive charts to display Rhode Island data that answer the question. Data stories end with a call to action for the state, districts, parents, educators, and students.

Importance of Storytelling

According to Ms. Votta, there are several reasons why data stories are important to comprehending data. “Stories are really comfortable for people,” said Ms. Votta. “Everybody can read the text and understand the charts and interact with the data.” For both novice and experienced data users, the ability to see

relationships among data helps users recognize important information and allows for new insights into Rhode Island’s policy or programmatic questions.

Creating a Culture of Using Data

Ms. Votta notes that the entire process—from gathering and linking data, to forming partnerships—has been time consuming. Initially, getting all agencies comfortable with sharing data was a significant challenge. To ensure that the DataHUB met the needs and expectations of agencies and users, Rhode Island allotted a significant portion of time for agencies to ask questions and think about how to best frame the data examples.

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Once all agencies were satisfied with how the data stories would function, Rhode Island set up training and webinars for agencies throughout the state. Because of Rhode Island’s small geographic size, most of the training was done in-person rather than through webinars. Rhode Island has continued to work with a journalist on more data stories and written materials about the Rhode Island DataHUB. While hiring a professional writer may be an additional cost, this crafting of engaging stories about the state’s residents through the lens of data made the Rhode Island DataHUB even more accessible to users.

The Georgia Tunnel



“The Tunnel,” a way for users to access Georgia’s SLDS, informs teachers, school administrators, and district staff as they work to improve instruction and education programs. The Tunnel was funded with an SLDS grant in 2009.

Different Dashboards that Lead to Different Data

Three role-based dashboards offer key user groups—teachers, principals, and district administrators—access to the Georgia SLDS. Depending on their role, each user has slightly different visualizations and access to student data. The Tunnel was designed specifically to meet the needs of teachers, who make up the tool’s largest user-base. Teachers have access to both aggregated and individual-level student data that can be compared across districts. When a principal accesses Georgia’s SLDS, he or she can view aggregated school information, such as enrollment and withdrawal statistics. Principals can also access the same information available to their teachers. District administrators see aggregated district-level data and information about specific schools as well as individual student data.

Each dashboard was designed to be as user-friendly and accessible as possible. Access to the SLDS is directly linked to local users’ student information systems (SIS) through the Tunnel; this link seamlessly connects the SIS user with an SLDS portal hosted through the Georgia Department of Education without the need for an additional log-in.

Accessing Aggregate and Individual-Level Data

Through their dashboard, Georgia teachers can view aggregated and individual-level data, such as their student’s attendance and statewide test results. Aggregated data help teachers see patterns at a classroom or district level, while individual-level data help teachers understand the strengths and needs of particular students.

When viewing the “Attendance Tracker,” a user first sees a color-coded attendance bar graph that breaks down percentages on a classroom, school, district, and state level (see Figure 2). The user can then click a specific attendance category to display a roster of students who fall into that attendance category (zero absences, one to five absences, six to 10 absences, over 10 absences). A hover hand displays additional background information for the attendance tracker, as well as a number of other graphs. The hand may, for

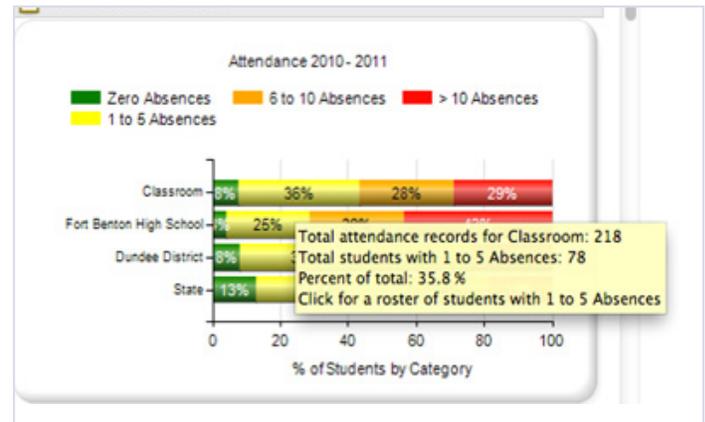


Figure 2. “Attendance Tracker” feature from a Georgia teacher’s dashboard

example, display the total attendance records for a classroom and a link to the roster of students.

Currently, Georgia’s SLDS houses five years of enrollment data, and will expand to gather students’ academic and transfer histories through the student profile feature. Student profiles are also accessible directly from any dashboard by using the student search feature displayed at the bottom of every screen.

