

FORUM GUIDE *to the*

TEACHER-STUDENT DATA LINK

A Technical Implementation Resource



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National Cooperative Education Statistics System

The National Center for Education Statistics (NCES) established the National Cooperative Education Statistics System (Cooperative System) to assist in producing and maintaining comparable and uniform information and data on early childhood, elementary, and secondary education. These data are intended to be useful for policymaking at the federal, state, and local levels.

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

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National Forum on Education Statistics

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

Development of Products

Members of the Forum establish working groups to develop best practice guides in data-related areas of interest to federal, state, and local education agencies. They are assisted in this work by NCES, but the content comes from the collective experience of the state and school district working group members who review all products iteratively throughout the development process. After the working group completes the content and reviews a document a final time, publications are subject to examination by members of the Forum standing committee that sponsors the project. Finally, the entire Forum (approximately 120 members) reviews and formally votes to approve all documents prior to publication. NCES provides final review and approval prior to online publication.



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The Forum appreciates the contributions of the following reviewers and contributors: Rob Curtin, Massachusetts Department of Elementary and Secondary Education; Deborah Jonas, formerly of the Virginia Department of Education; and Linda Rocks, Bossier Parish Schools (LA).



In this Guide

This document is intended to serve as a practical guide for implementing a teacher-student data link (TSDL) that supports a range of uses at the local, regional, and state levels. The guide addresses the considerations for linking teacher and student data from multiple perspectives, including governance, policies, data components, business rules, system requirements, and practices. It provides references to promising practices for high quality data linkages, including TSDL-specific processes such as roster verification and the establishment of the Teacher of Record.

To meet the needs of practitioners, sections within the guide are organized around a range of uses of the TSDL and related implementation considerations for each use scenario. Because some readers may wish to focus on the implementation of TSDL within a specific use scenario, this online publication will include links for navigating directly to the use case sections.

The appendices provide supplemental summaries and references to related legislation and state policies, data models, and technical references.

Purpose and Audience

This guide highlights thoughtful advice and emerging practices to help state education agency (SEA) and local education agency (LEA) staff implement the TSDL in a responsible manner—and ultimately generate high quality data for high-stakes decisionmaking.

The primary audience of this guide includes all of the individuals charged with implementing the TSDL or using TSDL data in SEAs and LEAs, including policymakers, data management professionals, program staff, curriculum coordinators, technology coordinators, superintendents, and educators.

Prior Work

This resource builds upon a wealth of research conducted by other organizations and individuals. Many of these key developments, promising practices, and examples of implementations in schools and education agencies across the nation are highlighted throughout the document.



Common Terms

- **Course** – The organization of subject matter and related learning experiences provided for the instruction of students on a regular or systematic basis, usually for a predetermined period of time (e.g., a semester or two-week workshop).
- **Course section (i.e., class section)** – An instance of a course in which organized instruction of course content is provided to one or more students (which may include cross-age groupings) for a given period of time. For the purposes of this resource, a course may be offered to more than one course section.
- **Educator-Student Data Link** – A broader interpretation of the “Teacher-Student Data Link” that could include data for non-teaching education professionals linked to students. Note: The definitions of “educator” and “teacher” may vary based on state or local definitions (e.g., as established by Teacher of Record policies).
- **Entity Resolution** – The comparison of records in order to eliminate different references to the same individual (also known as matching).
- **“High-Stakes” Use** – Any use of the TSDL (or other data) that has major consequences or is the basis of a major decision. For example, decisions about student and teacher placement, teacher evaluation, hiring/firing/promotion, teacher compensation, and school configurations based on linked teacher-student data are “high-stakes” uses because of the significance of subsequent decisions that will impact people’s lives.
- **Governance** – In the context of data, includes establishing responsibility for individual data elements, datasets, and databases, and continuously improving data systems through the institutionalized development and enforcement of policies, roles, responsibilities, and procedures. Data governance identifies master data sources (i.e., authoritative data sources) and defines responsibilities for accessing and maintaining these data in order to safeguard the quality, integrity, privacy, and security of data.
- **LEA** – A local education agency (i.e., a school district)
- **Local Source System** – A student information system (SIS) and/or human resources (HR) information system at the local level.
- **Longitudinal Data System (LDS)** – Data system that captures more than a single point in time for individual students or educators. Longitudinal data are required for many uses of the TSDL, and in this document an LDS is not limited to a State Longitudinal Data System (SLDS) used for state and federal reporting. An LDS may include state data warehouses and/or state operational data stores (ODS) with longitudinal capabilities, but it may also be a local system other than the source operational system to which data are collected over time to support one or more TSDL use cases.
- **Process of Linking Teacher-Student Data** – One common mechanism for linking teacher and student data begins with the collection of student schedule data from a local education agency’s student information management system. These data can then be merged with data from other source systems, including staff assignment (HR) systems and systems that collect student outcome data, to establish the primary TSDL. A number of additional processes, such as roster verification and automated error checking, support the quality of TSDLs.
- **SEA** – A state education agency.



- **Teacher of Record (TOR)** – TOR is defined as the educator who is accountable for a student’s or group of students’ learning outcomes. However, defining a TOR for an organization such as an SEA or LEA is a policy decision. Many SEAs and LEAs maintain jurisdiction-specific definitions for TOR in order to support policies related to the responsibility and accountability of educators for student outcomes. Different policy questions and operational uses of the TSDL call for the differentiation of teachers with primary accountability for student learning, those teachers partially responsible for student learning, and education professionals that are linked to students for operational purposes. TOR is discussed further in Appendix B.
- **Teacher-Student Data Link (TSDL)** – The linking of teacher and student data, most often based on a student’s enrollment in a course section and a teacher’s assignment to that same course section.
- **Use Case** – Any scenario in which a TSDL might be established and used.

Additionally, several national resources are referenced throughout the document:

- **Common Education Data Standards (CEDS)** – A specified set of the most commonly used education data elements to support the effective exchange of data within and across states, as students transition between educational sectors and levels, and for federal reporting. This common vocabulary enables more consistent and comparable data to be used throughout all education levels and sectors necessary to support improved student achievement. CEDS is a voluntary effort that increases data interoperability, portability, and comparability across states, districts, and higher education organizations. More information on CEDS is available at <https://ceds.ed.gov/>.
- **School Codes for the Exchange of Data (SCED)**
 - **The Secondary School Course Classification System (2007)** – This publication includes course titles, codes, and descriptions and a recommended structure for indicating course level, credit, and sequence. The site also provides an Excel file of the course codes and descriptions. A helpful SCED Overview document is also available to help answer frequently asked questions from states and districts that are adopting SCED for their student records or transcripts. The publication is available at <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2007341>.
 - **Prior-to-Secondary School Course Classification System (2011)** – This document provides a taxonomy and course descriptions intended to help schools and education agencies maintain longitudinal information about students’ coursework in an efficient, standardized format that facilitates the exchange of records as students transfer from one school, district, state, or level to another. By design, the prior-to-secondary course framework mirrors, in large part, the secondary course framework. The document is available at http://nces.ed.gov/forum/pub_2011801.asp.

Both frameworks consist of four basic elements: course description, course level, available credit (for secondary) or grade span (for prior to secondary), and sequence. Taken together, these elements create a unique identification code for any course from preK through secondary school.



- **Privacy Technical Assistance Center (PTAC)** – This resource is one component of the U.S. Department of Education’s (ED’s) comprehensive privacy initiatives, and offers technical assistance related to the privacy, security, and confidentiality of student records. This assistance, available to SEAs, LEAs, and institutions of higher education, may include site visits; regional meetings; privacy and security practice presentations; privacy toolkits containing best practice guides and related resources; data security policies, procedures, and architecture reviews; data security audit assistance; frequently asked questions (FAQs); and help desk support on data privacy and security questions. For more information, refer to the PTAC website, available at <http://ptac.ed.gov/>.



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Chapter 1: Understanding the Teacher-Student Data Link

Teachers and students have always been informally linked through data—via class rosters, report cards, and numerous other connections that describe the instructional relationship between a teacher and learner. Education data systems have become more sophisticated in recent years and are now able to more precisely reflect the complexity inherent to teacher-student relationships at a scale that can be useful for policymaking, management, and operations at the state, district, school, and building levels.

What is the Teacher-Student Data Link?

The teacher-student data link (TSDL), sometimes referred to as the educator-student data link, formally identifies the relationship between teacher and student data in education data systems, and is most often based on a student's enrollment in a course section and a teacher's assignment to the same course section (Figure 1). The TSDL is sometimes used to establish accountability for the learning outcomes of a student or group of students, which can be linked to a person, group of people, or learning system.

The teacher-student data link formally identifies the relationship between teacher and student data in education data systems, and is most often based on a student's enrollment in a course section and a teacher's assignment to the same course section.

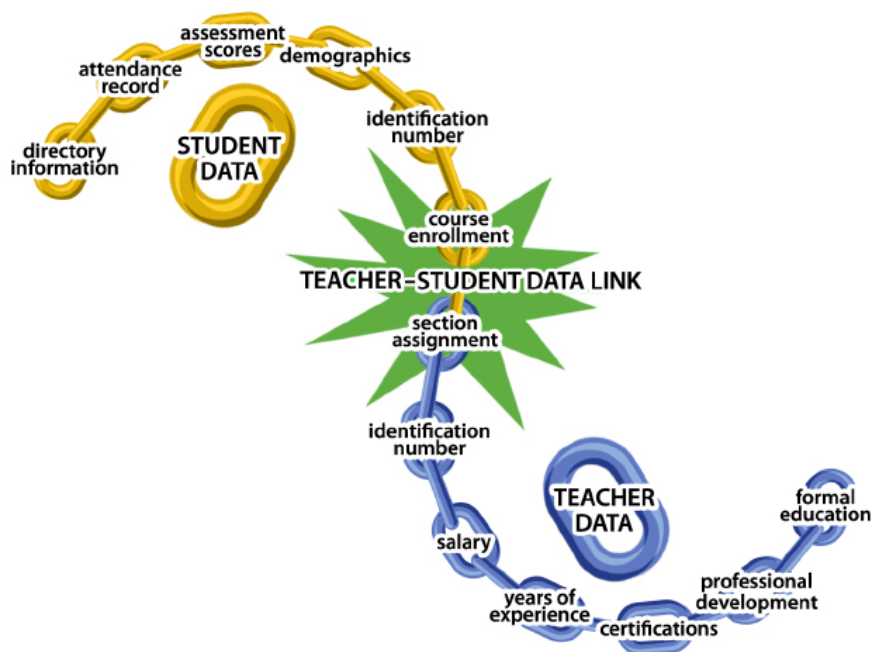


Figure 1.1 Conceptual illustration of the Teacher-Student Data Link



There are significant risks in assuming that data systems have valid data to support high-stakes uses simply because they have the ability to match teachers to students.

Traditionally, teachers and students have been “linked” based on the time they are scheduled together in the course section of a class. Current and emerging “instances of learning” unrelated to “seat time” in a classroom expand the way the link is created and can accommodate a wide range of entities that may either formally or less formally influence student learning, including a teacher in a traditional classroom, a team of teachers responsible for instruction, a study hall supervisor who tutors students, an offsite instructor who teaches a student “virtually,” and even technological applications used by students for instructional purposes. For example, in the case of complete virtual learning environments—in which electronic tools provide all content and assessments—the TSDL can be based on the amount of time a student uses the system, and accountability applied to the system instead of a person. Simply put, the emerging vision of the TSDL identifies professional responsibility for learning outcomes, whether that responsibility lies with a person, people, or learning system. In the case of a learning system, unless the system is reduced to just the collection of some reasonable and simple categories of instruction points, it may be impractical to implement within most contemporary schools. Although it is an emerging practice, this document attempts to discuss issues around use of the TSDL for learning systems in Appendix A.

Why is the Teacher-Student Link Insufficient in Some Existing Data Systems?

There are significant risks in assuming that data systems have valid data to support high-stakes uses simply because they have the ability to match teachers to students. In the past, rudimentary versions of the TSDL were used simply for scheduling purposes. These links were often stored in information systems that were not interoperable, nor longitudinal in nature, and focused on aggregate rather than individual student data. Data in these systems generally did not focus on the relationship between individual teacher inputs and student outcomes over time, and because the data only provided snapshots of the most recent version of student schedules and staff assignments, the teacher-student relationship could not be analyzed to determine how to best support student learning.

High-stakes uses of the TSDL, such as placement or compensation decisions, necessitate longitudinal data that accurately reflect frequent changes to student schedules and teaching responsibilities. Issues of data quality and timeliness have historically presented significant problems for these types of uses, but the emergence of more sophisticated systems gives education agencies the ability to properly define, capture, scale, and apply the link to improve student outcomes under a variety of use scenarios.



Why Should Education Agencies be Concerned about the TSDL?

When student data are linked to teacher data, education agencies can begin to explore more complex questions left unanswered by unlinked data, including

- Which educator preparation programs produce teachers that are more likely to be effective in the classroom?
- Which concepts are students of a particular teacher learning or not learning adequately?
- How much value does a teacher add to his or her students' learning over the course of a year?
- Which individual students might benefit most from a particular teacher's strengths?
- Which teachers are most likely to generate growth for a particular subgroup of students?
- Do the students of teachers who have work experience in their discipline outside of teaching do better or worse than teachers without that experience?

When student data are linked to teacher data, education agencies can begin to explore more complex questions left unanswered by unlinked data.

Answers to these questions can help education agencies better understand and evaluate how variations in teacher practice and preparation may impact student learning. More importantly, agencies may be able to dramatically influence student outcomes by applying this knowledge to a wide range of issues, including

- educator preparation program feedback and evaluation;
- targeted professional development;
- classroom instruction feedback and evaluation;
- teacher placement;
- accountability/reporting;
- teacher compensation/merit pay; and
- individualized learning systems.

Research confirms what many education leaders already know: of all school-based factors, teacher quality has the greatest influence on student learning.¹ In order to improve student outcomes, it is helpful for education agencies to understand how teacher inputs impact student learning. In recognition of this relationship, several national initiatives require state education agencies (SEAs) and local education agencies (LEAs) to tie teacher evaluation to student learning. As these and other high-stakes decisions are being made,

¹ Rivkin, S., E. Hanushek, and J. Kain (2005). "Teachers, Schools, and Academic Achievement," *Econometrica*, 73(2), 417-458 (<http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0262.2005.00584.x/abstract>.)

Rivers, J.C., Sanders, W.L. (1996) "Cumulative and residual effects of teachers on future student academic achievement." Knoxville, TN: University of Tennessee Value-Added Research and Assessment Center. (<http://heartland.org/policy-documents/cumulative-and-residual-effects-teachers-future-student-academic-achievement>.)



education agencies need accurate and valid data about the teacher-student relationship. A well-implemented and robust TSDL offers new ways to explore this relationship.

Recognizing and drawing upon a wealth of existing work related to the TSDL, the National Forum on Education Statistics (Forum) developed this resource for LEAs and SEAs. The document is intended to support a range of use scenarios for adopting the TSDL.

As education agencies look to design and implement a high quality TSDL—for a variety of uses—many components and considerations should be addressed. Before exploring specific use cases for the TSDL, this chapter reviews some of the more generally applicable components of the TSDL, including data requirements, roster verification, and links between teachers and students in local source systems.

What Data Are Needed Beyond a Compliance-Based Link?

The requirements for TSDL data—e.g., the granularity of the data, the quality of the data, and the frequency of collection—are driven by the purpose for which the data will be used. As such, an education agency's TSDL should not be designed simply to meet minimum compliance reporting requirements, which are rarely sufficient to support other uses of the data. For example, the America Competes Act requires a state to have a longitudinal data system that includes “a teacher identifier system with the ability to match teachers to students” (section 6401(e)(2)(D) (III)). An SEA may fulfill that requirement without capturing daily schedule changes and attendance data, or formalizing the kind of teacher-roster verification process needed to support specific reporting requirements or uses of the linked data. However, in the case of high-stakes uses such as teacher evaluation, the TSDL calls for more frequent collections, an expanded set of teacher and student data, and rigorous processes to ensure data quality.

Issues planners will need to consider include

- implementing a data governance program;
- adopting a formal roster verification process;
- tracking daily schedule changes (LEA);
- collecting student attendance data;
- collecting staff attendance data;
- linking students to more than one teacher in a course section;
- examining the frequency of student outcome/progress measurement;
- adjusting the frequency and scope of data transfers to longitudinal data systems;
- using unique student identifiers;
- using unique staff identifiers; and
- institutionalizing data quality feedback loops.



This guide examines such considerations both at a high level and within the context of specific use cases in real-world education agency settings.

The elements required to make the basic TSDL in most local source systems include student ID, teacher ID, course code, and data that uniquely identify the course section—no other data from student or staff information systems are required. However, an education agency may choose to engage in more robust analytics by including additional data. For example, the delivery method of instruction—such as online and/or individual learning environments—may advance analysis by

- tracking longitudinal changes in enrollments and assignments;
- incorporating actual (as opposed to scheduled) time on task; or
- establishing the link through something other than the course section.

Similarly, subsequent uses of the link may necessitate the capture of “instances of learning” not related to the traditional class (course section) scheduling. Rather than based on “seat time” in a classroom, an “instance of learning” is based on other touch points, such as quantity and quality of individualized instructional feedback in an online environment, regardless of whether the “educator” is a person or the learning system. Course section data could also be extended to include information about the delivery method, funding source, credits earned, course sequence, or learning standards. Student outcome data are also generally included in a TSDL to increase the usefulness of the link. Depending on the implementation scenario, information about the linked teacher may also include his/her teacher preparation program(s), certifications, in-service professional development history, and more (see Figure 1 for additional examples of links in the TSDL chain). For more information, see implementation scenarios in Chapter 4 of this guide.



Chapter 2: Recommendations for the Collection and Use of the Teacher-Student Data Link

Once the purpose and data needed for the TSDL are identified, an education agency will need to determine its requirements for collecting and using linked teacher-student data, including both functional and technical requirements. An effective TSDL that is suitable for common uses requires that attention be given to a range of critical success factors in areas such as

- governance;
- policies;
- data components;
- business rules;
- system requirements; and
- professional practices.

Governance

Due to the complexities surrounding the collection and reporting of the teacher-student link data, governance is critical. More specifically, data governance accomplishes several goals, including

- establishing clear ownership and responsibilities;
- establishing data quality goals and metrics;²
- minimizing redundant efforts;
- facilitating more frequent, broader, and better quality communication and collaboration;
- establishing whether and how business rules are changed and/or data are merged;
- standardizing business processes over time;
- shifting operations from reactive to proactive mode; and
- increasing understanding of the data available in the agency.

These goals are especially relevant when data requirements span traditional administrative boundaries of education agencies and program areas. In such cases, it is only through strong data governance that conditions can exist to enable the collaboration required for an effective TSDL. Among other benefits,

² For more information on data quality, refer to the Forum document, “Forum Guide to Building a Culture of Data Quality: A School and District Resource,” available at http://nces.ed.gov/forum/pub_2005801.asp.



governance can address administrative issues at all levels, create a culture of shared responsibility for data quality, and produce realistic expectations for the benefits of data use throughout an agency.

One particularly important aspect of data governance is the process by which participants establish how data will be used and, subsequently, develop operational processes to manage the data in support of those uses. Because TSDL source data contain personally identifiable student and staff records, another important role of data governance is to ensure its use is appropriate and privacy is maintained.

Policies

Policies that allow for successful implementation and use of the TSDL should address all aspects of operationalizing the link and using the data. In addition to these practical concerns, policies should also reflect needs related to local policy demands, state legislative expectations, and federal funding requirements (e.g., if a state promised to implement a TSDL as a condition of accepting a grant).

Policies that support successful implementation include those related to appropriate staff access to student data, identifying educator(s) who are accountable for student learning, regulating the data flow process (e.g., to ensure data quality), and ensuring that all students are enrolled in course sections by core subject area. More specific recommendations on policies to consider when implementing the TSDL are available in Chapter 4. Appendix C contains examples of state policies related to the TSDL and its use.

