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Implementing Statewide Longitudinal Student Data Systems: Lessons from the States

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Executive Summary

Providing accurate and useful information on student achievement is a rising challenge for state educational agencies. With the passage of the No Child Left Behind Act (NCLB) in 2001, such challenges have become more pressing. A centerpiece of the educational accountability movement, NCLB has prompted states to improve their reporting on student outcomes. Although not mandated by the law, in recent years states have actively moved to revamp their student data systems (SDS) to better address both federal mandates and inform local stakeholders. Many states now utilize unique statewide student identifiers and seek to collect longitudinal data on students' progress throughout their K-12 educational system and beyond. To date, however, there remains considerable variation across states in quality and comprehensiveness of student data systems. How then can states successfully develop and establish their statewide longitudinal student data systems?

This report provides an overview of longitudinal student data systems (LSDS) across the fifty states before focusing on cases of the creation, implementation and expansion of SDS in three states. *Emergent State* has just begun assigning unique student identifiers to state assessment data. *Accelerated State* has rapidly developed and implemented a longitudinal student data system and is moving towards including data warehousing capabilities. *Established State* has a comprehensive K-20 longitudinal student data system that includes a data warehouse. These cases illuminate the challenges and successes that state educational agencies have encountered in their efforts to develop, implement and expand LSDS.

The report finds that the state education agencies faced similar challenges in the following areas:

- building state agency capacity;
- developing reciprocal and efficient relationships with districts and schools;
- clarifying governance of the data system and ownership of data;
- garnering and sustaining state legislative support.

The authors identify the variety of strategies that state education agencies employed to meet these challenges, highlighting those strategies that hold the most promise for the development of comprehensive LSDS. The authors conclude with recommendations for state education agency leaders interested in creating and expanding their states' LSDS. The recommendations are summarized below:

- strengthen communication channels between the state education agency and the districts;
- promote reciprocity with districts by providing early-on easy-access to reports;
- strengthen communication channels between the state education agency and the legislature;
- promote the creation of a state commission on education data;
- encourage district and state data consortia;
- build internal capacity within the state education agency;
- foster school districts' capacity;
- establish a balanced and productive use of consultants and vendors;
- link data collection to school funding;
- clarify authority over LSDS within state education agencies.

INTRODUCTION

Overview

We are in the midst of intensifying demands for increased accountability and reporting requirements for K-12 public educational agencies. As a result of the No Child Left behind Act (NCLB) of 2001, schools, districts and states are now hard-pressed to provide more and more accurate data related to student achievement and school performance. State education agencies (SEAs) are critical to these efforts. Over the past decade, SEAs have moved to create more comprehensive data infrastructures to better inform educational policy and practice. In particular, many have sought to implement statewide data collection systems that can follow a student's progress over time and that can be used to relate student progress to school, teacher, financial, and other contextual factors. The assignment of unique statewide student identifiers to all students is a critical element to creating a longitudinal statewide data infrastructure.

Developing statewide longitudinal student data systems (LSDS) provides the fundamental benefit of being able to track and link students' records through time. Such tracking can, in turn: 1) improve the accuracy and quality of data collection, 2) enhance the capacity of public managers and researchers to report on schools, programs and educational outcomes, and 3) rationalize data collections systems, reducing costs and administrative burdens (NCES, 2000). Statewide LSDS can provide districts and schools with student level information so educators can enact locally sensitive and sound educational decisions. Statewide LSDS can also facilitate the movement of data to the federal government, helping inform national education policy.

As of 2007, 44 states have data collection systems that allow them to track individual student records at the state level through unique identifiers (NCEA, 2007). For many states, these systems remain relatively new and in further need of development, improved functionality, and support. Many states, in fact, have encountered various challenges in developing their LSDS.

These challenges have not yet received thorough study. While there has been a recent increase in the availability of information regarding the condition of state LSDS and some lessons learned, this information can be piecemeal (see Appendix A). This report offers insight into these challenges with the goal of providing SEA leaders strategies to address them.

What is a Longitudinal Student Data System?

A longitudinal student data system, or LSDS, is a data system developed to collect statewide student-level data, including longitudinal assessment data. Ensuring that LSDS data is of high quality entails the provision of unique statewide student identifiers. LSDS will in most cases involve the integration of several databases or source systems that go beyond student demographics, and which are then linked through the unique student identifiers. In fact, the Data Quality Campaign (DQC), a non-profit organization seeking to increase the implementation of longitudinal data systems, has identified a minimum of 10 different elements for LSDS to be considered comprehensive, including unique student identifiers (www.dataqualitycampaign.org). The list of necessary elements follows:

1. A unique statewide student identifier that connects student data across key databases across years
2. Student-level enrollment, demographic and program participation information
3. The ability to match individual students' test records from year to year to

measure academic growth
4. Information on untested students and the reasons they were not tested
5. A teacher identifier system with the ability to match teachers to students
6. Student-level transcript information, including information on courses completed and grades earned
7. Student-level college readiness test scores
8. Student-level graduation and dropout data
9. The ability to match student records between the P–12 and higher education systems
10. A state data audit system assessing data quality, validity and reliability.

Scope and Focus

This report examines the current conditions, key challenges and lessons learned when introducing statewide LSDS. Building LSDS involves significantly revamping data collection practices, the interaction of multiple public educational agencies and, potentially, private IT firms, and entails high, long-term financial commitments in an uncertain political climate. Our study reveals that states' efforts to introduce LSDS and their successes are broadly shaped by issues that are inter- and intra-organizational, governance-related, and political. The core part of this report will focus on examining how these sets of factors shape the evolution of state LSDS and the lessons learned from these experiences.

The following interrelated questions guide this study:

- What are the current conditions in statewide student information systems?
- What are the challenges and influential factors associated with implementing LSDS?
- What recommendations can we derive to guide future LSDS development efforts?

We sought to answer these questions through two approaches. First, we compare the comprehensiveness of the LSDS across the 50 states and identify relevant state characteristics. The comparative analysis is meant to provide an overview of the status of LSDS across the states and to identify possible influential factors. Second, we explore, in-depth, the development of LSDS in three case study states. The states were at different stages in the development of their LSDS. Taken together, the two approaches illuminate the challenges of building state and district capacity, clarifying issues of data ownership and system governance, and legislative involvement to the development of comprehensive LSDS.

OVERVIEW OF LSDS ACROSS THE STATES

We begin our study by comparing the comprehensiveness of LSDS across states. The Data Quality Campaign (DQC) organization has developed a careful and well-designed index assessing a state's longitudinal data systems. The index, which ranges from 1 to 10, identifies how many elements a state LSDS has from the list of 10 items deemed essential by the DQC. In addition to the DQC's index we examine state characteristics that might relate to LSDS comprehensiveness, including: a) legislative activity surrounding states data systems, b) degree of district centralization, c) state general fiscal conditions, and d) use of vendors for developing critical elements of LSDS[1].

Table 1 summarizes the DQC index and the state characteristics that might relate to LSDS comprehensiveness. Drawing on our analyses of this data (see Appendix B), we divide the states into "low" and "high" according to the number of elements included in their LSDS. We classified 26 states as "low." These states have between 1 and 6 LSDS elements. We classified the remaining 24 states as "high" on their DQC rankings as they had from 7 to 10 LSDS elements.

Table 1: Classification of States by LSDS Comprehensiveness and Potential Influential Factors

DQC LSDS Index	Data System Legislation/ Statute	District Centralization	Percent Budget Balance	Vendor for Unique Student Identifiers	Vendor for Longitudinal Data	Vendor for Program & Other Data
	Percent	*Average*	*Average*	*Percent*	*Percent*	*Percent*
Low *(N=26)*	69.20%	6.25	11.4	65.40%	62.50%	30.76%
High *(N=24)*	87.5%	4.57	17.8	50.00%	41.60%	45.80%

Table 1 indicates that there are distinct differences on how the states with "low" and "high" DQC index scores compare across the selected characteristics. First, states with more comprehensive LSDS, or high scorers, are more likely to have some legislation related to student data collection systems than less established states. While state legislatures in 69.20% of the "low" index states had enacted a law or statute regarding the creation of a LSDS, fully 87.5% of the state legislatures in the "high" index states had done so. Moreover, high index states are also more centralized than low index states. High index states had on average 4.57 districts per

[1] The measure on legislative activity comes from the Educational Commission of the States (*ECS*, 2007), and captures whether a law or statute was located by its researchers pertaining to a state's data system. The degree of district centralization is a rate: the number of districts per 10,000 students. This captures the degree to which states have organized themselves into a fewer or larger number of districts. The measure of a state's fiscal conditions is the total state general fund balance as a percent of expenditures (*NASBO*, 2006) and provides an indicator of a state's overall fiscal health for the year 2007. And finally, three measures on the utilization of vendors come from the DQC survey and they assess respectively whether a state has contracted vendors to develop unique students IDs, collect performance data across time, and collect other program, enrollment and demographic data.

10,000 students while low index states had 6.25 districts per 10,000. Finally, the fiscal conditions of high index states are better (17.8% ending balances) compared to those of low index states (11.4% ending balances). These contrasts suggest that there might be a correspondence between legislative involvement, centralization, and healthier fiscal conditions with more developed and comprehensive LSDS.

From a perspective of internal state capacity Table 1 also reveals that states with more developed LSDS are less likely to have used vendors when developing their unique student IDs and their longitudinal test data than less developed states. On the other hand, low index states are less likely than high index states to have used vendors for implementing other collection systems, such as enrollment and program participation, which are in some sense the latter steps in developing a LSDS. These patterns suggest that high index states, compared to low index states, may have had more initial internal capacity to begin with, or that they had some other organizational predisposition that prompted them to develop this capacity rather than use vendors. Conversely, low index states may be relying less on vendors for the more advanced part of the LSDS in part because they may already be using vendors for the other arenas, and because they have yet to reach these stages.

Though the small sample sizes of this exploratory analysis somewhat hampers our ability to find statistically significant differences across high and low index states, three of the six state characteristics-- legislative activity, fiscal balance, and use of vendors for longitudinal data – were statistically significant[2]. For the factors that did not achieve statistically significant differences --use of vendors for unique IDs and for other data, and district centralization-- the direction of the difference is still consistent with our expectations.

