

TRAVELING THROUGH TIME: THE FORUM GUIDE TO LONGITUDINAL DATA SYSTEMS

[Draft: August 2009]

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The National Forum on Education Statistics (Forum), among other activities, proposes principles of good practice to assist state and local education agencies in meeting this purpose. The Cooperative System and the Forum are supported in these endeavors by resources from the National Center for Education Statistics (NCES).

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The Forum World Wide Web Home Page is <http://nces.ed.gov/forum>

Suggested Citation:

National Forum on Education Statistics, Longitudinal Data Systems Task Force. (YEAR). *Traveling through Time: The Forum Guide to Longitudinal Data Systems* (NFES YEAR-###). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

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Foreword

The National Forum on Education Statistics (Forum) is pleased to present *Traveling through Time: The Forum Guide to Longitudinal Data Systems*. One goal of the Forum is to improve the quality of education data gathered for use by policymakers and program decisionmakers. An approach to furthering this goal has been to pool the collective experiences of Forum members to produce “best practice” guides in areas of high interest to those who collect, maintain, and use data about elementary and secondary education. Developing longitudinal data systems (LDS) is one of those high interest areas. These systems hold the promise of revolutionizing the way we educate our students and transforming the way we do business from the policy level, to the school office, and into the classroom.

LDSs are the “future,” and are increasingly becoming the state of the art, in educational data. These systems are taking us from relying on blunt aggregate snapshot student data to detailed and timely longitudinal student-level data. LDSs provide us with a tool to not only monitor the success of individual students, but also to identify trends in those students’ educational histories. Freeing educators from guesswork and lessening the burden of painstaking data analysis, these systems provide powerful and timely insight about their students and allow them to tailor instruction to better meet each individual’s needs. They can show us, with much greater clarity, what effects our policies, programs and decisions have on our schools. These systems allow us to track students across institutions to facilitate appropriate course placement and to determine who has transferred and who has dropped out. And, LDSs offer a new level of sophistication at the business level that can streamline operations, improve data quality, and free up valuable resources previously devoted to inefficient data entry, maintenance, and reporting practices.

For these reasons and many others, it is vital that states continue to develop and expand their LDSs. *Traveling through Time: The Forum Guide to Longitudinal Data Systems* is intended to help state and local education agencies meet the many challenges involved in building robust LDSs, populating them with quality data, and using this new information to improve the educational system. It will briefly introduce important topics, offer best practices when possible, and direct the reader to additional sources of information on many key issues in the LDS development process. In sum, it is intended to help agencies establish LDSs that have lasting and far-reaching impacts on the educational system and student’s lives.

In this Guide

- The Introduction explains the purpose and format of this guide and its intended audience.
- Chapter 1 is a primer on LDSs, which defines and discusses overarching benefits, lays out key steps to planning and implementing an LDS, and presents the technical components that generally comprise such a system.
- Chapter 2 discusses in more detail the planning, implementation, and evaluation phases of an LDS project. It guides readers through the process of engaging a wide variety of stakeholders to create a vision for an LDS, building support for the undertaking, developing the system, and gauging how well it is meeting its intended goals.
- Chapter 3 explores several fundamental challenges of data management, focusing largely on defining and reviewing the benefits of strong data governance, and providing a basic model for establishing a sound governance structure and process. Additional sections of the chapter address data quality, privacy, and security issues.

- Chapter 4 considers the effective use of LDS data, including ways in which various stakeholders can benefit from the system, the importance of training and professional development, the many potential uses of the data, and the various types of tools that can be used to turn student-level longitudinal data into actionable information at all levels of the educational system.
- Chapter 5 concludes the guide...
- The Appendixes...

The National Forum on Education Statistics

The work of the Forum is a key aspect of the National Cooperative Education Statistics System. The Cooperative System was established to produce and maintain, with the cooperation of the States, comparable and uniform educational information and data that are useful for policy making at the federal, state, and local levels. To assist in meeting this goal, the National Center for Education Statistics (NCES), within the U.S. Department of Education, established the National Forum on Education Statistics to improve the collection, reporting, and use of elementary and secondary education statistics. The Forum deals with issues in education data policy, sponsors innovations in data collection and reporting, and provides technical assistance to improve state and local data systems.

Development of Forum Products

Members of the Forum establish task forces to develop best-practice guides in data-related areas of interest to federal, state, and local education agencies. They are assisted in this work by NCES, but the content comes from the collective experience of the state and school district task force members who review all products iteratively throughout the development process. Documents prepared, reviewed, and approved by task force members undergo a formal public review. This public review consists of focus groups with representatives of the product's intended audience, review sessions at relevant regional or national conferences, or technical reviews by acknowledged experts in the field. In addition, all draft documents are posted on the Forum website prior to publication so that any interested individuals or organizations can provide feedback. After the task force oversees the integration of public review comments and reviews the document a final time, publications are subject to examination by members of the Forum standing committee sponsoring the project. Finally, the entire Forum (approximately 120 members) reviews and formally votes to approve all documents prior to publication.

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Introduction

Across the country, educational agencies are hard at work developing longitudinal data systems (LDSs). States and local agencies are working at various stages of the development process – some just getting started while others explore ways to further develop or better harness systems that have been in place for years. The federal government strongly supports LDS development, endorsing it first in the No Child Left Behind Act of 2001¹; continuing its support through the provision of grants from the Institute of Education Sciences (IES) of the U.S. Department of Education (USED), which have helped many states in their LDS development efforts; and requiring that states “establish and use pre-K-through-college and career data systems to track progress and foster continuous improvement” in order to be eligible for Race to the Top funds under the American Recovery and Reinvestment Act of 2009. Vendors are offering a growing number of products to facilitate the collection, storage and use of longitudinal data. And, a number of national organizations are providing support for LDS development efforts or working to increase awareness of the need for and benefits of these data systems.² By facilitating the collection and use of high quality student-level information, LDSs hold the promise of revolutionizing the way we educate our students and vastly improving the way we do business from the policy level, to the school office, and into the classroom.

What is the Purpose of this Guide?



“Far too few states have data systems like the one in Florida that keep track of a student’s education from childhood through college. And far too few districts are emulating the example of Houston and Long Beach, and using data to track how much progress a student is making and where that student is struggling – a resource that can help us improve student achievement, and tell us which students had which teachers so we can assess what’s working and what’s not. That is why we are making a major investment in this area that we will cultivate a new culture of accountability in America’s schools.” –President Barack Obama, March 10, 2009

Many challenges stand in the way of building good LDSs, achieving high quality data, and using this new information effectively. Essentially, the goal of this guide is to help state and local education agencies overcome these obstacles and effectively plan, build, and/or improve upon their LDSs. It offers advice for developers at various levels of your education agency, providing both an aerial perspective and a close-up view from the ground. Its scope is broad, covering a wide range of key concepts and activities, offering best practices and lessons learned from state and district staff, and noting procedural and structural benchmarks for you and your organization to reference throughout the development process.

The reality is, though, that there is no one way to build an LDS and no two of these systems look alike. Each organization takes its own path to its own desired version of an LDS (*e.g.*, some education agencies will build a data warehouse, while others will not; some will hire a vendor, while others will do the work in-house). This



The goal of this guide is to help education agencies overcome obstacles and effectively plan, build, and/or improve upon their LDSs.

¹ Title I, Part A, Section 1111(b), subsection 3(B) of the law states that “each state may incorporate the data from the assessments under this paragraph into a state-developed longitudinal data system that links student test scores, length of enrollment and graduation records over time.”

² See Appendix for a list of the major organizations working in the LDS field.

³ Remarks of President Barack Obama, “A Complete and Competitive American Education,” US Hispanic Chamber of Commerce, March 10, 2009, Washington, DC.

http://www.whitehouse.gov/the_press_office/Remarks-of-President-Barack-Obama-A-Complete-and-Competitive-American-Education-US-Hispanic-Chamber-of-Commerce/

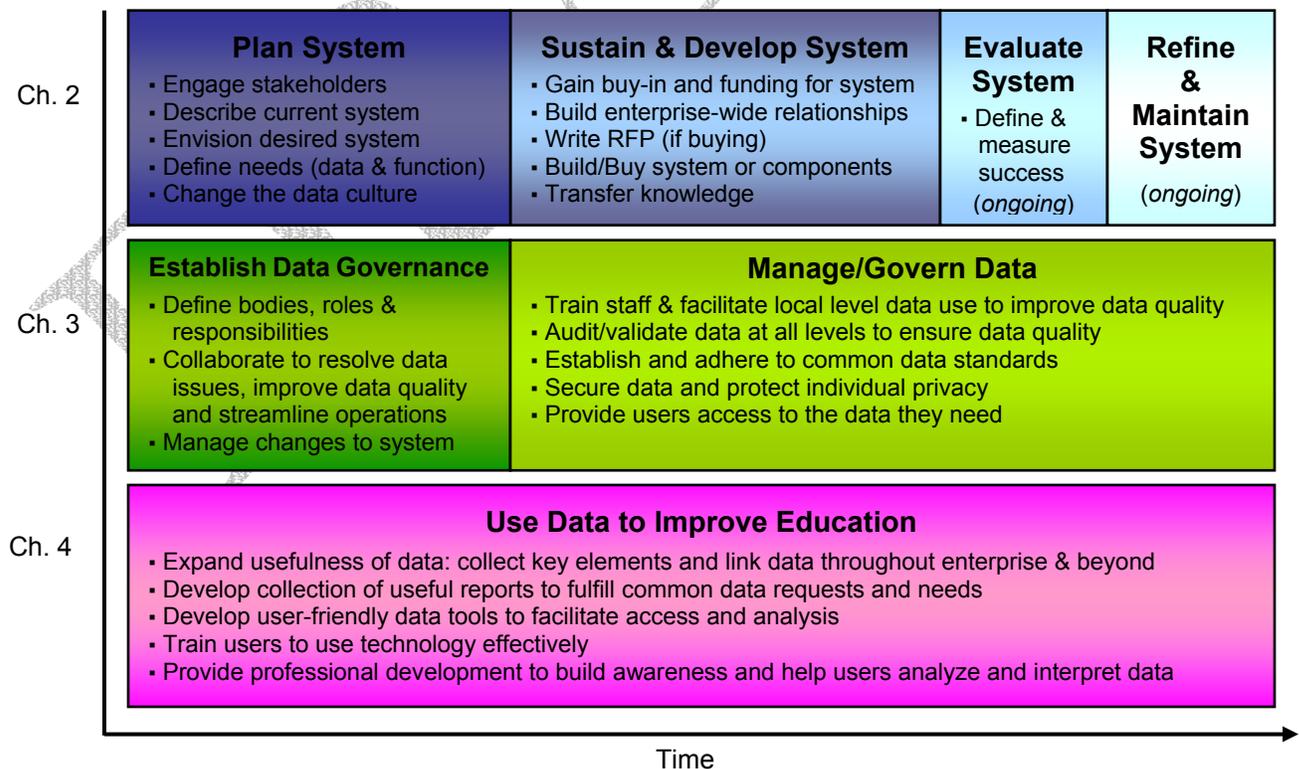
guide does not present a rigid list of steps that must be followed in order to develop a successful LDS – success, after all, is relative to your specific set of goals. Instead of supplying doctrinaire answers, we hope to provide you with good questions and possibilities with which you can develop the solutions particular to your specific challenges and opportunities (e.g., political will, resource availability, agency culture, starting point, staff talent, state laws, etc.).

With special emphasis on the business-level perspective, this guide walks through many things you need to know or should consider about LDS planning, development, data governance, as well as reaping the benefits of the data an LDS can provide through effective and extensive data use. You should establish a process of data governance to ensure that the data you collect with your system will be of high quality. Then you will need to carefully plan the system in detail with the input of all of the interested parties, before constructing a sound foundation, building upward, and putting the system to good use.

How to read this guide

Readers should feel comfortable making their way through this guide from start to finish. However, as states and districts may not be at the starting point – that is, have no LDS at all – but rather, at some place along the way, readers may also use it *à la carte*, skipping around and focusing on those sections that are of interest to them and their colleagues. Chapter subsections are intended to be autonomous pieces. This will allow readers the option of either skipping those parts of this guide that address work already completed and to focus on the pages that discuss project phases that lie ahead, or to review those sections and consider adjusting past or current work based on information offered here. The figure below lays out the contents of the guide in time, roughly presenting the order in which agencies will or should tackle the various activities involved in the process of LDS development and use. Keep an eye out for this figure throughout the guide as it will reappear at the beginning of major sections to help you get your bearings.

LDS Guide by Activities in Time



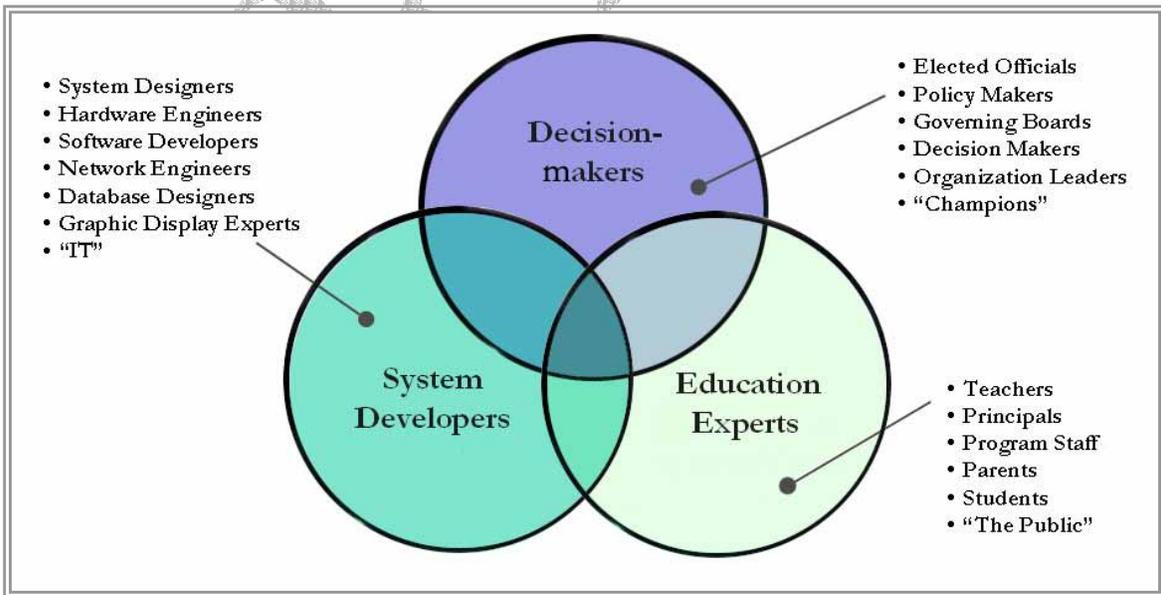
An additional goal of this guide is to help synergize the LDS community by offering a broad and accessible source of information to those involved in LDS development. This product is designed as a gateway to a wide variety of additional resources to provide the interested reader with more in-depth discussions and examples of the topics introduced here. See the Additional Resources boxes after each section for further information on each subject.

Who is the Audience for this Guide?

While this guide is intended to be useful to a broad range of users at both the state and district levels, it was developed with three main audiences in mind: decisionmakers, education experts, and system developers. Each of these groups is instrumental in the effective design, implementation, and utilization of an LDS. However, in many ways, their perspectives on LDSs differ – in terms of what the systems are and what value they hold. Some focus on the nuts and bolts of building the various parts of these systems. Others are interested only in the end products, the data, which they will be able to use for research and data-driven decisionmaking. While these differences can be beneficial – bringing a variety of perspectives, knowledge, and expertise to the table – in a colossal project like the development of an LDS, effective collaboration and communication between these groups are vital to success. This guide views an LDS holistically, seeking to bring the various groups to a common understanding of these systems and to clarify the roles of each in the development process. It’s easy to talk about technology, but more difficult to bridge the divide between policymakers and Information Technology (IT). To that end, this guide will focus on areas where their needs and interests overlap, while also seeking to bridge the language gaps that exist between them. The figure below depicts these three primary groups.

District Difference 

While the focus of this guide is generally on state-level systems, the majority of the information offered in this product also applies to district-level LDS efforts. Key differences between state and district LDS requirements and best practices are highlighted in boxes like this one.



Decisionmakers drive the LDS mission and create the vision for the project. This group provides policy guidance, funding, and political leadership by sponsoring the development of effective

education information systems and deciding if the final product will be a good investment of public funds (from federal to local dollars). They need to ask themselves some key questions up front, develop a clear plan for people who will create the system, and set explicit goals. This group includes elected officials, policymakers, governing boards, and organization leaders who must see the big picture as well as understand much of the development process. These decisionmakers must also understand what their ongoing role in LDS development is. And, as they can also become key users of the system once detailed, longitudinal data are made available, they must know what data need to be included. This guide seeks to help this audience group establish a vision, mission, and expectations for their LDS.

Education experts include people who drive the implementation of the policymakers' plans for an LDS. They are the program area staff (*e.g.*, special education services, Title I, English Language Learner programs), school and district administrators (*e.g.*, principals and directors), and human resources staff who oversee LDS implementation, help define the requirements, provide professional development, and monitor the use of the data. This group also includes researchers and other data consumers like teachers and administrators, parents and students, and those people who are sometimes known as "the public," all of which need to know what to do with the data. Education experts provide insights and understanding about education processes, the use of information in creating and enhancing educational assessment, and the effective teaching of all students. While the decisionmakers may decide if the development of an information system was a good investment, it will be the system users that – either by utilizing or ignoring it – will determine if the information is used to improve education. This guide seeks to define this audience group's unique requirements to help them achieve the decisionmakers' vision, mission, and expectations for the LDS.

Finally, the **system developers** are the technical experts who make the LDS work. System developers, or builders, provide understanding of the strengths and weaknesses of information technology and the developmental trends in relevant future technology and information management processes. This group includes project managers, hardware engineers, software developers, network engineers, database designers, and graphic display experts. The system developers may know little about the processes of education, policy, or the information needs of the stakeholders who will ultimately use the system, but without their expertise the effective and efficient storage and manipulation of education data will be impossible. Focused on the nuts and bolts, they build the system details and want to know about things like how the data are to be housed, secured and maintained. This guide seeks to inform this audience group so they are better able to meet the unique requirements of their education data community.

Conventions

Throughout this guide, important terms and topics will be highlighted in side bars. This notable subject matter will be emphasized using the following devices:

Definitions



LDS Lore/Case studies



Key points



Quotes



Bright ideas



Tips



Chapter 1:

Longitudinal Data System (LDS) Primer

An LDS is a business solution, not just an IT project.

In this Chapter

This chapter considers some basic, yet complicated, questions. What is an LDS? What are the basic steps to developing a successful LDS? What components and capabilities do basic LDSs have and what additional attributes can make them even more useful? What are the common LDS misconceptions? What is the value of this type of data system – that is, what facility and efficiency can it offer?

Sections in this chapter include:

- Defining LDS
 - What are the Steps to an LDS? The Non-technical Side of LDS Development
 - What Does an LDS Look Like? Technical Components from Real to Ideal
 - Dispelling the Misconceptions: What an LDS is and is Not
 - Putting the L in LDS
 - LDS Benefits: Why Should We Build these Systems?
-

Defining LDS

What exactly do we mean when we talk about an LDS? What an LDS looks like will vary from one organization to another, and the perceived value of this type of system will differ depending on who you ask. Furthermore, LDS misconceptions abound [see the ‘Dispelling the Misconceptions: What an LDS is and is Not’ section for more information]. For these reasons, it is important that everyone involved in the development process gets on the same page early on. To help with this challenge, we offer the following definition of an LDS:

An education **longitudinal data system** is a data system that:

- collects and maintains detailed, high quality student- and staff-level data,
- links these data to one another across entities and over time, providing a complete academic and performance history for each student, and
- makes these data accessible through reporting and analysis tools.

Though system characteristics and capabilities will vary in the real world, this definition captures what many experts agree is the standard for an LDS.



*An education **longitudinal data system** is a data system that collects and maintains detailed, high quality student- and staff-level data that are linked to one another across entities and over time, providing a complete academic and performance history for each student, and makes these data accessible through reporting and analysis tools.*

What are the Steps to an LDS? The Non-technical Side of LDS Development

While LDSs are often defined by their technical components and capabilities (as discussed in the following section), it is important to note that an effective LDS involves much more than expanded technology and data collections. Designing and building a robust LDS for long-term use must address many non-technical processes, as well. These non-technical processes, as listed below and discussed throughout this guide, require the support and engagement of key stakeholders outside of the IT department, and from both within and outside the education agency. The following non-technical activities or “steps” to implementing an LDS may not be followed in any particular sequence. Your agency may tackle them simultaneously or in a different order. However, the long-term success of the system will require your agency to meet all of these challenges.

- **Establish data governance:** An LDS is only as good as the data it contains. To ensure data quality, develop a data governance process and structure, setting standards and policies, organizing staff, creating oversight committees, and identifying clear roles and responsibilities. Ideally, this should be the first step in the LDS implementation process to ensure that the data that populate the LDS will be of high quality and, in turn, will be trusted and effectively utilized throughout the education community. [See the “Governing the Data” sections in chapter 3 for more information.]
- **Engage stakeholders:** A successful LDS will be designed to meet the needs of a wide variety of users. Engage a broad range of stakeholders to gather feedback, inform system design and build grassroots interest in the planned system. Engage interested parties from inside and outside the education agency to create a vision, identify key policy, political, and instructional questions that the LDS should be used to answer, and articulate reporting needs and potential new uses of data. [See the “Engaging Stakeholders: Bringing Everyone Along” and “Self Assessment: You Are Here, but Where Exactly is That?” sections for more information.]
- **Identify data champions:** To ensure support and sustainability over the long term, despite fluctuations in available resources and changes in political leadership, it is critical to build both high-level and grassroots demand for the system. In addition to engaging stakeholders, identify “data champions” within the agency and among state policymakers to build support for the system, locate sources of start-up and maintenance funds, and develop a culture of data use in which stakeholders value data as assets in the effort to improve education from both the top down and from the bottom up. [See the “Ensuring System Sustainability: Staying “There”” and “Marketing and Communicating about Your LDS” sections for more information.]
- **Conduct self and needs assessments:** Agencies must reflect on why they want an LDS and what they and their stakeholders need from the system before they build or buy it. Assess where your agency currently is in terms of a data system, data assets, and data use, and review your organizational structure and resources to determine what needs to be done to get the system you want. The needs assessment should result in a document that addresses specific technical requirements, recommendations for organizational structure, and/or recommendations about governance processes. Take time to gather stakeholder input as well as lessons learned and best practices from other agencies that are farther along. [See the “Needs Assessment: Defining “There””, “Data: Knowing What You Have, Identifying What You Need” and “Procurement Planning: Build or Buy?” sections for more information.]
- **Provide professional development and training:** Create a plan for providing professional development and training to key stakeholders to ensure long-term use of the LDS. Review

internal staff skill sets and external options for modes of instruction, and identify funding sources for on-going training. Ensure that users will be able, not only to use the tools designed for accessing and analyzing the data, but also that they understand how to properly interpret the results. [See the “Preparing Users” section for more information.]

- **Use the data to improve education:** The LDS planning stage should involve engaging potential users of LDS and analysts to identify key questions that educators, policymakers and practitioners need answered in order to improve student achievement and find the best methods for producing timely, useful data for a variety of stakeholders, including legislators, state agency staff, local administrators, educators, researchers, parents, students and others. Having planned the system to meet the needs of these end users and having trained these users to make the most of the new data, the new information must be utilized to improve the education system and the educational outcomes of individual students. [See chapter 4 for more information.]

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What Does an LDS Look Like? Technical Components from Real to Ideal

LDSs come in as many different shapes and sizes as ways in which they come into existence. While there are a number of fundamental characteristics that all basic LDSs should share, the methods of achieving those features will differ among states and districts. LDSs are often conceived and built over time in a piecemeal fashion, and as follows, the characteristics of real systems are not always those of ideal systems. Ideally though, the design of an LDS should be driven by the organization’s questions and desired functionalities. The system should be carefully planned from the outset with an overarching design intended to meet specific state or local needs and goals. The various components and functionalities of the LDS should be seen as means to desired ends, not ends in and of themselves.

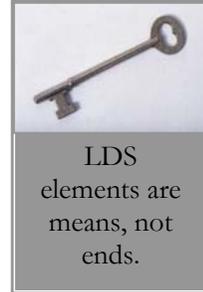


Table 1.1 and the text that follows present the spectrum of LDS components, including core components and characteristics that experts say a basic, yet sophisticated LDS will have (“basic”) as well as those attributes that can transform a basic system into a high performance system (“expanded”). While the “basics” can allow your organization to meet the common, core goals of a P-12 LDS, the “expanded” components will provide greater efficiencies and capabilities. While attaining all of these characteristics may be challenging – technologically, politically, and financially – their establishment is essential to a fully functioning LDS. And in fact, as time passes, the components that used to be viewed as “extra” or “nice-to-have” (e.g. data warehouses, linkages between K-12 and postsecondary and workforce data systems) are quickly becoming the norm as agencies advance in their LDS development efforts. For definitions of these items, we rely heavily on the Data Quality Campaign, a leader in the push towards LDS implementation, among other resources.

Table 1.1. LDS components and characteristics – basic and expanded

Basic	<ul style="list-style-type: none"> ▪ Student unique identifier system ▪ Student data (enrollment, attendance, demographics, and program participation) <ul style="list-style-type: none"> ○ Student-level college readiness test scores ○ Information on untested students ○ Student-level transcript information ○ Student-level graduation and dropout data ▪ Annual summative assessment data links from year-to-year ▪ Teacher unique identifier systems and ability to link teacher and student data ▪ Teacher and staff data ▪ Data warehouse ▪ Reporting and analysis tools ▪ Interoperability ▪ Portability ▪ Privacy protection ▪ Data sharing beyond P-12 (“P-20”) <ul style="list-style-type: none"> ○ Early Childhood Learning ○ Postsecondary ○ Workforce ▪ Data audit system to assess data quality, validity, and reliability
Expanded	<ul style="list-style-type: none"> ▪ Interim and formative assessment data ▪ Finance data linkage ▪ Facilities data linkage ▪ Data sharing with Social services ▪ Role-based stakeholder access via web-based portals ▪ Additional, non-traditional student data ▪ Geographic information system

Basic

To achieve “basic” functionality, a P-12 LDS will include the following core elements, components, and capabilities:

▪ **STUDENT UNIQUE IDENTIFIER SYSTEM:**

A student unique identifier system is the basis for an LDS. Without this component, tracking students over time will be exceedingly difficult if not impossible. A unique statewide student identifier is “a single, non-duplicated number that is assigned to and remains with a student throughout his or her P-12 career. Assignment of a unique statewide student identifier to every student in the P-12 system provides a way to follow students as they move from grade to grade and across campuses and/or districts within the state. This component, among other things, can help to show 1) the academic value-added of a school or program, 2) the achievement levels in early grades that indicate that a student is on track to succeed in subsequent grades, and 3) the test scores in early grades which should be thresholds for intervention.”⁴

Alternatively, a number of states have passed legislation to allow the use of Social Security numbers as student identifiers. This approach, while raising privacy concerns among some constituents, has been seen as a safe and less costly way to track students. It also makes the job of tracking students beyond P-12 easier as SSNs are used by postsecondary institutions and other government agencies.

District Difference

At the district level, LDSs may have two unique identifiers – a local ID as well as a state-level ID to enable integration with the statewide system.



▪ **STUDENT DATA:**

“Accurate information on student enrollment, [attendance,] demographics, and program participation (*e.g.*, student participation in special education or the free and reduced price lunch program, the most common indicator of student poverty status) is essential to evaluate the effects of schools and programs, and to assess the impact of student mobility and continuous enrollment on learning. With student-level enrollment, demographic and program participation information, policymakers and educators will know: 1) the extent to which free and reduced price lunch enrollment drops off in high school and how that might affect measures of each high school's poverty rate, 2) how the percentage of minority students in gifted and talented programs compares with that of white students, and 3) the rate at which English language learners are entering the state [or district] for the first time in high school and how they are doing on... high school exit exams.”⁵ [See the “Data: Knowing What You Have, Identifying What You Need” section for more information.]

Student-level college readiness test scores

“To ensure that students make a successful transition from high school to postsecondary education, it is important for [agencies] to collect and report student performance data on college admissions, placement and readiness tests. Student performance on SAT, SAT II, ACT, Advanced Placement (AP) and International Baccalaureate (IB) exams are important indicators of students' college readiness; [agencies] should collect and report these data on an annual basis. With student-level college readiness test scores, policymakers and educators will know: 1) how participation rates and scores on SAT, ACT, AP and IB exams change over time for low-income and minority students, 2) the percent of students who meet the proficiency standard on the state 8th grade test who also take AP or IB courses in high school and pass the corresponding AP or IB exams, and 3) the percent of low-income students who met the proficiency standard on the

⁴ Data Quality Campaign, *The 10 Essential Elements in Detail for 2008-09*, http://dataqualitycampaign.org/survey_results/elements.cfm.

⁵ Data Quality Campaign, *The 10 Essential Elements in Detail for 2008-09*.

state high school test who take the SAT and ACT exams and score at college readiness benchmark levels on those exams.”⁶

Information on untested students

Education agencies “need to go further than tracking students who do not take the test to find out why they are not tested and then match those records to separate enrollment and program participation databases. This makes it possible to identify patterns associated with specific student populations (*e.g.*, special education students or English language learners) and ensure that all students are held to high expectations.” With information on untested students, policymakers and educators will know: 1) which students were not tested by grade and subject and why, 2) trends over time in the number and percentage of untested students from each student group (English language learners, special education students, different ethnic groups, etc.), and 3) whether or not particular schools and districts have excessive absences on test day or questionable patterns of absences and exemptions across years (these measures can be used in a state's data audit system to ensure data quality).”⁷



THE MANY MONIKERS OF LDS

The concept of LDS has been referred to in many ways in education, business, and IT literature. No matter what moniker you choose, however, the key common factor among these systems is student-level longitudinal data that can be tracked over time and across institutions. LDS aliases include:

- Enterprise Education Information System
- Longitudinal Data System
- Longitudinal Data Stream
- Longitudinal Education Information System
- Longitudinal Student Data System
- State Data Manager
- Statewide Longitudinal Education Data System
- Student-level Longitudinal Data System
- Student Unit Record System

Student-level transcript information

“Many states are encouraging students, particularly low-income and minority students, to take rigorous courses in high school so that they are better prepared for success in postsecondary education and the job market. In most states, however, course taking data is not collected at the state level, making it impossible to monitor the impact of these policies. To fill in the missing information, states should collect student-level transcript information from middle and high school, including courses taken and grades [and credits] earned. With student-level transcript information, policymakers and educators will know: 1) the number and percent of students who are enrolling in and completing rigorous courses in high school, disaggregated by ethnicity and income status, 2) the middle schools that are doing the best job of preparing students for rigorous courses in high school, 3) whether or not students in more rigorous courses in high school have been more successful in college or in the workplace, and 4) whether or not there is evidence of grade inflation (*e.g.*, students with the same test scores receive dramatically higher grades in the same course in certain schools or districts.)”⁸ This same data collection and analysis will also provide insight into course and program effectiveness at the district level.

Student-level graduation and dropout data

“A majority of states currently collect annual records on individual graduates and dropouts, but to calculate the graduation rates defined in the National Governors Association (NGA) compact, [state or local agencies] need to be able to track individual students over time. The calculation of accurate graduation rates also requires the ability to accurately account for what happens to

⁶ *Ibid.*

⁷ *Ibid.*

⁸ Data Quality Campaign, *The 10 Essential Elements in Detail for 2008-09*.

students who leave public education. For example, [agencies] must be able to distinguish correctly between departing students who drop out or get a GED from students who transfer to another school. With good graduation and dropout data in place and the ability to match records to other databases, policymakers and educators will know: 1) when and why students leave the state's public education system, 2) the percent of first-time 9th graders in a given year who graduate from high school within four, five, or six years, 3) the schools and school systems that are doing the best job reducing the dropout rate, and 4) the characteristics of high school dropouts and whether or not there are early warning signs that schools can look for in elementary and middle school.”⁹

▪ ANNUAL SUMMATIVE ASSESSMENT DATA LINKS FROM YEAR-TO-YEAR:

“A statewide database of individual student performance on state exams (and state-mandated local exams) should be maintained with the ability to disaggregate the results by individual item and objective, in order to provide good diagnostic information to teachers. Though most states do have annual test records for individual students, only some of these states have created the ability to match records for individual students across time and with other databases (*e.g.*, enrollment, course completion, and graduation databases). With the ability to match individual student test records across years to follow student progress, policymakers and educators will know (by grade and subject): 1) the percent of last year's below proficient students who met the state's proficiency standard this year, and 2) whether or not proficient and advanced students are achieving at least a year's growth every year.”¹⁰

District Difference

At the district level, there may also be assessments that are locally-mandated, locally-created, and locally-used. While these may not be related to state assessments, they are of great value to local educators, especially when they can be linked over time to create student performance histories.



▪ TEACHER UNIQUE IDENTIFIER AND THE ABILITY TO LINK TEACHER AND STUDENT DATA:

“Many [agencies] collect data on teacher education and certification, but matching teachers to students by classroom and subject is critical to understanding the connection between teacher training and qualifications and student academic growth. Collecting this data makes it possible to identify which students and which courses are being taught by teachers with different levels and types of preparation or certification, and which forms of teacher training and certification have the greatest impact on students' academic growth in the classroom. With a teacher identifier and the ability to connect teacher and student data, policymakers and educators will know: 1) the teacher preparation programs that produce graduates whose students have the strongest academic growth, 2) how the experience levels of the teachers in the district's high-poverty schools compare with those of teachers in the schools serving affluent students, and how these experience levels are related to the academic growth of the students in their classrooms, and 3) the relationship between the performance of the district's low-income students on the state algebra exam and teacher preparation in that subject.”¹¹ Teacher privacy must be protected when these links are made. [See ... for more information.]

▪ TEACHER AND STAFF DATA:

“Connecting student information with teacher preparation, instructional practices, professional development and working conditions is essential to understanding how and why teachers are

⁹ *Ibid.*

¹⁰ *Ibid.*

¹¹ Data Quality Campaign, *The 10 Essential Elements in Detail for 2008-09*.

able to improve student outcomes.”¹² The value of linking student and staff data is limited unless we have detailed data on individual staff. Information on teachers and staff, such as educational attainment, experience, and salary, will help us to better understand issues like the relationship between student achievement and teacher quality, teacher supply and demand, as well as staff attrition and mobility.¹³ [See the “Data: Knowing What You Have, Identifying What You Need” for more information.]

▪ DATA WAREHOUSE:

“An educational data warehouse is a storage facility, built and maintained by [an agency], where detailed and reliable educational data from several areas that affect student achievement are stored and integrated.”¹⁴ This LDS component should be district- or state-wide and should link student, school and district information over time.¹⁵ [See Chapter 4 for more information.]

▪ REPORTING AND ANALYSIS TOOLS:

“Reporting and analysis tools... are essentially the software programs written to calculate the statistics that stakeholders need to evaluate the performance of a student, school, district or state and produce reports (electronic or print) that answer stakeholder questions.”¹⁶ Without these tools, which provide stakeholders with easy access to the data in both raw form and in standardized reports, it is impossible to reap the full benefits of an LDS and improve student achievement. Many agencies build LDSs without investing in these tools, only to find that use of their new data for reporting and analysis is limited, seriously compromising the usefulness of the system. [See Chapter 4 for more information.]

▪ INTEROPERABILITY:

Interoperability is the quick and easy transfer of data between systems via a common set of technical software standards. “Data interoperability entails the ability of different software systems from different vendors to share information without the need for customized programming or data manipulation by the end user. Interoperability reduces reporting burden, redundancy of data collection, and staff time and resources. ...It depends on systems having common data standards and definitions.”¹⁷ [See Some Critical “abilities”: Interoperability and Portability section for more information]

▪ PORTABILITY:

“Data portability is the ability to exchange student transcript information [e.g. course completed, credits earned, GPA, etc.] electronically across districts and between P-12 and postsecondary institutions within a state and across states. Portability has at least three advantages: it makes valuable diagnostic information from the academic records of students who move to a new state [or district] available to their teachers in a timely manner; it reduces the time and cost of transferring students' high school course transcripts; and it increases the ability of agencies to distinguish students who transfer to a school in a new state [or district] from dropouts. The large interstate movement of students in the wake of Hurricane Katrina made the value of such a system obvious. Data portability is supported by the implementation of interoperable systems, but it requires [agencies] that use these systems to have a set of common definitions or protocols.”¹⁸ [See Some Critical “abilities”: Interoperability and Portability for more information]

¹² Berry, Fuller and Reeves. (2007). *Linking Teacher and Student Data To Improve Teacher and Teaching Quality*.

¹³ Center for Strengthening the Teaching Profession. *a Comprehensive Teacher Data System*.

¹⁴ DQC (September 2007). *How Can My State Benefit from an Educational Data Warehouse?* DQC, September 2007

¹⁵ DQC (October 2006). *Creating Longitudinal Data Systems: Lessons Learned from Leading States*.

¹⁶ Steiny & Smith. (2007). *Reporting and Analysis Tools: Helping Mine Education Data for Information Riches*.

¹⁷ Data Quality Campaign, *Fundamentals in Designing State P-12 Longitudinal Data Systems*.

¹⁸ *Ibid*.

▪ **PRIVACY PROTECTION:**

“One of the critical concepts that should underscore the development of any LDS is preserving student privacy. An important distinction needs to be made between applying a ‘unique student identifier’ and making ‘personally identifiable information’ available, for example. It is possible to share data that are unique to individual students but that do not allow for the identification of that student. It also is critical to put in place encryption and data security protocols to secure the transmission or transaction of data between and among systems. States should ensure that they bring privacy considerations into the development of each repository and the exploration of each protocol or report.”¹⁹ Compliance with federal and state privacy laws must be ensured and staff must be trained on the education agency’s privacy and security policies to protect sensitive data. [See the “Protecting the Individual, Securing the Data” section of this guide for more information.]

▪ **DATA SHARING BEYOND P-12 (“P-20”):**

The scope of LDSs is not limited to the P-12 grade levels. Indeed, the value of longitudinal data is even greater when it spans beyond these years into college and the workforce (commonly referred to as “P-20” systems).

Early Childhood Learning

For years, many states have collected student-level data on publicly funded pre-kindergarten (PK) programs and early childhood education (ECE) programs for students with special needs. These data typically include information on which services were received and where. Few states have child-centered data systems that track enrollment or participation in private PK or ECE programs or day care centers. As policy and education discussions expand to address P-20 longitudinal data systems and the impact of educational opportunities across the full spectrum of learning, more people are trying to understand the relationship of early childhood learning and kindergarten or grade school readiness and subsequent performance.

Postsecondary

“As states and school systems work to align expectations in high school with the demands of postsecondary education, they need better data on student success when they leave the P-12 system and enter college. Most states today do not have data systems that enable this two-way communication. With the ability to match student records between P-12 and higher education systems, policymakers and educators would know: 1) the percentage of each district's high school graduates who enrolled in college within 15 months after graduation, 2) the percentage of last year's graduates from each high school or school district who needed remediation in college and how these percentages varied by student income and ethnicity, 3) the percentage of students who met the proficiency standard on the state high school test and still needed remediation in the same subject in college, and 4) how the students' ability to stay in and complete college is related to their high school courses, grades and test scores.”²⁰

Workforce

With a connection between education and workforce data, researchers can answer questions about whether schools, colleges, and universities are preparing students for long-term success in the workplace, what percentage of students graduating from a district/school is unemployed one year after graduation, and how a graduate’s earnings are related to academic preparation in high school.²¹

¹⁹ DQC. (2006). *Creating a Longitudinal Data System: Using Data to Improve Student Achievement*.

²⁰ Data Quality Campaign. *The 10 Essential Elements in Detail for 2008-09*.

²¹ Data Quality Campaign (2007). *Linking Education and Social Services Data to Improve Child Welfare*.

▪ **DATA AUDIT SYSTEM TO ASSESS DATA QUALITY, VALIDITY, AND RELIABILITY:**

“Invalid or unreliable reporting by some schools and districts is a problem in a number of states, and this problem is likely to continue in the absence of checks on the accuracy and quality of the data submitted by schools and districts. Without a well-designed and well-implemented state data audit system, the public cannot have confidence in the quality of the information coming out of the state's public education system. With a robust data audit system in place, policymakers and educators will know: 1) whether or not the disaggregated student information used to rate schools for Adequate Yearly Progress (AYP) is valid, 2) the districts that do the best job of reporting valid and reliable dropout data, 3) whether or not districts are reporting their numbers of untested students and reasons for not testing the students, and 4) the amount and type of data quality problems identified by districts and how those problems are being addressed.”²² These issues also exist within districts. Without controls over local school data quality and accuracy, district-level LDSs will suffer from the same confidence issues as a state education agency. [See the “Improving Data Quality” section for more information]

Expanded

To be highly effective, an LDS would ideally include or allow for:

▪ **INTERIM AND FORMATIVE ASSESSMENT DATA:**

In addition to the maintenance of state-mandated annual summative tests, state-level LDSs may also maintain and make available data on interim and formative assessments, which are administered more frequently than annual summative tests. These data are often maintained at the local level, but also may be incorporated into the state LDS. These tests, which will ideally be aligned with the academic standards of the summative assessments, are given throughout the year to give students and educators more timely and detailed measures of how students are progressing. Thus, by equipping educators with more granular data than annual assessments, these assessments greatly enhance educators’ ability to use data proactively to keep students on track and stem problems early on. Educators can use the information to adjust instruction throughout the school year to better meet student needs, either providing additional help in areas where students are struggling or giving advanced students more challenging material. [See chapter 4 for more information.]

▪ **FINANCE DATA LINKAGE:**

“Creating a comprehensive data system that links longitudinal student outcome data to financial data at the district level — and ultimately, the school or even classroom levels — can help decisionmakers understand not only what works but also what it takes to deliver what works.” Furthermore, “a high-quality financial system that is connected to longitudinal student data supports student learning in a number of fundamental ways: 1) facilitating the identification of resource-effective strategies and schools; 2) providing insight into the most productive ways to structure districts, schools and classrooms to support student outcomes; and 3) increasing transparency for education stakeholders at all levels to ensure that increasingly scarce resources are spent in the most efficient and effective way.”²³ [See the “Data: Knowing What You Have, Identifying What You Need” for more information.]

▪ **FACILITIES DATA LINKAGE:**

Data on school facilities offer insight into the physical environment in which students receive their education. Facilities data can inventory schools and describe the condition, design,

²² DQC. *The 10 Essential Elements in Detail for 2007-08*.

²³ Gazerro, P and E. Laird. (May 2008). *Linking Spending and Student Achievement: Managing Inputs, Processes and Outcomes*.

utilization, management, and funding of these facilities. Facilities data elements may include a wide variety of information such as building identifiers and addresses; date of original construction; renovation and new construction information; site acreage; building area (*e.g.*, sq. footage); building and site condition; safety appraisal information; air conditioning and heating systems; operations management information; building use; etc. Collecting these data and linking them to other educational data can help decisionmakers ascertain the adequacy of these facilities, how they are distributed, and inform decisions about funding, renovation, modernization and infrastructure improvements.²⁴ These data should be shared with the state to inform state and national level policy planning and implementation. [See the “Data: Knowing What You Have, Identifying What You Need” for more information.]

▪ **DATA SHARING WITH SOCIAL SERVICES**

By linking education and social services data, education agencies can answer questions about 1) the impact of school mobility on student achievement for children and youth in foster care, and how it affects success in higher education and the workforce, 2) how services beyond the scope of the classroom (*e.g.*, health care, child welfare, higher education access and public safety) can be better tailored to help each student meet academic goals, 3) how initiatives aimed at improving child outcomes can be better aligned and coordinated among the education, child welfare and judicial systems to improve outcomes and reduce duplication, and 4) what practices/programs have demonstrated the ability to improve outcomes for students, including not only educational achievement, but also social, health and civic progress.²⁵ While this link is more likely to occur at the state level, some larger urban districts in which social service programs are offered may also benefit from sharing LDS data with local social services departments.

▪ **ROLE-BASED STAKEHOLDER ACCESS VIA WEB-BASED PORTALS:**

Depending on the needs and authorization of various users, role-based access to LDS data can be established both to protect sensitive data from getting into the wrong hands and to allow users to easily access data useful to them for educational purposes. State education agencies, school districts and vendors are increasingly turning to web-based portals as a means of presenting data. Besides eliminating the need to prepare and send a plethora of data files and reports to multiple users, these portals provide an excellent mechanism for controlling security and access to sensitive data. For example, with a username and password, teachers can be granted access to a site that contains personally identifiable data on all of their current students, but only see aggregated data for all other classrooms in the school. And parents can be allowed to retrieve data on their children, while being barred from viewing information on their neighbors’ kids. Other stakeholders such as students, administrators, researchers, and the public should also be granted role-based access to the data. [See the “Security” section for more information.]

▪ **ADDITIONAL, NON-TRADITIONAL DATA:**

In addition to data that are usually collected on students and staff, other information can be valuable in informing decisionmaking. For example, data about student, parent, and staff perceptions and experiences can provide greater insight into what changes can be made to improve the educational environment. For instance, how do students perceive their relationships with teachers and the expectations teachers have for them? Do parents feel their kids’ teachers are committed to students’ learning? Do parents have enough time to help their kids with school work after school? Do teachers feel the school has a vision? Are they given ample support? Additionally, school process data, describing programs, curriculum, instructional and assessment

²⁴ National Forum on Education Statistics (2003). *Facilities Information Management: A Guide for State and Local Education Agencies*,

²⁵ Data Quality Campaign. (October 2007). *Linking Education and Social Services Data to Improve Child Welfare*.

strategies, and classroom practices, can provide another revealing window into the classroom.²⁶ And, community demographics such as household income levels, unemployment rates, and adult education levels can also be informative.²⁷ All of this information can add new dimension to analyses, helping us to explore more of the factors involved in student learning and success.²⁸ [See the “Data: Knowing What You Have, Identifying What You Need” section and chapter 4 for more information.]

▪ GEOGRAPHIC INFORMATION SYSTEM

According to the Collegial Centre for Educational Materials Development, “a Geographic Information System (GIS) is a system that integrates hardware, software and data. It is used to collect and analyze geographically referenced information, which creates models that associate attribute data with specific aspects of physical spaces. It allows users to manipulate data so they can address geographic problems by summarizing data, calculating spatial statistics or processing queries, among other things. ... The results are often visualized in the form of a map.”²⁹ As an education LDS tool, GIS offers unique functionalities such as providing users with landscape views of population characteristics and growth, achievement data, and redistricting. Policymakers and parents are often especially interested in this technology. [See ... for more information.]

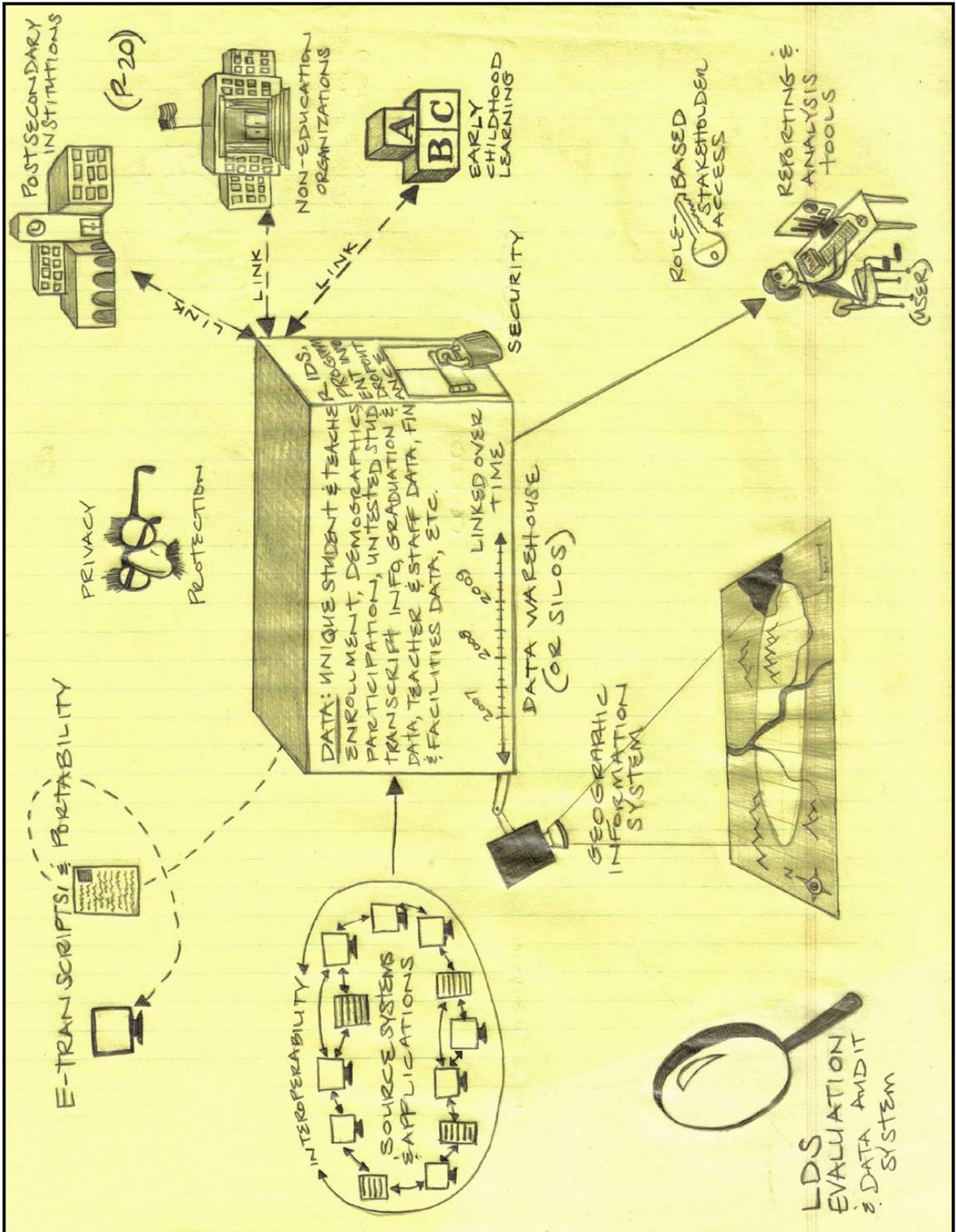
²⁶ Bernhardt, V. L., (2004). Continuous improvement: It takes more than test scores. *ACSA Leadership*. November/December 2004, 16-19.

²⁷ Newby, D. (July 2007). [CCSSO's National Education Data Partnership: Phase Two](#)

²⁸ Bernhardt, V. L., (2004). Continuous improvement: It takes more than test scores. *ACSA Leadership*. November/December 2004, 16-19.

²⁹ Collegial Centre for Educational Materials Development Geographic Information Systems website: <http://www.ccdmd.qc.ca/ressources/?id=1275>, accessed on September 18, 2008.

The Longitudinal Data System: Crudely



Dispelling the Misconceptions: What an LDS is and is Not

There are many ideas about what an LDS is. What's its purpose? What's its value? How should it be used? How helpful can it be? What components and capabilities should it have (e.g., a data warehouse, reporting and analysis tools, linkages to P-20, interoperability, etc.)? But, while there is plenty of room for differing opinions on these questions, some of the commonly held beliefs about LDSs are simply incorrect. Below are examples of some of the LDS misconceptions you may have heard at a conference or around the office:



"Yeah, sure we have an LDS. We just rolled out our data warehouse."

A data warehouse (DW) is not necessarily an LDS. While a DW can be an extremely valuable LDS component, it is quite possible to build an LDS that draws data from numerous interoperable silos or separate data stores. What matters is not the type of system you use to store the data, but what type of data you are collecting, storing, and making available with it. DWs should not be considered LDSs if they are full of aggregated snapshot data. To be an LDS, DWs need to contain comprehensive student-level longitudinal data that span many years to allow meaningful analyses to be performed.

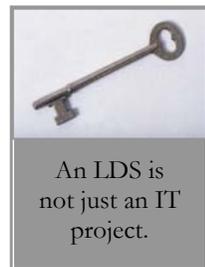


↳ Other types of data systems may also be confused with an LDS. An **operational data store** (ODS) maintains only very recent information, which is frequently updated to reflect the current status of an object (e.g., a student's enrollment). Historical data are not stored in the ODS, so users are only able to make simple queries on small quantities of data.³⁰ While useful for other purposes, due to these limitations, an ODS does not allow for longitudinal analyses and can not substitute for an LDS. Similarly, a **transactional database**, which is designed for recording and processing, but not for reporting, should also be distinguished from an LDS.



"Call the IT department and tell them to build us an LDS."

An LDS is not just an information technology (IT) project. It's a business solution – a way to meet business needs. IT staff can build an LDS, but the system they develop may not meet user needs. Therefore, education experts must work closely with IT throughout the design and development process to make sure the system will effectively serve the requirements of the end users. Developers must consider how users do their jobs and what functionalities will make their work easier and more efficient. They should also think about how data users access and use the data and how the new system can help them make the most out of the information.



"We'll just buy an LDS and be done with it."

If only it were so easy. The reality is that you can not simply buy an LDS or hire someone to do all the work for you. An education agency shouldn't expect an "out-of-the-box" LDS or LDS component to be a success for a number of reasons. 1) Systems need to be designed or tailored to meet stakeholder needs, which vary among regions and organizations. Agency staff need to take the time to carefully plan the system, learn about the



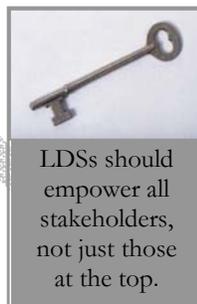
³⁰ Inmon, Bill. "[The Operational Data Store](#)." Info DB, February 1995.

various possible solutions, and figure out how best to please their stakeholders and benefit their students. If you skip these stages, how will you know if the product you buy is what you actually need? Being an informed consumer is essential to getting a successful system. 2) An LDS is not a one-time purchase. In addition to upfront development costs, ongoing maintenance and updating is required to ensure long-term value. And 3), beyond the technology, an LDS requires a new way of thinking about data throughout the organization. People need to shift their ideas about data, valuing it as a tool rather than seeing it as a burden. A good deal of ongoing planning, communication, and professional development for users is necessary to make this happen. [See the Engaging Stakeholders, Self Assessment, Needs Assessment, and Procurement Planning sections of this guide for more information.]



“This LDS thing makes me uncomfortable. It’s just going to be used as Big Brother.”