Privacy

Once student and teacher data are linked, the protection of student data, teacher data, and linkage data must be prioritized. In many states, any teacher data that are collected may be subject to open record laws. Before establishing policies to collect new teacher data, policymakers should consider whether the data will need to be made available to the public, and if so, the implications of this availability—especially in light of much more stringent laws protecting student information.

When implementing new uses of the TSDL, SEAs and LEAs should adhere to policies that support compliance with the federal Family Educational Rights and Privacy Act (FERPA) legislation and rulemaking, as well as applicable state and local laws.³

Teacher of Record

Having a Teacher of Record (TOR) policy is essential for high-stakes uses of the TSDL, and highly recommended for all uses. It is helpful for the TOR policy to be developed before the TSDL is implemented because the TOR policy will establish a reference for many subsequent implementation decisions. For example, when teacher evaluation incorporates student outcome data, it is imperative to establish

³ For more information about data privacy, visit the Privacy Technical Assistance Center (PTAC) website, available at <http://ptac.ed.gov/>.



criteria by which individual teachers will be associated with (linked to) individual students. This includes considerations such as the teacher's role, the proportion of a student's learning activities for which the teacher is responsible, and the subject or course content and scope. In some states, TOR policies must be adopted at a state level to enable the implementation of other state policies. For example, a state that legislates a common statewide system for teacher evaluation or recertification based on student outcomes will need a statewide definition of the Teacher of Record. More information about establishing a TOR policy is available in Appendix B.

Data Components

In almost all cases, the TSDL is most simply constructed using the core data elements needed to schedule students and teachers within the context of a class (course section). The components generally common to all uses include unique student ID; unique teacher/staff ID; state and local course identifiers; data to uniquely identify the course section for the time period being collected or reported (e.g., school or LEA section identifier and academic year); data that link both a student and educator to the course section for a specific time period (e.g., start and end dates); and data that further describe the nature of the link (such as the educator's role as a lead or co-teacher). Any uses of the TSDL beyond the local level require School Codes for the Exchange of Data (SCED) for comparability across LEAs.⁴ This can be achieved by LEAs keeping the state/standardized course codes in the source system or by mapping local course codes to state/SCED codes as part of the reporting process.

In addition to the core link, other data about students and educators are needed to support more specific and advanced uses. For example, the evaluation of teacher preparation programs requires the TSDL, as well as a link between the teacher and his or her preparation program. Requirements for the data granularity and frequency of collection also vary based on use. See Chapter 4 of this document for implementation scenarios and related data elements.

Business Rules

TSDL business rules describe how TSDL data are processed, the formulas used, any constraints on frequency, required accuracy, and parameters on the granularity of the data, as well as rules used to validate the data. In some cases a policy, such as a state teacher evaluation requirement, may define business rules—e.g., specific formulas and operational business rules for calculating value-added metrics, which are used to calculate the impact of teachers on their students' learning, usually while attempting to control for the students' past performances and influences outside of the control of the teacher. In other cases, business rules may not be prescribed, but may be guided by promising practices established by researchers, practitioners, or policy analysts.

⁴ For more information on state course IDs, reference the School Codes for the Exchange of Data (SCED) handbooks, available at <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2011801>. For more information on data element standards, refer to the Common Education Data Standards (CEDS), available at <https://ceds.ed.gov/>.



System Requirements

Use of the TSDL often relies on data systems designed for purposes other than the collection and use of the link. Source system requirements frequently reflect a wide range of factors related to the TSDL, including the ability to schedule elementary course sections and the capacity to assign multiple teachers to a course section in a co-teaching capacity. The source systems should include a teacher dosage element: the share of instructional time that a student spends with a teacher, which may be weighted for contributions from a co-teacher. Dosage allows the systems to reflect the changing reality of students and teachers assigned to course sections in an ongoing manner, rather than just the beginning-of-year schedule assignments. Source systems must also have the capacity to incorporate statewide student identifiers and staff identifiers, as well as state-defined course codes or references that bridge state and local course codes (often referred to as ‘crosswalks’). Without these capabilities, the information systems may not be robust enough to generate the critical elements needed to link students and teachers. The collection of TSDL data may push the limits of legacy systems that were designed to collect aggregate rather than individual data. For example, LEAs may face capacity issues when scheduling elementary students by subject if the data were previously collected as a single “homeroom” course section. Similarly, SEA systems may need modifications to accommodate the more granular student-section-teacher data.

In an effort to advance capacity, some data systems are being built for expected future needs. Best practices suggest that systems be designed and built in a way that the TSDL may be used for new applications.

Professional Practices

Practices that support the collection and use of valuable TSDLs become more powerful when they are understood by both data and instructional staff. Professional development and staff training associated with the TSDL should include, for example, quality assurance practices like roster verification, as well as embedded validation processes such as a process by which teachers verify rosters while taking attendance or by using records from an electronic gradebook (roster verification is discussed further in the next chapter).



Training in specific skills and broader professional development are both important in ensuring accurate and responsible data entry and data use. In many cases, school districts provide professional development programs; however, given that the TSDL is often a statewide initiative, SEA training may also be appropriate. The effectiveness of training on professional practices is improved when school administrators, data entry staff, and other users of the TSDL are

- encouraged to attend professional development or training sessions;
- aware of policies and business rules;
- informed about the data's applications;
- allowed to discuss findings and new directions at staff meetings or in written communications; and
- permitted to cross-train (e.g., training that includes staff members with a variety of roles and perspectives on the implementation and uses of the TSDL).



Chapter 3: Establishing the Teacher-Student Data Link

The most fundamental component of generating a high quality TSDL is the process of capturing data in local source systems. As such, the managers of LEA student information systems (SIS) and human resources (HR) data systems, and the data owners and data stewards who help to govern these source systems, play critical roles in ensuring a high quality teacher-student link.

Importance of Data Quality at the Source

Some of the uses described in this document involve data that are collected by schools and local education agencies and then transferred to another system for use by other organizations, such as the SEA or research organizations. In such a scenario, the users of the data may not be able to verify the accuracy of the data. Data quality procedures in place at all levels of data management (including the school and classroom levels) can help ensure accuracy of the TSDL and confidence in the quality of the data.

Data Entry Issues

Data entry is a frequent source of data error, but even “correct” data entry can lead to data quality concerns when entry procedures don’t adequately consider how the data will be used. For example, when creating a class schedule, a school may not need the state course code to be accurate (or even present) because it may be sufficient for local use to know the class title, teacher assigned, room, schedule, and students enrolled. However, if the data system permits a data entry clerk to leave the course code field blank or enter an invalid course code, this type of omission may have serious repercussions on quality when the data are shared with users who rely on state course codes to understand course content.⁵

Best practices suggest that data managers and stewards examine the process by which data are entered whenever there is a new use for the data. This includes emphasis on identifying those steps in the data collection and entry process that might permit unacceptable levels of error. Once data staff have a better understanding of ways in which human error may result in data quality issues, entry staff can be trained to reduce error and source systems can be re-engineered to minimize human error. Such quality control might be achieved by automated edit checks and validation steps as data are entered, including a control that ensures an LEA course properly maps back to an SEA course code (and that the LEA does not create its own course code). For example, rather than allowing optional free-form entry of a course code, the systems

⁵ The quality of information used to develop an instructional plan, run a school, plan a budget, or place a student in a class depends upon the school data clerk, teacher, counselor, and/or school secretary who enter data into a computer. For more information about best practices for data entry, refer to the “Forum Guide to Building a Culture of Data Quality: A School and District Resource,” available at <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2005801>.



could incorporate a look-up function that provides (and permits) only valid entries to the person entering the data. Auto-populating other data, such as the course title associated with the standard course code, provides an additional safeguard. When necessary, the LEA may contact the SEA curriculum staff to ensure that courses are aligned with the correct state course code.

Whenever new data elements are introduced or data are being used for new purposes, staff responsible for data entry may need additional training to ensure that they are aware of the additional uses, purposes, and intent of the data; understand the consequences of inaccurate or missing data; and employ all procedures needed to confirm data quality.⁶

Data Standards and Alignment

Comparability and synchronization across agencies contribute significantly to data quality. With respect to TSDL elements, an LEA should ensure that its courses and grades are accurately mapped to the SEA's standards for courses and grades if those data are to be compared at the state level. Similarly, an LEA's method for calculating grade point average should be aligned with the SEA's method if it is to be incorporated into state level reporting. Common language, definitions, and metadata are critical to data quality at all levels of the education enterprise.⁷

Master Data Management

In order to support the right level of accuracy across a range of uses and users, systems may need to be re-engineered not only for real-time validation, such as checking for valid course codes, but also to prevent duplicative and inconsistent entries across systems. For example, it is common for separate local source systems to permit repeated entry of the same data elements (e.g., “teacher name” being rekeyed in the SIS and HR systems). Over time, such duplication often results in out-of-date information or slight variations in the data (e.g., “Jim” in one system and “James” in another).

These issues can be addressed from both data governance and systems integration perspectives by identifying the primary source system of record for each duplicated field and integrating systems to sync with the data from the source system of record.⁸

Synchronizing Across LEAs and SEAs

When SEA systems pull data from local source systems, the frequency and timeliness of updates to data in the local systems can have a large impact on the TSDL and the related data that make it useful. States that successfully employ data governance policies synchronize collection schedules so major events such as enrollment, testing, test “ticket” production, and graduation are aligned across systems.

⁶ For staff training materials on data quality, refer to the “Forum Curriculum for Improving Education Data: A Resource for Local Education Agencies,” available at http://nces.ed.gov/forum/pub_2007808.asp.

⁷ For more information on common terms and the TSDL, refer to the Common Education Data Standards (CEDs), available at <https://ceds.ed.gov/>.

⁸ For more information on master data management, refer to “Forum Guide to Metadata: The Meaning Behind Education Data,” available at <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2009805>.



Merging data from multiple local source systems creates many challenges due to differences in the frequency and timeliness of collections, data formats, and permitted values and other business rules. For many uses of the teacher-student link, local source systems may include data that are updated frequently; SEA data systems, such as those systems containing statewide testing results, may be updated less frequently. Merging data that represent one snapshot in time with data that represent another snapshot in time may result in errors and poor data quality. Similarly, changes in one system can make the data incompatible for matching/merging with data from another system. For example, when an SEA uses data from a beginning-of-year collection to create test tickets for registering students for the end-of-year statewide summative assessments, it is likely that by the time the assessments are administered some students will have exited and other students will have entered the school.

High Quality Matches

Unique personal identifiers are important when establishing a TSDL. However, staff and students sometimes have multiple personal identifiers across data systems or even within a single system. For example, when students move from one school or district to another, simply issuing a new unique identifier often creates unwanted redundancy within systems (a single student with more than one unique identifier). One promising practice for addressing this issue is for local systems to be integrated with state identity management systems in such a way that when a new student or teacher record is entered, the local systems automatically search the state systems for possible matches (i.e., for that individual's previously issued unique identifier).

Additionally, standard identifiers don't always exist and aren't necessarily administered consistently across organizations. For example, the ID given to a student by a postsecondary institution is not the same as the ID given to that student when he or she gets hired as a teacher by a school district. A similar problem can occur with student IDs when the TSDL uses data from non-education agencies, such as data on foster care. In such scenarios, LEAs may need to refer to probabilistic matches or other commonly used standard identification systems to accurately identify individuals.

The details of the process may vary, but the purpose of establishing high quality probabilistic matches is to minimize instances in which an individual is issued more than one unique identifier and to minimize or prevent the assignment of incorrect identifiers to students or teachers in source systems.

Data Governance

Data governance—the responsibility for and continuous improvement of data systems—is a critical success factor, especially when the TSDL introduces new uses for existing data:

While certain other sectors have long benefited from good data governance, the education community is relatively new to the concept. Every education agency has some means of handling its data but, historically, many have grown multiple, program area-specific approaches and cultures rather than implement a coherent, well-orchestrated, enterprise-wide system of data



governance. Moreover, responsibility for data has too often been unclear or misplaced. For example, data ownership has often been placed with technology staff, who are already responsible for the infrastructure that collects, stores, and shares the data; rather than with program area specialists who have a deeper understanding of the data.⁹

Data governance policies may vary depending on whether they are intended to support the needs of small or large education agencies. Smaller LEAs generally have fewer staff and smaller data sets but greater agility, as well as organizational dynamics that allow for less formal data governance¹⁰—however, that doesn’t mean data governance should be less important to the smaller organization. It takes a substantial commitment at the local level to build a culture of data quality: understanding the potential negative impact of erroneous data and the value of quality data as an organizational asset that supports the core mission of student learning.

Effective data governance helps non-technical staff who use data and data systems to understand that their work with data impacts the larger organization, often in ways they don’t see. It assigns data stewardship responsibilities to individuals, identifies data standards that all members of the organization must follow, and tracks compliance. The most successful and sustainable data governance programs are supported by the executive leadership (e.g., the superintendent) and formally designate a data quality director who reports to senior leadership.

Roster Verification

Another common obstacle to high quality TSDL data relates to the student roster for each course section and the collection of attendance on a daily basis. Particularly in the PK-8 grade levels, where data on course completion and performance are not included in transcript requests to postsecondary programs, the list of students in a course section within local source systems does not always accurately reflect the actual students in the classroom throughout the year, much less on a day-to-day basis.

Roster verification can increase the quality of these data. One common approach to roster verification is to have teachers review the list of students in their course section at the beginning of each course and regularly update the list as enrollment changes throughout the duration of the course (thereby documenting dates on which instructional contact with a student begins and ends). Teachers then complete a certification of the roster at the end of the year using the state portal—a type of roster verification known as “certification.” For an even stronger link, teachers can also check the roster and enter student attendance into local source systems on a daily basis—a process known as “embedded” roster verification (See Use Case 1). A promising practice for the embedded process is to tie the teacher gradebook to the local source system. In this way, students cannot be manually added or exited in the online gradebook, resulting in cleaner daily rosters.

Typically, the data source of the rosters being verified is collected at the local level and sent to the state. Best practices suggest that data stewards at both the state and local levels be involved in the design of the operational state system, and that those who are most familiar with the source data should be consulted

⁹ “The Forum Guide to Longitudinal Data Systems. Book Three of Four: Effectively Managing LDS Data,” available at <http://nces.ed.gov/pubs2011/2011805.pdf>.



during the design phase. Additionally, roles for administration and management of the roster verification process should be established at all levels (school, LEA, and SEA). Without roles at the LEA and school levels, the state is likely to be overwhelmed by teachers and local administrators contacting the state help desk with technical issues and questions. The various roles at the LEA and school levels can help to manage the reports that go to the state.

At its core, roster verification relies upon teacher and principal review to verify accuracy, and strong roster verification policies increase confidence in related data links. Roster verification is a data quality best practice, but in high-stakes uses it is essential. The roster verification process can also include principal review and sign-off after teacher verification and an appeals process. An appeals process is a formal mechanism for certifying (i.e., ensuring agreement on) class rosters, and is especially useful when roster data are applied to high-stakes scenarios.

NEW YORK STATE'S ROSTER VERIFICATION PROCESS

New York State values teacher involvement in the roster verification process and uses an online portal for teachers to verify their data. Teachers use their email address and a personal identification number (PIN) to create an account in the portal. As an additional security measure, teachers are asked to enter their date of birth and the last four digits of their social security number. Once they have created an account and are logged into the secure site, teachers verify multiple items for each course section such as students enrolled, linkage start and end dates, and course duration times. The portal is FERPA-compliant and teachers are only given access to approved data based on their role. In order to allow for a more manageable verification process and establish real-time data in the local source system, an embedded process is also used: teachers are expected to verify the roster each time they take attendance for their course section(s). Teachers must report any discrepancies to their school data coordinator and then ensure that the appropriate changes have been made by checking the data again after a weekly data refresh. *(Adapted from <http://www.p12.nysed.gov/irs/teacher>)*



Chapter 4: Teacher-Student Data Link Use Cases

This chapter presents the following use cases for the TSDL:

1. Educator Access to Student Data to Support Student Learning
(for access to systems such as dashboards and assessment systems)
2. Research and Analysis
3. Targeted Professional Development
4. Educator Preparation Program Feedback and Evaluation
5. Teacher Placement/Allocation Decisions
6. Compliance Reporting
7. Educator Evaluation
8. Teacher Compensation

Each use case includes an introduction; examples of potential applications; a discussion of relevant governance, policies, data elements, and relationships; local and state practices; business rules; key roles; success factors and challenges; implementation recommendations; and a checklist of implementation considerations.

Use Case 1: Educator Access to Student Data to Support Student Learning

Educators require appropriate access to individual data if they are to support student learning. Applications such as data dashboards, learning management systems, and online assessment systems often use class rosters as a basis for authorizing a user's access to student-level data, and to provide context for the appropriate use of decision support information.

Example use cases include

- teachers having access to learning management systems, online assessment systems, and data dashboards;
- department heads or instructional coaches being granted access to systems for collaborative decisionmaking; and
- paraprofessionals, librarians, and support staff having limited, but appropriate, access to data systems with student information.



Determining “appropriate access” involves a thorough understanding of the federal Family Educational Rights and Privacy Act (FERPA), which necessitates that

An educational agency or institution must use reasonable methods to ensure that school officials obtain access to only those education records in which they have legitimate educational interests. An educational agency or institution that does not use physical or technological access controls must ensure that its administrative policy for controlling access to education records is effective and that it remains in compliance with the legitimate educational interest requirement in paragraph (a)(1)(I)(A) of this section. (34 CFR §99.31)

FERPA guidance may be supplemented by state and local policies, and will influence how the TSDL affects the definition of “legitimate educational interest” for a teacher based on current and prior course section assignments (i.e., which personally identifiable information a teacher should be able to access).¹⁰

Governance

The governance process may be guided by policy decisions that address questions such as “What data should each teacher be permitted to access?” For example, will an art teacher have access to all student classroom and testing data, including reading, math, discipline, etc.? Answers to this type of question cannot be taken lightly, as they could be in conflict with the vision, values, mission, and/or culture of the school. Therefore, when a school values a multidisciplinary approach to instruction and adopts a professional learning community model, it would be at odds with a policy that prohibits the art teacher from accessing data about a student’s other coursework.

In local data systems, data governance policies typically determine which program area staff will serve as data stewards—the individuals who have responsibility for TSDL data quality. Governance also establishes the parameters that define user access privileges, which are usually based on role and subject to stringent federal (as well as state and local) privacy laws. The data management committee may also determine which data fields will be refreshed, on what schedule, and whether existing or new fields may be needed to support access rules. Doing so is not just an IT function; it requires the expertise of data stewards (the

¹⁰ For more information on FERPA, refer to the Privacy Technical Assistance Center’s (PTAC) FERPA 101 webinar, available at <http://ptac.ed.gov/Webinar-FERPA-101>.



program area staff responsible for data quality) most familiar with the data, such as the HR staff responsible for teacher data or the attendance clerk who manages student enrollment.

In the case of state systems, a governance/oversight committee that includes teachers and administration representatives from LEAs is frequently viewed as a model for developing effective guidance. Ideally, state oversight includes review by legal staff to ensure compliance with FERPA and state privacy statutes.¹¹

Policies (local and state)

Data system access may be managed by LEAs for an LEA's own (internal) use, by SEAs for internal use, by SEAs for use by LEAs and schools, or by third parties as a service to the state or local school district. Each of these cases may require different policies related to data access.