- Most states have a significant way to go toward enacting comprehensive LSDS.
- States with more comprehensive LSDS have higher levels of legislative involvement, school centralization, and fiscal health.
- States with less comprehensive LSDS tend to rely more on vendors in early stages of LSDS development.

The state overview reveals that several factors are important to the development of state LSDS. These include a state's legislative predisposition, fiscal climate, organizational structure, and management decisions. The state comparisons highlight in particular the relation of legislative leadership and in-house capacity with higher levels of LSDS comprehensiveness. In the following chapters, we explore how these factors shape the development of LSDS in our three case study states to develop insight for SEA leaders who seek to implement and expand comprehensive LSDS in their states.

[2] The differences between low and high index states achieved statistical significance in one-tailed tests of differences of legislative activity, fiscal balance and use of vendors, with p-values of .06, 0.09 and 0.07, respectively.

THREE CASES OF THE DEVELOPMENT OF STATE LSDS

We examined the development of LSDS in three states. In this section, we briefly describe the present conditions of each state's LSDS as well as the approaches each state took in developing these systems.

We selected the case study states to reflect the range of states' development of LSDS. Using the Data Quality Campaign's index of LSDS comprehensiveness, we identified one state early in a planned implementation of a LSDS (low DQC index), a second state that had recently implemented a LSDS with plans for further expansion (medium DQC index) and a third state with a fully established LSDS (high DQC index). In each state, we collected relevant data and organizational charts and conducted semi-structured interviews from three to six officials within the state education agency involved directly in the development of the LSDS.

We begin with a brief discussion of the context and conditions of the LSDS development in each case study state. The three states took distinctly different approaches to constructing their LSDS. These approaches were both responses to key constraints and resources at the same time they reinforced or gave rise to further constraints and opportunities.

Emergent State

The Emergent State's approach to developing a LSDS has been incremental. State officials envisioned a comprehensive system that integrated data across K-12 and higher education systems, program areas such as special education, English language learning, and data points, such as attendance, discipline and assessments. At the time of our study, however, the state had just begun to assign unique student identifiers and attach them to state assessment data.

The state's data system falls within the lower end of the DQC's 50-state ranking. It contains just between 1 and 4 elements that the DQC identifies as critical to LSDS. At this point, the state's SDS does not have longitudinal capabilities. For this reason we refer to the state's data system as a SDS when referring to present conditions, and as LSDS when referring to plans and approaches.

The Emergent State had little state legislative support for the development of a LSDS. The state legislature had not enacted any legislation regarding a state student-level data system by the time of our study. School governance in the Emergent State was relatively decentralized. There were over 700 districts within the state. As we discuss below, this presented significant challenges to the SEA. The state also faced some fiscal constraints; it had less than a 10% total state general fund balance as a percent of its total expenditures. Fiscal resources to support the creation of an extensive LSDS were thus somewhat constrained in comparison to high index states. Finally, the Emergent State relied heavily upon external consultants to create and manage the application of unique student identifiers.

Accelerated State

The Accelerated State in our study has had a LSAS for some years now. It contains between 5 and 7 elements identified by the DQC as essential to comprehensive LSDS. The system has had longitudinal capacity since its inception. In contrast to the Emergent State's incremental approach, SEA officials in the Accelerated State characterized their approach as "plunging in." The Accelerated State's first step in developing its LSDS was establishing unique

student identifiers. This step was part of a comprehensive plan that included piloting of the system in selected districts. When state mandates tied state funding to the data system, however, the SEA was compelled to enact a comprehensive system across the state immediately.

The Accelerated State had legislative support for the development of its LSDS. The state legislature had enacted legislation establishing a state student-level data system and provided fiscal support for it. This was enabled by the state's relatively strong fiscal conditions; the state had a roughly 15% total state general fund balance as a percent of its total expenditures. Like the Emergent State, the Accelerated State was relatively decentralized. SEA officials noted that the state had a long tradition of local control. Finally, the Accelerated State used external consultants and vendors to establish unique student identifiers and to assist in its construction of longitudinal data. It did not employ them, however, in creating other program elements to expand its data system.

Established State

The Established State in our study was at the vanguard of the movement to create LSDS in the US. The state began creating the system in the 1980s. It current system is highly comprehensive. In terms of the DQC index, Established State's LSDS ranking falls between 7 and 10 from the list of essential elements. The approach undertaken by SEA staff in Established State was highly planned and occurred over several years of piloting. In the late 1980s, SEA staff developed the technological infrastructure that enabled school districts to provide student-level rather than aggregate data to the state. Early successes of the LSDS in pilot districts facilitated district participation and support.

Since its inception, the LSDS in the Established State has grown to integrate data across program areas and data points and including higher education. Indeed, the system is truly K-20 and beyond as it has begun to track students into the workforce. In order to enable and maintain the data necessary for a K-20 system, the state has created a data warehouse and is now planning to redesign its LSDS towards a transactional framework.

The state legislature was very supportive of the state's LSDS from its inception. It tied school funding to LSDS data and mandated that districts contribute part of their funding to the creation and maintenance of the LSDS. The state was healthy in terms of its fiscal conditions, with over a 15% state general fund balance as a percent of its total expenditures. School governance was highly centralized in the Established State. There was less than one district for every 10,000 students in the state. This reduced the number of districts from whom the SEA had to obtain and manage data. While the SEA employed external consultants or vendors to establish its unique student identifiers, it relied upon internal staff to develop and manage its comprehensive LSDS.

Though the states approached the development of their LSDS very differently and encountered different sets of state-level factors, they faced similar challenges associated with organizational capacity, governance and politics. We explore each of these challenges in-depth in the following chapters and identify strategies that SEA leaders used to address them.

BUILDING STATE AGENCY CAPACITY

LSDS mark a significant departure from pre-existing systems. Creating and utilizing a system that tracks individual data across the K-20 educational system require sophisticated technology and the personnel who possess the knowledge and skills to employ it. As state legislatures and the federal government place increasing demands on states to collect and utilize longitudinal student data, SEAs must continually expand and up-date their data system. This requires that SEA personnel develop both a depth and breadth of knowledge about the system. Further, because LSDS ultimately seek to integrate data from across program areas and agencies, creating and utilizing such systems ultimately require that SEA personnel collaborate across departments and divisions. In short, LDSD require significant efforts to develop technological and human capacity in SEAs.

In this chapter, we examine how the case study states undertook such efforts. The states took different approaches to developing their capacities for implementing and sustaining LSDS. In particular, they varied in their uses of external consultants and in the degree to which they planned or were actively working to develop knowledge of the LSDS across the state educational agency. Our research suggests that these approaches had implications for the comprehensiveness of the student data system and for the state's capacity to initiate and plan for continued system improvement.

State Capacity-Building Strategies

- *Emergent State*: reliance on external consultants; little distribution of LSDS knowledge across SEA

- *Accelerated State*: targeted, short-term use of external consultants; emphasis on professional development for highly skilled staff; emergent distribution of LSDS knowledge across SEA

- *Established State*: minimal and targeted use of external consultants; longevity of highly skilled staff; wide distribution of LSDS knowledge across SEA; collaborative SEA culture

Building Capacity in Emergent State

At the time of our study, the Emergent State was in the early stage of developing its SDS. It was focused on creating unique student identifiers and attaching them to state assessments. While Information Technology (IT) staff has been involved in designing features of the state's emergent SDS, a consultant team, housed in the SEA, held primary responsibility for implementing and daily operation of the system. This team assigned unique identifiers to students in the state's schools, attached them to state testing records, and maintained constant contact with school districts.

Housing the consultant team in the SEA facilitates interaction between the team and the state IT staff. The consultant team meets regularly with state IT staff and staff involved in setting

assessment policy to discuss emergent issues associated with the SDS. The consultant also maintains documentation about the SDS to coordinate its work with state staff.

The meetings and documentation represent channels through which knowledge of the SDS could be transferred from the consultant to state agency staff to build the latter's capacity to manage the system over time. Currently, the consultants possess the most in-depth knowledge of the state's emergent SDS. One state staff member acknowledged this, noting that SEA staff members "don't have the knowledge to provide (districts) the assistance that's necessary with the SDS."

Our interviews suggest that SEA staff do not currently view questions of building SEA capacity as a pressing issue. SEA staff did identify several long-term goals. These included integrating the SDS with other internal data systems, such as personnel, and across agencies with higher education, improving data quality, and providing useful information to districts and schools. At the time of our study, the state was focused on resolving immediate problems associated with assigning unique student identifiers to the state's over-700 school districts.

Building Capacity in Accelerated State

The Accelerated State has taken a hybrid in-house/outsourcing approach to developing its capacity to implement and sustain its LSDS. The SEA hired a consultant to assist with the creation of unique student identifiers, the first step in the state's construction of its LSDS. SEA staff was generally positive about this consultant and its product though state staff members had altered the consultant's program to integrate multiple state applications into a comprehensive, K-20 LSDS. This further required state staff to develop applications to check the validity of student IDs as they added more data elements beyond those embedded in the consultant program. Interestingly, staff in the state joined with other SEAs to pressure the consultant to make its product more responsive to each state's needs and contexts.

Though the Accelerated State employed consultants at various stages in the development of its LDSD, SEA staff members expressed skepticism about them. This skepticism revolved around two issues: product flexibility and expense. The state's experience working with consultants to collect student-level discipline data illustrates these issues. The SEA initially hired two consultants to provide initial guidance and technical capacity. SEA staff was, however, disappointed with the consultant's products; the staff did not believe that the products got to the level of specification that the SEA wanted. Though the state paid for the products, SEA staff scrapped the products, started over, and built new applications. State staff reported other incidents in which consultants offered products that were not flexible enough to meet the state's needs and that were simply too expensive. As a result, the SEA currently hires consultants primarily on a short-term basis, to assist with the implementation of highly specialized technologies and to train state staff to utilize and manage these technologies.