An LDS should not be seen as Big Brother. However, these systems are sometimes viewed skeptically as tools that will be used to monitor and punish staff members. For instance, some fear that analyses of student test score data linked to teachers will be used to determine teacher bonuses or target individuals for termination or transfer. In fact, at the federal level there is an emphasis on using data to reward effective teachers, identifying struggling teachers for professional development, and removing ineffective educators. And some states do allow the use of teacher-level data for evaluation, as well as pay and personnel decisions, while other states have




Schools must “use data not as a hammer, but as a flashlight.” –Aimee Guidera (Data Quality Campaign)³¹

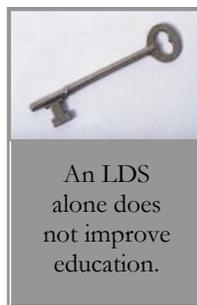
laws prohibiting such use (though there is growing pressure from the federal government to reverse such laws³¹). The main value of LDSs, however, is their ability to help us find out what works, identify ways to improve instruction and tailor approaches for individual students, identify problems early on to stem

failure and dropouts, and automate and streamline daily administrative operations. Most agree that these systems should be used to empower staff with access to valuable information, not to punish them. State, district, and school leaders must build trust through clear communication and collaboration within the education community to assuage such fears. [See Chapter 4 for more information on using longitudinal student- and staff-level data.]



“When we get our LDS, we can kiss all our problems goodbye! The kids are gonna do great!”

Simply having an LDS at your stakeholders’ disposal will do nothing to benefit students. Just as a new high-tech cell phone won’t make your busy life any more manageable if you use it just like your grandparents’ old rotary phone, a new LDS won’t serve your needs any better than the legacy system if you don’t put it to good use it. A sophisticated LDS can be a tremendous tool for shedding light on the reality of education and for use to improve student outcomes. But agencies must harness the data in these systems in aggressive and creative ways in order to take full advantage of their potential.



³¹ US Dept. of Education, “Secretary Arne Duncan Addresses the Fourth Annual IES Research Conference,” June 8, 2009. Speech transcript available at <http://www.ed.gov/news/speeches/2009/06/06082009.html>.

³² Alpert, E. “New Number-Crunching Links Teachers to Test Scores,” VoiceofSanDiego.org, accessed on October 6, 2008.

Putting the 'L' in LDS³³

So what is an LDS? What makes it longitudinal? Many states and districts think that they have a longitudinal data system because they have a data warehouse that has many years worth of data. Others don't have a data warehouse, but do report many years worth of annual graduation rates. So, they say that they have an LDS. Others believe that they have a longitudinal data system because they have a student identifier system.

Longitudinal means that data on a given student can be connected across years. In photography parlance, it is more like being able to watch a video of a student as they go from grade to grade. If you put all those videos of individual students together into a montage, you can usually spot some trends about what happens to students with different types of experiences in the early grades. Usually, though, school districts and state education agencies (SEAs) review 'snapshot' data – pictures taken of a given 3rd grade class one year, the 4th grade class the next year, and the 5th grade class the third year. Some of the same students might be in all three pictures, but it is more likely that some students leave and others join the cohort over the three-year period.

In years past, it was more common for school districts to send summary statistics to the SEA — for example, the count of students receiving special education services or free- or reduced-price lunch, the percent of students passing that statewide exam in the spring, or the number of students in each racial/ethnic category. The SEA could then aggregate or add up all of the school or district numbers to get statewide totals. Aggregated snapshot data is very valuable to educators and policymakers, especially when they need a way to quickly summarize how schools are performing and see which districts serve which types of students.

However, snapshot data alone do not provide enough information to truly evaluate the impact of student mobility or of dropout intervention programs, the relationship between course-taking patterns and college-readiness, or the ability to calculate a graduation rate while taking into account students who transfer to another school, are retained in a grade, leave for private school or drop out. Only a set of robust longitudinal data on the characteristics and experiences of each student — that tracks students across school years and across campuses within a state and connects that enrollment data with other outcome data (course completion, college readiness, assessment and exit data) — provides the ability to thoroughly investigate the patterns of success and struggle that students experience. Student-level longitudinal data can be aggregated to look at school, district and state trends, but they can also be analyzed at a much finer level of detail than snapshot data to fully understand the relationships between the many factors affecting student achievement.

With the snapshot data that is reported per No Child Left Behind requirements, it is possible to say, for example, that 51 percent of African-American students were proficient on the 10th grade mathematics exam, while 83 percent of White students were proficient. With student-level longitudinal data, it is possible to say that of the 51 percent of African-American students who were proficient on the 10th grade mathematics exam, 65 percent of them were also proficient on the 8th grade mathematics exam, and of those students 78 percent took Algebra I in the 8th grade. With that information, educators and policymakers can understand the importance of preparing students to take Algebra I in 8th grade. This type of longitudinal data shows that students who do not take Algebra I in the 8th grade are less likely to show proficiency on future exams. With this information, administrators can tailor their curricular activities in earlier grades to prepare more students for Algebra I in the 8th grade. Of course, with longitudinal data, the same administrators will also have the data necessary to determine which elementary and middle school students are on track to take Algebra I in the 8th grade and provide the necessary intervention to those who are not yet ready but could get there.

Data warehouses and easily accessible reporting and analysis tools are critical to improving the use of data in education. They are very useful and important tools, even when they are full of snapshot data and statistics. Having these tools, however, does not automatically imply that the state collects student-level longitudinal data or that they are using longitudinal statistics to inform their decisionmaking.

Longitudinal data implies the ability to collect many key pieces of data on individual students (examples include: campus of enrollment each year, programs in which the student receives services, ethnicity, age, statewide and end-of-course exam scores every year, reasons for not taking statewide exams, college-readiness test scores, and exit status (graduate, dropout, transfer, home school)), connect all those pieces, and then aggregate across students according to a set of key variables in order to analyze the impact of and relationship between variables. This ability to analyze and predict performance at the student level is what will ultimately help educators and policymakers at the local and state levels improve the policies that will eventually lead to improved student achievement for all students.

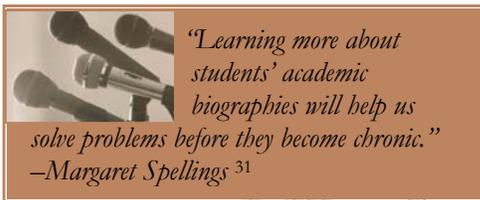
³³ Nancy Smith, Data Quality Campaign, May 2008 Newsletter, 3 (3). Available at http://dataqualitycampaign.org/file_viewer.cfm?itemID=443

LDS Benefits: Why Should We Build These Systems?

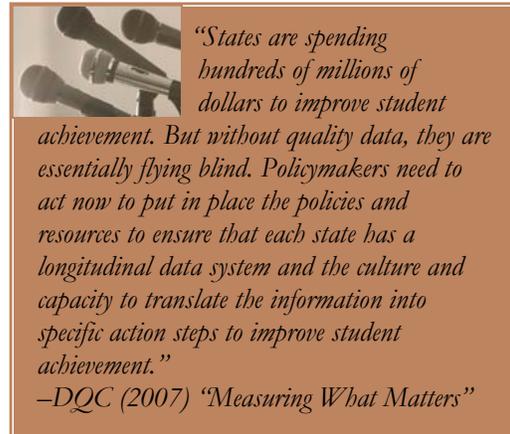
Contrary to what you may have heard, an LDS is not simply a compliance system that will feed the state and federal governments even more data. This type of system holds the potential to make high quality, timely data available to all stakeholders to help them improve student achievement, ease data burdens, and leverage significant culture change. This section gives an overview of some of the types of benefits an LDS has to offer.

Better data, deeper questions, more informative answers, enhanced education
An LDS can bring reality into clearer focus. When we zoom in on our aggregate-level data, student-level

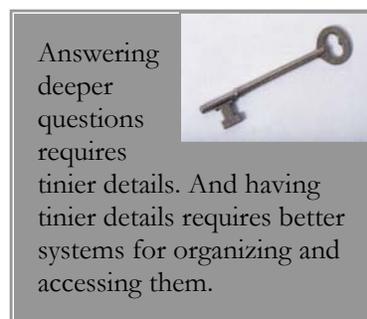
data are what we see. When staring at a static image on our screen, longitudinal data are what we can observe when we press  and follow the data (e.g., students) through time and space. Combined, longitudinal student-level data show us the “real time” details of what is going on in our education system. With these data, policymakers and educators no longer need to act on hunches or remain in the dark about what effects their decisions and practices have on students. LDS data provide transparency and allow us to examine in far greater detail what effects certain policies, programs, schools, teachers, and classroom practices have on individual students.



success or failure, longitudinal student-level data let us identify trends, predict outcomes, and make more informed decisions about policy, administration, and instructional strategies. Better equipped, we then can create better policies, use our resources more efficiently, and pursue the most effective teaching strategies tailored to meet individual student needs. By providing timely information about what works, where, and for whom, LDSs allow educators to shift from “autopsy” data use to preventative data use. That is, they can take us from asking, “What went wrong?” to identifying potential problems early on and asking, “What can we do to promote student success and avoid failure before it occurs?” For example, by making student-level longitudinal data accessible at the classroom level, teachers can look at their student’s histories, follow progress throughout the school year, identify weaknesses, and tailor instruction to address problems before it’s too late. They can work with other teachers to identify and learn from effective strategies. And with better data, we can explore whether there are early warning signs for undesirable outcomes like dropping out of high school and act to keep kids in the pipeline. [See Chapter 4 for more information on the uses of LDS data].



Do you just want to monitor student achievement or do you want a system that helps you glimpse the future and act to influence it? Beyond simple monitoring of student outcomes and reacting to old aggregate data, policymakers and educators can use LDSs to become more proactive. By allowing us to examine the influence of the many variables that may contribute to student



³⁴ Former Secretary of Education Margaret Spellings, from speech to the Education Commission of the States’ *National Forum on Education Policy*, Washington, DC, 7/1/08 [link](#).

Detailed student-level longitudinal data allow us to more accurately answer the questions we're used to asking (e.g., How many students do we have? What percentage of 4th grade African-American students met the state's proficiency standard in math last year? What is our school's graduation rate?). More importantly though, by showing us the reality of our educational systems in finer detail, these data allow us to answer deeper questions than is possible with the blunt, aggregate-level cross-sectional, or "snapshot," data to which we've grown accustomed. For example, with LDS data we can abandon the often inaccurate graduation rate estimates of the past in favor of more precise counts based on student-level data. Moreover, we can use our longitudinal data to see how many years it took those graduates to earn their diplomas and find out what they did after graduation day, in postsecondary education and the work force.

Table 1.2 below presents some other examples of the types of questions LDS data allow us to answer.³⁵

Table 1.2. What types of questions can we answer with detailed student-level, longitudinal data about:

Individual students?	<ul style="list-style-type: none"> ▪ Which early education program did a kindergartener attend, if any? At what age did the child enter the program? ▪ How has a student progressed in math over the course of the year? What was her performance in this subject in earlier grades? Was there a point at which her performance took a turn for the worse? ▪ What specific areas of the reading curriculum does a student need extra help with? ▪ Did a student drop out or transfer to another school? If she dropped out, did she ever participate in a dropout intervention program? ▪ Which students in a school are at risk of dropping out in the future? What intervention program will be most effective in preventing this outcome? ▪ Which courses did a student take in high school and how did they prepare him for college? Did he require remediation? Did he earn a degree, and if so, how many years did it take him to do so?
Groups of students?	<ul style="list-style-type: none"> ▪ How are the Hispanic students in a school district doing academically this year compared to the White students? Tracking these students back in time and to other institutions, how did those same kids do the prior year? How do the schools they attend compare in terms of various characteristics such as funding and teacher quality? ▪ How did students who attended a certain middle school fare in the high schools they moved on to? ▪ How many African-American students who were proficient on the 8th grade mathematics exam were also proficient on the 10th grade mathematics exam? Of those students, how many took Algebra I in the 8th grade? ▪ How do students who were previously identified as limited English proficient perform compared to those students whose native language is English?
Teachers?	<ul style="list-style-type: none"> ▪ How do various teacher qualifications or training (e.g., education level, degree, certification, undergraduate institution, professional development, and teacher test performance) correlate with student performance? Do these effects vary among certain types of students? ▪ Which teachers are most successful in improving the skills of struggling students? ▪ Which of a school district's teachers achieve the greatest improvements in student achievement in a subject? What are they doing differently than less effective teachers? ▪ How are teachers of varying qualifications distributed among schools and students? ▪ What are the teacher retention rates among various institutions?
Policies, programs & strategies?	<ul style="list-style-type: none"> ▪ What are the effects of certain teacher policies on teacher recruitment and retention? In turn, what effect do these policies have on student outcomes?³⁶ ▪ What effects does a policy have on student achievement? Do these effects vary among students with different characteristics? ▪ Was a program successful in boosting achievement? Did certain types of students benefit from it more than others? What was its value-added? ▪ Did a teaching strategy pay off? How did kids being taught with this strategy compare to similar kids who were taught using another approach? ▪ What effect does the use of a certain materials or technologies have on student outcomes? Do certain teachers have greater success with certain tools? ▪ How do varying funding levels or resource allocation strategies relate to student success or program effectiveness?
Indicators	<ul style="list-style-type: none"> ▪ What are the early indicators of high dropout risk?³⁷

³⁵ Note that answering each of these questions requires a very sophisticated LDS that 1) collects certain detailed data (e.g., unique student and teacher identifiers, and in depth data on students, teachers, classroom practices, school resources and facilities, and expenditures); and 2) links these data to one another, from year to year, students to their teachers, and K-12 to PK and postsecondary.

³⁶ National Center for Analysis of Longitudinal Data in Education Research

	<ul style="list-style-type: none"> ▪ Is a certain local assessment a good predictor of success in a subsequent grade? ▪ Is a particular state assessment a good predictor of success in postsecondary education? ▪ What levels of achievement in middle school are associated with success in high school? ▪ What high school performance indicators are the best predictors of students' success in the workplace?³⁸
Schools?	<ul style="list-style-type: none"> ▪ Controlling for the characteristics of student populations and other characteristics, which schools produce the most academic growth in their students? ▪ How does the success of students enrolled in a school for a certain period of time compare with that of students enrolled for the same amount of time in the highest-performing comparable schools? ▪ How does a middle school perform with students who entered the school well-prepared in mathematics? How does the same school perform with students who were poorly prepared?³⁹ ▪ What percentage of a school's graduates requires remediation in college? ▪ How is a school's increase in proficiency rates related to the attrition of its low-performing students?⁴⁰
Districts?	<ul style="list-style-type: none"> ▪ What are the characteristics shared by the highest performing districts? How does the quality of the teaching staff at those districts compare to other districts in the state? ▪ What is a district's NGA graduation rate? ▪ How do districts compare in the number of students who enroll in postsecondary institutions? In the percentage that requires remediation? That earns a degree? ▪ Which districts have the highest teacher turnover rates? ▪ How many students does a district actually serve?
States?	<ul style="list-style-type: none"> ▪ What is a state's NGA graduation rate? ▪ What percentage of a state's high school graduates required remediation in college?

Streamlining operations and easing data burdens

LDSs can be designed to make everyday operations more efficient, thereby freeing your staff to spend more time on students and less on key strokes. Interoperability and data sharing among a school's various data systems, for instance, eliminates the need for redundant data entry and, at the same time, limits the chance for entry errors [see the "Some Critical –abilities: Interoperability and Portability" section for more information]. Consolidation of data into a unified system can also eliminate redundancy. And alignment of data definitions among schools and districts will result in more consistency and improve data quality [see the "Data Standards" section for more information]. Automation of mandated state and federal reports will also reduce data burden and, thus, free up resources and staff time for more student-centered work and analyses.

Staff should also know that an LDS is not just another system into which they will load data for the state and federal governments. In fact, the primary purpose of an LDS should be for school and district level instruction and operations. An LDS can facilitate a quick and easy two-way exchange of data – up AND down the ladder, from the locals to the state to the federal government and back. Many local agencies are used to working hard to provide the state and federal government with required data. If they are fortunate enough to see these data again in the form of, for example a



Small gestures, big implications

The simplest of tools may turn out to be the most appreciated. That's what one state education agency learned when it used its LDS data warehouse to quickly and easily produce lists of students by school, showing schools which students they're responsible for each year. These simple lists were a huge hit in the state, and continue to save local staff much toil and confusion. While agencies may spend a lot of time and money developing the slickest electronic data access and analysis tools, the value of basic lists and reports should not be underestimated. Think big, but don't forget about the small stuff.

³⁷ Data Quality Campaign (January 2008). *Tapping into the Power of Longitudinal Data: A Guide for School Leaders*.

³⁸ Data Quality Campaign (November 2007). *Measuring What Matters: Creating a Longitudinal Data System to Improve Student Achievement*.

³⁹ Dougherty, Chrys. (2002). A Policymaker's Guide to the Value of Longitudinal Student Data.

⁴⁰ MPR Associates/National Center for Educational Accountability, *Judging Student Achievement: Why Getting the Right Data Matters*, September 2005.

report comparing the district to others in the state, the information may not come back until a year or more later. With an LDS, these data may quickly be made available to the locals through a number of media from sophisticated reporting and analysis tools, to standardized reports, to basic lists. These simplest of tools are often the most appreciated.

Culture change

LDSs have the potential to change our relationship with data – revolutionizing the way we think about and use this information – and to leverage culture change throughout the education community. By improving data quality and increasing the speed at which agencies are able to return data to districts and schools, LDSs open the door to many new possibilities. At the local level, these systems, along with ample training [see Professional Development section of this guide], can transform “statistically-challenged” teachers into empowered data consumers who use data to gain valuable insight about their students. They can turn data-burdened staff who spend their days entering data into data users with time to put the information to use for their schools and students. And, because LDSs can make data such a useful and accessible tool to those in the local education community, staff will have more reason to care that those data are of high quality. Education researchers can expand their toolkit from trying to draw conclusions from cross-sectional aggregate data to using individual-level longitudinal data to get more valid and reliable results. In all of these ways, we see that LDSs not only require, but also inspire culture change. [See Chapter 4 for more information on realizing these benefits.]

Additional Resources: LDS Benefits

- [A Policymaker's Guide to the Value of Student Longitudinal Data](#) - Chrys Dougherty, Education Commission of the States, July 2002
This brief gives a quick summary of the uses and value of longitudinal data. It also lists some questions that only longitudinal data can help us answer.
- [Harnessing the Potential for Research of Existing Student Records Databases: An Action Agenda](#)
This document is the result of a 2005 meeting of academic researchers and individuals responsible for several state "student unit record systems" (SURs) – it explores the potential benefits of SURs and some issues associated with their development and use.
- [Measuring What Matters: Creating a Longitudinal Data System to Improve Student Achievement](#) - DQC, Nov 2007
This is a quick introduction brochure that reviews the states' progress toward building along with the benefits and possibilities of LDSs. It includes future directions of state data systems (e.g., finance data linked to students and programs, linkage to social services and employment data, and inter-state transfer of data through use of common standards), the rationale for building LDSs and the benefits they can provide, and a review of national progress toward each of the 10 essential elements.
- [Judging Student Achievement: Why Getting the Right Data Matters](#) – MPR/NCEA Policy Brief, September 2005
This policy brief reviews some of the benefits of longitudinal data over the cross-sectional data that we have used to date. These include the ability to 1) assess student academic growth and proficiency over time, 2) monitor student mobility, retention, and attrition, 3) examine prior achievement for all student subgroups, and 4) predict future student achievement.
- [Every Student Counted](#) - DQC, Jul 07
To calculate the NGA's graduation rate, states need to have a longitudinal data system, which provides the ability to track individual students from year to year and across campuses and districts. This article outlines benefits and need for LDS in this area.
- [Tapping into the Power of Longitudinal Data: A Guide for School Leaders](#) – DQC, Jan 2008
This article explores the advantages that longitudinal data afford teachers and principals in contrast to snapshot data. It presents "six key uses of longitudinal data" including progress monitoring, diagnosis and prescription, internal benchmarking, external benchmarking, predictive analysis, and evaluation.
- [Getting the evidence for evidence-based initiatives: How the Midwest states use data systems to improve education processes and outcomes](#) - Regional Education Laboratories Midwest – June 2007
This report was prepared for IES. It reviews the progress of several Midwest states in developing LDSs and use of data systems in general. Based on interviews with SEA officials and federal agency staff, the authors review the work that has been done, the challenges that have been faced, and the current requirements being pursued by the states
- [Longitudinal Data Systems: Summary of Current & Potential Issues](#) (2006)
*This document summarizes information and findings related to longitudinal data systems in education, exploring current issues and potential uses. It will guide the external stakeholder needs assessment process, highlighting themes and posing questions to be addressed in interviews, surveys, and focus groups.
(SEAs can find this resource on NCES's LDS Share Document Depository)*

- [National Center for Analysis of Longitudinal Data in Education Research \(CALDER\)](#)
Visit CALDER, a program of research by the Urban Institute and several universities, for some examples of research made possible by the availability of longitudinal student data. The main focus of CALDER is to examine "how state and local policies, especially teacher policies, governance policies, and accountability policies affect teachers (e.g., who teaches what students) and students (e.g., academic achievement and attainment)." In addition to housing a large collection of publications, the site also provides links to several longitudinal state databases
- [Data Use Drives School and District Improvement](#) – DQC, Sep 06
Although data can be used by school systems in myriad ways to promote system-wide success, this DQC brief focuses specifically on how stakeholders at all levels can support access to and use of a student's academic history to adjust instruction to meet the student's needs.
- [Questionnaire for Teacher Specialists](#) (2007)
This questionnaire lists a host of questions that an LDS can be used to answer. It was given to teacher specialists who were asked to rate the questions in terms of the value that their answers would offer.
LDS Share - Filename: SC Questions for SC Teachers

In the News...

- [New Number-Crunching Links Teachers to Test Scores](#) – Emily Alpert, VoiceofSanDiego.org, 10/6/08
This news article reports on recent breakthroughs made possible with longitudinal student-level data. Interviews highlight the benefits of these data, saving staff significant amounts of work and making data available promptly to inform decisionmaking. The piece also discusses some of the controversies that surround the use of these data including fear about merit pay and job security. Concerns are also voiced about the value of standardized tests and their accuracy in assessing student and teacher performance.

Additional Resources: General LDS Information

- [Building and Using Statewide Longitudinal Data Systems: Implications for Policy](#) - DQC, May 07
This is a brief summary of potential benefits of LDSs as well as the requirements of building a good one. It summarizes the progress of states and reasons for the recent explosion of progress toward LDSs. The article also includes a discussion of the "barriers for the development and use of LDSs.
- [IES Statewide Longitudinal Data Systems Grant Programs](#)
A downloadable abstract of the three-year work each state is planning to complete with the help of their IES SLDS grant along with the state's original application to the grant program.
- [Longitudinal Student Data in the No Child Left Behind Act of 2001](#) - Chrys Dougherty, NCEA
This article outlines the ways in which LDSs can help education agencies achieve the goals of NCLB. While not required by the law, LDSs are encouraged in some passages. It also outlines scenarios under which LDS might be funded by the federal government.
- [Results of 2008 NCEA Survey of State P-12 Data Collection Issues Related to Longitudinal Analysis](#) - Nov 08
This website presents the findings of a survey conducted by the DQC and the National Center for Educational Accountability (NCEA) in September 2008. It looks at states' longitudinal data system infrastructure and abilities. The survey findings are summarized along with a state-by-state analysis of the policy implications of each state's LDS.
- [Council of Chief State School Officers \(CCSSO\) Longitudinal Student Data Systems Task Force](#)
This page contains notes from this task force's meetings since May 2006. The group is made up of about a dozen representatives from state education agencies. Each meeting includes updates on the states' LDSs and on the activities of relevant organizations, as well as discussions on topics such as privacy, portability, interoperability, e-transcripts, and P-20.
- [Creating a Longitudinal Data System: Using Data to Improve Student Achievement](#) - DQC, 2006
See the Appendix for state education agency action steps towards implementing the ten essential elements.
- [The Case for a Longitudinal Student Data System in California](#)
Spinetta, Amy & Iyer Sankaran. California State University, Sacramento. *eJournal of Education Policy*. (2002).
This brief 2002 policy paper argues the case for developing a longitudinal data system, citing a host of benefits from student tracking to policy analysis. It considers some other states' systems, security, and student identifiers.

In the News...

- [Finding Your Way in a Data-Driven World](#)
EdWeek Magazine, January 2008
This article provides a glimpse of what some districts are doing to help students with their LDSs and sophisticated analysis tools. It also offers some important lessons learned from leaders in LDS development.
- [Student Data System Idea Gains Traction](#) - Jan 08
This article highlights a case for LDS development based on enrollment tracking and funding.
- [High School Studies Eye Role of Charter Status, Teachers](#) - Education Week
This article discusses some findings of the National Center for the Analysis of Longitudinal Data in Education Research (CALDER), which used longitudinal data to assess the effects of charter schools and programs such as Teach for America.

- [Editorial: Despite tight budget, aim high for education- How can California expect excellence without sufficient data about students?](#) - Jan 08
This op-ed piece comments on California's efforts to develop a more sophisticated and useful LDS. The author calls for the development of a P-20 system modeled after Florida's.

DRAFT

Chapter 2: Initiating, Planning, Executing & Evaluating an LDS

Developing a successful LDS is 80% planning and 20% building.

In this Chapter

This chapter discusses the early stages of LDS development and is intended to help you through the process of figuring out what you want to accomplish with your LDS and what you will need in order to achieve your goals. Coming up with a vision for and planning an LDS is usually the job of policymakers at the top, but this process should be heavily informed by the needs of a broad range of stakeholders. Along the systems development life cycle, policymakers and system developers need to engage in self assessment, identifying the system they have before figuring out what type of system they want. This decision of what they want should be driven by the needs of the educational community, the costs involved given the legacy system and staff, and the institutional support for the project. Planners should ensure project sustainability by creating interest and sustained buy-in as well as securing long-term funding for the project. Procurement planning, that is lining up a vendor and putting them to work or building the staffing capacity in-house to construct the system must be done. But, just having the right people may not be enough – a culture change in management and throughout the organization is necessary for long-term success. And throughout the life of the system, thorough evaluation must be done to ensure the quality of its data and the confidence of its users.

Sections in this chapter include:

Planning Prerequisites: What to Think About Before Developing an LDS

- Information Life Cycle
- Systems Development Life Cycle

Seeing Here, Seeing There: Knowing What You Have and Planning What You Want

- Engaging Stakeholders: Bringing Everyone Along
- Self Assessment: You are 'Here'... but, Where Exactly is 'That'?
- Enterprise Architecture
- Needs Assessment: Defining 'There'
- Data: Knowing What You Have, Identifying What You Need
- 'L' is for Local: District-level LDS Considerations
- Some Critical "abilities": Interoperability and Portability
- Ensuring System Sustainability: Staying 'There'
- Marketing and Communicating about Your LDS
- Building State-District Relationships

Getting from Here to There: Developing What You Want

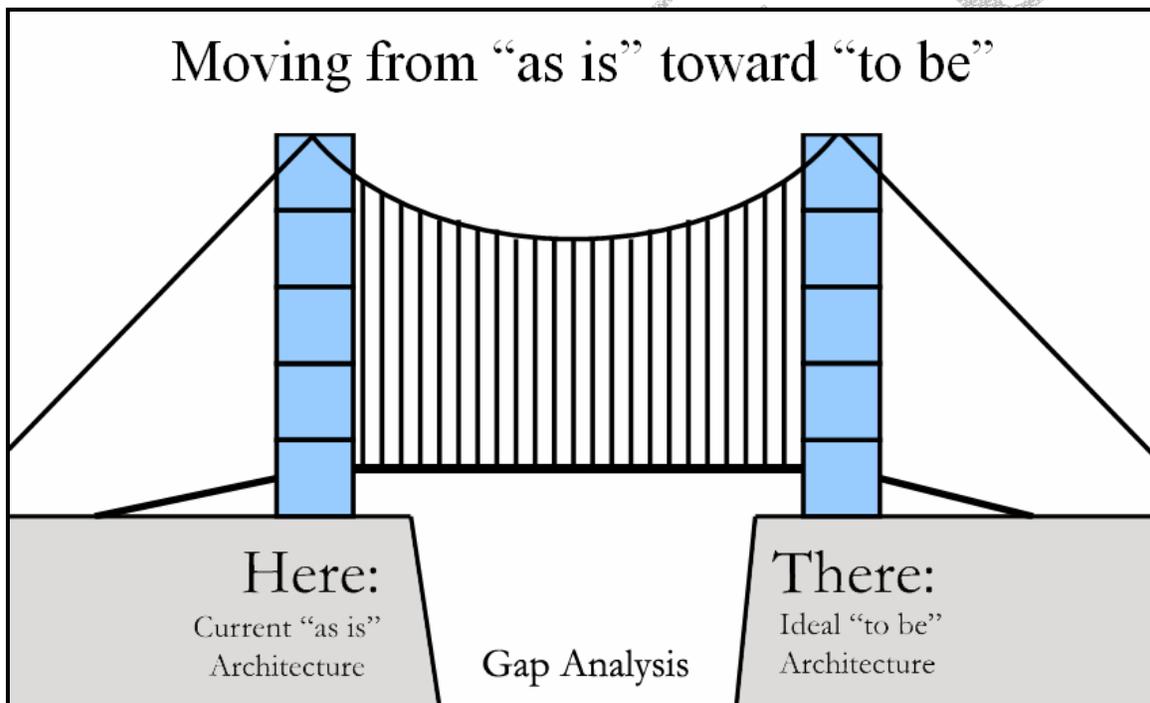
- Procurement Planning: Build or Buy?
- LDS RFP ABCs: Writing a Strong Request for Proposals

Are We There, Yet? Evaluating your LDS

Planning Prerequisites: What to Think About Before Developing an LDS

Building an information system today can be a daunting task. It's not uncommon for those who analyze a newly proposed information system design and compare it with the current information system environment to say, "You cannot get there from here." Certainly the technological, organizational, and professional gaps between the information system that currently "is," (a.k.a. "here") and the ideal information system that we hope will "be" in the future (a.k.a. "there") are often very discouraging.

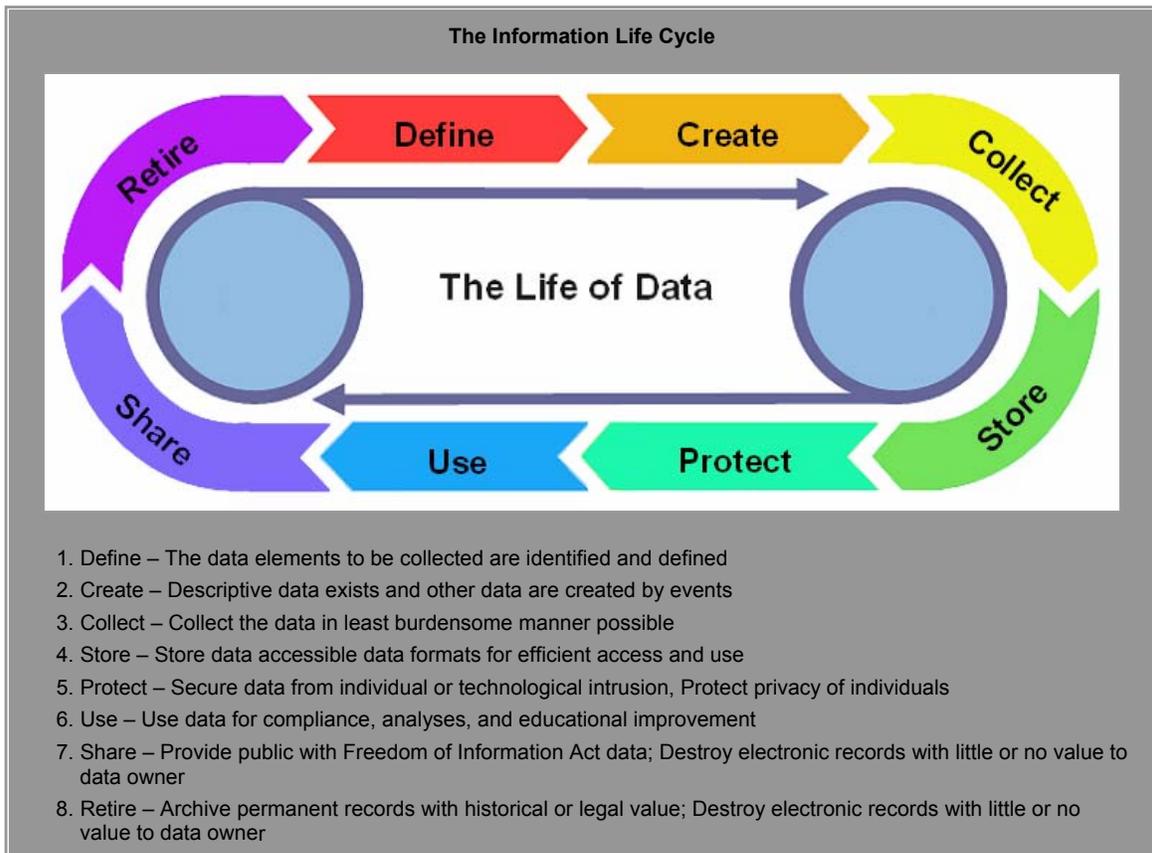
For centuries, when people stood at the edge of a ravine, faced with the challenge "you cannot get there from here," they have often met that challenge by building a suspension bridge to traverse the gap. The primary characteristic of a suspension bridge is that it is securely anchored in the "here" and the "there" on both sides of the void. In systems development work, these anchors are the explicit descriptions of the architecture of the current "as is" system and the architecture of the planned, future "to be" system [see Enterprise Architecture section of this guide].



Once the current reality is solidly understood and the future reality is clearly defined, we can do what is commonly referred to as a "gap analysis" and then begin to take a series of small steps or tasks necessary to move us from the present into the future. When these small steps are implemented in the proper sequence, the incomprehensible becomes easily understood and the impossible is accomplished. Later in this chapter, we will discuss the processes of self assessment and needs assessment to help you identify "here" and "there" [See Self Assessment and Needs Assessment sections for more information].

Information Life Cycle

One of the first concepts information systems designers and developers need to absorb is that information has a “life cycle” that begins with information’s creation and continues through its destruction. Although there are many ways to describe the life cycle process, we will use the following verbs to enumerate the life cycle stages: Define, Create, Collect, Store, Protect, Use, Share, and Retire.



DEFINE: Before collecting data, organizations identify and define the data elements they need or want to comply with requirements or to use to inform decisionmaking and business processes. Definition of data is not a precursor to the cycle, nor is it a one time process, however. This stage should occur iteratively with every cycle to refine the data and data relationships so that they better meet the agency’s evolving needs. [See Data: Knowing What You Have, Identifying What You Need].

CREATE AND COLLECT: While some information already exists, such as demographic data, other data are the product of events or activities such as math, reading, or science tests. In order to put these data into an electronic information system, they will need to be collected. Thoroughly understanding the nature of the various types of data that will be entered into the system and the collection processes that will be used is essential for understanding the quality – completeness, timeliness, and accuracy – of the data, and thereby understanding whether or not the data will be usable. It is also important to understand the burden costs of acquiring and entering the data and the skills of those tasked to do this critical work [See Data: Knowing What You Have, Identifying What You Need].

STORE AND PROTECT: It is essential to think through the storage requirements for the data and the levels of protection these data will require. The risk of exposure will vary based on the contents of the records. Risk has two components: the amount of harm that will be done if the data are obtained by an unauthorized person and the likelihood that such an event might happen. If the content of the records is such that little or no harm will be done, then the risk can be considered low even if the likelihood of getting the data is high. But as the potential for harm increases, systems must provide higher levels of protection protocols to prevent access and reduce the likelihood of an unauthorized access to the data. [See the Securing the Data, Protecting the Individual section for more information.]

USE: The purpose for building systems is that the data in them will be used to improve the work of the organization and the educational outcomes of students. The users of the data in the information system are the primary customers of the system builder. How the data are to be used, how they are to be presented, and how they are to be refreshed are just a few of the considerations that will require an extensive series of requirements discussions. [For more information, see Chapter 4.]

SHARE: How, when, under what circumstances, and with whom (e.g., individuals, organizations, and other information systems) the data will be shared is another set of questions and deliberations. Sharing data often involves legal and policy considerations such as “freedom of information” and “privacy” requirements. Clearly articulating all of these requirements and the business rules is necessary to meet the legal and ethical requirements for data. [See the Securing the Data, Protecting the Individual section for more information.]

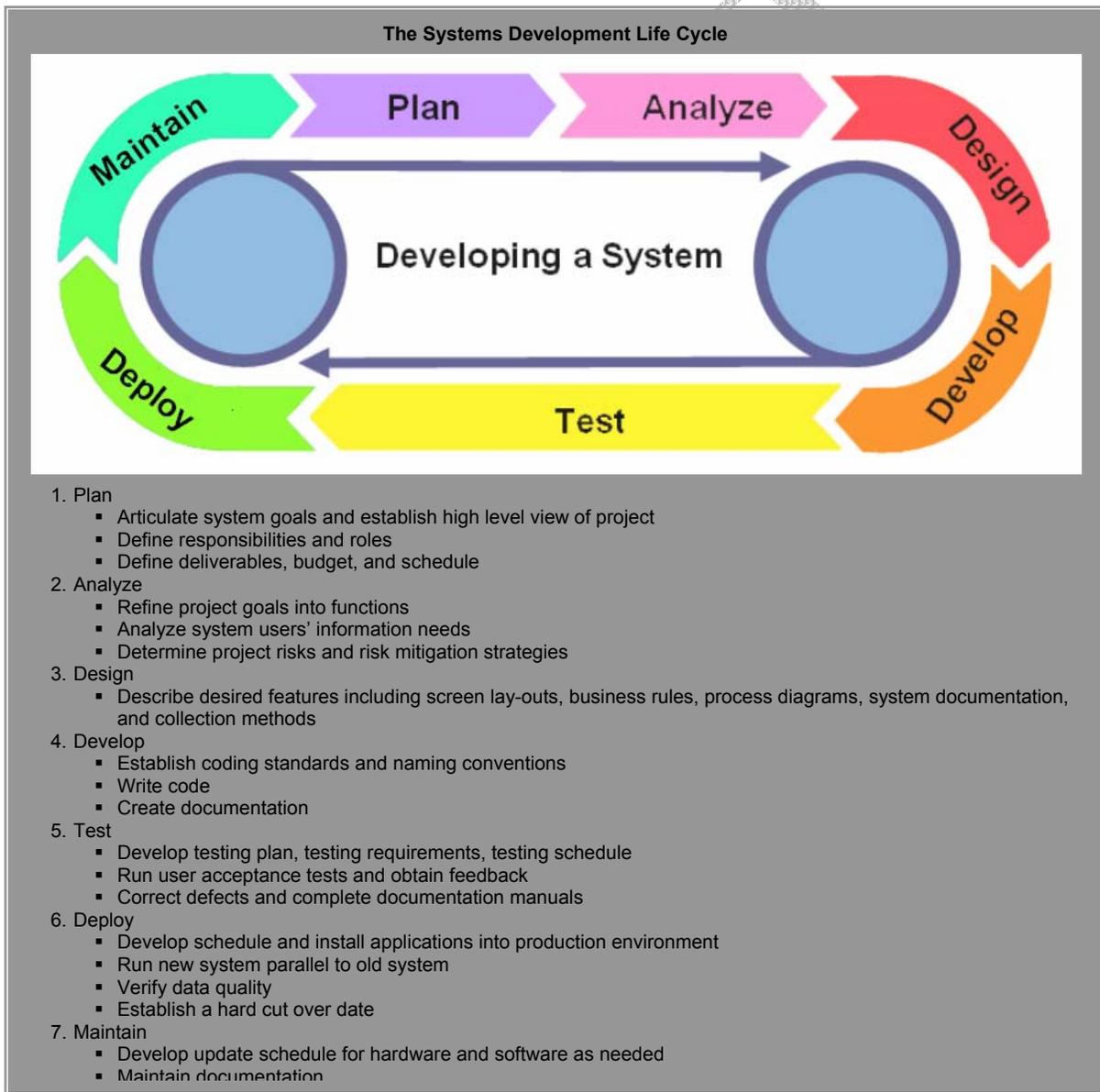
RETIRE: One of the last decisions about specific data in the life cycle of information comes when the data cease to be accessed and used for the purposes they were originally collected and stored. When the data are dormant and only occupying valuable storage space, it is time to make the decision to archive the data or to destroy them. Some data by their nature are “eternal” and need to be properly and securely archived in case they are ever needed again (e.g. transcript data, financial data). Other data have lost all of their value and need to be destroyed in a manner consistent with their sensitivity. [See the Governing the Data and Securing the Data, Protecting the Individual sections for more information.]

Policymakers must understand the lifecycle of information to know where they are and where they want to go. They should also understand their ongoing role in the development and maintenance of the LDS. If they think an LDS is just a project, they will not be good policymakers. And, before the design and development experts for any information system begin their work, the system owners and planners need to thoughtfully review all aspects of the life cycle of the information they propose to collect, store, and use. A thorough understanding of the current information handling processes will provoke insights and suggestions for system and process improvements and avoid difficulties that would, otherwise, not have been discovered in a timely manner.

Systems Development Life Cycle

Developing anything more than a simple data retrieval system can be expected to be a multi-year project. The numbers of system users, their requirements, the network relationships, the complexities of ever changing technology, and the personal politics of any human-run system multiply the importance of sound project management and an in-depth understanding of the life cycle of a systems development project. While an LDS is not just a project – it's ongoing, and requires maintenance, use, continuing training, etc. – it can be useful to think of LDS development as a project in its early phases.

There are many words that can be used to name the various stages and sub-stages in an information systems development effort, but we will use the following verbs to describe the whole life cycle: Plan, Analyze, Design, Develop, Test, Deploy, and Maintain.



PLAN: The importance of thorough planning cannot be overemphasized. And neither can the requirement to take all the time that is needed to implement the plan successfully. For our purposes, planning includes working with a broad range of stakeholders from inside and outside the education agency to articulate the goals of the new system, and assigning roles and responsibilities for the management of the project. General goals need to be defined by project “deliverables” with a set schedule and budget for all of the separate parts as well as the whole. In the planning stage, the current environment should be analyzed [see the Engaging Stakeholders, Self Assessment, and Enterprise Architecture sections for more information] and a clear picture of the future information system should be created [see the Needs Assessment and Enterprise Architecture sections for more information]. Anything missed in the planning stage will either go unnoticed until it is too late to make the necessary adjustments or it will require a return loop to the planning stage to do what wasn’t done initially.

ANALYZE: Analyzing the information requirements of all of the information system users is a long and tedious process. It requires great patience and repetition to generate the reflection necessary to turn vague ideas of what would be useful information into definable and actionable system requirements. This is where the project goals and deliverables become defined in functional process terms. This is also where the project is critically examined to articulate and define all of the risks associated with the work to be done and the resources to do that work. Each of these risks must be classified as high, medium or low and each must be given a strategy for mitigation in case it materializes. [See the “Engaging Stakeholders” and “Needs Assessment” sections for more information.]

DESIGN: In the design stage, all of the mental pictures created in the earlier stages are put into clear and completely documented forms. Business rules are articulated and refined, screen layouts are developed and improved, process diagrams are drawn and redrawn, and system documentation is carefully and completely kept.

DEVELOP: When the design documents are complete, they are given to the developers to write the code that will automate the processes and produce the desired result. Coding standards and naming conventions are but two of the many considerations that must be made by the system developers.

TEST: During the development stage, the testing stage begins and testing plans, user acceptance tests, and a testing schedule are developed. These tests are run, defects are discovered, and the system is changed to eliminate the defects. Any time or effort that is avoided at this stage may come back multiplied many times if the system defects survive to plague the system users.

DEPLOY: In the deploy stage, the new system with its hardware, software, and applications is installed and often run parallel to the old system until it meets the acceptance criterion established earlier. System security is deployed and tested in real time situations and data quality is checked and verified.

MAINTAIN: When the system has met all of the acceptance testing, it enters the maintenance stage. Here the system operations team will perform quality assurance and system security audits, update hardware and software as needed, and maintain documentation. The maintenance stage continues as long as the system is operating. When it is determined that the existing system is not as effective or efficient as it should be, the system owners will begin the systems development life cycle again by beginning to plan for a new system.

The Forum has more...

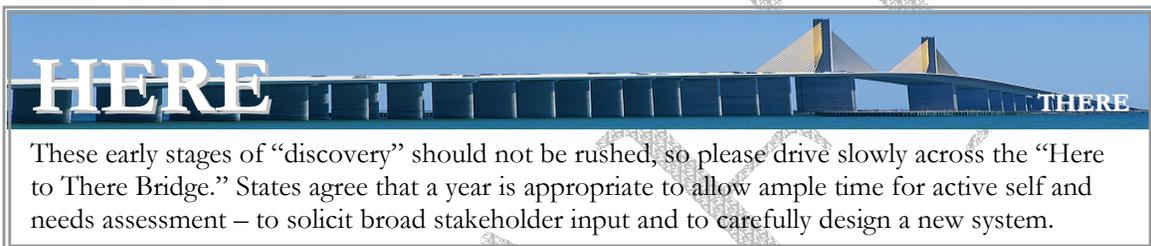
For more detailed information about these issues, visit:



- [Forum Unified Education Technology Suite \(2005\)](#)
- [Forum Guide to Decision Support Systems: A Resource for Educators \(2006\)](#)
- [Technology @ Your Fingertips \(2001\)](#)

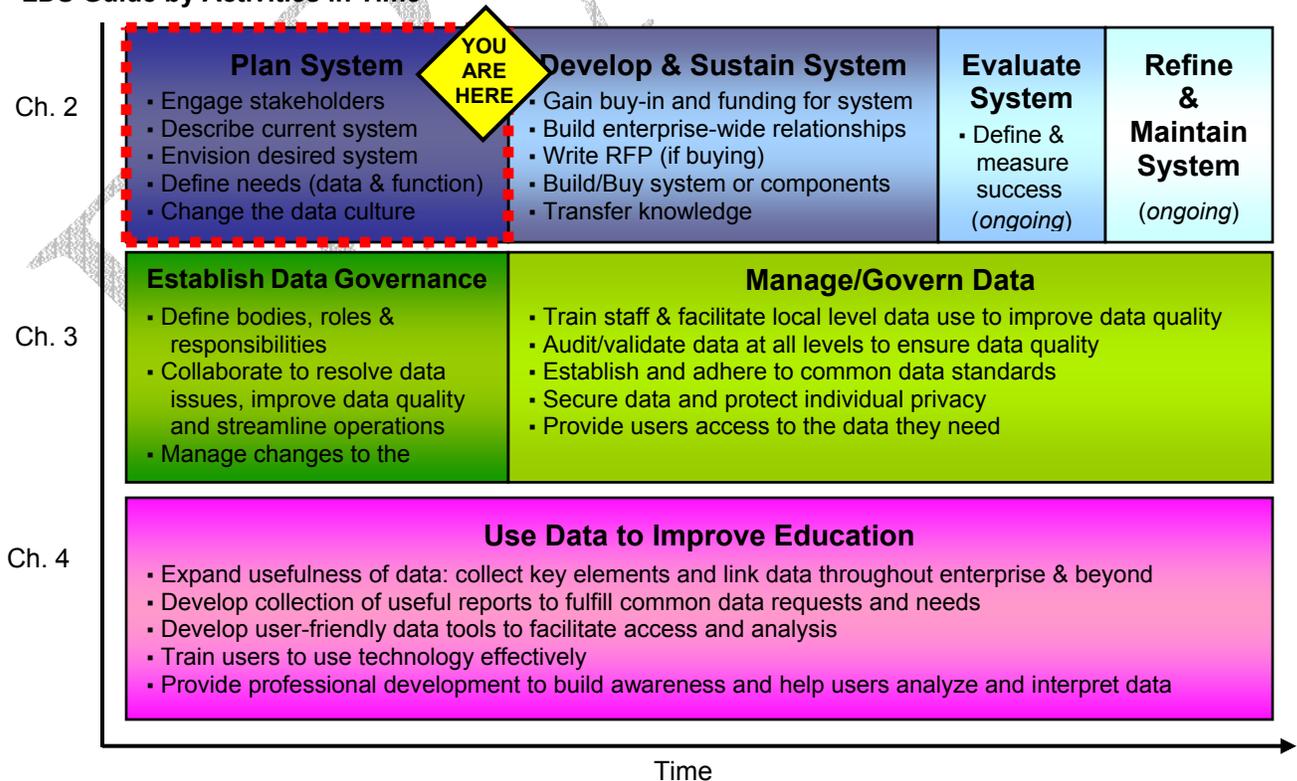
Seeing Here, Seeing There: Knowing What You Have, Planning What You Want

Before you jump into developing your new system – writing code or drafting an RFP to find a vendor to build the system for you – it is important to take some time for reflection or “discovery.” That is, before you begin your LDS journey, you should first figure out where “here” is and then carefully plan where “there” is. Start this often overlooked phase at the beginning of the LDS development process by engaging a broad range of stakeholders, collectively doing some thorough self assessment and identifying what your current system and environment look like – the answer, of course, will vary widely among organizations in terms of technology, applications, data, politics, resources, and so on. Once you’ve clearly established where you are, you should then pinpoint where you want to go by thoroughly assessing your needs and carefully planning your desired system. At the end of your self and needs assessments, compare your ‘here’ and ‘there’ to figure out how your current data system and organizational culture will need to change in order to realize your desired system.



The following sections address these crucial early stages of the LDS development process. While the activities of engaging stakeholders, doing self assessment and identifying needs are commonly referred to collectively as “needs assessment,” they are disaggregated here and discussed as distinct interrelated parts of the early planning process.

LDS Guide by Activities in Time



Engaging Stakeholders: Bringing Everyone Along

Early on, an education agency should pull together a broad range of stakeholders in a collaborative effort to define the organization's LDS vision. Because a wide array of people hold a stake in the effective design and utilization of the system, this early stage is critical for two primary reasons: 1) it increases the usefulness and relevance of the system to users, and 2) it increases the visibility of and demand for the system across the education community.

Without diverse input from a range of perspectives, the resulting system may not be useful to all those who stand to benefit from it. And, if the system is not relevant to potential users, it will not be used. Engaging users early in the design process will increase the likelihood that they will value and use the resulting system, and since they were given the opportunity in the design stages to ask for certain information, the data collected may be more relevant to their efforts to improve student outcomes. Involving stakeholders in the LDS design process also serves as the first step in marketing the system [see the Marketing Your LDS section of this guide for more information]. This process will educate people and get them thinking about the system's potential, while spreading excitement, increasing buy-in, and helping to gain lasting executive and grassroots support for the project in the process.

A model for engagement

An effective model for bringing stakeholders together creates a number of individual standing committees and stakeholder groups to hold periodic information gathering meetings. The number of groups necessary to accommodate all interested parties and the means of bringing participants together (*e.g.*, in one central location, at regional sites, or via telephone or online conferences) will depend largely on the size of your organization, the geographic size of your state or district, and resource availability. At these meetings, participants should identify the current system and data issues that cause them concern, define needs, and pinpoint aspects of the "as is" system that need improvement. In addition to talking about data assets and needs, care should be taken by leaders to emphasize the LDS vision, which should first be to provide educational practitioners with the information they most need and want; secondly, to inform policy and resource allocation; and thirdly, for accountability and reporting. The culture of data collection for compliance must be overcome and stakeholders should focus on how to make the data help them to improve education from the bottom up as well as from the top down.

Assign roles and responsibilities as appropriate and keep things moving between meetings. In addition to these meetings, consider using a variety of information gathering strategies such as focus



JOINT APPLICATION DEVELOPMENT

Joint Application Development (JAD) is a popular information gathering technique that may be employed to engage stakeholders in the planning phases of an LDS. The method, which seeks to identify user needs and then create a system that directly meets those needs, is guided by four basic principles:

1. People who actually do a job have the best understanding of that job.
2. People who are trained in information technology have the best understanding of the possibilities of that technology.
3. Information systems and business processes rarely exist in isolation -- they transcend the confines of any single system or office and affect work in related departments. People working in these related areas have valuable insight on the role of a system within a larger community.
4. The best information systems are designed when all of these groups work together on a project as equal partners.

For more information on JAD, visit the University of Texas at Austin Technology Resources website at <http://www.utexas.edu/ecs/trecs/hris/pub/jad.php>.

groups (in-person and online), interviews, roundtable discussions, or surveys (paper or web-based).⁴¹ Also, take advantage of already established groups that may take up the issue of defining LDS requirements and facilitating communication. If there are relevant task forces, working groups, or data user groups already in existence, for example, ask these groups to carve out some time for LDS discussions.

A representative from each of the stakeholder groups should also serve on a core committee, which should meet frequently to share findings from stakeholder group meetings. This central committee should play a continuing role in overseeing and facilitating ongoing communication about the LDS planning process, and fostering a “living system” by ensuring continuous feedback on how to design and improve the system so it meets stakeholder needs. [See the Additional Resources following this section, Marketing an LDS section, and Chapter 3 for more information].

It is important to create a collaborative environment where all stakeholders feel comfortable to contribute as equals. Participants should be encouraged to be bold and creative in their suggestions. Innovation requires practitioners to step out of the box and consider how the system can work for them and to think about the types of information that would help them be more successful in their jobs.

Who to engage

The stakeholders invited to join in the early design process should vary in terms of their interest in the project, expertise, responsibilities, geography, and the ways in which the system can benefit them. Include insiders who are familiar with education data and the workings of the agency as well as outsiders who can provide a

fresh perspective. Bring in both those who are tech savvy as well as those who know the business end of the enterprise. And, involve those who collect and provide the data as well as those who use the data. Your approach to stakeholder engagement should also acknowledge the need for culture change in the education community in terms of data.

While data systems have historically been built primarily for compliance, the recent shift of emphasis to using the data to inform decisionmaking, improve educational strategies, and enhance student learning requires that the design of these systems takes local educators’ needs into consideration. For these reasons, you should also be sure to include ample representation from schools and districts in the planning process in addition to state-level personnel.

Contact other agencies, organizations, or other potential stakeholders that may be interested in the system to invite them to participate in stakeholder meetings. You should try to include as many stakeholders as possible at first and let them decide whether to continue attending meetings. This will give everyone an introduction to the project and allow those with special interest in the endeavor to become more involved. A word of caution though, while it is beneficial to include a broad collection of stakeholders through these planning processes, there can be such a thing as too much input and such inclusiveness introduces the risk of hampering the project. Setting goals, ground rules, and

MIX IT UP AND KEEP IT MOVING

Enlist stakeholders who vary in terms of:

- interest in the project
- expertise (e.g., business and technology specialists)
- responsibilities (e.g., data collectors and data providers)
- level of government (e.g., state, regional, or district)
- geography
- benefits they stand to gain
- perspective (e.g., insiders and outsiders)



⁴¹ Wilson, L & Nunn, J. “Stakeholder Involvement in Maryland.” Presentation given at MIS Conference in Atlanta, GA, February 28, 2007.

strategies early on for handling everyone’s ideas efficiently will help keep the process moving and on track.