State Policy

A state policy is often needed to oversee the process for gaining access to state-hosted applications (e.g., dashboards and reporting applications). States sometimes develop such policies and supporting technology to allow each LEA to manage system access for their own staff. For example, Kansas requires that a district superintendent sign off (authorize) each teacher's access to the state system. In Georgia, authentication takes place in local source systems prior to granting access to these private state resources. Data from local systems are also used to determine which student-level data a teacher should be permitted to view.¹²

Because in many cases dashboards require up-to-the-minute data to be useful, the point-in-time data that are being provided by the district for federal reporting may not be relevant. For example, in state dashboards, the daily attendance for a student will often reflect what is provided by the district; however, the Days in Attendance element that is used at the end of the year for accountability decisions is often a summarized value calculated from district data. This element could be useful in understanding a student's overall attendance rate, but not helpful for identifying patterns of absence (e.g., the student is not in class every Monday) or understanding whether a student was absent during the presentation of a particular topic of instruction or lesson.

State policies usually clearly define and limit SEA uses of data provided by LEAs. A state policy might specify that data provided by a district solely for the purpose of display in a state dashboard (i.e., not part of any other data collection for federal or state purposes) should be accessible only by authorized LEA staff and may not be used by the SEA in other ways. For example, "local assessment results" is a dashboard element that can be included when provided by a district, but otherwise is not part of any required state data collection, and should ideally warrant a policy that prohibits use for other purposes.

¹¹ For more information, refer to the data governance section of the Privacy Technical Assistance Center (PTAC) Toolkit, available at http://ptac.ed.gov/toolkit_data_governance.

¹² For more information, refer to the Teacher-Student Data Link Project's white paper, "The Georgia Tunnel: A Case Study Perspective," available at http://www.tsdl.org/resources/site1/general/WhitePapers/TSDL_Summit2012_GeorgiaTunnelPaper.pdf.



In many states, “Teacher of Record” (TOR) is an accountability issue that is established as state policy.¹³ This policy generally defines the most restrictive criteria for associating a teacher to a class. But if access to student data via a dashboard or other application is intended to facilitate student learning, then individuals other than the TOR may have a valid educational need to access individual student data. Therefore, the ability to access a student’s data via an application may extend beyond the TOR, meaning that policies need to be in place to recognize other authorized data users with a legitimate educational interest.

Local Policy

Best practices suggest that districts establish policies governing software applications that deliver data for teacher use—which will likely include requirements for training prior to access to data.

Data must be current and accurate to be useful to the teacher, and the processes used by staff to identify and correct errors will generally fall under data governance operations, but may be formalized as policies to ensure consistent implementation. For example, roster verification is a necessary policy component to ensure the accuracy of class rosters; however, there are multiple approaches to roster verification.¹⁴ For the purpose of maintaining accurate and up-to-date data access and use, a less formal “embedded” process may be more appropriate than a formal “certification” policy and procedure. In such a case, districts may wish to establish a process that trains teachers to recognize roster errors when taking attendance, a process to immediately report the errors, and a process for data staff to know how and when to correct errors that have been identified.

Data Elements and Relationships

Data elements needed to establish and monitor authorized data users (and subsequent access) include

- data elements that determine roles and relationships, such as the role of teacher for a class or principal for a school; and
- metadata in the form of business rules that enable the implementation of data access procedures based on staff roles and authorizations.¹⁵

Different roles within a district result in differentiated access needs. For example, an LEA administrator might only need to see summarized data about students and not require the ability to drill down to individual student data, but at the same time might be able to see all data about individual teachers throughout the LEA. Meanwhile, teachers in the same LEA might be able to see individual student data for those children in their own classroom, but not be able to access data about students who have other teachers in the LEA. Many other TSDL use cases are concerned only with those data that link teachers to students through the course section. In this case, however, access will be determined by other roles (and other rules). Therefore, other data may be needed, including

¹³ Refer to Chapter 3 for more information on Teacher of Record policies.

¹⁴ Refer to Chapter 3 for more information on roster verification processes.

¹⁵ See Appendix D for typical structures of the TSDL in the local source system.



- staff assignments to a course section other than the TOR (e.g., paraprofessionals);
- staff assignments outside of a course section (e.g., a counselor or paraprofessional who is scheduled separately with a student); and
- school-wide or district-wide assignments (e.g., a principal who has access to all student records in a school).

Local and State Practices (collection, frequency, quality assurances, use, etc.)

Historically, elementary schools have scheduled students by homeroom, which complicates the use of a course section as the unifying entity between teachers and students in a TSDL. This reality also limits the ability to identify which teachers not assigned to a particular homeroom might nonetheless have a role in a student's education and, therefore, may have a need to access a student's education data.

Practices frequently employed by education agencies as safeguards for ensuring appropriate access include

- administrators verifying access to student data by teachers before permission is granted;
- a roster verification process; and
- use of reasonability checks to identify possible data quality issues (e.g., attendance data compared to schedule data).

Using the teacher-student link to provide data to teachers can greatly enhance data quality because teachers are most familiar with the data about the student and are more likely to recognize when a student's data are incorrect. Therefore, it is important that education agencies and schools establish a clear method for teachers to communicate data quality problems, and that a process be in place for the school or agency to correct those problems in local source systems. It is equally important for those changes to propagate to state systems on a regular basis.

Local practices and processes are needed to support the timeliness (or currency) of data for this use case, which may include processes for moving/syncing data between source systems and other systems that depend on TSDL data. Depending on the type of application being accessed, there may be a need for weekly, daily, or near-real-time updates from source systems.

In the case of non-mandated reporting to state systems, such as that which might occur in a state-provided data dashboard tool, districts are usually able to determine the frequency and content of updates to match their local needs with respect to the timing and availability of data. Well-engineered state systems will ensure that student data become available immediately upon student transfer between districts. This can improve the access protections and timeliness of local data.

Business Rules

Business rules are perhaps the most important consideration when managing access to data systems. It is the business rules, guided by policy, and implemented in systems using data elements and relationships, that control access to systems and data (e.g., when granting permission to view student data, business rules can be used to differentiate access by staff type, role, and function).



Ideally, business rules are based on a thorough understanding of how the data will be used. For example, if teachers are using a state data dashboard, it takes a skilled planner to understand that multiple levels of granularity may be needed because dashboards are useful for initial course planning as well as daily monitoring of student progress. When a teacher is planning during the summer for the upcoming school year, data about each incoming student's history of attendance, program participation, and concept mastery (e.g., performance on state assessments) is more useful than daily information. However, during the school year, daily information may be more important than historical data so that the teacher can respond to current educational needs and progress.

Key Roles

All district and school employees have a role in ensuring that only authorized users (with a legitimate educational interest) have access to individual student data. While some staff are responsible for developing and enforcing access rules, all staff are expected to respect and adhere to policies and procedures that govern access. Particularly critical roles and responsibilities will likely be held by

- teachers;
- co-teachers, paraprofessionals, etc.;
- supporting educators (e.g., grade-level or subject teams in Professional Learning Community [PLC] models, mentor/coach);
- IT and help desk support;
- instructional leadership/school principals; and
- source systems administrators.

Success Factors and Challenges

Critical factors related to the successful implementation of the TSDL to support learning include

- establishing, operationalizing, and testing policies and practices that provide appropriate access to staff with a legitimate need to see student data (and preventing inappropriate access by anyone else);
- understanding how to use application(s) that provide access to data;
- offering professional development as needed—which includes training on the appropriate use of data, in addition to appropriate access to data;
- inputting data on a frequent basis (e.g., timely addition of new authorized users into systems);
- building local capacity to keep the data up-to-date and providing the right data to the right people; and
- ensuring that technical precautions are taken to prevent unauthorized access (e.g., firewalls, authentication procedures, etc.).



Implementation Recommendations

Scheduling elementary students by subject or course is generally recommended for TSDL data, although it may not be required for access rules.

Like most other uses of TSDL data, it is recommended that planners

- incorporate standardized statewide course identifiers and local section identifiers to uniquely identify course section (composite or surrogate keys);
- use statewide unique student identifiers in all systems to support merging data from multiple source systems;
- use statewide unique educator identifiers; and
- employ a roster verification process.

Prior Work

Georgia Department of Education

Georgia developed a statewide system, the Georgia Tunnel, to provide authorized educators with access to student-level data from the statewide longitudinal data system (SLDS). Using a process known as “tunneling,” the system simplifies data access by allowing teachers to use their local login to view the data through a local website (with access to the SLDS and identity management administered at the local level).

One of the many benefits of Georgia’s system is the turnaround time for access to the data of students who transfer from another LEA. For example, within one day of student enrollment in a course, teachers of record and contributing professionals can access demographic information, withdrawal history, state assessment results, and transcript data through the Tunnel.¹⁶

¹⁶ For more information about the Georgia Tunnel, refer to the Teacher-Student Data Link Project’s white paper, “The Georgia Tunnel: A Case Study Perspective,” available at http://www.tsdl.org/resources/site1/general/WhitePapers/TSDL_Summit2012_GeorgiaTunnelPaper.pdf.



Implementation Considerations for Educator Access to Student Data to Support Student Learning¹⁷ * Common to all use cases	
Data Governance	
Implement written data governance policies adopted by all relevant organizations.*	
Establish well-defined user access policies.*	
Communicate clear directives for handling of personally identifiable and de-identified data.*	
Define TSDL elements and relationships, secure agreement across stakeholders, and confirm those elements and relationships exist in the available data.*	
Define ownership of data as part of agreements between stakeholders.*	
Clearly identify and differentiate state-level committee and local-level committee roles. For example, for a state-hosted dashboard the state-level committee might determine security roles and the LEA would determine the individuals to fill those roles.	
Establish committee(s) to guide development of system(s) and data use. Include stakeholder representation in committees.	
Include policy and technical components in governance committees.	
Policies and Practices to Support Implementation	
Adopt a data quality audit process.*	
Decide whether current collections can be used (and with what limitations) or if additional data will be needed.*	
Implement a Teacher of Record policy, and separate policies or administrative guidance defining what it means for the teacher and student data to be linked in the context of each use.*	
Adopt policies and practices to support timely updates to scheduling and other data.*	
Adopt policies and practices to support elementary scheduling by subject.*	
Adopt policies that provide timelines for entering and refreshing data.*	
Adopt policies for appropriate use of data.*	
Establish process for staff to report errors in roster data and for timely correction in source systems.	
Student and Staff Attendance	
Determine what student and staff attendance data are needed based on student outcome data used.*	
Formal Roster Verification Process	
Determine what level of roster verification, if any, is required to support the level of data integrity needed.*	
Clearly define, document, and communicate procedures for correcting data.*	
Data Components	
Include data that link both a student and educator to the course section for a specific time period. This may include unique identifiers for students, staff, course, schools, programs, and course section-time period.*	
Determine, based on use, the need for the ability to link students to multiple educators in different roles in any given course section.*	

¹⁷ See Appendix F for a summary matrix of considerations across TSDL uses.



Business Rules	
Establish administrator approval before permissions are provided to access student data.	
Confirm appropriate alignment with the Common Education Data Standards (CEDS). ¹⁸	
Determine whether to link students to more than one teacher in a course section.	
Systems Requirements	
Determine identification and access needs required to support varying instructional groupings and models (refer to Appendix A: Emerging Learning Systems).*	
Ensure that the source systems can support elementary scheduling.	
Ensure that the source systems have the ability to track student movement/transfers on a daily basis.*	
Ensure that the district is prepared to submit data in a standard format.	
Ensure flexibility for the systems to use local fields.	
Student Outcome Data (frequency and granularity to support this use case)	
Determine the data needed on a daily basis.	
Determine which data are to be provided by the state and LEA and on what schedule.	
Frequency of TSDL Data Collection Transmission/Reporting	
Send data daily to the LDS/operational data store (ODS) (to capture record of longitudinal schedule changes).	

¹⁸ For more information, visit the Common Educational Data Standards website, available at <https://ceds.ed.gov/>.



Use Case 2: Research and Analysis

The value of TSDLs for answering policy questions and supporting research is quite significant. To facilitate meaningful conclusions and guidance, this implementation scenario focuses on the use of TSDLs with P-20W (early learning through the workforce) statewide longitudinal data systems (SLDSs) such as those currently funded by the Institute of Education Science (IES), through the National Center for Education Statistics (NCES).¹⁹ Even within more limited K12 longitudinal data systems, data can support broad categories of policy and research questions.²⁰

If certain policy or research questions require data that do not already exist, then those questions and projects may inform new uses of the TSDL. For example, even if some data are not explicitly linked to both a teacher and student (through the TSDL), such as free- and reduced-price meal status, there is the possibility that such a linkage could occur “after the fact” through matching. Adjusting to the needs of research studies that require data that do not already exist can often improve data quality and applicability for staff as well as researchers.

The TSDL enables the answering of policy and research questions around how educator attributes, behaviors, and backgrounds impact student outcomes. Potential questions include

- What teaching factors positively impact a student’s long-term academic success?
- How effective are specific K12 instructional models that involve more than one educator, such as co-teaching and inclusion?
- How is educator absenteeism associated with student standardized test scores and GPA?
- How is an educator’s enrollment in a performance pay program associated with changes in student outcomes?


Governance

SEAs typically establish data governance well in advance of using the TSDL to answer policy and research questions. In many states, such planning results in a data policy committee comprised of the leadership from relevant education and human services agencies, as well as a data management committee that includes data stewards from education program areas and representatives supporting education data systems (alternatively, there may be a separate IT advisory group). A data quality director may be assigned to manage the cross-agency data governance process through the ongoing work of the data management committee and to serve as the liaison to the data policy committee.

If the use of data for research requires the involvement of additional organizations, such as research entities (e.g., universities and advocacy groups), data governance policy and practices may need to be reconstituted. The process of establishing governance policies and procedures becomes more time consuming and complex as the number of organizations involved in sharing data increases.

¹⁹ Through grants and a growing range of services and resources, the Statewide Longitudinal Data Systems (SLDS) Grant Program has helped propel the successful design, development, implementation, and expansion of K12 and P-20W longitudinal data systems. More information is available at <http://nces.ed.gov/programs/slds/index.asp>

²⁰ For more information on supporting requests from researchers, refer to the “Forum Guide to Supporting Data Access for Researchers: A State Education Agency Perspective,” available at <http://nces.ed.gov/pubs2012/2012809.pdf>.



Whether or not all participating agencies are part of the data governance process, best practices suggest the establishment of memorandums of understanding (MOUs) between each organization and the primary research authority.

Policies (local and state)

Properly conducted education research is an important component of improving teaching and learning. Policies encouraging research, while still closely governing data sharing with researchers, should be transparent to all stakeholders in the education community. The agency's data use and data sharing policies, such as those related to FERPA, must be thoroughly understood and followed by anyone involved in research.²¹ As such, an agency's policies, expectations, and procedures must be clear, actionable, and enforceable. It is also helpful when orientation and user-guide materials are produced and disseminated to prospective researchers. State/local laws and regulations governing employee records, student records, and linking the teacher and student data may provide guidance concerning the boundaries of acceptable and legal data use.

Data Elements and Relationships

The TSDL reflects a wide range of factors related to a teacher's connection with students and student outcomes—most frequently summative assessments. It may also measure a teacher's impact on graduation rates, course completion rates, absentee rates (or measures of chronic absence), and discipline incident/action data.

In addition to data that establish the link to student outcome data, researchers and policy analysts are interested in characteristics of linked students and teachers, such as demographics, family background/environment, prior academic history, program participation, teacher preparation, in-service training, and employment history.^{22,23}

Local and State Practices (collection, frequency, quality assurances, use, etc.)

Although the ability to answer research and policy questions is an important consideration for the design of state longitudinal data systems, this is rarely the case for the design of data collection processes. Standard processes affecting the collection, frequency, and quality assurance of data are often driven largely by purposes unrelated to research, such as LEA operations or mandated reporting to SEAs. This reality may result in constraints on the data available to answer research and policy questions. For example, research data sets are generally refreshed or updated only as often as the data systems are updated for operational and reporting purposes. Similarly, data element availability will depend heavily on the purpose for which data were reported and decisions made when establishing the TSDL. To account for these issues, policy and research entities may wish to collaborate with the local agencies that initially establish TSDLs to request

²¹ For more information on FERPA, refer to the Privacy Technical Assistance Center's (PTAC) "FERPA 101" webinar, available at <http://ptac.ed.gov/Webinar-FERPA-101>.

²² For more information about research data and working with researchers, refer to "The Forum Guide to Supporting Data Access for Researchers: A State Education Agency Perspective," available at http://nces.ed.gov/forum/pub_2012809.asp

²³ See Appendix D for typical structures of the TSDL in the local source system.



and/or explore other possible TSDL relationships when such information is determined to be useful. These modifications may require major changes to data models and practices at the local level, and therefore may not be practical for educators who are tasked primarily with the effective operations and management of schools and districts.

Business Rules

Because of their different perspectives on the data, the data source (e.g., an education agency) and data user (e.g., a researcher from an institution of higher education) may have competing business rules for a single data set. For example, if an SEA collects data from LEAs and then provides those data to a university research project, the SEA, as the data provider, will have business rules for collection, transformation, and loading the data into its system, as well as for generating and sharing output from the system. The output rules may include parameters for disaggregation and cell suppression if the use does not permit the disclosure of personally identifiable data. Similarly, the research project or policy analyst (i.e., the researcher who uses the data) may establish another set of business rules for the data set as they relate to the policy or research question being studied. Best practices suggest that the data provider and data user engage in a dialogue that clarifies any assumptions and limitations related to their respective application of business rules.

Key Roles

Best practices suggest that the roles involved in supporting the collection and use of the TSDL for research and analysis be filled by all staff involved in the collection and compilation of data into state and local systems, as well as staff involved in the research project or policy analysis using the data, including

- data stewards;
- program area specialists;
- research specialists;
- privacy experts/legal counsel;
- source systems administrators; and
- vendors.

Success Factors and Challenges

Research use of the TSDL involves a range of hazards related to the potential misuse or misinterpretation of data, potentially including personally identifiable data, which represents a particularly high-stakes risk. Other data quality and usage concerns stem from the application of different data standards, expectations, processes, norms, and dictionaries across organizations. Strong leadership, transparency of process, legal agreements, and organizational communication can reduce potential risks.



Because the agency providing the data to researchers and policy analysts (usually the SEA) has ownership privileges and responsibilities as the data source, the agency’s data governance policy is a critical success factor. Best practices suggest that data quality (consistency, completeness, integrity, timeliness, accessibility) be addressed at all levels—from the source to the recipient—and that feedback mechanisms exist to correct errors in source systems when discovered.

Implementation Recommendations

Recommendations for implementing the TSDL to support research and policy decisions include

- Establishing a strong governance group, technical group, and research group (if possible, prior to developing and implementing the data link).
- Ensuring that sufficient communication protocols exist between workgroups, data governance, data stewards, researchers, and other stakeholders.
- Seeking formal partnerships with researchers (if possible, prior to implementing the data link), including legally binding usage agreements.²⁴ Schedule adequate time to prepare data prior to sharing files. If the data sharing process does not include time to cleanse datasets, needed privacy, verification, and quality control assurances may not have been implemented. Individualized data preparation may be required for each use of the data.
- Ensuring that researchers begin with a correct set of assumptions about the data. Researchers should be aware of the quality, validity, assumptions, and limitations of TSDL data (e.g., in which year roster verification was first used, granularity of collection, etc.).

²⁴ For more information on partnering with researchers, refer to the “Forum Guide to Supporting Data Access for Researchers: A State Education Agency Perspective,” available at <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2012809>.