The state's decisions regarding consultants reflects the SEA's efforts to hire staff with the requisite expertise and to build the capacity of current staff to create, implement and manage its LSDS. The SEA has doubled the number of IT staff, including trainers, quality assurance, project managers and support staff since the inception of the state's LSDS. In addition, the SEA focused on training veteran staff on the new data technologies, while hiring new staff to do maintenance work on the existing systems. This enabled veteran staff members to combine their extensive knowledge of the state's educational system with increased technological knowledge to design, expand and revise the state's LSDS. A project leader asserted that this strategy enabled the SEA to move quickly towards developing a data warehouse, "We brought all that embedded

knowledge of our operational systems to the data warehouse world... If we brought in brand new people, they would have had to learn the business of education. We have that embedded."

Significantly, some of the personnel initially involved in creating the state's LSDS have left the SEA to pursue higher salaries in the private sector. One staff member we interviewed noted that the agency was still experiencing the loss of key staff members who possessed special knowledge of the data system's architecture that was not easily transferred to other staff members. The staff member characterized this as a "major pressing issue right now." While staff departures reflected, in part, the competitive market for highly skilled IT workers, one staff member asserted that the SEA's funding structure contributed to staff turnover. Much of the work related to the LSDS in the Accelerated State has been supported by grant money rather than by general funds used to pay for stable staff positions. While a creative response to budget constraints, this approach introduced some uncertainty. Difficulties associated with securing bonuses and salary increases further contributed to the challenges of maintaining highly skilled staff members.

Building Capacity in Established State

The development of the LSDS in the Established State was almost entirely in house. The Established State has the most comprehensive LSDS among the states in our study. It spans the K-20 system and includes a fully operating data warehouse. The decision to develop this system in-house was initially due, in part, to the environment in which the state first initiated its LSDS. At that time, data collection and reporting in the state was still paper-based. There were few consultants prepared to assist the state in creating a student data system. The LSDS thus emerged, in large part, from efforts by SEA staff to systematize data collection efforts through using computer technologies. SEA staff members described how they "learned on the run" as they were constructing a largely novel data collection system.

The state does use consultants to provide short term, task specific support, such as generating reports during high demand periods. It also employed a consultant in creating its data warehouse. The technology associated with data warehousing is, currently, highly specialized. The Established State hired a consultant to help create the architecture for the data warehouse. Significantly, SEA staff members involved in the data warehouse initiative worked closely with the consultant to develop their own knowledge of the associated technologies. These staff members quickly took on responsibility for further development and management of the data warehouse.

The LSDS staff members also help to build capacity for operating and utilizing the LSDS more broadly across the state agency. Because of the system's comprehensiveness and the high demand for data from state legislators and the governor, SEA staff members from across several program areas must work with the LSDS. Staff most directly involved in operating and maintaining the LSDS has sought to develop the capacity of program area staff in several ways. Project leaders and LSDS staff members meet regularly with program area heads, staff and programmers to inform them of the evolution of the LSDS and to work with them to address any concerns associated with it. A LSDS staff member reported that he takes programmers from the program areas to conferences and meetings with him so that they develop their knowledge of the LSDS.

LSDS staff members were able to collaborate with and bring other staff across the SEA together around the data system, in part, because of their long tenure in their positions. Many staff members involved in launching the state's LSDS remain involved in the system's

continuing operations, management and development. Most of the staff members associated with the LSDS we interviewed had been at the SEA for over fifteen years, with much of this time being spent working with the LSDS. This longevity enabled the staff to develop both breadth and depth of knowledge about the LSDS, which has, in turn, enabled the staff to monitor, manage and revise the system on an on-going basis. This capacity has garnered the LSDS staff members the respect and cooperation of other agency staff.

Our interviews suggest that supportive leadership and a collaborative culture have contributed to this staff stability and longevity and fostered strong staff commitment to the work of creating, maintaining and revising the LSDS in the Established State. LSDS staff members described how agency leaders encouraged their efforts to identify problems and develop system solutions. In addition, staff members emphasized the collaborative culture that had developed among the staff responsible for maintaining the LSDS. Staff members described collegial relationships through which they drew on each other's expertise, regardless of their organizational position, to resolve problems that arose over the course of their work.

FINDINGS

The case studies illustrate the central approaches that states have taken to build their capacity to create, implement and sustain LSDS. These approaches reflect, in part, the stage of system development at which the state is currently. They also reflect the decisions states have taken regarding staffing and the use of consultants.

Key Findings

- Building internal state capacity contributes to comprehensive LSDS.
- Targeted use of consultants can enhance state staff capacity.
- Leadership and collaborative culture facilitates retention of highly skilled staff.
- Distributing knowledge of LSDS across the SEA enables on-going LSDS development and improvement.

Finding 1. *Building internal state capacity contributes to comprehensive LSDS.*

We find a correspondence between a focus on building internal SEA capacity and the comprehensiveness of state LSDS. States that focused primarily on building the capacity of SEA staff had the most comprehensive LSDS. These states targeted training and resources to develop staff members' depth and breadth of knowledge of the LSDS. This knowledge allowed staff members to design, monitor and expand their state's LSDS and to meet changing state and federal mandates and data demands.

Finding 2. *Targeted use of consultants can enhance state staff capacity.*

LSDS require increasingly advanced technology and the skilled staff to utilize it. External consultants often possess the access to and knowledge of such technologies and can thus provide

needed assistance at particular points in the state's creation, expansion and maintenance of its LSDS. Targeted use of consultants can also contribute to building SEA staff capacity. Using consultants to complete specific, technical tasks can free SEA staff to build their depth and breadth of knowledge of the LSDS and its relation to the state's broader educational enterprise. Further, assigning specific SEA staff members to work with consultants on defined projects can also facilitate the short-term transfer of knowledge from the consultants to relevant SEA staff.

Finding 3. *Leadership and collaborative work cultures facilitate the retention of highly skilled staff.*

Hiring and retaining highly skilled staff are critical to creating and maintaining LSDS. Leadership and collaborative work cultures are important to these efforts. We found that leadership is key to generating financial support and stability to hire highly skilled staff. Leadership is also important to focusing resources on developing the knowledge base of highly skilled staff members. Finally, leaders can provide such staff members with autonomy and support to identify problems and generate new solutions. This fosters staff commitment to working collaboratively to expand and improve the LSDS.

Finding 4. *Distributing knowledge of LSDS across the state agency enables on-going development of LSDS.*

In their most comprehensive form, LSDSs require the participation of staff from across departments and divisions within SEAs and, in some cases, across agencies. At the least, this means that staff members across program areas and divisions within SEAs need to possess some understanding of the operations and purposes of LSDSs. We find that states with the most comprehensive LSDS distribute knowledge of the LSDS across SEA staff through providing trainings for staff across the agency, communicating with program area leaders, and including relevant program staff in critical meetings. Such efforts contribute to the on-going maintenance and improvement of the state's LSDS.

BUILDING CAPACITY IN DISTRICTS AND SCHOOLS

Just as LSDS require building capacity within state agencies for producing, managing and utilizing data in new and more complex ways, they require similar capacity building in districts and schools. The state has a crucial role to play in assisting districts and schools to develop the knowledge and skills districts need to participate in and utilize LSDS. This chapter examines how our case study states took up this role. SEA staff across the three states identified district capacity as a key challenge. Districts varied significantly in the availability of technological resources and skilled, knowledgeable personnel. A lack of communication among district and school program area staff and the staff working directly with the LSDS also presented obstacles to implementing and maintaining LSDS. Districts also faced problems related to consultants.

The state agencies we studied employed several strategies to develop district and school capacity. All three SEAs provided districts and school personnel with just-in-time technical assistance. In the Accelerated and Established states, SEA staff also developed processes to assist district and school staff in developing relevant knowledge and skills and obtain necessary technological resources. Regardless of the strategies employed, developing trust and reciprocity with districts and schools was critical to state's efforts to assist districts in building their capacity around the LSDS.

Building District and School Capacity in Emergent State

The Emergent State has over 700 school districts. According to SEA staff, these districts varied in their technical capacity. SEA personnel noted that in order to submit data accurately many districts would have to devote significant resources to purchase both hardware and software. In addition, one staff member noted that many districts have high staff turnover making it difficult to build staff capacity related to working with and using the state's SDS. Some districts, according to this staff member, did not have any staff designated for such work. In some, the superintendent reported the data. A member of the SDS vendor team confirmed this, noting that, at the district and school levels, the people who interacted with the SDS ranged from secretaries to superintendents.

SEA staff also noted that a lack of cooperation among program personnel at the district and school levels also impeded the districts and schools' ability to participate in the SDS. A student data system is intended to integrate data on individual students from across different program areas, including special education, bilingual education and Title I. A SEA staff member in the Emergent State said that personnel in charge of collecting data for these programs do not communicate with each other or with the staff involved in reporting data to the SDS. This lack of communication contributes to students being classified differently across these programs or not reported as participating in the program areas, both of which made it difficult to track students' progress within school accurately.

The SEA has attempted to address these challenges primarily through providing yearly training sessions and maintaining a help desk. During the first years of implementing its SDS, state staff offered training sessions throughout the state. During these sessions, state staff worked with district and school personnel directly, taking them through the system as the latter worked on laptops. The state also provides technical assistance to the districts and schools on a daily basis through the help desk managed by the SDS vendor. Members of the SDS vendor team

interact daily with district and school personnel through the help desk, addressing their questions and helping them to resolve problems.

Though SEA staff members reported that communication with districts and schools is essential to implementing and operating an effective SDS, problems with one of the state's testing vendors made such communication challenging. As in the other states in our study, districts in the Emergent State appear to have been initially hesitant to participate in the SDS. SEA staff reported that they had to spend time "convincing" the districts of the system's value. Failures associated with the state's testing system exacerbated this initial district hesitancy. The SEA hired a vendor to manage its testing system. Over the course of the multi-year contract with this vendor, several problems arose, including the mis-scoring of tests, failure to administer the tests on time, and losing tests. These problems resulted in districts not being able to meet reporting deadlines associated with NCLB. Because districts faced negative sanctions for such failures, several districts took their complaints to the state legislature. The SEA, in response, contracted additional staff for data editing purposes and relied upon internal staff to resolve the testing problems. Ultimately, however, the testing failure resulted in the SEA not being able to provide districts with the requisite data. As one SEA personnel noted, "And all during this process, this agency was saying, 'Okay, you're going to have your scores on this date…And so 'We promise' and 'we promise,' and we'd never get delivery. So that created some real problems."