Comparative Analysis at the District Level

The teacher dashboard also provides users with the ability to compare their classrooms’ performance with that of other schools in the district and in the state. The “Test Results” page, for example, breaks down the results of statewide tests into specific strands of the assessment. A graphical display shows teachers the total number of items in the strand, number of items answered correctly by a student, and the percentage correct within that strand. Results are also available in a tabular format. The teacher may click the graph to display results in bar graph form for comparison groups (student, school, district, and statewide). (See Figure 3.) As with the “Attendance Tracker,” a hover hand displays additional information about the student or other units of analysis (e.g., classroom).

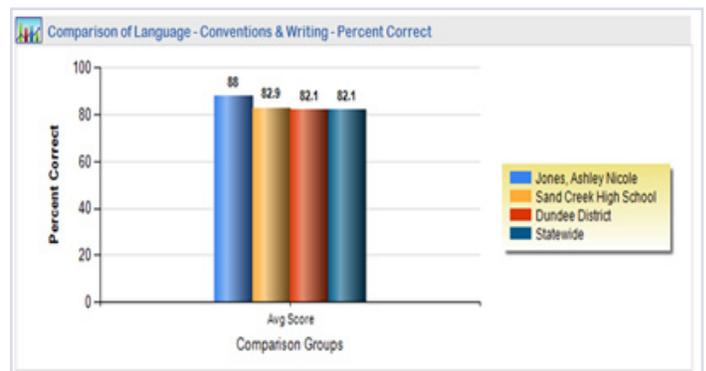


Figure 3. Test Results page used in The Tunnel

The demographics and attendance portion of the student profile shows students' basic information, including ethnicity, gender, grade level, assessments, enrollment history, and grades. Through this portion of the student profile, a teacher can use the demographics and attendance graphs to observe patterns displayed at the student level.



Oregon created the Oregon Direct Access to Achievement (DATA) Project²—a professional development initiative that encourages a culture of data literacy in Oregon schools—which has been credited with contributing to learning gains throughout the state. Through training sessions, online resources, support from regional Education Service Districts, and guided implementation of concepts in school districts, the project helps teachers and administrators learn how to gather, interpret, and use data to improve instruction.

Library to Access Data Education Materials

As one of the elements that sustain the statewide effort beyond the initial rollout and training, an online resource library was created by Oregon and made available to the public. The resource library includes access to ZipTrain (an online portal that offers educators an e-learning platform for professional development and educational courses), as well as specific modules that were developed for the state's Instructional and Technical strands of training. In addition, each presentation in the project's annual webinar series is recorded and posted for on-demand viewing. This online library enables Oregon stakeholders to easily access and share resources across the state.

Many of the activity segments used in the training sessions are also available online for educators to use throughout the school year to address data needs. For example, the project's third strand of training focused on data-driven decision-making, and the instructional strand of the resource library provides practical tools and exercises to help users discover patterns and trends in data.

² The Oregon DATA Project was funded from 2007–2011 with a \$4.7 million grant awarded by the U.S. Department of Education's Institute of Education Sciences (IES). Since the original grant ended in August of 2011, continued support has been provided by another IES grant under the Project Oregon Formative Assessment Resources project.

Data Visualization Exercises: An In-Depth Look

Many of the exercises found in the resource library are well-known models/diagrams that have been used in training to frame data visualization and analysis.

Some components of the instructional section focus on educators becoming comfortable with recognizing and analyzing data. One exercise, “treasure hunt data,” gives school decisionmakers a process to guide them through examining data. With a graph or table, participants gather data by topics (e.g., reading scores, math scores); list the ways that they want the data to be examined (e.g., by grade level, by individual teacher, etc.); hunt for the data and record it in the graph; disaggregate data (where needed); and enter group information when examining longitudinal trends and patterns.

Through this process, decisionmakers review assessment data related to content areas, attendance, specific grades, and demographic data from the user's own school and/or district in order to gain insights about the strengths and weaknesses of its teaching and learning programs.

The Ishikawa Fishbone diagram is also used to help educator decisionmakers identify data components. In this exercise, educators use the diagram to find the root cause of a success or problem. In the example below, users noted the problem (“Poor performance in writing in our school”) at the head of the fish. Possible causes (climate, instructional strategies, standards) are assigned on the spines of the fishbone with additional details below each spine. Through the Ishikawa Fishbone diagram, educators can determine priorities from the list of causes that can or cannot be influenced.