Implementation Considerations for Research and Analysis²⁵ * Common to all use cases	
Data Governance	
Implement written data governance policies adopted by all relevant organizations.*	
Establish well-defined user access policies.*	
Communicate clear directives for handling of personally identifiable and de-identified data.*	
Define TSDL elements and relationships, secure agreement across stakeholders, and confirm those elements and relationships exist in the available data systems.*	
Define ownership of data as part of agreements between stakeholders.*	
Establish clear guidelines for use of disclosure avoidance techniques and written agreements for all organizations participating in the research and analysis.	
Establish memorandums of understanding (MOUs) between each organization and the primary research authority.	
Policies and Practices to Support Implementation	
Adopt a data quality audit process.*	
Decide whether current collections can be used (and with what limitations) or if additional data will be needed.*	
Implement a Teacher of Record policy, and separate policies or administrative guidance defining what it means for the teacher and student data to be linked in the context of each use.*	
Adopt policies and practices to support timely updates to scheduling and other data.*	
Adopt policies and practices to support elementary scheduling by subject.*	
Adopt policies that provide timelines for entering and refreshing data.*	
Adopt policies for appropriate use of data.*	
Clearly communicate limitations of the data to researchers.	
Establish separate policies and procedures for internal review as needed to effectively govern research.	
Student and Staff Attendance	
Determine what student and staff attendance is needed based on student outcome data used.*	
Determine questions regarding thresholds, dosage, weighting, etc.	
Formal Roster Verification Process	
Determine what level of roster verification, if any, is required to support the level of data integrity needed.*	
Clearly define, document, and communicate procedures for correcting data.*	
Data Components	
Include data that link both a student and educator to the course section for a specific time period. This may include unique identifiers for students, staff, course, schools, programs, and course section-time period.*	
Determine, based on use, the need for the ability to link students to multiple educators in different roles in any given course section.*	
Establish that the research project and supporting agency has fully identified all elements and relationships that are dependent on TSDLs.	

²⁵ See Appendix F for a summary matrix of considerations across TSDL uses.



Business Rules	
Ensure that relevant policy and research questions have been addressed by business rules.	
Verify that business rules can be implemented with existing data.	
Determine the research purposes needed to link multiple educators to students.	
Systems Requirements	
Determine identification and access needs required to support varying instructional groupings and models (refer to Appendix A: Emerging Learning Systems).*	
Ensure that source systems have the ability to track student movement/transfers on a daily basis.*	
Establish the ability to identify the necessary common elements across multiple source systems.	
Determine which identifiers are necessary to answer the research or policy question(s).	
Student Outcome Data (frequency and granularity to support this use case)	
Determine the level of the student outcome data needed to support the research question(s).	
Determine the needed frequency (once per year or more) and number of longitudinal data points needed to support the research question(s). e.g., some questions may require multiple years of annual student assessment results for growth and trend analysis.	
Frequency of TSDL Data Collection Transmission/Reporting	
Determine the need for frequency of collection/transmission of data based on the research and analysis requirements.	



Use Case 3: Targeted Professional Development

Data about student outcomes can strongly influence decisions about an individual teacher's professional development priorities. As such, administrators and teachers can use these data to help focus professional development on the areas in which there is the greatest need for teacher growth and improvement. This section focuses on targeting professional development to individual teachers based on the TSDL and linked student outcome data.

Potential TSDL uses include using item-level data from student outcomes to

- determine a teacher's particular strength and weaknesses in
 - ✓ content areas;
 - ✓ delivery methods; and
 - ✓ student subgroups.
- ask relevant "why" questions, such as
 - ✓ Why do a group of students in a sixth grade classroom have difficulty with word problems?
 - ✓ Why are a group of students in a third grade classroom unable to complete a short journal entry?
 - ✓ Why does a specific subgroup of an 11th grade classroom have a higher-than-average rate of absenteeism?
- take action based on those data, including:
 - ✓ adjustments to curriculum, scope, and sequence to allow sufficient coverage of concepts;
 - ✓ targeted professional development to strengthen teacher content expertise;
 - ✓ targeted professional development that focuses on pedagogy, or introduces promising or alternative methods for teaching those concepts/skills;
 - ✓ pairing teachers with complementary strengths for mentorship, coaching, and/or collaboration; and
 - ✓ identifying both individual teacher professional development needs and those most qualified to be models, mentors, or coaches.

Governance

Data governance is important for any implementation of the TSDL. However, compared to other uses, this case will benefit from a dialogue between local teachers and school administrators to ensure appropriate data quality and interpretation. Use of the TSDL to support teacher professional development relies heavily on local data collection, management, and use—all within the same local education agency. In such a scenario, practitioners can be expected to have a better understanding of the context of the data (unlike other cases in which the users of the data may be far from the source and environmental context).



For example, before reaching conclusions about student learning or teacher proficiency based on student outcomes, practitioners can examine the context under which the group of students did not achieve a particular objective. Even though the data may point to something specific that a teacher can do to improve student outcomes, the course of action may still need to accommodate relevant and well-understood contextual circumstances.

Policies (local and state)

Policies about the use of data to target professional development will typically be established at the district level. Most state-level policies about in-service training are related to re-certification and maintaining or advancing a professional license. For example, state-level policies often certify a course as eligible for professional development credits, but states rarely play a role in the local administrator and teacher analyses that identify development needs. The presence of data to inform professional development choices creates opportunities for the more efficient use of limited professional development funds, with a demonstrable focus on improving teaching and learning in the classroom.

Data Elements and Relationships

The core data elements to target professional development are the teacher-student link (usually established through course section) and some measure of the teacher's impact on student outcomes such as a value-added score.²⁶ If value-added scores are not available, a growth score or growth percentile for students associated with the teaching assignment(s) may be appropriate. As with value-added data, historical data about the range of typical student growth for teachers who are teaching the same course can help to minimize the effects of other variables when calculating growth.

The data points that can be used to inform professional development go beyond data generally collected at the state level, such as annual student achievement and growth scores. In this case, having granular data about what content was covered in a course and unit, and the level of mastery for individual students, will help a teacher and colleagues ask meaningful questions such as, "What kind of professional learning would help me become better prepared to meet the needs of a similar child or circumstance in the future?"

Multiple measures of effective teaching, along with the student outcome data and other indicators, can paint a clearer picture of the areas in which targeted professional development can equip the teacher for the greatest improvement on student learning. In some cases the opportunity for improvement is in "doing" rather than "knowing" (e.g., a teacher may know strategies for addressing a particular learning disability, but the data shed light that he or she has not effectively put those strategies into practice). Analysis of the data may reveal that targeted professional development should focus on improving habits of practice, rather than spending seat time and money in a traditional professional development course to gain new knowledge.

²⁶ See Appendix D for typical structures of the TSDL in the local source system.



Local and State Practices (collection, frequency, quality assurances, use, etc.)

For timely, targeted professional development, student results on benchmark assessment data will need to be collected multiple times per year with some alignment between what is assessed and the scope and sequence of instruction.

An important aspect of data-driven professional development decisionmaking hinges on understanding what the data (specifically, the TSDL) reveal about a teacher's strengths and weaknesses. Such a collaborative discovery process goes beyond simply what the data show on the surface—for example, what extenuating circumstances might also factor into the reasonable interpretation of the data. This training might be customized for principals, teachers, and other administrators, and allow for more personalization when analyses suggest that routine, one-size-fits-all development will not meet the growth needs of the teacher.

Analysis of the data may reveal that targeted professional development should focus on improving habits of practice, rather than spending seat time and money in a traditional professional development course to gain new knowledge.

Business Rules

In this use case, a teacher, principal, and instructional coach will typically work together to analyze the data and discover the best course of action for targeted professional development. However, there may be cases in which it is appropriate to establish different expectations of roles—for example, perhaps a teaching colleague might be given access to student-level data to share analytical and teaching expertise with decisionmakers. The rules for whether and how those data are made available (subject to Family Educational Rights and Privacy Act [FERPA] and other privacy expectations that govern the organization) will impact the effectiveness of the process.²⁷

Business rules that define calculations for student growth and procedures for attributing growth to individual teachers provide the format in which student outcome metrics and other measures will inform professional development decisions. These rules may consider the percentage of time (or actual days) a teacher was responsible for the class and overlapping days or percentage of time a particular student was in the class. More accurate attribution algorithms may use weighting coefficients based on the level of responsibility a teacher has in a class when multiple teachers are involved. These business rules are usually guided by a local or state policy definition for “Teacher of Record.”²⁸

²⁷ For more information on FERPA, refer to the Privacy Technical Assistance Center's (PTAC) “FERPA 101” webinar, available at <http://ptac.ed.gov/Webinar-FERPA-101>.

²⁸ See Chapter 3 for more information on Teacher of Record policies.



Other business rules about collection of the data may also apply, such as

- scheduling elementary schools by subject or course (if the instructor varies by unit, then this would be tracked as well);
- using standardized statewide course identifiers and local section identifiers to uniquely identify course section (e.g., composite or surrogate keys);
- using statewide unique student identifiers in all systems to support data merging from multiple source systems;
- using statewide unique educator identifiers; and
- maintaining a longitudinal record of the courses and students a teacher has taught.

Key Roles

The following roles may be involved in supporting the collection and use of the teacher-student link to support targeted professional development decisions:

- local registrar/data entry clerk
- teacher
- co-teacher, paraprofessional, etc.
- supporting educators (e.g., grade-level or subject area teams in Professional Learning Community [PLC] models, mentor/coach)
- principal
- Human Resources administrators
- SEA certification and licensure staff
- assessment data steward
- professional development specialist
- source systems administrators

Success Factors and Challenges

Using teacher and student data to inform professional development decisions depends a great deal on teacher and administrator confidence in the quality of the data and its capacity to accurately diagnose instructional strengths and weaknesses. This goes beyond identifying where student outcomes are falling short for a particular teacher; the process must include an analysis of root causes and specific professional practices that can be improved. These decisions may best be made within the context of professional learning communities that collaborate to identify which practices work for a specific course and set of students, where deeper content knowledge will help, and how improved pedagogy and practice might improve outcomes.



The way in which the data are displayed to users will affect how the data are interpreted and used. For example, applications that present data might provide visualizations or reports that show strengths and weaknesses, and then allow “drill-down” of the data to help establish a more complete story. Usually, the presentation of the data will be a starting point for a conversation that leads to questions about why particular students are (or are not) doing better, what practices may help to address their needs, which other teachers are having success conveying particular competencies, and how instruction could be delivered differently.

Effective data governance practices can help to overcome challenges related to getting everyone the data they need (and only the data they are permitted to see as governed by appropriate access policies), at the appropriate time, and at the appropriate granularity of detail so the data can be used to inform decisions.

Implementation Recommendations

It is important to recognize the differences between using data for teacher evaluation and the kind of analysis used to inform professional development decisions. For example, professional development decisions may be based on shorter-cycle outcome data or those data that measure specific areas of professional practice. The process of using the TSDL to inform individualized professional development coursetaking also differs from using aggregated data to decide what a district-wide professional development program should address. Tracking individualized professional development activity and data associated to the teacher via the TSDL may also help answer questions such as what professional development is most effective for meeting the needs of which students, and which programs are the most cost-effective.



Implementation Considerations for Targeted Professional Development²⁹ * Common to all use cases	
Data Governance	
Implement written data governance policies adopted by all relevant organizations.*	
Establish well-defined user access policies.*	
Communicate clear directives for handling of personally identifiable and de-identified data.*	
Define TSDL elements and relationships, secure agreement across stakeholders, and confirm those elements and relationships exist in the available data systems.*	
Define ownership and stewardship of data as part of agreements between stakeholders.*	
Adopt data governance policies at the LEA level, appropriate to LEA size and needs.	
Policies and Practices to Support Implementation	
Adopt a data quality audit process.*	
Decide whether current collections can be used (and with what limitations) or if additional data will be needed.*	
Implement a Teacher of Record policy, and separate policies or administrative guidance defining what it means for the teacher and student data to be linked in the context of each use.*	
Adopt policies and practices to support timely updates to scheduling and other data.*	
Adopt policies and practices to support elementary scheduling by subject.*	
Adopt policies that provide timelines for entering and refreshing data.*	
Adopt policies for appropriate use of data.*	
Establish a process for staff to report errors in roster data and for timely correction in source systems.	
Adopt policies regarding what autonomy school or district administrators have in assigning teachers and students to particular courses and sections.	
Adopt policies and practices to support timely updates to schedule data (e.g., a policy for timeframe within which formative assessment data are updated in local source systems by school office staff, with accountability and oversight to ensure timely updates).	
Student and Staff Attendance	
Determine what student and staff attendance is needed based on student outcome data used.*	
Ensure that attendance data are of sufficient granularity and frequency to be able to link teachers to particular units of instruction within a given course and section.	
Formal Roster Verification Process	
Determine what level of roster verification, if any, is required to support the level of data integrity needed.*	
Clearly define, document, and communicate procedures for correcting data.*	
Data Components	
Include data that link both a student and educator to the course section for a specific time period. This may include unique identifiers for students, staff, course, schools, programs, and course section-time period.*	
Determine, based on use, the need for the ability to link students to multiple educators in different roles in any given course section.*	
Establish the ability to link assessment data to individual teachers; this could include formative and interim assessments.	
Consider establishing the ability to link teachers to their professional development history.	
Include student demographics (subgroups) and program participation if available.	

²⁹ See Appendix F for a summary matrix of considerations across TSDL uses.



Business Rules	
Ensure that relevant policy and research questions have been addressed by business rules.	
Verify that business rules can be implemented with existing data.	
Determine the research purposes needed to link multiple educators to students.	
Systems Requirements	
Determine identification and access needs required to support varying instructional groupings and models (refer to Appendix A: Emerging Learning Systems).*	
Ensure that source systems have the ability to track student movement/transfers on a daily basis.*	
Establish the capacity to provide views of teacher-level student growth history to principals or other relevant administrators.	
Ensure the capacity to display a menu of professional development options linked to areas targeted by the data to teachers, principals, or others involved in assigning/selecting professional development.	
Student Outcome Data (frequency and granularity to support this use case)	
Ensure that item-level data are collected multiple times per year for targeted professional development.	
At a minimum, collect summative teacher-level data on student growth prior to beginning of school year; preferably more frequently if teacher placement decisions occur more than once a year, ideally using multiple years of data.	
Ensure that teachers receive more frequent, necessary professional development based on student outcomes, and that the professional development is targeted to support teacher placement.	
Frequency of TSDL Data Collection to a Longitudinal Data System	
Send data annually or more frequently (local use).	



Use Case 4: Educator Preparation Program Feedback and Evaluation

An important use of the TSDL is to inform educator preparation programs on a variety of fronts related to program improvement (e.g., identifying a program's strengths and challenges). Educator preparation and paths to certification involve complex sets of rules that vary from state to state. This use case focuses not on those complexities, but on the commonalities of agencies interested in using the teacher-student data to generate feedback to educator preparation programs.

In addition to feedback, the data may be used as one component of a multiple-measures approach to program evaluation. For example, LEAs might choose to use the results of these analyses as a basis for hiring decisions (e.g., hiring new teachers who come from the most successful educator preparation programs).

TSDL data may be used to answer questions such as

- How do teachers from various educator preparation programs impact K12 student outcomes in particular subject areas?
- How do teachers from various educator preparation programs impact K12 student outcomes for particular student subgroups (e.g., English Language Learners)?
- How much progress do the K12 students of teachers trained in various preparation programs make each year?
- Where are educators from various preparation programs working and what kinds of students are they teaching?
- What are the characteristics (e.g., community variables, student demographics, school size, etc.) of schools in which teachers from various preparation programs tend to get jobs?
- Are educators working in assignments that reflect their original content certification?
- How long do teachers and principals tend to stay in each position?
- How long do teachers and principals stay in public schools in the state?

When using teacher-student data to assess educator preparation programs, it is important to recognize that fluctuations in student and teacher outcomes are normal because of a wide variety of factors, including changes in school or community demographics, significant changes in state and local expectations (e.g., in assessments or graduation requirements), random variation, and other variables, some of which cannot be accounted for in statistical models. As such, it is critical that policymakers and program leaders consider the spectrum of factors that are relevant to analysis, including data over time (rather than just a single point in time) and statistical controls needed to avoid making unsubstantiated and inappropriate causal attributions for relationships between data.



Governance

Some states have had success developing data governance policies that can be jointly adopted by both K12 and institutions of higher education (IHEs). Because this use case involves collaboration and data sharing across K12 and IHEs, planners may find it appropriate to consider the establishment of a P-20W (early learning through workforce) data governance organization to oversee this type of project.

In many states, such planning results in a data policy committee comprised of leaders from the respective agencies, as well as a data management committee that includes data stewards from program areas and the managers of data systems (alternatively, there may be a separate IT advisory group). A data quality director may be assigned to manage the cross-agency data governance process through the ongoing work of the data management committee and as the liaison to the data policy committee. The governance body must understand the risks associated with combining data from multiple sources (i.e., more than one organization), especially for uses not originally intended. Risks may be minimized by clearly defining the purposes for which the data will be used, including appropriate use guidelines, data limitations, and cautions regarding the misuse of data. Legal representation from K12, IHEs, and certification organizations may be needed to ensure compliance with state and federal privacy statutes.³⁰

Policies (local and state)

Policies to support educator preparation program feedback and evaluation typically begin with a state or local policy focused on the measures to be examined, including which student outcomes will be used and to what extent. In broad terms, policies should clearly articulate what data will or may be used, by whom, and for what purposes.

With respect to determining appropriate TSDLs, a promising practice is to utilize the same statewide Teacher of Record (TOR) policy established for other uses.³¹ Additional policy decisions require consideration of issues such as

- the differentiated evaluation of initial certification programs and other programs in which teachers may subsequently participate over the years (e.g., continuing education);
- whether traditional educator preparation programs will be handled in the same manner as alternative paths to certification; and
- whether and how teachers providing instruction outside of their area of certification will be incorporated.

³⁰ The Federal Educational Rights and Privacy Act (FERPA) and state privacy laws govern student data. Appropriate application of these laws may depend on how data are collected (e.g., via applications for teacher licenses as opposed to collection from student records provided by preparation programs). All student records, whether in K12 or higher education, are subject to FERPA. Data collected via application for teacher license, endorsement, or renewal may be subject to state privacy laws. For more information about data governance, refer to the Forum document “Traveling Through Time: The Forum Guide to Longitudinal Data Systems (Book Three of Four) – Effectively Managing LDS Data,” available at http://nces.ed.gov/forum/pub_2011805.asp.

³¹ See Chapter 3 for more information on Teacher of Record policies.



Policies might also establish appropriate use limitations, especially in light of the sensitive nature of this type of feedback and evaluation. Some considerations for setting appropriate use may include

- a minimum number of educators from an educator preparation program to consider that program eligible for analysis;
- a minimum number of teacher-student links (K12 student and educator) for analysis (e.g., if an educator preparation program produced 100 teachers in an agency, but only ten of those teachers are assigned to tested subject areas or grade levels, how are the other 90 teachers included in the analysis?);
- the generalizability of the results (e.g., are evaluative information about mathematics teachers applicable to science, history, and art teachers prepared by the same program?);
- program attribution for educators attending multiple preparation programs;
- length of time between program attendance and program attribution (e.g., how many years after leaving a program are a teacher's data still attributed to that program?);
- statistical controls to include in evaluative models associated with preparation programs; and
- comparable evaluation policies for administrators.

Data Elements and Relationships

For the purpose of using student outcome data to evaluate educator preparation program effectiveness, the core elements include the TSDL (usually established through course section), the educator preparation program name, program completion or participation information, the relevant measure of student outcome (such as a growth score or growth percentile), and a crosswalk between certification area and teaching assignments.³² The link established through the course section generally includes the dates within which a teacher provided instruction to a particular class (composed of individual students) and the dates students were scheduled for the class. For some purposes, teacher and student attendance data may be needed. In addition to the core TSDL, the following data elements may also be useful:

- preparation program information linked to individual educators (note, however, that this may be complicated by the fact that different institutions may collect and report this descriptive information in different ways; the use of IPEDS³³ federal collection and CEDS³⁴ standards can improve comparability);
- educator endorsement areas and crosswalks to courses taught;
- date of license/endorsement;

³² See Appendix D for typical structures of the TSDL in the local source system.

³³ The Integrated Postsecondary Education Data System (IPEDS) is a system of interrelated surveys conducted annually by NCES to collect information from every college, university, and technical and vocational institution that participates in the federal student financial aid programs. The Higher Education Act of 1965, as amended, requires that institutions that participate in federal student aid programs report data on enrollments, program completions, graduation rates, faculty and staff, finances, institutional prices, and student financial aid. These data are made available to students and parents through the College Navigator college search website (<http://nces.ed.gov/collegenavigator/>) and to researchers and others through the IPEDS Data Center (<http://nces.ed.gov/ipeds/datacenter/>).