The testing failure contributed to distrust between districts and the SEA. This distrust affected how the state interacted with districts around its SDS. One member of the SDS consultant team noted that she did not take state agency personnel to her trainings and meetings with districts because state personnel often became "lightning rods." This consultant reported that her team had developed strong relationships with districts and schools, in part, because the team was able to help district and school personnel directly through its help desk. The consultant team also attributed their positive relationships to their ability to "play the role of not being the state agency." Members of the SDS consultant team were careful to position themselves as "sympathetic" helpers rather than representatives of the state agency.

By positioning itself as "not the state agency," the consultant team served as a buffer between the districts and the state agency. In this position, the consultant team provided the SEA with important feedback on its emergent SDS from the districts. SEA staff also gathered district feedback through training sessions they offered district personnel and through talking at superintendent conferences. Though it was not clear how SEA staff used such feedback, the staff was concerned that they establish a reciprocal relationship with districts. SEA staff emphasized the importance of providing districts and schools with reports that they could readily use as a means to fostering district support for and participation in the SDS. Given the emergent nature of the state's SDS this desire for reciprocity remained as yet a future goal.

Building District and School Capacity in the Accelerated State

Staff in the Accelerated State had originally planned to build and implement its LSDS over several years. The first step planned was piloting the unique student identifiers in a sample of districts. The pilot was abandoned, however, when the state's superintendent decided to attach the unique student identifiers immediately to the state's restructured assessments. The same year, the state legislature attached school funding to the data collected through the LSDS. Given the potentially negative consequences for districts and schools, these decisions placed considerable pressure on the SEA to ensure that the emergent system operated successfully. Problems with

the system could result in districts and schools losing funds or facing negative sanctions related to federal mandates.

The decision to move the LSDS into operation all at once posed several challenges to SEA efforts to build district and school capacity. One challenge was targeting assistance and training to the local personnel actually involved with the system. This challenge was compounded by what SEA staff saw as a lack of communication between the people responsible for collecting and reporting data in the districts and schools. The state's implementation of the LSDS marked a dramatic and swift change for district and school personnel who had long worked in separate program areas and with aggregate data. The Accelerated State attempted to address this challenge by offering training sessions for district and school personnel around the state. SEA personnel reported, however, that the personnel actually involved in data reporting in the districts and schools often did not attend these sessions. In addition, personnel in the program areas, i.e., special education, bilingual education, Title I, did not communicate with each other or with personnel responsible for up-loading the data to the LSDS. According to a SEA staff member, the lack of communication contributed to considerable frustration among district and school personnel during the first year of LSDS implementation and impeded full and accurate reporting of student information.

The SEA established several means of communicating with district and school personnel. One project leader met monthly with the state's superintendent council to apprise the council of the various data collection efforts associated with the LSDS. State staff held weekly conference calls with every school in the state to field questions, established a help desk and created specific list serves to provide relevant information to superintendents, principals, curriculum directors, technology coordinators and all personnel dealing with the LSDS. The state continues to maintain these venues. During the first year of implementation, the state also sent trainers to the schools and districts to work directly with personnel involved with the LSDS.

Working directly with the districts and schools led the SEA to develop a certification program for school and district personnel involved with the LSDS. Through their on-going contact with the districts and schools, state staff realized that the district and schools often did not have IT staff. In many cases, the SEA found that front office secretaries in schools were reporting data to the LSDS. In response, the SEA established a voluntary certification program for district and school staff involved in such reporting. The program involves staff taking classes and working with specific products. Along with developing personnel capacity, the program provides school and district staff with an endorsement to place on their resume *and* signals to principals and superintendents that engaging with the LSDS requires unique knowledge and training.

The SEA also created a certification program for vendors that provide student information packages to districts and schools. Working with these vendors was particularly challenging for state staff. Since schools and districts hire the vendors, the SEA does not have authority over them. This makes it difficult for the state to resolve problems that arise as vendors work with the districts and schools on data reporting. In order to reduce problems of inconsistencies across vendor packages and the state's LSDS, the SEA created an environment through which vendors can test their applications over the summer before school starts. The state also tests vendor packages to ensure they produce the files required for the state's LSDS and lists the certified vendors on their webpage. The state requires vendors to be recertified if they make changes to their products. Though the state agency does not promote any vendor packages, the certification program provides districts and schools with information to determine which

packages to purchase. In addition, the state meets monthly with vendors to inform them of changes in and extension of the LSDS.

The vendor certification program reflects the SEA's efforts to create reciprocity with the districts and schools. SEA staff in the Accelerated State acknowledged their reliance on districts and schools to report accurate student information. In addition to providing technical assistance, they believed that they could increase the accuracy of this data by providing the districts and schools with data analyses and reports that the latter could use to inform their own decision-making processes. As one state staff member noted, "…We totally understand that the only way to get high quality data is to give it back to them. And then they're going to see what it looks like and make it even higher quality." Reporting back useful information from the LSDS represented a key means of constructing relationships with districts and schools that was reciprocal and that would enable the LSDS to operate more accurately and efficiently.

SEA staff members also sought to develop a sense of reciprocity with districts and schools by serving as a mediator between federal and state legislative mandates, on the one hand, and the districts and schools, on the other hand. The state faced challenges in maintaining a mediating position. State staff asserted that federal mandates created "an environment of fear" that led districts and schools to be suspicious of the state's efforts to create the LSDS. While the districts and schools acknowledged that the state was responding to federal mandates, they remained fearful that the data collected through the LSDS could result in their facing negative sanctions. Resolving such mistrust remained a challenge for SEA staff even though they reported that they had begun to receive positive feedback from districts and states regarding the utility of the state's LSDS.

Building District and School Capacity in the Established State

The Established State implemented its LSDS in an environment in which the standards and accountability movement in education was just emerging. Though the state legislature put its support behind the effort, no federal mandates or programs existed that encouraged states to collect student level data and to integrate it into a longitudinal, K-20 system. When the Established State first announced its plans to establish such a system, it met with considerable resistance from district personnel. This resistance stemmed, in part, from the system's novelty. Districts saw the system as an "add on" that would exact costs in terms of work effort and technology without yielding any clear benefits to them. Staff members involved in the LSDS's inception still refer to the meeting with district personnel where the staff presented initial plans for the LSDS as "Bloody September."

The SEA planned its LSDS over the course of several years before implementing it fully across the state. During the planning period, SEA staff met with districts around the state on a regular basis to inform them of the planning and to solicit their support. The state also identified receptive districts, of different sizes and geographical location, to pilot the LSDS. According to SEA staff, these districts felt that the LSDS increased the efficiency and accuracy of their data reporting procedures. They provided the early successes that the state could use to promote the LSDS among other districts.

The SEA was further supported in their efforts to implement a LSDS by a state legislative mandate that required that school funding be determined by data reported to the system. The legislature also required districts to contribute funds to support the LSDS. These mandates made early successes of the LSDS paramount. As in the Accelerated State, an initial failure held important negative consequences for the district.

Given the system's now established status, SEA staff members describe most districts as "cooperative." The districts have built up their capacity to participate in the LSDS over the past several years, though the SEA continues to provide technical assistance through conferences, help desks, list serves and an extensive electronic documentation archive. Like in the Emergent State, the SEA staff in the Established State did encounter several smaller districts that initially found the technological demands of the LSDS difficult to meet. The SEA worked to connect these districts into consortia, a model that the state had used for other educational programs as an effort to build the capacity of resource-limited districts.

As in the Accelerated State, SEA staff members in the Established State acknowledged the need to develop reciprocal relationships with districts. One state staff member's comment encapsulates this relationship, "They send us raw data and we do all of our managerial reports off of it. At the same time we generate reports that go back down to the schools and the school district for them to use in whatever manner that they choose." Given the system's expansiveness, SEA staff members noted that they try to avoid requesting that districts send data that are not tied directly to a state or federal legislative mandate. At the same time, the staff members acknowledge that such mandates are continually increasing. The SEA's recently established data warehouse was intended to meet some of this demand. Staff members acknowledged, however, that they are often in the position of being "the messenger" of increased state and federal demands placed on the districts. They also noted, however, that the districts often perceive them as the "go-between" or "mediator," helping them to meet state and federal mandates. SEA staff members also see their mediator role as acting proactively to plan for future mandates rather than to react to them. The state's plan to move to a transactional system in which local data changes are immediately registered at the state level is one way that the SEA is seeking to up-date its system to make it more user friendly for the districts and schools.

FINDINGS

LSDS create challenges for states to work in new ways with districts and schools. Ensuring the accurate and efficient flow of student data between the state agency and the districts and schools require that states assist the latter in building their capacity to participate in LSDS. Our case studies point to the following key findings in this area.

Key Findings

- Just-in-time assistance enables state agencies to meet the diverse needs of districts and schools.

- States are critical to developing long-term district and school capacity.

- Reciprocity between state agencies and districts is important to implementing and maintaining LSDS.

Finding 1. *Just-in-time assistance enables SEAs to meet the diverse needs of districts and schools.*

Issues of district and school technical capacity emerged as each of the states in our study began to implement its LSDS. All the SEAs addressed these issues by providing just-in-time assistance in the form of help desks, list serves and other types of training. These forms of assistance provided the flexibility necessary to address the myriad of difficulties that districts and schools encountered as they engaged with their states' LSDSs. Because the technical capacity of districts and schools varied considerably and because districts and schools experienced varying levels of staff turnover, just-in-time assistance enables the state agency to meet the diverse needs of its districts and schools.

Finding 2. *States are critical to developing long-term district and school capacity.*

Though just-in-time technical assistance is important to implementing and maintaining LSDS, we found that SEA efforts to enact more comprehensive strategies for developing district and school capacity to participate in and utilize LSDS were also important. The states in our study employed several strategies to assist districts and schools in developing their long-term capacity. These included district and school personnel certification, consultant certification, and the creation of technology consortia that reduced the technology and staff costs associated with LSDS for small districts

Finding 3. *Reciprocity between state agencies and districts is important to implementing and maintaining LSDS.*

Implementing and maintaining an efficient and accurate state LSDS requires that SEAs develop relationships marked by trust and reciprocity with their districts and schools. States rely upon districts and schools to report data accurately and efficiently. We found that failures related to the LSDS eroded trust between the districts and schools and the SEA, presenting an obstacle to implementing the LSDS. Even without failures, our case studies suggest that districts and schools tend to view state mandates for data reporting with some suspicion, particularly in an environment in which state and federal mandates attach negative sanctions to performance data. State provisions of short and long-term technical assistance to districts alleviated some of this suspicion and improved district and school participation. Providing useful information and reports to the districts and schools from the LSDS also facilitated increased district and school LSDS participation and reporting accuracy.