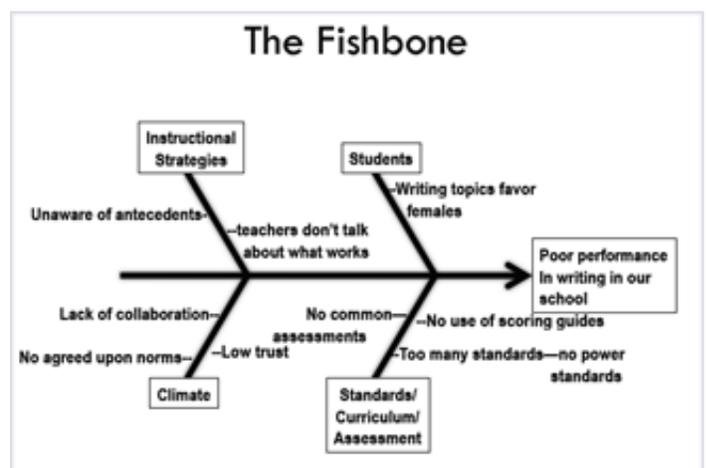


Figure 4. The Ishikawa Fishbone diagram

Three-Dimensional Look at Data Analysis

Triangulation is another model used by Oregon for data analysis. Triangulation consists of a three-dimensional data analysis that is created from identifying instructional strategies, accountability, and collaboration. Triangulation uses multiple measures to explore cause and effect and interdependencies, and supports the continuous monitoring of the data improvement process.

In the example below, educators used the model to understand why students were struggling with reading comprehension. Users triangulated reading fluency, vocabulary, and comprehension. By analyzing these three data points, they generated a hypothesis that, “If a teacher ‘explicitly’ taught vocabulary, then it would increase student comprehension.”

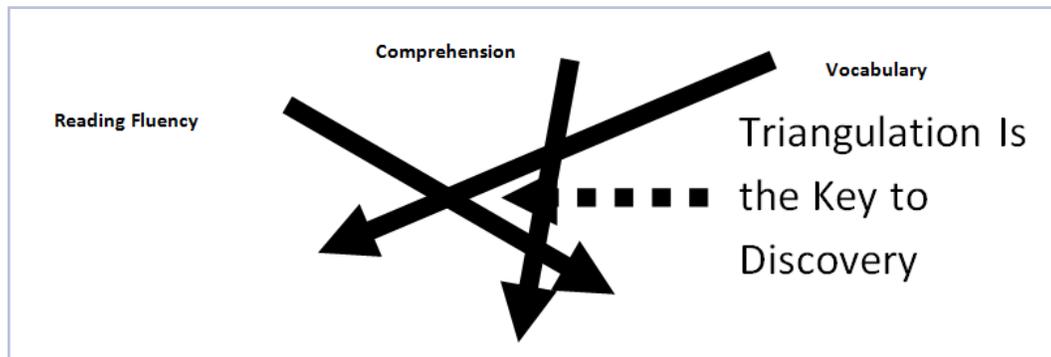


Figure 5. Triangulation data analysis example

Available in the Public Domain Clearinghouse

The Georgia Tunnel

Provides access to state applications via local education agency (LEA) software without a separate ID and password. Literally, with the click of a button in the district SIS, authorized teachers, administrators, and district staff can access longitudinal student data that crosses district boundaries. This connection is called “The Tunnel.”

Oregon DATA Project

The Direct Access to Achievement (DATA) Project provides professional development to educational stakeholders throughout Oregon on how to effectively use data to inform instruction. The project, a collaborative initiative of the Oregon Department of Education and Oregon’s education service districts, also provides leadership on education data skills and Common Core State Standards implementation. Training materials can be found via the Public Domain Clearinghouse (PDC) or the DATA Project website, including videos and presentations for the project’s multiple training strands; links to resources developed by the project, including the Toolkit for Accountability; and information on the project’s design, goals, and progress. For more information on the Oregon DATA Project and to download the Georgia Tunnel, visit the PDC via GRADS360° (<https://nces.grads360.org>).

Additional Resources

Rhode Island Data Hub <http://www.ridatahub.org>

Georgia Data Hub and Portal <http://slds.doe.k12.ga.us/DataHubPortal/Pages/index.aspx>

Oregon DATA Project <http://www.oregondataport.org>