Table 2.1 below lists many of the types of stakeholders that might be enlisted to take part in the planning stages of the project.

Table 2.1. Stakeholders who might be involved in LDS planning

Internal stakeholder groups (state, district and school):	
Elected officials	Teachers
Legislative and Governor’s Staff	Registrars
Governing Boards	Secretaries
State Education Agency Program Coordinators	Librarians/Media specialists
District Superintendents & Assistant Superintendents	Program Area Experts
Chief Information Officers	Special Education Directors
Public Information Officers	English Language Learner Program Directors
Local Accountability Officers	Title I Coordinators
District-level data stewards	Title III Coordinators
Content Supervisors	Gifted and Talented Education Coordinators
Human Resources Staff	Information Technology Staff
Early Learning Coordinators	Project Managers
Guidance Services Directors	Hardware Engineers
Curriculum/Instruction Staff	Software Developers
Career Tech/Adult Learning Staff	Network Engineers
Teacher Certification Staff	Database Designers
School Administrators (Principals and Directors)	Graphic Display Experts
External stakeholder groups:	
Advocacy groups	PTA representatives
Child Services	Parents
School Board members	Media/Press
Teacher Retirement Board	School Counselors
Institutions of higher education	Researchers
Business and industry	Community members/“The Public”
Support organizations	Vendors
Union representatives	Other state agency representatives (e.g., Dept. of Labor)

Additional Resources: Engaging Stakeholders

- AK’s Initial solicitation letter Commissioner signature (Invitation to Participate in Stakeholder Groups) (2007)
“This item is a draft letter inviting stakeholder participation to Alaska’s Unity Project.”
LDS Share - Filename: AK’s initial stakeholder solicitation letter with Commissioner signature.
- Alaska Unity Project: Functional Stakeholder Organization Chart (2007)
This item illustrates the Unity Project’s Functional Stakeholder Organization.
LDS Share - Filename: AK Visio_functional_stake_holder_chart
- External Communications Plan EXAMPLE (2007)
This document represents an example and/or template External Communications Plan developed by the state of MI.
LDS Share - Filename: MI Communication Plan Example
- [Don’t Get Lost in Translation—LDS and the Data Divas, Geeks, and Duffers \(i.e., the Stakeholders\), Strategies for Success.](#) 2007 SDC LDS Strand: **Session II**, Debra Holdren, South Carolina Department of Education
This presentation review’s SC’s approach to engaging stakeholders, getting the right people involved in the LDS project and facilitating effective communication between these key players from various backgrounds to optimize results.
- [Stakeholder Involvement - MD](#)
This presentation given at the 2006 IES SLDS Grantee Meeting provides an overview of Maryland’s efforts to engage a wide variety of stakeholders. It includes the various types of stakeholders, their roles, and the process through which needs assessment is conducted. Lessons learned and best practices are offered. Slide notes are also included.
- [Stakeholder Involvement - WI](#)
This is a short presentation given at 2006 IES SLDS Grantee Meeting. It lists the challenges of engaging stakeholders.

Self assessment: You are Here... but Where Exactly is That?

What is your current, or “as is,” data system? The answer might seem obvious since, after all, we’re talking about the current operations of the organization – the everyday reality. But, to get your LDS project off to a good start, you and a broad range of stakeholders will need to step back and create a careful depiction of your system environment and capabilities. What you find may surprise you.

Engage people from a range of stakeholder groups in this process [see the Engaging Stakeholders section] and look at the organization’s current data system and data use practices. Though technical staff should be involved, an understanding of the nuts and bolts is not required to participate. On the contrary, the most important input in self assessment will come from those who understand the day-to-day business operations and goals of the organization.

Self assessment can be carried out in a number of ways such as through an LDS steering committee, advisory board, or working group, personal or group interviews with stakeholders, written questionnaires, and focus groups. Look at what system components and functionalities exist currently and what developments are under way. Ask yourselves the questions in table 2.2 below:

Table 2.2. Self assessment example questions

<p>What does your data system look like?</p> <ul style="list-style-type: none">✓ Do you have a data collection system? Is it web-based?✓ How do you collect these data (e.g., via paper or electronic transfer, etc.)? How often are they collected and updated? What is the path of data collection (e.g. from schools to districts to the state)?✓ How granular are your data (e.g., individual or aggregate level)?✓ Do you have a unique student identifier system? Can you use it to match records across databases? If not, do you use Social Security numbers instead? In which databases are these identifiers used as the primary ID?✓ Do you have a unique teacher identifier system?✓ Are your data linked across years?✓ Are your data linked to postsecondary, workforce, social services, or other data outside of P-12? If so, how often is a match rate analysis conducted?✓ Are the data linked across state borders?✓ Do you use electronic transcripts to share student information?✓ Are your systems interoperable?✓ Do you have a central data warehouse or do programs use individual silos?✓ What infrastructure and technology support the system (e.g., servers, software, etc.)?✓ What parts of the system are run in-house? By a vendor?✓ How are data secured?
<p>What data do you collect?</p> <ul style="list-style-type: none">✓ What data do you collect on students (e.g., enrollment, demographics, test scores and information on untested students, program participation, course completion, graduation, free and reduced price lunch status, etc.)? Are these data matched for students from year to year? How often are students tested in each subject and can testing data show annual growth for students in any subjects?✓ What data do you collect on teachers (e.g., certification, professional development, Highly Qualified, salary, etc.)?✓ What other data do you collect on the educational system (e.g., financial, facilities, etc.)? At what levels do you collect these data (e.g., school, district)?✓ When are these data collected and who provides them? (Catalog all current and planned data collections.)
<p>How is data quality ensured?</p> <ul style="list-style-type: none">✓ What kinds of quality assurance processes and audits are utilized to ensure data quality?✓ Are there business rules in place?✓ Are there automated data edit processes to ensure compliance with the business rules?✓ What is the governance structure in place that ensures data quality?✓ Are common course codes used? Is there a central authoritative data dictionary?✓ Is there a data model depicting the data environment✓ Is there a staff training program in place at the local level to improve data quality?
<p>How are your data used?</p> <ul style="list-style-type: none">✓ How are data transmitted to the state or federal government?✓ What reports are produced with the data?✓ How are those reports made available to users?✓ What ad hoc querying is available?✓ Is access to data role-based? Who is allowed access to what data?

- ✓ How are the data presented to users (e.g., spreadsheets, web-based analysis tools, digital dashboard, etc.)?
- ✓ What does your staff do with the data (e.g., federal and state reporting, program performance monitoring, student tracking, data driven decisionmaking, etc.)?
- ✓ What types of professional development is provided to help staff access, use, and analyze your data?

What other factors affect your data?

- ✓ Do any federal or state laws and regulations control the collection and use of individual student data and protect the privacy of student records?
- ✓ Do any federal or state laws prohibit or mandate linkages between P-12 data systems and postsecondary or other outside databases?
- ✓ Do any federal or state laws or regulations require the data system to have certain components?
- ✓ What is the culture of your organization in terms of data use, data sharing, and collaboration?

The section that follows introduces enterprise architecture, which is a process used to systematically conduct both self and needs assessments, as well as to guide efficient and effective system development thereafter. Whether your organization follows this rigorous process or conducts less formal information gathering, it is important to carefully document the findings from your self assessment process before moving on to the next stage of information gathering and planning: needs assessment.

Additional resources: Self Assessment

- [DQC 2008 Sample Survey](#)
This is a sample survey from the DQC's 2008 survey of state education agencies. It is organized around the DQC's 10 essential elements, asking key questions about agency progress towards and activities related to these elements.
- [Map of Core Elements for Establishing a Statewide Longitudinal Data System \(IES\)](#)
This checklist can be used to help your organization gauge where it is and where it needs to focus efforts in establishing an LDS. Agencies can reflect on which LDS components they have, which they want or do not care to have, and the status of support and funding for those components.
- [Forum Unified Education Technology Suite](#)
See Chapter 2 of this Forum product for a discussion of needs assessment, which also touches on ideas important in self assessment.

Enterprise Architecture

Enterprise architecture (EA) is a planning and analysis tool to help you through the self and needs assessment [see Self Assessment and Needs Assessment sections for more information] stages of the LDS project. Various complex definitions of EA are available, but put simply, **enterprise architecture** is “a conceptual tool that assists organizations with the understanding of their own structure and the way they work. It provides a map of the enterprise and is a route planner for business and technology change.”⁴²



Enterprise architecture is “a conceptual tool that assists organizations with the understanding of their own structure and the way they work. It provides a map of the enterprise and is a route planner for business and technology change.”

Your education agency and all of its parts make up your enterprise. The architecture is both the process of describing and a description of “the fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution.”⁴³ Viewed as a *process*, EA identifies the mission and goals of your organization and the applications, technology, data, relationships, and other resources that your enterprise uses to accomplish its work. As a *description*, EA documents your findings in the form of a top-level, low detail blueprint that can be used to efficiently guide LDS development and maintenance. Though an EA focuses largely on technology and the organization of data, its main function is to make sense of the technological nuts and bolts so that technology can be better aligned with business needs.

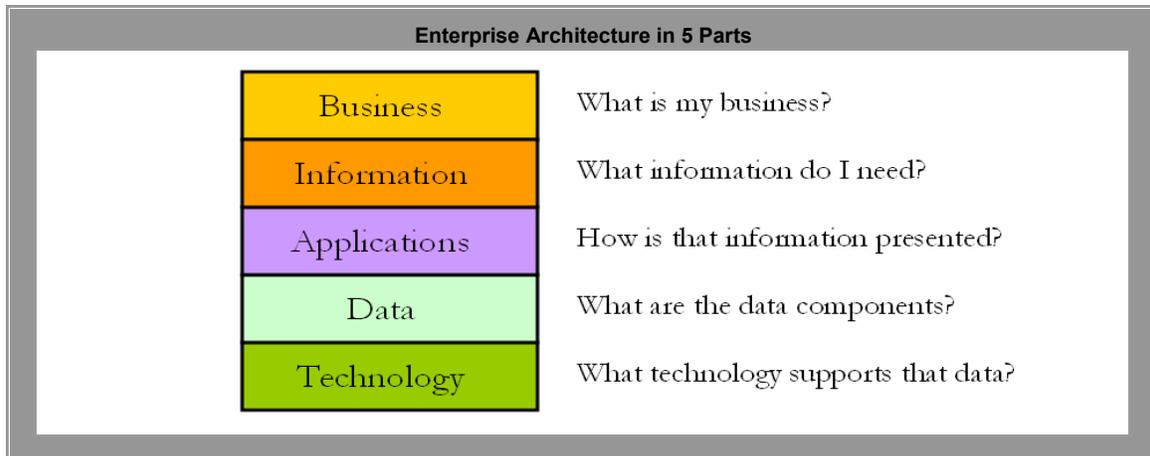
The EA should first describe the current system. The architecture exists whether you describe it or not. So, depicting and documenting that reality gives you a better grasp on how your agency and its information system work. This depiction, at least at first, should focus on high-level business operations, rather than get mired in the details. Then, an EA of the future ideal system can be created. With these blueprints, you will be in a better position to make decisions about how your enterprise needs to be modified to meet its evolving goals.⁴⁴ The EA process also identifies who has authority over what system components and who has been assigned responsibility for certain activities. In these ways, EA will be beneficial in terms of both planning and governing your LDS [see the Data Governance section of Chapter 3 for more information].

The figure below breaks EA down into five areas or perspectives, allowing us to focus on increasingly detailed individual aspects of the enterprise.

⁴² Microsoft Architecture Overview, available online at <http://msdn.microsoft.com/en-us/architecture/ms978007.aspx>.

⁴³ IEEE, *IEEE Std 1471-2000 IEEE Recommended Practice for Architectural Description of Software-Intensive Systems*, available at http://standards.ieee.org/reading/ieee/std_public/description/sc/1471-2000_desc.html

⁴⁴ Aden, David. *Enterprise Architecture Demystified*. Sep. 24, 2008. Retrieved from <http://www.govtech.com/gt/articles/418008> on Oct. 16, 2008.



While there are many, many details that need to be determined as you drill down into the EA process, some of the high level questions that will help you in early LDS planning are presented below. A variety of stakeholders need to be involved in the process of answering these questions about what the system looks like and the purposes it serves.

BUSINESS ARCHITECTURE: What is our business?

- Why does our business exist? What is its mission? What does it accomplish?
- How do we do what we do? What are our core processes? Who do we serve?
- How are we organized? How do people and processes interact to do what we do?
- What are the strengths of our enterprise? What do we do well, and very well?
- What are our weaknesses or failures? What have we learned from those failures?
- How will our business change in the future? What are our growth challenges?

INFORMATION ARCHITECTURE: What information do we need?

- What decisions do we make? What information do we need in order to make each decision?
- What are the component parts of that information? How do we obtain each part?
- Where does that information originate? Who creates it? What is its quality?
- What information is needed to produce the products the business produces?
- Is any of the information highly sensitive? How is that information protected?
- Is there other information we do not have that could be valuable to our business?

APPLICATIONS ARCHITECTURE: How is that information presented?

- What automated services support our business processes?
- How do our applications interact and depend on one another?
- How are our data presented to users?
- How do our applications link various staff within our organization? With the outside world?
- How do our applications help us transform data into information?
- How do our applications serve different groups to achieve common business objectives?
- What are our plans for developing new applications and revising old ones to meet our goals? ⁴⁵

DATA ARCHITECTURE: What are our data components?

- What are the sources of our data?
- How are our data managed? What business rules and quality assurance procedures are in place?

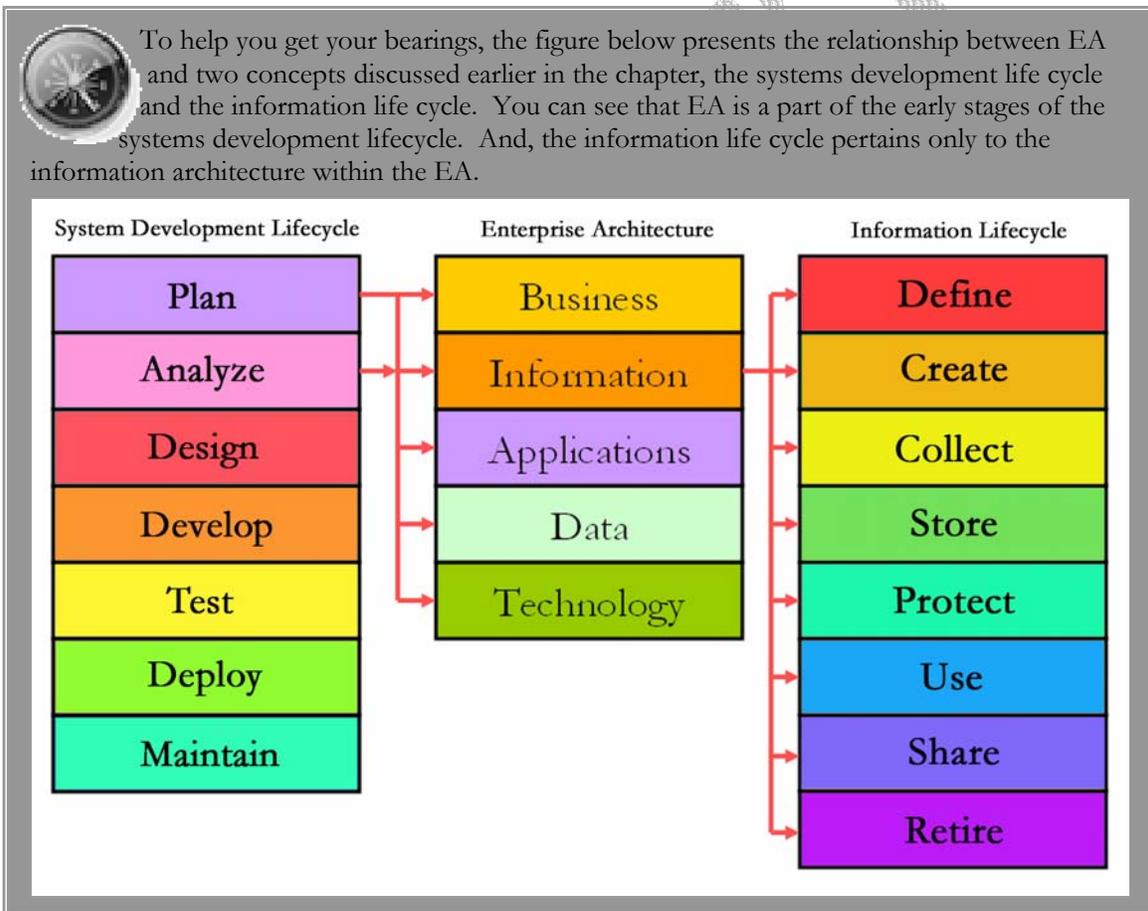
⁴⁵ Microsoft Architecture Overview, available online at <http://msdn.microsoft.com/en-us/architecture/ms978007.aspx>.

- Do we have a data model?
- What metadata do we maintain? Is there a system in place to manage these metadata?
- Do we have an authoritative, agency-wide data dictionary?

TECHNOLOGY ARCHITECTURE: What technology supports that data?

- What technology standards and services are used to accomplish our mission? ⁴⁶
- What technologies are used to collect and maintain our data?
- What technologies protect our data?
- What technologies provide access to our data?
- What technology expertise is needed to support this effort?

It is most beneficial to develop an EA before or during the planning and analysis stages of your LDS development process. But it's never too late for EA, and great insight can be gained from the process at any point throughout the LDS's life cycle.



Additional resources: Enterprise Architecture

- [Enterprise Architecture](#), Microsoft Developer Network
This site includes links to a host of articles on EA including an introduction to Microsoft's approach to EA, a discussion of the most popular EA frameworks,
- [Enterprise Architecture As Strategy](#) (2006). Ross, et al. D.C. Harvard Business School Publishing, Boston, MA.

⁴⁶ *Ibid.*

Enterprise Architecture Frameworks:

Below is a list of some of the most popular EA frameworks. Microsoft says that “none of these approaches is really complete. Each has strengths in some areas and weaknesses in others,” and recommends using the most useful bits of each one to meet your organization’s needs.

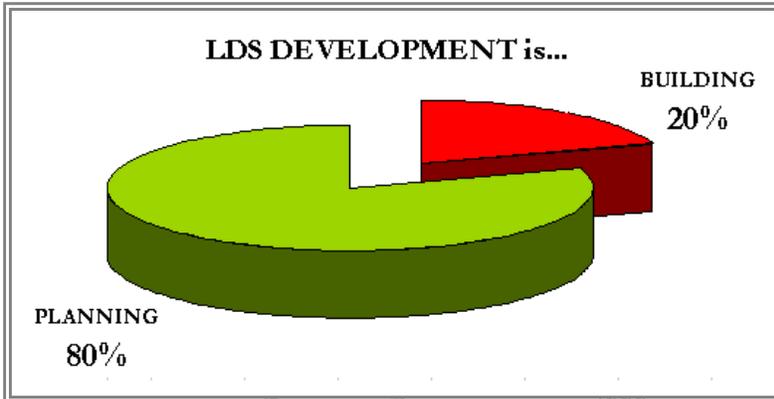
- [Federal Enterprise Architecture \(FEA\)](#) website. Also see the [FEA Practice Guidance](#).
The federal government has been a leader in developing and using EA, and the private sector is following suit.
- [The Open Group Architecture Framework \(TOGAF\) & Architecture Development Method \(ADM\)](#)
“The Open Group Architecture Framework (TOGAF) is a framework - a detailed method and a set of supporting tools - for developing an enterprise architecture. It may be used freely by any organization wishing to develop an enterprise architecture for use within that organization” ADM is a “reliable, practical method... for defining business needs and developing an architecture that meets those needs, utilizing the elements of TOGAF and other architectural assets available to the organization.” Simply stated, TOGAF is the framework and ADM is the process for creating TOGAF.
- [Zachman Framework](#)
One of the earliest EA frameworks, this framework is “a logical structure for classifying and organizing the descriptive representations of an Enterprise that are significant to the management of the Enterprise, as well as to the development of the Enterprise’s systems” (Zachman, J. (1996)). “[The Framework for Enterprise Architecture: Background, Description and Utility.](#)”

For more in depth discussion of these and other frameworks, see Microsoft’s [Comparison of the Top Four Enterprise-Architecture Methodologies](#).

DRAFT

Needs Assessment: Defining 'There'

Many states jump head first into developing or purchasing their LDS (or certain components of it) without spending much time on the front end thinking about exactly why they're doing what they're doing, what their stakeholders need, and what it will take to get the job done. According to many knowledgeable people, the reality is, successful LDS development is 80% planning and only 20% building. Careful planning can make the difference between a clumsy belly flop and a graceful dive into system development – between disappointment and a perfect 10.



During the needs assessment phase of the project, policymakers need to establish the business justification for what kind of LDS they want and why they want it. And, stakeholders should define the requirements for their new system so that the resulting system reflects their needs. Needs assessment is also another early step in creating buy in for the project, getting everyone – both internal and external stakeholders who use or would like to be able to use education data – involved in creating a vision for a system that they will one day put to good use.

Why do you want an LDS?

Before ground is broken and the developers start their work defining requirements and building the system, some fundamental questions should be answered about why the system is being built and what it will do for the educational community. Early on, decisionmakers should ask themselves:



Why do we want an LDS?
What are our ultimate goals for the system?

Preferably, the answers should not be:



“To check off the Data Quality Campaign’s 10 essential elements.”



“To keep up with the progress of other agencies (a.k.a. the Jones’s).”

Some better answers include:



“To improve instruction by helping teachers to identify student needs, discover and practice the most effective teaching strategies, and tailor instruction; by helping administrators to target teachers for professional development; and by helping researchers conduct more informative studies to identify effective strategies.”



“To inform policy and resource allocation decisions at the state and local levels with better information and to help state program staff target district and school improvement needs.”



“To calculate academic growth, and track students and maintain their academic histories as they graduate to higher grade levels, transfer across districts within the state, dropout

or transfer to private school or another state and come back into the system, and move into higher education.”



“To track staff and maintain their professional histories as they enter and progress through teacher preparation programs, receive professional development, and transfer among schools.”



“To streamline operations and improve data quality by automating processes such as data entry and loading, making data collection more efficient; by helping state staff produce federally- and state-mandated reports; and by conforming to broadly shared data standards.”

What do you need from an LDS?

Once decisionmakers and other stakeholders are familiar with what an LDS is [see the Defining LDS section for more information], the benefits one can provide [see the LDS Benefits section of this guide for more information], what their current system looks like [see the Self Assessment; Enterprise Architecture; and Data: Knowing What You Have, Identifying What You Need sections for more information], and why they want to build such a system, they can begin to create a vision of what they want their own LDS to be and what functionalities they want it to have.

Determine system requirements early in the project so that expectations can be adjusted accordingly for everyone involved in the development process. It’s also good practice to establish central goals and expectations for the system. This will help focus system design and keep IT staff, vendors, legislators, and other stakeholders on the same page in terms of what needs to be done and what will actually become available to them in the future.

KEY QUESTIONS FOR KEY AUDIENCES



Ask *decisionmakers*:

“What do you want and why do you want it?”

Ask *education experts*:

“What will the system do for you?”

Ask *system developers*:

“What’s needed to make the system work?”

Ask *everyone*:

“How do we know if we’ve achieved the goal?”

“How do we identify success and anticipate failure (when education processes are and aren’t succeeding)?”

Everyone wants to improve student achievement, but the important question is, “How do you want to do it?” Policymakers and other stakeholders need to figure out what functionalities they want and establish requirements for the developers. If system developers have clear requirements to fulfill, policymakers and all other stakeholders are much more likely to get what they need.

You may want a super up, cutting edge system that will cost you a mint. Or you may just want a basic, no frills bargain system. Either way, you must be clear about what you need and what you can afford. Without a careful period of reflection and planning, your organization may find itself dealing with the consequences of a poorly designed money pit that doesn’t really do what it needs it to do.

KNOWING WHAT YOU DON’T KNOW:

Often, it is difficult to figure out what you need because you may not be familiar with that which you don’t have. You may not realize what you don’t know or the ways in which certain functionalities might make your life easier. To get started, you might compare your current system, as



OTHERS’ LDSs

The National Center for Analysis of Longitudinal Data in Educational Research (CALDER) offers links to several LDS datasets along with descriptions of their source systems. The [State Data page](#) is a good place to start your research on other agencies’ LDSs.

you depicted it in your self assessment, to the ideal LDS outlined in Chapter 1 of this guide. Researching the data systems of other agencies or visiting another education agency with a more sophisticated system can also provide context and insight into what your options are. Also, review the software applications on the market. Consider the functionalities they offer and reflect on how well they would meet your environment and your stakeholders' needs.

When working with stakeholders, try to operate in concrete rather than in abstract terms. Instead of asking stakeholders vague, open ended questions about what they need, it may be helpful to start by using questionnaires to gauge interest in certain aspects and capabilities of an LDS. For instance, an agency might survey staff and other stakeholders with a list of questions that the new system, specifically analysis tools and reports, could be designed to answer with the new data. The staff then can rate the questions in terms of the value they think their answers will provide, thus, allowing you to gauge stakeholder interest in a systematic fashion.

The specific questions included on such a survey might be drawn from the stakeholders themselves, and the rating process can provide a basis for prioritizing stakeholder needs. Surveys like this might be written for different stakeholder groups. For instance, while teachers might be asked to evaluate the answers to certain questions about curricula or student achievement, other staff might be asked to rate the value of particular operational functionalities such as data entry automation and data sharing between databases. Based on the answers provided and the resources available, a state might decide which data to collect, which tools and reports to offer, or which capabilities to prioritize. And, since some stakeholders will inevitably be louder and more aggressive in stating their needs in meetings and other venues, such surveys are a good way of canceling out the noise and leveling the playing field so prioritization of needs can be done fairly.

ASSESSING WHAT YOU NEED:

To help guide discussions, develop some open ended questions that should be asked of the various audiences. Some examples are listed in table 2.3 below:

Table 2.3. Needs assessment questions for stakeholders

- ✓ What questions do you want the LDS to help you answer [see chapter 1 for examples]?
- ✓ What information will help you improve instruction and programs?
- ✓ What are the common data requests you receive that cannot be answered with the currently available data?
- ✓ What additional data will you need to collect in order to answer your questions? How can you get those data?
- ✓ What database linkages will be necessary to answer your questions?
- ✓ What access to data will be provided to various types of users to facilitate easier, more effective use of the data?
- ✓ What tools will facilitate access to and analysis of the data?
- ✓ What kinds of additional reports will be useful to staff and outside researchers?
- ✓ What types of professional development will be necessary?
- ✓ What user support will be helpful?
- ✓ What business operations do you want the LDS to improve (i.e. what functions will make your job easier and treat your "pain points")?
- ✓ How can data collection be improved (e.g., move to web-based system)?
- ✓ How can the new system help you to better comply with federal and state collections? (e.g., Are there data elements required by federal or state collections that are currently not collected or able to be submitted on time?)
- ✓ What technology do you need to make the system work? What new technical capabilities will be necessary?
- ✓ What additional security measures will need to be implemented to protect the new data?

It is very important to document your requirements in some form such as in a needs statement. This is "a description of the functional needs, technical requirements and security and ethical standards that need to be met by a technology solution."⁴⁷ Take your findings, categorize them, and try to boil them down to discrete needs. The resulting set of requirements can help guide the work of in-house system developers or to help you find a product on the market that will meet your needs. If you are planning on hiring a vendor (or multiple vendors), you can use your findings to help in the creation

⁴⁷ National Forum on Education Statistics, *Technology at Your Fingertips*

of an RFP[see the Procurement Planning: Build or Buy, and LDS RFP ABCs: Writing a Strong Request for Proposals section for more information]. And, be sure that your identified needs can be measured by tangible criteria, so that your success in attaining your goals can be assessed during evaluation of the system later on [see the “Evaluating Your LDS” section for more information].

After figuring out what you have and what you want, a gap analysis should be done to identify the discrepancies between “here” and “there,” and help you see what work will be necessary to achieve your desired system. For instance, if you do not currently have a student identifier system, but your needs assessment calls for one, you’ve found a hole that needs to be filled.



REALISTIC LDS EXPECTATIONS

When negotiating with a vendor or working with in-house staff to design your LDS, consider asking for these important LDS features:

- Unique identifier system that allows individual student achievement to be tracked and protects student privacy
- Interoperability with other K-12 systems
- Interoperability with Pre-K and postsecondary systems
- Teacher value-added data
- Data warehouse
- Reporting and analysis tools with easy to use interface

Keep in mind that building an LDS with stakeholders’ input is an iterative process. Give it time and be persistent. Expect to carry on ongoing needs assessment, rather than just once at the beginning of the project. As the parts of the system are developed and go live, continue to get feedback to find out what your stakeholders think and what new needs they have. New ideas are often stirred up by new developments.

Additional resources: Needs Assessment

- [Technology @ your Fingertips](#) – National Forum on Education Statistics
Chapter 2 of this product contains a helpful discussion of needs assessment. While not specific to an LDS project, it offers some relevant guidelines for finding out what functional and technological needs your stakeholders have. It also offers tips on creating a statement of needs.
- Longitudinal Data Systems: Summary of Current & Potential Issues (2006)
“This document summarizes information and findings related to longitudinal data systems in education, exploring current issues and potential uses.” It reviews the basic requirements of an LDS as well as the possibilities that can be built into the system. It may be used as a reference to inform the design of a needs assessment process by “highlighting themes and posing questions to be addressed in interviews, surveys, and focus groups.”
LDS Share - Filename: MD_ LDS Literature Review
- Maryland Longitudinal Data System Needs Assessment Guidelines for Internal Stakeholders (2006)
This document represents materials that Maryland’s project staff will use to conduct a needs assessment for internal stakeholders. The document also contains proposed topics for needs assessment for external stakeholders.
LDS Share - Filename: MD Needs Assessment Materials for Internal Stakeholders
- Questionnaire for Teacher Specialists (2007)
This questionnaire lists a host of questions that the state’s LDS can be used to answer. It was given to teacher specialists who were asked to rate the questions in terms of the value that their answers would offer
LDS Share - Filename: SC Questions For SC Teachers
- SLED Focus Group Requirements Traceability Matrix (2007)
This file summarizes the findings of numerous focus groups that the District of Columbia held with a variety of stakeholder groups: the mayor’s office; community/principal groups; and functional groups (e.g., special education, charter schools, funders, researchers). Potential data requirements for a State Longitudinal Data Warehouse (SLED) have been identified and rated on a scale of 1-3 by all stakeholder groups. The file also includes the focus group schedule.
LDS Share - Filename: DC Focus Group Tracking (11.1.07)b
- Felner, Robert D., and Natalie Bolton. Anne Seitsinger, Stephen Brand, and Amy Burns. “Creating a statewide educational data system for accountability and improvement: a comprehensive information and assessment system for making evidence based change at school, district, and policy levels.” *Psychology in the Schools*; Mar 2008, Vol. 45 Issue 3, p235-256, 22p.
This article provides a good example of how designers can dream big from the outset, defining their needs and developing a system guided by loftier goals than usual. The system described, “unlike those used by other educational institutions, is unusual in that from the outset of the development and then the implementation, the assessment moved

well beyond the simple assessment of the performance and achievement of students to include a comprehensive assessment of all aspects of the developmental, educational, fiscal, and policy conditions that comprise the ecology of the public education system, at all levels, as well as of the developmental and educational needs and attainment of students.”

- [Study of Leading Indicators of Educational Improvement](#) – Ellen Foley, et al., Annenberg Institute for School Reform (2008)

This study looks at leading indicators used to identify early signs of academic progress before the test scores come in. These indicators may be useful in helping agencies think about the questions they want to explore and the data they will need to answer them.

DRAFT

Data: Knowing What You Have, Identifying What You Need

Once the decisionmakers and stakeholders have considered the types of questions an LDS can help them answer and decided which they care most about, your organization must assess what data it has and those it will need to answer those questions. Most agencies are up to their organizational ears in data, especially if they are collecting and maintaining data on individual students – an LDS requisite. However, while more is not necessarily better, the data you currently maintain may not be sufficient to answer your pressing questions. This section offers a summary of some of the data that you may need to achieve your goals.

Your data may be stored in a central data warehouse, or many separate data stores. Likely source systems include:



Curriculum Management System	Student Information System
Instructional Management System	Student Transportation/Food Services Systems
Assessment/Accountability System	HR and Teacher Certification System
Financial/Budget System	Program Systems (e.g., Spec. Ed., Title I)
Student Health System	Library/Media System ^{48, 49}

After you've taken inventory of what data you have, cataloging all of your current and planned data collections and identifying where your many data items are housed (and which data system is the authoritative source of each data element), figure out if there are any additional data your organization should consider collecting.

While we often focus on student traits and learning outcomes, truly informative research on our educational system requires that we also capture information on the students' contexts (i.e. their learning opportunities and learning climate). Our focus should broaden to include information on the inputs and processes that contribute directly and indirectly to student learning in addition to outcomes. For instance, in which programs does the student participate? Who are the student's teachers? What classroom strategies are used? Are there differences in student learning opportunities by race, gender and/or



EDUCATION INDICATORS

Many resources are available to help you figure out what data you need to answer your questions about the education system. For more information on developing and using education indicators to measure status and outcomes, see:

- [Forum Guide to Education Indicators](#) (2005)
This document from the Forum is designed to help readers to properly create, use, and interpret education indicators. It also identifies standard definitions and calculations and warns readers of common misuses of education indicators.
- [From Information to Insight: The Point of Indicators](#)
ESP Solutions (2007). Available at ESP's [Resources page](#).
This document from ESP Solutions discusses various types of education indicators as well as education "indexes," which are combinations of related indicators that offer, perhaps more sophisticated views of educational values and trends than single indicators can provide. The product also discusses the selection of data elements are required and the establishment of thresholds to indicate the need for action.
- [Comparative Indicators of Education in the United States and Other G-8 Countries: 2006](#)
This report from IES presents twenty indicators used to compare the United States' education system to those of other G-8 countries. Indicators focus on population and school enrollment; academic performance; context for learning; expenditure for education; and education returns: educational attainment and income.
- [Buried Treasure - Developing a Management Guide From Mountains of School Data](#) (2005)
This report, geared towards district-level management, presents seven key types of school-level education indicators. The authors suggest that less may be more when it comes to education indicators. Rather than seeking to develop an indicator to suit every need, the report encourages parsimony.

⁴⁸ Jim Hirsch, [Performance Management - Data Informed Decisions: Having Information Provides New Understandings and Insight](#)

⁴⁹ ESP Solutions, *D3M Framework: Building a Longitudinal Data System*, 2008.

socioeconomic status (e.g., representation in special education and non-college-prep tracks, teacher experience levels, resources, expectations?) What are the local financial and hiring practices?

When identifying new data for collection, try to use overarching goals as a framework for selecting new elements. To make the most of scarce resources, collect and store only those data that will be used to benefit the enterprise. Avoid random, arbitrary selection of elements that stakeholders think would be nice to have, but do not lend themselves to achieving your goals. And make sure that the data you collect captures the appropriate level of detail. For instance, when collecting data on attendance, should you collect data by day, by period, or by some other unit of time? If attendance by day is a sufficient level of detail, you may not want to burden staff further.⁵⁰ Also, make sure to adhere to widely accepted standards and definitions so that the data you maintain will be consistent and comparable to other agencies' data.

Using the Right Data Architect for your LDS

The usefulness of your LDS will be greatly affected by the data architecture you use when building it. A good data architect can create a flexible data model [see Data Model box in the “Data Standards” section for more information] from the outset that will help your education agency avoid having to make massive changes later. In addition to helping the agency identify the right data elements, the data architect can define the relationships among those elements at the conceptual (i.e. relationships among major concepts), logical (i.e. in terms of a data manipulation technology such as a relational database or XML), and physical (i.e. in terms of a particular product and means of storage such as a server or disk drives) levels to create a fully-integrated system.⁵¹

Table 2.4 below presents many of the key types of data that should be contained in a P-12 LDS. The list presents data elements of key importance in conducting longitudinal analyses, but it is not exhaustive. Agencies should collect all other data required for state and federal reports as well as other key data necessary to answer its questions.

Table 2.4. Key data to collect for a P-12 LDS^{52, 53, 54, 55, 56, 57, 58, 59}

⁵⁰ National Forum on Education Statistics (2008). *Every School Day Counts: A Taxonomy for Standard Attendance Data*.

⁵¹ American National Standards Institute. 1975. “ANSI/X3/SPARC Study Group on Data Base Management Systems; Interim Report”. *FDT (Bulletin of ACM SIGMOD)* 7:2.

Student data:*Personal and Demographic information*

Unique Student Identifier
 Gender
 Date of birth
 Race
 Ethnicity
 Economically disadvantaged status
 Limited English Proficient status
 Title I status (or school-wide status)
 Migrant status
 Disability status
 Parent education level
 Truant status

Program participation information

Bilingual/ESL program
 Gifted & Talented program
 Early childhood learning program
 Individualized Education Program
 Special assistance program

Performance information

Assessments (summative and formative)
 Untested student records
 College readiness data (AP, SAT, and ACT scores)
 Grades
 Credits earned
 Awards (e.g., Diplomas)
 Displaced status

Enrollment information

Campus of enrollment
 Grade level
 Attendance data

Attainment information

HS graduate
 Type of diploma
 School dropout
 Dropout follow-up
 High school equivalency (e.g., GED)

Transcript /curriculum information

Course codes and descriptions
 Completion grades
 Summer and M.S. courses for H.S. credit
 Dual enrollment courses

Other information domains

Student health and nutrition
 Safety and Discipline
 Transportation data (e.g., length of bus ride)
 Family history
 Library records (e.g., books checked out)
 Meal data
 Perceptions data

Teacher and Staff data:*Personal and Demographic information*

Unique Teacher Identifier
 Date of Birth
 Gender
 Ethnicity
 Race

Qualifications information

Years of experience (by location)
 College attended/Certifying Institution
 Highest degree earned
 Academic major and minor
 Highly qualified
 Graduation (with dates)
 Certificates (with dates)
 Licenses
 Endorsements
 Staff assessment results (e.g., subject knowledge test scores)

Professional development information

Professional development training (e.g., record of in-service credits)
 Hours of professional development

Personnel information

School ID
 Job/Subject assignment(s) (e.g., teacher, librarian, etc.)
 Program Assignment (e.g., Special Education, etc.)
 Position title
 Position codes
 Schedules: grade/course/period taught
 Compensation (e.g., Salary, Benefits, Supplemental Contracts)
 Employment status (e.g., Full-time equivalency; start./retirement/leave dates)
 Time spent on administrative duties
 Tenure
 Mobility and Attrition data

School system data:*Finance information*

Revenues and expenditures

District demographic information

School size

⁵² Education Information Management Advisory Consortium, Longitudinal Data Systems Task Force, March 2007 Meeting, Phoenix Arizona. [Meeting Summary](#) available online.

⁵³ Data Quality Campaign, [Sample Survey](#) 2007.

⁵⁴ Education Information Management Advisory Consortium, Student Longitudinal Data Systems Task Force, Council of Chief States School Officers, (2008). *Longitudinal Data System Roadmap*.

⁵⁵ REL Midwest. (June 2007). *Getting the Evidence for Evidence-based initiatives: how the Midwest states use data systems to improve education processes and outcomes*.

⁵⁶ Davis, Michelle R. (2008) Finding Your Way in a Data-Driven World.

⁵⁷ Center for Strengthening the Teaching Profession. [Creating a Comprehensive Teacher Data System](#)

⁵⁸ Berry, Fuller and Reeves, DQC. (March 2007). *Linking Teacher and Student Data To Improve Teacher and Teaching Quality*.

⁵⁹ Nunn, JA & KL Harper Mainzer. (2006). *Longitudinal Data Systems: Summary of Current Issues and Potential Uses*.

Salaries and benefits	Class size
<i>Facilities and Technology information</i>	School safety
Building identifiers	AYP
Building area and space utilization	<i>Community demographic information</i>
Building condition	Locale
Classroom type (e.g., conventional, distance learning)	Adult education levels
<i>Organizational information</i>	Income single parent households
School	Property values
Accreditation	Labor force data
Relationship between schools	
District and school level directory data	

Additional resources: Data: Knowing What You Have, Identifying What You Want

- [NCES Handbooks Online](#)
The NCES Data Handbooks Online "provide guidance on consistency in data definitions and maintenance for education data, so that such data can be accurately aggregated and analyzed." Use this searchable web tool to find standard data elements for students, staff, and education institutions along with standard definitions and recommended values or responses for each element.
- [Education Data Model](#) (Forum & SIFA)
The Education Data Model is a catalogue of the data used in PK-12 education and a description of the relationships among those data. It is designed to be used as a reference tool that can be used to: 1) facilitate the identification, merging, and matching of data across different systems; 2) provide similar descriptions across LEA systems, across LEAs, and from LEAs to the state and federal government; and 3) specify the content and structure of logical and physical data models.
- [SETDA – Common Data Elements for Education Technology Assessment](#)
This toolkit presents the common data elements SETDA identified for tracking states' progress with the technology section of NCLB.
- [Every School Day Counts: A Taxonomy for Standard Attendance Data](#) (forthcoming from Forum)
This Forum Guide defines "attending/present" and "not attending/absent," categorizes attendance codes in an exhaustive and mutually exclusive way, and supports improved attendance data quality and comparability between states and districts.
- [Accounting for Every Student: A Taxonomy for Standard Student Exit Codes](#) (Forum 2006)
This guidebook presents "best practice" advice, from members of the National Forum on Education Statistics, for tracking and maintaining information on enrollment status. It presents an exhaustive and mutually exclusive taxonomy of exit codes.
- [Coordinated Data Ask](#)
This product "will provide states and data collectors with a unified data collection template that, for the first time, identifies the most commonly requested education data elements and their agreed upon definitions." It includes about 100 data elements along with their standard definition, and a crosswalk to EDEN and SIF.
- [Longitudinal Data Systems: Summary of Current & Potential Issues](#) (2006)
This document summarizes information and findings related to longitudinal data systems in education, exploring current issues and potential uses. It will guide the external stakeholder needs assessment process, highlighting themes and posing questions to be addressed in interviews, surveys, and focus groups.
LDS Share - Filename: MD_ LDS Literature Review
- Data Quality Campaign, [Sample Survey](#) 2008.
This sample survey asks about data systems and collection practices along the DQC's 10 essential elements. Questions and answers explore these elements in detail.
- [Getting the evidence for evidence-based initiatives: How the Midwest states use data systems to improve education processes and outcomes](#)
Regional Education Laboratories Midwest – June 2007
This report reviews the progress of several Midwest states in developing LDSs and use of data systems in general. Based on interviews with SEA officials and federal agency staff, the authors review the work that has been done, the challenges that have been faced, and the current requirements being pursued by the states.
- [Creating a Comprehensive Teacher Data System](#)
Page 6 of this report includes a list of data elements suggested for a comprehensive staff data system.
- [Linking Teacher and Student Data to Improve Teacher and Teaching Quality](#). Berry, Fuller, Reeves & Laird. DQC. (2007).
This article discusses some of the information about teachers that may be tracked in an LDS and the benefits those data can offer when linked to student data.

District-level LDS Considerations

You may have noticed that most of the discussions about LDSs focus on state-level systems. But state agencies aren't the only ones building these systems – plenty of school districts and regional agencies are doing it, too. While fewer people may be working on LDSs at these local levels, the same need exists and the same mistakes are being made. Below is a collection of questions and considerations for school district staff to ponder while thinking about building their own LDS. Many of these are also applicable to a state-level effort.

WHEN ASSESSING THE NEED TO BUILD A DISTRICT-LEVEL LDS, ASK YOURSELVES:

- What are the existing options?
 - Is there a possibility of state-offered LDS services?
 - Is there a possibility of regionally-offered LDS services?
 - Is it possible to form a partnership or education cooperative with other similar school districts to share the LDS effort?
- If all else fails, does your district have the resources to implement and maintain an LDS:
 - Can you cover the initial costs?
 - Will you need additional staff to maintain and manage data loads and reporting?
 - Can you afford the additional costs of training staff to use the system?
 - Can you afford the additional costs of training staff in how to make informed decisions at the classroom, school and district level based upon the new LDS data?

IF THE DECISION HAS BEEN MADE THAT A LOCAL LDS IS THE RIGHT WAY TO GO, THEN:

- Thoroughly investigate and evaluate your existing data systems before simply adding another system to the mix.
 - There may be enhancements to existing systems or partners of existing systems in place that will meet the LDS needs of the district without implementing a full-fledged LDS system.
- Investigate what other districts in your state are doing as well as the state agency.
 - Ensure that whatever you choose to do will fit into the big picture in the future and your investments will not be lost as the state agency requires use or interoperability with another unique system.
- Coordinate with the state agency to maximize alignment with state data standards. Consider using standards (e.g., SIF) to connect systems.
- Address data quality issues at the source(s) of the data before any extract, transform, and load into the data store(s).
- Ensure that the LDS will be able to handle your district's unique local assessment data needs.

Some Critical “abilities”: Interoperability and Portability

In economic times of yore, people traded bits of precious metals in exchange for goods or services. When a transaction was made, the metal pieces needed to be weighed to determine their value before a fair deal could take place. Eventually, the advent of monetary standards removed this step from the process. According to authoritative regional standards, metal pieces were minted into consistently weighted currency – commonly in the form of stamped coins – giving each unit of metal a standard value. With the invention of this concept, buyers could offer their regionally recognized units of metal without the need for a scale, improving the convenience and efficiency of commerce. Standards, therefore, allowed for easier exchange of resources.

Where data standards are lacking, the education community faces a somewhat similar problem in our contemporary efforts to exchange data between systems and applications. Without **interoperability**—that is, the quick and easy transfer of data between systems via a common set of technical software standards—exchange of our resources is laborious and taxing. Whether resources are being exchanged in the marketplace or data are being transferred among data systems, shared standards allow easy and reliable transactions to take place [see Standards section in Chapter 3 for more information].



Interoperability
is the quick and easy transfer of data between systems via a common set of technical software standards.

An interoperable system is “an environment in which diverse data systems seamlessly exchange information with little or no additional effort.”⁶⁰ Use of widely accepted technical specifications facilitates this kind of environment and allows information to be easily and safely shared among numerous systems and applications regardless of the platform or vendor.⁶¹ The standards offered by the Schools Interoperability Framework (SIF) Association are perhaps the most commonly used, though some states and districts have achieved or are exploring ways to attain interoperability by other means. While many states have implemented or are pursuing interoperability, and the federal government strongly encourages the establishment of integrated and interoperable data systems, the majority of educational systems are still working with numerous isolated applications.⁶² This reality is costing countless staff hours and resources and is limiting our ability to effectively use the data we collect.

An LDS should allow for the timely and simple exchange of data between applications within and among schools, districts, states, other educational institutions, as well as agencies and organizations outside the educational system. Interoperability, by ensuring data compatibility, opens the door to vast quantities of longitudinal data from sources that may have otherwise been prohibitively laborious to acquire. These diverse data allow us to explore questions previously difficult to answer due to our inability to link data from various sources—sources that hold data illuminating many dimensions of students’ lives. In this sense, interoperability allows us to easily view a more complete and accurate picture than is possible using only fragmented sets of data.

⁶⁰ Laurie Collins, et al. DQC Issue Brief, *The Right Data to the Right People at the Right Time: How Interoperable Data Help America's Students Succeed*, June 2007.

⁶¹ SIF is recommended by IES for its SLDS grant program as a voluntary standard to use in LDS development.

⁶² Action Step #7 of the National Education Technology Plan (USED, 2004) states that “integrated, interoperable data systems are the key to better allocation of resources, greater management efficiency, and online and technology-based assessments of student performance that empower educators to transform teaching and personalize instruction.” Available online at:

http://www.ed.gov/about/offices/list/os/technology/plan/2004/plan_pg14.html#steps

The effective use of data requires the ability of information from various source systems and applications to work together to enable easy analysis and reporting. Data should enter the system at a single point, the various applications should share data, and the information should be able to be easily re-purposed many times. This will free staff from the need to enter information into each of the systems (e.g., enrollment, library, school lunch, etc.). By eliminating the need for redundant effort, interoperability also eliminates much of the risk for data entry errors, thus improving data quality, and saves time for activities other than tedious data entry and management. Staff will, therefore, have more time to offer better services to students, focus on teaching, and improve student achievement through more effective and timely analysis and data-driven decisionmaking.⁶³

ACHIEVING INTEROPERABILITY: How does a state or local education agency go about achieving interoperability using and based upon education technology standards? The shift to interoperability requires the support of multiple members of the agency. These include decisionmakers, data system managers, technical staff, programmatic areas and the end consumers who will use the system. This is an overall culture change in the organization in terms of the way data are collected, viewed, used, and shared. By bringing together the multiple members in the agency to discuss and answer some key guiding questions, you will begin to form a team and garner the support needed to make the project a success. Without support across the education agency, the chances of the project succeeding will diminish. Keep in mind that, while interoperability is a great enabler, it is also viewed with skepticism because it is change, after all, that is being enabled.

When deciding to implement an interoperable solution, your organization will need to determine and address several key questions such as:

- What is the ultimate goal of the interoperability effort?
- Will this project connect systems from multiple local levels to gain a comprehensive view?
- What are the data you are trying to share and why?
- Will you develop and implement the project on your own or have a vendor walk you through the process?
- Will you repurpose existing software applications and data structures or purchase new?
- What is your timeline to implement a solution?

Your answers to such questions will largely determine the scope and breadth of the project. As we drill into these key guiding questions, it becomes apparent why discussing and addressing them with the team forms the foundation for interoperability. Let's start with the first question, "What is the ultimate goal of the interoperability effort?" When thinking of an interoperable solution, you should be able to clearly state, in a one to two sentence goal statement, what the project is about. For instance, a goal might be:

"Our goal is to have one point of data entry, to improve data quality, reduce data latency, and advance data entry efficiency, thus improving our ability to service our stakeholders and effectively make sound educational data-driven decisions based on the most accurate information available."

Keep in mind that if you go beyond a simple, realistic goal, you run the risk of creating a project with a very broad scope that can be cumbersome to implement.

"Is this a project that will connect systems from multiple local levels to gain a comprehensive view?" This is the second key guiding question for the group to consider, and it is perhaps the most important question as its answer can greatly expand the reach and timeline of the project. If you are considering this project at just a district or state level, that is one reflection. But when you start to

⁶³ Schools Interoperability Framework Association, *Analysis of Costs and Benefits Associated with Implementing SIF*, June 2006.

span entities, it brings in many additional considerations, such as which systems need to be interoperable, which systems contain the data needed, and are there multiple data collections involving multiple programmatic areas? This also starts to touch on the third key guiding question, “What are the data we are trying to share and why?” These two questions of ‘what’ and ‘why’ go hand-in-hand and will take time to analyze and discuss as a group to determine what is or is not comprehensive enough to be included in a meaningful interoperable system.

“Will you develop and implement the project on your own or have a vendor walk you through the process?” This question is significant to the project for a number of reasons. If you have the technical staff and capacity to take on a project of this scope in house, it can greatly reduce the cost but may also increase implementation time. While working with a vendor whose core competence is implementing solutions will greatly reduce the implementation time, it can increase the cost and may also be based on a proprietary interoperable solution rather than a true interoperable solution. This, to some degree, can be solved with the vendor community if you state your project must be built on education technology standards such as those developed by SIFA and the Postsecondary Electronic Standards Council (PESC). This also starts to look at the other key guiding question, “Will you repurpose existing software applications and data structures or purchase new?” When repurposing existing software applications and data structures, you will either use existing software that has already used or could use the standards (for example, many existing applications can be repurposed and only need to have a SIF agent developed for them to make this happen), or you can buy new applications based on standards. An example would be software applications that have been SIF certified (much software is nowadays).

INTEROPERABILITY TIMELINE: So, just how long does it take to ‘go interoperable’? Well, one state, with the help of a vendor that specializes in educational data systems, is working on a 12-month rollout timeline that includes processes such as hardware and infrastructure development, training, and knowledge transfer. While this may be considered an aggressive timeline to some, it may fit others. Generally, most districts and states plan a phased implementation of the project that will last from 2 to 5 years to completion. While some may see this as a long time to implement an interoperable system, experience has shown that this is reality. This should be considered especially when developing a project that incorporates multiple entities. Phases of the project based on the systems development lifecycle include, but are not limited to:

- Planning: Data needs discovery and analysis
- Design: Write and release RFI, RFP and/or RFQ
- Development:
 - Implement a back bone of connectivity including hardware
 - Structure and build an LDS
 - Develop validations and custom reporting tools
- Testing: Evaluate and/or pilot the system?
- Deployment: Project roll out, training and knowledge transfer
- Maintenance: Ongoing maintenance of the system

EXPERIENCES ON THE GROUND: Some states have experienced pushback from their districts because of the extra workload and significant costs that may be associated with implementing an interoperable solution (and similarly, some districts have experienced resistance from their schools). This resistance may be more likely in states where districts are especially autonomous or resistant to change. The aim of some states is to include at least several of the largest districts in the interoperability framework project with the hopes that this success will interest the smaller districts who may have the most to gain from such a project. Additionally, states have decided to temporarily leave some districts out of the interoperability framework either because they are too small to bring in or the districts’ current software applications are not ready. In such cases, the state may allow the

districts to submit and receive data as they have in the past, sometimes even on paper as they move to a fully interoperable system. The ultimate, real-world benefits to all involved should be stressed to gain buy-in for the transition to interoperability.

Portability

Hurricane Katrina and the resulting displacement of students highlighted the need to be able to transfer student information between systems around the country. Data **portability** is “the ability to exchange student record and transcript information electronically from system to system, across districts, and between P-12 and postsecondary institutes – within a state and across states.” This option of maintaining, moving, and sharing a set of personal student information allows districts and states to quickly, easily, securely, and quite cheaply attain information on students who transfer in and out of their school system, and helps them to distinguish transfers from dropouts.⁶⁵ [See the ‘Crisis Data Management’ box in Chapter 3 for more information].