THE GOVERNANCE OF LSDS

Because they require states to integrate data from across a broad range of programs and across multiple organizational levels, LSDSs present several governance challenges. This includes questions of who determines what data is collected and for what purposes? How are multiple programs and organizational levels coordinated? And, ultimately, who bears responsibility for these systems and their data? Because LSDSs integrate individual student data at the state level, issues of privacy and confidentiality make such questions pressing. Increasing demands for data reporting from multiple stakeholders further place pressures upon SEAs to coordinate the production of data and to manage growing work loads. In all, the multiplicity of parties involved in the LSDS calls for clear leadership and ownership.

In this chapter, we examine how our case study states addressed these challenges. Though the LSDS was formally located in different departments across the three states, staff members all reported the need to manage work with personnel from other departments and divisions. Coordination with the school districts was also critical, with states with a stronger tradition of local control facing a more arduous enterprise. Governance issues surrounding the security and privacy of the data were more relevant for those states beginning to grapple with the implementation of LSDS. Encompassing all of this, the case studies illustrate the importance of establishing staff and leadership ownership over the LSDS.

The Governance of LSDS

Emergent State: Formal authority in fiscal services, special education and curriculum; low levels of leadership and ownership; emerging agency coordination; local control state requiring district buy-in; some concerns with FERPA.

Accelerated State: Formal authority in IT and fiscal services; high levels of leadership and ownership; emerging agency coordination and advanced formal governance structure; local control state requiring district buy-in; some concerns with FERPA.

Established State: Formal authority in assessment; high levels of leadership and ownership; fluid agency coordination; highly centralized state; established agency and state-district coordination; few concerns with FERPA.

LSDS Governance in the Emergent State

In the Emergent State, governance over the student data system was structured around a team made up of deputy superintendents from the fiscal, curricular and special education offices within the SEA. Formal authority over the system's operations was located in the fiscal offices, while policy oversight was located within the offices of curriculum and special education. However, leadership turnover within the superintendents' and deputy superintendents' offices as well as within the departments, left final responsibility and ownership over the system somewhat uncertain. One staff member asserted that "no one wanted to own" the SDS. This staff member hypothesized that the reluctance to fully assume leadership over the data system was due to the complexities of constructing a SDS and the knowledge it required. It is likely, too, that the highly

publicized failure associated with the state's testing system made responsibility for the SDS more onerous. Significantly, when asked who was ultimately accountable for the running of the SDS, it was a member of the external consulting team who asserted her responsibility for it.

The deputy superintendents initially met as a team with project leaders and staff members involved with the implementation of the SDS. Staff in program areas could report issues and problems associated with the SDS to this team where they could be resolved. A staff member noted that participating in the SDS team allowed him to develop a better understanding of the work of the different program areas within the state agency. The SDS team structure thus helped to coordinate work across offices and departments within the state agency and introduced some degree of collaboration that some staff members had not experienced prior to the data system.

Governance issues related to school districts and schools revolved centrally around the issue of ownership. SEA staff emphasized that the state has a strong tradition of local control. This is reflected, in part, by the existence of over 700 school districts in the state. The tradition of local control meant that the state had to rely primarily on efforts at communication and persuasion, in particular with district superintendents. One staff member noted that the system might have been implemented with fewer problems had district superintendents been brought into the planning process from the beginning. The challenge of fostering participation in such a highly decentralized context is illustrated by the state's current efforts to extend the SDS to include data on student expulsion and suspension. Districts in the Emergent State have expressed some resistance to providing student level discipline data to the state. One SEA staff member attributed this resistance to the districts' efforts to maintain ownership over this data and to avoid being sanctioned for poor performance and to face a possible state takeover.

Though local control and the decentralization of authority in the Emergent State posed difficulties in fostering district buy-in, SEA staff members also noted that most districts had, over time, begun to embrace the SDS. This appears to have been due, in large part, to NCLB. According to staff members, though districts express some frustrations with reporting data through the SDS, most districts in the state have "embraced" the SDS because they "realized it has helped them clean up their own data and to start looking at it." State staff members also attributed the lack of urgent K-12 governance problems to the state providing districts with assistance to meet reporting mandates. Though the state is responsible for constructing and maintaining the SDS, districts bear ultimate responsibility for the accuracy of the data.

Governance issues in relation to privacy and security did arise in relation to the expansion of the SDS to include higher education and compliance with the Family Educational Rights and Privacy Act (FERPA). LSDSs are intended to allow for the tracking of student progress across K-12 schools into higher education and, ultimately, into the workforce. In the Emergent State, the K-12 school and higher education boards were located in separate agencies with separate governing boards. In addition, while the K-12 state board had created unique student identifiers, the higher education board used social security numbers. This made matching students between the two systems difficult and the transferring not secure. In general, state staff members expected more clarification in the future regarding FERPA and the legality of transferring data. Given the emergent nature of their SDS, though, such challenges were not pressing.

LSDS Governance in Accelerated State

In the Accelerated State, staff members in the Information Technology (IT) department oversee the construction and operations of the LSDS. The IT department is further located within the division of fiscal administration. IT leaders were keen to take ownership of the development

of the LSDS and from the beginning they addressed issues surrounding LSDS governance. In fact, in the initial stages of system development, they established a three-part governance structure. This structure included a Data Governance Board, a Data Managers team and a Data Request Board. The first comprises directors of all the program areas, IT and auditing who meet monthly to develop policies to manage the SEA's data needs. The Data Managers deal with the data elements and manage the security of the data as it moves across the system, though they are not ultimately responsible for its accuracy. Finally, the Data Request Board manages requests for data that arise internally from the program areas and externally from state legislatures, the federal government, researchers, etc.

The new governance structure allowed the SEA to regulate the production, movement and use of student level data associated with the LSDS. This formal structure did not, however, resolve all the challenges associated with coordinating data production across multiple organizational lines. For example, one SEA staff member described how several policy questions from schools emerged in the implementation of the state's discipline application. The staff attributed the emergence of these questions to the failure of IT and planning staff to adequately consult with staff from program areas associated with discipline, suspensions and expulsions. Staff members from these areas were reluctant to address the questions since they did not feel the application was their "problem."

Instituting the LSDS also manifested issues of data coordination with districts and schools. As in the Emergent State, SEA staff in the Accelerated State characterized their state as having a tradition of local control, though the Accelerated State had considerably fewer districts and schools. One project leader noted, "We are a local control state. A lot of decisions about reporting data and how to handle the students' data are made at the local level. And it is important that our policies respect that." SEA staff members were careful to communicate that the LSDS was a response to the legislative and federal data reporting mandates that they faced as a state education agency. SEA staff used the state's council of superintendents to communicate the rationales and goals for the data collection efforts to the districts. In the Accelerated State, then, SEA staff utilized existing governance structures as venues for fostering district buy-in and participation in the LSDS.

In addition SEA staff members were careful to distinguish between the district and school ownership of student data and the state agency's management of the data. As one staff member noted, "They're (districts and schools) actually the owners and we are acting on their behalf." This distinction did not, however, resolve many of the tensions that arose around data reporting for the LSDS. For example, districts and schools resisted providing the state with student level discipline data. The districts and schools were concerned with protecting student privacy and being labeled as "unsafe". One state staff member noted that, as a result, the state "pulled back" on that data collection. The example illustrates the tensions inherent in data ownership for districts and schools.

By establishing formal procedures the three-part governance structure described above helped to address some of the concerns related to the security and privacy of the data. However, as in the Emergent State, linking the information collected for K-12 to higher education while remaining compliant with FERPA remains an unresolved challenge. Similarly, having schools look up information on students that are moving from school to school is also problematic in terms of privacy considerations. According to a LSDS project leader, FERPA needs to be rewritten to precisely allow agencies to share data on students where it could benefit them with

more ease. According to a staff member, the approach of the state with regards to FERPA has been to simply try things out and wait for any response.

LSDS Governance in Established State

Unlike in the Emergent or Accelerated States, the LSDS in the Established State was located in the assessment department of the K-12 school division within the SEA. According to state staff, this location reflected the integral position that the LSDS held within the state agency. Staff from across the agency participated and utilized the LSDS as part of their work. Significantly, however, our interviews suggest that the informal relationships formed between state agency staff and the depth of knowledge possessed by the staff involved with the LSDS was more central to governing data collection, reporting and restructuring of the LSDS than formal lines of authority.

The presence of staff members who had worked with the LSDS for several years allowed for a horizontal, fluid flow of work. On-going communication among project leaders and staff members allowed for problems to be identified and resolved informally, without having to apply formal rules and procedures. As one SEA staff member reported, "We do not look at levels, at tiers in the organizational chart. We look at what we need to accomplish. And we cross over whatever lines. Lines are blurs to us. We go to get done whatever it is we need to get done." Another staff member described how a LSDS project leader could facilitate action because of the respect and knowledge he had developed over his many years with the state, "He knows things have to get done, whether it's his stuff or other stuff… He's got enough background and experience and respect that people will come to the table."

Given the mature nature of the Established State's LSDS, governance issues did not appear as pressing for the SEA staff we interviewed in the Established State as they did for staff in the Emergent and Accelerated States. It appears that most of these issues had been resolved in the Established State. When they emerged in our interviews they did so primarily in conjunction with the creation of the state's data warehouse. Staff involved in developing the data warehouse described initial reluctance among some program areas staff within the SEA to send their data to the warehouse since they would lose control over the data. Over time, however, as the data warehouse began to issues reports, data warehouse staff said that program personnel began to see the value of participating in the data warehouse. The data warehouse staff members asserted the importance of providing valuable and accurate reports to fostering buy-in among SEA staff.