³⁴ The Common Education Data Standards (CEDS) project is a national collaborative effort to develop voluntary, common data standards for a key set of education data elements to streamline the exchange and comparison of data across institutions and sectors, from early learning to workforce education. More information on CEDS is available at <https://ceds.ed.gov/>.



- additional education information (e.g., degrees earned, other institutions attended);
- educator date of birth (or month and year at minimum);
- educator demographic subgroups (using options and definitions from IPEDS/CEDS);
- valid measures of student growth;
- accurate educator evaluation information (some states collect each individual educator's summative evaluation data);
- accurate information to include as statistical controls in program evaluation models, including student and school/community characteristics and prior student achievement (of both K12 students and educator preparation program students);
- college courses and outcomes (for educators);
- relationship to teacher certification/endorsement data;
- crosswalk between course content and endorsement; and
- years of experience as an educator.

In addition to the first bullet point above, some of the other data may be collected by the IHE. In cases where these data are linked within the IHE's systems, the data do not need to be collected by the SEA or LEA as the IHE can serve as the data source.

Local and State Practices (collection, frequency, quality assurances, use, etc.)

A once-a-year snapshot may be sufficient to provide meaningful feedback to educator preparation programs. However, when used for program evaluation, a higher level of granularity is typically needed, such as data that track the longitudinal changes in student enrollment and teacher assignment within an academic year or course session. Roster verification is an effective practice for maintaining up-to-date TSDL data, and is especially important when using student outcome data to evaluate teacher preparation programs.³⁵ Summative reports, aggregated by subgroup, and other reasonability checks may also be used for verification.

Business Rules

When using the TSDL to evaluate educator preparation programs, rules for consideration might include

- inclusion/exclusion of teachers who attend multiple programs;
- if including teachers who attended multiple programs, weighting criteria that reflect the amount of a teacher's training that was attributable to a given program (e.g., a teacher may have received pre-service training in one program but then transferred and graduated from another program);
- inclusion/exclusion of student data when the student is taught by multiple teachers;
- inclusion/exclusion of students based on time in class/school and attendance;
- inclusion/exclusion of teachers based on time worked with students (e.g., accounting for long-term leave, teacher attendance, etc.); and
- suppression rules for small cell sizes that could reveal information about a particular person (educator or student).

³⁵ See Chapter 3 for more information on roster verification.



If the TSDL is constructed based on course section, it will be necessary to find an alternative way to match resource teachers when their contact with students does not involve the entire class. In such cases, it may be advisable to develop secondary rules for assessing a preparation program, with special attention being given to students in subgroups, such as special education students, limited English speaking students, or other groupings that make for meaningful analysis.

Additionally, the evaluation of program areas that are not part of standardized testing may warrant the application of different rules than those used for programs and assignments in the core subject areas (e.g., teachers providing instruction in foreign languages).

Key Roles

A typical scenario for educator preparation program feedback is for the SEA to collect the data from LEAs and then work in collaboration with preparation programs, the IHEs, or with a state-level higher education coordinating/governing board. In such a case, relevant staff roles might include

- program office and IT staff;
- district data coordinators who serve as LEA liaisons to the SEA data collection;
- teachers (e.g., verifying class rosters and program participation information);
- school/LEA administrators (e.g., verifying class rosters and program participation information);
- educator preparation program staff (e.g., providing educator participation and performance data); and
- SEA and IHE leadership (e.g., establishing data governance policy).

Success Factors and Challenges

Key challenges for using the TSDL for educator preparation program evaluation and feedback stem from possible differences between the respective data systems and organizational cultures. As such, it is important to remember that the data collected in one context, such as student scheduling or teacher licensure, may not always be appropriate for combining with other data and, subsequently, used for new purposes. Another critical success factor is the level of cooperation and coordination between the SEAs and IHEs when validating and cleansing the data (e.g., different data governance policies and processes could complicate validation and cleansing).

Evaluating educator preparation programs may generate concerns or even negative reactions from programs and/or graduates, including questions regarding the

- accuracy of teacher-student-course data links;
- complexity of data related to variation in paths to license/endorsement;
- verification of degrees and educator preparation program participation;
- decisions about how data from teachers who attended preparation programs outside the state will be used;
- linkage to other systems or data sets; and
- privacy concerns of individual and program evaluation data.



Implementation Recommendations

Advanced Planning and Analysis

Education agencies using the TSDL in program evaluation or feedback may wish to proceed with caution, taking the time necessary to conduct a thorough analysis before moving forward. This includes coming to a realistic understanding of the quality, usefulness, and limitations of existing data. For example, if planners know that a significant number of teachers cannot be linked to an educator preparation program, the agency might adjust its evaluation strategy to ensure that analyses are equitable and the project worthwhile. Agencies reduce risk by starting small and carefully building to full implementation. A pilot project with willing participants may serve to identify and resolve problems before they become major issues on a larger scale. The agency may also wish to consider providing draft findings to participating IHEs to help confirm that analysis is valid prior to sharing the results more broadly (e.g., with LEAs, the public, or legislative bodies).

Collaboration

Ongoing partnerships between K12 agencies and schools of education (i.e., education preparation programs) are a first step in the process of ensuring cooperation in program evaluation and feedback efforts. Such partnerships may include higher education governing bodies where applicable. Best practice suggests the involvement of leaders from participating educator preparation programs who presumably care about the quality of education they provide to their students. This expertise can provide valuable insight into program data and practices that may be particularly useful when developing evaluation/feedback policies and business rules.

Prior Work

Louisiana Department of Education

Since 2007, Louisiana's Teacher Preparation Program Assessment Model (TPPAM) has used value-added measures to evaluate the state's teacher preparation programs by linking student outcomes to teachers and, subsequently, to the schools of education that trained them.³⁶ Funded by the Louisiana Board of Regents and in partnership with the Louisiana Department of Education, Louisiana State University and A&M College use the model to analyze data from LEAs in Louisiana. The value-added results for each teacher preparation program are then shared in an annual public report.³⁷

³⁶ For more information on Louisiana's Value-Added Model, including a brief description of how students and teachers are linked, visit Act54 Louisiana (<http://www.act54.org/components-tested-grade-02.html>).

³⁷ For additional information on Louisiana's TPPAM, visit

<http://regents.la.gov/academic-affairs/teacher-education-initiatives/value-added-teacher-preparation-program-assessment-model/>.



Implementation Considerations for Educator Preparation Program Feedback and Evaluation³⁸ * Common to all use cases	
Data Governance	
Implement written data governance policies adopted by all relevant organizations.*	
Establish well-defined user access policies.*	
Communicate clear directives for handling of personally identifiable and de-identified data.*	
Define TSDL elements and relationships, secure agreement across stakeholders, and confirm those elements and relationships exist in the available data systems.*	
Define ownership of data as part of agreements between stakeholders.* (In this use case, stakeholders include institutions of higher learning and K12 agencies.)	
Involve preparation program leaders in the planning and development of policy, including a data governance policy for cross-agency/institution data sharing and use.	
Policies and Practices to Support Implementation	
Adopt a data quality audit process.*	
Decide whether current collections can be used (and with what limitations) or if additional data will be needed.*	
Implement a Teacher of Record policy, and separate policies or administrative guidance defining what it means for the teacher and student data to be linked in the context of each use.*	
Adopt policies and practices to support timely updates to scheduling and other data.*	
Adopt policies and practices to support elementary scheduling by subject.*	
Adopt policies that provide timelines for entering and refreshing data.*	
Adopt policies for appropriate use of data.*	
Determine whether to use the same student growth attributions or value-added measures as used for other purposes.	
Determine policies describing the articulation of linking the teacher to the preparation program.	
Student and Staff Attendance	
Determine what student and staff attendance is needed based on student outcome data used.*	
Determine questions regarding thresholds, dosage, weighting, etc.	
Formal Roster Verification Process	
Determine what level of roster verification, if any, is required to support the level of data integrity needed.*	
Clearly define, document, and communicate procedures for correcting data.*	
Data Components	
Include data that link both a student and educator to the course section for a specific time period. This may include unique identifiers for students, staff, course, schools, programs, and course section-time period.*	
Ensure that teacher certification areas are matched to teacher class schedules.	
Develop rules for attributing a teacher to a particular teacher prep program.	

³⁸ See Appendix F for a summary matrix of considerations across TSDL uses.



Business Rules	
Develop rules for a metric for teachers in classes that are tested in state testing.	
Develop rules for a metric for teachers in classes that are not part of state testing.	
Develop rules for system of record based on data governance/master data management policies.	
Determine whether to link students to more than one teacher in a course section.	
Systems Requirements	
Determine identification and access needs required to support varying instructional groupings and models (refer to Appendix A: Emerging Learning Systems).*	
Ensure that source systems have the ability to track student movement/transfers on a daily basis.*	
If it is necessary to gather data from multiple systems (certification data, student data, HR data), develop technical specifications for the data extraction, transformation, and loading into longitudinal data systems.	
Develop technical specifications (and implementation plans as needed) detailing how new or existing systems will manage and report the TSDL data to support program feedback and evaluation.	
Student Outcome Data (frequency and granularity to support this use case)	
Determine whether annual student outcome data are sufficient for an annual assessment of teacher prep programs.	
Frequency of TSDL Data Collection to a Longitudinal Data System	
Send data annually.	



Use Case 5: Teacher Placement/Allocation Decisions

Linked teacher-student data can inform decisionmaking about which courses, sections, and individual students will be most successful with a given teacher. For example, if TSDL data identify an educator who is particularly effective at teaching students who are learning English, that teacher can be assigned to a classroom that has a high number of English Language Learner students. Similarly, TSDL data can be used to place students who are “below grade level” with teachers who have demonstrated the most success at helping students progress to grade level. Although data about teachers, students, and student outcomes can help to inform teacher and student assignments, TSDL data should not be the only indicator considered when evaluating the highly complex dynamics of the classroom setting.

Another aspect of data governance relates to getting the right data to the right people at the right time.

Governance

The data governance process used by the education agency will have an impact on the usefulness of data available for teacher placement and allocation decisions. Data quality includes consistency, completeness, integrity, timeliness, and accessibility. Inaccurate, incomplete, untrusted, or inaccessible data are not useful. Therefore, it is especially important to have key aspects of data governance in place for this use of the TSDL. Data governance establishes an organizational culture that recognizes the value of data as an agency-wide asset, and recognizes that poor data quality can have a significant negative impact on the organization, the staff, and the primary purpose of education: student learning.

Another aspect of data governance relates to getting the right data to the right people at the right time. Governance in this case determines who receives access to what data (referred to as “access rules”) in light of FERPA and other state and local privacy laws/policies.³⁹ Teacher/student placement is a valid educational purpose for principals and school district administrators charged with making decisions related to classroom assignments. Local decisionmaking, policies, and contractual terms may determine who else participates in the process and has access to data. Therefore, the data governance process is critical to the establishment and enforcement of appropriate data access rules.

³⁹ For additional information about the Family Educational Rights and Privacy Act regulations and associated guidance documents, refer to the Family Policy Compliance Office’s website, available at <http://www2.ed.gov/policy/gen/guid/fpco/index.html>. For best practices and technical assistance with issues related to protecting privacy, security, and confidentiality of student records, refer to the Privacy Technical Assistance Center’s (PTAC’s) website, available at <http://ptac.ed.gov/>.



Policies (local and state)

Decisions about teacher placement and allocation will reflect local policies administered at the LEA level and operationalized at the school level. Most often the use of TSDL data (linking teachers to student outcomes) is not prescribed at a policy level, but board decisions, bargaining agreements (teacher contracts), and issues of law may set parameters on the ways in which TSDL data are used. In addition to state and district policies on the selection and implementation of growth models, other needed policies may relate to

- appropriate data use (e.g., reflecting FERPA, state, and local access policies);
- mandatory and/or voluntary reporting (all versus subgroups of staff);
- the use of historical data;
- data granularity (e.g., subject, course, or item level);
- validation mechanisms; and
- training requirements and opportunities.

Data Elements and Relationships

Placement and allocation decisions typically reflect multiple measures of professional practice in addition to more common and direct measures that link a teacher to student growth. Foundational data elements include the teacher-student link (usually established through course section) and some measure of student progress such as a growth score or growth percentile for students linked to the teaching assignment(s).⁴⁰

Student growth attribution is a key calculated measure when using student growth scores. Weighted attribution (based, for example, on percentage of time with individual teachers) can also be accommodated by the TSDL, although many of the algorithms used to weight attribution may be viewed as controversial and warrant substantial consideration (and perhaps even negotiation with teacher unions). Multi-year student growth attribution data may provide the ability to review the growth history of a given teacher's students by prior achievement levels. Historical data showing student growth related to the same teacher in the same course can help to minimize the effect of other variables.

Placement decisions might also reflect professional development history and evidence of competencies required to teach a particular course, as well as the competencies needed to address special needs in the class. A rich set of data about individual student needs and teacher competencies will support these decisions in a more holistic way. Historical/longitudinal data about schedules and placements provide the capacity to review how educators and students have been matched in the past and how well those placements have worked out.

⁴⁰ See Appendix D for typical structures of the TSDL in the local source system.



Local and State Practices (collection, frequency, quality assurances, use, etc.)

Data will need to be collected and available whenever placement decisions are made—most often prior to the start of the school year, although changes in student and staff placement can occur at any point throughout an academic year.

Effective use of the data will likely require training and support for decisionmakers to understand what the data indicate about a teacher's particular strengths and weakness, as well as what inferences should not be made from the data. As such, it is important for training to include a review of the assumptions and limitations that govern data use based on the granularity, quality, integrity, and analytic methods available.

Business Rules

The business rules to support the use of TSDL data for placement and allocation decisions will relate to common instructional and management issues such as

- scheduling elementary course sections by subject or course (if the instructor varies by unit, then this can be tracked as well);
- using standardized statewide course identifiers and local section identifiers to uniquely identify course section;
- using statewide unique student identifiers to support merging the data from multiple source systems;
- using statewide unique educator identifiers; and
- connecting instructors to past (historical) courses and students taught.

The use of TSDL data for placement and allocation decisions often involves business rules for calculating student growth and rules for attributing growth to individual teachers. In the case of co-teaching or team teaching scenarios, the rules may be based on weighting each educator's level of responsibility for a course section and the percentage of time (or actual days) each teacher was entirely or partly (proportionally) responsible for the class. These business rules are typically defined by a local or state policy definition of "Teacher of Record."⁴¹

⁴¹ See Chapter 3 for more information on Teacher of Record policies.



Key Roles

The following roles may be involved in supporting the collection and use of the teacher-student link for placement and allocation decisions:

- local registrar/data entry clerk;
- teacher (roster verification);
- co-teacher, paraprofessional, etc. (roster verification);
- principal;
- assessment data steward;
- vendors; and
- source systems administrator.

Success Factors and Challenges

Because placement decisions involve a complex set of constraints, principals and administrators must understand what flexibility exists with respect to placement decisions, and how TSDL-enabled analytics can support the placement/allocation process. Human capital management can be a people-intensive process, either relying on personal judgment or becoming less subjective by relying more heavily on data.

Implementation Recommendations

Before implementing TSDL for placement and allocation decisions, best practice suggests the establishment of a Teacher of Record (TOR) policy that considers the use of the data for placement (e.g., the policy for assigning weighted responsibility for student learning in a class in a co-teaching scenario). Note that the method for weighting data for teacher evaluation may be different than the method for placement and allocation decisions. If the TOR policy was developed with evaluation in mind, there may not necessarily be different rules that apply for placement decisions. The TOR policy may be a statewide definition, or a local adaptation if the state policy was selected for purposes other than supporting placement decisions. As such, it may provide the parameters for the business rules to be used, including the algorithms used for student growth attribution. Any other measures to be used should be pre-defined. Because it is understood that the data may only tell part of the story, some organizations will choose to weigh other relevant factors such as personality or strengths not captured through student growth data when making placement decisions.

Like other TSDL uses, teacher placement/allocation analysis may be only the beginning of a bigger conversation that uncovers other context and performance questions. Such a discussion will likely call for the participation of teachers and school administrators in placement planning. Sound analysis can yield information that helps to address individual learner needs and broader organizational requirements (e.g., maximum class size) as well as a balanced and practical approach to optimizing the allocation of limited human resources.



Prior Work

Charlotte-Mecklenburg Schools

As part of the Strategic Data Project (SDP) at Harvard University's Center for Education Policy Research, North Carolina's Charlotte-Mecklenburg Schools (CMS) uses the TSDL to examine human capital data on teachers throughout the cycle of recruitment, placement, development, evaluation, and retainment/turnover. School and district leaders use these data to better understand the effects of their decisions throughout this cycle and to support related decisionmaking in ways that help improve student outcomes.⁴²

⁴² For more information on CMS's use of the TSDL to better understand the impact of teacher placement/allocation decisions, refer to the SDP's presentation "Teacher Employment Patterns and Student Results in Charlotte-Mecklenburg Schools," available at http://www.gse.harvard.edu/~pfpie/pdf/Teacher_Employment_Patterns_and_Student_Results_in_CMS_Feb_23_2010.pdf.



Implementation Considerations for Teacher Placement/Allocation Decisions ⁴³ * Common to all use cases	
Data Governance	
Implement written data governance policies adopted by all relevant organizations.*	
Establish well-defined user access policies.*	
Communicate clear directives for handling of personally identifiable and de-identified data.*	
Define TSDL elements and relationships, secure agreement across stakeholders, and confirm those elements and relationships exist in the available data.*	
Define ownership of data as part of agreements between stakeholders.*	
Policies and Practices to Support Implementation	
Adopt a data quality audit process.*	
Decide whether current collections can be used (and with what limitations) or if additional data will be needed.*	
Implement a Teacher of Record policy, and separate policies or administrative guidance defining what it means for the teacher and student data to be linked in the context of each use.*	
Adopt policies and practices to support timely updates to scheduling and other data.*	
Adopt policies and practices to support elementary scheduling by subject.*	
Adopt policies that provide timelines for entering and refreshing data.*	
Adopt policies for appropriate use of data.*	
Establish process for staff to report errors in roster data and for timely correction in source systems.	
Determine if attendance data are needed (e.g., to set thresholds for including/excluding or making adjustments when calculating student growth attribution).	
Student and Staff Attendance	
Determine what student and staff attendance is needed based on student outcome data used.*	
Determine questions regarding thresholds, dosage, weighting, etc.	
Formal Roster Verification Process	
Determine what level of roster verification, if any, is required to support the level of data integrity needed.*	
Clearly define, document, and communicate procedures for correcting data.*	
Data Components	
Include data that link both a student and educator to the course section for a specific time period. This may include unique identifiers for students, staff, course, schools, programs, and course section-time period.*	
Determine, based on use, the need for the ability to link students to multiple educators in different roles in any given course section.*	
Establish the ability to link assessment data to individual teachers. This could include formative and interim assessments.	
Include student demographics (subgroups) and program participation if available.	

⁴³ See Appendix F for a summary matrix of considerations across TSDL uses.



Business Rules	
Define rules for matching all instructors tied to particular students for particular content areas.	
Determine whether to link students to more than one teacher in a course section.	
Systems Requirements	
Determine identification and access needs required to support varying instructional groupings and models (refer to Appendix A: Emerging Learning Systems).*	
Ensure that source systems have the ability to track student movement/transfers on a daily basis.*	
Establish the capacity to provide views to principals, or other relevant administrators, of teacher-level student growth history.	
Student Outcome Data (frequency and granularity to support this use case)	
Collect item-level data per year for placements.	
At a minimum, collect summative teacher-level data on student growth prior to beginning of school year, and ideally data from multiple years.	
Frequency of TSDL Data Collection to a Longitudinal Data System	
Send data annually or more frequently (local use).	