Portability is the ability to exchange student record and transcript information electronically from system to system, across districts, and between P-12 and postsecondary institutes – within a state and across states.¹⁴

When you develop and implement an interoperable solution, portability and interoperability can, and should, work hand-in-hand. With the thought of allowing information to flow seamlessly or to be ported between systems, you are enabling portability of data at the level of the project’s scope – be that locally or between entities. Many refer to this in terms of the portability of content rather than of data, but if viewed holistically, portability can actually refer to any large amount of data or content that needs to be shared. Interoperability also has to do with the meaning of the data once the data have been ported between systems. Some states are working on content delivery systems that are both interoperable and portable. Others are seeking the ability to move a student’s e-transcript, whole student record, or portfolio of work between trusted entities using portability as well as interoperability. Portability also can imply the ability to port large amounts of data, such as a state report, packaged in a way that allows for much easier movement within an interoperable framework. Many believe that the future approaches are focused on allowing for greater levels of data portability/ interoperability across sites to be implemented.⁶⁶

Additional resources: Interoperability and Portability

- [The Right Data to the Right People at the Right Time: How Interoperable Data Help America's Students Succeed](#)
Collins L, L Fruth (SIFA), M Sessa (PESC), E Laird (NCEA), and the DQC. DQC Issue Brief, June 2007.
Reviews the needs for, benefits of, and concurrent efforts to establish interoperable education systems. It offers several key definitions, a case study section, and a list of interoperability examples from other industries.
- [SIFA Implementation Toolkit](#)
This collection of documents, intended to help educational institutions along in the SIF implementation process, includes planning questions (scope, desired automation, data needs expected changes), RFP language, an implementation planning toolkit (walks “ districts through the planning process from conception-of-need to the deployment of the technology based on the premise of that systemic approach, and a recognition that the integration will evolve over time. Within the Toolkit you will find the steps you should take to identify your data integration needs, consider your options, acquire the technology, and implement the SIF solution that will serve you today and provide a foundation for the future.”), and SIF Tools Framing.
- [Analysis of Costs and Benefits Associated with Implementing SIF](#)
Developed independently by Educational Systemics, Inc. under contract to SIFA
This third party study looks at three school districts’ experiences with SIF implementation and concludes that SIF standards contributed to “dramatic improvements in data interoperability, student achievement, funding increases, and student services.” This study may be used to bolster the case for SIF implementation.

⁶⁴ Collins, L. et al. (2007). DQC Issue Brief, *The Right Data to the Right People at the Right Time: How Interoperable Data Help America's Students Succeed*.

⁶⁵ *Ibid.*

⁶⁶ Oberkirch, B. *A Journey of a Thousand Steps*, March 28, 2008.

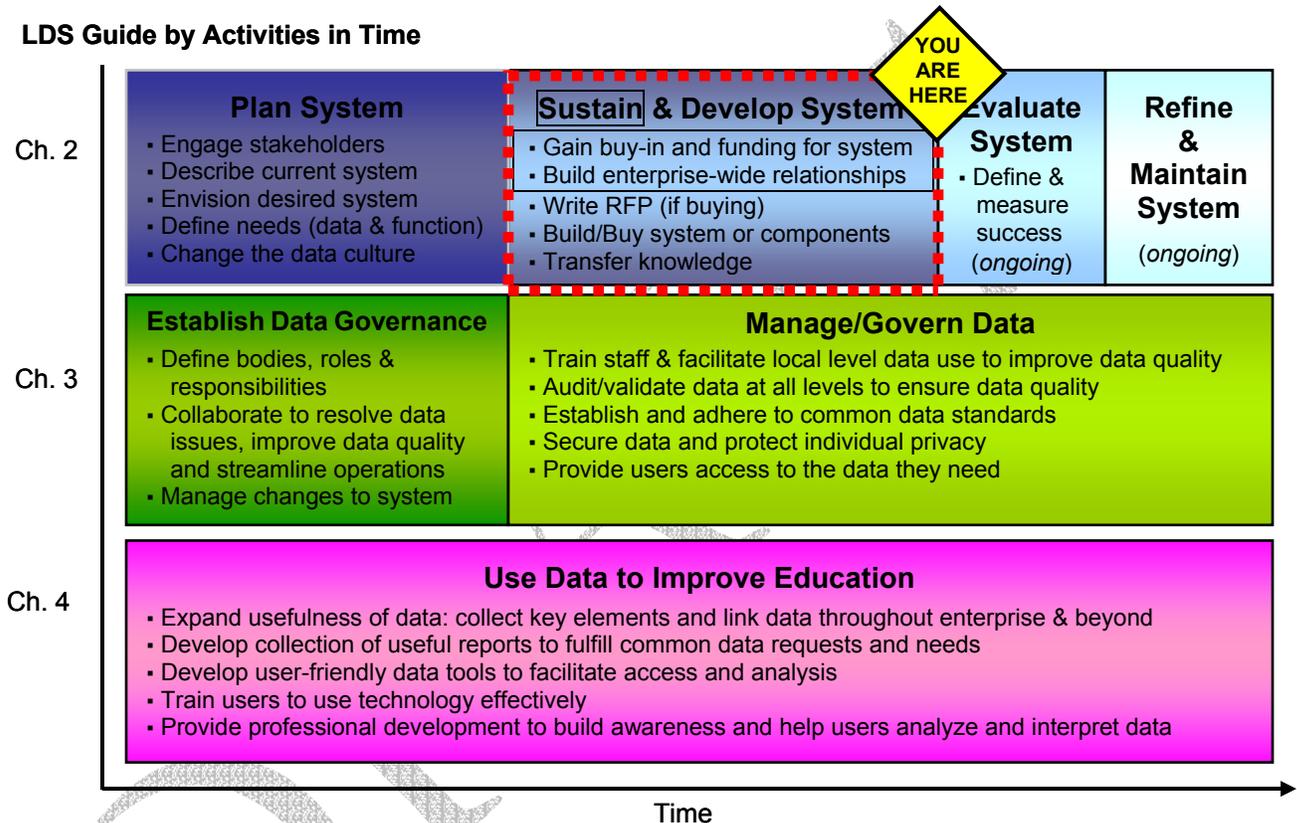
- [Interoperability in pK12 Applications SIFA](#) (December 2006)
This brief discusses interoperability and SIF, its benefits to pK-12 education, current progress, and suggestions for moving forward.
 - [SIFA University](#)
This site offers online SIF overview modules and information on training courses offered by SIFA.
 - [ADL/SIFA Executive Brief SIFA \(2007\)](#) ([http://www.sifinfo.org/upload/press/289BZA_SCORM and SIF_final.pdf](http://www.sifinfo.org/upload/press/289BZA_SCORM%20and%20SIF_final.pdf))
This brief discusses two organizations' standards for interoperability. SIFA's standards are called SIF. ADL's are called SCORM. This piece introduces each and suggests that organizations consider both of them when pursuing interoperability.
 - [SIF Specifications](#)
This page includes the latest SIF implementation specifications. Access is free.
 - [DataPortability Project](#)
"The DataPortability Project is a group created to promote the idea that individuals have control over their data by determining how they can use it and who can use it. This includes access to data that is under the control of another entity."
- In the News*
- [The SIFication of America](#) – District Administration: The Magazine of School District Management, March 2009

DRAFT

Ensuring System Sustainability: Staying 'There'

As emphasized earlier, the 'L' in LDS is for 'longitudinal' and longitudinal data, by definition, take years to amass. So, it should go without saying that these systems need to be around for a long time if they are going to fulfill their intended purposes and potential. But, what does it take to sustain an LDS over the long haul? This section offers some basic answers to this question. And, the sections that follow will take a closer look at some specific topics of importance in winning broad and lasting commitment for your system, including LDS marketing as well as building relationships between the state and local education agencies.

LDS Guide by Activities in Time



Winning early and lasting support

A sustainable system has broad and deep stakeholder support as well as long term commitments of funds and staff. If the system is going to be a success, it is necessary to build strong interest in the project early on by gaining support from legislators and stakeholders throughout the educational community through effective marketing and outreach [see the Marketing and Communicating about Your LDS section of this guide for more information]. Legislators can provide funding and pass helpful laws. Education agency executives will authorize system development and implementation. Education agency staff will share responsibility for the system and have a stake in its success. And, local administrators and teachers will use the system and come to rely on it as a source of valuable information. This wide-ranging support will provide the foundation of a sustainable system.



GENERATING THE CHARTER: ACTION STEPS

1. Get executives to sign off on LDS
2. Establish goal(s) – articulate the business case for why the system is being built
3. Identify the seed team
4. Develop high level timeline
5. Develop high level budget
6. Do self assessment, revisit charter, and re-examine the scope, budget, and timeline

LEGISLATIVE SUPPORT

Early on, the project should be pitched to legislators to explain the value of the planned system, establish expectations, and garner support, both political and financial. Lawmakers can provide funding for the system in addition to passing legislation that supports the system, for instance, by writing the system's major tenets into law or mandating system compliance. Education agency leaders need to figure out what vision should be painted to legislators and how to deliver it effectively. Whoever makes the proposal to the lawmakers must have a broad understanding of the LDS and be ready to impart the right information. That is, they must understand what the legislators need to know – the purpose, potential benefits, and estimated costs of the system. In addition, they must understand what education specialists need as well as the basic technical details of the system. They should make a compelling, yet realistic proposal, taking care not to make promises that can't be kept or set goals that can't be reached. They should convey the big picture in plain language, keeping in mind that their audience may not have expertise in education, let alone education data, and shouldn't inundate them with too many details. Their goal should be to educate and persuade them, not to bore them.

ADDITIONAL SOURCES OF FUNDS

In addition to relying on legislators for resource commitments, consider other sources of funding. Other potential sources of financial support for building and maintaining an LDS include:

- federal grants (*e.g.*, IES SLDS grants) [see appendix],
- foundations (*e.g.*, the Bill & Melinda Gates Foundation),
- separate program areas (*e.g.*, assessment, IDEA, LEP, Title I, etc.),
- state-level technology bonds,
- universities and Higher Education research institutions, or
- business/private sources.⁶⁷

ESTIMATING COSTS

According to some estimates, the development of a state-level LDS will cost around \$1 million per year for three to five years. However, there are many variables that affect how much an LDS will cost an education agency. Research other agency's systems to see how much they've spent on their systems or various components, keeping in mind the differences between your agencies, environment and system requirements [see the LDS RFP ABCs: Writing a Strong RFP section of this guide for more information]. Some important factors that can affect system costs include:

- *Starting point.* What does your education agency already have in place? Can parts of the existing system be modified or will you need to start from scratch? What infrastructure will you continue to use with the new system?
- *Size.* How populated is your state or district? How many students and staff will the system track?
- *State laws.* Are their mandates that will require the system to have certain characteristics, *e.g.*, SIF implementation?
- *Environment.* What is the existing level of communication and collaboration among

District Difference



It may be more difficult for a district to estimate the cost of implementing an LDS than it is for a state agency because of a number of factors. For instance, districts have a relatively limited ability to learn from each other's experiences due to the lack of networks and means of collaboration that exist among states. Also, the number of districts within a state developing an LDS may be limited and the experiences of distant districts may not translate well across state lines. Further complicating the task is the wide variation that exists among districts in terms of size, circumstance, and needs. However, in most cases, the cost of a district LDS should be substantially less than a state's.

⁶⁷ EIMAC LDS Task Force, Meeting Summary, March 23, 2007.

districts and between districts and the state? Establishing these lines of communication will take time and money. How uniform is your current system across districts and what standardization efforts will be required?

- *Data demands.* How many users will need access to the data and what security demands will granting this access entail?
- *Local costs.* If you are building a statewide system, what participation costs will be shouldered by your districts that are not included in the state-level price tag?
- *Scope.* Do you want a top-of-the line system, or just a basic one? How and to whom will the data be made available (*e.g.*, agency staff, teachers, students, parents, researchers, etc.)? What data linkages (*e.g.*, to postsecondary, etc.) will be created? Beware of costly scope creep.
- *Procurement.* If you're building, what staff will be working on the project and what new staff or contractors will be required? If you buy, consider both vendor and in-house staff costs.
- *Overlapping efforts.* In building infrastructure or developing system components, it is possible to kill two (or more) birds with one stone, working towards multiple goals in a single effort. Savings may result.
- *Change.* Evolving data requirements: programmatic changes, new definitions and updated standards, and the addition of new elements that require programming changes can involve significant costs for state and local agencies.
- *Training and user support.* How many staff members will need to be trained on how to use the system and new tools, and on how to do data analyses? What user support will be necessary?
- *Savings.* How much will the new system save you? How will new efficiencies save staff time? What collections can be eliminated and replaced by the new system? Weigh the benefits with the costs. Over the long run, the benefits of the system should amount to big savings.
- *Maintenance.* Your LDS will have not only startup costs, but ongoing maintenance costs as well. Who will do this? A vendor or in-house staff? How often will hardware be updated?

^{68,69}

MAINTAINING LONG-TERM SUPPORT

Though LDS development is often referred to as a project (both in the real world and in this guide), it is much more than that. Implementation is just the beginning. Whereas a project has an end, an LDS is ongoing and requires continuing maintenance and enhancement. Everyone involved needs to understand that the benefits of the system will take hard work and several years to realize. Maintain excitement along the way by structuring the project around incremental stages with frequent milestones. Each of these small achievements should be announced to the educational community so that the results of their efforts and resources are apparent [see the Marketing and Communicating about Your LDS section of this guide for more information]. Patience and determination are important, but people also need to see results once in a while or faith in and commitment to the system may wane.

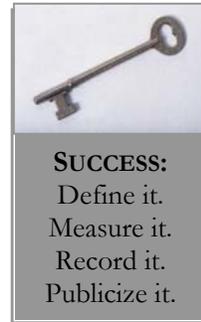
A successful LDS will outlive political leaders, so there is also a need to bridge administrations. Education data is up to various interpretations in terms of what they can help to achieve. Therefore, the appointment of a new commissioner or election of a new governor can change the support for the project. It is important to be flexible when new leadership with new agendas comes along.⁷⁰ But, having a deep commitment to the system across the education agency and the broader educational community, as well as being able to show some actual benefits of the system, will help sustain the LDS through changes at the helm.

⁶⁸ EIMAC LDS Task Force, Meeting Summary, March 23, 2007.

⁶⁹ EIMAC LDS Subcommittee, Meeting Summary, October 17, 2007.

⁷⁰ Data Quality Campaign, *Creating Longitudinal Data Systems: Lessons Learned from Leading States*.

Early on establish how success will be measured. For example, a successful system may be deemed successful if it delivers high quality results within budget constraints and on time. Document system successes such as new efficiencies and improvements in educational outcomes or processes, and use them in future pitches for resources. Building a system with measurable deliverables and outcomes will make this possible. Education agency staff should also make an effort to sell new leaders on the importance and value of the LDS data. Brief them on system capabilities and equip them with data that will help them make good decisions and a good impression. One state, for example, had a new commissioner who was making trips to meet with district representatives. Agency staff provided the commissioner with detailed data on the district he was to meet with. This had two very important, far-reaching effects. It 1) informed the commissioner and showed him the usefulness of the data, and 2) demonstrated to districts that the data they report to the state is actually used, thus giving them greater incentive to submit high quality data.



This example demonstrates the importance of making the data visible and useful to as many stakeholders as possible. If the benefits are only seen at the top, local support will not be strong. So, make sure the locals also benefit from the system. Local support is crucial, especially when it comes to convincing political leaders to provide funding. It has been suggested that increasing the scope of the project so that its benefits are further reaching can actually help gain grassroots and political support for the system, even if it causes increased costs.⁷¹

Additional resources: Ensuring System Sustainability

- [EIMAC Longitudinal Data Systems Subcommittee Fall 2007 Meeting](#), October 16-17, 2007
Among discussions of other LDS-related topics, this meeting summary includes notes on factors that affect the cost of LDS implementation.
- [Wisconsin Case Study: Toughing It Out](#) - DQC, Aug 2006
Pages 4-5 of this case study include a list of estimated costs to the state to implement a vendor-developed student ID system and student-level enrollment data collection. Costs are broken up by year and source. A discussion of costs and extra burden imposed on districts is also provided.
- [South Carolina Case Study: Building in Progress](#) - DQC, Nov 2007
Pages 6-7 of this case study include a list of estimated costs to the state to implement SIF standards, bring in extra staff, upgrade infrastructure, and implement a state data manager and a new data warehouse. A discussion of costs and extra burden imposed on districts is also provided. In general, staff said they were not able to provide accurate cost estimates. Some dollar amounts were taken from estimates in the state's application for an IES SLDS grant.
- [State Data to Improve Achievement](#)
This is a 2006 request to Washington Legislature to fully fund a 2-year, \$2.9 million statewide longitudinal student database project. The document sets the stage with relevant history, discusses the need for and benefits of the proposed system, as well as the associated costs. The system was to facilitate daily data extractions from districts, replace existing single-year achievement data bases with longitudinal achievement and demographic databases, and build and implement value-add tools.

⁷¹ ESP Solutions. *Marketing Your Field of Dreams*.

Marketing and Communicating about Your LDS

Gaining stakeholder buy-in for an LDS is critical for the long-term sustainability of the project and the effective design and utilization of the system. Unfortunately, the fact that a system is being developed, even if that system will greatly benefit the entire organization and its stakeholders, may not be enough to get everyone enthusiastically on board. Consequently, agencies may need to do some work selling the idea to gain support for the LDS. Agencies have pursued many tactics in efforts to market their systems and gain institutional support. This section is intended to help your education agency face the marketing challenge.

Who's the audience?

Marketers should cast a wide net, reaching out to stakeholders throughout the education community, focusing on all levels. Present the project to the executives and education agency decisionmakers at the top, focusing on the policymaking advantages of the LDS, and brief them regularly on the progress being made as well as the use of the system to help achieve the organization's goals. The level of buy-in at the top can also increase once the executives see that the LDS team is moving forward with the project – contacting districts or schools for data, for instance. Also, take a grassroots approach to selling the project. Make sure that people on the ground understand the value of the system so that info and support travel up as well as down the organizational ladder. Make sure people realize how the LDS will be critical to day-to-day operations of the organization.

Put special emphasis on the business side of the organization. While the project will need support from your organization's technology team, buy-in from non-technical staff is critical. As discussed earlier, involving a wide variety of stakeholders in the design process will give people a sense of connection to the project and can help gain early buy-in. That's the first step in marketing. Get input from program area staff, district representatives (for a state LDS), school administrators (particularly important for a district LDS), teachers and other interested parties to help design your system and let these people know you're listening to their feedback. What data do they want? What information will save them time and help them be more successful at their jobs? What tools will best suit their needs? [See the Engaging Stakeholders section of this guide for more information.]

What's the message?

Communicating about an LDS development project can be a major challenge. However, getting people to understand what the new system will be and what benefits it will offer is important if the project is to succeed.

First, be sure that you've created a clear vision for the project. Communicate it consistently and be prepared to repeat your message over and over again. Frame messages about the LDS around

History helps.

Take advantage of relationships that exist throughout the educational community, especially between state, regional, and local education agency staff. Get the word out and keep these lines of communication open.



To Holler or to Hush...

Should you keep a low profile or grab a megaphone and yell from the rooftops about your LDS? Agencies have taken both paths in communicating about their LDS projects. Some have worked under the radar, while others aggressively advertised their project. Both approaches have their advantages. While the latter course could slow down the development process by inviting an inundation of interest and involvement, the former limited outreach approach could pose fatal problems later on when the agency tries to build support for the project.

organizational goals and how the new system will better equip you to achieve them.⁷² Get the word out and tell people:

- What will the new system be? How will it be different from the current system?
- Why is the system being developed? How will it benefit the educational community? Stress benefits such as streamlined daily operations, time and money savings through increased efficiency, quicker access to data and better informed decisionmaking, and improved services. Make sure the LDS is not perceived as a burden. [See the LDS Benefits section and Chapter 4 for more information.]
- How will the system better equip the organization to meet its goals?
- How will the culture of the educational community need to change in terms of the way people think about and use data?

Also provide frequent updates on:

- Who is backing the project? What support and resources have been won (*e.g.*, governor buy-in, grants awarded, etc.)?
- What progress has been made toward system goals? What benefits and functionalities have already been achieved, and which ones will materialize in the future?
- What is the timeline for the system? Be realistic in your estimates so that expectations are appropriate. Highlight planned milestones and get people to look forward to reaching them.

CONVERTING THE LDS NON-BELIEVERS: While some people will get on board early on without much convincing, there will probably be some who are not so willing to embrace the project. For instance, many schools and districts do not see data systems as critical to their day-to-day operations. Show them value of the system. Win these folks over by showing them undeniable proof that the LDS will improve their days and make their jobs better. For example, what information will they be able to get through the portal? What reports are going to be made available to them with the data? What data entry will become automated? How will greater efficiency improve the timeliness and usefulness of the data? How will better information equip teachers and other staff to make better decisions and spend their time and resources more effectively? These improvements don't need to be high tech. Often, the changes that will make local staff the happiest can be the simplest ones that save them time every day.

Show people what is bad about the system they're using and the data it contains. For example, the current system may be deficient because it stores redundant and/or conflicting data in various silos rather than in a centralized, authoritative data storage facility. It may require laborious data entry or make it difficult to get any information back in a timely manner. Then, show them what the new system is and how it will address these problems and improve their data. For example, if your development project involves the construction of a data warehouse, early on, identify all of the silos and show people that this project will replace them (not the staff). Tell the staff that, while the silos have served the state well in the past, the LDS data warehouse will be better for reasons x, y, and z. (This approach may also generate more money for the project because all of the money that previously was devoted to maintaining the silos can be transferred to the LDS's data warehouse.)

When all else fails, more coercive measures may become necessary. For instance, an executive such as a superintendent might send out letters or emails to non-compliant districts to encourage them to get on board. Some states make compliance with the LDS mandatory. In those cases, communications can be more forceful than merely offering encouragement.

⁷² ESP Solutions. *Marketing Your Field of Dreams*.



STRATEGIC COMMUNICATION PLAN

Develop a marketing or communication plan early on. This strategic plan can help you identify your marketing needs and carry out an effective marketing campaign. A strategic communication plan may consist of the following sections:

Analysis

1. **Context:** What's happened before? What's the relevant history?
2. **Environmental scan:** What are the key factors that will affect the project's success? What are other jurisdictions doing? What's the legislative context?
3. **Stakeholder analysis:** Who are the LDS stakeholders and what are their characteristics? What are their expected reactions? How can you use the support of those who react positively and mitigate the concerns of those who may resist the project?

Planning

4. **Objectives:** What clear and measurable goals do you want to achieve in your communications effort? To educate your stakeholders? To build support or create demand for the LDS project?
5. **Strategy:** From a top-level perspective, how will you achieve your communication objectives? Should your approach be high or low profile?
6. **Audiences:** What specific, key audiences will you try to reach? What are their needs and interests? How will you tailor your communications to these various audiences to maximize the impact of your messages?
7. **Announcement:** Given the strategy, are you making an announcement? If so, how will you summarize the project in your announcement?
8. **Messages:** What are you trying to tell people? What is the project and why are you doing it? What will change as a result of the project and the new system?
9. **Tactics:** How will you implement your strategy before, during, and after your announcement of the project? What modes of communication will you use (emails, direct mailings, speeches, meetings, training sessions, web conferences, presentations, websites, press releases, etc.)? Who will be responsible for each communication activity? When will communication activities take place?
10. **Issues:** What problems might you have to overcome? Can you anticipate any potential confusion or push back? How will you deal with these issues if they arise?
11. **Budget:** What will your communication plan cost? Where will funding come from? Pay attention to the details.
12. **Evaluation:** How will you know how well you've achieved your goals? Can you see a before and after effect of your efforts? How will you measure your marketing success? Did the project receive media coverage? How have stakeholder perceptions changed?

These 12 sections have been adapted from "Strategic Communications Planning," available at www.davefleet.com. See this resource for more guidance on developing a communication plan.

Who should do the marketing?

When trying to get the word out, it is important to have the right people at the forefront to promote the project. Find motivated people to do much of the marketing groundwork for the LDS and keep them excited about the project. Identify these passionate communicators in stakeholder groups and deploy them to talk with their peers. Dedicated district leaders, for instance, can talk to other district leaders or give presentations at local meetings to inform stakeholders about the benefits of the LDS and the status of the implementation process. They can also solicit valuable feedback from their contacts. Enthusiastic legislators, governors and state superintendents and other leaders can also make a strong impression. These high profile advocates or "champions" can speak at meetings or communicate through mailings to raise awareness and get the system on people's radars.

Alternatively, these roles might be filled by outside consultants who can focus exclusively on the marketing effort. These champions should be knowledgeable about the system and the progress towards its implementation.

What modes of communication should be used?

Agencies have used a vast arsenal of communication techniques. Of course, a large share of the communication about the project should take place during internal and external stakeholder meetings in which the participants can be updated on progress. Presentations in these meetings or at conferences (both in-person and web-based) can also offer updates. Activities such as training sessions also provide a great venue for marketing the system. Other means of communication include email campaigns; paper mailings such as letters, newsletters, or brochures; and press releases to announce the project and milestone achievements. In this case, staff must be ready to effectively and consistently respond to questions and concerns from the media if support is to be gained from the general public. Assign specific personnel as the go-to people for specific types of information on the system and direct calls and questions to them. Agencies might also consider creating a webpage or site dedicated to the project to which stakeholders can be directed to get up-to-date information on the project.



LDS Lore: Know your audience and communicate appropriately

An agency staffer met with a group of superintendents after having sent a half dozen communications about the system. After sitting down, it quickly became apparent that none of them had a clue about the system. The staffer couldn't blame them. They were probably just jaded because numerous similar projects had already been attempted in the past and had failed. After the meeting, instead of spending her time writing summaries of the project, the staffer sent out brief communications saying things like, "The system redesign is really happening this time. Here's a website that details the progress." This saves her time and lets the reader take their time learning about the new system on a communications website.

Agencies must be able to disseminate information quickly in a format that is understandable to lay people. Again, have a clear message and make sure that your audiences understand what you are saying. Avoid miscommunication, for example, by limiting the use of jargon in general presentations and communications. Agencies might also consider creating a common glossary of terms for stakeholders to reference.⁷³

Maintaining support

Communications should be used to keep people excited about the project along the way. An LDS development project plan that includes many short term deliverables will lend itself to a successful marketing effort. Show progress, however small, along the way by announcing achievements and delivering results. With the completion of each deliverable, a separate communication can be disseminated to celebrate each of the organizations little "wins." These victories towards an LDS can be advertised through the media and throughout the organization. But, be careful not to promise anything you can't deliver quickly! If results are not forthcoming when promised or if your first success takes a long time to realize and subsequent achievements are infrequent, faith in the project and your ability to create and maintain support may be diminished.⁷⁴ And, aside from just talking to staff about the project, project managers should also acknowledge a job well done. A little recognition or token of appreciation for the work of those on the project goes a long way in keeping people motivated and invested in the success of the project.

⁷³ Data Quality Campaign (October 2006). *Creating Longitudinal Data Systems: Lessons Learned from Leading States*.

⁷⁴ Data Quality Campaign (October 2006). *Creating Longitudinal Data Systems: Lessons Learned from Leading States*.

Finally, the system and the data themselves represent another important marketing vehicle. Along the way, get the data out and show stakeholders its usefulness to gain support. Further down the line, when parts of the system are ready for testing, pilots also provide an effective means of winning over key stakeholders. Pilots get districts and schools interested in the system, and let them try it out and take an active role in improving it and working out the kinks.⁷⁵ If a new data mart is created, for instance, let the appropriate stakeholders explore it and see how it can benefit them. If an analysis tool is created for teachers or administrators, let them see its value or chime in on ways to make it more useful.

Additional resources: Marketing the System

- [Creating Longitudinal Data Systems: Lessons Learned by Leading States](#) - DQC, Nov 06
This summary of findings from DQC case studies in FL, UT, VA and WI - states that vary in terms of LDS progress, public and political support for LDS, and the focus of their LDS efforts – presents a number of lessons learned.
- [Building Student-Level Longitudinal Data Systems: Lessons Learned from Four States](#) - DQC, Aug 06
The Data Quality Campaign conducted four site visits (Florida, Utah, Virginia, Wisconsin) to document common challenges and lessons learned as states design and build student-level longitudinal data systems. This report synthesizes the findings from these four visits, including several tips on marketing and communication.
- [Strategic Communications Planning - A Free eBook](#)
Written from a business perspective, but intended to be useful to a broader audience including the public sector, this eBook guides the reader through the process of developing a communications plan. Marketing goals of relevance to an LDS project covered here include educating stakeholders, building support, and creating demand. Consult this resource for help throughout the process from the early stages of stakeholder analysis, through crafting and spreading your message, estimating costs, and evaluating the results of your efforts.
- [ESP Marketing Your Field of Dreams](#)
Find at: <http://www.espsolutionsgroup.com/resources.php>
This document offers strategies on how to gain buy-in for your technology project through various marketing techniques. A marketing plan is outlined to help your organization gain stakeholder support. It is written from the state's perspective.
- [Education Leadership Toolkit: The Communication Plan](#) - National School Boards Foundation
This is a free on-line "collection of tips and pointers, articles, case studies and other resources for education leaders addressing issues around technology and education." Though it is designed for a district level audience, much of the advice included may be used more broadly. This section focuses on developing a successful communication plan. See the [Community Involvement](#) section of the toolkit also.
- External Communications Plan EXAMPLE (2007)
This document from the state of Michigan presents a template for organizing committees and facilitating ongoing communications about an LDS project. It outlines the various roles and activities of these groups and their members, as well as suggesting ground rules for meetings.
LDS Share - Filename: MI Communication Plan Example
- [Marketing and Communicating LDS Project - FL](#)
This short presentation offers some tips on marketing an LDS.
- [Developing Political Support and the Will to Build and Use Longitudinal Education Data Systems](#)
Bob McGrath & Jay Pfeiffer
This presentation reviews lessons learned from PA and FL in marketing their states' LDSs. Emphasis is put on having a clear vision, consistently communicating that vision and being persistent to maintain support over the long term.

⁷⁵ ESP Solutions. *Marketing Your Field of Dreams*.

Building State-District Relationships

Why is the state-district relationship so important, especially in the case of LDS development? Why are such relationships mutually beneficial to states and districts? How does a good relationship improve the quality and usefulness of the LDS? How can these relationships be forged and fostered? How can states get districts to buy into the process? This section offers best practices and insight from the states on these issues.

Building bridges and gaining LEA buy-in

As discussed earlier, LDS development should involve all stakeholders. Districts are an important part of this group and their engagement is vitally important to the creation of a successful statewide LDS. Too often, the relationships between states and districts are very limited – collaboration an unfamiliar, or even unpleasant idea. In such situations, a culture shift may need to occur in many organizations to move to a more inclusive atmosphere. A strong relationship between a state and its districts offers many advantages in the development and use of LDSs, whether the systems are statewide or built locally to serve district or regional needs. Communication barriers between these levels can have serious consequences including an air of mistrust or frustration, poor data quality, misunderstanding, or the establishment of unrealistic or unachievable requirements.

The benefits of this relationship flow both ways. State agencies developing statewide LDSs can gain tremendous insight from the locals, and districts can benefit from sharing their knowledge with states by eventually getting a system that better meets their needs and makes their work both more efficient and effective. Districts interested in building their own local LDS can learn lessons from the state. And in some cases, the opposite may be true. Especially with large districts, local LDSs may be more sophisticated than the state's and so much can be learned from local experiences. In either case, the state and local agencies should work together to build a single system, or systems that will serve common goals and will be aligned to facilitate simple data transfer and to create only one version of the "truth."



KEEPING DISTRICTS IN MIND:

LOCAL CONSIDERATIONS FOR STATE AND REGIONAL AGENCIES BUILDING AN LDS

- Consider the varying needs of your districts. Be flexible enough to serve both large and small districts, as well as districts with varying degrees of experience with data systems.
- Consider the extra burden being placed on districts to report data elements.
- Involve districts in the entire process. Find out what the locals need from an LDS.
 - What questions need to be answered at the district-, school-, and classroom-levels and what data are needed to answer them?
 - What access is needed at the district, school, and classroom levels?
 - What reports and tools will help local staff do their jobs better?
- Consider interoperability with existing systems in districts based on standards and common definitions.
- Consider the possibility of providing added value back to districts as incentive to use the system (*e.g.*, state-hosted student information system (SIS) & LDS).
- How will the LDS address the need to collect and analyze local assessment data over time? Realize that these assessments can be unique to schools and districts.
- How will districts exchange student records (release to a transfer student's new district)?

⁷⁶ Data Quality Campaign (2006). *Creating a Longitudinal Data System: Using Data to Improve Student Achievement*.

With a statewide LDS project, it is generally beneficial for states to think of districts as partners, rather than as customers. As follows, the LDS should be conceptualized and developed not as something that districts simply need to comply with – but as a valuable tool that will benefit both the state and the districts. The state should think of districts not only as providers of data, but also as users of the data who will benefit from data sharing and access. And conversely, districts should not think of the state only as a collector of data, but also as a provider of data that will be useful to them. This sort of state-district partnership can be cultivated in a number of ways.

ENGAGE LEAs IN VOLUNTARY WORKING RELATIONSHIPS EARLY ON: Ideally, LEAs should buy into the LDS development process because they see the value in creating and participating in such a system. Their involvement should not need to be imposed upon them. State communication with districts about the LDS should be framed in terms of its value to the districts, and local engagement should be initiated as early in the process as possible.

From the initial planning stage, district representatives should be included in committees or working groups focused on LDS oversight and development, for example. Small states may seek to include all districts in this process while larger states might settle for a sample group of diverse, representative districts. In this process, states should try to gauge districts in terms of expertise and the time they will have to help with the project. States may also involve districts in the grant writing process or the RFP committee both in order to get them engaged in the process and to gain input. District representatives should also be involved in the state's data governance process. In terms of data collection, for example, when a state proposes the collection of a new data element, LEA representatives included in the governance structure will be able to weigh in [see the “Governing the Data” section for more information]. The state may also ask all of its districts for feedback. It is important to allow ample time for response, perhaps up to a year prior to the collection of that element. This way, the LEAs will be aware of what's coming well in advance, and their feedback can be incorporated to make data collection proceed as smoothly as possible.

Moreover, ask the locals what kinds of questions they want to answer [see Table 1.2 in the LDS Benefits section of this guide]. Additionally, how do they want the data to be returned to them? What information will be most useful in alleviating their pain points? And along the way, find out what they think of certain aspects of the system. For instance, in the portal or business intelligence tool development phase of the project, districts should be allowed to chime in on what types of tools will be most useful. How can certain reports be made to be more useful or user-friendly? Flashy tools are nice, but the simple low-tech improvements that save staff time are often hugely appreciated and can strengthen support for the project.

RESPOND TO LEA FEEDBACK WITH ACTION: Many states cite the importance of not only listening to or soliciting LEA feedback, but also responding with action. For instance, if districts tell the state that some areas of the data collection are problematic, the state might seek ways to resolve the issues, by adjusting the collection, making it optional, or even eliminating it if necessary. Districts should not feel ignored in the process. This can lead to alienation and even cynicism and mistrust. However, while it is important to be responsive to districts, it is also important for the state to strike a balance and make only promises that it can keep. States should offer a realistic view of what can be accomplished in both the short- and long-terms. All will benefit from an open and frank relationship.

GET THE DATA BACK TO THE DISTRICT: Districts submit large quantities of data to states. This responsibility can be burdensome and often seems without reward. State agencies should strive to quickly return data to the districts in a useful form for their review and use. If the districts are able to use the data for analyses or see them in reports that show comparisons among schools and districts within the state, they're importance is made all the more apparent. This reinforces the importance of

the data as more than just a troublesome requirement. Showing the districts the good uses to which the data are put, and giving them a chance to use the data serve as excellent incentives for cooperation from the districts and encourage them to devote more energy to the submission of high quality data. States can enhance this process by seeking to collect data that the districts find most useful.

MAINTAIN DISTRICT ENGAGEMENT THROUGHOUT THE PROJECT LIFE CYCLE: District involvement should continue throughout the development process. Some states have brought districts into the product testing phase of the process by conducting pilot studies with all or some districts. Districts get a chance to try the system out and give feedback to the state. One large state, for instance, involved 10% of its districts in one such study after the state's LDS was operational. Continued engagement should also be sought through regular communications, as well as training and feedback sessions that cover the uses and benefits of the system. In such training, district staff can be shown why they should go the extra mile to provide the necessary data accurately and on time [see the "Improving Data Quality" section for more information]. States have also strengthened their relationships with districts through financial means. Providing funds, perhaps by earmarking a percentage of state funds for districts to support infrastructure development, has been a source of good will.⁷⁷ In some cases, when buy-in is not forthcoming and districts are resistant, states may seek ways to incentivize data quality and timely submission of data. One approach that has been considered is tying funding to data quality and timely submission. Other states have had high-level executives send letters to districts stressing the data's importance.

STRATEGIES TO FACILITATE STATE-DISTRICT COMMUNICATION: Having existing relationships between the state and districts prior to the start of an LDS project is, of course, better than starting from scratch. Some state agencies have program area staff that have close working relationships with the districts. They have been able to leverage these relationships in building the different pieces of the system to meet the needs of the program areas and the districts. Other states have project managers who have worked with the districts in the past, perhaps even in earlier phases of the LDS project, and built strong relationships. These staff members may serve the state as intermediaries with the districts.

Such history may be ideal, but the reality is that many states and districts do not have these strong ties and even the connections they do have can always stand to be strengthened. States pursue various strategies to bridge this divide, but regular communication is fundamental to this effort. Some states periodically send a newsletter to the districts that discuss specific data issues and review progress and successes in the state's LDS development. Other states hold regular conference calls, online meetings, and face-to-face meetings with district staff. Small states should consider collaborating with districts in face-to-face meetings, while larger states may find it more feasible to work with regions, rather than with many individual districts. Bear in mind that districts vary in their capacity to participate in such efforts both in terms of expertise and time, so states should try to gauge where districts are and be flexible.



**LDS Lore:
Leveraging Past Partnerships**

In the past, the state's districts were grouped into a number of regions, with a regional department servicing districts in each region. After budget cuts, many of the people working in regional departments were moved to the state education agency. Since then, the state has taken advantage of these relationships which were fostered by the regional service centers. This communication continues today between the same personnel at the state and the districts they served and these relationships continue to benefit the system today.

⁷⁷ Data Quality Campaign (2006). *Creating Longitudinal Data Systems: Lessons Learned by Leading States*

Communication with staff from all levels of the system should be sought so that a consistent view of what's happening in the state is shared by all involved. The least informed groups can be the biggest problem because they don't understand the challenges involved. Thus, education of such groups is a necessity. It is also important to educate as many people as possible because there is no guarantee that a single individual representative will disseminate information to any of his or her colleagues.

Districts should also be represented on committees, advisory boards, and working groups, which serve to spread knowledge and facilitate communication about data issues, and to build relationships among staff and other stakeholders. States might also facilitate communication by making it easier to locate and contact staff members. One state, for instance, is planning to create a data-area specific directory of district and state staff to make it easier for the different agencies to communicate with one another. The directory would also identify which staff member are in charge of specific data-areas, thus allowing questions to be directed to the right people and increase the efficiency of communication. Another option is to use a third party to bring districts and the state education agency together. One state used a consulting firm to help forge and strengthen their SEA/LEA relationships.

Additional resources: Building State-District Relationships

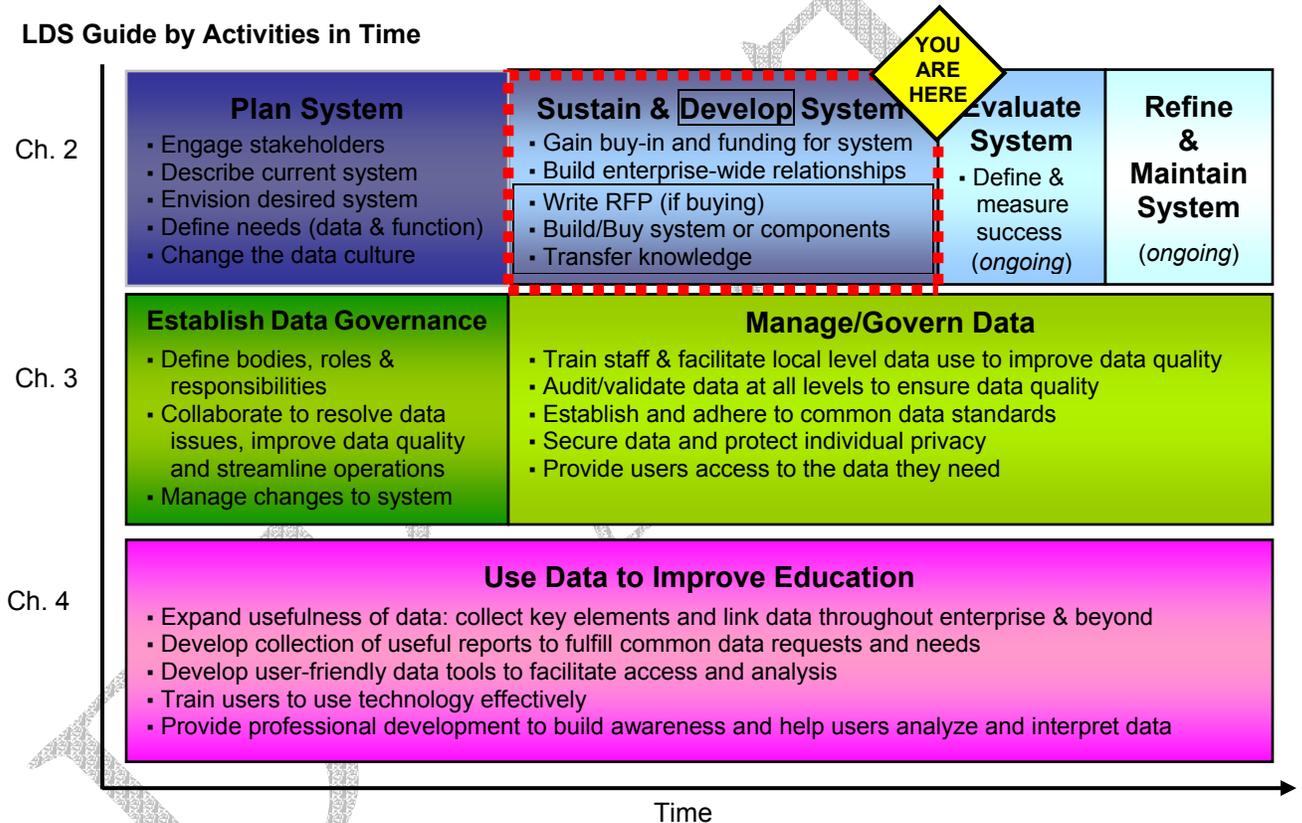
- [What is the role of the SEA in providing LEAs with access to key data for instruction?](#)
EIMAC LDS Taskforce Brief #2, October 2007
What can the SEA do to help LEAs in the LDS effort? This brief covers the establishment of ID system, provision of professional development, benchmarking, data management and BI, and legislative support.
- [Creating Longitudinal Data Systems: Lessons Learned by Leading States](#) - DQC, Nov 06
This summary of findings from DQC case studies in FL, UT, VA and WI - states that vary in terms of LDS progress, public and political support for LDS, and the focus of their LDS efforts – presents a number of lessons learned including some tips on building effective state-district relationships.

Getting from Here to There: Developing What You Want

When the vision for the system has been firmly established and support for the effort has been won, the focus should turn to implementation. With “there” in your sights, you can depart from “here” and begin work towards reaching your desired destination. Projects may be planned either in phases or confronted all at once. In the case of LDS development, states have taken both routes. Which path is most appropriate depends on many factors, perhaps most importantly, the state’s available resources.

The sections that follow will discuss many of the decisions your education agency will have to make and the challenges you may face while building or purchasing your system, and will offer some tips on how to make your ride to “there” go more smoothly.

LDS Guide by Activities in Time



Procurement Planning: Build or Buy?

Whether you are building a data warehouse or adding reporting and analysis tools to an existing depository, someone will have to develop and implement these products. The decision of whether to take on these tasks within your education agency or to hire a vendor to tackle them for or with you is an early and crucial one. Our goal here (and throughout this guide) is to help you become an informed builder or consumer before you begin construction or the vendors are hired so you can end up with a system that suits your needs and is worth your money. A collection of lessons learned and good practices, this section aims to help you make that choice and to steer you in a good direction once you've decided to pursue either a build or buy solution, or perhaps even a combination of the two.

Deciding which path to take

For many states, the choice of building or buying is obvious from the outset. For others, much deliberation is necessary. The decision you make about hiring or not hiring a vendor will depend on many factors. For instance, organizational characteristics such as technical capabilities, workload capacity, and culture will all influence this choice. Does your organization have the staffing and expertise needed to carry out your desired project and will they be available through the project's lifecycle? Or is additional staff or a vendor needed to help develop and maintain the system? Beyond in-house characteristics, the preferences of the organization's decisionmakers play a role, deciding for example, the fundamental question of where responsibility should reside – in-house or with a vendor? Your organization should also consider other questions such as:

- What can we build in house that we can not or do not want to get from a vendor?
- Can we get what we want from a vendor?
- Will we need to settle for a product that doesn't completely meet our needs or will we need to spend resources to modify the product to meet those needs?
- Can we do a better job than a vendor?
- Can we complete the task more quickly than a vendor or can we meet deadlines without external assistance?
- Can we save money by building it on our own? (Consider the ongoing maintenance costs for a vendor-built system and the savings you might have if knowledge resides in-house.)
- What will be the ultimate trade-off between relying on a vendor and developing the expertise in-house?



Take Baby Steps & Celebrate Each One

Even with ample resources and support for the project, the general consensus is that breaking the project into manageable small, short-term stages is the best way to go – one step at a time.

Not only is attempting to take on an entire project at once a daunting challenge, it can also strain an organization if existing staff need to devote time to extra tasks, hurt morale if successes and benchmark achievements are infrequent, and may ultimately lead to serious compromise in the quality of the resulting system. Establishing a clear long-term plan for the project at the outset and breaking the work up into phases offers many advantages. Taking things one or two goals at a time is a more manageable process for staff and small, short term successes keep people excited and focused. Be sure to highlight and celebrate each “win” along the way. On the down side, the slower pace could make some people impatient and draw out the timeline for the entire project. But in the end, a better system will result.

WHY BUILD? Some states prefer to keep the job in the family, so to speak. They may have a great staff with the necessary expertise, extra resources available to direct those staff members' time to the

new project or to hire additional staff to do the work. Some states say that if you can afford to do it, build the LDS in-house. This, they say, is ultimately more cost effective than using a vendor because add-ons to vendor-built systems can cost a lot of money. If you have the capability, keeping the knowledge and ownership to yourself all along will free you from the costly prospect of having to rely on a vendor for ongoing services. Some states think that, in general, it takes just as much effort to work with vendors to make sure specifications are met as it does to build applications on your own. And keeping the work in-house may help to ensure long-term sustainability because important knowledge about the data, source systems, reporting needs, how to make modifications, and other key issues are developed and kept in-house. Research findings suggest that if the in-house capabilities are strong, or even just moderate, a build solution is the better option. The organization should use its resources to tackle the project on its own and to further develop its staff expertise rather than bring in an outside consultant. In-house staff's greater knowledge of the organization's culture and goals may, in the end, compensate for a lesser technical skill set.⁷⁸

WHY BUY? Other states see hiring a vendor as the best way to go. This may be because they like a product on the market and see no need to try to re-create a perfectly good wheel that's been used elsewhere with satisfactory results. It is common for states to purchase such off-the-self solutions and "brand" them – that is, putting your education agency's logo on an out-of-the-box solution. By using a vendor, the state is freed from having to be mired in the details and is allowed to have higher level engagement – that is, to focus on the big picture and on how to sell the system to stakeholders. Also, for an agency with limited resources and capabilities, doing the work in-house may just be unrealistic, even if it wanted to. If the state lacks the in-house expertise (*e.g.*, a staff member with the same level of knowledge as a vendor's project manager) or capacity to build its desired product on its own, it may need outside assistance. In fact, research suggests that when internal IT capabilities are weak, the support of a knowledgeable external consultant can boost productivity and reduce overall costs.⁷⁹ State hiring regulations that limit the size of SEA staff or impose other constraints (*e.g.*, barring the hiring of contractors) may also make buying a more attractive idea. These rules can make it difficult to hire programmers. In this case, or if your organization is having trouble finding and keeping the necessary in-house staff, hiring vendors may be the more hassle-free option. A short timeline might also necessitate the use of a vendor as the number of programmers, architects, business analysts, project managers, senior developers and other staff available may allow the project to move much more quickly than it could if shouldered only by in-house personnel. Whatever the reason for buying, if done the right way, bringing in a vendor can be a very rewarding and successful course of action. But of course, every state's experiences will be different and careful self and needs assessment are vital whether you build or buy.

On Building

Your organization has decided it can handle the project by itself without the assistance of a vendor. Either the necessary staff is on board and has time to devote to the project or new staff members will be hired. Other states have made this decision not only because they have ample staff and all the necessary expertise, but also because they see the system as mission critical. As such, they wanted to keep the expertise and responsibility in-house. A central challenge your organization may face is that of finding and holding on to skilled technical staff. These experts are often drawn away from educational institutions to the private sector for reasons such as higher pay. Many states have lost key team members this way and such losses can be major setbacks to a project. So, before you embark on a build solution, ask your organization how it will safeguard against this loss of staff and the knowledge they hold. If staffing is an issue, going with a vendor may be a more secure option. ...

⁷⁸ Nevo, S et al. (2007) *An examination of the trade-off between internal and external IT capabilities*. Journal of Strategic Information Systems, 16, pgs. 5-23.

⁷⁹ Ibid.

On Buying (and dealing with vendors)

Deciding not to go it alone, your organization has chosen to buy a product and/or services from a vendor. You'll need to figure out what you need, what is available, what kind of relationship you want with your vendor, and how much you are willing to spend. Then you'll need to write a good Request for Proposals (RFP) [see the LDS RFP ABCs: Writing a Strong Request for Proposals section of this guide for more information], interview some bidders, select a vendor (or consortium of vendors), and then forge an effective relationship with that vendor to get the product you asked for.

Many agencies are using outside contractors and consultants to help build their LDSs or various components of the systems. These agencies may have one in-house state employee who is the project manager and a number of consultants that serve as programmers and system builders. Other states hire project managers as part of the vendor team. State agencies without the necessary expertise may rely more heavily on their vendors and seek a consulting firm that they won't need to micromanage. To be safe, states should be somewhat wary of depending too much on vendors though, since they could unexpectedly close their doors or scale back their services. Other states with more in-house knowledge may seek a relationship in which they have significant control over the vendor's work. States might want to work more like a CEO when they lack the skills or personnel to complete the work on their own. In this case, vendors may be brought in to do the technical and programmatic areas of the work and may participate in certain committees to bridge the divide between their nuts and bolts staff and the in-house executive levels.

CHOOSING A VENDOR: Once you've written and sent out your RFP [see the LDS RFP ABCs: Writing a Strong Request for Proposals section of this guide for more information], bids and proposals will pour in from competing vendors. At this point, of course, you will have to decide who you want to hire. Some states know who they want to work with from the start because they like a product on the market. However, if you're not sure who you want to hire, you should try to narrow the field to a small set of top contenders based on their proposals. You should keep in mind that vendors vary widely in many ways, including their bidding practices. Differences in quality and experience often afford vendors varying levels of selectivity and leverage. That is, some less established vendors will bid on almost anything and might make promises they cannot keep, while other more experienced and successful vendors who are already on the ground in many states may be very selective about which RFPs they respond to.

In making your decision, it's important to look beyond the marketing of the vendor and at the details of what they can actually provide. Two core principles to follow are 1) know the product, and 2) know the team you'll be working with. Rather than taking the lowest bidder, be sure that the vendor can actually supply what it claims at the price it agrees to. Look at the vendor's references, prior work, and their available staff to try to evaluate them. Consider vendors' experiences working with states similar to yours in terms of size and student population.

Will their solution accommodate your specific needs? Do they have ample staff to deal with possible turnover? Do they have the staff to adequately service all of their contracts (*i.e.* oversee the work and complete quality deliverables on time) or are they stretched too thin? In the end, careful selection may save you the costs of bringing in a second vendor later on to clean up the mess made by your original consultant. Also, as you'll be spending a lot of time with this team, social



STATES & VENDORS: WHO'S USING WHO FOR WHAT?

The Data Quality Campaign offers a [table of vendors](#) organized by the state they work for and by which of the DQC's 10 Essential Elements they were hired to work on. The table is based on 2008 survey results. Note: The table also includes a line labeled 'In-house' showing the number of states building each of the components.

considerations are also important. Will you like working with the project manager and staff? How will they fit into the culture of your organization?

Many agencies hold face-to-face interviews with a set of favorite prospective vendors. In fact, some states swear by such interviews and highly recommend them. These meetings offer the advantage of allowing you to meet the team of people with whom you will actually be working. Consulting firms should give presentations, demonstrate their products, field questions, and be allowed a chance to ask some questions of their own. A review board might be created by the education agency to evaluate the various vendors and should include agency as well as local leaders and prospective users of the system to get a variety of perspectives and insight. Other agencies do not hold face-to-face vendor interviews. They make due with reference checks, answers to standardized questionnaires, and phone and online meetings. At the very least, they say you can learn a good deal about a vendor by the types of questions they ask. What is their level of technological knowledge and capability? How familiar are they with education data and its nuances? For instance, a vendor might have an extensive background in finance data and might give you a product that would work well for a financial institution, but not so well for an education agency. Make sure the vendor is ready for the task at hand.

WORKING WITH A VENDOR: Don't expect your vendor to hold your hand and guide you through the project design process. As they often are not experts in education data or in a client's needs, many decisions will be left for the client organization to make. A state or district must have a full understanding of what they're planning to do in order to ensure that their needs are being met. Detailed planning must be done upfront and cannot be avoided. At the same time, the vendor team should have some knowledge of the education agency's data or should be willing to learn about the nuances of education data and get things right (*e.g.*, striking the right balance between confidentiality and not eliminating too many dropouts from the dataset). Ensure that you have the time commitment from not only the in-house project manager, but also from the subject area experts and IT staff to educate the vendor on source systems, reporting needs, validation of work and other important issues.

Make sure the vendor staff you are working with is up to par. Some vendors will give you a top-of-the-line project manager, for instance, while the technical and subject area staff actually doing the nuts and bolts work may not be highly qualified. In such a case, it is to your advantage to have an in-house staff member who is just as qualified as the vendor's project manager and is able to evaluate the work being done. Without knowledgeable people in-house who can monitor the vendor's progress, you will be to some extent, at your vendor's mercy. Without such a balance, you may end up with only what the vendor's project manager wants to give you or only what their deficient staff is capable of providing. You need an evaluator who understands the technology at 1,000 feet – someone who can keep things on track. The in-house project manager should hold frequent meetings with the vendor to obtain updates, assess progress, and address problems as they arise. It is also good practice to have someone on your staff to keep minutes of these meetings to allow you to make sure you're on track and are able to compare your minutes to the vendor's to ensure that you're all on the same page.



CREATE A WIKI

One state is in the planning phase of developing a wiki, which is “a piece of server software that allows users to freely create and edit Web page content using any Web browser” (wiki.org). This resource will be used to help create a more collaborative environment in which the state and its vendors can work. The wiki would allow the state to post documents and receive feedback on them from vendors. After a substantial amount of information is accumulated, the wiki may eventually evolve into a user guide or FAQ on LDSs.