This appears to be the case with the coordination of the LSDS across districts and the SEA, as well. At the time of our study, the SEA staff members did not identify major problems of district-state coordination. Instead, SEA staff pointed to several forums for communication that they had established to inform districts of changes in federal and state mandates and in the system itself. As we noted in the previous chapter, these forums included statewide conferences, list serves, web-based documentation and archives, and on-going conversations with district personnel. In addition, SEA staff reported that the relationships built up between state and district personnel over time positioned state staff associated with the LSDS as "go-betweens" between the districts and the program areas within the state agency.

System governance was further facilitated in the Established State by a level of centralization that was not present in the Emergent or Accelerated States. In those states, the tradition of local control was combined with a high number of districts and schools. In contrast, the Established State contained far less than 100 districts. Though some of these districts enrolled high numbers of students, the level of centralization meant that LSDS staff had to deal

with far fewer district personnel than those in the Accelerated State and especially in the Emergent State. Interestingly, state LSDS staff encouraged smaller districts in their state to develop consortia to share and exchange technological resources, thus reducing the costs each district bore to participate in the LSDS. The consortia represented, in part, an effort use centralization to make participation in the LSDS more efficient and less costly in the Established State.

Given the increasing demands for educational data stemming from federal and state mandates as well as from researchers and other interest groups and stakeholders, managing data requests has become a critical issue in the Established State, particularly among the IT staff associated with the LSDS. These staff members noted that they were receiving increased demands from both external and internal actors. They did not, however, have any clear procedures with which to help them prioritize these demands and expressed a desire for further clarity. On the other hand, this state did not encounter any large concerns with security or privacy issues in terms of coordinating the movement of data. Given the maturity of the system, the state has a long experience of interpreting and complying with FERPA issues.

FINDINGS

Given both the comprehensive nature of LSDSs and the sensitive nature of the data reported, the governance of LSDSs poses particular challenges to state education agencies. Our case studies illustrate the importance of fostering clear ownership of the LSDS among project leaders and staff and of clarifying the ownership of data with districts and schools. However, no single formal or informal governance scheme was found to ensure the successful management of the LSDS.

Finding 1: *There are substantial differences in the formal location of LSDSs across the states.*

The formal leadership of the LSDS can reside in different parts of a state education agency across the states. LSDSs may be led, for example, by IT teams, program area teams, or assessment teams. However, these formal organizational differences do not seem to correspond to variations in the development of an LSDS.

Finding 2: *Higher levels of staff and leadership ownership of the LSDS enhance the integration and development of the LSDS.*

We find a direct correspondence between staff and leader ownership of the LSDS and the development of the LSDS. In particular staff ownership can be a very powerful resource, since it can translate into a high level of commitment to maintaining the system. Leadership ownership of the LSDS helps to guide the evolution of the LSDS, by helping the teams through inevitable failures, seeking much needed funding resources, and mapping future goals.

Finding 3: *Both formal governance structures and informal horizontal working environments help coordinate the management of an LSDS within a state agency.*

Coordination within the agency is an arduous necessity for the successful management of an LSDS. However, states may develop different but equally successful strategies to resolve internal conflicts regarding data ownership. These may range from formal internal governance structures

to informal departmental relations that bring staff together from across the SEA to resolve task-specific problems.

Finding 4: *Local control states experience more of the tension between the state and districts related to data ownership and its stakes.*

Though SEA staffs are careful to observe the distinctions between their management authority and the schools and districts' ownership of data, this distinction can still create tensions with schools and districts who ultimately have to bear the consequences associated with reporting performance data. Resistance from schools and districts can be more focused in states with a tradition of local control, that is, where the state defers to localities policy-making discretion.

Finding 5: *FERPA compliance is a concern for states in the initial and intermediate stages of LSDS development.*

As technology makes the transfer and reporting of data more routine, concerns with security and privacy of data increase. States with more mature LSDS have had more opportunity to tackle these issues in general, and more specifically in relation to federal regulations such as FERPA. But, states that are in the initial phases of LSDS development face higher hurdles since they have had less trials-and-error experiences with interpreting FERPA and they may face high immediate expectations in terms of "state-of-the-art", but secure, data reporting.

THE ROLE OF STATE LEGISLATURES IN THE EVOLUTION OF LSDS

State legislatures can influence the evolution of a state's LSDS under different roles as stewards, providers, regulators, and consumers. Legislatures can provide executive leadership by expressly encouraging state agency officials to organize and develop statewide data systems. In practical terms, legislatures can show their support for these data collection efforts through their funding decisions. Legislatures can also leave their imprimatur on these systems by legislating reporting obligations and fiscal implications between the state and local education agencies. Finally, legislatures can encourage data collection efforts by actively consuming and using data generated from such systems. As Palaich et al. (2004, p.1) warn though, it is not clear that the average legislator will be too familiar with the need for further investments in data technologies: "most elected officials will not have the expertise to grasp the technical and operational trade-offs associated with these investments." This implies that the state educational agencies may have to play a critical role in mobilizing legislative support for LSDS. As we explain next, the role of legislatures in the three case studies states is quite distinct and revealing. Overall, we find a direct correspondence between the degree of legislative involvement and state LSDS comprehensiveness, with legislative participation being mediated by the relations with state education agencies.

The Role of State Legislatures in LSDS

Emergent State: Little or reactive involvement by state legislature

Accelerated State: Recent engagement by state legislature through support and funds

Established State: High levels of involvement from early inception through funds, mandates, and use

Legislative Support in the Emergent State

The Emergent State has had the least interaction and involvement with the legislature. The legislature has not been a key player in the creation of the state SDS nor in its evolution. If anything its involvement is more reactive, as events or problems unfold. The one instance in which the legislature became more directly involved took place during a recent period of turmoil surrounding the failures and delays from the state testing vendor. The districts, in their frustration, went to the legislature and several hearings were held on this issue in the general assembly. The legislature provided then a setting in which to channel complaints but it was not clear from our interviews what specific measures, if any, the legislature took thereafter.

The state legislature has not specifically allocated funds for the state SDS nor has it passed legislation with direct implications for state student level data collection efforts. One state staff member observed that, in fact, "the legislature probably doesn't have much information or knowledge about the SDS." In this staff member's opinion the SDS, is "low on the totem pole" for state legislators, with items with potential national impact attracting more interest. This low level of engagement from the state legislature with the SDS is also revealed in terms of usage. The legislature certainly has demands for reports form the state education agency, but these reports stem from previous systems and not the current one being developed. The legislature then is not a key consumer of the new data, which is not surprising if in fact they are not fully

knowledgeable about it. On the other hand, it does not appear that state agency members involved with the SDS have attempted to engage the legislature on these issues. When asked whether they interacted with the state legislature or the governor's office a staff member noted, "No. We try to avoid all that."

Legislative Support in the Accelerated State

The Accelerated State has had legislative engagement since it launched its LSDS a few years ago. The deputy commissioner of fiscal services, who is responsible for the whole data enterprise, frequently interacted with the legislature around issues of data collection, reporting and use. Despite a certain level of turnover at the executive level, a common denominator among SEA leaders has been a keen interest in data collection, and these concerns have been carried over to the legislature.

The legislature, in turn, has showed its support through funding the LSDS and its expansion. When the state was not awarded a federal grant to implement its LSDS, the legislature "stepped forward" and funded the project for three years at a cost of nearly $3 million, the largest expenditure for this kind of project within the agency. One of the project leaders is now also hoping to get permanent positions from the legislature and believes the leadership within the state agency will make this happen. The legislature also makes its influence felt in the state through state funding rules. Districts need to abide by the new data requirements stemming from the LSDS to obtain state funding, a very strong incentive for compliance.

In general, according to SEA staff, legislators in the Accelerated State have "a lot of appetite for data." Project leaders have taken into consideration legislators' interest in different types of data by developing each new piece of data in an iterative way that incorporates the priorities displayed by legislators (i.e., first assessment and accountability data, next staff data and so on). The staff believes expectations for the data will become increasingly high once the LSDS is fully operating.

Project leaders associated with the LSDS have expressly sought out interactions with state legislators as well as engaged the agency's executive leadership to learn about opportunities related to data systems. Staff members visited legislators to see what they wanted in terms of data, as eventual stakeholders in the process. The leadership of the agency (directors and deputy commissioners) were also approached and enlisted by inviting them to attend data warehousing conferences. In this state the SDS project leaders believe enlisting executive support, which in turn can enlist legislative support, is a necessity. According to the project leader, a data system initiative cannot be "an IT project, although IT leads it a lot. But if, executive leadership is not in favor, you will have huge issues." This has helped garner support from key individuals who now, according to LSDS staff "try to think of ways to help."

Legislative Support in the Established State

The Established State has very high levels of support from the legislature, which has shown its commitment in terms of the purpose, regulatory environment, and funding of the LSDS. A state staff member characterized this support as "tremendous… both officially and unofficially." The backing of the legislature has been present from the inception of the state's LSDS. Indeed, some of the early information needs of the legislature, specifically for student level vocational data, encouraged its creation. The early and sustained support of the legislature meant that political challenges have not been problems in the Established State. This support was critical when dealing with the initial resistance from districts to a statewide data system. After

the SEA had completed piloting the system, the legislature mandated that school districts use some of their money to further develop the SDS. The legislature also tied school district funding to the information collected at the student level in the SDS, which from one project leader's perspective, "was the best way to go." From a regulatory perspective this decision prompted districts to get on-board from the beginning since their funding depended on it. More recently, the SEA has received a large grant from the state legislature to explore redesigning its current system and move it towards a transactional model. This appropriation reflects the legislatures continued commitment to the LSDS.

The legislature in the Established State has also been an avid consumer of data from the inception of the LSDS. As one staff member states, "they're one of the heaviest users of our information." Legislators use LSDS data to evaluate particular programs and to inform policy decisions. The interest in data has also extended from previous to current governors.

Informal relationships between state agency staff and state legislative staff have quite distinctly facilitated legislative support for the LSDS. According to one project leader, legislative interest in the data system was initially fostered by legislative staff who had previously been part of the SEA. These staff members were users of information while at the SEA. Relationships between LSDS staff and legislative and gubernatorial staff, dating back many years, have promoted an understanding of the LSDS and its uses. In the view of one project leader, these relations are necessary, "the magic bullet if there is one," to developing LSDSs.