Use Case 6: Compliance Reporting

Data from the TSDL can be used to satisfy many different types of reporting needs, including federal programs requiring LEAs and SEAs to collect course sections, student courses completed, and grades earned. (Note: Current federal policy does not require states to report TSDL data; it only requires that states collect the data for program evaluation and aggregate reporting.) Different reporting needs will place different demands on systems with respect to data quality and the frequency of collections. When the use requires reporting at the state level, best practices suggest that SEAs work with LEA stakeholders to assess readiness to report TSDL data.

Linked teacher and student data can be used to

- provide student academic growth data back to teachers;
- support local accountability reporting;
- provide data to support local, state, and federal programs;
- inform specialty areas such as career and technical education, limited English proficiency (LEP) programs, Special Education, technology education, dual enrollment, and virtual education; and
- qualify for federal funding (e.g., ARRA) and accountability waivers (e.g., ESEA waivers).

Governance

Compliance reporting most often involves cross-agency collaboration, such as an SEA collecting data from LEAs. In the past, when data were used primarily for compliance purposes, data ownership was often assigned to technology staff responsible for the infrastructure that collects, stores, and shares the data rather than with program area specialists who have a deeper understanding of data meaning. However, as the goals of education information systems continue to evolve, successful implementation of the TSDL requires data ownership by knowledgeable program staff, as well as data governance policies and procedures that

- establish and enforce clear ownership responsibilities;
- anticipate uses of linked educator and student data beyond compliance reporting;
- define enterprise-wide standards for each data element (e.g., definitions, code lists, field lengths) and normalize the procedures for data reporting and collection;
- facilitate communication and collaboration; and
- address appropriate use of the TSDL data and impact of changes over time.



The data governance process can also eliminate legacy collections in cases where collecting more granular TSDL data can be used to support both the new and legacy requirements.⁴⁴ For example, LEAs reporting data from source systems in a more automated way at regular intervals may replace multiple manual submissions of data at different times of the year. The data governance process would include plans for documenting changes and communicating the changes to staff and data users. The process often includes working with vendors to accomplish these objectives.

Anytime new data are collected, data are collected in a different way, or data are collected at a different frequency, there is potential to interrupt trend lines, thus increasing the likelihood of misinterpretation. The agency or multi-agency data governance body must determine how changes will be documented and how reports and reporting systems might be impacted. There is great value in stakeholders understanding how data from their source systems will be used, and for longitudinal reports to include metadata that encourage proper interpretation of the data. If TSDL data are part of a new collection that will be used for existing reports, it is important for users to know that it is being sourced differently—that is, using TSDL data rather than previous direct reporting of aggregate measures.

An SEA needs to determine how to handle initial teacher-student linkages that, by their very nature as “new” collections or constructs, are unproven and more likely to suffer from data quality concerns. It is particularly important to recognize that stakeholders sometimes misuse data with which they are unfamiliar (in definition, quality, or granularity). An example of this is once-a-year snapshot collection of TSDL data, which may be sufficient for American Recovery and Reinvestment Act (ARRA) compliance, but does not provide sufficient longitudinal quality for other purposes, such as teacher evaluation. Part of the data governance process is to understand and communicate appropriate uses of the data, and to recognize when additional collections or validation procedures are needed to support new uses of the data.

Policies (local and state)

The SEA will need to establish policies concerning the required use of the TSDL for compliance reporting (such as ARRA Indicator b 1-8). For example, policy should determine whether the inclusion of an indirect link (e.g., teacher to course and course to student) fulfills a TSDL requirement or whether a direct TSDL must be constructed and stored in an SLDS.

⁴⁴ EdFacts defines legacy collections as data that are discontinued or retired, moving toward retirement, being transformed, or have had a significant reduction in burden.



Best practices suggest that policies be established regarding how the TSDL is reported when teachers and/or students change over time—as occurs when a new teacher takes over halfway through a course, or when a student enrolls but does not complete a course (e.g., the student moves or drops the course). Policies should provide specific guidance for reporting or, alternatively, excluding data when teachers and students are linked for only part of the school year (otherwise, the absence of clear reporting instructions will almost surely raise quality concerns due to differing interpretations of what should be reported).

Policies will also be required to explain the appropriate use of TSDL data. Collecting TSDL data for compliance reporting usually involves collecting more granular source data about student course section enrollments and teacher assignments. This more granular data will provide opportunities to derive elements that may have previously been collected as aggregate measures. It is often worthwhile to review collections, reports, and existing elements in legacy collections on an annual basis to determine whether newly collected TSDL data can satisfy new and existing requirements—and subsequently eliminate redundant collections.

Before replacing or modifying legacy collections, it is necessary to compare and reconcile legacy data with measures derived from the new (TSDL) system. Often the TSDL's more granular collection, its reliance on multiple sources, and its application for new purposes will reveal quality issues that should be addressed. For example, data that originate in multiple source systems may be accurate enough to support operational use within each system, but difficult to combine in a meaningful manner. The process of identifying and reconciling these differences between new and legacy collections requires the development of policies and practices to expose data quality issues and make corrections at the source.

Policies related to the TSDL should recognize that inaccurately reported or misused data may have a negative impact on the LEA, its staff, or students. Therefore, care must be taken to mitigate the risks of potential harm. One promising practice is for an SEA to proactively inform all policymakers across the state about the TSDL's appropriate uses and limitations.

Data Elements and Relationships

The TSDL is established as the connection between teachers and students through the scheduling of a class (course section), and enrollment/assignment to a course section is the common way to establish the link. Although other data about individual teachers and students may also be required to meet compliance reporting mandates, the elements that are useful for applying the TSDL to compliance reporting include

- student identifier;
- teacher identifier;
- course code; and
- data that uniquely identify the course section (e.g., school identifier + course code + section number).⁴⁵

⁴⁵ See Appendix D for typical structures of the TSDL in the local source system.



Best practices suggest that LEA source systems use state course code standards or, alternatively, that the LEA have a process by which all local course codes can be mapped to a set of standard course codes. A well-recognized source for standardized course codes is the School Codes for the Exchange of Data (SCED), which includes the prior-to-secondary course code and the secondary course code frameworks as defined in the NCES Handbooks and documented in Common Education Data Standards (CEDS).⁴⁶

Additional data about the course section may include the

- delivery method for the class (e.g., a traditional or virtual classroom);
- funding stream (e.g., a general education, special education, or English for Speakers of Other Languages [ESOL] course);
- course level (e.g., remedial, general, advanced, or honors);
- course credit available; and
- sequence within a course series or program.

Other details, such as frequency of collection, rules for inclusion/exclusion, and validation requirements, may vary. For example, one mandate may require reporting the link for all students enrolled in a teacher's class regardless of whether the student and teacher were both assigned for the full duration of the class. Another mandate may specify that only data for the teachers and students who were in the same class all year be reported (or based on a minimum threshold of days). More granular data collected from source systems with start and end dates for student-course section enrollment and teacher-course section assignment provide flexibility to support differences in reporting requirements.

Local and State Practices (collection, frequency, quality assurances, use, etc.)

Practices useful for compliance reporting are influenced by circumstances at both the source and destination of the data. For some federal reporting, a once-a-year snapshot may be adequate as long as source systems are able to track changes in student enrollments and teacher assignments over time. Other collections might require beginning-of-the-year and end-of-the-year snapshots, and some may mandate continuous or real-time transactions.

The following types of questions may help to evaluate LEA capacity to handle compliance reporting:

- Are elementary grades scheduled by course or subject in your local source systems, or are they scheduled by “homeroom” (combining math and English Language Arts)? Are local source systems capable of tracking changes in enrollments and assignments? That is, can a system reconstruct at any point in time which students were enrolled in a class and which teacher(s) was assigned to the class?
- Are changes in a student's enrollment in a course section recorded in the local source systems in a timely manner? Is there a lag between when a student drops a class and when the change is

⁴⁶ More information about School Codes for the Exchange of Data (SCED) is available at <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2011801>. More information about Common Education Data Standards (CEDS) is available at <https://ceds.ed.gov/>.



recorded in the system? Would the change be backdated to the actual drop date or reflect the date when systems were updated?

- Are state-approved course codes used in your local source systems, or is there a process by which the LEA can map to the state course codes for reporting?

Some local source systems were designed only to store current-point-in-time data (i.e., the system knows which students are enrolled in a class today, but cannot report which students were enrolled in the class last month). This is a common problem; when this is the case, the SEA and LEA(s) can explore multiple options:

- The SEA could maintain the longitudinal history by backing up daily snapshots from the LEA systems and keeping them in a longitudinal operational data store (ODS)—an intermediate data warehouse—and transforming it into the SLDS for compliance reporting.
- The SEA could develop policies that require all LEAs purchasing new source systems to meet minimum requirements or use source systems from a state-approved vendor/product list.
- The SEA could offer a state-procured source system alternative that meets the needs for compliance data.

The destination for the TSDL compliance data also warrants consideration. For example, best practice suggests that the data be stored longitudinally as microdata (i.e., the most basic level of data), but there are tradeoffs between the benefits of increased granularity and the costs of increased storage capacity. In the final analysis, however, microdata provide the most flexibility for responding to changing reporting requirements if the incremental costs of storage can be accommodated.

Best practices also suggest that an agency consider an internal quality audit in order to determine data quality. The data quality audit may include techniques such as data profiling and reasonability checks, and can reveal where edits, business rules, and definitions can be improved. These system enhancements will improve TSDL quality for a wide range of purposes.

Business Rules

Business rules must account for very real complexities in systems, policies, and reporting requirements, such as districts sharing teachers and courses, and students no longer attending classes simply by sitting in brick and mortar school buildings. SEAs will want to adopt specific policies and guidance for consistent TSDL reporting across LEAs. This starts with a clear definition of “Teacher of Record” and then progresses to address questions such as the following:

- How is the link handled when the teacher of a course does not work for the school where the student is enrolled? (This is particularly true for special education courses, virtual coursework, and specialized Career and Technical Education Pathways.)
- If one LEA reports the teacher-course link and another LEA reports the student-course link, how can the SEA combine these data to produce a unified TSDL?
- If an LEA gives credit for a course at a community college taught by a college professor (who does not have a state teaching license), who is the teacher linked to the course?



- How must the following situations be reported:
 - distance learning;
 - virtual education;
 - districts sending a student to another district to complete specialized instruction for a particular course;
 - teachers traveling to multiple districts; and
 - a class with students from multiple districts?

These scenarios occur in LEAs throughout the nation. Developing business rules that accommodate this reality is necessary in order to generate high quality data about our educational system.

Key Roles

People involved in compliance reporting include

- data collection staff;
- data coordinators;
- federal program office; and
- data stewards.

Success Factors and Challenges

States and school districts face significant challenges when reporting linked educator and student data. In some cases, agencies lack basic readiness to collect and report the data, but capacity can be improved by

- having effective data governance in place;
- understanding the purpose and uses of the TSDL;
- collecting the right course and schedule data in each local source system;
- using statewide unique student identifiers consistently across systems;
- using unique educator identifiers consistently across systems;
- developing the capacity to track longitudinal changes in student course section enrollment and teacher assignments;
- having a statewide Teacher of Record policy that clearly defines the rules under which the data are linked for which purposes;
- having assessment and outcomes data to add meaning to the link; and
- being able to effectively link data across systems owned by different offices and agencies.⁴⁷

⁴⁷ Adapted from the Teacher-Student Data Link Project website, available at www.tsdl.org.



Some of the greatest challenges to implementing a TSDL reflect the variability in the quality and accuracy (or even existence) of the link in local source systems. Sometimes the link is of high quality for the purpose originally envisioned in the source systems, but not appropriate to other uses (e.g., changing reporting/use needs).

Data quality will improve over time with the right verification and feedback processes—all strengthened by developing effective communication between the SEA and LEAs.

Implementation Recommendations

Before piloting data collection, it is recommended that LEAs conduct a readiness assessment focused on foundational issues such as the source system's capacity to capture and report required data. The number of source systems complicates this because, in many cases, reporting for one LEA requires data from multiple systems (e.g., Human Resources and Student Information Systems). These different systems often have different update cycles, use different identifiers, and support operational processes that may not fulfill the compliance need. In order to reduce data collection burdens on LEAs, individual elements can be retired from legacy collections where the same or better data are collected through the TSDL collection.

Ideally, SEAs should work in advance with LEA vendors and give LEAs time to establish, implement, and test the link between systems. Data profiling tools and techniques can help staff to understand issues with the source data and identify technical and policy-/procedure-based solutions. It may take time to work out the method for collecting these data (e.g., format, elements, transport mechanism, etc.) in ways that are least burdensome to schools. A pilot is essential for both the SEA and LEAs to better understand the requirements and the needed policies and business rules. For example, Colorado implements a three-year pilot, including a TSDL collection with seven LEAs during the 2012–2013 school year. To help LEAs with this collection, they offered training and support around mapping courses to the state standard courses.⁴⁸

⁴⁸ More information on the Colorado Department of Education's Educator Identifier Project is available at <http://www.cde.state.co.us/EDIDProject/index.asp>.



Prior Work

Rhode Island Department of Education

The Rhode Island Department of Education (RIDE) requires LEAs to report Teacher-Course-Student (TCS) data. These data are used in a number of RIDE data systems. One example of a data system that uses TCS data is the Instructional Management System (IMS).

The TCS data collection consists of four submissions: K12 SECTION-COURSE, K12 SECTION-SECTION, K12 SECTION-STAFF, and K12 SECTION-STUDENT. LEAs began reporting TCS data to RIDE in the 2011–2012 school year. TCS data are submitted at the beginning of the year and maintained daily. The COURSE and SECTION data do not need to be submitted to RIDE daily as the courses and sections do not change on a daily basis but are submitted as necessary. The STAFF and STUDENT data are submitted to RIDE daily to reflect the changes in student classes, student mobility, teacher class assignment changes, and teacher mobility.⁴⁹

⁴⁹ For more information on RIDE's TSDL reporting requirements, visit <http://www.ride.ri.gov/InformationAccountability/RIEDDataResources/DataCollection.aspx>.



Implementation Considerations for Compliance Reporting ⁵⁰ * Common to all use cases	
Data Governance	
Implement written data governance policies adopted by all relevant organizations.*	
Establish well-defined user access policies.*	
Communicate clear directives for handling of personally identifiable and de-identified data.*	
Define TSDL elements and relationships, secure agreement across stakeholders, and confirm those elements and relationships exist in the available data.*	
Define ownership of data as part of agreements between stakeholders.*	
Ensure that the SEA or cross-agency data governance policy is adopted by the governing authority (e.g., state board of education).	
Ensure that the SEA has put the data governance policy into practice, e.g., a data quality director and data management committee exist and function according to the defined policy.	
Ensure that the data governance practice includes implementation of an effective communication plan, e.g., timely public posting of data collection schedules, SEA-LEA communication, and an issues and resolutions process.	
Policies and Practices to Support Implementation	
Adopt a data quality audit process.*	
Decide whether current collections can be used (and with what limitations) or if additional data will be needed.*	
Implement a Teacher of Record policy, and separate policies or administrative guidance defining what it means for the teacher and student data to be linked in the context of each use.*	
Adopt policies and practices to support timely updates to scheduling and other data.*	
Adopt policies and practices to support elementary scheduling by subject.*	
Adopt policies that provide timelines for entering and refreshing data.*	
Adopt policies for appropriate use of data.*	
Student and Staff Attendance	
Determine what student and staff attendance is needed based on student outcome data used.*	
Formal Roster Verification Process	
Determine what level of roster verification, if any, is required to support the level of data integrity needed.*	
Clearly define, document, and communicate procedures for correcting data.*	
Data Components	
Include data that link both a student and educator to the class section for a specific time period. This may include unique identifiers for students, staff, course, schools, programs, and course section time period.*	
Determine, based on use, the need for the ability to link students to multiple educators in different roles in any given course section.*	
Determine the data elements required by federal and state reporting requirements.	

⁵⁰ See Appendix F for a summary matrix of considerations across TSDL uses.



Business Rules	
Develop a complete set of business rules for LEAs defining when and how students and teachers are linked in the data (e.g., minimum thresholds, data element definitions and acceptable values, and various exceptions). Rules can be constrained by policies, such as a Teacher of Record policy, and include scenarios such as co-teaching.	
Determine whether to link students to more than one teacher in a course section.	
Systems Requirements	
Determine identification and access needs required to support varying instructional groupings and models (refer to Appendix A: Emerging Learning Systems).*	
Ensure that source systems have the ability to track student movement/transfers on a daily basis.*	
Ensure that districts are prepared to submit data in a standard format.	
Ensure that LEAs collect the required fields in source data systems or have a process for a cross-walk/conversion prior to submission.	
Student Outcome Data (frequency and granularity to support this use case)	
Determine the data elements required by federal and state reporting requirements.	
Frequency of TSDL Data Collection to a Longitudinal Data System	
Send data in conjunction with SEA reporting requirement.	



Use Case 7: Educator Evaluation

Many states and districts use student progress (e.g., academic growth and/or teacher value-added) as a measure of teacher effectiveness by integrating the measure into their teacher evaluation system along with other indicators of teacher effectiveness.⁵¹ In this context, teacher-student linkage data are crucial for the accurate calculation of student progress measures included in any teacher evaluation framework. These teacher effectiveness metrics require student-level data that are accurately attributed to the teacher being measured, and roster verification is an important component of this process, both for accuracy and credibility.⁵²

Some evaluation models dictate specific needs of the linkage data. For example, the EVAAS Value-Added metric—used by Tennessee and Ohio—requires certain methodological characteristics, such as instructional attribution (i.e., the instructional linkage between a student and teacher through a specific subject). Other value-added models require data elements that quantify instructional time, such as the District of Columbia model, designed by Mathematica Policy Research, which requires the link to include a teacher dosage element (the share of instructional time that a student spends with a teacher).⁵³

For teachers providing instruction in non-tested subjects, some states use Student Learning Objectives (SLOs)—goals for student academic growth that are set by the instructor at the beginning of the year—to measure the student outcome portion of an educator’s evaluation. State using SLOs will likely need to use a roster verification system even if not addressing attribution issues. Other models, such as Rhode Island’s, require student attendance updates and enrollment adjustments at one or more points during the process.

In teacher evaluation systems, the TSDL can be used to

- support student growth attribution; and
- calculate weighted attribution/dosage to support value-added analysis.

Governance

Governance in this use case addresses how data may be shared for the calculation of metrics and dissemination of results. Since teacher evaluation is a high-profile use of the TSDL, it is important that the governance process clearly identify which data are intended to be used, how they will be used, and how they are not intended to be used. Major considerations center on data quality (whether teacher evaluation data are accurate) and data privacy (whether they are private or part of the public record).

⁵¹ For more information about growth models, refer to the NCES document “Growth Models: Issues and Advice from the States,” available at http://nces.ed.gov/programs/slds/pdf/guide_growth-model.pdf.

⁵² Refer to Chapter 3 for more information on roster verification.

⁵³ Design of Value-Added Models for IMPACT and TEAM in DC Public Schools, 2010-2011 School Year, available at <http://1.usa.gov/WBuaZE>.



The following excerpt from the Measures of Effective Teaching (MET) project gives an example of student outcome data that are not based on test scores and use the TSDL for evaluation and feedback. (Source: http://www.metproject.org/downloads/Student_Perceptions_092110.pdf)

Recent education research has begun to explore whether students' perceptions of the teaching they experience help in predicting how much those students learn...Cambridge Education's Tripod Project surveys assess whether or not students agree with a variety of statements designed to measure seven teaching practices that the survey's authors call the "Seven Cs."