What type of relationship and working arrangement do you want to have with your vendor? Everyone wants to get along and many states attest to having excellent relationships with their vendors. But, if a project seems to be getting off track or falling behind it is important to be firm with your vendor and hold them accountable for failing to deliver. It's also important to balance trust and deference to vendor management with the need to get things done on time and to your specifications. Some vendors tend to lean towards giving their clients a bare bones version of their specified product – just meeting the requirements of your RFP, but not going the extra mile to create the ideal result – in an effort to maximize profits. If the vendor is going to give you a no frills product, you need to make sure that you are at least getting a quality version of what you asked for and were promised. When push comes to shove, don't be afraid to fire your vendor and bring someone else in if things aren't working out and the relationship can't be salvaged.

Plan for knowledge transfer

Knowledge transfer is the transmittal of knowledge (*e.g.* information, expertise) from one organization (or part of an organization) to another organization (or part of the organization). From the early stages of your vendor search, it is crucial that your agency is thoughtful about knowledge transfer and training. The vendor will usually develop the system components or tools and will probably use them for some time before the responsibility of actually running the system is passed off to in-house staff. Therefore, it is vitally important that a plan for knowledge transfer is drawn out ahead of time (*e.g.* specified in your RFP) and implemented along the way or once the project is nearing completion. First, make sure that you have adequate staff in place to maintain what is built. Diligent documentation of everything done by the vendor as well as in-house staff for the entire project is also crucial to facilitating knowledge transfer. Additionally, your internal staff should work alongside the vendor for some time or receive sufficient training from the vendor to gain an understanding of how the system works. At least once before the vendor leaves you on your own, it is good practice to have in-house staff involved in various processes such as building tables to learn their structures and contents so that they have a comfortable grasp of what's in the LDS, how it is structured and formatted, how to load data, how to make modifications to reflect changing requirements, and other key issues. Additionally, the in-house responsibility must be clearly defined so the transition from vendor to in-house staff runs smoothly. Once the vendor's main tasks are completed, ongoing support from a vendor is not cost effective. Develop in-house expertise so you don't have to rely on expensive outside support.

Additional resources: Build vs. Buy

- [An examination of the trade-off between internal and external IT capabilities](#), by S. Nevo, MR Wade, and WD Cook, *Journal of Strategic Information Systems* 16 (2007) pp. 5-23.
This study explores the tension between internal and external IT capabilities on the realization of enhanced IT productivity. It focuses on short-term, small scale consulting rather than the large scale, multi-year outsourcing that often occurs in LDS development. In that respect, it is limited in applicability here. However, it does offer some possible insights into the relationship between in-house staff and vendors and may help to enlighten your decision on build vs. buy and how you proceed down whichever path you choose.
- [2008 Information about Vendors Used by States to Build Essential Elements for P-12 Data Systems](#), DQC
See this page for survey results about which states are using which vendors to help them develop which LDS components. These results are from the 2008 DQC survey. Look for more up to date results.
- [Technology @ your Fingertips](#) – National Forum on Education Statistics, Ch 4.1, pgs. 50-57
See this section for general discussions of conducting a build vs. buy analyses, finding a product to fit your needs, and other issues. While somewhat dated and not specific to an LDS project, it offers some relevant tips. Page 57 includes a list of sample questions that might be used to interview vendor references.
- [Data Tools for School Improvement](#) by Victoria Bernhardt (2005)
This article talks about the data tools available (three types: data warehouses, student information systems, and instructional management systems), their uses, and how to make good purchasing decisions, get what your organization wants and needs, how to deal with vendors, etc.

LDS RFP ABCs: Writing a Strong Request for Proposals

If your organization chooses to buy your LDS, or at least some portion of it, you'll need to write an effective Request for Proposals (RFP) to solicit bids from potential vendors. This section will provide a brief introduction to RFP writing and is followed by an extensive collection of additional resources and example RFPs from state education agencies. The information in this section draws heavily on the report *Lessons Learned: Writing Requests for Proposals for Statewide Student Data Systems in Education* by Nancy J. Smith.

BASIC CHECKLIST OF RFP DEVELOPMENT

1. Know your needs before you write an RFP or begin development work
2. Follow your state's procurement procedures
3. Define clear, specific and measurable requirements
4. Delineate critical requirements from optional enhancements
5. Focus on both process and outcomes
6. Build in safeguards to protect your agency

DEFINE YOUR NEEDS FIRST:

Preferably, you've already done thorough self and needs assessments [see "Self Assessment" and "Needs Assessment" sections for more information] and are ready to translate your identified requirements into an RFP that tells vendors what you want them to provide you. If you're not sure what your requirements are when you sit down to write your RFP, your bidding and development processes may turn out to be frustrating ordeals (for education agency staff and vendors alike) and the system you end up with might not serve you well. If you don't separate needs assessment as a discrete activity done prior to the development stage, analysts must define needs as they go along and solutions building can be slowed down.

It is good practice to allow about a year or more for active requirements gathering for a large scale project like LDS development. Take the time to discover your program area needs. How will you need to restructure the data for the LDS? What data will the users need? How will you need to deliver your data to users? How will you need to secure your data and protect student privacy? Try to foresee as many requirements as possible to limit the amount of additional needs unearthed during development. A quality RFP contains a nearly exhaustive collection of clear and specific requirements. Encourage vendors to be creative, but don't leave any room for misinterpretation. For instance, don't write "etc." in your RFP – say what "etc." is. Don't say you want a 'quality' X – tell vendors what criteria you will use to measure 'quality.'

You may conduct your needs assessment on your own or work with a vendor to define your requirements. Both approaches are commonly taken. Some agencies have the vendor do the requirements gathering for them, hiring them to figure out what the education agency and its stakeholders need. If your agency is allowed to enter into personal service contracts, you may be able to employ the vendor under a time and materials contract to do needs assessment for or with you before the development project begins. While this approach is not uncommon and many agencies



START WITH AN "RFI"

Before you write an RFP, consider issuing a Request for Information (RFI). In this document, an agency presents vendors with the problems they want to solve and asks respondents to pitch solutions, pose questions, and make suggestions about the agency's intended project. The advantage here is that agencies 1) get the opportunity to receive early feedback from the experts on the feasibility and cogency of their planned system, and 2) to learn about the range of possible solutions available to them before they write their RFP.

find it to be very helpful, other agencies feel that it is preferable to do the needs assessment, or at least a large share of this phase, on your own before the vendor is brought on board. In other words, your agency should know what it wants, rather than let a vendor tell you what you want. However, if you do elect to have your vendor do requirements gathering for or with you, make sure they know what they are doing. Be certain that they are knowledgeable about your agency and about education data. And make sure they are asking stakeholders the right questions to elicit helpful responses. Stakeholders usually know what they want, but they often don't know how to articulate their needs unless asked the right questions. [See the "Engaging Stakeholders" and "Needs Assessment" sections for more information.]

WRITING THE RFP:

Once you've done the difficult work of defining your needs and those of your stakeholders, you'll set to writing a strong RFP. This will help you find the right vendor with the right product and services for the right price. Some states have a standardized method of writing RFPs, others are less formal and prescriptive, while some others don't write RFPs at all but may still need to document their requirements in some form.

The team assigned to write the RFP should include staff from various education agency departments. The group should also ideally be made up of both subject area experts who understand the content and business operations, policies and regulations, and the potential budget, as well as technology staff who understand the codes and bytes.⁸⁰ District and/or school representatives should also be brought into the process of defining requirements.

The Forum has more...

For more detailed information about RFP writing, visit:

- [Forum Unified Education Technology Suite \(2005\)](#)



There are many approaches to writing RFPs. For instance, you may write one RFP for your entire system, create a separate RFP for each system component, or you might compose one RFP with multiple components and let vendors choose which parts they will bid on. Additionally, your RFP may be based on either process or on solutions (a.k.a. deliverables or outcomes). In a process-based RFP, an education agency defines the process the vendor must follow. For instance, your agency might require a standardized development process based on the systems development life cycle. A solutions-based RFP describes the desired results, but leaves the vendor to determine the process through which they are completed. A combination of these approaches may be best as each may lead to potential problems. Focusing solely on process may raise deadline problems or result in final products that don't meet agency needs. And, concentrating on outcomes alone may ignore important details such as the frequency of collections and integration with other applications.

Another recommended approach is to find a role-model system (*i.e.* a system that you like) at another education agency, get a copy of that agency's RFP, and make necessary modifications based on your specific needs or your agency's RFP-writing guidelines. This will save you the trouble of starting the RFP from scratch.

Anatomy of an RFP

An RFP may be composed of the following sections:

1. **"Project overview and administrative section:** Includes an overview or summary of the problem, along with administrative information about the expected management of the RFP.

⁸⁰ Smith, N. (2004). *Lessons Learned: Writing Requests for Proposals for Statewide Student Data Systems in Education*.

2. **Technical requirements:** Provides technical requirements and enough information to help the vendor understand the request and write a firm proposal.
3. **Management requirements:** Specifies the expectations for managing and implementing the project.
4. **Supplier/Vendor qualifications and references:** Asks for vendor qualifications and references; ideally specifies the format in which these should be supplied.
5. **Supplier's section:** Allows vendors to include information about themselves or about the project that is not specifically requested.
6. **Pricing section:** Specifies how the pricing information should be specified.
7. **Contract and license agreement:** Contains the purchase contract, nondisclosure agreements and other legal documents.
8. **Appendices:** Includes relevant information that is too bulky to include in the RFP such as network diagrams, outlines and requirement studies.”⁸¹

Tips for RFP Writing

During the RFP writing process:

- Provide background. Tell the vendor about the state's data environment, database development standards, business requirements and other relevant information about how the education agency does business. Without this information, the vendor may make erroneous assumptions in their proposal and through the development process.
- Don't specify the solution. Focus on the problems you want to solve and the existing environment in which the solution must work, not on a particular perceived solution to your woes. Give vendors room to pitch their own solutions to those problems.
- Define “clear, concise, and measurable requirements.”⁸² Distinguish critical requirements from nice-to-have add-ons. The vendor needs to know which requirements to include in their bid and which ones are optional enhancements for which they should offer separate additional bids. This will make it easier for vendors to bid and make it easier to interpret vendor's offers.
- Specify costs, or don't. You may elect to specify the amount you will pay for a solution and have vendors say, “Yes, we can deliver for that price.” Or you may withhold cost estimates and allow vendors to make their own offers. One state adopted the latter approach, but took it a step further, asking vendors to submit their costs in sealed envelopes. This allowed the education agency staff to assess each proposal prior to opening these envelopes, judging each bid on its merits rather than by its price tag. Once the judging period was over, if favorite vendors' prices turned out to be too high, the agency tried to negotiate a more agreeable fee.⁸³
- See how much others paid. When trying to figure out how much a solution should reasonably cost, ask colleagues in other agencies for information on their costs. Consider differences between your state or district and theirs' (*e.g.*, student populations, varying requirements, etc.) and make necessary adjustments.
- Inquire about management practices. Ask how the vendor manages projects in terms of communication, risk management, methodology, quality reviews, etc.

⁸¹ Smith, N. (2004). *Lessons Learned: Writing Requests for Proposals for Statewide Student Data Systems in Education*.

⁸² Ibid.

⁸³ Ibid.

- Don't be too aggressive in your timeline. Be realistic and try to strike the right balance between quality and quickness. In addition to deadlines for the vendor, you should also consider your agency's end of the bargain. What will you need to do or provide and how much time will you need? In the end, it is possible that your own education agency causes the project to fall behind schedule. One state representative suggested that instead of emphasizing deadlines, agencies should put emphasis on quality results.
- Ask for references from the vendor and perhaps even for the staff you'll be working with. Take the time to check these references and see what others thought of the services they were provided by the vendor. Are they technically capable? Do they have adequate staffing to support the endeavor?⁸⁴
- You can buy standards off the shelves, but most agencies build them based on their own existing standards and or federal standards.
- Get third party opinions. Have a variety of people from outside the RFP writing team review the document to make sure it conveys what you intended it to and is free of any ambiguities.
- Realize that your RFP may not be perfect. The requirements, as you have written them, may be flawed and could end up causing problems during implementation. Allow vendors to offer corrections or alternatives.⁸⁵

On the safe side: What might you include to protect your organization?

In your RFP, you should also consider including some safeguards and stipulations to ensure that you get what you need from your vendor. For instance:

Staffing:

- Maintain the right to change the vendor's project manager if you're not happy with their service.
- Specify a limit to vendor staff turnover, perhaps to 25% or less. In reality though, even if you say in the RFP that staff can only change by so much or in certain ways, turnover happens and you can't always avoid it. If change must occur, ensure that the required knowledge transfer will be paid for by the vendor, not your taxpayers.
- Specify that the vendor project manager and staff who you interview are the people who will actually work with you throughout the project. A trick of the trade, one education agency staffer suggested, is for the vendor to send in their best for the interview and then give you someone of lesser skill to work with once the deal is sealed.
- Require the vendor to work onsite rather than remotely, if possible. It may be difficult to work at a distance as scheduling on-line meetings can be a hassle and can impede regular and effective communication. If the vendor must work offsite, specify the number of onsite meetings and require that they cover travel expenses. Onsite vendor staffing offers many advantages. For instance, people are more apt to ask questions if onsite, more meetings can be held and they can be more easily convened with specific individuals or groups of people.

Deliverables:

- Define deliverables in clear and unambiguous terms. Make sure that these requirements have measurable results that hold the vendor accountable. Alternatively, ask the vendor to propose measures that can be used to assess the deliverables.
- Require that deliverables meet certain quality criteria before they can be delivered (*e.g.*, grammatically correct, spell-checked, formatted according to standards, etc.). Avoid wasting your time correcting simple vendor mistakes.

⁸⁴ Smith, N. (2004). *Lessons Learned: Writing Requests for Proposals for Statewide Student Data Systems in Education*.

⁸⁵ Ibid.

- Distinguish critical requirements from optional enhancements. In addition to the benefits discussed above, this can also protect you later on by preventing the vendor from claiming that a requirement was an add-on that will cost the education agency extra money. Clear specification up front saves time, frustration, and money later.

Sustainability:

- Ask vendors to include a section in their proposals on ongoing maintenance and support. Agencies report that many vendors just want to build the system, get paid, and then cut and run, leaving the in-house staff on their own.
- Request or define a plan for knowledge transfer so that your staff is able to pick up the slack when the vendor leaves.

Communication:

- If you intend to rely on your vendor to communicate with the educational community about the project, make sure that they have an organized approach to communication or, alternatively, define a good communication plan in the proposal that they must follow.
 - Figure out who's going to write the communications (the vendor may know the product best and should have a communications staff – avoid having the project manager or a technology staffer write communications (unless the piece needs to be technical in nature),
 - Define who the audience(s) will be,
 - Define a communications schedule or define at what milestones or intervals communications will be sent out,
 - Define the communication media that will be used, and
 - Figure out, in general, what the communications will say. [See the Marketing and Communicating about Your LDS section for more information].
- Ask the vendor to provide example communications.

Additional resources: Writing a Strong Request for Proposals

- [Lessons Learned: Writing RFPs for State Data Systems](#), Nancy Smith, ECS/InfoSynthesis, October 2004
This report summarizes findings from a survey of three state education agencies and offers a host of RFP writing principles and tips. Two RFP examples are provided at the end of the document for reference
- [Writing RFPs for State Data Systems: Lessons Learned](#)
This PowerPoint includes three back-to-back presentations. It reviews lessons learned while writing RFPs.
- [SIFA Recommended RFP Language](#), Version 2.0. (2006) SIFA University
This document offers language to include in your RFP if your agency wants to purchase an application based on SIF standards. It requests documentation of SIF certification, SIF implementation experience, agent costs, Zone Integration Server(s) offered, SIF Association participation, and SIF support offered to clients.
- [Virginia Case Study: Enjoying Support](#) - DQC, Aug 2006
This case study includes two sections (on pages 6-7) that offer helpful tips on RFP writing and evaluating bids.
- [Forum Guide to Decision Support Systems: A Resource for Educators](#) – Forum, 2006
The Appendix of this resource presents an overview of the types of issues that may be included in a decision support system. There is considerable overlap between with the requirements that might be included in an LDS RFP.
- [Technology @ your Fingertips](#) – Forum, Ch 4.2, pgs. 57-59
This resource offers a brief introduction of RFPs and an example of an RFP table of contents to help guide the writing process. It also discusses RFIs and interviewing references (including a list of questions to ask interviewees).

Examples of State-level RFPs and one RFI (from LDS Share, February 2008):

- [Virginia RFP: Student Information System](#) (2007)
“Virginia RFP to provide a Student Information System for use by Public School Divisions located within the Commonwealth of Virginia. The goal of this RFP is to award contracts to multiple qualifying vendors for the purpose of providing Virginia school divisions the option of purchasing off this contract.”
LDS Share - Filename: VA LDS -RFP SIS (WinZip file—contains 5 files)
URL: <https://vendor.epro.cgipdc.com/webapp/VSSAPPX/Advantage> (Click on Public Access, then search for Department of Education in the list, then DOE 2007-2008 RFP for Student Information System)
- [Request for Proposals: California Longitudinal Pupil Achievement Data System \(CALPADS\)](#) (2006)

"The purpose of this RFP is to solicit proposals from qualified firms to develop and/or implement a California Longitudinal Pupil Achievement Data System (CALPADS), as required by Senate Bill 1453 (Chapter 1002). The CALPADS project effort will result in the implementation of a comprehensive operational data store and reporting environment to track statewide longitudinal assessment data and other demographic elements required to meet the federal No Child Left Behind (NCLB) Act of 2001 reporting requirements. Note: The attached version of the RFP has been approved by state control agencies and is currently posted at the California Department of General Services (DGS) to solicit bids from vendors interested in building CALPADS. However, the DGS has already posted six addenda (as of 2/23/07) at their website and there is still a possibility of more changes."

LDS Share - Filename: CALPADS RFP

- [DRAFT] Request For Proposals For Data Collection Tools

"This RFP illustrates Tennessee's intent to secure a contract for a next-generation data collection toolset that will streamline the collection and cleansing of detailed data from districts and improve the quality of the resulting information. Tennessee's desire is to select a set of tools to pilot and subsequently deploy on a statewide basis. In addition to the collection of data, the State is looking to provide an application interoperability function to be able to share data elements with other State as well as local (school district) applications. While some detailed specifications for the current systems are provided in this RFP, the State does not intend to re-create existing systems and transmittal functions. Rather, responders to this RFP are encouraged to use the existing specifications to understand the current functionality enough to propose improved methods and tools. NOTE: Tennessee does not intend to release the RFP, but instead will be pursuing a different approach for the next generation data collection tools involving a pilot."

LDS Share - Filename: TN Data Collection RFP - DRAFT Version 6

- CSDE Statewide Longitudinal Education Data System Request for Proposals (2006)

"This RFP was issued by the Connecticut Department of Information Technology and IT Contracts & Purchasing Division on behalf of the Connecticut State Department of Education (CSDE), which is seeking to build a statewide longitudinal data system (SLDS). The objective of the project is to develop an SLDS that will enable CSDE to meet the needs of both state and federal reporting requirements. An SLDS will utilize decision support dissemination tools to meet the increasing demands for education data from its constituency, thus enabling stakeholders to make informed education decisions based on timely and accurate information."

LDS Share - Filename: CT RFP rfp06itiz00921

- Data Management and Budget Purchasing Operations: Invitation to Bid No.0711 (2006)

"The Michigan Department of Management & Budget and the Center for Educational Performance and Information, in coordination with the Department of Information Technology, issued this RFP for the purpose of gathering requirements and obtaining two new state-of-the-art systems to replace the current Single Record Student Database/Unique Identification Code system and the School Code Master system, including all associated hardware and software as options."

LDS Share - Filename: MI_Invite to Bid

- Florida Department of Education Data Warehouse Scope of Work (2000)

"This document describes the requirements and expectations for Florida's K-20 Education Data Warehouse (EDW). The intent was to find a vendor who was experienced in large scale data warehousing, and couple its experience with staff from the FLDOE who were subject matter experts relating to the data collected and reported by the Department. This combination was (and still is) seen as a critical predicate to effectively developing and implementing the EDW. Because we were not asking for a canned/shrink-wrapped solution as with many projects, the effort evolved once the vendor was selected. Because of its expertise in data warehousing, the vendor was able to offer suggestions and counsel as to design and methodology. Further, staff insight and expertise provided a "real world" balance to the work of the vendor."

LDS Share - Filename: FL Scope of Work DW V5 Final

- Intent to Negotiate: Integration of Facilities and Finance Data Into a Longitudinal Student Database (2006)

"This Intent to Negotiate (ITN) was designed to carry out major work for Florida's LDS grant. It was designed to invite vendors to propose approaches that would ultimately incorporate school facilities and finance information into the existing K-20 Education Data Warehouse. The ITN heavily emphasizes year 1 activities that focused on the requirements phase of development. A major product of the year 1 activities was the production of a deployment plan that was intended to serve as a statement of work for later years. The ITN leaves decisions about year 2 and 3 open but states that "good performance" will provide the opportunity for extending the contract into subsequent years. We were not interested in an off-the-shelf solution, but wanted a careful, deliberate discovery and requirements process as a prelude to any development and deployment."

LDS Share - Filename: FL Final ITN posting

- Request for Proposal: Kentucky Instructional Data System (KIDS) Data Warehouse (2006)

"In this RFP, the Commonwealth of Kentucky is seeking a vendor to undertake the design, development, and implementation of a data warehouse/decision support system with an online interface making it possible to display a variety of assessment reports about individual students, groups of students aggregated by demographic elements, or groups of students aggregated by school and district. This system will eventually be accessible by a variety of different stakeholders including parents, teachers, school administrators, state officials, legislators, and members of the public. Sections 20 and 30 are the most specific to the vision and requirements of the system. Other sections contain more generic contractual language. The final document ended up being more prescriptive than originally intended, due mainly to the large amount of very specific feedback from multiple stakeholder groups."

LDS Share - Filename: KIDS RFP.FINAL

- Request For Proposals For: Pennsylvania Information Management System (PIMS) (2006)

"This RFP provides those interested in submitting a proposal for the subject procurement ("Offerors") sufficient information to enable them to prepare and submit a proposal for the Pennsylvania Department of Education (PDE) to satisfy a need for a Pennsylvania Information Management System (PIMS). At its core, the scope of the PIMS project involves two major components: Student Record Collection, and Data Warehouse and Business Intelligence Tools. PDE's goal is to create a single, standards-based system that takes in data from all of the department's internal and external sources and delivers reports and query responses on any and all of those data to authorized and authenticated users both in and out of the department, ranging from teachers, parents, and district administrators to the legislature, Board of Education, and the Secretary of Education."

LDS Share - Filename: PA PIMS RFP CN00020094new

- Request for Proposals: Data Consolidation and Warehousing for Alaska Unity Project (2006)

"This request for proposals outlines the work necessary to complete the construction of an authoritative data repository, or data warehouse. This is the second phase of the Unity Project, and the first phase to be funded under the SLDS grant. The successful contractor will be provided with the department-owned Oracle 10g Release 2 technology and tools and wizards for the development of this data warehouse."

LDS Share - Filename: AK Data Warehousing_Unity Project_RFP

- Request For Proposals: Education Management Information System Redesign for Longitudinal Data (2006)

"The Ohio Department of Education (ODE) asked the Office of Information Technology to solicit competitive proposals for designing and implementing the Education Management Information System Redesign for Longitudinal Data System, and this RFP is the result of that request. Due to limitations of the current Education Management Information System, ODE is currently unable to process and manage statewide student-level data efficiently and its ability to support statewide longitudinal data analysis on student academic growth remains limited. Changes and improvements must be made to the Education Management Information System, as accessing, analyzing and using timely and quality data are critical for informing instruction and services and ultimately driving higher achievement for all students."

LDS Share - Filename: OH RFP Redesign for Longitudinal Data 0A1015

- Task Order Request For Proposals (TORFP): Unique Student and Teacher Identifier System (2006)

"The Maryland State Department of Education (MSDE) issued this TORFP to obtain technical services to design and implement a Unique Student and Teacher Identifier System for Maryland. Through the assignment and maintenance of a unique state assigned student/teacher identifier (SASID) Maryland will have the ability to identify individual students, relate them to test scores, attendance, enrollment, suspensions, teachers and produce accountability reports as required by the federal government. Maryland wants to implement a longitudinal student/teacher data system, the basis of which is assigning a unique identifier to every student and teacher in Maryland. In addition, the assignment of unique identifiers in our Infant and Toddler Program, beginning at birth, along with children receiving Special Education services through age 21, will allow tracking of these students. Maryland will then have the capability to perform longitudinal analyses for educational programs and student achievement that will give educators the tools they need to improve services and achievement."

LDS Share - Filename: MD RFP MLDS_Unique_Student_ID_-_081106

- Request for Proposal: South Carolina Department of Education State Data Manager (2006)

"The South Carolina Department of Education (SDE) is in need of a centrally managed, automated enterprise level system to manage the extraction, movement, validation, and storage of data reported by LEAs to the SDE. The automated solution the state is seeking would also provide a user interface for presentation, management, and notification of event results to the LEAs and the SDE. The purpose of this solicitation is to acquire services and supplies or equipment complying with the enclosed description and/or specifications and conditions."

LDS Share - Filename: Final RFP-State Data Manager-S7366_001

- Request For Bid: Facilitation of the design of the Longitudinal Data System (LDS) for the Wisconsin Department of Public Instruction (2007)

"This document represents Wisconsin's request for bids to secure a source to facilitate the design of the Wisconsin Department of Public Instruction's Longitudinal Data System (LDS) by providing expert educational statistical analysis, report design, educator curriculum development, and longitudinal, multidimensional analytics development and guidance to the LDS project team. This RFB was signed with Next Level Inc."

LDS Share - Filename: WI RFB document Final (2).doc

- District of Columbia Request for Information (RFI): State Longitudinal Data Warehouse (2007)

"This Request for Information (RFI) was used by the District of Columbia to finalize the Government's technical requirements prior to issuing a solicitation to procure, customize and implement a statewide longitudinal education data warehouse and associated systems."

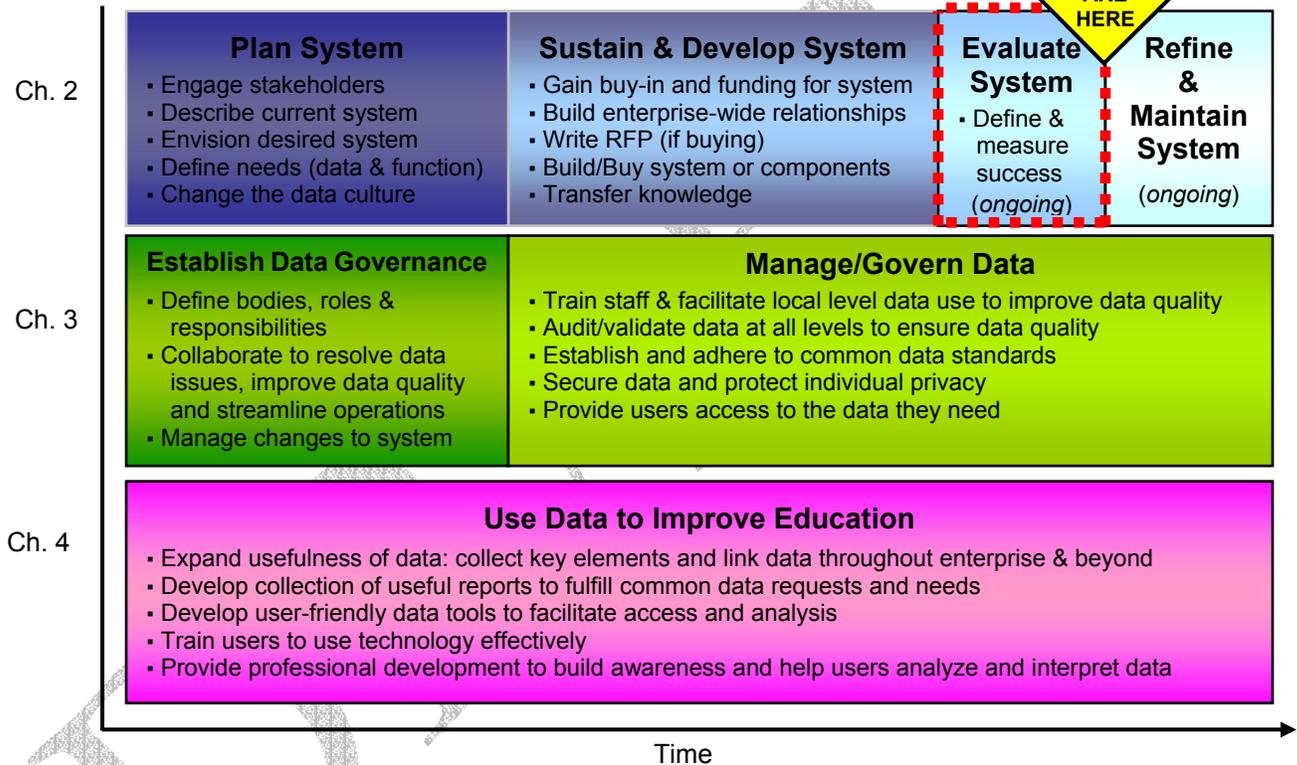
LDS Share - Filename: DC_SLED RFI

Are We There, Yet? Evaluating Your LDS

During LDS implementation, you should evaluate your progress towards achieving the system's goals. How well does your LDS deliver in terms of its intended criteria for success? How does it enhance operations, improve data quality, and facilitate better data-driven decisionmaking? Your ability to evaluate the system depends largely on how you planned the project in the very beginning of your endeavor. How clear was your vision of your desired system? Did you identify unambiguous and measurable goals? This clarity at the beginning will help you and other stakeholders see how their efforts are actually paying off and help you make adjustments to refine the system. [See the Needs Assessment and RFP Writing sections for more information.]



LDS Guide by Activities in Time



The subjectivity of 'success'

Without clearly stated goals and criteria for measuring how close you've come to reaching them, success may be determined, to some extent, in the eye of the beholder. For instance, technologically savvy users may expect cutting edge applications, while average users, unfamiliar with the state of the art, may be more interested in usability and user-friendly interfaces.⁸⁶ The expectations set at the beginning of the project can also affect perceptions later on. Those who lead the marketing and outreach efforts for the LDS project, for instance, will affect people's expectations for the systems. Care should be taken not to create expectations that are too high to satisfy. If you paint too ambitious a picture when trying to win support, don't be surprised if people are less than satisfied with the results.⁸⁷

⁸⁶ Miller, H. (2000). Managing customer expectations. *Information Systems Management* 17.

⁸⁷ Staples, D. S., Wong, I., & Seddon, P. B. (in press). "Having expectations of information systems benefits that match received benefits: Does it really matter?" *Information & Management*, 1976, 1-17.

Measuring LDS success

Before an evaluation begins, education agency leaders or groups of stakeholders serving on an evaluation committee should also reflect on some basic questions:

1. Who will evaluate the system? Agencies commonly bring in an outside consultant.
2. From whose perspective will system's success be judged (*e.g.*, agency leaders, IT staff, teachers, etc.)?
3. What types of information should be used to gauge success (*e.g.*, objective or subjective)?
4. What methods will be used to gather and analyze that information?
5. What criteria will be used to judge success?⁸⁸ Identify well-defined assessment criteria aligned with the established LDS goals. Will greater emphasis be put on timeliness or on progress towards achieving system goals?

And later, when interpreting evaluation results, consider changes in the environment that may have affected the project and the ability to achieve the original goals. Did political leadership change? Was there significant staff turnover in-house or in vendor staff? Were new laws passed? Did technology changes have any effects? Did new resources become available, or did a downturn in the economy affect the budget?

EVALUATION METHODS:

Evaluators may use a number of methods to gauge system success. Commonly used methods include:

- Surveys (online and paper)
- Case studies
- Direct observation

EVALUATION CRITERIA AND QUESTIONS:

Table 2.5 below presents a collection of some evaluation criteria and questions. These should be answered using the methodologies above. While these questions are qualitative in nature, you should include solid, measurable criteria in the evaluation whenever possible.

Table 2.5. Sample evaluation questions.^{89,90,91}

Development and implementation	<ul style="list-style-type: none">▪ How long did the project take?▪ What resources were used?▪ What savings in time and money were realized?
Measurable benefits	<ul style="list-style-type: none">▪ How have operations been made more efficient?▪ To what extent has the system helped to improve academic performance?▪ To what extent has the system helped to close achievement gaps?
Awareness and engagement	<ul style="list-style-type: none">▪ How aware are stakeholders of the system?▪ How well do stakeholders understand the system?▪ What level of stakeholder engagement has been achieved?
Use	<ul style="list-style-type: none">▪ How widespread is the use of the system?▪ Which system components are used and how are they applied?▪ How widespread has participation in training been?
Perceptions	<ul style="list-style-type: none">▪ How well has the system met reporting and decision-making needs?▪ How helpful are the reporting and analysis tools?▪ Has the system made data adequately available and accessible?▪ Are users getting the data they need?

⁸⁸ Seddon, P. B., Staples, S., Patnayakuni, R. Dimensions of information systems success. *Communications of the Association for Information Systems*. Vol 2, Article 20, November 1999.

⁸⁹ IES, Statewide Longitudinal Data Systems Grant Program: Summary of RFA Requirements FY 2007

⁹⁰ Beth Juillerat and Eric James, *Evaluation of the Effectiveness of Ohio's D3A2 Initiative*. Presentation given at November 2006 IES SLDS Grantee Meeting.

⁹¹ Alan J Simon, *ADE LDS Evaluation* Presentation given at November 2006 IES SLDS Grantee Meeting.

	<ul style="list-style-type: none"> ▪ How effective has professional development been?
Lessons learned	<ul style="list-style-type: none"> ▪ What are the barriers to effective use of the system? ▪ What improvements can be made to the system? ▪ How can professional development efforts be improved?

Additional resources: LDS Evaluation

- [Evaluation of the Effectiveness of Ohio's D3A2 Initiative](#)
Beth Juillerat & Eric James, ODE – November 2006 IES SLDS Grantee Meeting
This presentation introduces Ohio's LDS evaluation plans. It gives a summary of their system as well as the criteria for and methods used in a planned evaluation of that system.

- [ADE LDS Evaluation](#)
Alan J Simon, Metis Associates – November 2006 IES SLDS Grantee Meeting
This presentation by AR's evaluation vendor, first gives an overview of AR's LDS and then discusses its approach to evaluating that system. A basic overview of evaluation criteria, methods, and timeline are provided.

LDS Share: EVALUATION – REQUESTS FOR PROPOSALS:

- Longitudinal Data System Implementation and Impact Evaluation RFP (2006)
"The Ohio Department of Education solicited competitive proposals for the Longitudinal Data System Implementation and Impact Evaluation 2006-2009, and this RFP is the result of that request. The purpose of the evaluation is to measure the implementation and impact of the Longitudinal Data System including its related professional development, quality, and effectiveness in meeting the reporting and decision support needs of all its key stakeholders, and eventually its effectiveness in catalyzing improvement in academic achievement of all students and in closing achievement gaps."
LDS Share - Filename: OH DRAFT RFP 7-11-06 REVISION

- Supporting Ohio's Longitudinal Data System through Evaluation: A Proposal to the Ohio Department of Education. (2006)
"This document represents the winning proposal, submitted by Hezel Associates LLC, to Ohio's Longitudinal Data System Implementation and Impact Evaluation RFP."
LDS Share - Filename: OH_Hezel_Associates_Ohio LDS_Evaluation_Proposal_DATA CHAT VERSION

LDS Share: EVALUATION OF LONGITUDINAL DATA SYSTEMS

- Supporting D3A2 Professional Development through Evaluation: A Report to the Ohio Department of Education (January 16, 2007)
This LDS evaluation report offers key findings from an evaluation of Ohio's LDS, focusing on data usage practices and professional development efforts. Key findings and recommendations are followed by discussions of methodology and more detailed discussions of evaluation findings. Data collected in this study will be used to "establish a baseline profile of administrators' and teachers' data usage practices, which will serve as the point of comparison for two subsequent years' of longitudinal inquiry."
LDS Share - Filename: OH Hezel Associates Report_1_PD Needs and Data Usage Practices_pdf
- Supporting D3A2 Professional Development through Evaluation: A Preliminary Annual Report to the Ohio Department of Education (June 29, 2007)
This LDS evaluation report follows up on the previous report. It offers key recommendations for the future LDS efforts, focusing on implementation and expanding on its earlier recommendations to improve professional development efforts. Key findings and recommendations are followed by discussions of methodology and more detailed discussions of evaluation findings.
LDS Share - Filename: OH Hezel Associates Report_2_Year 1 Evaluation Report
- [Everybody Loves Evaluation](#) – Indiana Department of Education
This presentation details the state's evaluation process. It outlines the purposes for the LDS evaluation, procedures used, activities, and sample findings.
- [You Say You Want Evaluation](#) – Arkansas Department of Education
This presentation reviews the questions and findings from a survey of districts intended to evaluate perceptions of the state's LDS. Questions seek to ascertain users' perceptions about the system's most useful functions, ease and frequency of use, success in improving data quality, and effects on student performance.

Chapter 3:

Managing the Data

Bad data, bad decisions

In this Chapter

LDSs provide us with more data, but it is essential that these multitudes of new data are accurate, trusted, collected once, protected vigilantly, and used frequently. This chapter on data management focuses on organizational issues aimed at moving the project forward and ensuring that the data are of high quality so that users will be able to use them with confidence for data driven decisionmaking. It looks at the establishment of governance structures and processes, getting the right people in place (defining leadership and staff roles and responsibilities) and creating committees and working groups of diverse expertise to oversee and inform the process (to resolve data issues; manage change; focus resources more effectively; and ensure regular, sustained and effective communication and collaboration throughout the enterprise). This process is ultimately aimed at improving data quality and increasing the use of those data to improve education. The chapter also explores other challenges in ensuring data quality through staff training, validation procedures, and establishment and adherence to data standards. Finally, the chapter takes a look at the challenges of securing the agency's data in order to protect individual privacy and the confidentiality of education records.

Sections in this chapter include:

Governing the Data

- What is Data Governance & Why Does It Matter?
- Benefits of Data Governance
- The Bodies, Roles, and Responsibilities of Data Governance
- Basic Steps to Establishing Data Governance

Improving Data Quality

- What are Quality Data
- Data Quality from Bottom to Top
- Data “Standards”

Securing the Data, Protecting the Individual

- Privacy and Confidentiality
 - Security
-



LDS Lore: The Ungoverned Agency

The History and Consequences

The state agency's data collection and management practices had come about over time with compliance and funding as main drivers. Various program areas were created to focus on specific federal programs and surveys, and staff collected the data they needed to do their jobs. Program area staff administered the surveys, followed their own home-grown quality assurance processes, maintained and secured the data in their own 'silo' systems and data were reported as required by the federal government. Individual managers took their own approaches to directing staff and organizing work, and coordination across program areas was limited....

Over time, multiple departments came to collect some of the same data elements. Inconsistencies were commonplace – for instance, while the Student Information System listed an 'Aileen Hutchinson' who was not in special education, the Special Ed System included a girl named 'Allie M Hutchinsen'. Despite these discrepancies, based on other directory information the staff could only deduce that the two records referred to the same student. Structural differences between the systems (e.g., use of different definitions, formats, and option sets) complicated matters further. For example, though Allie was White, her Race was coded as '1' in one database, and '2' in the other because the systems used different option sets. Furthermore, because program areas defined their own data elements and used different software to manage them, the ability of the agency's many data systems to "talk" to one another varied from limited to nonexistent, thus burdening staff with tons of redundant data entry and introducing all sorts of errors into the system due to human errors. With no clear requirement for documentation of data processes, methodologies often changed, like the time when Joe left the agency to work in the private sector and no one else knew how to produce the dropout rate. The new guy, Steve, came in and calculated it the way he had at his previous agency. No one saw much of a problem with this, especially since Steve's numbers were lower than Joe's. But when it came time to compare the new rates to last year's, some staff realized that they were comparing apples to oranges.

Year in and year out, the work was done (albeit sometimes late or incomplete), but the specific tasks weren't assigned to individuals in any consistent manner. And, since there wasn't any documentation of which data system was the 'official' source for each data element, it wasn't uncommon for a federal report to come from one source one year, but another system the following year.

Similarly, without any clear guidelines for handling data requests, staff fielded requests as best they could. When requests came in, it was up to the recipient to decide to which program area the request should be sent. In one instance, Talia received a request for all the school addresses in a district. While McKenna and Vita both managed school directory data in separate systems, Vita got the request since her desk was closer to Talia's.

When postsecondary asked about sharing data, agency officials cried "FERPA!" invoking the federal privacy law because they mistakenly thought it prohibited such exchange [see Privacy and Confidentiality section for more information]. Security and access protocols were not well understood and staff often took a lax approach to protecting sensitive information [see LDS Lore 'Identity Theft in the Printer Room' in the 'Security' section]. Data quality problems were either ignored or dealt with as they arose, rather than making long-term changes to ensure the same issues wouldn't crop up again – it was like treating symptoms as they flared up, but never working to cure the underlying illness. And since there was no responsible group or process in place to identify the sources of the agency's problems, those sources went undiscovered and much to the techies' chagrin, data quality issues were usually just blamed on IT. This was the reality for some time and most staff members didn't see much of a problem. It was simply business as usual.

The Realization

Over time, the world grew more interested in education data. People wanted to use this information for accountability purposes and to conduct analyses to gain better understanding of what programs and instructional strategies worked. They wanted data to inform decisionmaking at all levels, and improve administration, instruction and student performance. The bottom line was they wanted data from all across the agency and they wanted them fast. This changing environment posed many problems for the Department. Analyses required linking across silos or integration of all data into a central data store. But duplicate, inconsistent data had to be reconciled before this could happen. However, once the integration work began, more inconsistencies were discovered than anyone had imagined. Data quality had to be a higher priority, security had to be beefed up, and the data elements collected had to serve business and stakeholder needs in addition to simply meeting federal requirements. Better methods of sharing data had to be devised if the Department was ever going to keep up with growing demand and the call for a "P-20" system. And better, more consistent protocols for processing data requests were needed to make data sharing more efficient and prevent improper dissemination. Facing this reality, the Chief Information Officer decided something had to be done. Having seen a presentation on the subject at a national conference, he was convinced that implementing a process of what the presenters called "data governance" could help address the agency's problems.

Governing the Data

Establishing data governance is crucial to LDS success and should be step #1 in the system's development. In a major effort like LDS implementation, with its expansion of the quantity and access to data, along with the heightened need for data quality and security, a coordinated approach to identifying data issues, creating solutions, and communicating decisions is a critical factor in the system's ability to meet its stakeholders' needs. Developing an LDS may allow your agency to collect, maintain, and share these data, but without the right policies, processes and people in place to ensure they are of high quality, you may end up with a system full of problematic data. The LDS's usefulness will be compromised and the system's reputation among potential users may be tarnished. By creating a culture of accountability, collaboration, and standardization around information, data governance provides a solution that is crucial to LDS success. It's no surprise then, that LDS development often spurs interest in data governance and provides the window of opportunity for an agency to spend the time and resources necessary to implement a strong data governance process.



LDS Lore: Data Governance, ASAP

The agency had planned its ideal system and hired a vendor to build it. Eventually however, staff began to

question the quality of all the agency's new student level data being collected and housed. The agency's effort to integrate data from multiple sources was exposing countless inconsistencies and inaccuracies, and it became apparent that potential users would shun the data if they didn't trust them – and rightfully so. At least a couple of data sharing blunders had occurred, potentially exposing sensitive personal student and teacher information. And, though demand for these new data was high and continued to increase, the staff was having trouble keeping up and data request processing was erratic and slow. The LDS investment would be for naught if these problems persisted. Something had to be done to improve data quality and secure the agency's information assets before it was too late.

However, while data governance is a fundamental step to ensuring high quality data, in reality, many agencies don't implement such a process until after they've broken ground for their LDS and have already been faced with many data troubles. But while it is certainly ideal to establish a process of

District Difference

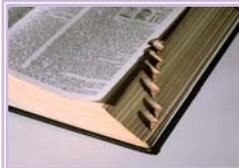
At the district level, data governance will look very similar to the state's version. In fact, the information offered in this section should be easily transferable to the local level with just one minor and obvious tweak: when involving data suppliers in the process, representatives will come from schools rather than districts.



governance before LDS development has begun, it's never too late to start. The following sections introduce data governance and its many benefits, outline basic action steps to implementing a system of data governance, and present the roles and responsibilities that may be included in a solid data governance structure. Though the focus of the sections that follow is on the state agency, the principles and practices presented here are equally applicable to district level data governance initiatives.

What is Data Governance & Why does it matter?

Whereas many organizations in the private sector have long benefited from good data governance, the education community is relatively new to the concept. While every education agency has some means of handling its data, historically, instead of implementing a coherent, well-orchestrated enterprise-wide system of data governance, agencies have typically grown multiple, program area-specific approaches and cultures. Moreover, responsibility for data has too often been unclear or misplaced. For example, in addition to their responsibility for the infrastructure that collects, stores, and shares the data, ownership of the data themselves has too often been placed with technology staff rather than those in the program areas – those who have a deeper understanding of the data. This reality, despite its inefficiencies, may have worked acceptably well in the days when data were only used for compliance purposes. But, now that the goal of education data systems continues to expand to providing broad access to and facilitating effective use of data, the old processes for managing those data must also change. By helping to create greater order, focus, and efficiency, the implementation of a strategic enterprise-wide system of data governance can help agencies meet their modern goals of data-informed education.



Data governance is both an organizational process and structure that establishes responsibility for data, organizing program area staff to collaboratively and continuously improve data quality through the systematic creation and enforcement of policies, roles, responsibilities, and procedures.

Data governance can be defined as both an organizational process and structure that establishes responsibility for data, organizing program area staff to collaboratively and continuously improve data quality through the systematic creation and enforcement of policies, roles, responsibilities, and procedures. As a *structure*, clear and specific roles and responsibilities are assigned and staff are held accountable for the quality of the data they manage. In effect, for each data problem, there is only “one throat to choke.” Ultimately though, data governance is not about who’s in charge – it’s about identifying existing or potential data problems and ensuring that the necessary work is done to fix them or prevent them from recurring. As a continuous and iterative *process*, data governance is a systematic way of handling data throughout the information life cycle (from definition to retirement) [see the Information Life Cycle section in Chapter 2 for more information]. The process fosters coordinated responses to ongoing data quality issues and, eventually, a shift to proactive action to stem these problems before they occur. An environment is created in which technical and business data issues can be resolved and prevented in a collaborative, efficient, and transparent fashion. This coordination should extend throughout the education agency beyond the compartmentalized program areas and business/technology divide, and outside agency walls to school districts and other organizations (e.g., postsecondary institutions, labor department, social services, and other organizations with valuable data related to student histories and outcomes).

Benefits of Data Governance

In an education agency, a data governance initiative typically aims for improvement in

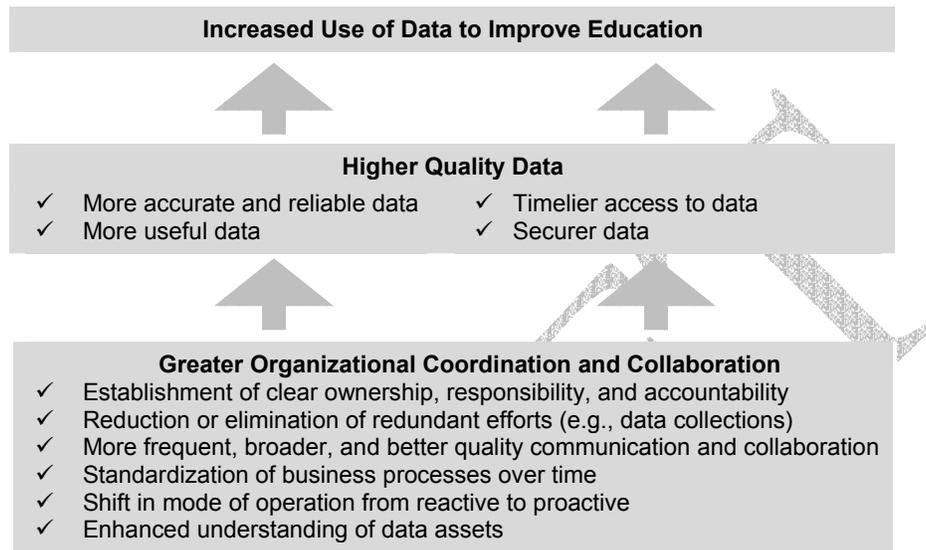


Ensure a Sound Foundation

Data provide the basis for sound decisionmaking and educational improvements. But, without a strong foundation – accurate, reliable, timely information about the educational system – decisionmaking will either be limited to guesswork based on hunches, or perhaps even worse, informed by poor quality data. The data governance structure manages the process through which that foundation is created and maintained. Upon this base, an organization can then build upwards defining or refining elements, standards, processes, and tools that ultimately make it possible to use the data to inform sound decisionmaking.

at least three major areas: organizational coordination, data quality, and data use. Figure 3.1 presents the benefits that strong data governance can provide. Operational improvements at the bottom of the figure lead upward to improvements in the agency’s data quality, which then facilitate more effective and widespread use of data to improve education. Below the diagram are discussions of each area.⁹²

Figure 3.1. Aims and benefits of data governance



Greater Organizational Coordination and Collaboration

A more holistic, cooperative approach to handling data can be established through data governance. The de-compartmentalization and coordination of enterprise efforts can change for the better the culture of data collection, maintenance, use, and dissemination. More specifically, data governance:

- **Establishes clear ownership and responsibilities:** As the adage goes, when something is everyone’s responsibility, it is no one’s responsibility. Data governance assigns responsibility for each and every data element and deliverable to a single Data Steward – their “owner.” The roles of program area staff are specifically laid out to avoid confusion and to make sure that all of the necessary work is completed and that only one person can be held accountable for a particular data problem.

For example, if a data request comes to the agency for discipline data, regardless of who is initially called, everyone in the agency knows that a specific program area staff member is the discipline data manager who, therefore, should be the person to respond to the request. In turn, if there is an issue with the discipline data included in a legislative report, or on the annual report card, that same person is held accountable and is responsible for resolving it. The bottom line is that the Data Steward is responsible for every aspect of his or her area of data, from collection to reporting to communication



DG goes beyond LDS
While data governance (DG) is a key factor in LDS success, its benefits do not end there. Data governance provides broader benefits in terms of how an agency manages data, ensures data quality, and fosters effective use of those data. In effect, any data initiative will benefit from good data

Get a handle on your data.

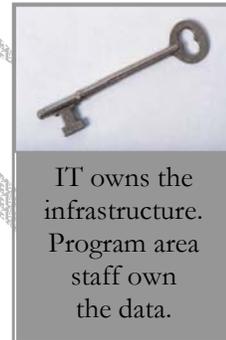


With good data governance, every job is known and every job is done.

⁹² TN PPT (2008)

and so on. In these ways, data governance helps agencies maintain an orderly operation in which every job is known and every job is done. Again, it must be stressed that responsibility for the data should be seated with program area staff, rather than with technology staff. IT's role should be to support the agency's business needs. Responsibility for the contents of those systems – the data – should rest firmly with program area staff.

- **Reduces or eliminates redundant efforts:** With data governance, staff work to seek out and eliminate collection redundancies wherever possible. The result is that data elements are collected only once by a single program area, rather than collected multiple times within or across program areas, and the areas that need that data element share it. Each element used for federal or state reporting or dissemination has a single authoritative source. Data elements are collected at the level of individual records, rather than in aggregate form and all aggregate collections are ended. Ownership of and responsibility for all deliverables is clearly documented and communicated, avoiding the duplication of efforts among multiple staff members. These activities can dramatically reduce reporting burden for the school districts that must report the data as well as the processing time for state staff. Ultimately, it will help the agency realize the “collect once, use many times” ideal, thus improving the efficiency and effectiveness of agency operations and the quality of its data.



- **Facilitates more frequent, broader, better quality communication and collaboration:** Because data come from outside the state agency (e.g., from districts) and the effects of data governance extend beyond state agency walls (e.g., decisions made about collections that affect districts), data governance should not be a strictly internal effort. Data governance forges lines of communication among a variety of stakeholders. The process is a mechanism for consistent transmission of expectations across program areas within the department as well as externally with districts and other agencies and partners. Standards for data reporting and collection, and changes to those standards, are clearly broadcast including definitions, formats, business rules, responsibilities and due dates. Beyond facilitating more effective communication, data governance brings affected stakeholders together to collaboratively plan their work and address data-related issues. Program area staff, IT, leadership, districts and other relevant parties make decisions collectively, rather than for instance, the state agency staff making decisions on their own and simply telling the districts what they've decided. With data governance, the districts and all other affected stakeholders are brought to the table to weigh in on data issues that affect them and to help create smarter solutions. They are involved in determining new requirements and making sure they can be met, and they also play a role in finding ways to make the data more relevant at the local level – a key incentive to ensure data quality. In short, with data governance, all decisions are made collaboratively and communicated effectively.
- **Standardizes business processes over time:** Data governance brings staff together to define enterprise-wide standards for each data element and to normalize the procedures for data reporting and collection. Clearly defined, documented, and well-communicated policies and processes let everyone know what needs to happen, by whom, in what fashion, and when they're due. These processes are documented and strictly adhered to, with each process having a single “owner.” For example, while calculating the NGA graduation rate may involve multiple staff members, only one should be ultimately responsible for ensuring that the rate is calculated on time, properly, and in a consistent manner over time. Guided by clear data management protocols (e.g., regarding collection, reporting, and sharing) that are

consistent within and across program areas, no longer does everyone operate in their own fashion within their own “silos,” and no longer are the same tasks performed in different ways by different people each cycle. Everyone, including districts, knows what to expect and what is expected of them regarding data. Documentation of these processes also helps to ensure sustainability over time and in the face of staff turnover, as well as to increase transparency by detailing processes and making the origins of data clear.

- **Shifts mode of operation from reactive to proactive:** Naturally, the data governance process will begin as a reactive process that deals with fixing the problems that already exist. But, as the process continues and the pressing problems are solved, the focus will eventually shift to identifying areas that can be improved and to preventing problems from arising in the first place. For instance, if a data release like a state report card lists two discrepant numbers pulled from two different silos (e.g., economically disadvantaged student counts from the FRPL and finance databases), the agency’s reactive response should be to bring the two Data Stewards together to figure out if there is a reason to use both sources. If not, they should then determine which one is the authoritative source to use for the report card. A proactive agency, on the other hand, would have identified this redundancy before report card season came around when they worked together to catalogue all of the agency’s collections and data elements.



LDS Lore: Data Quality from Management Simplicity

It seemed like more and more work was being done, but the quality of the agency’s data wasn’t getting any better. In fact, the staff’s lack of coordination was just making things worse.