The one challenge the Established State seems to face in terms of legislative support relates to staffing. According to a SEA staff member, there has been a freeze on permanent staff positions in the education agency, at least in year 2007. This staff member believes this may prove a constraint as it is occurring at the same time that demands for data are increasing exponentially.

FINDINGS

The experiences of the three case study states with their legislatures are varied, ranging from legislative lack of awareness and involvement to full support and use of the data systems. The case studies and the overview of the states clearly point to the importance of sustained support from the legislature for the development and maintenance of state LSDSs.

Finding 1: *State legislative involvement greatly facilitates the evolution of LSDS*

We find that legislative involvement helps in the development of a state's LSDS in multiple ways. Legislatures through their backing can help the SEA through difficult transitions and relations with local districts. Legislatures can provide additional resources necessary for creating and sustaining ever-evolving, comprehensive LSDS. State legislatures can also drive further developments by requesting specific kinds of data collections. Finally, state legislatures can provide a regulatory framework that can more closely link incentives for districts and schools to participate in earnest with state data collection efforts.

Finding 2: *Legislative involvement often results from state education agencies efforts to enlist support*

We find that legislative involvement will often stem from SEA efforts to enlist legislative interest and support, rather than from a legislature's own initiative. SEAs reach out to legislators

through various channels, including staff informal relations, executive leadership contacts, funding requests, and formal hearings.

RECOMMENDATIONS

Our study has revealed that there are multiple critical factors that contribute to starting up and expanding statewide LSDS. These factors stem from challenges that are inter and intra-organizational, governance-related and political. From an inter-organizational perspective, it became clear that SEAs should find ways to support school districts' capacity and foster trust. In terms of internal considerations, SEAs need also to carefully assess how they will nurture their own in-house capacity. In terms of governance, it became clear that SEAs should strive for a strong system of ownership and clear lines of responsibility. Finally, we found that within the political sphere, enlisting legislative support can provide SEAs with both much needed resources and clout. In short, LSDS necessitate up-to-date technology and long-standing, knowledgeable staff, clear lines of governance and the support of all constituencies involved. SEA leaders are the most natural actors to motivate these outcomes. Accordingly, we direct our recommendations to them.

Our recommendations capture four important themes that our study has illuminated. These themes emphasize the following: "enhancing communication", "economies of scale", "ensuring capacity", and "clarifying governance." Naturally there will be some overlap in the ways of achieving these different goals; that is, one recommendation can help for example to improve capacity as well as communication channels. We detail the recommendations next.

Recommendations: Enhancing Communication

A project of the scale and scope of a LSDS requires the support of an array of stakeholders. State education officers need the LSDS to be known by and accessible to multiple audiences and users. Our first set of recommendations emphasizes the need to enhance communication between critical partners.

Recommendation 1. *Strengthen communication channels between the state education agency and the districts.* SEAs need to create and maintain clear communication channels with their districts to provide ready access to technical assistance and to staff that set policy. Given the districts' ultimate ownership over and accountability for the data central to the LSDS, it is critical that state education agencies develop forums through which districts can have input into data collection efforts as well as assistance. These contacts and points of information need to be maintained throughout the evolution of states' LSDS. They are essential venues through which state education agencies can also explain the rationale for the data systems, promote participation among districts, and receive feedback. Effective channels of communication between SEAs and districts include: help desks by phone and e-mail; list serve announcements; monthly conference calls; in-depth and accessible web-sites; in-house SEA conferences and on-the-road consulting team.

Recommendation 2. *Promote reciprocity by providing early-on easy-access to reports to the districts.* One of the most important channels of communication that SEAs can develop is providing districts with reports derived from the LSDS that districts and schools can readily use to inform and improve their own decision-making processes. Along with technical assistance, the provision of useful reports is critical to fostering districts' participation in a LSDS. Such reports signal to districts that SEAs take issues of reciprocity seriously, as they foster district

interest in and ability to use data to improve educational practice. Fostering such interest can also work to improve the quality of the data that districts report.

Recommendation 3. *Strengthen communication channels between the state education agency and the legislature.* State educational officials should foster and mobilize channels of communication with the legislature. State legislatures can play many roles in relation to a state's LSDS. These include steward, regulator, advocate, and user. In order for the legislature to play these roles, however, they need to be informed and up-to-dated on issues involving the state's data collection efforts. These channels of communication can include: informational sessions by state education officials to legislators or staff; special task forces in the SEA with legislative staff participation; grant and funding applications to the legislature, and formal hearings for funding requests or LSDS developments

Recommendation 4. *Promote the creation of a state commission on education data.* SEAs should promote the creation of a state commission on education data to help guide and inform policy in the state. Palaich et. al (2004), insightfully note that legislators may not have the expertise to understand all of the tradeoffs involved when making decisions with regards to a state's LSDS. One of their recommendations that we here endorse is the creation of an independent and on-going commission on education data collection to advise the legislature, in a similar manner to boards and commissions that exist to advise the legislature on utilities, transportation and energy. This commission may also advise SEAs. This would not be a task force, an entity called upon for the duration of a project, but a permanent commission. Legislators would then have access to information on educational data collection issues on an on-going basis.

Recommendations: Exploiting Economies of Scale

The management of information improves when economies of scale are exploited. A state with a highly decentralized organization and, in particular, with myriads of school districts will face higher obstacles when implementing a LSDS than a more centralized state. Clearly, we would not recommend massive overhauls of a state's education organization but we think there are various practices already observed in some states that address the challenges that decentralization presents and which SEAs can emulate.

Recommendation 5. *Encourage district consortia.* An SEA faced with a large number of school districts with varying sizes and technical capacities can encourage the creation of consortia for the purpose of information collection and provision. Smaller districts, which have difficulty supporting the technological and staffing structure required to participate efficiently and effectively in a LSDS, could then join efforts to centralize collection in one entity, improving on resource and personnel investments. A clear regulatory framework must be in place to ensure compliance with confidentiality laws (e.g., FERPA). Such consortia can also facilitate the provision of assistance that the state education agency can offer districts, thus reducing resource burdens on the state agency, as well.

Recommendation 6. *Encourage state consortia.* Not only districts may profit from local alliances, but states may do so as well. SEAs may seek associations with other states and

agencies when entering relations with vendors to ensure that vendors address the specific needs of the member-states. Given that some vendors may be reluctant to introduce adaptations to their products if they believe few states may demand them, they may operate differently if faced with an organized cadre of states. States may also profit from such consortia as they can facilitate a sharing of experiences and expertise. Vendors may profit from larger markets.

Recommendations: Ensuring Capacity

A constant factor throughout our analyses has been the need for states to build the human capacity within their SEA and also foster school districts' capacity. A rapidly changing technological environment presents several challenges to such efforts. In-house personnel may not be able to fully keep up with new applications in data information systems. The very specialized IT personnel who does keep up may not stay very long at the SEA if more remunerative positions are available in the private sector. Within the school districts, technical capacity varies considerably, while issues of data collection may take a lower priority to other operational concerns. These trends suggest that managers of a LSDS development project will need to incorporate a multiplicity of strategies to ensure those involved with the LSDS have the proper know-how.

Recommendation 7. *Build internal capacity within the state education agency*. SEAs need to allocate resources and make management decisions that focus on building internal capacity of LSDS related staff and leadership. The core emphasis should be on being able to retain and retrain, when necessary, the highly skilled personnel involved with the LSDS. We have identified several ways to do so:

- provide training to further develop staff members' capacity;
- seek resources to keep salaries competitive;
- reallocate highly skilled staff to the newer, less routine, parts of the project;
- provide skilled staff with autonomy to identify problems and seek solutions;
- distribute knowledge of LSDS across the agency through training sessions, communication with program leaders, and inclusion of program staff in critical meetings;
- foster a culture of collaboration within LSDS staff.

Recommendation 8. *Foster school districts' capacity.* SEAs need to promote the technical capacity at the school district level in order to assist them in the delivery of data, to encourage their participation in the LSDS effort, and in general to improve data quality. Districts and schools have encountered countless problems when engaging with the LSDS and SEAs should provide assistance to ensure the integrity and evolution of the LSDS. Some of the ways in which the SEA can assist are:

- provide training and certification on data provision for school district personnel;
- provide certification to school vendors that are state compliant to encourage responsiveness and uniformity;
- provide just-in-time assistance to school districts through established channels of communication (*see Recommendation 1*).

Recommendation 9. *Establish a balanced and productive use of consultants.* SEAs should use consultants only for those specialized projects that in-house personnel cannot carry out. These projects often will involve a part or application of the statewide LSDS, as opposed to the wholesale implementation of a state's LSDS. Consultants and vendors need to be clearly held accountable for these smaller-sized or time-limited projects. At the same time, SEA leaders need to target their resources to develop a cadre of state staff with both depth and breadth of knowledge of the LSDS. In addition, for any project that consultants are utilized relatively quick transfer of knowledge to state personnel should occur. If consultants or vendors are being used to liaison with school districts, state personnel should take up these tasks on a relatively short order, not only to develop knowledge in-house, but to ensure that working relationships of trust are developed between the districts and the SEA.

Recommendations: Clarify Governance and Ownership

Developing a statewide LSDS relies upon the participation of a range of leaders and staff across multiple organizational lines within state education agencies and across districts and schools, as well. Maintaining such participation requires governance structures that can, at once, clarify lines of authority and responsibility and allow for collaboration across such lines. Questions of data and system ownership are critical to such efforts. Given these issues, our final set of recommendations pertains to how incentives can be incorporated to ensure earnest involvement across stakeholders in data collection efforts.

Recommendation 11. *Clarify authority over LSDS within state education agencies.* Statewide LSDS involve SEA staff from across program and administrative departments. Though they thus require high levels of collaboration across state agencies, establishing clear authority over and responsibility for a LSDS is essential. SEAs can locate this authority and responsibility in one office or division or within an executive team that includes leaders from across relevant offices. What is critical is that these leaders exert clear LSDS oversight, advocate for the LSDS within the agency and manage its development. The governance structure of the LSDS and all movement of the data should be clearly established and documented.