- Caring about students (Encouragement and Support)
Example: The teacher in this class encourages me to do my best."
- Captivating students (Learning Seems Interesting and Relevant)
Example: "This class keeps my attention—I don't get bored."
- Conferring with students (Students Sense their Ideas are Respected)
Example: "My teacher gives us time to explain our ideas."
- Controlling behavior (Culture of Cooperation and Peer Support)
Example: "Our class stays busy and doesn't waste time."
- Clarifying lessons (Success Seems Feasible)
Example: "When I am confused, my teacher knows how to help me understand."
- Challenging students (Press for Effort, Perseverance and Rigor)
Example: "My teacher wants us to use our thinking skills, not just memorize things."
- Consolidating knowledge (Ideas get Connected and Integrated)
Example: "My teacher takes the time to summarize what we learn each day."

States that have adapted statewide teacher evaluation guidelines generally allow LEAs to develop teacher evaluation systems that work within those guidelines. An important consideration for program development and data governance is understanding which policies (and business rules) will be set by the SEA and which policies (and business rules) will be determined at the local level.

Policies (local and state)

Student progress measures and the methodologies used to calculate them will drive many policies for implementing the TSDL. For example, policymakers must decide whether daily attendance will be accounted for as a component of the evaluation: should teachers be accountable for students who, although enrolled, routinely miss school?



Perhaps most critical to the use of TSDL for value-added or growth attribution is the establishment of a policy that defines Teacher of Record and Contributing Educator (for the purpose of this document, a Contributing Educator is a teacher who supports development and/or delivery in a course but is not the Teacher of Record).⁵⁴ This policy definition will determine which students/outcomes are attributed to a teacher and what weightings will be used in the attribution. The Teacher of Record and Contributing Educator definitions must be clearly communicated to all stakeholders.

Another area of policy prescribes the system of roster verification to be used. This usually includes a set of rules and guidance describing the process for verification and the granularity at which teachers are determined to be “linked” to particular students. Rather than more precise weighting, some states have set thresholds for percentage of participation and thresholds based on role. For example, some states use a 25, 50, 75, 100 percent system depending on role.

States that have a formal roster verification process implement strategies to address the issue of teachers who do not verify rosters. One state’s approach is to give a window of time within which rosters must be verified by the teacher (after that time, the rosters are assumed to be correct). Several states have roster verification that requires the teacher and a school administrator to agree on the roster before it can be finalized. Additionally, states that require student outcomes to be a part of teacher evaluation must also determine whether an effectiveness measure can still be generated without roster verification.

Some policies may assume certain capacity in a data system. For example, a Teacher of Record policy might require a system to be able to accommodate multiple teachers of record—if the system is unable to do so the policy is impractical. Best practices suggest that policymakers work closely with IT leadership to ensure that they do not adopt a policy that is impossible to implement in existing data systems, nor one that prescribes unreasonable time frames for changing the data systems. At the same time, state policy can set guidelines for minimum requirements for student information system vendors that market embedded roster verification processes.

Data Elements and Relationships

The following set of core data elements is useful for applying the TSDL to educator evaluation:

- District Code
- School Code
- State Assigned Student ID
- Unique State or Local Student ID
- Unique State or Local Course ID (SCED Code or State Code)⁵⁵
- Course Section ID
- State Staff ID

⁵⁴ See Chapter 3 for more information on Teacher of Record policies.

⁵⁵ For more information, refer to the School Codes for the Exchange of Data (SCED), available at <https://ceds.ed.gov/>.



- Staff Name
- Section Start Date
- Section End Date
- Teacher Role (e.g., Teacher of Record)
- Student Last Name
- Section Entry Date (Student)
- Section Exit Date (Student)
- Section Entry Date (Staff)
- Section Exit Date (Staff)

Additional data elements are determined by the specific model and may include attendance data and operational elements such as teacher email addresses (required by some online systems).⁵⁶ Teacher evaluation may be informed by additional measures, such as measures of professional practice (e.g., data from principal observations) and other student outcome measures (e.g., attendance and perceptions survey data).⁵⁷

Local and State Practices (collection, frequency, quality assurances, use, etc.)

Data quality is crucial for accurate and effective linking. Considerations for data quality include

- frequency of data collections;
- local source systems capacity; and
- SEA systems capacity.

Data can initially be collected a few times a year, but in order to meet the goal of accurate TSDL data, some states begin with snapshot data and use the roster verification data to fill in details about changes in the teacher and student populations throughout a session. However, it is recommended to capture changes in local data systems and report those changes in state systems on a daily basis.

Policy considerations will likely drive practices, but roster verification is a necessary step when using TSDL for teacher evaluation. In many cases, final roster verification/certification is handled by the teacher and verified by a principal at the end of the respective course session or school year. Embedded roster verification (e.g., teachers verify rosters while taking attendance or by using records from an electronic gradebook), if feasible, may streamline the process.

⁵⁶ See Appendix D for typical structures of the TSDL in the local source system.

⁵⁷ For more information on multiple measures of teacher effectiveness, refer to the MET Project's report, "Ensuring Fair and Reliable Measures of Effective Teaching (2013)", available at http://metproject.org/downloads/MET_Ensuring_Fair_and_Reliable_Measures_Practitioner_Brief.pdf.



Other critical practices include

- use of standardized statewide course identifiers and local section identifiers to uniquely identify course sections;
- use of statewide unique student identifiers in all systems to enable the merging of data from multiple source systems; and
- use of statewide unique educator identifiers.

Business Rules

The business rules for generating value-added scores or student growth attribution are driven by state and district policies, as well as the value-added or growth models selected for use.

The rules embedded in a model may or may not account for non-traditional cases such as online learning, dual enrollment, off-site facilities, etc. If they do not address these increasingly important modes of instruction, a separate set of rules may be needed to govern the inclusion or exclusion of these data.

Business rules also include considerations such as determining the amount of time necessary in a teacher-student relationship for a valid growth score, and the number of students necessary to determine a growth value for a teacher.

Key Roles

The following roles may apply when the teacher-student link is used as a component of teacher evaluation:

- LEA administrator;
- principals;
- teachers;
- LEA IT staff;
- SEA staff; and
- help desk support.

Success Factors and Challenges

Successful implementation of the teacher-student link as a component of teacher evaluation is dependent on a number of critical factors. These factors include

- selection of the appropriate growth/value-add model and weighting of student outcome measures along with other evaluation metrics (and the research base to support the case for the chosen methodology);
- data quality required for valid results; and
- data integrity (e.g., teachers should trust that the source data and the resulting value-added scores are correct).



Some possible risks and challenges include

- incomplete data (such as may be caused by missing educator identifiers);
- the accuracy of roster data (from state and/or local information systems) and its effect on the effort needed to verify final rosters;
- high mobility that complicates both data management and policy/instructional choices (unless effectively accounted for in input data);
- the burden of roster verification (e.g., demands on staff which may impact delivery schedules and stakeholder opinions); and
- the capacity of local data systems to capture and report needed data.

Implementation Recommendations

Best practices suggest piloting a roster verification system to assess support and training needs (and audit results for accuracy). Agencies should also consider conducting a low-stakes/limited pilot of the student progress-based evaluation metrics before implementing a wide-scale higher-stakes rollout. It is important to ensure that the data issues can be resolved for trust and integrity prior to full implementation. Including a range of stakeholders in the planning and implementation can help build trust and acceptance. Communication is also critical. The development of a diverse leadership team that has credibility with various constituencies can help to strengthen stakeholder understanding and buy-in.

Training is necessary for principals, teachers, and data personnel. States have adopted best practices for roster verification, some of which are referenced in this document.

Prior Work

Georgia Department of Education

Measures of Georgia's CLASS Keyssm evaluation system for teachers and school administrators include

- observations and documentation of teacher performance standards;
- student growth and academic achievement; and
- student perception surveys.

For teachers in tested areas, measures include student growth percentile/value-added measures and achievement gap reduction. Teachers in non-tested areas are measured by achievement growth measures approved by the Georgia Department of Education and student learning objectives.⁵⁸

⁵⁸ For more information on CLASS Keys, refer to the "CLASS KEYS Process Guide," available at <http://bit.ly/S602mM>.



Los Angeles Unified School District, California

Los Angeles Unified School District has adopted an Academic Growth over Time statistical model that measures a teacher's contribution to student outcomes. A recognized limitation of the model is that it only incorporates data for students included in a beginning-of-year census who also take the California Standards Test in May. It excludes students and teachers that have moved from school to school at any point during the year.⁵⁹

Hillsborough County Public Schools, Florida

One of the challenges with using student outcome (academic growth) data as part of evaluation is that data are often limited to the core subjects: English language arts and mathematics. Sometimes there are annual assessment data for science and social studies, but rarely for other taught subjects, especially subjects such as physical education, home economics, or CTE classes.

To overcome this challenge, Florida's Hillsborough County Public Schools has developed its own tests to cover all subjects taught in its schools. The effort is part of a \$100 million grant from the Bill & Melinda Gates Foundation. With the means to measure student growth across all subjects, the district is adopting a teacher evaluation system in which "40% of a teacher's evaluation is based on student learning gains."⁶⁰

⁵⁹ For more information on Los Angeles's Academic Growth over Time statistical model, visit <http://talentmanagement.lausd.net/academic-growth-over-time>.

⁶⁰ For more information on Hillsborough's efforts to measure student growth, visit http://communication.sdhc.k12.fl.us/empoweringteachers/?page_id=309.



Implementation Considerations for Educator Evaluation ⁶¹	
* Common to all use cases	
Data Governance	
Implement written data governance policies adopted by all relevant organizations.*	
Establish well-defined user access policies.*	
Communicate clear directives for handling of personally identifiable and de-identified data.*	
Define TSDL elements and relationships, secure agreement across stakeholders, and confirm those elements and relationships exist in the available data.*	
Define ownership of data as part of agreements between stakeholders.*	
Determine with which relevant organizations there should be written agreements.	
Establish guidelines for how the data are collected and how the results are disseminated.	
Establish a process for escalation and resolution of data quality issues.	
Policies and Practices to Support Implementation	
Adopt a data quality audit process.*	
Decide whether current collections can be used (and with what limitations) or if additional data will be needed.*	
Implement a Teacher of Record policy, and separate policies or administrative guidance defining what it means for the teacher and student data to be linked in the context of each use.*	
Adopt policies and practices to support timely updates to scheduling and other data.*	
Adopt policies and practices to support elementary scheduling by subject.*	
Adopt policies that provide timelines for entering and refreshing data.*	
Adopt policies for appropriate use of data.*	
Establish process for staff to report errors in roster data and for timely correction in source systems.	
Determine the methodology (EVAAS, Colorado Growth, etc.), which will guide many business roles related to the link.	
Student and Staff Attendance	
Determine what student and staff attendance is needed based on student outcome data used.*	
Determine questions regarding thresholds, dosage, weighting, etc.	
Formal Roster Verification Process	
Determine what level of roster verification, if any, is required to support the level of data integrity needed.*	
Clearly define, document, and communicate procedures for correcting data.*	
Adopt policies and procedures, including appeals, to verify rosters for high-stakes circumstances.	
Ensure that an LEA administrator has final sign-off on the roster verification to mediate conflicts, ensure completeness, and serve as general check and balance.	

⁶¹ See Appendix F for a summary matrix of considerations across TSDL uses.



Data Components	
Include data that link both a student and educator to the class section for a specific time period. This may include unique identifiers for students, staff, course, schools, programs, and course section time period.*	
Determine, based on use, the need for the ability to link students to multiple educators in different roles in any given course section.*	
Establish the ability to link teachers to their professional development history.	
Determine data to support thresholds, dosage, and weighting.	
Consider including student demographics (subgroups) and program participation if available.	
Business Rules	
Establish business rules for non-traditional cases (virtual, etc.).	
Consider adding business rules for subjects not assessed.	
Consider adding dosage language.	
Determine whether to link students to more than one teacher in a course section.	
Systems Requirements	
Determine identification and access needs required to support varying instructional groupings and models (refer to Appendix A: Emerging Learning Systems).*	
Ensure that source systems have the ability to track student movement/transfers on a daily basis.*	
Ensure that districts are prepared to submit data in a standard format.	
Establish the ability to link more than one educator to a student.	
Student Outcome Data (frequency and granularity to support this use case)	
Student outcome data will depend on the methodology being employed. SEA assessment data will likely only be collected once a year.	
Teacher effectiveness measures using formative assessment data may be collected more frequently, and would require data systems capable of updating as necessary.	
Frequency of TSDL Data Collection to a Longitudinal Data System	
Send data daily (to capture longitudinal schedule changes).	



Use Case 8: Teacher Compensation

Emerging approaches to educator compensation offer merit pay or performance bonuses based in part on student outcomes. Teacher-student data linkages for compensation and merit pay are highly dependent on 1) the quality of linkages used when student outcomes are part of the evaluation criteria, and 2) the validity of the theory of action behind the evaluation system.

Note: This guide addresses implementation of the TSDL without making any judgments about the underlying theories connecting pay-based incentives to outcomes.

TSDL can be used to support compensation models including

- student growth/value-added attribution for merit pay calculations; and
- incentive pay for teachers who, having demonstrated success with particular subgroups (based on longitudinal data), accept assignments that meet the needs of high-need subgroups.

When part of an educator's compensation will be based on linked student outcome data, the TSDL implementation process can help promote understanding, buy-in, and fairness. An ineffective implementation of TSDL will likely contribute to the failure of the program by undermining participants' beliefs that changes in professional practice will result in fair value returned as a bonus. Key implementation considerations include

- data quality checks (fairness);
- roster verification (buy-in); and
- transparency of the TSDL policy, including which student outcome data will be linked using the TSDL, and which student outcomes will result in compensation levels (perceived value).

High-stakes uses of the TSDL, such as teacher compensation, require a high level of accuracy. Best practices suggest factoring this level of rigor into program planning decisions.⁶²

Governance

Data governance and project governance become more critical in high-stakes implementations such as those that impact teacher compensation. The governance will be framed within boundaries set by local, state, and federal policies/regulations and require active coordination with a range of stakeholders who have strong interest in the methods and outcomes. A data governance policy may be influenced by

⁶² For more information on data quality and ethics, refer to "The Forum Guide to Building a Culture of Quality Data: A School and District Resource" (2005), available at http://nces.ed.gov/forum/pub_2005801.asp, and "The Forum Guide to Data Ethics" (2010), available at <http://nces.ed.gov/pubs2010/2010801.pdf>.



- state and federal regulations regarding
 - privacy of students' personally identifiable information (PII) and sensitive personnel data;
 - personnel evaluation practices;
 - compensation parameters and limitations; and
 - employee rights;
- union and professional organization representation and/or involvement such as
 - current collective bargaining agreements; and
 - communication with constituents;
- legal counsel;
- human resource representation; and
- fiscal services (payroll system) representation.

Governance must ensure high data quality. The people impacted (teachers and other education agency employees) must have high confidence that the data used to make compensation decisions represent the truth, and that the metrics derived from those data are applied fairly when implementing the compensation or merit pay policies.

To accomplish this level of integrity, agencies have formalized data governance. The data governance is operationalized by program-level data stewards, regular data management team meetings, a data quality director, and an issues and resolutions process.

Policies (local and state)

The key policies in this use case pertain to the criteria for making merit pay awards or compensation adjustments. These criteria include which performance(s) to measure, how to identify recipients, and which cut-points will be used as thresholds for a tiered award system. Policymakers and IT leaders must determine whether the appropriate data (and data quality) are available to support the criteria. Example questions to ensure this include

- Which roles are eligible to receive awards? Can these roles be identified within the data, or are the roles informal (e.g., position titles/job codes versus adjunct assignments)?
- What is the unit at which awardees are identified (i.e., are awards granted at the individual-, grade-, school-, school type-, and/or district-level)?
- What are the standards-based criteria or ranking of units (e.g., benchmark, threshold cut-score, percentage cut)?
- Can all eligible individual/groups receive the award, only a limited number/percentage, or is only a specific subgroup eligible in a given year?
- Are units required to submit applications or petition for awards?



There is a complex relationship between the intent of the policy, the details in the data, and the likelihood of the implementation fulfilling the intent. Policies that set compensation levels based on data must consider issues that could result in unintended consequences. Before finalizing a policy it is helpful to test assumptions with real data, asking questions such as

- Does attribution of specific types of courses to specific roles predetermine the individual's eligibility? For example, would assigning department heads as the Teacher of Record for all virtual courses positively or adversely affect the likelihood of the department heads receiving awards?
- If some positions are judged by different criteria than others, do the individuals have control over the different criteria? In other words, if a counselor is eligible based on school-wide performance and a resource teacher's eligibility is based on students receiving services, do each of these positions impact the criteria on which they are being judged?
- How long does an individual need to be employed in the role to be eligible? How do leaves of absence affect the longevity criteria? Are temporary employees eligible?
- How will the organization determine eligibility for employees assigned to multiple work sites?

The compensation policy should reflect a host of options and variables, including

- amount of award
 - flat rate
 - variable scale—criteria to determine placement on scale;
- data elements required to determine results
 - frequency of data collection
 - standardized file format;
- type of data
 - personally identifiable information (PII)
 - de-identified student-level data
 - aggregate;
- dosage criteria
 - formula transparency;
- access to data
 - viewing
 - editing (if any)
 - verifying;
- access to results
 - viewing
 - editing (if any)
 - verifying;



- student roster verification
 - process
 - authorized roles;
- reporting
 - form and venue
 - level of granularity
 - categorical data (i.e., subcategories contributing to the overall score)
 - final score or rating
 - ▶ detailed scale, range, or numeric count
 - ▶ general category rating (e.g., novice, developing, mastery, etc.);
- contesting or correcting results
 - appeal process
 - timeline
 - evidence or documentation requirements
 - authorized individual or roles to approve or deny appeals; and
- allowable uses of the resulting data
 - may or may not trigger specific interventions or professional development
 - may or may not act as prerequisites for other employee opportunities or benefits.

When a high-stakes policy depends on data, engage in an iterative process of policy development in which policymakers and data analysts collaborate to refine operational rules.

When a high-stakes policy depends on data, engage in an iterative process of policy development in which policymakers and data analysts collaborate to refine operational rules. Such an iterative approach reduces risk through the draft/review process and transforms policy from a theory of action to an implementable set of steps that reflect the reality of the data, systems, and organizational capacity.

When a high-stakes policy depends on data, engage in an iterative process of policy development in which policymakers and data analysts collaborate to refine operational rules.

Data Elements and Relationships

Compensation systems that rely on the TSDL generally require multiple student outcomes measures.⁶³ Recent research suggests that in addition to student outcome data in the form of summative assessments, other student outcome data contribute to professional effectiveness as well, including graduation rates, course completion rates, absentee rates (or measures of chronic absence), discipline incident/action data results, and student perceptions of the classroom environment.

⁶³ For more information on multiple measures of teacher effectiveness, refer to the MET Project's report, "Ensuring Fair and Reliable Measures of Effective Teaching" (2013), available at http://metproject.org/downloads/MET_Ensuring_Fair_and_Reliable_Measures_Practitioner_Brief.pdf.



When incorporating these additional student outcome measures, an early consideration must be whether preexisting collections can be leveraged or new collections are required. The portion of the compensation formula based on student outcomes typically uses predictive, value-added techniques or growth percentile based on student cohorts. In order to use these formulas there must be a minimum of two years (or two data points, such as beginning-of-course and end-of-course) of student assessment results data to set a baseline, calculate predicted values, and compare to actual results (or using growth percentile, for comparison to other students in the cohort).

The data set typically requires

- standardized course codes;
- TSDL and dosage or weighting for a teacher's role with a student;
- unique student identifier;
- student data
 - attendance
 - achievement
 - proficiency and/or growth
 - course taking and marks
 - behavior;⁶⁴
- unique teacher identifier;
- teacher data
 - attendance
 - evaluation metrics (i.e., other than student outcomes); and
- timing and sequence of data collection.

Local and State Practices (collection, frequency, quality assurances, use, etc.)

Given the high stakes of using the TSDL for compensation decisions, a formal roster verification process is an essential step in this usage scenario. In this use case a multi-layered roster verification/certification process is recommended to ensure that a teacher, principal (or other supervisor), and district administrator all certify that the roster data are correct (see Chapter 3).