Cedric and Mark worked together to compile the Safe and Drug-free Schools file, running some quality assurance tests on the district data, aggregating data and building tables. Meanwhile, Amy, the staffer who’d worked on last year’s file had some free time on her hands. Poking around on the agency drive, she found the file the new staff was working on and took a look. Some of the numbers seemed off, so she typed up and ran some code. Her results seemed much better than the ones in the file, so she pasted them in...

Months later, districts started calling, saying that some of the numbers were off in the Gun-Free file. Mark and Cedric reviewed and re-ran their code to see what the problem was, but they couldn’t replicate the bad numbers. No one could figure out what had happened. Eventually, word got around and Amy came forward, admitting the mistake.

The message was clear: Less is more when it comes to data quality, and quantity of work does not necessarily translate into the quality of data. Without the assignment of clear roles and responsibilities, and the adherence to clear processes, confusion will result, work will be duplicated, errors will be difficult to trace and resolve, and time will be wasted.

- **Enhances understanding of the organization’s data assets:** Through the data governance process, staff become more aware of the data the agency collects and which Data Stewards are in charge of what data elements. At a higher level, data governance can help spur a culture shift from viewing data as “the stuff of compliance” to viewing them as assets that can help the agency improve its work and the performance of its students. With student-level longitudinal data, agencies can do more than make compliance easier – they can answer questions to help them improve programs and policies. The data governance process helps agency stakeholders shape the system to better meet their needs and to expand their capabilities.

Higher Quality Data

The growing emphasis on using student-level data to inform decisions and improve student achievement increases the visibility and use of data. Furthermore, it raises the stakes for agencies to

collect and provide high quality information. Simply implementing a longitudinal data system does not ensure higher data quality. However, the implementation of an LDS provides the organization with an opportunity to improve data quality by bringing data errors and inconsistencies to light through the enterprise-wide integration of data from disparate silos. Without a systematic approach to governing data, the organization will not have a means of addressing these data issues. As a result, the masses of information collected and maintained in an agency's LDS will be questionable and may not meet stakeholder needs. Consequently, many education agencies see improving data quality as the primary reason to focus on data governance. More specifically, data governance:

- **Improves accuracy and reliability:** Data governance serves to increase alignment among program areas, ensuring consistency in data and data management procedures. Collective efforts by groups of data managers to define clear definitions and other standards, and the work of Data Stewards to identify and correct any deviations from those standards, makes data more reliable. Thorough and consistent validation procedures starting at the local level ensure data accuracy. And, authoritative data sources are identified and redundancies eliminated, thus creating only a single “version of the truth.” These processes ensure that data elements are collected only once by the agency, streamlining data reporting and making the results of analyses more consistent.
- **Increases the usefulness of data:** When data are aligned with the needs of program areas and other stakeholders, rather than driven by information technology, data will be more useful [see the “Needs Assessment” and “Data: Knowing What You Have, Identifying What You Need” sections for more information]. As stressed in chapter 1, an LDS is not an IT project – the same goes for data governance. Data governance helps to keep the data system from becoming an IT project by shifting control and responsibility to the program areas. This in turn, makes the business staff think more deeply about their needs and to take greater responsibility for the data. The involvement of district staff and representatives from other stakeholder groups also helps to increase the alignment between data collection practices and the information needs of end users.
- **Provides timelier access to data:** Data governance leads to timelier data by increasing the order and efficiency of data collection and reporting. By creating standard business processes and eliminating redundant collections, data reporting becomes less burdensome. The involvement of districts in the data governance structure and improved communication between the state and local education agencies ensures that the suppliers of the data, the districts, are involved in making changes to collections. Furthermore, the districts are given ample notice of changes and, thus, more time to prepare and work out potential issues early on. Standardization of business processes at the state level can also provide significant savings in time. Streamlined data sharing procedures, for instance, can improve the speed with which data requests are processed giving requestors faster access to the information they need. Data governance also serves to standardize data processing from year to year, helping to eliminate wasted time figuring out who is going to do what and preventing re-creation of the wheel every collection cycle.
- **Improves security of data:** The shift to collecting and maintaining longitudinal student-level data increases the sensitivity of the information that agencies maintain. Therefore, access to data must be carefully controlled through both technology and the day-to-day activities of personnel. Within a strong data governance system, staff from program areas



and IT work together to determine the sensitivity of each data item and implement effective protections. The creation of clear and consistent data sharing processes streamline and coordinate agency efforts and help to prevent improper release of sensitive data [see “Security” section for more information].

Increased Use of Data to Improve Education

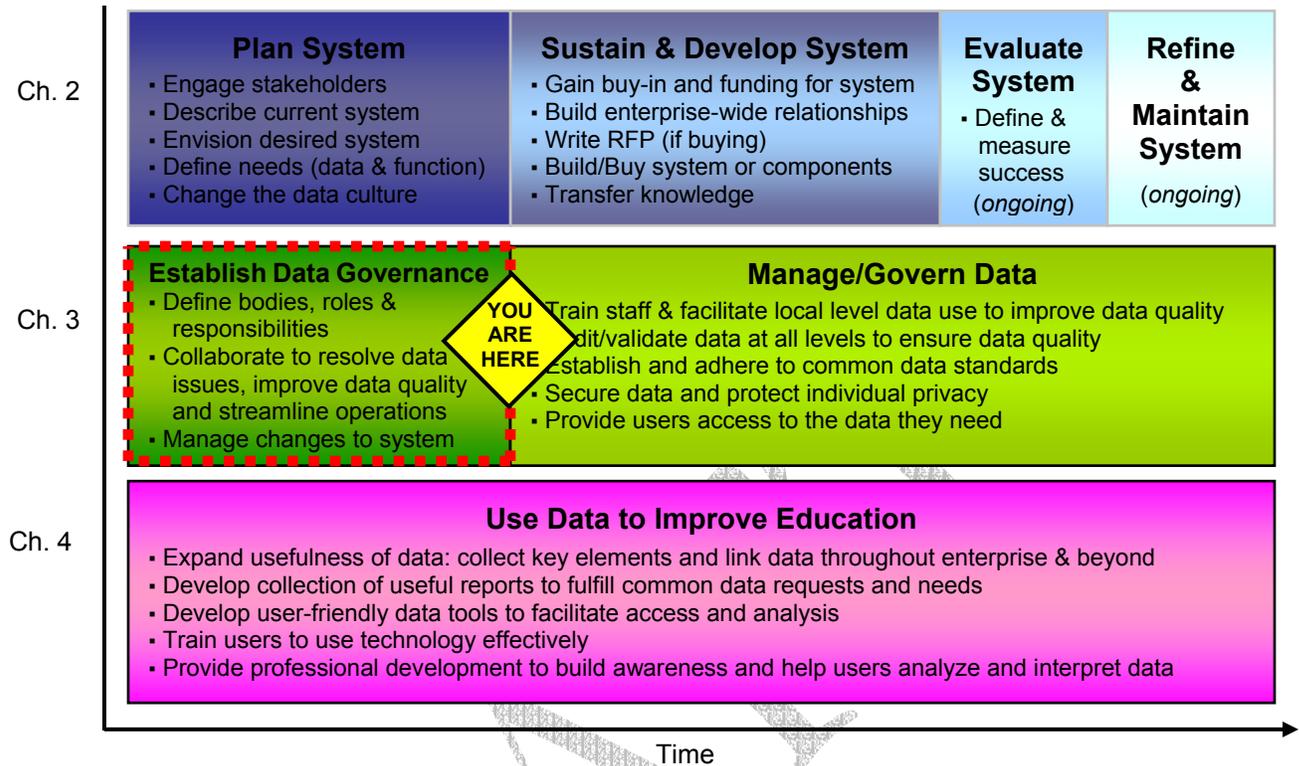
While many see high quality data as the primary goal of data governance, the ultimate benefit is actually the next crucial step. It is the increased use of those data by legislators, administrators, and educators to improve education. After all, without such utilization of the data, there is arguably no reason to collect the information in the first place – no reason to burden the districts with collecting, validating, and reporting them, and no reason to amass them in an LDS. But, for data to be used, they must be accurate and trusted, they must be timely, and they must be designed to meet the needs of stakeholders. The coordination of staff from across the enterprise through data governance to collectively solve data issues helps agencies realize these goals. Clear ownership of data ensures that the right people are disseminating and answering questions about data, and better communication increases everyone’s knowledge of the data collected by the agency. Better quality data equip decisionmakers to make better resource allocation choices, and better student data enable educators to better meet their students’ instructional needs.

These benefits should far outweigh the costs of implementing data governance. If your agency has the in-house capacity to implement a data governance process, the cost of a data governance program can be as low as \$0. While some state or local agencies will decide they need to bring in an outside consultant to drive the data governance process, other agencies will need to invest only their time. The benefits of data governance, however, can culminate in smoother operations and better decisionmaking based on the foundation of timely, secure, high quality data aligned with agency goals. Though it will take time to change the way the organization operates and to improve the quality of its data, persistence and adherence to the data governance process will eventually lead directly or indirectly to greater order and efficiency, time and resource savings, better programs and policies, higher quality information, and ultimately, better student outcomes.

Additional Resources: Data Governance (introductory)

- [Data Governance: Changing Culture, Breaking Down Silos, and Deciding Who is in Control](#) – DQC, Sep 08
- [The Need for Data Governance](#)
EIMAC LDS TF Brief #4, March 2008
Data governance is driven by the need for data quality. This 3-page brief discusses the “components of good data governance,” including leadership, data quality management, controlled analysis and reporting, security and confidentiality, resource management, and data use and accessibility.
- [The Next Step: Using Longitudinal Data Systems To Improve Student Success](#) – DQC
See page 10 for section on data governance.
- [Data Governance Maturity Model](#): Establishing the People, Policies, and Technology That Manage Enterprise Data (DataFlux)
- [Implementing Data Governance as the Foundation of a LDS Presentation](#) – TN DoE, C. Chatis, Rick Rozelle
- [Data Governance – Managing Information as an Enterprise Asset: Part I – An Introduction](#)
- The Data Governance Institute – www.datagovernance.com
- The Data Administration Newsletter – www.tdan.com
- *Alpha Males and Data Disasters: The Case for Data Governance*. Gwen Thomas
- *Sailing in Dangerous Waters: A Director’s Guide to Data Governance*. E. Michael Power
- *Enterprise Knowledge Management: The Data Quality Approach*. David Loshin

LDS Guide by Activities in Time



Basic Steps to Establishing Data Governance

Ideally, a good system of data governance will be in place before LDS development begins. However, if your organization has already broken LDS ground without having established an effective governance structure, it is never too late to start. And, even if your agency has implemented a governance structure, data governance is an iterative process in which there is always room for improvement.

Just as developing an LDS can be viewed as a journey, so too can the implementation of a data governance process. Although there is no single best approach for implementing a data governance initiative, there are some key action steps that should be taken on the road to good data governance. Normally, the Chief Information Officer (CIO) is the person who initiates the data governance plan. However the CIO or other leader comes to the realization that his or her organization could benefit from better data governance, they should begin their mission by taking a careful and honest appraisal of the agency's approach to data management, weighing the enterprise's levels of coordination and confusion. Certain tools exist to help in this period of reflection [see "Gauging Governance" box].



Gauge your Governance

How governed is your organization?

- [Dataflux's Data Governance Quiz](http://makeyourdatabehave.com/quiz/) asks a series of questions to help you assess your agency's level of governance and provides resources and tips on how to "mature" to the next level. The brief, generic quiz is applicable to both state and local agencies and is available at <http://makeyourdatabehave.com/quiz/>.
- The Data Administration Newsletter offers a [Data Governance Test](http://www.tdan.com/view-articles/10149) to help you evaluate your agency in eight areas of data governance. The test is available at <http://www.tdan.com/view-articles/10149>. It is geared towards helping you build the case for data governance to leaders of your organization.

After this stage of self assessment, the leader(s) should take some key steps. First, high level executive support should be sought, followed by the assignment of key responsibilities to staff members, and the formation of several bodies central to managing and implementing the initiative. Data governance structures range from basic to more elaborate in terms of personnel who serve the various functions [see the “Bodies, Roles, and Responsibilities” section for more information]. However, the key action steps in a minimal, core data governance structure include:

1. Seek executive support for the initiative
2. Create a Data Policy Committee
3. Assign a Data Governance Coordinator
4. Identify Data Stewards
5. Create a Data Governance Committee
6. Identify, prioritize and mobilize to resolve critical data issues
7. Form Data Steward Working Groups as needed

Seek Executive Support for the Initiative

Appeal to agency leadership to gain buy-in for the data governance initiative. The specific leaders that should be on board will vary depending on the state’s size and staff. In small states, support might come from as high as the Education Chief, while in bigger states it might be staff of the Chief such as an assistant commissioner or deputy. Communicate to these executives the costs of the status quo and the benefits that will result from greater order and coordination. Executives must understand the value of the agency’s data and the need for data governance to ensure effective management of those information assets and to improve quality and security. To gain support from executives, it is helpful to present qualitative and, ideally, quantitative costs of poor quality data, redundant efforts and insufficient security. Stress the tangible benefits that can result from a more strategic enterprise-wide approach to data management that coordinates policies, processes, and architecture to improve data quality; aligns work across the agency and streamlines operations; more effectively protects the data; and shares them in a more systematic and timely manner.⁹³ In making your case for data governance to leaders, some compelling arguments a CIO or Data Governance Coordinator may cite include:

- **No more errors resulting in lost funding.** Stress the potential or real past experiences with the loss of funding due to late or inaccurate reporting of data to the federal government. Explain how data governance can streamline data processes and increase the quality of those data and ensure that the state and districts get the funding they require to meet students’ needs. For example, if the special education data were late last year, explain how clearer standards and requirements, better communication and collaboration with the districts, improved validation procedures, and the sharing of best practices among Data Stewards can help avoid such blunders.
- **More efficient use of resources.** Explain how the increased data accuracy and transparency possible with individual-level collections and data governance enables more appropriate allocation of resources. With an individual level data collection, it is possible to see where the numbers come from rather than just rely on a tally from a district. For instance, while last year’s submission may have included 50 English language learners, this year’s new student collection may have only included 15 individual students. While the aggregate number was difficult or impossible to verify, the individual records show exactly where the numbers come from.
- **Saved resources and time through fewer resubmissions, cleanings, and audits.** By improving communication between the state agency and districts and facilitating collaboration

⁹³ NASCIO, *Data Governance – Managing Information as an Enterprise Asset: Part I – An Introduction*, April 2008.

around data issues, data governance reduces the time and money spent fixing bad data (e.g., through multiple resubmissions by districts) or auditing districts with problematic data. Better quality data in the beginning will save wasted time and resources later on.

- **State economic benefits.** Beyond the effects on the educational system, education data can affect sectors of the state's economy. For instance, education data errors like a high number of dropouts can decrease a school's ratings and negatively impact real estate values in the area.
- **Increased ability to identify common problems among districts and target interventions.** Through better coordination with districts, states are better able to identify districts experiencing similar difficulties. Where multiple vendors provide data systems throughout the state, states might determine that a particular vendor needs to make improvements in a certain area. Or, districts might be targeted for professional development or the introduction of new validation procedures.
- **Fewer headaches in general.** Finally, invoke the leader's unpleasant memories such as the phone calls received from irate constituents and school staff about bad data. Explain how those experiences could have been avoided had a data governance process been in place to better ensure data quality.

The importance of gaining executive buy-in and support for a data governance initiative cannot be overemphasized. Strong and continued commitment from leaders of the organization will not only provide needed resources but, more importantly, will support the culture change needed in a data governance effort, applying pressure from the top and providing the authority needed to enforce contentious decisions. At some point, for instance, a decision will be made by a data governance body that prompts backlash by a key staff member (e.g., a responsibility or ownership of a data element is shifted from one staff member to another or a program area's data are included in the LDS without the area's full support). Without pressure from leadership, staff resistance could undermine the process. Sometimes, even getting people to show up for data governance meetings can be challenging if leadership doesn't stress the importance of participation or make meeting attendance mandatory. The agency leaders might also require data governance group members to send qualified substitutes in their stead when they're unavailable.

It is unlikely that your agency's leadership will willfully resist a data governance plan. Commonly, executives just need help understanding how data governance will benefit the organization. At the very least, staff need to make leaders aware of the initiative, but ideally, executives will support and participate in the data governance process. If leadership support cannot be quickly won, agencies should start or continue their data governance initiatives nevertheless, while continuing to seek high level buy-in. Inevitably, this support will eventually prove to be crucial.

Create a Data Policy Committee

The CIO should convene and participate in a group of executive management staff including the Education Chief (or another high level agency staff member), Data Governance Coordinator, and executive leaders from each program area that has a Data Steward. Rather than creating a new group, it may be preferable to identify an existing group that includes these members and ask them to occasionally focus on data governance issues. This group's main roles will be to establish the data governance policy and to address data issues that require executive support, such as those that affect multiple program areas and/or impact major agency reports or deliverables. [See a more detailed description of this group in the "Bodies, Roles, and Responsibilities" section below.]

Assign a Data Governance Coordinator

It is absolutely critical that a single person is assigned responsibility for overseeing the data governance initiative. This person should be the “catalyst” for coordinating the data governance initiative, setting a cohesive action plan, and tirelessly pushing the process forward. Significant culture change must occur in order for data governance to take hold and make a difference in an agency. In fact, many data governance initiatives fail because there is not a single, dedicated person in charge of making sure that the roles, responsibilities, and processes of the initiative are being followed on a daily basis. In the search for a person to serve this role, leaders may look for someone who:

- Has tenacity. This person must give the data governance process inertia, setting goals and constantly following up on progress to keep the work moving forward.
- Possesses strong analytical skills. Must identify areas of needs and those players needed to address them.
- Sees the forest AND the trees. This person should be able to see the overarching goals of the organization as well as the details that are required to meet the big goals.
- Understands technology and is able to bridge the divide between program area staff and IT.
- Has an education background. Must understand why the organization is actually collecting the data and why they matter – it’s about the students, not the data.
- Possesses good mediation and communication skills. Must be able to bring people together to work through difficult and sometimes contentious issues.

[See a more detailed description of this role in the “Bodies, Roles, and Responsibilities” section below.]



LDS Lore: The Meeting Mandate

Yori, the Data Governance Coordinator, paced back and forth across the floor of the nearly empty board room. He didn’t know why people weren’t showing up for the agency’s second Data Governance Committee meeting. The first meeting seemed to have been a great success at the time, but here he was with no more than two thirds of the group’s members, waiting for others to arrive. He knew that the data governance plan would derail if participation was low. Nevertheless, Yori put his game face on, took roll and got down to business with those in attendance. After the meeting, Yori strode down to the Education Chief’s office.

After 30 minutes of a compelling appeal, Yori closed the Chief’s door feeling a sense of accomplishment. He knew he’d sold her on data governance. It’s not like the case was that hard to make – data governance, from his perspective at least, was a no brainer. It was a common sense business solution for improving the Department’s data and he laid the case out clearly and simply, contrasting the Department’s data management status quo with the potential benefits of the data governance initiative. Making the case even easier was the fact that aside from maybe some coffee and donuts for meetings, the costs to the state were nearly zero.

That afternoon, the Chief sent out a brief email:

“Participation in all data governance meetings is required. Staff assigned to these groups should attend all scheduled meetings, making them a priority over all other activities. If you are unavailable, please send a qualified substitute.”

Sure enough, the next meeting of the Data Governance Committee packed the board room. Yori smiled as he called the meeting to order, confident that the plan was back on track.

Identify Data Stewards

Identify areas of data and assign a Data Steward to be responsible for each. Articulate specific steward responsibilities, making each and every data element the responsibility of a single steward. It is important that each Data Steward is given responsibility for data elements, rather than for data bases. Data Stewards should “own” specific contents of the data system regardless of where those data physically reside (e.g., on a desktop, in a database, or in a central LDS). A clear process should be created for designating Data Stewards. For instance, when identifying staff for these roles, leaders may look for persons who:

- Have business subject matter expertise and work directly with data (should not be supervisors)
- Are knowledgeable about data and their educational context, i.e. the programs and policies (preferably not techies)

- Serve as points of contact for districts with questions and comments about a program area's data
- Are frequent users of data and are comfortable with databases and querying
- Prepare data for federal/state collections
- Are detail oriented and have an understanding of how to review data for accuracy
- Appreciate the value of data quality

Of course, many education agencies will not have people in every program area with all of these qualities. But, as a general practice in your search for Data Stewards, rather than hiring new staff, start with existing personnel and provide support to grow necessary skill sets and knowledge. Try to identify the best fits possible. The Data Governance Coordinator should be responsible for identifying gaps in knowledge and skills and for providing professional development and coaching to ramp everyone up. [See a more detailed description of this group in the “Bodies, Roles, and Responsibilities” section below.]

Create a Data Governance Committee

Convene a cross-area group of data management staff that includes the Data Governance Coordinator, Data Stewards and other key staff members to drive the organization's data governance initiative. This group will be the core of the data governance process where most of the collaboration and decisionmaking will occur. The Data Governance Coordinator should chair this group and oversee the data governance agenda. Early in its formation, the group should collectively agree upon a mission statement and its core goals and objectives [See Appendix B for examples]. The committee should then meet monthly to fulfill this mission, which should include the identification, documentation, prioritization, and resolution of critical data issues. The Data Governance Coordinator as well as the Data Stewards should contribute agenda items for these meetings. Agendas may include items such as federal reporting updates (e.g. from the ED*Facts* Coordinator), technology updates (e.g., including any IT problems affecting the transmission or reporting of data), LDS project updates, and open discussion in which any member can raise issues not on the agenda. [See a more detailed description of this group in the “Bodies, Roles, and Responsibilities” section below.]



MASTER DATA MANAGEMENT

Master Data Management (MDM) essentially refers to the ongoing process of identifying the authoritative source of data and ensuring that this source is consistently used to feed other data systems or to populate the agency’s central data store, as well as for reporting, dissemination and analyses. In this way, it is the answer to the “collect once, use many times” challenge. When key data elements are collected and used by multiple data systems, MDM is the process that determines which single source is authoritative. When integrating data from multiple sources into a central data warehouse, “master” sources are identified for each element. And when new elements are collected, a master source is identified for each. When populating the data store with historical data that were collected before the MDM process began, it will also be necessary to determine the master sources for those older data items. MDM also aims to keep track of the data collected and maintained throughout the agency to ensure that common standards (e.g. data element names, definitions, codes, formats, etc.) are being used. When all of the agency’s past and present data are dealt with, MDM’s focus will then narrow to handling new data elements.

MDM relies on both data governance processes and technological solutions. The data governance side of the process can be fulfilled through the Data Governance Committee, which facilitates the collaborative designation of authoritative data sources and elimination of redundant collections. Then, technological solutions can be used to share data among multiple data systems (i.e. “horizontal integration”), by updating “slave data” in one system with the “master” data from another. For instance, if the agency uses a number of operational databases, the SIS may hold the “master” student address data, while the transportation system holds “slave” student address data. The MDM application would feed the SIS data into the central data store and update the transportation system automatically whenever that information was changed in the SIS.

Additional Resources:

- [Data Governance for Master Data Management](#) –Dataflux
- [Data Warehousing Institute](#)
This organization has produced a number of resources about MDM, including an MDM assessment tool designed to help agencies determine how much an MDM solution would benefit them and also to assess how ready they are to implement such a solution.
- [Master Data Management](#) – Presentation given at the July 2008 ISE SLDS Grantee Meeting

Identify, Prioritize and Resolve Critical Data Issues

At each meeting of the Data Governance Committee, members should work to identify, prioritize, and resolve critical data issues, maintaining a log to track progress in these efforts. Critical data issues are the organization’s data “dirty laundry” that must be addressed for the committee to achieve its core goals. One Data Steward should be responsible for each critical data issue and should provide an update on the progress towards its resolution at each monthly meeting. In the beginning, the Data Governance Coordinator will likely identify many of the critical data issues. But, as the process matures, Data Stewards should identify the majority of these issues. Examples of data issues that might be deemed “critical” include:

- A data collection that creates significant burden for school districts due to timing, collection mechanism, or duplication with other collections
- Reporting linked to funding that has been late, incomplete or inaccurate.
- High profile reporting that has been late, incomplete or inaccurate.



Document Everything!

Every data governance detail should be documented. Who’s responsible for what? When are due dates for deliverables? What are the critical data issues and what’s the status of their resolutions? What are the standard procedures? Etc. Documentation helps keep the work on track, prevents confusion, and allows staff to replicate their activities from year to year and in spite of any staff turnover.

Prioritize these issues based on factors such as:

- Time sensitivity
- Number of program areas affected
- Importance of or number of times the data are used for federal reporting.⁹⁴

On occasion, data issues will arise that requires leadership-level support beyond the Data Management Committee. Such cases should be elevated to the Data Policy Committee via the Data Governance Coordinator.



LDS Lore: Integration-inspired Indigestion

Adam dug his fingertips into the armrest. He and his supervisor and other program area staff were sitting with the Data Governance Coordinator and the CIO to talk about the agency’s future plan to phase its data into the LDS. Yori, the Data Governance Coordinator was going over the LDS project goals and timeline and had just notified Adam and his colleagues that their program area’s data would be part of the first phase of data migration into the agency’s LDS. Adam did not like this idea one bit. “That’s *my* data,” he thought. He felt like he was losing control of a data set he’d managed for years and he didn’t want to see them dumped into some communal data store. As the meeting continued, he worried that the data would be at risk in the LDS and he wasn’t swayed by the argument that this action was necessary to give users greater access to the agency’s data. “They already get enough access to the data,” he thought. Would this make it more difficult for him and his staff to work with the data? He was accustomed to a good deal of autonomy, and he didn’t want to have to coordinate with other areas of the department. Suddenly, Adam’s stomach tensed. Was this the first step in a phasing out or scaling down of the staff? Would his job be at risk later in the year when the integration was complete? Then, twisting his feet around the chair’s legs, Adam realized that integration of “his” data into the LDS would probably expose the records to scrutiny. Errors might be discovered. Surely he and his staff would be held accountable for poor quality data. This was bad...

Across the table, Yori noticed the uncomfortable looks on some of the staff’s faces. Adam, slightly contorted in his seat, seemed particularly uneasy. Seeking to reduce the growing tension in the room, Yori reviewed the plan again. He told them that though the integration had support from agency leadership and was non-negotiable, there would be many benefits for the agency’s stakeholders as well as the team itself. For example, integration would make it easier to create reports and conduct analyses across program areas that were previously painstaking or impossible to generate. For instance, they would soon be able to see how their attendance data correlated with discipline incidents and drop outs. Yori said the agency needed the team’s help to increase the benefits of the system and asked the team to think about what reports could be made available through the LDS to ease their workload and help districts. He also assured the team that while the physical location of the data would change, staff ownership of the data would not.

After the meeting, Yori visited each of the Data Stewards and let them know they should feel free to ask questions or raise concerns whenever they have them. Knowing that some of the staff lacked backgrounds in data management – despite the fact that they were hired to manage data – Yori made it clear that this effort was about ensuring quality data, not about punishing people. The agency was beginning to offer a host of professional development sessions to inform staff and improve necessary skill sets. Yori also scheduled one-on-one meetings with Data Stewards to check in periodically, see how things were going, and to answer questions. He told Adam that while the data governance process was a major departure from how the agency had managed its data in the past, its objectives were aligned with high level goals and the initiative had strong executive support. Change is difficult, Yori knew, but he made it clear – they were all in this together and the benefits would be worth the trouble.

Form Data Steward Working Groups as needed

As discussed above, one of the key principles of data governance is collaboration across the program areas of the organization. Many data issues affect multiple program areas, but in the absence of data governance, it is unlikely that these issues will be addressed in a comprehensive way. When one of these issues arises, the Data Governance Committee should form a working group of stewards to

⁹⁴ Chatis Consulting, *Data Management Committee: Critical Data Issues* (unpublished)

collaboratively address the issues and craft a solution. Within each group, a single Data Steward should be identified as ultimately responsible for overseeing the working group and ensuring it resolves the issue. Groups should identify the problem and pinpoint its original source (see box below); define the goals of solving the problem; set up a clear and detailed strategy for resolving the issue; report back to the Data Governance Committee on progress; work with IT to implement the business solution; and finally, communicate the final solution to all relevant stakeholders.⁹⁵ [See Appendix B for guidelines on how meetings of this group can be structured].



Track Data Problems to their Source

The identification of a data problem's source is essential if the issue is to be resolved once and for all. If staff only treat the symptoms of a problem, the issue will likely surface again in the future.

For example, if a program area's data are late, a surface appraisal might conclude that the district or state Data Stewards aren't doing their jobs efficiently. However, a closer look might track the problem further back, exposing the fact that the tardiness was due to a breakdown in communication – perhaps, districts were not clear on the cut-off point for submission. The superficial, reactionary response might have been to pressure the Data Stewards to work harder or hire additional staff. But, at the problem's source was a lack of clear communication of expectations earlier in the submission cycle. Failure to right this wrong will likely lead to recurrence of the same issue during the next collection cycle.

Additional Resources: Basic Steps to Establishing Data Governance

- [Implementing Data Governance as the Foundation of a LDS Presentation](#) –C. Chatis (TN DoE) & Rick Rozelle (CELT)
- [Role Descriptions and Responsibilities in the Realm of Data Governance: Managing Information Assets](#) (Rick Rozelle, CELT) Describes eight jobs and roles of data management. Also includes a matrix of data governance activities and the people/groups that need to be involved in each activity.
- [Data Governance Maturity Model](#) (DataFlux)
Outlines four stages in the development of strong data governance: Undisciplined, Reactive, Proactive, and Governed. The document characterizes agency data management practices into these stages and offers action steps to help the organization advance to subsequent stages.
- Data Management Committee Critical Data Issues Log (2007)
This document is a template for tracking critical data issues and was referenced in Tennessee's "Data Quality " and "Effective Governance Models for Managing Data Systems" presentations at the February 2007 MIS conference in Atlanta, GA.
LDS Share - Filename: TN_Data Management Committee Critical Data Issues_log
- Process Definition Template with Activity Table (2007)
This Process Definition Template was referenced in Tennessee's "Data Quality " and "Effective Governance Models for Managing Data Systems" presentations at the February 2007 MIS conference in Atlanta, GA. It is a tool for the definition and step-by-step documentation of processes.
LDS Share - Filename: TN_Process design template with activity table
- Management (2006)
The purpose of this document is to establish policy and procedures governing data management and quality for the department. Roles and responsibilities of the data governance structure are also outlined.
LDS Share - Filename: TN Data Management Policy - April 06 revision

⁹⁵ Ibid.

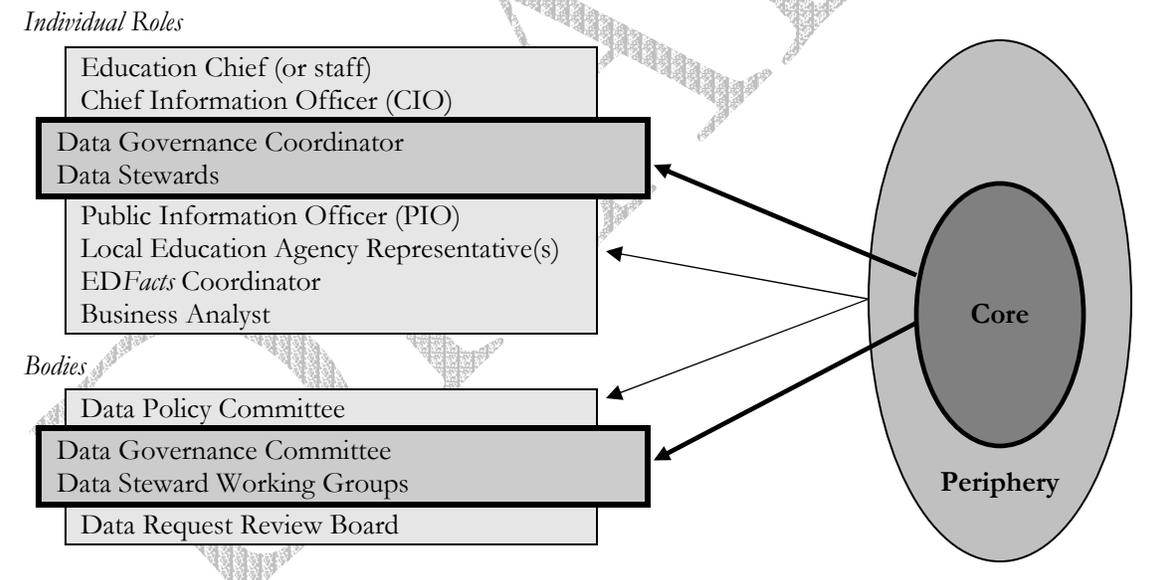
The Bodies, Roles, and Responsibilities of Data Governance

In an education agency’s data governance system, there are a range of responsibilities that may be assigned to staff to manage the collection, maintenance, reporting, and use of data. This section provides a more granular view of the practical workings of the process, detailing the people and activities involved, describing a sample set of bodies, roles, and responsibilities your organization may choose to assign in its data governance structure. The information here is presented generically and should not be considered as *the* data governance structure to follow. Rather, it is a suggested framework that may be adapted based on your agency’s specific needs, staffing capacities, and available resources.

Figure 3.2 below presents a list of individual roles and bodies that may constitute a data governance structure. As depicted in the figure, the Data Governance Coordinator and Data Stewards are the individuals who do the work at the “core” of the data governance process. A number of important peripheral roles may initiate, support, inform or draw from the process.

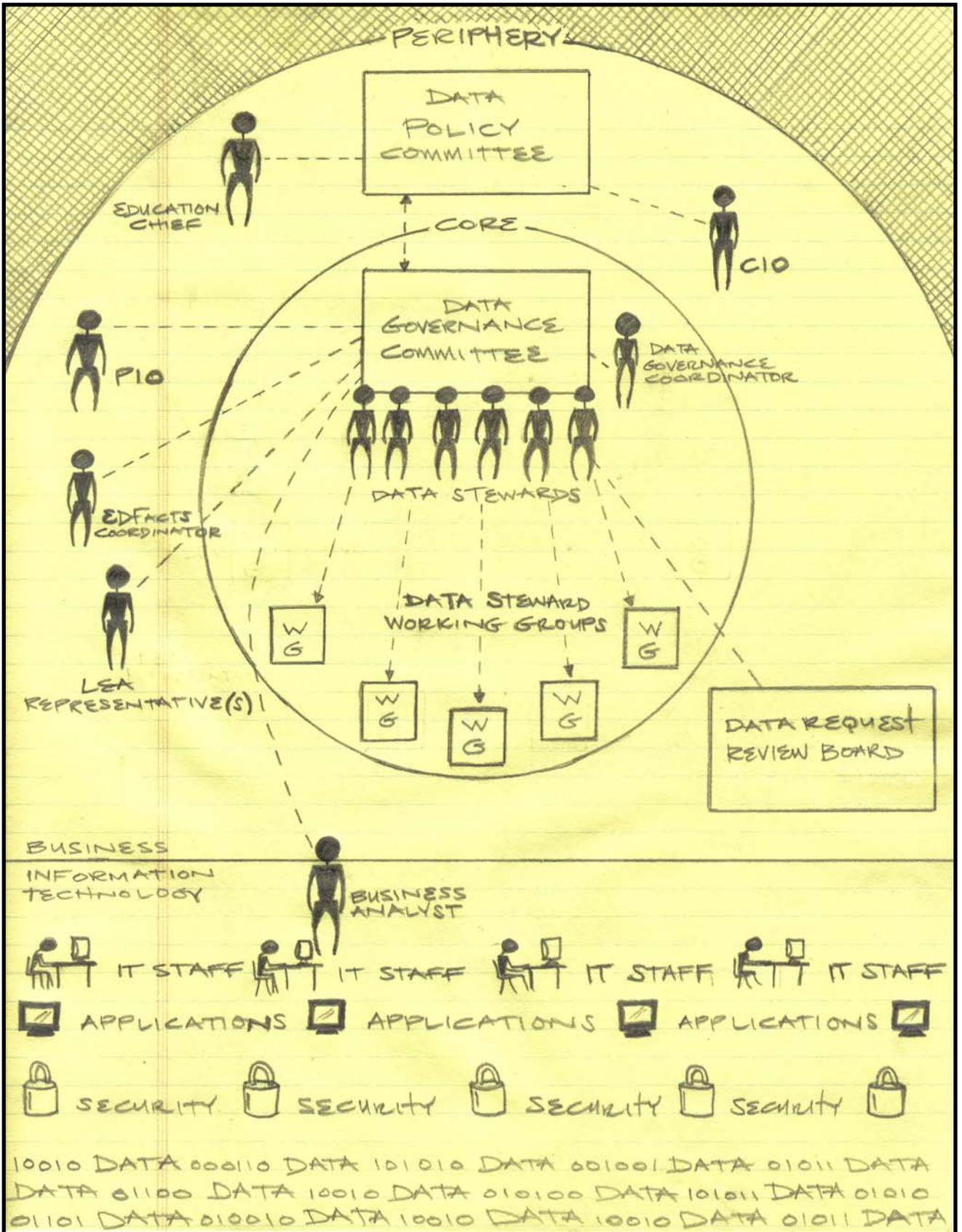
Several groups should also work to drive the process, identifying data issues and collectively creating responses. The core groups include the Data Governance Committee and the Data Steward Working Groups. A couple of peripheral groups also serve important functions. The discussions below consolidate many activities into these four bodies, though your agency may decide to add additional groups to take on some of these tasks.

Figure 3.2. Key Bodies and Roles of Data Governance



The drawing below presents this information in a different fashion, showing the individual and group roles *and* the relationships that may exist between them in a robust data governance structure. In the center is the core of the data governance structure (the Data Governance Committee, Data Governance Coordinator, Data Stewards, and Data Steward Working Groups) surrounded by the periphery. The agency’s business staff are on the top of the drawing, with the IT division below. Dashed lines connect individual roles to the bodies in which they participate.

Data Governance Bodies & Roles: Crudely



INDIVIDUAL ROLE DESCRIPTIONS ^{96, 97, 98, 99, 100}: Several key players may be involved in a data governance structure. There are a few essential roles that every data governance initiative should include. Specifically, every data governance process should have a Data Governance Coordinator, a group of Data Stewards, and a Data Management Committee. However, aside from these key roles, many of the roles and responsibilities may be assigned differently than in the manner outlined below. What is important is not necessarily the roles you define, the titles you give them, or how the responsibilities are assigned to each person. More important is that all major responsibilities are clearly assigned and staff know their duties. In designating and managing these roles, at least three guidelines should be kept in mind:

1. Develop and follow clear criteria for selecting staff members for each role. Careful assignment up front will help to mitigate staff turnover later on.
2. Provide ample support to help staff successfully meet their responsibilities. It may take time to get everyone up to speed, so persistence and patience are very important.
3. Reexamine decisions about why the agency has each role and if each person is right for his or her position. Make staffing adjustments if absolutely necessary.

Important individual roles may include:

Education Chief (or other high ranking staff member)

A high ranking executive such as the Education Chief, or other high level executive should provide support for the data governance initiative. Some of this staff member's specific data governance related responsibilities may include:

- Participating in Data Policy Committee Meetings
- Mandating staff participation in data governance bodies
- Exercising authority to enforce contentious decisions

Chief Information Officer (CIO)

This person normally initiates the data governance process within the organization. They should take the important early steps to establish the initiative and the team. Thereafter, the CIO should remain heavily involved in many of the structure's ongoing activities. Some of the CIO's specific data governance related responsibilities may include:

- Seeking executive support for data governance initiative
- Forming and serving on the Data Policy Committee
- Working with the Data Policy Committee to develop the data governance policy
- Appointing the Data Governance Coordinator
- Working with the Data Governance Coordinator to identify the Data Stewards
- Forming and serving on the Data Governance Committee
- Working with the Data Governance Committee and Data Policy Committee to identify and resolve critical data issues that require leadership support

Data Governance Coordinator

It is critical to have one person leading the data governance process. That person, the Data Governance Coordinator, is perhaps the most important person in the data governance structure and no agency should undertake data governance without this single overseer. This person should drive

⁹⁶ Tennessee Data Management Committee Manual

⁹⁷ Data Quality Campaign (2008). "Data Governance: Changing Culture, Breaking Down Silos, And Deciding Who Is In Control."

⁹⁸ EIMAC LDS Task Force, *The Need for Data Governance*, Policy Brief, March 2008.

⁹⁹ Rozelle, Rick. *Role Descriptions and Responsibilities in the Realm of Data Governance*. Center for Educational Leadership and Technology, 2008.

¹⁰⁰ *The Tennessee Statewide Longitudinal education Data System (SLeDS): The Governance Process* - Rick Rozzelle. Presentation given at 2006 IES SLDS Grantee Meeting

the data governance agenda, direct Data Steward activities around data quality efforts, and make sure that data issues are resolved. Many data governance efforts fail due to a loss of momentum, so Data Governance Coordinator (a.k.a. Catalyst) must work to keep the initiative moving.¹⁰¹ This person must focus on the mission of the group, keeping an eye on the overarching goals of the organization, following timelines and managing deliverables, and constantly reinforcing the principles of good data stewardship and working with staff to figure out how the agency can do a better job of handling its data. It is important that the Data Governance Coordinator stays positive throughout this process because data governance involves significant culture change and can be hard on staff morale. That is, the constant scrutiny of the way the agency does business and the focus on improving upon these practices can be disheartening for staff. The Data Governance Coordinator must assure them that this is a necessary part of the process and will benefit the agency in the long run. Some of the Data Governance Coordinator's specific data governance related responsibilities may include:

- Working with the CIO to identify the Data Stewards – maintain Data Steward roster, train and oversee Data Stewards' work (should not necessarily supervise the Data Stewards, however)
- Working with the CIO to form Data Governance Committee
- Leading the Data Governance Committee: scheduling meetings, preparing agendas, facilitating meetings, tracking and following up on action items, and recording and distributing minutes
- Participating in the Data Policy Committee meetings (take data issues to leadership)
- Convening and participating in the Data Steward Working Groups to resolve shared data issues (While this leader should be involved in these groups early on to get the working groups started, individual Data Stewards should take on greater leadership responsibilities as the data governance process matures.)
- Working with the Data Governance Committee to identify, track, and resolve critical data issues. Maintain a log of these issues and ensure that a Data Steward is accountable for resolving each issue [see Appendix B for an example Critical Data Issues Log]
- Providing support to Data Stewards and other staff to ensure that everyone knows what they are supposed to do and are capable of meeting their responsibilities
- Facilitating internal communication and collaboration between program areas and between program areas and technology about data quality issues
- Facilitating communication with districts by serving as the main point of contact for data topics. The Coordinator should also serve as the point of contact for districts if any state



LDS Lore: Guns & Governance

In its Sunday pages, the county newspaper reported that during the previous school year a local school had recorded ten firearm incidents. The following morning, the school was a ghost town. Frantic parents flooded the office with calls, demanding to know why no one had notified them about these incidents. Staff assured the callers that the report in the newspaper was wrong and it was safe to bring their children back to school – there had been no firearm incidents in the school's history. Zero. A call to the newspaper revealed that the reporter found the information on the state's website. Sure enough, within a few mouse clicks, the school principal had located the error. But how could this have happened?

At the state level, the problem was traced back to three possible staff members. But, all three said they thought that reviewing that particular set of data was someone else's job this year. A call to the district found similar confusion as no one could figure out who'd dropped the ball there either. As it turned out, the simple typo of an overworked school office staffer had made its way through the quality assurance efforts of both the district and the state and into state's LDS. It was clear that a pervasive lack of clear roles, responsibilities and procedures had caused the education community a high profile embarrassment, not to mention unnecessary anxiety among a school community.

¹⁰¹ NASCIO, *Data Governance – Managing Information as an Enterprise Asset: Part I – An Introduction*, April 2008.

- program area undermines or deviates from the data governance policy (e.g., a program area makes a duplicate data request or provides inadequate notice before changes are made to a collection).
- Working with the Data Governance Committee and IT division to develop and review standards for data elements [See Standards section later in this chapter]
 - Maintaining a data collection and reporting calendar
 - Creating and managing the data request approval process to ensure the accuracy and security of shared data (alternatively, this activity may be the responsibility of the Data Request and Review Board)
 - Participating in national data conferences and member associations to stay abreast of best practices nationally

Data Stewards (a.k.a. Data Managers)

Data Stewards should be selected to manage the organization’s data, with a single Data Steward being charged with managing the data within a particular program area. A Data Steward should be accountable for the quality of specific data elements, and every data element should be the responsibility of a single Data Steward. Note that some agencies also include an additional role in their data governance structure – the Data Owner (see box to the left for more information).¹⁰² Some of the Data Steward’s specific data governance related responsibilities may include:

- Participating in the Data Governance Committee (alternatively, this may be the responsibility of the Data Owner)
- Identifying and resolving critical data issues involving the data for which they are responsible
- Participating in Data Steward Working Groups to collectively resolve data issues
- Working with the Data Governance Coordinator to develop and review standards for data elements [See Data Standards section later in this chapter for more information].
- Evaluating data quality (integrity, timeliness, accuracy, and completeness) and management (storage, reporting, adherence to policies and data architecture)
- Implementing data quality standards and all decisions of



The “Data Owner”

Some agencies distinguish “Data Owners” from Data Stewards. These may be program area directors assigned particular higher level authority for specific sets of data, while much of the work related to managing those data is assigned to Data Stewards. Specifically, the Data Owners’ responsibilities may include:

- Participating in the Data Governance Committee
- Working with IT division (specifically the security team) to determine the level of security required for each data element for which they are responsible
- Approving and signing off on all requests for the data for which they are responsible

Whereas in the simpler data governance structure proposed in this section these responsibilities are assigned to the Data Stewards, agencies may find it helpful to add this additional level to the hierarchy – some say that is critical, while others may prefer to operate without it, opting for a structure that consolidates the responsibilities among fewer staff. If your agency adopts this extra level of authority, it is crucial that each Data Owner buys into the data governance process and that two-way communication exists with the Data Stewards. In general, a good rule of thumb in data governance is to keep things as simple as possible – but whether or not that means adding another level of authority to the data governance structure depends on the agency.

¹⁰² Kansas State Department of Education (2008), Data Governance Program Version 2.2 (unpublished)

- the Data Governance Committee
- Ensuring that data dictionary and data collection and reporting calendar contain the most current information about the data elements for which they are responsible
- Documenting and updating metadata related to data elements for which they are responsible
- Working with the IT division (specifically the security team) to determine the sensitivity of and corresponding level of security and access rights required for each data element. While the security team may lead this process, Data Stewards should have substantial input. If Data Owners are a part of the structure, they may fulfill this task instead of the Data Stewards.
- Assisting users with the use and analysis of data
- Communicating to districts any changes in the way data will be collected, calculated or reported
- Signing off on the release of data (for internal or external use)
- Identifying opportunities to share and re-use data (e.g. for federal or state reporting)
- Stay abreast of laws that impact the data for which they are responsible

Public Information Officer (PIO)

This staff member identifies and communicates data of interest to the public and responds to data requests from the press. This role may also be fulfilled by the agency's Communications Officer or similar staff member. The PIO should participate as a member of the Data Governance Committee to stay apprised of data issues and knowledgeable about ownership and data sharing procedures. However, the PIO is not a Data Steward because he is not responsible for any data. In responding to press requests for data, agency procedures must be followed and data should be released only by the proper Data Steward. This will reduce the risk of spreading inconsistent or inaccurate information. The PIO can also contribute to the Data Governance Committee by sharing news of any emerging public interest in certain types of data.

Local Education Agency (LEA) Representative

Given that schools and districts are the source of all data that the state agency collects, it is essential that they actively participate in the agency's data governance process. Inclusion of districts in the data governance process helps to ensure that the decisions made are informed by the local perspective. For instance, district representatives can tell the state staff whether a proposed change to a collection can reasonably be met, and suggest alterations to make it easier for districts to comply. LEA staff can offer information about district contracts, software, workload, and costs. They can help the state create solutions that will effectively decrease local reporting burden and improve its communications and relationships with districts. In addition, participating in the state's data governance process helps increase districts' awareness of the importance of data quality and provides a model that could be implemented at the district level. At least one LEA representative should be a member of the Data Governance Committee, but multiple representatives is preferable in order to provide a more well-rounded local perspective (e.g., to represent districts of various sizes, from different geographic regions, etc.). Some states create an external group of district and others (e.g., non-education state agencies) specifically to review and approve proposed changes to data collections. Some of the LEA Representative's specific data governance responsibilities may include:

- Participating in Data Governance Committee (as a member, not as a data manager)



LEA Representative Selection

In your search for LEA representation to participate in the governance structure, it may be helpful to ask state program area leaders to identify district staff who:

- Contact them frequently about data (including those who have questions and those who have suggestions for improving collections - LEA representation will ideally come from both ends of the spectrum)
- Care about data accuracy (even when the data aren't flattering for the district)
- Have a program area, rather than a technology background.

- Participating in Data Steward Working Groups to resolve data issues that directly involve the



LDS Lore: The Effects of Disorder Trickle Down

The districts were accustomed to supplying the state department with tons of data. Sure, they had to report the same data to the state multiple times with some of the elements reported in both student-level and aggregate forms. Sure, changes to data collection requirements were often thrust upon them with no prior notice and confusion about what was required and when was common. And no, they didn't really get much out of the deal – sending the data to the state, but never getting anything especially useful back. If they realized their data were wrong – due to either a local or state mistake – local staff often didn't know who to contact and even state staff had trouble directing them to someone who could help resolve the issue. Since the state's data system didn't meet the local data needs, the district spent its time and money maintaining its own system, while grumbling about the state's shortcomings.

Unbeknownst to the districts however, a data governance process was being implemented up above. Gradually, the districts started to see improvements and word got around that a few district representatives were working with the state to improve operations. Districts rejoiced at the first sign of change: an email went out to the districts listing all of the state's Data Stewards. Finally, district staff knew who to call if they had questions about a particular program area or a submission! Next came a data collection calendar accompanied by a notice that a few of the state's data collections were being eliminated and pared down due to redundancy with other state collections. District staff gave a collective sigh of relief – not only was some burden being lifted, but they finally had an authoritative source of collection due dates. Of course data governance hadn't solved all the enterprise's problems, but it was quickly and noticeably making some real improvements in operations as well as with the districts' relationships with the state. At the state, good will and better data from the districts were confirming that their efforts were paying off.

relationship and communication between the state agency and districts

EDFacts Coordinator

Since *EDFacts* Coordinator oversees the federal reporting activities across the agency, it is important that he or she is involved in the data governance process. Some of the *EDFacts* Coordinator's specific data governance responsibilities may include:

- Participating in Data Governance Committee (as a member, not as a data manager)
- Providing periodic updates on *EDFacts* to the Data Governance Committee
- Working with the Data Governance Committee to address data issues related to *EDFacts* submissions

Business Analysts

In essence, this staff member resides at the border between the business and technology sides of the education agency – within the organizational structure, they may be in either area. Acting in a sense as the translators between the two domains, the Business Analyst harvests, assembles and translates business needs into foundational technical specifications.



Business first, then Technology

Program areas should lead the data governance process. Good data governance forces business staff to think more deeply about their needs. If the content area experts aren't forced to think through the data's purpose, definition, and standards, IT will inevitably make assumptions in order to get the job done. If their assumptions are wrong – a common occurrence that is not the fault of IT – data quality will suffer and undue burden could be imposed upon school districts. For instance, if a business rule is defined incorrectly (e.g., should a student who doesn't earn a high school diploma, but enrolls in college be counted as a dropout?) or if the option set offered for an element does not meet business needs (e.g. allows 'Null' in error), the resulting data may be problematic or even useless, resulting in data collection for naught. In creating new data element specifications or amending existing specs, program area staff should work out the business solution to the very last detail, leaving no room for guess work. Only after reflection and hard work on the business side should IT be brought in to figure out how to implement the solution with technology.

One of the agency's Business Analysts should actively participate in the data governance process. Some of the Business Analyst's specific data governance responsibilities may include:

- Participating in Data Governance Committee (as a member, not as a Data Steward)
- Working with Data Steward Working Groups to design the technology component of the solutions they develop to resolve data issues
- Reviewing data element and technology standards

DATA GOVERNANCE BODIES ^{103, 104, 105, 106, 107, 108}: In addition to the individual roles involved in the data governance structure, several groups of policymakers, data managers, and other stakeholders should be convened to address data issues collectively. When data issues affect multiple program areas, all affected stakeholders should be at the table to formulate the best response. These bodies also serve to foster coordination and shared decisionmaking to ensure that the agency approaches data issues in a consistent way across program areas and over time. Important bodies include:

Data Policy Committee

This group of executive management stakeholders may include the Education Chief (or another high level agency staff member), CIO, Data Governance Coordinator, and executive leaders from each program area that has Data Stewards. Rather than creating a new group, it would be preferable to identify an existing leadership group that includes these members and include a standing time slot during their regular meetings to focus on data governance issues. The relationship between this group and the Data Governance Committee (see below) is the critical link between leadership and those working directly with the data. The Data Policy Committee provides high level sponsorship of the data governance initiative as well as leverage for implementing major data related decisions that affect multiple program areas. This body also puts the executive "stamp of approval" on new or amended policies. Additionally, decisions that are highly contentious or outside the authority of the Data Governance Committee should be escalated to the Data Policy Committee for an authoritative resolution. For example, when staff resists a decision of the Data Governance Committee, the Data Policy Committee provides the authority to enforce the decision. Policies that significantly change the organization's handling of data should also be raised to



Data Collection and Reporting Calendar

Led by the Data Governance Coordinator, the Data Governance Committee should create and maintain a comprehensive and up-to-date data collection and reporting calendar. The calendar should document all of the agency's current and planned data collections along with details including collection due dates, a description of the data and their uses, collection format, and the person responsible for submission. This resource should be made available to all staff and the public.

Additional Resources:

- **Tennessee Data Collection Calendar (2005)**

This is a sample data collection calendar from the state of TN.
LDS Share - Filename: TN Data Collection Calendar

- **South Carolina Data Collection Manual (2006/2007)**

This manual lists the data elements collected from the School Administrative SIS by the SC Department of Education. It also includes a table listing the various collections, a table describing how the data were used in 2005-06, and a table listing the offices in the department that use the data.

LDS Share - Filename:

South Carolina 06-07datacollectionmanual

¹⁰³ Tennessee Data Management Committee Manual

¹⁰⁴ Data Quality Campaign (2008). "Data Governance: Changing Culture, Breaking Down Silos, And Deciding Who Is In Control."

¹⁰⁵ Rozelle, Rick. *Role Descriptions and Responsibilities in the Realm of Data Governance*. Center for Educational Leadership and Technology, 2008.