Recommendation 10. *Link data collection to school funding.* SEAs should require (or seek the requirement from the legislature) that district funding be linked to the data collected for the statewide LSDS. That is, the formula that states use to allocate district funding, based on general enrollment counts and various special program participation or enrollment, should be computed with data directly from the LSDS. This is a recommendation that will forcefully enlist district participation and promote ownership. It is crucial, however, that it only be enacted when the SEA is ready to provide districts with the support they need.

Conclusion

State and local education agencies are being called upon to collect, report, and utilize data in new ways. Statewide LSDS can assist education agencies in these efforts. LSDS enable state agency leaders and local educators alike to improve the accuracy and quality of data collection, enhance their capacity to assess educational programs, and reduce the costs and administrative burdens of data collection and reporting. Statewide LSDS can also facilitate the movement of data to the federal government, helping to inform national education policy. In order to reap these benefits, state agency leaders will have to mobilize resources and stakeholders on a large scale. Leaders can draw on the lessons learned by states at varying stages of the development and implementation of LSDS to develop the political, managerial and governance strategies that can facilitate the development and the use of LSDS to inform and improve educational policy and practice.

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APPENDIX A

What do we know about the Evolution of Longitudinal Student Data Systems?

There are several core research questions and queries of an applied nature that arise when considering the development of a statewide LSDS. First, why do some states have more fully developed comprehensive data systems than others? That is, the reasons for the variation in the level of development of states' student data systems need to be understood. Second, what are some of the best practices from past experiences with student information collection efforts? Given the variation in student data systems, from a public management perspective, it is important to identify those critical facilitators that have been shown to promote successful outcomes. And third, what has been the impact of data collection efforts on educational outcomes? Since the development of statewide LSDS is in part a response to increased efforts in accountability, which in turn are a response to increased pressures to improve educational outcomes, it is natural to examine whether any educational benefits have ultimately accrued.

The extent of previous research and evidence on these issues varies substantially. To the best of our knowledge there has not been any concerted effort to rigorously explain levels of variation in states' LSDS. From a practical standpoint, however, there is a growing literature, coming particularly from non-profits, government education agencies, and vendors, that seeks to provide information on the necessary elements for improving the comprehensiveness of state LSDS. Whether these collection efforts in turn are translating into better educational outcomes and how this may be happening has received less attention. What has received much more attention and examination has been the educational consequences of increased testing, standards and in general the whole accountability movement, including the No Child Left Behind Act.

State level differences in LSDS development and the reasons for these differences have not yet received thorough study. For example, we do not have a systematic understanding of why many southern states have more developed LSDS than their northern counterparts, or why some states began their investments in data collection systems in the late eighties while other states have only begun more comprehensive efforts in recent years. The literature on policy adoption and policy diffusion provides some insight. In particular, scholars of state government innovation (Berry and Berry 1990, 1994) have suggested explanations at various levels of influence: a) internal determinants (political, economic and social characteristics of a state), b) external determinants (federal pressures), and regional diffusion (influence from neighboring or similar states). Regional diffusion explanations have drawn attention to the role of social learning across states in terms of policy issues: states can learn what to avoid or what to emulate from other states' experiences (Mooney 2001). States' paths in policy innovation can also be mediated by economic competition (Boehmke and Witmer 2004), particularly by issue that revolve around scarce resources. In the context of education, policy entrepreneurs who can network across states have been found to increase the probability of legislative consideration and approval of a policy innovation, in particular, in relation to school choice (Mintrom 2001). In the case of states' LSDS, the geographic and temporal paths of development suggest regional and networking effects may have played a role. However, only careful research will reveal the relative weight of regional effects, as compared to internal factors, which in many policy areas have been found to be the driving forces shaping reform.

From a public management perspective, the last years have seen an increase in the availability of information regarding states' LSDS conditions and some lessons learned, though this information can be piecemeal and on occasions mediated by the goals of the originating entity. The sources of the information include non-profit organizations (e.g., Data Quality Campaign, Education Commission of the States), educational agencies (e.g., National Center for Educational Statistics, Institute of Education Sciences) and vendors. The Data Quality Campaign deserves distinct mention in that in its goal to achieve increased high-quality data and implementation of state longitudinal data systems, it has provided useful guidelines, such as its list of essential "ingredients" in a LDSD, as well as produced four years of survey results on the status of states' data systems. DQC has also summarized many of its findings in short briefs, often with an emphasis on project management issues (DQC, 2006, 2007). The federal educational agency, the Institute of Education Sciences, sponsored an in-depth report on states' data systems and their use in the Midwest region (REL, 2007). In their findings they emphasize the challenges stemming from staff constraints at the local level (collection capabilities) and at the state level (analysis capabilities), as well as concerns with data burden and the barriers imposed by federal and state regulations. Some of these concerns have been voiced at the trade conference on education data systems, the Management Information Systems annual Conference, which is sponsored by the NCES and where representatives from state agencies present many of their respective lessons learned to the rest of the country (MIS, 2007). This conference provides a rich repository of experiences and accounts by the states that opt to participate in on-going LSDS challenges and successes.

The goal of improving data collection efforts is dual and inter-related: to improve accountability and to improve educational outcomes. There are many levels within the educational hierarchy where data can have beneficial potential uses (Palaich et. al, 2004), and there is some research that has addressed how increased data gets used at the state and local levels (e.g., Massell 2001). However, there is not much research yet on whether higher quality of data, for example longitudinal and linked to program and teacher data, in the end contributes to improved educational outcomes through better decision-making. What has received more attention has been the linkages between testing and accountability policies, such as NCLB, and educational outcomes (for some surveys on the issue see Evers and Whalberg, 2002; Fuhrman, 2001, Ladd 1996). Not surprisingly the findings vary considerably, with some researchers finding improvements (e.g., Carnoy and Loeb, 2002; Jacob, 2005), but others cautioning against artificial improvements (Fuller, Wright, & Gesicki, 2007; Linn, 2005).

APPENDIX B

STATE LSDS RANKINGS

Table 2: Ranking of States with Less Comprehensive LSDS and Potential Influential Factors

State	DQC LSDS Index	Laws & Statutes	District Rate	Percent Budget Balance	Vendor for Unique Student IDs	Vendor for Longitudinal Data	Vendor for Program & Other Data
Idaho	1	Yes	4.69	18.5	Yes	No	No
New Jersey	1	No	4.61	5.4	Yes	Yes	No
Illinois	3	No	4.53	3.6	Yes	Yes	Yes
Maryland	3	No	0.28	17.2	No	No	No
Maine	3	No	11.56	3.3	No	No	No
California	4	Yes	1.64	10.3	Yes	No	Yes
Michigan	4	Yes	4.75	1.2	No	Yes	No
Missouri	4	Yes	5.73	13.2	Yes	Yes	Yes
Montana	4	Yes	29.71	25.6	Yes	Yes	Yes
Rhode Island	4	Yes	3.13	3.8	No	Yes	No
Arizona	5	Yes	5.33	17.5	No	Yes	No
Iowa	5	Yes	7.55	10.8	Yes	Yes	No
Indiana	5	Yes	3.17	6.1	Yes	No	Yes
North Carolina	5	Yes	1.52	8.1	No	No	No
Nebraska	5	Yes	16.08	28.8	Yes	Yes	Yes
New Hampshire	5	Yes	8.21	7.1	No	No	No
New York	5	No	2.77	7	Yes	Yes	Yes
Pennsylvania	5	No	3.5	4.2	Yes	Yes	No
South Carolina	5	No	1.27	17.5	Yes	No	No
South Dakota	5	Yes	14.1	13	Yes	Yes	Yes
Colorado	6	Yes	2.33	9.7	Yes	No	No
Kansas	6	No	6.55	14.3	Yes	Yes	No
Minnesota	6	Yes	5.99	12.6	No	No	No
Oklahoma	6	Yes	8.55	11.4	Yes	Yes	No
Oregon	6	Yes	3.8	8.7	No	No	No
Virginia	6	Yes	1.1	17.6	Yes	Yes	No
		Percent Yes	Average	Average	Percent Yes	Percent Yes	Percent Yes
26 States		**69.20%**	**6.25**	**11.4**	**65.40%**	**62.50%**	**30.76%**

Table 3: Ranking of States with More Comprehensive LSDS and Potential Influential Factors

State	**DQC LSDS Index**	**Laws & Statutes**	**District Rate**	**Percent Balance**	**Vendor for Unique Student IDs**	**Vendor for Longitudinal Data**	**Vendor for Program & Other Data**
Alaska	7	Yes	4.05	73.8	Yes	No	Yes
Alabama	7	Yes	1.78	19	Yes	Yes	Yes
Connecticut	7	Yes	3.34	10.7	No	No	No
Kentucky	7	Yes	2.6	9.5	Yes	No	Yes
Massachusetts	7	Yes	3.99	12.5	No	Yes	No
North Dakota	7	Yes	20.35	30.7	Yes	Yes	Yes
New Mexico	7	Yes	2.72	14.4	Yes	Yes	Yes
Nevada	7	Yes	0.44	15.8	No	No	No
Ohio	7	Yes	4.92	6.6	Yes	Yes	No
Tennessee	7	Yes	1.43	6.4	No	No	No
Vermont	7	No	28.77	4.7	No	No	No
Wisconsin	7	No	5.05	0.4	Yes	Yes	Yes
Wyoming	7	Yes	6.75	72.6	Yes	No	Yes
Delaware	8	Yes	2.65	21.7	No	Yes	No
Georgia	8	Yes	1.15	10.4	Yes	No	No
Hawaii	8	No	0.05	16.8	No	Yes	No
Mississippi	8	Yes	3.29	0.5	No	No	Yes
Washington	8	Yes	2.92	5.2	No	No	No
West Virginia	8	Yes	2.03	16.6	No	No	Yes
Arkansas	9	Yes	5.53	0	Yes	Yes	Yes
Louisiana	9	Yes	1.31	19.5	No	No	No
Texas	9	Yes	2.74	24.6	No	No	No
Utah	9	Yes	1.51	16.9	Yes	Yes	Yes
Florida	10	Yes	0.28	17.1	Yes	No	No
		Percent Yes	Average	Average	Percent Yes	Percent Yes	Percent Yes
24 States		**87.50%**	**4.57**	**17.8**	**50%**	**41.60%**	**45.80%**