¹⁰⁶ *The Tennessee Statewide Longitudinal education Data System (SLeDS): The Governance Process* - Rick Rozzelle. Presentation given at 2006 IES SLDS Grantee Meeting

¹⁰⁷ Chatis Consulting, "Data Management Committee: Critical Data Issues" (unpublished)

¹⁰⁸ Kansas Department of Education, *Data Governance: The Kansas Approach*. Presentation given at Education Information Management Advisory Consortium (EIMAC) Spring Meeting, May 2007.

the Data Policy Committee, such as those that significantly alter data collections. This relatively small group should meet periodically, but not as frequently as the Data Governance Committee – perhaps every other month. Some of the committee’s specific data governance related responsibilities may include:

- Establishing the data governance policy to guide the agency’s efforts
- Selecting the Data Governance Coordinator
- Establishing the Data Governance Committee
- Approving data policies and major data-related decisions referred by the Data Governance Committee
- Identifying critical data issues to be resolved by the Data Governance Committee

Data Governance Committee

This group is the central locus of control in a data governance structure, accountable for the quality (completeness, validity and reliability) of all agency data. It is an enterprise-wide group of Data Stewards chaired by the Data Governance Coordinator that will ideally also include the CIO, PIO, the lead Business Analyst, and at least one district representative (though the involvement of multiple districts is preferable). This body may also include representation from other external organizations depending on the scope of your agency’s desired data system (e.g., representatives from higher education and other agencies such as labor, child services, etc.). By bringing a variety of stakeholders to the table, this group facilitates the collaboration necessary to address shared data issues. Meetings should occur frequently, perhaps on a monthly basis or more if necessary. An effort should be made to make this group a resource to Data Stewards, in addition to an obligation. Some of this group’s specific data governance related responsibilities may include:

- Creating a clear mission statement to guide the group’s data governance plan [See Appendix B for a sample mission statement.]
- Working together to identify, prioritize, track and resolve critical data issues
- Identifying the primary, authoritative sources of each data element (where multiple sources exist), and determining authoritative definitions and values for each data element
- Creating a schedule of deadlines for proposed changes to data collections
- Approving all new data collections and changes to existing collections (It is critical that a group of district representatives and other affected stakeholders (e.g., other state agencies) are involved in this process of “change management.” If their representation in the Data Governance Committee is small, the agency may adopt other strategies for collecting their feedback. For instance, the agency may hold meetings with districts and other affected groups (in person or online) to periodically review proposed data collection changes (it is beneficial to have both program area and technology staff present from each agency in these discussions). Alternatively, a separate group of state staff and affected external stakeholders may be formed to take on the responsibility of considering and approving proposed changes. See the Change Management box on page 109 for more information.)
- Creating and maintaining a data collection and reporting calendar
- Eliminating the collection of redundant or unnecessary data (Agencies may conduct periodic sunset reviews to evaluate the continued need for every data element it collects. This sizeable task may be taken on by the Data Governance Committee, or assigned to a separate working group. See the Change Management box on page 109 for more information.)
- Creating Data Steward Working Groups to address shared data issues that affect or involve multiple program areas
- Recommending new policies and policy changes concerning the management, quality, security, and use of data to the Data Policy Committee (via the Data Governance Coordinator)
- Overseeing the implementation of the work dictated by data-related policies

- Establishing standard business rules for data collection, sharing, and reporting to streamline operations across the enterprise
- Working with the agency’s security team to determine the sensitivity of and appropriate level of security required for each data element
- Escalating data issues outside the Committee’s authority to the Data Policy Committee for resolution (via the Data Governance Coordinator)
- Facilitating communication and collaboration across the agency between Data Stewards and other staff, and with districts and other external organizations about data issues. A standard process for communication should be created and followed (e.g., establishing standard form(s) and frequency of communications)
- Reviewing and approving standards for data elements with the IT division



LDS Lore: The Committee Becomes a Resource

When the agency began with its data governance initiative, Gary was tapped as his program area’s Data Steward. He was less than thrilled when he was told he’d need to attend a monthly meeting with other stewards and staff from other program areas. At the first meeting, he must’ve rolled his eyes a dozen times. “What a waste of time,” he thought. He had a ton of work to do and needed to call one of the districts about their data, which was on the verge of being late for the third collection cycle in a row.

Towards the end of the meeting, Patti, the woman from the English Language Learner team asked,

“Is anyone else was having trouble with the district over in Stuckeyville?”

Gary perked up, “Oh yeah. The guy Steve over there never returns my calls and they’re two days away from their deadline.”

“Forget about Steve. Call Mary. She’ll help you out,” Ellen suggested from the other end of the table.

The room erupted as more and more stewards began sharing stories and offering tips.

At the next meeting, one of the stewards, Jim, mentioned “master data management.”

“Sorry, but what the heck is master data management?” Ellen asked.

Most sat silent, a few shrugged, and finally, Jim explained what he knew about the subject.

Gary jumped in, “So it’s kind of like horizontal integration?”

“I don’t know. What’s that?” Steve asked.

Yori, the Data Governance Coordinator, suggested they set up a professional development session. It seemed everyone was at least a little unclear on the subject.

Thanks to conversations like these, Gary and the others started looking forward to these meetings. They saw the group as a resource and a sense of camaraderie was beginning to form. Staff from previously isolated program areas started helping each other as they realized they shared many of the same problems. The Data Governance Committee had shown them that they were not alone.



CHANGE MANAGEMENT

While it is very important for agencies to get a handle on their data early on in the LDS development process, as time goes by, it will also become clear that managing the changes made to the system is also a crucial and challenging task. And in fact, some states that are further along in their LDS development process have developed sophisticated systems of managing the changes made to their LDSs. Changes made to a system can impose additional costs and burdens on districts and introduce data quality challenges. And as follows, poor management of change can also become a source of tension between a state agency and its districts. For these reasons, a systematic approach to managing change with the involvement of representatives from school districts and other affected stakeholder groups is essential for the long-term success of the LDS.

A change management system should ideally include four main steps:

1. Create annual schedules listing deadlines for program areas to submit requests for additions or changes to data collections.
2. Establish data governance group(s) to review all proposed changes to the agency's data collections. Involve a large and varied group of district representatives to weigh in on changes. This will provide valuable feedback to inform better solutions and will give all districts the peace of mind of knowing that their colleagues' voices were heard and respected in the process.
3. Communicate all changes to districts as early as possible and make the message clear. Effective strategies of communicating change include district staff involvement in the data governance process, periodic training for regional or district staff and school district software vendor staff on changes to the data collections (e.g., changes to record structures, reporting requirements, business rules, standards, edits, etc.), Web meetings, and prominent posting of new documentation (e.g., new standards, due dates, etc.) on a public website.
4. Conduct periodic sunset reviews to evaluate the need for every data element the agency collects. Justify the continued collection of each data element and record, considering whether the item is required by state or federal law or is otherwise useful to the enterprise. The elimination of unnecessary data items will decrease the reporting burden imposed on districts and will increase data collection efficiency.

A Lesson from Texas

The Texas Education Agency has been collecting student-level data for nearly two decades. Early in this history, the agency realized how difficult and costly it was for districts to comply with changes made to the state data collection (e.g., new data elements, altered codes sets, etc.). The state quickly came to appreciate the need to systematically manage the changes made to their data system by involving districts and other affected stakeholders in the process and effectively communicating all changes across the enterprise.

To meet these goals, the state created a data governance structure that includes two bodies made up of external staff specifically focused on managing changes to the state's data collections. One group, the Information Task Force (ITF), is a group of representatives from districts, regional education agencies, and other organizations, which receives all proposed changes to the agency's data collections, including sunsets. Approved changes are escalated to the Policy Committee on Public Education Information (PCPEI). This group of representatives from school districts, regional education agencies, and several state agencies (e.g., Office of the Governor, Office of the Speaker of the House, the State Auditors Office and others), considers all of the ITF's recommended changes and either approves, denies, or suggests alternatives to these data collection amendments.

Additionally, every two years, the agency conducts sunset reviews of all of its data elements and records. During these reviews, a group of agency data managers and program area staff evaluate the need for *each and every* data item. Then, they present their findings to the state's data governance committees, providing a justification for continued collection of the item (including descriptions of how the data are used and any state or federal mandates to collect the item) or a proposal to cease collection of that data item. Finally, revised standards (e.g., definitions, code sets, etc.) and collection requirements (e.g., timeline of submissions and resubmissions, record layouts, edits, etc.) are created and posted prominently on a public website. All changes to collections and resulting state reports are also highlighted in periodic training sessions with district, regional, and vendor staff.

This process has been very effective in reducing district burden and ensuring that districts and their vendors have ample time to prepare for collection changes.

SOURCE: This section is largely based on correspondence with the Texas Education Agency, May 2009. For more information, visit TEA's Public Education Information Management System website at <http://ritter.tea.state.tx.us/peims/>.

Data Steward Working Groups

These teams of Data Stewards are formed by the Data Governance Committee to resolve critical data issues that span more than one program area. They work together to collectively identify the source of the data issue and develop a solution that addresses each program area's needs. While all members of this type of group should contribute to formulating a solution to the problem, only one steward should be responsible for ensuring that the group creates and implements an effective solution. [See Appendix B for guidelines for Data Steward Working Group activities.] Some of these working groups' specific data governance related responsibilities may include:

- Defining and documenting the source (not the symptoms) of the shared data issue (e.g., communication breakdowns, technology issues, unclear definitions, etc.)
- Defining the goals of resolving the issue (i.e. what they want to achieve by solving the problem)
- Creating mini projects to resolve the problem, including well documented steps, roles, and due dates
- Providing monthly updates to the Data Governance Committee on the group's progress
- Notifying the Data Governance Coordinator of issues outside the Data Governance Committee's authority so they can be escalated to the Data Policy Committee
- Collaborating with IT to implement the collectively created business solution
- Documenting and communicating final solutions to the Data Governance Committee¹⁰⁹

Data Request Review Board

This Board may be formed to manage the data sharing process and handle data requests, which are likely to increase dramatically once the agency starts collecting student-level longitudinal data. This group of directors, legal counsel staff, and Data Stewards (or Data Owners) should meet on a monthly basis. Some of this body's specific data governance related responsibilities may include:

- Creating and enforcing policies and procedures for handling data requests that standardize the review of and response to data requests (e.g., standard criteria for approval and denial, such as legality under privacy and freedom of information laws and potential benefits to the educational system)
- Documenting all approvals and denials of information requests. (In addition to internal record keeping, this activity also allows staff to more easily identify common data requests that might be fulfilled through a data mart or other "self service" resource, and it fulfills the recordation requirement under FERPA.)
- Prioritizing approved data requests based on factors such as merit and staff capacity
- Referring requests to appropriate Data Stewards, ensuring consistency in data sharing
- Monitoring the flow and completion of requests
- Escalating issues to the Data Governance Committee as needed
- Supporting data-for-a-fee services (If a data request will not benefit the educational system, or is frivolous or especially time-consuming (e.g., requestor asks agency to reformat existing data to meet their needs), the agency may decide to charge the requestor a fee in order to offset the costs of processing the request.)

Whether or not your agency forms this group, clear policies and processes for handling data requests should be developed. Some hard work on the front end to establish standard processes will save staff a lot of time and confusion by increasing inefficiency and helping to avoid improper data sharing.¹¹⁰

¹⁰⁹ Chatis Consulting, "Data Management Committee: Critical Data Issues" (unpublished)

¹¹⁰ Kansas State Department of Education (2008), *Data Governance Program, Version 2.2*.

Additional Resources: Bodies, Roles, and Responsibilities

- [Role Descriptions and Responsibilities in the Realm of Data Governance: Managing Information Assets](#) (R. Rozelle, CELT) Describes eight jobs and roles of data management. Also includes a matrix of data governance activities and the people/groups that need to be involved in each activity.
- Chatis Consulting, "Data Management Committee: Critical Data Issues" (unpublished)
- Kansas State Department of Education (2008), *Data Governance Program, Version 2.2*.
- The DGI Data Governance Framework – Gwen Thomas, Data Governance Institute (DGI)
- [The Need for Data Governance](#) – EIMAC LDS Task Force, March 2008
- [Data Governance: Changing Culture, Breaking Down Silos, And Deciding Who Is In Control](#) – DQC, Sep 08
- [Data Management Committee Manual](#) (TN)
This document is designed to be used as a reference guide to help Department employees become familiar with the Data Manager role and the Data Management Committee objectives.
- [Implementing Data Governance as the Foundation of a LDS](#) – Presentation from TN DoE: Corey Chatis, Rick Rozelle
- [Governance Structure - TN](#) – November 2006 Grantee Meeting: Session V: Governance Structure, LDS Project Team Organization, and Sustainability Tennessee presentation: Representatives discussed how their project teams were organized within their respective SEAs and how decisions were made.
- Data Managers Working Group (DMWG) Charter (2007)
This document outlines the key roles in Michigan's, Data Managers Working Group (comparable to the Data Governance Committee in this guide), the mission of that group, and the responsibilities of its members.
LDS Share - Filename: MI_DMWG Charter Final NO CONTACTS

Additional resources: Data Governance (miscellaneous)

- NASCIO on Enterprise IT Governance: A Shared Responsibility - <http://www.govtech.com/qt/270049>
- [ESP Data Management Strategy](#) for States
Page: <http://www.espsolutionsgroup.com/resources.php>
Data driven decision making relies on getting the right data, in the right way, right away, and getting them right in the process. ESP's paper explains how the right data management makes this happen.
- [Management of an Education Information System](#) (ESP)
Page: <http://www.espsolutionsgroup.com/resources.php>
Best practice has been consolidated into a comprehensive guide for managing an education agency's information system. ESP's contract's with individual SEAs and with the USED contributed insights into effective policy and practice.
- [Data Governance – Managing Information As An Enterprise Asset: Part I – An Introduction](#)
- [Harnessing the Potential for Research of Existing Student Records Databases: An Action Agenda](#)
National Center for Higher Education Management Systems (NCHEMS), July 05
A meeting of academic researchers and individuals responsible for several state "student unit record systems" (SURs) was convened on July 25-26 2005 by the NCHEMS with support from the Ford Foundation, the Lumina Foundation for Education, and the Spencer Foundation. The action agenda presented here resulted from that meeting – it explores the potential benefits of SURs and some issues associated with their development and use.
- [IES State Grantee Report: Effective Governance Models for Managing Data Systems](#)
NCES Winter Forum and MIS Conference 2007.
Three states that received 2005 Institute of Education Science Statewide Longitudinal Data Systems grants—Tennessee, Michigan, and Wisconsin—reported on the governance structures that have helped them succeed in implementing changes required in developing a longitudinal data system.

Improving Data Quality

As education data come to the fore in efforts to improve the educational system, so too will problems with those data. As follows, the return on your LDS investment is dependent on the quality of the data that are maintained in and made available through the system. This reality necessitates a heightened commitment to data quality.

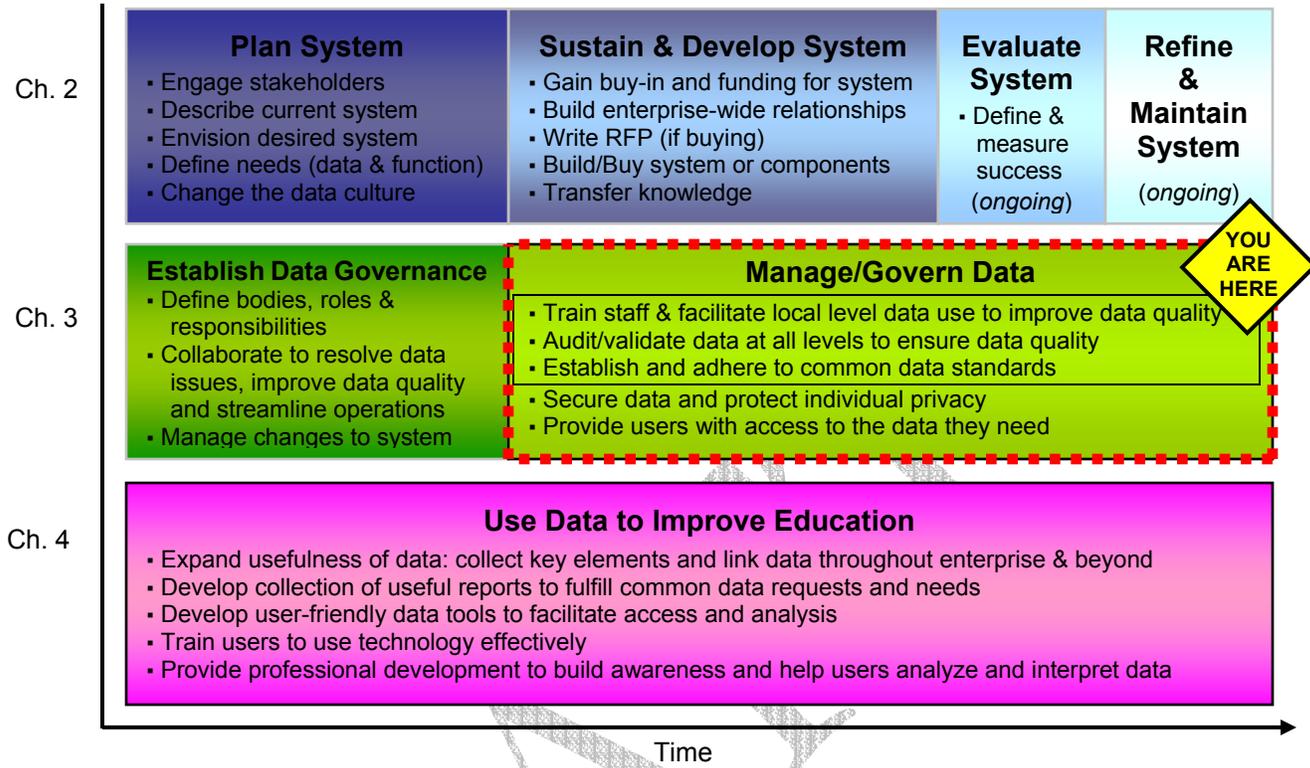
Bad data lead to bad decisions, plain and simple. Poor quality data will not be trusted, and if data are not trusted, the data system that maintains them will not be used to inform better decisionmaking. Or worse, inaccurate data can send the wrong message, cause misallocation of resources, or misdirect interventions. Decisions informed by misinformation can have potentially dire consequences for individual students, teachers, schools and districts, potentially affecting funding, reputations, careers, and students' educational opportunities. Poor quality data are also the source of much wasted time and resources as staff toil to fix bad data. If data are of high quality from the moment they are created, the agency will be able to process and use those data more quickly and effectively.



Poor quality data come from many sources – data entry and reporting errors, confusion over which data are the “right” data, and inconsistent or ambiguous standards are all common culprits. To arm decisionmakers, students, researchers and other stakeholders with timely, high quality information, and avoid costly errors and embarrassment, education enterprises must improve their strategies for creating and managing data. Data quality should be a high priority throughout the enterprise, with efforts to improve it including data governance, clear and respected policies and standards, careful and competent data entry, quality assurance procedures at all levels, and staff training and professional development. Staff must not only be taught about agency data procedures and requirements. They must also be convinced of the importance of the data they work with. The data must not be seen only as work to do; they should also be appreciated as assets that can inform and enhance their work. To this end, it is very important that local staff is able to use the data they create.

The following sections aim to help agencies improve the quality of the data they create, collect, store and make available through their LDSs. These sections will provide an overview of many factors involved in creating quality data and will direct readers to other resources focused on these issues

LDS Guide by Activities in Time



DRAFT

What are Quality Data

Data quality can be viewed in several dimensions. Quality data are accurate depictions of the real world, which are consistent across an enterprise, secure and accessible, delivered in a timely manner, and suitable for their intended applications.¹¹¹

- *Accurate and complete.* The most obvious measure of data quality is accuracy, that is, the degree to which the datum accurately depicts the real world construct or phenomenon it represents (e.g., the student's numeric grade for Algebra I in the LDS matches the one printed on the student's report card; if dialed, the school's phone number in the LDS actually connects a caller with that school; etc.). To be accurate, data reported and maintained must also be complete (e.g., all of a school's students are represented in a collection; every student is identified as either male or female; etc.).
- *Internally consistent.* Quality must be consistent across the enterprise. For instance, a student's name should be recorded in various silo systems in the same manner. While a particular child may answer to "Charles," "Charlie" and "Chuck," only one form of first name should be maintained by the agency. Calculated data items such as the dropout rate should be computed in a consistent manner across an enterprise (if they are calculated more than once). Internal consistency may also be referred to as integrity, which may be compromised when data are somehow corrupted during a data transfer or other process. Consistency is also similar to the concept of reliability, which may be diminished if, for instance, the definition of a data element is unclear, leaving room for varying interpretations by the staff that creates the data. Ultimately, inconsistent data will not be comparable for analyses.
- *Fit for intended uses.* Quality data should be valid. That is, they should be suitable measures that are designed to answer the questions that users apply them to, providing appropriate and sufficiently detailed information to inform decisions. For example, if a stakeholder wants to use data to learn about the effects of teacher qualifications in the educational system, the agency must ensure that the data items it collects to measure teacher qualifications and the definitions and contents of those data elements will capture the necessary and appropriate information.
- *Timely.* Quality data must be delivered to users within a beneficial timeframe. While a data system may be able to provide teachers with accurate student test scores, the data will be of limited use if they take months to deliver. So while data may be considered to be of high quality by other measures, they must be made accessible to users quickly if they are to meet their intended purpose of providing users with actionable information for decisionmaking.
- *Secure, yet accessible.* Quality data must also be secured to protect privacy, but also to prevent tampering by unauthorized persons. [See the Security section for more information.] These data must also be made available to authorized users to provide information and inform decision-making.¹¹²



¹¹¹ Definition is partially derived from Redman, T.C., *Data Quality. The Field Guide*. 2001, Boston: Digital Press.

¹¹² Education Information Management Advisory Consortium (March 2008). *The Need for Data Governance*.

Data Quality from Bottom to Top

The best way to ensure the quality of data is to get them right in the first place and prioritize data quality throughout the information life cycle. Data quality relies on the activities of people in the school as well as staff at the district and state levels. It starts at the source of course, typically in the school where teachers, data clerks, and other personnel record and enter data. From the school, the data then continue on to the district where they are validated and/or audited, and up to the state agency and federal government where further quality assurance processes take place.

In addition to the processes that check the flow of data up the ladder, data quality also relies on effective governance



While the state education agency can do a number of things to improve the quality of its data, essentially, it is a data receiver, relying on school and district staff to provide quality information.

and communication from the top down. Establishing effective data governance at the state (and perhaps district) level provides a mechanism to deal with ongoing data issues and will help resolve problems to prevent the passage of blame or the sweeping of issues under the agency rug. Education agencies must move from disjointed models of data management to ones that bring together all affected stakeholders from across the enterprise, create key governance groups, assign clearly defined roles and responsibilities to staff, secure the agency's data, and make sure that the organization's data help it to achieve its goals. [See Governing the Data section for more information.]

Furthermore, the federal government and state agencies establish policies, guidelines, standards and reporting requirements that must be effectively communicated down to the data suppliers to enable successful and timely implementation at the local level. Likewise, school districts may create their own standards, guidelines, policies, and regulations to guide school data activities. They create data reporting calendars, data dictionaries, metadata

systems, business rules, assign responsibilities, and implement technology to facilitate data processes. These guidelines and procedures should be similar across program areas so that districts will have similar experiences submitting various data – that is, the process for submitting data to one program area should not be very different from that of submitting to another.

Responsibility for data quality should ultimately rest with program area staff, rather than information technology staff. This is not to say that technology isn't a critical factor in improving data quality. Technology that streamlines and automates data entry and sharing are indispensable to this cause as are validation procedures implemented through technology. However, when it comes to

The Forum has more...

For more detailed information on improving data quality, visit ...



- [Forum Curriculum Online \(2008\)](#)
- [Forum Curriculum for Improving Education Data: A Resource for Local Education Agencies \(2007\)](#)
- [Forum Guide to Building a Culture of Quality Data: A School and District Resource \(2005\)](#)



CENTRAL ENROLLMENT OFFICE

The establishment of a central enrollment office where all of a district's students go to enroll can help improve the quality of data at the point of entry. Rather than relying on staff at each school to collect and enter student information for enrollment, a central enrollment office consolidates the work to a team of specialized staff who follow consistent procedures and focus solely on enrollment.¹¹¹

¹¹³ Aarons, DI, "Leading the Charge for Real-Time Data." *EdWeek*, June 3, 2009. Available at http://www.edweek.org/ew/articles/2009/06/03/33dataleader_ep.html?tkn=PSNFXRv4MZsj0rDA8PJJQE7WcHpl%2F4chVf78

ensuring data quality, oftentimes education agencies focus too much on technology and not enough on the data, and the people and business processes that govern them. If the data reported by districts are inaccurate to begin with, for instance, even the best technology solutions will fail to transform them into quality data further up the chain.

Provide Training and Professional Development

At the local level, where the life cycle of information begins, the “data makers” so to speak, from the school teacher, counselor, nurse or secretary entering student data to the district, regional service agency, or vendor staff member building a report for the state agency, must be trained to ensure the production of high quality data. Staff must be trained on best practices and procedures for creating and entering high quality data, and on use of the technology employed to collect, edit, and report data. It is also important that they are very familiar with the relevant policies, data standards, reporting requirements, and timelines. See the *Forum Guide to Building a Culture of Quality Data: A School and District Resource* and the *Forum Curriculum for Improving Education Data: A Resource for Local Education Agencies* for more information on training local staff to improve data quality.



DATA QUALITY CERTIFICATION

The Kansas State Department of Education has been a leader in ensuring data quality at the local level. The state has created a professional development program that trains and certifies a range of school and district staff on data quality practices and techniques, and software applications. For more information on Kansas’s Data Quality Certification program, visit www.ksde.org/dqcprogram

Data appreciation leads to better data quality

Staff preparation should be more than lessons on policies and procedures. Professional development programs (as well as ongoing communications throughout the enterprise) should help people understand why data are so important. Staff needs to know how what they do with data impacts the use of those data for decisionmaking at all levels, affecting everything from school funding to individual student achievement. They must understand why the data are being collected, how teachers and decisionmakers use the information, and how the data are related to the money their school or district receives. An understanding of the uses of those data will give staff a better appreciation for why it’s crucial that they are accurate and timely, and provide an incentive to strictly adhere to procedures and care about the data they produce.

Data quality results from data use

A major deficiency in many education enterprises and source of much poor quality data is the fact that the data are not used by those who create them. If staff see data collection and reporting simply as chores they’re performing for an authority, they may not be sufficiently motivated to go the extra mile to ensure data quality. The accelerating shift from a culture of “data for them” to one of “data for everyone” also helps to boost the quality of data at their inception. Whereas data have commonly moved up the data food chain often never to be seen again, the suppliers of the data – the schools and districts – now have greater access to the state’s data and can use them to enhance their work. Agencies must ensure data use down to the school office and classroom levels in order to create an incentive to improve data quality. For instance, access to student-level data with reporting and analysis tools or dashboards makes those data more useful to practitioners. District administrators can access the data to see how their schools’ performance compares with other similar districts in the state. Teachers can view data in real time to inform lesson plans and tailor instructional strategies. Additionally, state agencies may use the submitted data to produce useful reports for schools and districts, such as enrollment or dropout lists, or reports comparing schools and districts in the state. If data submitters see that the data are being used for high stakes calculations, or will be used to hold them accountable,



Data should not simply *be* work. Data should *enhance* work, as well.

or they see that the data can be used to make their jobs easier, they will have greater incentives to make sure the data are of high quality. [See Chapter 4 for more information on data use.]

Validation procedures

The flow of data from suppliers (e.g., schools and districts) to the state LDS should include a number of checks and balances to ensure the quality of the information. That is, on their way from the school secretary's keyboard to the district and on to the state data system, certain procedures and mechanisms should be in place to check data's quality, identifying anomalies and guiding their resolutions.

On their way to the collecting agencies' data systems, data should be checked for quality, ideally before they are loaded into the collecting systems. Some states use validation mechanisms to check submitted data for problems and alert staff to their existence via validation reports. Validation checks may include, but are not limited to, the application of business rules that:

- Compare data to prior year values to identify significant changes that may be in error (e.g., a change in a student's race)
- Identify invalid values (e.g., Null in a field that requires a numeric value, invalid codes, incomplete or blank fields, out of range or over limit values)
- Identify invalid formats (e.g. date is entered in incorrect format)
- Detect excessive use of certain codes (e.g., frequent use of "Other")

Such front-end validation procedures are preferable over back-end cleansing of data that have already been loaded into the system. The general consensus is that errors should be corrected in the source files and resubmitted, rather than corrected after the fact in the state or district's system. And, even if such corrections are made by state or local staff, a process should be in place to ensure that the source files are also corrected.¹¹⁴ Detected errors may be identified as critical (requiring correction) or non-critical (requiring staff review, but not necessarily requiring correction). Data suppliers should be notified of these findings (e.g., in reports via website or other means) and required to correct errors or verify that any questionable data are, in fact, correct. Agencies must determine the frequency with which their data will be validated and the timelines for submissions and resubmissions. This kind of process is helpful in verifying that the data reported are accurate representations of reality. States may also opt to verify reports with district program area staff before their release to ensure that the numbers match districts expectations.

Additional Resources: Data Quality

- [Forum Guide to Building a Culture of Quality Data: A School and District Resource](#) (2004)
This guide was developed by the Forum's Data Quality Task Force to help schools and school districts improve the quality of data they collect and to provide processes for developing a "Culture of Quality Data" by focusing on data entry—getting things right at the source. The quality of data will improve when all of the staff understands how the data will be used and how data become information. This guide will show how quality data can be achieved in a school or district through the collaborative efforts of all staff.
- [Forum Curriculum for Improving Education Data: A Resource for Local Education Agencies](#) (2007)
This curriculum supports efforts to improve the quality of education data by serving as training materials for K-12 school and district staff. It provides lesson plans, instructional handouts, and related resources, and presents concepts necessary to help schools develop a culture for improving data quality. This curriculum is also available online: [Forum Curriculum Online \(2008\)](#)
- [Texas Education Agency Data Standards web page](#)
This page presents up-to-date documentation on the state's data standards and requirements. Section 1 includes a discussion of data submission training.
- [Texas Data Validation Monitoring web page](#)

¹¹⁴ Schutte, S, S. Edwards, S. Fadaoff, T. Ogle, and G. Ligon. "The Process of Data Quality: State Discussion with Alaska, Wyoming, Missouri, and California." Presentation given at the 2009 MIS Conference, February 2009. As cited in *The Process for Ensuring Data Quality*, ESP Solutions, 2009.

This page includes resources related to the Texas Education Agency's data validation process, which "an automated data system that identifies potential data anomalies reported by districts and charters in their leaver and dropout reporting, student assessment data reporting, and discipline data reporting."

- [Kansas Individual Data on Students \(KIDS\)](#) – Data Quality Certification (DQC) program (see [May 08 DQC newsletter](#) article by Kathy Gosa) *States should look at the DQ Cert. program in KS and consider designing similar programs for data entry personnel, e.g., school clerks and administrators based on their own LDSs. Also see a presentation about the program: [Yellow Brick by Yellow Brick: Using a Professional Development Program to Strengthen Data Quality in Kansas](#)*
- [Nebraska's Data Validation Process](#), B. Beecham & P. Tagart
This presentation and the supporting document outline Nebraska's approach to data validation, which flags errors and presents the data issues through reports on a versatile website. There, authorized staff members can review the potential errors, make corrections, and sign off on the information.
- [The Process for Ensuring Data Quality](#) – ESP Solutions
http://files.e2ma.net/10851/assets/docs/esp_process_for_ensuring_data_quality_orb.pdf
- [Process Illustration: Steps for Ensuring Data Quality](#) (ESP Solutions)
Page: <http://www.espsolutionsgroup.com/resources.php>
See how decisionmakers can gain confidence in and rely upon data...
- [ESP Data Quality Imperative](#) – ESP Solutions
Page: <http://www.espsolutionsgroup.com/resources.php>
Part I of the series ties together the foundations of data quality from the formal information systems literature with the practical aspects of data quality in the arena of public education decision making.
- [ESP Data Quality Manual Part II](#) – ESP Solutions
Page: <http://www.espsolutionsgroup.com/resources.php>
Part II furthers the journey into achieving data quality from start to finish. The best practices and principles included are time-tested and gleaned from conventional wisdom in conjunction with further insights from years of real school experience.
- [State of Tennessee Department of Education Policies and Procedures: Verification of Electronic Data Systems & Accompanying Letter](#)
The purpose of this document is to establish policies and procedures for governing data system verification of quality. The letter that accompanies this document is also available.
LDS Share - Filename: TN Verification Policy - rev 4.20.06; and TN Verification Policy Letter – rev 4.20.06
- [Statistical Process Control](#) (2007)
This document describes Maryland's Statistical Process Control, a [validation] process added to the state's education data collection system to ensure the logical nature of the aggregates that Maryland State Department of Education is publishing on its website for state and federal compliance reporting.
LDS Share - Filename: MD_Statistical Process Control

Data “Standards”

A look around the country will reveal the fact that states and many districts are building separate and dissimilar LDSs. While many see this as problematic, potentially complicating the exchange and comparison of data contained in the systems, in fact, trouble only arises when various systems are built using incompatible standards. The ease with which data can be shared within an education agency and with external data systems, as well as the quality, comparability, and usefulness of the data, will largely depend on the standardization of data elements and technical specifications across systems. Adherence to common data standards is the key to bridging these systems, achieving interoperability, and enabling analyses across institutions.

First off, we need to establish what we mean by “data standards.” **Data standards** are documented agreements on representations, formats, and definitions of common data elements intended to improve the quality and share-ability of education data.¹¹⁵ Discussion of this topic is complicated by the fact that



***Data standards** are documented agreements on representations, formats, and definitions of common data intended to improve the quality and share-ability of education data.*

some people use the term as a very broad, catch-all phrase, while others use the phrase with a more specific, limited meaning in mind. In fact, the national conversation around data standards is evolving and revealing the issue’s complexity. Under the umbrella of “data standards,” there are three major types of “standards,” which serve disparate audiences and purposes:

- *Data definitions and code sets* – Concerned with the meanings and contents (e.g., values) of data elements. In a sense, they provide a common vocabulary or language for those who manage and use education data. These may be referred to as “suggested standards” and are typically included in data dictionaries, glossaries, as well as various other resources. These resources can be useful to a very broad array of users ranging from teachers, to district and state data staff, researchers, institutions of higher education, and private sector organizations.
- *Technical specifications* – Used by software and systems developers to facilitate interoperability between applications or to guide data reporting. These resources typically provide technical criteria or requirements, methods, and processes for data reporting and management. Resources including these technical standards are useful to software application vendors and system developers, as well as education agency staff who submit data to a collecting agency (e.g., to USED via the Education Data Exchange Network (EDEN) for *EDFacts*).
- *General guidelines/relationships* – Describe the relationships that exist between data elements. Data models are the typical source of such information. These resources are commonly developed for software and systems developers to help build data system architecture, as well as for researchers who need to explore the types of data available to them for study.

A systematic approach to documenting all of this information for guiding the creation, management and use of data should be established. Data managers and users alike will benefit from the maintenance and availability of these standards, and the timely communication of any changes made to them.

¹¹⁵ Definition adapted from version offered by Laurie Collins, SIF Association...

Use common definitions and codes

Without a standard set of common data elements within the state, there would be no way to make sense of the data collected and shared across schools and districts or to truly follow student performance as they change schools and districts within the state over time.

Likewise, unless states adopt the same definition and system of coding and formatting, it is impossible to compare information, such as dropout counts, from one state to another. For instance, if one state counts as graduates students who dropped out of high school, but later earned a GED or enrolled in a postsecondary institution, that state's cohort graduation rate may be higher relative to a state that counts such students as dropouts. The use of common codes for recording education data (e.g., academic courses, exits, attendance, race and ethnicity, etc.) or, alternatively, the cross-

walking of local codes to a common system offers many benefits. The establishment of common data codes like those for race and ethnicity or for courses makes it easier to transfer information and draw comparisons across entities. In the case of course codes, for instance, use of a universal system can

LDS Lore: What's a School Anyway?

Unexpected difficulty may arise during the development of standards. For instance, it took months for one state agency to define "school" – a task that no one anticipated would be particularly difficult. Staff wrestled with the nuances. Are special education schools included? How about private schools? The decisions were anything but straightforward. Variations in definitions like these can have severe implications such as in the allocation of funding.

District Difference

Many districts have their own local systems for coding data elements such as "course". Local education agencies may either adopt the state's system or create rubrics to map existing local codes to the state codes – an approach that may be less labor-intensive than the former.



reduce staff time spent in interpreting course information from transfer schools and help to easily place new students in the appropriate courses when they move to a new school in the state or even across the country. For example, common course codes based on the academic standards taught in each course will ensure that a student who completed Algebra I in one district will be placed in the appropriate follow-up course in her new school across the state. Use of common course codes will also allow more reliable comparisons of performance data over time and across institutions. For instance, an analysis considering the effects of taking Algebra I will yield reliable results only if the courses being measured are comparable in content (i.e., were classified by a common course coding system based on academic standards taught in each course).

Maintain Metadata

Metadata are the 'data about data' critical to guiding proper data management and informed data use. Without an organized approach to recording information about and standards governing the agency's data elements, it will be up to staff to remember or otherwise track all the information necessary to

understand the data (e.g., definitions, technical specifications like field length and format, data source, due date(s), purpose, business rules, related calculations or transformations, related policies, and all other relevant information related to the creation, management, interpretation, and use of those data). In the modern data environment, where data elements are numerous, complex, and ever-changing, it is simply not reasonable or advisable to manage a data system without a robust metadata system. In fact, many experts see a central, authoritative metadata repository as critical to the effective management and use of an agency's data.

The Forum has more...

For more detailed information about metadata and metadata systems, visit ...



- [Forum Guide to Metadata: The Meaning Behind Education Data](#) (2009)

Metadata are often documented in various resources, though these resources are not equivalent to a centralized metadata system. For instance, metadata may be found in a data dictionary, data set documentation, report glossaries, data collection and reporting calendars, or data models. Most of these entities, however, will normally contain only certain types of metadata (e.g., a data dictionary will generally contain only a subset of the agency’s metadata, such as data element names and definitions, and perhaps formats and business rules). See the *Forum Guide to Metadata: The Meaning Behind Education Data* for more information on metadata and metadata systems. The *Forum Curriculum for Improving Education Data* also includes helpful information about creating data dictionaries.

DATA MODELS

Recall from your days in science class the traditional taxonomy of the Animal Kingdom, in which each species is categorized under a system of classes and subclasses (from Phylum to species) grouped by characteristics. Similarly in an education data model, many entities of the educational system can be organized into a taxonomy of classes and subclasses, each with their own attributes and relationships to other entities in the Educational Kingdom, so to speak. For example, teachers and students may be categorized under the class called “Persons.” Teachers may be in the “service provider” sub-class with attributes such as full-time equivalent and various demographic information, while students might be sorted under the “client” sub-class with attributes including last name, free and reduced price lunch eligibility, and course completion records. Additionally, in the wild, we can observe certain relationships between the animals beyond the basic taxonomic organization (e.g., a suckerfish cleans a shark; an owl eats a mouse; etc.). Similarly, the observer can also note that education entities are also related (e.g., a teacher provides services to a student, etc.).

A data model documents the agency’s data architecture, helping users to make sense out of the many data items that may be tracked by an education data system. By presenting an inventory of all the persons, places, and other entities involved in education and by describing the relationships that exist among them, an education data model can help educational institutions, vendors, and researchers to better understand the education data ecosystem. And as follows, a data model can help vendors and agency staff in data system design or assist education agency leaders in the market for a data system in the selection of a product that will meet their stakeholders’ needs. A data model may also be a resource for researchers in their search for data to build into research designs.

While developing their own data models, states and districts should focus on program area needs. IT should implement the model, but the business side of the organization should drive its design. Data models are offered by a number of vendor organizations, and by the federal government, which has recently developed and continues to enhance a national non-proprietary PK-12 data model, the National Education Data Model (NEDM). The Model is available at <http://nces.ed.gov/forum/datamodel/index.aspx> and a presentation about the model is also available at http://www.dataqualitycampaign.org/files/USED_-_Education_Data_Model_Version_1_pK12_-_edited.pdf

National “Standards” Resources

State and local education agencies use a variety of data “standards,” be they home grown or adopted from state or national sources. These standards are commonly set to meet federal and state data reporting requirements. However, the use of common data standards across the education community also offers many other benefits. For instance, it enables interoperability [see ‘Some Critical Abilities’ section for more information], thus eliminating redundant data entry and lessening reporting burdens, reducing data errors, and allowing easy transfer of data and valid data comparisons across district and state lines.

Education agencies may refer to a number of major sources for national data “standards” when designing, buying, adjusting, or using a data system. The passages below discuss six such resources. These resources vary widely in nature, in terms of purpose, domain, enforceability, technicality, infrastructure, and intended audience (in fact, some would argue that not all of these resources are truly data standards in a stricter sense of the term). They range from the National Education Data Model (NEDM), which is limited to depicting relationships among data elements, to the Schools Interoperability Framework (SIF) and the Postsecondary Education Standards Council (PESC) specifications (and to a lesser extent, *EDFacts*), which offer a much fuller range of technical and non-technical standards. However, these are presented here together because they can all be used to inform the design of data elements and applications used in an LDS development effort. It should also be noted that data standards are constantly evolving. While the descriptions below represent the current state of the standards, they will undoubtedly change in time.



STANDARD INSTABILITY

Standards are constantly altered as data meanings are refined, institutions seek to align their standards to facilitate data sharing, new information is desired, new collection requirements are imposed, populations evolve, and problems with existing standards are identified. While this evolution of data standards is necessary and good, the need for data quality and efficient use of resources demand that states document and make public all changes to their data standards so that data suppliers have enough lead time to comply [see the ‘Governing the Data’ section and the ‘Change Management’ box within that section for more information].

Below, figure 3.3 presents the six major sources of data standards. These are broken up into the three types of data standards described above and are represented graphically in three Venn diagrams which depict the overlaps that exist among them in terms of their coverage of each type of data standard. As an illustrative example of how to interpret the diagram, see in the top diagram that the entirety of the *EDFacts* and SCED data definitions and code sets are contained within the NCES Handbooks, which have been incorporated into both SIF and NEDM, both of which overlap to some degree with the definitional standards offered by PESC and the Forum Guides. Moving down to the second data standard type, see that only PESC, *EDFacts* and SIF offer technical specifications, as only PESC, NEDM and SIF offer relational data standards. Examples of what each type of standard looks like in reality are presented in the third column.

Figure 3.3. Data standards resources and examples by type and relationships

Standard Type	Resources (& Relationships)	Examples								
Data definitions & Code sets	<p>A Venn diagram with five overlapping ovals. At the top is a purple oval labeled 'PESC'. Below it are three overlapping ovals: a green one on the left labeled 'NEDM', a pink one on the right labeled 'SIF', and a central one labeled 'NCES Handbooks'. Inside the 'NCES Handbooks' oval are two smaller ovals: a red one labeled 'ED Facts' and an orange one labeled 'SCED'. Below the 'NCES Handbooks' oval is a light blue oval labeled 'Forum Guides'.</p>	<p>Hispanic or Latino Ethnicity =An indication that the individual traces his or her origin or descent to Mexico, Puerto Rico, Cuba, Central and South America, and other Spanish cultures, regardless of race. The term, "Spanish origin," can be used in addition to "Hispanic or Latino."</p> <p>Code Set: 02304 - Hispanic or Latino 02305 - Non-Hispanic/Latino</p> <p>(Source: NCES Handbooks, Version 6.0)</p>								
Technical Specifications	<p>A Venn diagram with three overlapping ovals. At the top is a purple oval labeled 'PESC'. Below it are two overlapping ovals: a pink one on the right labeled 'SIF' and a red one on the left labeled 'ED Facts'.</p>	<table border="1"> <thead> <tr> <th>Element/@Attribute</th> <th>Char</th> <th>Description</th> <th>Type</th> </tr> </thead> <tbody> <tr> <td>HispanicLatino</td> <td></td> <td>An indication that the individual traces his or her origin or descent to Mexico, Puerto Rico, Cuba, Central or South America, or other Spanish cultures, regardless of race.</td> <td>values: Yes No</td> </tr> </tbody> </table> <p>Table 6.2.32-1: HispanicLatino</p> <pre><HispanicLatino>Yes</HispanicLatino></pre> <p>Example 6.2.32-1: HispanicLatino</p> <p>(Source: SIF Specification, Version 2.3)</p>	Element/@Attribute	Char	Description	Type	HispanicLatino		An indication that the individual traces his or her origin or descent to Mexico, Puerto Rico, Cuba, Central or South America, or other Spanish cultures, regardless of race.	values: Yes No
Element/@Attribute	Char	Description	Type							
HispanicLatino		An indication that the individual traces his or her origin or descent to Mexico, Puerto Rico, Cuba, Central or South America, or other Spanish cultures, regardless of race.	values: Yes No							
General guidelines & Relationships	<p>A Venn diagram with three overlapping ovals: a purple one at the top labeled 'PESC', a green one on the left labeled 'NEDM', and a pink one on the right labeled 'SIF'.</p>	<p>A diagram showing a box labeled 'Demographics' with 'DemographicsType' below it. To its right is a vertical list of four boxes, each with a question mark icon and a sub-element name: 'RaceList' (RaceListType), 'HispanicLatino' (HispanicLatinoType), 'Gender' (GenderType), and 'CountryOfBirth' (CountryType).</p> <p>(Source: SIF Specification, Version 2.3)</p>								

EDFacts

EDFacts is a data initiative of the U.S. Department of Education that compiles national K-12 education data by consolidating a number of previously separate federal surveys. By combining these collections, EDFacts is intended to centralize performance and other aggregate data for decision- and policymaking. The aim is to streamline data submissions to the federal government and eliminate redundancies, thus easing the burden on state education agencies. Data collected for EDFacts include student and staff demographics, program participation, student performance and completion, school and district directory data, revenues and expenditures, school choice options, and other information. As a “standards” resource, EDFacts provides data elements, definitions and code sets. USED also publishes technical specifications for EDFacts to guide the file submission process. As much of the data collected by states are used to meet federal reporting requirements, the standards provided by EDFacts are commonly adopted by the states to facilitate compliance. All of the EDFacts data elements have been incorporated into the NCES Handbooks, the Schools Interoperability Framework (SIF) specifications, and the National Education Data Model (NEDM) (see below). For more information on EDFacts, visit <http://www.ed.gov/about/inits/ed/edfacts/index.html>.

National Center for Education Statistics (NCES) Handbooks

The NCES Handbooks includes a vast collection of basic data elements and options. The resource's stated purpose is "to provide a comprehensive listing of all data elements that might be needed for decisionmaking related to managing an education system, reporting to state and federal education agencies, and computing indicators of school effectiveness." The data elements of the Handbooks are updated annually and are organized into seven "domains" or levels, which include Class, Intermediate Educational Unit (IEU), Local Education Agency (LEA), School, Staff, State Education Agency (SEA), and Student. For each data element, a definition is provided along with an option set, whenever applicable. As a "standards" resource, the Handbooks offer a catalogue of data elements, definitions and code sets. The Handbooks are consistent with and incorporate all of the data elements needed to submit to the *EDFacts* data collection. The Handbooks also include the School Codes for the Exchange of Data (SCED) (see below), and a number of the standards provided by Forum publications (see below). Additionally, the vast majority of the Handbooks' terms, definitions, and code sets have been incorporated into the Schools Interoperability Framework specifications (see below) as well as the National Education Data Model (see below). For more information and to access the NCES Handbooks, visit <http://nces.ed.gov/programs/handbook/>. Education agencies may also use the Handbooks' Data Dictionary Customization site to build their own data dictionaries.

The Handbooks include the SCED, which presents a course taxonomy and course descriptions for secondary education.¹¹⁶ These codes are specifically intended to help education agencies track students longitudinally as they advance grade levels, transfer to different schools, or enroll in a postsecondary institution. To access the SCED handbook, visit <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2007341>. For a basic list of elementary level course codes, see the related options list for the NCES Handbooks data element "Elementary Course/Subject" at <http://nces.ed.gov/programs/handbook/elementinfo.asp?elementid=63664>.

National Education Data Model (NEDM)

The National Education Data Model began as a joint effort between the Forum and the Schools Interoperability Framework (SIF) Association and is now managed by the Council of Chief State School Officers under contract with USED. The model is *not* a standards instrument. Rather, as a "standards" resource, it provides general data guidelines, *depicting the relationships* between a large collection of data elements collected and used in PK-12 education. Specifically, it focuses on the granular data items, attributes and relationships associated with teaching, learning, and business operations at the school and district levels. For instance, the NEDM will tell you that a student, who has a name, physical address, phone number, displacement status, and other attributes, receives services from a teacher and participates in a class, which has a room number within a building, which is a capital asset defined in the NCES Handbooks, and so on. Version 1 of the data model can be accessed at <http://nces.ed.gov/forum/datamodel/index.aspx>. The Model currently includes the majority of the elements contained in the NCES Handbooks, and also overlaps considerably with the collection of data elements in the Schools Interoperability Framework (SIF) specifications [see below]. A number of the Forum standards are also included [see below]. Version 2.0 of the NEDM, which is currently in development, will include all of the data elements contained in the NCES Handbooks. In the future, the Model is also expected to include elements from postsecondary education, which are included in the Postsecondary Electronic Standards Council (PESC) standards (see below). [See the 'Data Models' box above for further general discussion].

¹¹⁶ A similar collection of course codes for the elementary and middle school levels is currently being developed. For more information, see the Forum's Elementary/Middle School Course Classification Working Group at <http://nces.ed.gov/forum/emscourseclass.asp>.

National Forum on Education Statistics

The National Forum on Education Statistics has long been a leading resource for education data standards, focusing on issues of data standardization and basic data elements. The Forum, an organization of state and local education agencies, the federal government and other organizations, has produced a number of publications that provide voluntary, best practice recommendations guides containing data standards, including definitions, codes and education data system components. Thus far, these products have covered areas such as crime, violence and discipline, attendance, exits, finance, and facilities, and student displacement. Many of the Forum's standards have been incorporated into the NCES Handbooks, the NEDM, and the SIF specifications. For more information on the Forum's publications, see Appendix D or visit <http://nces.ed.gov/forum/publications.asp>. Forum products can also be accessed through NCES's Standards and Guidelines page at <http://nces.ed.gov/dataguidelines>.

Postsecondary Electronic Standards Council (PESC)

PESC is an organization of colleges and universities; professional and commercial organizations; data, software and service providers; nonprofit organizations and associations; and state and federal government agencies. Among the organization's missions is to create data standards to facilitate the exchange of data among postsecondary institutions. As a "standards" resource, PESC provides range of standards for higher education, cataloguing data elements, definitions, and code sets, and specifying technical requirements. The PESC standards for student transcripts have been cross-walked to the SIF standards for student records to ensure comparability and completeness. However, because the standards are implemented differently, some variations exist. PESC and SIFA continue to work together to promote interoperability. PESC data elements related student transitions to postsecondary (e.g., e-transcript information) will also be included in the NEDM in the future. K-12 education agencies may use PESC standards to enable data sharing with postsecondary institutions about students bound for or enrolled in Higher Education. For more information on PESC, visit <http://www.pesc.org/>.

Schools Interoperability Framework (SIF) Implementation Specifications

The SIF Association is a nonprofit organization, which includes as members local and state K-12 education agencies, software vendors, and others in the education community. The organization has created and continues to enhance a vendor-neutral "technical blueprint" for exchanging K-12 data. As a "standards" resource, SIF offers a full range of standards. SIF defines suggested standards for naming, defining, and formatting data elements, as well as the technical specifications to facilitate interaction between software applications to enable applications from different developers to easily interact and exchange data. SIF also includes a data model, depicting the relationships among the data. SIF includes data elements in various areas such as student information, assessment, facilities, finances, food services, transportation, and professional development. The SIF specifications incorporate the NCES Handbooks elements and code sets whenever possible. However, SIF includes many data elements that are not captured by the Handbooks. All of the ED*Facts* elements are included, and the SCED codes are referenced in the SIF specifications, as well as a number of standards provided in Forum products. SIF also overlaps with PESC standards related to student transitions to postsecondary, such as transcript information. For more information on the SIF specifications, visit <http://www.sifinfo.org/us/index.asp>

Additional Resources: Data Standards

- [Data Quality Campaign Standards, Interoperability and Portability Thought Leaders Meeting \(Washington\)](#) DQC. May 5, 2009.
This webpage includes a number of presentations and resources related to data standards. The meeting materials, [Common Data Standards](#), offer basic definitions of commonly used terms related to data standards.
- [SIFA Implementation Toolkit](#)
Includes Planning Questions (scope, desired automation, data needs expected changes), RFP Language, Implementation Planning Toolkit ("To assist with that task, this Toolkit will walk districts through the planning process from conception-of-need to the deployment of the technology based on the premise of that systemic approach, and a recognition that the integration will evolve over time. Within the Toolkit you will find the steps you should take to identify your data integration

needs, consider your options, acquire the technology, and implement the SIF solution that will serve you today and provide a foundation for the future.”), and *SIF Tools Framing*

- [NCES Handbooks Online](#)
The NCES Data Handbooks provide guidance on consistency in data definitions and maintenance for education data, so that such data can be accurately aggregated and analyzed. The online Handbook database provides the Nonfiscal Handbooks in a searchable web tool. This database includes data elements for students, staff, and education institutions.
- [Financial Accounting for Local and State School Systems: 2003 Edition](#)
- [The Right Data to the Right People at the Right Time: How Interoperable Data Help America's Students Succeed](#)
Laurie Collins, et al. DQC Issue Brief
- [Secondary School Course Classification System: School Codes for the Exchange of Data \(SCED\)](#) (2007)
This NCES data handbook provides taxonomy for assigning standard codes to secondary school courses in 22 major subject areas. It also includes a content description for each course, and instructions on how to use the taxonomy in coding courses.
- [Articulating the Case for Course Numbers](#) (ESP)
Page: <http://www.espsolutionsgroup.com/resources.php>
This article argues for the use of common course codes nationwide.
- [The Open Group](#)
The Open Group is a consortium of organizations from the public and private sectors that seek to “enable access to integrated information within and between enterprises based on open standards and global interoperability.” The organization provides a SIF certification program for vendors.

Additional resources: Metadata & Data Dictionaries

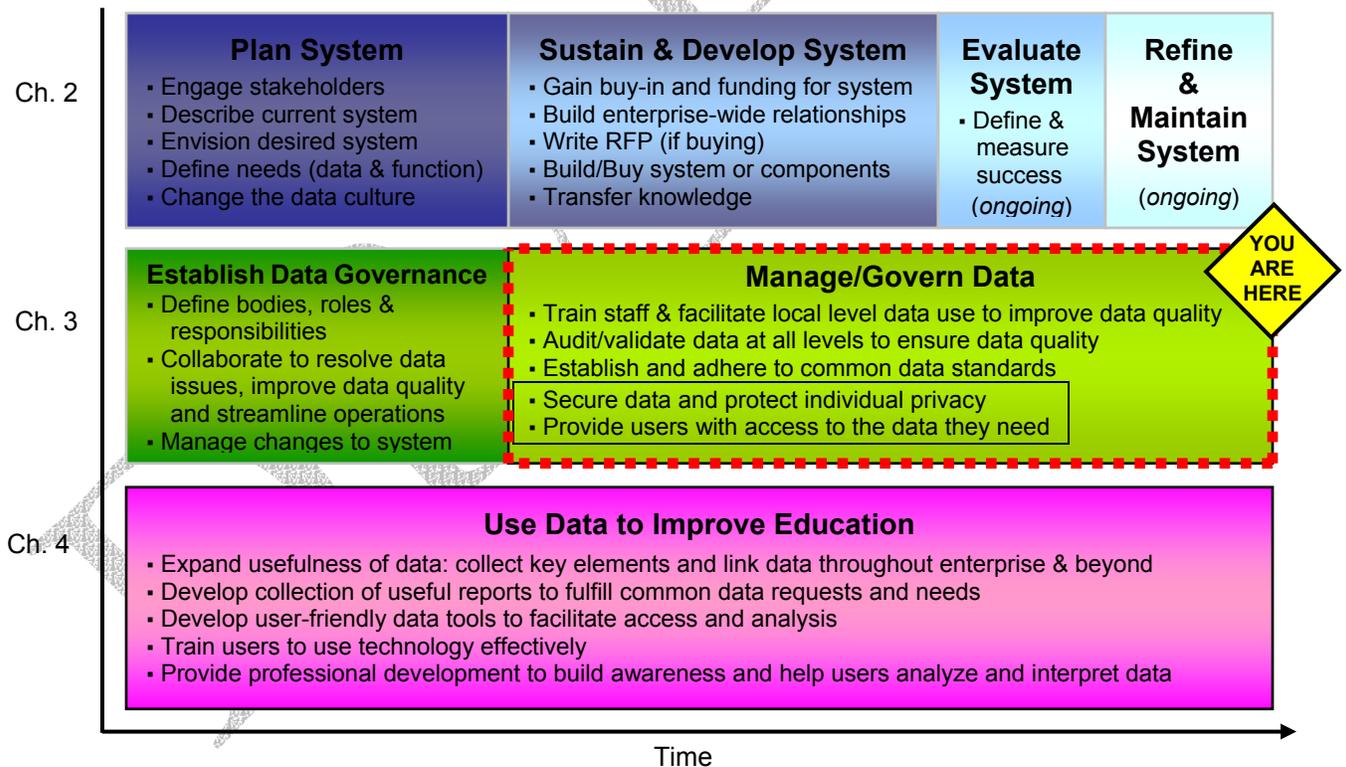
- [Forum Guide to Metadata: The Meaning Behind Education Data](#) (Forum - 2009)
The purpose of this guide is to empower people to more effectively use data as information. To accomplish this, the publication explains what metadata are; why metadata are critical to the development of sound education data systems; what components comprise a metadata system; what value metadata bring to data management and use; and how to implement and use a metadata system.
- [Minnesota Department of Education Data Dictionary: Demo Version](#) (2007)
Minnesota has prepared and published a demo version of its Minnesota Department of Education data dictionary. This version has the same content and form as Minnesota's internal data dictionary, with the exception that data elements that might be sensitive from a security point of view are not revealed.
LDS Share - URL: <http://education.state.mn.us/mde-dd/>
- [South Carolina LDS Project: Data Dictionary-Data Model](#) (2006)
This document illustrates South Carolina's longitudinal data system project's data dictionary/data model.
LDS Share - Filename: SC DataModel
- [Strategic Approach For Developing the Longitudinal Data System \(LDS\) Data Dictionary](#) (2007)
This is a working document that outlines the approach for developing the Wisconsin Department of Public Instruction's longitudinal data system data dictionary.
LDS Share - Filename: WI DataDictionaryApproachV3
- [Agency-wide Data Dictionary Planning Project](#) (2007)
This document details the two projects related to the Wisconsin Department of Public Instruction's Agency-wide Data Dictionary: 1) The Agency-wide Data Dictionary Planning project; and 2) The Agency-wide Data Dictionary Implementation project.
LDS Share - Filename: Data Dictionary Final Report ver1-6

Securing the Data, Protecting the Individual

As state and local education agencies implement LDSs, the collection, management and dissemination of individual student records via these data systems will increase the need to protect individual privacy and dramatically raise the stakes for data security. While many state agencies, districts, and schools have not maintained student-level longitudinal data in the past, many educational institutions have had experience handling extensive and sensitive records on individual students and staff. And even the aggregate data sets maintained at the district and state levels may contain information that can be used to single out individual students, thus requiring special protection.

A host of federal and state laws exist to protect the privacy of individuals. Education agencies must also create and implement their own policies and procedures to guide staff activities in accordance with these laws and regulations in order to protect sensitive information. Security policies and procedures should be established and implemented through staff training and technology solutions to protect sensitive records. The following sections address these issues.

LDS Guide by Activities in Time



Privacy and Confidentiality

To reach their potential, LDSs must be used to collect, maintain, and make student- and staff-level data available to a wide variety of people. Users like teachers, students, principals, legislators, researchers, postsecondary administrators and others can benefit from access to longitudinal data [see Benefits section in chapter 1 and Beneficiaries section in chapter 4]. But, while these data can greatly enhance our ability to efficiently allocate resources and improve programs, instruction, and achievement, we must at the same time appreciate the sensitivity of this information and the need to protect it accordingly. Individual privacy must be safeguarded in compliance with federal and state laws to prevent unauthorized and unlawful access to private data. And, procedures should be created to allow secure and appropriate data sharing with organizations and users throughout the education community and beyond. While there has been ongoing debate and uncertainty over how best to protect privacy while allowing research and data access, many states have demonstrated that an effective balance can be struck. Getting it right will work to everyone's advantage. This section provides a basic overview of issues and relevant laws regarding the protection of these data.



Privacy ≠ Confidentiality

Though often confused, there is a distinction between privacy and confidentiality. “Privacy refers to an individual’s right to withhold information, that is, not to divulge information to anyone else. Confidentiality refers to the handling of information that has been obtained by a second party.”¹¹⁶

Federal Privacy Laws

This section provides brief overviews of the four key federal laws that directly affect the data collected and maintained by most education agencies. Although the Family Educational Rights and Policy Act (FERPA) applies to the vast majority of education data, three other federal laws – the Health Insurance Portability and Accountability Act (HIPAA), the Individuals with Disabilities Education Act (IDEA), and the National School Lunch Act (NSLA) – also apply to some data in some cases. Though the details of these laws and their official interpretations do not spell out every detail of implementation, they do provide basic guidelines on what data can be shared, with whom, and under what circumstances.¹¹⁸ State policies and laws often work out some of the implementation issues and sometimes add further privacy protections to those required by the federal government’s laws.

Personally identifiable information

Before we review the privacy laws of import, it should be made clear which data are affected. Privacy laws such as FERPA put no restrictions on data sharing if all individually identifiable information is removed from the records. According to FERPA, *personally identifiable information* includes direct and indirect identifiers such as:

- Name
- Social Security number



...BUT, DON'T TAKE IT FROM US!

Information offered here on these federal laws should not be considered authoritative or legally binding interpretations. Given the complex and dynamic nature of these laws, specific questions about student record confidentiality should be referred to the appropriate federal office or your agency’s legal or administrative agents. See the Additional Resources box following this section for more information.

¹¹⁷ U.S. Department of Education, National Center for Education Statistics. (1998). *Unit Record Versus Aggregate Data: Perspectives on Postsecondary Education Data Collection, Retention, and Release*, NCEES 98-280, prepared by David Stevens and Michael McGuire for the Council of the National Postsecondary Education Cooperative Working Group on Unit Record Data Versus Aggregate Data. Washington, DC.

¹¹⁸ Information offered on these federal laws should not be considered authoritative or legally binding interpretations. Specific questions about student record confidentiality should be referred to appropriate federal office or your agency’s legal or administrative agents.

- Student identifier (e.g., from school, district, or state)
- Student's or family's address
- Date of birth
- Place of birth
- Names of parents and other family members
- Biometric records (e.g., biological or behavioral characteristics including fingerprints, retina and iris patterns, voiceprints, DNA sequence, facial characteristics, and handwriting samples)
- Mother's maiden name
- Other traceable characteristics or information (see below)

In some cases, even when personal information is removed from individual student records, users of the data may still be able to match individual students to their records when those students' characteristics are rare or unique. State and local staff needs to take a proactive approach to preventing such invasions of privacy. Taking a simple example, the only female Asian 3rd grader enrolled in a school won't be very hard to identify in a data set, even if all of the personally identifiable information is removed. Given the historical detail contained in these longitudinal records, enterprising viewers may be able to identify individuals using even less obvious clues. For instance, if there are two White male students in the 12th grade who came from a particular middle school and one drops out, it will be possible for users to identify both students, potentially exposing their performance on assessments, free and reduced price lunch eligibility and other personal information. In cases like these, perturbation, encryption, redaction or deletion of data is necessary to maintain the confidentiality of private information.

Agencies may also need to manipulate aggregate data sets or performance reports that include groups of less than a specified number (or *n*) of students – 5 or 10, for example – to avoid exposing any individual student's score or other personal information. In practice, agencies may suppress all of the information about a small subgroup, or combine subgroups to raise the number or percentage of students reported in a group. This minimum *n* should be large enough to protect privacy and ensure statistical reliability, while also avoiding the loss of too much detail.¹¹⁹ Similarly, agencies must also manipulate their data sets or reports if certain statistics are too large. For instance, if 100 percent of students in a school are eligible for free- or reduced-price meals, in effect, users will know the eligibility status for every student in that school. In this case, the percentage may be artificially decreased to create uncertainty about who is eligible, and thus, protect students' privacy.

The Forum has more... 

For more detailed information about FERPA (and HIPAA), visit the Forum's [FERPA Resources page](#). The Forum also offers several publications about privacy issues:

- [Forum Guide to the Privacy of Student Information: A Resource for Schools \(2006\)](#)
- [Forum Guide to Protecting the Privacy of Student Information: State and Local Education Agencies \(2004\)](#)
- [Privacy Issues in Education Staff Records \(2000\)](#)

Once “scrubbed” of personally identifiable information and manipulated as necessary, data may be shared with the public without consent according to FERPA, although some states do restrict access to even these de-identified data to varying degrees. However, data sets that do contain personally identifiable information are subject to a number of laws intended to protect individual privacy.

FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT (FERPA): The *Family Educational Rights and Privacy Act of 1974*, commonly referred to as FERPA, is a federal law intended to protect the privacy of student education records. The law applies to all educational institutions that receive federal funding under programs administered by the U.S. Department of Education.

¹¹⁹ ESP Solutions (2008). *Confidentiality and Reliability Rules for Reporting Education Data*.

FERPA has increasingly become a critical issue in the education community, recently because of its emerging implications for LDS development and data sharing. As a result of the rapid advance of technology and the expansion in data collection and demand, a rising level of uncertainty has surrounded the law's implementation. The law generally prohibits agencies from sharing personally identifiable information without written consent (though a number of exceptions are made). Many agencies have been reluctant to share data in some instances for fear of infringing on their students' rights under FERPA. While this hesitance may often be justifiable, in other cases, agencies' withholding of information may be overly cautious, based on too strict an interpretation of the law. This roadblock to data access has been a continuing source of frustration for many potential data users – primarily education researchers. And, it has been asserted that some education agencies have used FERPA as an excuse not to release data that might portray the educational system in an unfavorable light.¹²⁰

Written during a time when individual education records were maintained on paper at the local level, FERPA's original authors knew nothing about electronic records or statewide LDSs. To keep up with the evolution of technology and culture, USED has offered subsequent interpretations of FERPA in order to allow the education community to progress while still honoring the law. Most recently, issuance of a revised interpretation of FERPA by USED in 2008 helped to clarify many of the ambiguities and remove some of the roadblocks that existed in previous regulations. Of major significance was the expansion of disclosure rights to state education agencies, effectively paving the way for easier access to statewide student-level data (previously, only districts were granted disclosure rights – a limitation that, among other problems, made it difficult for researchers to compile significant samples of student data). Additionally, the new regulations refine guidance concerning disclosure of student information to parents, third parties, former schools, state auditors, and research institutions; recordation (i.e., keeping records of each disclosure); data sharing among K-16 educational institutions; de-identification of shared records; and uses of Social Security numbers.

Still, while the new regulations were intended, at least in part, to strike an appropriate balance between the protection of student privacy, and the facilitation of valuable research to improve the quality of education, questions about the law remain. These uncertainties center primarily on the particulars of sharing PK-12 data with researchers, postsecondary institutions, student's former schools or districts, and other state agencies (e.g., workforce and social service agencies).¹²¹ Further work may be necessary to reconcile the law with the federal government's goal of fostering the development and effective use of statewide, student-level LDSs.

HEALTH INSURANCE PORTABILITY AND ACCOUNTABILITY ACT (HIPAA): The Privacy Rule of the *Health Insurance Portability and Accountability Act of 1996* (HIPAA) is intended to protect the confidentiality of individual health records. In general, elementary and secondary schools and districts are not subject to HIPAA, because even if they qualify as a "covered entity" under HIPAA, any health-related data they maintain are considered "education records" subject to FERPA. FERPA takes precedence over even those records created by a school nurse or other healthcare provider under the direct control of the school. The majority of schools and districts must comply with HIPAA only when they request medical records from a health care provider. Once those data are in the educational institution's possession, they are considered education records and are subject to FERPA. Private schools that are subject to HIPAA but do not receive funding from a program of USED are the most common exception. In these cases, the education institutions must protect any health-related data about students or others it provides health care services to, in this case considered "protected health information," in compliance with HIPAA.

¹²⁰ Viadero, D. (2006). "Scholars Cite Privacy Laws as Obstacle." *Education Week*, 25(19).

¹²¹ Education Counsel (2008), *Needed Changes in FERPA Not Addressed in Final Regulations*

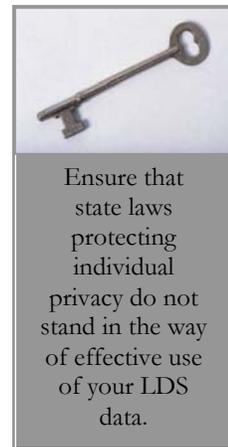
INDIVIDUALS WITH DISABILITIES EDUCATION ACT (IDEA): Records on students in Special Education programs, including data related to services provided under the *Individuals with Disabilities Education Act* (IDEA) are subject to the privacy requirements of IDEA. The IDEA requirements include many of the same protections that exist in FERPA, with a few differences, plus a number of additional requirements not required by FERPA. For instance, IDEA adds that information on a student's disability cannot be shared without parental consent. In sum, institutions subject to both FERPA and IDEA must comply with the privacy provisions of both laws. The significant overlap between the laws simplifies this task.

NATIONAL SCHOOL LUNCH ACT (NSLA): Data on students' eligibility for free- and reduced-price meals and information obtained as part of the National School Lunch Program of the U.S. Department of Agriculture are covered by confidentiality restrictions in the *National School Lunch Act* (NSLA). While also subject to FERPA, the privacy restrictions of the NSLA are stricter in two cases: free- and reduced-price meal *eligibility* and *status*. The sharing of individually identifiable information on eligibility is prohibited without parental consent. Eligibility and, in some cases, other information obtained as part of the eligibility process about the student's household, may be shared with select individuals and programs, such as some assessments (e.g., the National Assessment of Educational Progress (NAEP)). A student's free- and reduced-price meal status is similarly protected. However, in most states, these data may be made widely available to data users if all personally identifiable information is removed.

State Laws

While the federal laws discussed above provide general guidelines for protecting student privacy while at the same time allowing some data sharing, it is up to states to determine many of the implementation details to guide daily operations. Many states have established their own laws and policies that either mirror or expand on the basic guidelines provided by federal laws.

For instance, some states have issued laws dealing with areas within FERPA that are perceived as ambiguous. For example, they may define authorized disclosures more specifically, establish a process for approving disclosures through written agreements, or specify roles and responsibilities for protecting privacy, or allow the use of Social Security numbers as student identifiers. Other states have passed laws that explicitly permit certain data sharing such as between K-12 and postsecondary, between state education agencies, or with other state agencies such as workforce or social service agencies. On the other hand, some states have enacted laws that are more stringent than the federal laws protecting privacy. For instance, they may prohibit disclosures that would otherwise be permitted under the current interpretation of FERPA, such as disclosures from the state education agency to districts receiving a transfer student, or to teachers about his or her pupil. States should review their existing privacy laws, regulations and guidelines to ensure that they will not prohibit effective use of the student-level longitudinal data they intend to make available through their LDS.^{122,123,124}



Ensure that state laws protecting individual privacy do not stand in the way of effective use of your LDS data.

¹²² Data Quality Campaign (2007). *Maximizing the Power of Education Data While Ensuring Compliance with Federal Student Privacy Laws: A Guide for Policymakers*.

¹²³ Hill, EG, Legislative Analyst's Office. (2008). *Redefining Student Data Access Policy*.

¹²⁴ Nunn, JA & KL Harper Mainzer, Johns Hopkins University. (2006). *Longitudinal Data Systems: Summary of Current Issues and Potential Uses*.

Additional Resources: Privacy and Confidentiality

- [Forum Guide to the Privacy of Student Information: A Resource for Schools](#) – Forum, 2006
This guide helps school and local education agency staff to better understand and apply FERPA, a federal law that protects privacy interests of parents and students in student education records.
- [Forum Guide to Protecting the Privacy of Student Information: State and Local Education Agencies](#) - Forum, 2004
This Guide presents a general overview of privacy laws and professional practices that apply to information collected for, and maintained in, student records. The document also provides an overview of key principles and concepts governing student privacy, summarizes Federal privacy laws and recent changes to them, identifies issues concerning the release of information to both parents and external organizations, and suggests good data management practices for schools, districts, and state education agencies.
- [Privacy Issues in Education Staff Records](#) - Forum, 2000
This report addresses key concepts in protecting and managing information in staff records. It does not provide legal guidelines, but does address the federal Freedom of Information and Privacy Acts and offers principles of best practice.
- [Redefining Student Data Access Policy](#) - Jan 08
- [Protecting Student Records and Facilitating Education Research: A Workshop Summary](#) – Margaret Hilton, National Research Council
- Confidentiality and Reliability Rules for Reporting Education Data - ESP, 2008
Available at: <http://www.espsolutionsgroup.com/resources.php>
This comprehensive report fleshes out the confidentiality and reliability issues that states encounter when reporting education data. It also offers criteria for agencies to use when establishing the rules for and selecting a minimum number of students to report in subgroups in data sets and performance reports such as AYP. In particular, see pages 26-32 for a discussion on methods of manipulating data to protect confidentiality.

FERPA

- [Family Policy and Compliance Office \(FPCO\) website](#)
This office of USED administers FERPA. Its website contains a host of resources on the law.
- [Final FERPA Regulations](#) FPCO, December 9, 2008
These regulations were issued by USED and have been effective since January 8th, 2009. This revised interpretation of the law contains extensive discussions of public comments received about the previous version of the regulations, noting all changes made.
- [Section-by-Section Analysis](#) of the new FERPA guidelines – Family Policy Compliance Office
This document highlights the FERPA guidelines that have changed in USED's new interpretation of the law.
- [Forum Guide to Protecting the Privacy of Student Information: State and Local Education Agencies \(2004\)](#)
- [Forum Guide to the Privacy of Student Information: A Resource for Schools \(2006\)](#)
- FERPA Regulations presentation – DQC & Education Counsel:
https://admin.na3.acrobat.com/_a756966085/p74276192/
- [Data Quality Campaign : FERPA resource page](#)
This page contains a wealth of resources including policy briefs, legal analyses, state memorandums of agreement and understanding, and more. Also visit the [Final Regulations and Analysis 2008](#) page for more recent resources.
- [Maximizing the Power of Education Data While Ensuring Compliance with Federal Student Privacy Laws: A Guide for Policymakers](#)
- [Data Quality Campaign: Final Regulations and Analysis 2008 resource page](#)
- [FERPA Myth Busters](#) - Steve Winnick, Education Counsel
- [Needed Changes in FERPA Not Addressed in Final Regulations](#) – Education Counsel

HIPAA

- [Department of Health and Human Services \(HHS\) Health Information Privacy page](#)
This website provides fact sheets, educational materials, and frequently asked questions about the law.
- [Joint Guidance](#) on FERPA and HIPAA – FPCO, 2008
- The National Association of School Nurses [Issue Brief on Privacy Standards for Student Health Records](#).
This resource geared towards school health care providers discusses the relationship between FERPA and HIPAA and the laws' implications for their work. The association also has a [resource page](#) on FERPA and HIPAA (log in required).
- [Washington State Office of Public Instruction technical assistance paper](#)
This brief paper discusses the instances under which educational institutions are subject to HIPAA.
- [Privacy Standards for Student Health Records](#) – National Association of School Nurses
- [Forum Curriculum for Improving Education Data: A Resource for Local Education Agencies \(2007\)](#)
Page 41 of this product discusses health record privacy requirements, including HIPAA and its interaction with FERPA.

IDEA

- [Forum Guide to Protecting the Privacy of Student Information: State and Local Education Agencies \(2004\)](#)

See pages 17-18 of this guide for a discussion of privacy protection under IDEA and the law's relationship to FERPA.

- [Individuals with Disabilities Education Act \(IDEA\) website of the USED](#) (Part B)
This site, focusing on Part B of IDEA, which deals with children ages 3-21, offers a large collection of resources related to the law.
- [Office of Special Education and Rehabilitative Services \(OSERS\) website](#)
This office of USED assists states with implementation of the Individuals with Disabilities Education Act (IDEA). This site offers a host of resources related to legislation, regulations, and policy documents.
- [Joint Guidance](#) on FERPA and HIPAA – FPCO, 2008
This document, while focusing on FERPA and HIPAA, includes a brief discussion of IDEA (see Section II).

NSLA

- [National School Lunch Program website](#) – United States Department of Agriculture, Food and Nutrition Service
- [Confidentiality of Free and Reduced Price Meal Eligibility](#) – Arkansas Department of Education memo, 1/14/2009

In the News...

- [Scholars Cite Privacy Laws as Obstacle](#). Education Week, 25(19), January 17, 2006. Available at <http://www.edweek.org/ew/articles/2006/01/18/19ferpa.h25.html?qs=viadero+researchers+cite+privacy+law>
This article describes some struggles between the education community and researchers regarding FERPA. The article predates the issuance of the new regulations, which may have resolved some of these issues.
- [Pupil tracking idea elicits privacy worry in Maine; longitudinal data system plan involves Social Security numbers](#), Kennebec Journal, May 5, 2009
This article discusses Maine's decision to use Social Security numbers as student identifiers to enable the linkage of student-level longitudinal data across PK-12, postsecondary and workforce agencies. The associated controversy is also explored.

DRAFT

Data Security

Regardless of whether your education agency has an LDS, your data need to be secured to prevent unauthorized access and tampering. However, the collection, maintenance, and dissemination of student-level longitudinal data via an LDS and various source systems ups the ante for data security. While many districts have long been in the business of storing some personally identifiable information, states take on a new responsibility when they begin to manage personally identifiable student-level data.

Security measures should serve to keep sensitive data out of the wrong hands, while at the same time maximizing the accessibility of the agency's data to users. An LDS contains sensitive data that, if compromised, can be used to violate privacy, exposing restricted personal information.¹²⁵ Protections must allow users to access data to which they are entitled, while barring other users from seeing or manipulating data to which they do not have rights. This includes decisions not only about *who* gets access, but for *how long* they are allowed to access the data (e.g., teachers' access to past students).

The Forum has more...

For more detailed information about data security issues, visit:

- [Forum Unified Education Technology Suite \(2005\)](#)
- [Forum Guide to Decision Support Systems: A Resource for Educators \(2006\)](#)



Securing data can be an expensive and time-consuming endeavor – one that can be especially taxing on small agencies with limited resources. For example, it will probably take more than a single database administrator to get the job done effectively, especially if your agency intends to extend access down to the school level. While there are many resources that provide detailed technical information about protecting data assets, this section offers some basic tips and best practices regarding the defense of your education agency's data. Though security relies heavily on technology, the process is also business-driven. This section focuses largely on that human side of security.

126,127,128

Know your data

The first step in securing your education agency's data is developing a clear view of its information landscape.

- Figure out what data the agency has. Take an inventory of all of the data the agency collects and maintains.
- Locate all the data. Document where the data are stored, including servers, individual computers, paper in filing cabinets, and other media such as CDs and storage devices.
- Document the “ownership” of each data element the agency manage. Each data element should be the responsibility of a single Data Steward.
- Determine the sensitivity of each data element the agency manages based on privacy requirements under state and federal laws. Document the risks associated with exposure of sensitive information and/or assign a risk level to each element, perhaps through a simple rating scale.

¹²⁵ Houde, D. “Arizona Department of Education Information Security Update”. Presented at Summer 2008 Forum Meeting, July 29, 2008.

¹²⁶ Federal Trade Commission, [Protecting Personal Information: A Guide for Businesses](#)

¹²⁷ Houde, Donald (2008).

¹²⁸ Zhao, X., B. O'Connor & G. Barroso. “Objective of the Data Security Model.” Accessed on April 23, 2009 from <http://www.information-management.com/infodirect/20060825/1061606-1.html>.

- Document who has access to what data, including internal staff, contractors, vendors and external users. Make note of who can do what with the data (e.g., manipulate vs. view). Also record all the ways these authorized users can access the data.
- Determine and document how long various users will be allowed access to data and ensure that access is ‘turned off’ and denied once it is no longer appropriate. For example, agencies must be diligent about ending or adjusting a staff member’s access to data when they change positions or leave the agency. Also, states or districts (or even school policymakers) must determine if teachers will be allowed access to personally identifiable information on their former students who have advanced to higher grade levels (some agencies update access by enrollment annually, while others grant teachers broad access to their former students information for an extra year or more – even into postsecondary).
- Document the sources of your agency’s data. What source systems do they originate from? Who sends them?
- Document the recipients of data. These may include federal agency departments, postsecondary institutions, research organizations and all others to which the data are transmitted.
- Document the means by which data are transmitted (e.g., transmitted electronically, mailed on paper, etc.).

Ownership Model of Data Security

Within a data governance structure, each of the agency’s data elements should be assigned to a single Data Steward with whom ultimate responsibility for each assigned item should rest [see the “Governing the Data” section for more information]. These Data Stewards should work with the security team to determine the sensitivity of and appropriate level of security for every data element. These staff may

- classify each item’s level of confidentiality (e.g., is each data item for public use or only for restricted use?); and
- identify the user groups, delineated by characteristics such as job function or need to know, that should be granted access to each element.

Each Data Steward should also be the point of contact for requests for the data they manage and may authorize data sharing in response to those requests.

¹²⁹ Data Quality Campaign, March 2009. *The Next Step: Using Longitudinal Data Systems To Improve Student Success.*

ROLE-BASED DATA ACCESS

It is essential that users have easy access to the data in an LDS. Standardized reports showing aggregate data and analysis results should be made publicly available. Additionally, the general public may be given access to aggregate statistics and to de-identified individual student records for ad-hoc querying and analysis. For personally identifiable information, users should be granted varying levels of access depending on who they are (e.g., their role, needs, and responsibilities). For instance, through an online application, users may sign on with their own individual username and password to gain access to permitted information. A student's record may be made available to that student, his or her parents or guardians, their current teachers, counselors, or school, district administrators, and any other authorized users. However, the specific data items shared may vary depending on the user's identity (e.g., only the student's parent might be allowed to see a lunchroom account balance).¹²⁸ Researchers with appropriate contracts and permission may also be granted access to some personally identifiable data.

Agencies should create documentation specifying accessibility by user roles and for what purposes the data can be used. This should be the job of the Data Policy Committee or Data Governance Committee [see the Governing the Data section for more information]. These specifications should be sufficiently granular as to detail the rights of each type of data user, giving them access to the information they are entitled to, but no more. Also, while user access rights may be determined at the state level, some software programs allow delegation of access rights to occur at the local level. That is, through the application, delegated district administrators may grant certain people access to sensitive information as they deem appropriate.

If the education agency runs multiple software systems to access separate databases or data sets, some agencies implement "Single Sign-On" systems to manage user identity and streamline access. Rather than assigning each user a number of passwords and usernames for multiple data systems, these systems maintain a single username and password for each user and grants appropriate access to the user across applications. Each user can also be granted multiple roles, tailored to the user's varying access rights to the data in each system.

Keep only the data your stakeholders need

The more data you have, the more you'll need to secure. Although stakeholders may demand a wide range of data, your agency should consider disposing of any data deemed unnecessary, especially if those data contain personally identifiable information. In this "final" stage of the life cycle of information [see the "Information Life Cycle" section for more information], destroy data in a manner consistent with their sensitivity.

- "Wipe" old computers and storage devices before disposing of them (completely removing information from the device or drive) and shred, burn or pulverize unnecessary paper records. Remote staff should follow the same procedures as on-site staff.
- Going forward, collect only the information required to meet business and stakeholder needs.
- Create a record retention policy that details what information should be stored by the agency, how it should be secured, guidelines on how long it should be kept, and in what way the information should be destroyed once it is no longer needed. Agencies may set up a formal review process requiring the assessment of data's value and authorization for disposal.

Secure the data

Agencies need to keep their guard up, identifying vulnerabilities and adapting to ever-changing security threats. Danger comes from both within the organization and outside agency walls. The Internet, for instance, amplifies the threats to student privacy as people from the local education community or from across the globe can hack into data systems to change test scores, unleash viruses, or just wreak general havoc just for sport.

- Establish a group or office specifically focused on security issues, perhaps creating an enterprise-wide security plan, and implement security strategies to manage data access and use.

- Identify a Security Officer to lead this office. This person should be well versed in all relevant privacy laws as well as the technology and business processes that facilitate compliance with those laws. This leader may coordinate the agency's security plan (e.g. authentication, intrusion detection, etc.) and must ensure that all staff are appropriately trained to protect the agency's data.
- Store data in a secure location that is only accessible to authorized personnel. When not in use, lock up in a secure location all sensitive information contained on servers, computers, media such as CDs, or on paper documents.
- Automatically encrypt hard drives and use only password protected thumb drives for transferring sensitive data.¹³⁰
- Set access controls to the network and review them periodically. Access to data should require a username and complex password. A user's identity should be **authenticated**, using a password, pass phrase, or other personal information. Then, based on the level of access determined for that particular user (determined by staff, e.g., Data Stewards and the security team, and implemented through technology), he or she should be **authorized** by the system to access the information.



***Authentication** is the verification of a user's identity through means such as the submission of a unique password and/or other personal information. **Authorization** is the mechanism by which that authenticated user is granted access rights (e.g., the right to view data of varying degrees of sensitivity, or the right to manipulate data in addition to viewing them).*

- Use intrusion detection systems to identify suspicious access to or attacks on the network.
- Establish and utilize infrastructure components such as firewalls, backups, antivirus, and anti-spyware software.¹³¹

¹³⁰ Houde, D., M. Vocca, D. Williams & B. Canada. "Security, Data Access." Presentation given at November 2007 IES SLDS Grantee Meeting in Arlington, VA. Available at http://nces.ed.gov/programs/SLDS/NOV07_presentations.asp#sessionVI

¹³¹ EIMAC LDS Task Force, *The Need for Data Governance*, Policy Brief, March 2008.

DISASTER PREPAREDNESS

A host of disasters, both natural and man-made, can severely disrupt educational activities, displacing students and disrupting services including the collection, maintenance, and use of data. Many of the data systems used by districts and states are critical for daily business operations. LDSs, which may consolidate a wide range of data and data processes, are likely to be mission critical (i.e. necessary for carrying out day-to-day business). And moreover, when disaster strikes, these systems will be vital in efforts to mitigate the effects of the events. For instance, they can be used for enrolling displaced students in the appropriate grades, courses and programs; meeting accountability requirements; and efficiently allocating funding. It is important that agencies carefully plan for destructive and disruptive events in advance, physically safeguarding data system, designing the system architecture to facilitate easier tracking of displaced students (e.g., including data elements such as displacement identifiers and event descriptors), and creating policies for tracking students and exchanging data in the wake of a crisis. The Forum's *Crisis Data Management: A Forum Guide to Collecting and Maintaining Data about Displaced Students* offers detailed information on many of these subjects.

The implementation of a state-level LDS offers several clear advantages in a crisis situation. For example, the consolidation of agency data into a single data store will make it easier to prepare for a disaster, as the need to modify and coordinate a multitude of silo systems is limited. During and after a crisis situation, the efficient exchange of high-quality student-level data that are verified by centralized validation procedures and marked by individual identifiers via an LDS can help in various areas of administration. For instance, administrators can use the data to efficiently and precisely target resources, provide displaced students with the proper services, and pass the scrutiny of federal data audits. Aggregate counts, on the other hand, are likely to be inaccurate (e.g., containing duplicate counts) and untimely as they will take time to produce. In turn, these aggregate counts can lead to slow and inaccurate distribution of resources, and haphazard provision of services. Finally, state agencies with an LDS may be better able to ease the reporting burden from districts in need of federal aid by dealing directly with federal agencies on school districts' behalf.¹³¹

Additional resources: Disaster preparedness

- [Crisis Data Management: A Forum Guide to Collecting and Managing Data about Displaced Students](#) (2009)
This guide focuses on the data issues surrounding the displacement of students. It offers best practices and lessons learned regarding data system planning activities that can help agencies mitigate the disruptive effects of crises on education data systems and business continuity, and thus help them to better serve students displaced by crises.
- Disaster Prevention and Recovery for School System Technology (ESP)
Available at: <http://www.espsolutionsgroup.com/resources.php>
"Existing disaster recovery planning guides tend to focus on business technology architecture - not school system realities. ESP's whitepaper discusses conventional wisdom and best practices for education agencies."
- [IT Disaster Recovery and Business Continuity Tool-kit: Planning for the Next Disaster](#) – NASCIO
This tool-kit provides a framework to assist CIOs and other agency leaders in the development of IT disaster preparedness plans. It includes a collection of high-level checklists and questionnaires to help focus agency efforts to prepare for crises.

- Protect data while they are 'in motion,' moving between data systems or to data users. For instance, student-level data might be encrypted before it is fed from a source system into the LDS, or from the state agency's LDS back to a district.
- Convene a Data Request Review Board [see the 'Bodies, Roles, and Responsibilities of Data Governance' section for more information] to establish a clear process for handling data requests in an orderly and consistent fashion. This can help to keep private data from mistakenly getting into the wrong hands.
- Create a security contingency plan to facilitate a quick and appropriate response in the event that data security is threatened or breached. This plan should specifically describe responses to a range of scenarios. For instance, how will your agency respond to network intrusion, a stolen laptop, or wrongful dissemination of sensitive information? Who will you notify (e.g., law enforcement agencies, agency staff, the individuals whose personal data have been compromised, the public, etc.) and through what means of communication? How will damage to the system be controlled? How will the impact of the breach be assessed?

¹³² National Forum on Education Statistics (2009). *Crisis Data Management: A Forum Guide to Collecting and Managing Data about Displaced Students*.

Train and inform data handlers

Even with a solid security plan, your agency's data will not be secure if the plan is not properly implemented. All agency staff, not just IT, should understand the sensitivity of the data and the vulnerabilities of the data system, and security should be a priority in their daily routines. In this way, beefing up agency security involves a certain degree of culture change. With an LDS, more staff members will gain access to sensitive student level data. So, as access to data expands, security and confidentiality training must also expand to avoid unlawful sharing or use of these data. Some best practices include:

- Establish a training plan that tailors instruction to various types of staff with different levels of access to sensitive data, giving those with more access to sensitive data more rigorous training than staff with less access. Training may also be tailored to specific groups of data users based on their job functions.
- Monitor the access granted to staff and provide additional training as needed.
- Train and re-train staff and contractors periodically on the proper and ethical handling of sensitive data. It is critical that such training is completed before access to sensitive data is granted.
- Hold staff accountable for failures to adhere to the agency's security procedures and confidentiality policies.
- Require contractors to sign non-disclosure agreements.
- Require researchers to sign memoranda of understanding (MOU), which detail privacy and security requirements.
- Establish a means for communicating security issues to staff, such as via a security website,

The Forum has more...

For more detailed information about data ethics, visit:



- [The Forum Code of Data Ethics](#) (forthcoming 2009)



LDS Lore: Identity Theft in the Printer Room

At the school district office, Margaret typed in her password and accessed the teacher information system. She found the data she needed and sent it to the printer. The phone rang - it was Sally about lunch. Starving, Margaret grabbed her coat and headed out for a burrito. Meanwhile, over at the printer, Eric lifted a stack of unclaimed paper from the tray and set it aside on the table. He waited for his print job to collate, snatched it, and went on his way. After lunch, the day got crazy for Margaret as one meeting flowed into another until it was time to make the commute home.

That night, the janitors came in to clean the place up. Richard, the new guy, veered the vacuum into the printer room. Noticing the stack of paper on the table, he leaned in to toss it in the recycling bin. He hesitated when he saw the list of names down the first column. Curious, he flipped through, recognizing some of them... they were teachers from his old high school. He scanned down to Callahan, Gerald. Sure enough, his old Algebra teacher, the guy who'd flunked him in 9th grade, was there on the page. Following the row across, he found a Social Security number, address, home phone number... he thought his mischievous friend Randy might know how to have some fun with this information. With a smirk, Richard folded the sheet into his pocket, leaned on the vacuum and continued down the hall.

The following morning, Yori, the Data Governance Coordinator, noticed the stack of papers on the printer room table. He fed them through the shredder and hurried back to his desk where he immediately sent out an email to all the Data Stewards [see the Governing the Data section for more information]. In it, he reminded all the stewards of the principles of safeguarding sensitive data. Next, he added a security and confidentiality discussion to the next Data Governance Committee agenda, and raced down to the Security Officer's office to ask for more aggressive security training for staff. This behavior was unacceptable and had to be stopped. He hoped such carelessness hadn't already exposed private data.

email newsletters, or meeting updates from security staff (periodic and impromptu as security issues surface).

- Specify security requirements in RFPs [see “LDS RFP ABCs: Writing a Strong Request for Proposals” section for more information] and assess prospective vendors’ security practices or software specifications to ensure that the service provider or product can, in fact, meet the education agency’s security needs.

Additional resources: Data Security

- [Forum Unified Education Technology Suite \(2005\)](#)
- [Protecting Student Records and Facilitating Education Research: A Workshop Summary](#) – Margaret Hilton, National Research Council
- [Risk Management for Information Technology Systems, Recommendations of the National Institute of Standards and Technology](#), Gary Stoneburner, Alice Goguen, and Alexis Feringa (NIST), 2002.
<http://www.csrc.nist.gov/publications/nistpubs/800-30/sp800-30.pdf>
- [Objective of the Data Security Model.](#)” InfoManagement Direct. August 25, 2006.
- [Enterprise Data Security](#). InfoManagement Direct, November 21, 2008.
This article offers a simple “ownership model” of data security, which specifically focuses on identifying data sensitivity and appropriately granting access to data user groups. It argues that delineation of user groups should be based on user’s job functions rather than the data’s level of confidentiality. Auditing should ensure proper allocation of data access rights.
- [Objective of the Data Security Model](#) – InfoManagement Direct, Zhao, X, et al.
This article provides a more technical discussion of the data security model than the previous resource. It describes a suggested set of processes including activities such as data classification, identification of the risks associated with business functions and data systems, the creation and implementation of an access control policy, and the establishment of training and contingency plans.
- [Data Environment Security](#) – D. Houde, Arizona Department of Education
This presentation provides an overview of the Arizona Department of Education’s efforts to improve security and manage data access. It discusses the establishment of a security office to focus specifically on security challenges, establishing processes for managing and monitoring data usage, training staff, and establishing a means for communicating security issues. The presentation also provides an overview of some of the technical solutions the agency has employed.
- [Compiled Data Access & Use Agreements \(2006\)](#)
This document compiles data access and use agreements from Kansas, Oregon, Oklahoma, Illinois, Missouri, and Louisiana provided via the NCEES Forum listserv.
LDS Share - Filename: Compiled Data Use Agreements
- [IES Restricted-Use Data Procedures Manual \(2007\)](#)
This Manual will be provided to organizations interested in obtaining restricted-use data, and to licensed organizations that currently have access to restricted-use data. The goal is to maximize the use of statistical information, while protecting individually identifiable information from disclosure. The Restricted-Use Data Procedures Manual was created to provide a guide to the restricted-use data application process, as well as to explain the laws and regulations governing these data.
- [Memorandum of Agreement between Alaska Department of Education & Early Development and CTG \(2006\)](#)
The purpose of this Agreement is to authorize the vendor, Computer Task Group (CTG), access to education data maintained and collected by the Alaska Department of Education & Early Development for the purpose of carrying out work in performance of CTG Alaska’s contractual obligations related to the delivery of a portion of the agency’s data dictionary project.
LDS Share - Filename: AK_Data_Dictionary_MOA
- [Policies and Procedures for Data Security & Confidentiality \(2005\)](#)
The purpose of this document is to establish policies and procedures governing data security and confidentiality for the department of education in Tennessee.
LDS Share - Filename: TN Data Security Policy - approved version
- [myNHDOE Single Sign On System](#) – New Hampshire Department of Education
http://nces.ed.gov/whatsnew/conferences/mis/2009/session_V.asp#A
This presentation briefly introduces the state education agency’s single sign-on system for user identity management.

References

- Aden, David. *Enterprise Architecture Demystified*. Sep. 24, 2008. Retrieved from <http://www.govtech.com/gt/articles/418008> on Oct. 16, 2008.
- Alpert, E. "New Number-Crunching Links Teachers to Test Scores." *VoiceofSanDiego.org*, 10/6/08
- Aarons, DI, "Leading the Charge for Real-Time Data." *EdWeek*, June 3, 2009. Available at http://www.edweek.org/ew/articles/2009/06/03/33dataleader_ep.html?tkn=PSNFXRv4MZsj0rDA8PJJQE7WcHpl%2F4ehVf78
- Bernhardt, V. L., (2004). "Continuous improvement: It takes more than test scores." *ACSA Leadership*. November/December 2004, pp. 16-19.
- Berry, Fuller and Reeves, Data Quality Campaign. (March 2007). *Linking Teacher and Student Data To Improve Teacher and Teaching Quality*.
- Center for Strengthening the Teaching Profession. [*Creating a Comprehensive Teacher Data System*](#)
- Chatis Consulting, *Data Management Committee: Critical Data Issues* (unpublished)
- Collegial Centre for Educational Materials Development Geographic Information Systems website: <http://www.ccdmd.qc.ca/ressources/?id=1275>, accessed on September 18, 2008.
- Collins, L. et al. Data Quality Campaign Issue Brief, *The Right Data to the Right People at the Right Time: How Interoperable Data Help America's Students Succeed*, June 2007.
- Dougherty, Chrys. (2002). *A Policymaker's Guide to the Value of Longitudinal Student Data*.
- Data Quality Campaign, *The 10 Essential Elements in Detail for 2008-09*. Available online at http://dataqualitycampaign.org/survey_results/elements.cfm
- Data Quality Campaign, *Fundamentals in Designing State P-12 Longitudinal Data Systems*. Available online at http://dataqualitycampaign.org/survey_results/fundamentals.cfm.
- Data Quality Campaign. (2006). *Creating a Longitudinal Data System: Using Data to Improve Student Achievement*.
- Data Quality Campaign (September 2007). *How Can My State Benefit from an Educational Data Warehouse?* September 2007
- Data Quality Campaign (October 2006). *Creating Longitudinal Data Systems: Lessons Learned from Leading States*.
- Data Quality Campaign, *Linking Education and Social Services Data to Improve Child Welfare*, October 2007.
- Data Quality Campaign. (October 2007). *Linking Education and Social Services Data to Improve Child Welfare*.
- Data Quality Campaign (January 2008). *Tapping into the Power of Longitudinal Data: A Guide for School Leaders*.
- Data Quality Campaign (Nov 2007). *Measuring What Matters: Creating a Longitudinal Data System to Improve Student Achievement*
- Data Quality Campaign (2007). *Maximizing the Power of Education Data While Ensuring Compliance with Federal Student Privacy Laws: A Guide for Policymakers*.

Data Quality Campaign (2008). "Data Governance: Changing Culture, Breaking Down Silos, And Deciding Who Is In Control."

Data Quality Campaign, [Sample Survey](#) 2008.

Data Quality Campaign, March 2009. *The Next Step: Using Longitudinal Data Systems To Improve Student Success*.

Davis, Michelle R. (2008) Finding Your Way in a Data-Driven World.

Education Counsel (2008), *Needed Changes in FERPA Not Addressed in Final Regulations*

Education Information Management Advisory Consortium, Longitudinal Data Systems Task Force, March 2007 Meeting, Phoenix Arizona. [Meeting Summary](#) available online.

Education Information Management Advisory Consortium, Student Longitudinal Data Systems Task Force, Council of Chief States School Officers, (2008). *Longitudinal Data System Roadmap*.

Education Information Management Advisory Consortium LDS Task Force, Meeting Summary, March 23, 2007.

Education Information Management Advisory Consortium LDS Task Force, Meeting Summary, October 6, 2006.

Education Information Management Advisory Consortium LDS Subcommittee, Meeting Summary, October 17, 2007.

Education Information Management Advisory Consortium (March 2008). *The Need for Data Governance*.

ESP Solutions (2008) *D3M Framework: Building a Longitudinal Data System*.

ESP Solutions (2008). "Confidentiality and Reliability Rules for Reporting Education Data."

ESP Solutions. *Marketing Your Field of Dreams*.

Federal Trade Commission, [Protecting Personal Information: A Guide for Businesses](#)

Gazerro, P and E. Laird. (May 2008). *Linking Spending and Student Achievement: Managing Inputs, Processes and Outcomes*.

Hill, EG, Legislative Analyst's Office. (2008). *Redefining Student Data Access Policy*.

Hirsch, J. [Performance Management - Data Informed Decisions: Having Information Provides New Understandings and Insight](#).

Houde, D., M. Vocca, D. Williams & B. Canada. "Security, Data Access." Presentation given at November 2007 IES SLDS Grantee Meeting in Arlington, VA. Available at http://nces.ed.gov/programs/SLDS/NOV07_presentations.asp#sessionVI

Houde, D. "Arizona Department of Education Information Security Update". Presented at Summer 2008 Forum Meeting, July 29, 2008.

IEEE, IEEE Std 1471-2000 IEEE Recommended Practice for Architectural Description of Software-Intensive Systems, available at http://standards.ieee.org/reading/ieee/std_public/description/se/1471-2000_desc.html

- IES, Statewide Longitudinal Data Systems Grant Program: Summary of RFA Requirements FY 2007
- Inmon, Bill. "[The Operational Data Store](#)." Info DB, February 1995.
- Juillerat, B. and E. James, *Evaluation of the Effectiveness of Ohio's D3A2 Initiative*. Presentation given at November 2006 IES SLDS Grantee Meeting.
- Kansas State Department of Education (2008), *Data Governance Program Version 2.2* (unpublished)
- Kansas Department of Education, *Data Governance: The Kansas Approach*. Presentation given at Education Information Management Advisory Consortium (EIMAC) Spring Meeting, May 2007.
- Microsoft Architecture Overview, available online at <http://msdn.microsoft.com/en-us/architecture/ms978007.aspx>.
- Miller, H. (2000). Managing customer expectations. *Information Systems Management* 17.
- MPR Associates/National Center for Educational Accountability, *Judging Student Achievement: Why Getting the Right Data Matters*, September 2005.
- NASCIO, *Data Governance – Managing Information as an Enterprise Asset: Part I – An Introduction*, April 2008.
- National Center for Analysis of Longitudinal Data in Education Research
- National Forum on Education Statistics (2009). *Crisis Data Management: A Forum Guide to Collecting and Managing Data about Displaced Students*.
- National Forum on Education Statistics (2008). *Every School Day Counts: A Taxonomy for Standard Attendance Data*.
- National Forum on Education Statistics, *Technology at Your Fingertips*
- National Forum on Education Statistics (2003). *Facilities Information Management: A Guide for State and Local Education Agencies*.
- Newby, D. (July 2007). [CCSSO's National Education Data Partnership: Phase Two](#)
- Nevo, S et al. (2007) *An examination of the trade-off between internal and external IT capabilities*. *Journal of Strategic Information Systems*, 16, pgs. 5-23.
- Nunn, JA & KL Harper Mainzer. (2006). *Longitudinal Data Systems: Summary of Current Issues and Potential Uses*.
- Oberkirch, B. *A Journey of a Thousand Steps*, March 28, 2008.
- Redman, T.C., *Data Quality. The Field Guide*. 2001, Boston: Digital Press.
- REL Midwest. (June 2007). *Getting the Evidence for Evidence-based initiatives: how the Midwest states use data systems to improve education processes and outcomes*.
- Rozelle, Rick. *Role Descriptions and Responsibilities in the Realm of Data Governance*. Center for Educational Leadership and Technology, 2008.
- Rozzelle, R. *The Tennessee Statewide Longitudinal education Data System (SLeDS): The Governance Process*. Presentation given at 2006 IES SLDS Grantee Meeting

- Schutte, S, S. Edwards, S. Fadaoff, T. Ogle, and G. Ligon. "The Process of Data Quality: State Discussion with Alaska, Wyoming, Missouri, and California." Presentation given at the 2009 MIS Conference, February 2009. As cited in *The Process for Ensuring Data Quality*, ESP Solutions, 2009.
- Schools Interoperability Framework Association, *Analysis of Costs and Benefits Associated with Implementing SIF*, June 2006.
- Seddon, P. B., Staples, S., Patnayakuni, R. Dimensions of information systems success. Communications of the Association for Information Systems. Vol 2, Article 20, November 1999.
- Simon, AJ. *ADE LDS Evaluation* Presentation given at November 2006 IES SLDS Grantee Meeting.
- Smith, N. (2004). *Lessons Learned: Writing Requests for Proposals for Statewide Student Data Systems in Education*.
- Staples, D. S., Wong, I., & Seddon, P. B. (in press). Having expectations of information systems benefits that match received benefits: Does it really matter? *Information & Management*, 1976, 1-17.
- Steiny & Smith. (September 2007). *Reporting and Analysis Tools: Helping Mine Education Data for Information Riches*.
- Tennessee Data Management Committee Manual
- TN PPT (2008) ...
- U.S. Department of Education, National Center for Education Statistics. (1998). *Unit Record Versus Aggregate Data: Perspectives on Postsecondary Education Data Collection, Retention, and Release*, NCES 98-280, prepared by David Stevens and Michael McGuire for the Council of the National Postsecondary Education Cooperative Working Group on Unit Record Data Versus Aggregate Data. Washington, DC.
- Wilson, L & Nunn, J. "Stakeholder Involvement in Maryland." Presentation given at MIS Conference in Atlanta, GA, February 28, 2007.
- Viadero, D. (2006). "Scholars Cite Privacy Laws as Obstacle." *Education Week*, 25(19).
- Zhao, X., B. O'Connor & G. Barroso. "Objective of the Data Security Model." Accessed on April 23, 2009 from <http://www.information-management.com/infodirect/20060825/1061606-1.html>.

Appendix B: Data Governance Supplementary Materials

Sample Data Governance Committee Mission Statement, Goals and Objectives¹³³

Example Data Governance Committee Mission:

The Data Governance Committee supports the _____ Department of Education's mission of helping teachers teach and children learn by promoting the appropriate use of data to inform decision making and ensuring data quality, accountability, and timeliness.

Examples of Data Governance Committee Goals:

1. Improve data quality
2. Increase accountability for data accuracy
3. Eliminate redundancy in data collection
4. Improve understanding of data within the Department and among districts
5. Increase use of data to make program and policy decisions
6. Improve data reporting capability and timeliness of reporting

Examples of Data Governance Committee Objectives:

- Identify the owner of every data element
- Define all data elements
- Document all data processes
- Standardize data processes from year to year
- Reduce manual manipulation of data
- Identify the official source of data for all external reporting
- Eliminate redundant data collections that are not the official source for external reporting
- Allow districts to review their data before it is externally reported
- Communicate all data decisions/changes to districts
- Reduce collection of/reliance on aggregate data
- Increase use of student-level data for external reporting

Sample Data Stewards Working Group guidelines¹³⁴

Process for addressing critical data issues:

1. Identify the data steward responsible for the issue and its resolution (one person)
2. Determine whether a small working group of relevant data stewards should be created to address the issue
 - a. Does the issue directly affect the data quality or work of more than one program/subject area in the organization?
 - b. NOTE: Even if a working group is formed, only one data steward should be accountable for the issue.
3. At first meeting of working group (or meeting to address issue)
 - a. Clearly define (and document) the source of the problem – not the symptoms.
 - i. This includes all aspects of the issue. For example, communication (internal and external), definitions, technology, etc. A reporting problem is almost never just a reporting problem – its source is earlier in the data process. NOTE: if the issue is complex it could require additional research and time to fully identify it – this time spent at the beginning of the process is well worth it to fully understand what it is you are trying to address.
 - b. Determine the goals of addressing the problem – what exactly does the group want to achieve? (These goals should be aligned with the DMC goals).
4. Create a mini project plan for addressing each aspect of the problem and achieving the goals established
 - a. Include main steps (with due dates) and who must be involved in/responsible for each
 - b. Assign action items at the end of each workgroup session with responsible person and due date
 - c. Determine whether any part of the issue is not within the control of the Data Governance Committee to address. If so, the responsible data steward should bring this issue to the Data Governance Committee chair for escalation.
 - d. Provide monthly updates to Data Governance Committee for inclusion on the critical data issues log
5. Once a preliminary “business” solution has been developed (i.e., you know what you want to do), coordinate with technology staff to get their input and determine how it can be implemented.
6. Document the final decisions/solution thoroughly and save to a common online area accessible by all DMC members.
7. Communicate the final decisions/solution to the Data Governance Committee, all applicable program areas, LEAs, and any other people directly affected by the issue. Be especially clear if the solution requires certain staff members to change how they conduct their work.
8. Retire the issue from the critical data issues log – celebrate! Then move on to the next issue...

¹³³ Adapted from Chatis Consulting, “Data Management Committee: Critical Data Issues” (unpublished)

¹³⁴ Ibid.

Sample Critical Data Issues Log:

DATA MANAGEMENT COMMITTEE - CRITICAL DATA ISSUES

Criteria: creates a burden to the districts, causes errors or delays in federal reporting, or prevents the use of the data for its intended purpose.

Data Item	Issue Description	Data Manager(s)	Priority	Recent Action Taken?	Status Update	Action Items

RETIRED DATA ISSUES

Data Item	Issue Description	Data Manager(s)	Priority	Date Retired	Last Status Update	Reason Retired

1= need to address in next 6 months to mitigate effects of the data issue.

2= can delay for 6 months to initiate efforts

SOURCE: TN...

DRAFT