Timing and sequence of data collection also have an impact on data quality and the suitability for making compensation decisions. It is generally not sufficient to collect roster data once a year—best practices suggest that the data reflect daily changes to rosters. This might be a function of source systems (usually the LEA student information systems), or it could be accomplished by longitudinal data systems that capture

⁶⁴ Student outcome data that are not in the form of annual test scores also depend on the TSDL, as well as a weighting or dosage element (the share of instructional time that a teacher spends with a student) applied to the link.



daily snapshots of rosters. The objective is to have more than a single roster snapshot, while still being able to report the percentage of time (or number of days) that a student and teacher were both assigned to the same course section. For example, if a teacher takes a medical leave after 90 academic days of a year-long course (i.e., a course that lasts 180 academic days), and a student enrolled in the school and class on the 60th day of the session, then the weighting of the teacher-student link would be 30 days (the days both student and teacher were assigned to the class).

Business Rules

The business rules for implementing teacher compensation scenarios will define the steps, processing rules, algorithms, and thresholds for calculating the compensation tier or amount of merit award for a teacher. Common business rules for this implementation may require the agency to

- schedule elementary grades by subject or course;
- use reasonability checks to identify possible data quality issues (e.g., attendance data versus schedule data);
- use standardized statewide course identifiers and local section identifiers to uniquely identify course section;
- use statewide unique student identifiers in all systems to support the merging of data from multiple source systems; and
- use statewide unique educator identifiers.

Key Roles

Roles involved in using the TSDL for teacher compensation include

- teachers and other employees eligible for merit awards/compensation;
- principals, supervisors, and district administrators;
- help desk support;
- human resources systems administrators; and
- financial services personnel (e.g., accounting, payroll/compensation clerks, etc.).

Success Factors and Challenges

When using the TSDL to calculate compensation and merit pay, success depends upon stakeholder perception of equitable access to awards. Communication to the stakeholders is critical, and communication with educators in particular should ensure that they



- understand the bonus criteria;
- accept the bonus criteria;
- understand the changes in professional practice that will result in the measured outcomes that improve performance (and, subsequently, bonuses);
- perceive a value in a bonus; and
- perceive there is fairness in the program design.⁶⁵

Technical capacity is also a success factor and includes the implementation of an effective data governance program, the limitations of operational systems, and the effective management of technical processes. Activities that increase stakeholder engagement, such as roster verification, build employee confidence in data quality.

On the technical front, the capacity to track teacher-student data linkages daily, and the ability to weight linkages based on the actual overlap of teacher-days and student-days in a class, will result in a more accurate measure of teacher and student outcome linkages.

Challenges may result from variations in LEA data collection methods, requirements for multiple measures, and any instability in the funding source for merit awards.

Implementation Recommendations

When components of an educator's compensation are based on linked student data, the model and its technical implementation must be sound. Stakeholder buy-in, the perceived value-for-effort, and transparency all depend on the technical details of implementation. It is therefore recommended that the education agency

- formalize the communication and feedback process with key stakeholders;
- formalize the roster verification approval and appeals process;
- pilot the compensation model prior to high-stakes implementation; and
- evaluate the equity of award distribution.

⁶⁵ Adapted from Julie A. Marsh, Matthew G. Springer, Daniel F. McCaffrey, KunYuan, Scott Epstein, Julia Koppich, Nidi Kalra, Catherine DiMartino and Art (Xiao) Peng, "A Big Apple for Educators: New York City's Experiment with Schoolwide Performance Bonuses" (The Rand Corporation, 2011), available at <http://www.rand.org/pubs/monographs/MG1114.html>.



Implementation Considerations for Teacher Compensation ⁶⁶ * Common to all use cases	
Data Governance	
Implement written data governance policies adopted by all relevant organizations.*	
Establish well-defined user access policies.*	
Communicate clear directives for handling of personally identifiable and de-identified data.*	
Define TSDL elements and relationships, secure agreement across stakeholders, and confirm those elements and relationships exist in the available data.*	
Define ownership of data as part of agreements between stakeholders.*	
Establish a process for escalation and resolution of data quality issues.	
Adopt a policy defining key stakeholders and their roles in determining awards.	
Align and comply with all state and federal regulations related to employee rights and compensation.	
Policies and Practices to Support Implementation	
Adopt a data quality audit process.*	
Decide whether current collections can be used (and with what limitations) or if additional data will be needed.*	
Implement a Teacher of Record policy, and separate policies or administrative guidance defining what it means for the teacher and student data to be linked in the context of each use.*	
Adopt policies and practices to support timely updates to scheduling and other data.*	
Adopt policies and practices to support elementary scheduling by subject.*	
Adopt policies that provide timelines for entering and refreshing data.*	
Adopt policies for appropriate use of data.*	
Establish a process for staff to report errors in roster data and for timely correction in source systems.	
Adopt policies that define the model and rules for calculating compensation variations/merit pay.	
Adopt policies and practices that ensure transparency of award criteria.	
Student and Staff Attendance	
Determine what student and staff attendance is needed based on student outcome data used.*	
Determine questions regarding thresholds, dosage, and weighting, etc.	
Formal Roster Verification Process	
Determine what level of roster verification, if any, is required to support the level of data integrity needed.*	
Clearly define, document, and communicate procedures for correcting data.*	
Adopt policies and procedures, including appeals, to verify rosters for high-stakes circumstances.	
Ensure that an LEA administrator has final sign-off on the roster verification to ensure completeness, mediate conflicts, and serve as general check and balance.	

⁶⁶ See Appendix F for a summary matrix of considerations across TSDL uses.



Data Components	
Include data that link both a student and educator to the course section for a specific time period. This may include unique identifiers for students, staff, course, schools, programs, and course section-time period.*	
Determine, based on use, the need for the ability to link students to multiple educators in different roles in any given course section.*	
Establish the ability to link teachers to their professional development history.	
Determine data to support thresholds, dosage, and weighting.	
Include student demographics (subgroups) and program participation if available.	
Business Rules	
Determine the level of transparency, accuracy, etc., critical for high-stakes uses.	
Determine whether to link students to more than one teacher in a course section.	
Systems Requirements	
Determine identification and access needs required to support varying instructional groupings and models (refer to Appendix A: Emerging Learning Systems).*	
Ensure that source systems have the ability to track student movement/transfers on a daily basis.*	
Ensure that required data elements are collected and stored.	
Ensure that systems have the capability and capacity to exchange the data.	
Student Outcome Data (frequency and granularity to support this use case)	
Annual aggregation at teacher-course-section level.	
Frequency of TSDL Data Collection to a Longitudinal Data System	
Send data daily (to capture longitudinal schedule changes).	



Appendix A: Emerging Learning Systems

Note: Similar to the Use Cases section, the following content reviews considerations for implementing the TSDL in the case of Emerging Learning Systems. However, because these learning systems and the application of TSDL to them are still in their infancy, best practices are limited and may change over time.

Emerging instructional systems support individualized, competency-based learning that generally takes place, at least in part, outside the traditional classroom environment. These outside-the-classroom models of instruction often accommodate virtual learning environments in which electronic tools provide all content and assessments, or blended instruction models that incorporate both virtual and more traditional classroom instruction.⁶⁷

These models support an emerging case for capturing teacher-student links in ways that go beyond seat-time. The key difference is the potential need to capture the TSDL in ad hoc/unscheduled teacher-student interactions as opposed to more traditionally scheduled occurrences. Rather than linking teachers and students based on the time they are scheduled to be together in the classroom setting (face-to-face or virtual classroom), this model captures “instruction-points.” For example, a teacher answering a student’s question by email after school hours or during a one-on-one consultation (face-to-face or virtual) may both be recognized as instruction points.

The following are examples of data systems that capture individualized learning “instruction-point” transactions:

- online learning environments or applications that students use in or outside of the classroom that support differentiated or individualized feedback/coaching/assignments by teachers (e.g., flipped classrooms);
- instructional improvement systems and learning management systems that capture not only planned instruction, but also the various interactions between students and teachers (assignments, assessments, scaffolding, diagnosis, feedback);
- social media-like collaborative environments for virtual and blended instruction that capture the teacher-student dialog using modes such as discussion threads, private and group chat/text messaging, virtual meeting spaces, and indexed email communication integrated with a learning management system; and
- integrated systems that track which students were present for a lesson/activity (e.g., via period attendance, near field communication technology [devices that log when a student and teacher are in a room together], or logged on to a virtual environment) and the content of a lesson (e.g., from plan book application that links lessons to learning standards).

⁶⁷ For more information on virtual education refer to the *Forum Guide to Elementary/Secondary Virtual Education*, available at http://nces.ed.gov/forum/pub_2006803.asp.



In considering TSDLs within an individualized instruction scenario, one must first determine how a teacher or teachers are attributed to a student's or students' learning—a policy known as the Teacher(s) of Record (TOR).⁶⁸ This policy decision establishes whether a dynamic collection of instruction points is necessary.

For example, if TOR policy dictates that the school pre-assign a teacher or teachers as being attributed to a student's or students' instruction and learning throughout the course, then the individualized instruction TSDL scenario is essentially no different from more traditional settings; therefore, such fine-grained data may not be necessary. However, if policy requires that the TOR is determined after all instruction occurs, based on actual teacher-student interaction, then such fine-grained instruction-point data may be necessary. In blended learning models, it may be practical to adopt a hybrid TOR policy that considers both scheduled classroom instruction time and online interactions between teachers and students. Accurate and timely collection of instruction-point data assumes there is a very robust, automated, and accurate data system used by disciplined and knowledgeable educators.

Even if instruction-point data are not required for accountability purposes, there can be great value in using more fine-grained data for continuous improvement of teaching and learning. This is especially valuable for optimizing new blended and virtual models since fine-grained interactions between educators and learners may be captured by the online systems. The near-real-time instruction-point data, along with ongoing measurement of student learning, can reveal what kinds of instruction points, with what characteristics, are most effective, and determine the circumstances and students who are most likely to benefit from such programs/instruction points. More frequent and more granular data can tighten the feedback loop for continuous improvement.

In this section, we will only consider individualized instructional systems that support virtual learning and/or blended instruction and are operated by schools whose policies require that teacher-student links be dynamically determined from instruction points (i.e., TOR is determined after all instruction occurs and based on actual student-teacher interaction). We will consider additional system and data requirements necessary to support the collection and management of instruction points. We recognize that collecting very fine-grained and timely instruction points may currently be impractical, unless they are embedded in and stored by virtual learning technologies. In time, with the advent of new and efficient data collection and management technologies, some—if not all—of these conditions may change to allow for the capture of teacher-student interactions in both physical and virtual learning environments.

Governance

Governance over the implementation initiative (and overall agency data governance) is as important for this individualized instruction scenario as for other uses of the TSDL. One possible difference is that the data are more granular, more automated, and used close to the source in this scenario (i.e., at the point of instruction and as a feedback loop for instruction). However, the more granular data may also inform other uses of the TSDL such as professional development planning. Therefore, it may be valuable for the governance body to have representation from all stakeholders. Best practices suggest that the data governance process consider all intended uses of the data and establish program-level data stewards. Although they may have a long-term vision, governance groups might reduce risk by initially starting a scaled-down system that has flexibility to grow.

⁶⁸ See Chapter 3 for more information on Teacher of Record policies.



Governance will need to address the complexities of data, instructional processes, and instructional management that are unlike what generally exists today. To successfully implement such a system, agencies may need to discard older systems incapable of the requisite types of data collection necessary to record instruction points.

While very clear and well-defined objectives must be in place for the near term and long term, an effective governance process will assess (at least every term or three months) where the system is working, where it is not working, and where it needs to go next. One way of formalizing this is to define an implementation scorecard focused first on key process measures (leading indicators) to indicate that the system is working as expected, rather than outcome measures (lagging indicators).

Policies (local and state)

Unless the state sponsors or mandates a statewide individualized learning solution and system, the policy aspects are primarily centered at the local level. Since this type of instructional setting and data collection will probably first occur and be mandated at local sites, policies will likely evolve from the bottom up. Even at the local level the policies will need to be rigorous and very well defined, as evidenced in the business rules in this use case.

State-level policies that relate to linked teacher and student data, such as TOR policies, will need to consider non-traditional, individualized models of instruction. State policies may need to allow alternative TOR definitions as some LEAs or individual schools in the state adopt blended or individualized instructional models, while others remain within a traditional model. Even in non-local-control environments, there will need to be policy flexibility to support the realities of implementing individualized learning systems and new models of instruction while supporting existing schools and systems. Such policies may need to include instructional models in which instruction and student work is conducted entirely with technology.

State policies that define standards for recording teacher-student links dynamically as described will need to have considerable top-down control over policy, and/or over the specifications for the systems and data. This is more likely when the state is providing the service to LEAs, such as states that provide a statewide instructional improvement system (IIS) (e.g., Race to the Top states piloting IIS systems).

Data Elements and Relationships

The typical data elements that apply to the classroom instructional model will generally apply here also.⁶⁹ However, due to the need to collect instruction points, a number of other items may apply. For example, if the use is to determine a teacher's contribution to a student's learning, it may be valuable to collect duration of the "instruction." This duration may be seconds for some types of instruction points, or span hours for other instruction points. However, "duration" might not be as valuable for some types of instruction points as for other uses. For some analysis, it may be more valuable to know an educator's "response time"—the time between the student asking a question and when the teacher responded—or some other measure of response effectiveness.

⁶⁹ See Appendix D for typical structures of the TSDL in the local source system.



Some of the data elements to be included for each instruction-point entity (data record or row) could include the following:

- Teacher ID – preferably LEA and SEA, but definitely LEA. SEA ID could be added later as needed for SEA reporting.
- Student ID – preferably LEA and SEA, but definitely LEA. SEA ID could be added later as needed for SEA reporting.
- Type of instruction point – this would be a code for a specific category such as one-on-one tutoring, e-mail exchange, or virtual classroom.
- Begin and end times of instruction point in hours and minutes (and perhaps seconds for some types of instructional points, such as an instant message response to the student’s online question). Elapsed times and cumulative times can be computed.
- The time equivalent in hours and minutes of asynchronous and often non-verbal instruction points. These could include text messages, e-mails, and voicemails. Pre-recorded lecture/teacher notes are instructional materials and do not qualify.
- The LEA and school context – the LEA and school in which the student was enrolled when this instruction point occurred.
- The course/subject context – the course in which the student was enrolled when this instruction point occurred. This can be very problematic since the student may have an instruction point that is not related to a course, or the student may be enrolled in multiple courses being taught by the same teacher during the same time.
- Learning standards/learning objective(s) – online lessons, tutoring transactions, as well as lessons in a traditional classroom setting may be tagged with the applicable learning standards covered. Some of this may be automated—for example, when a student doing an online exercise asks a question. The activity may be already tagged as teaching one or more learning objectives so the system can tag the instructional point of a teacher’s answer based on the context of the activity.

For any near field communication technology (NFC)—devices that record when a student and teacher are in the same room—there needs to be the capability of manual overrides so the instruction point could be deleted if no instruction occurred, or so that the instruction point could be accurately tagged or categorized to the appropriate course. Likewise, in the social networking environment the instruction point (e.g., postings and email) would need to be tagged or categorized.

Local and State Practices (collection, frequency, quality assurances, use, etc.)

Here the data and the collection processes become much more complex than those required in a traditional classroom environment. If every contact between teacher and student needs to be recognized, categorized, and recorded, a number of technology options can be considered.

NFC is perhaps the most advanced method for recording of instruction points that occur in physical settings. However, a near approximation of that level of precision may be achieved through the practice of recording period-based attendance. In both cases, this is capturing the time the teacher and student are together, not necessarily the teaching and learning context.



Collection of TSDL data may be collected in different ways depending on the setting:

- Within virtual settings the system(s) involved would need to recognize login identifiers and record the amount (time), type of instruction point, and other characteristics of the transaction.
- Scheduling/registration system(s) must be highly integrated with the actual data collection system. The data collection system must know which teacher-student interactions are relevant and to which course to assign them.
- For the classroom part of blended instructional models, if not based on scheduled time or manually entered period attendance data, automated data collection systems may be used such as classrooms equipped with card readers (or RFID devices) and every teacher and student scans their card when entering and leaving the classroom for all scheduled or non-scheduled instruction points, group or individual. One to one computing environments may take advantage of location services built into devices. Integration with teacher planbooks and a simple way for teachers to indicate what instruction actually took place, if different from the planned lesson, may be needed.

Business Rules

Rules for an accountability-based course section assignment (see Chapter 1 for more information on course sections) and/or instances of instruction/learning called instruction points must be defined and operationalized. For example, instruction-point rules may include


- rules that determine when and where instruction points are collected;
- rules that determine how instruction points are recorded and stored; and
- rules that determine how instruction points are interpreted so they can be assigned as instances of instruction between a teacher and student for a quality of time and for the appropriate course, subject, or curricula.

The business rules may define boundaries of what data will be collected to support the intended use. For example, if data are used for funding and/or accountability, a rule might be that only instruction points that involve a student that is registered for a specific course being taught by that teacher and assigned to that teacher for that course will be counted.

The link may use both assignment and responsibility data. Because the TOR for a student can change over time, the system must recognize and manage dates and times at which such changes occur. For example, the system might be designed to only record instruction points between a teacher and student during those times when the teacher is a TOR for that course.

One assumption might be that, while a possibility, recording of every teacher-student interaction is not necessary. The system is only concerned with recording/logging instruction points between a teacher assigned or tasked with the instruction of a student in a specified course. In other words, the concept of a predefined TOR may still be very relevant even in collection of instruction points in blended learning environments.

If a given teacher is predetermined to be the TOR for a student in more than one course at a given period in time, then the teacher may be required to intervene manually at the time the instruction point occurs



in order to assign that instruction point to the appropriate course. In addition, a similar type of manual selection might be valuable to indicate a link to a unit, lesson, or learning standards for the instruction-point transaction. However, the system and process design might consider ways of deriving context and filtering selection options to minimize additional work for the teacher. The business rules may include definitions of when such details are required and when they are optional for an instruction-point record.

Success Factors and Challenges

There is significant dependence placed on the proper configuration and use of the technology used to collect and categorize instruction points. This scenario is not just about introducing a new technology, but also about a significant change in the way the work of teaching and learning is done. Systems designed to support online teaching and learning are capturing data about teacher-student interactions. The challenge is to design the process that makes best use of such systems to support teaching and learning while leveraging, to the greatest extent, data captured by these systems for the TSDL.

Initially the technology may be quite expensive, especially if trying to capture details about face-to-face interactions, and the system components will require seamless integration. Unless this type of system is reduced to just the collection of some reasonable and simple categories of instruction points, it may be impractical to implement within most contemporary schools. The more advanced instruction points would certainly include e-mails, virtual classes, teleconferences, social networking, one-on-one tutoring, and chance meetings. Even e-mails and instant messaging could be challenging because of their asynchronous nature. However, technology that unifies all communication between teachers and students does exist, such as platforms currently being used for delivery of virtual K12 and postsecondary courses.

Implementation

Implementation will likely have greater chances of success for systems that start by capturing a limited number of new instruction-point types. For example, in a blended model the teacher-student link could be captured in two parts:

1. online interactions (e.g., email, chat, virtual collaboration environment) in which both teacher and student interactions are logged; and
2. traditional class schedules and attendance data to represent the classroom instruction points.

Unless the learning system is reduced to just the collection of some reasonable and simple categories of instruction points, it may be impractical to implement within most contemporary schools.

Standards across the domain need to be defined and followed. Although models and data systems for blended and individualized learning are in their infancy, there are already some applicable standards for capturing data about instruction points, the context of instruction, and individualized student learning progressions. For example, the Common Education Data Standards (CEDS) has defined a common vocabulary for such data elements.⁷⁰

⁷⁰ More information on the Common Education Data Standards (CEDS) is available at <https://ceds.ed.gov/>.



Appendix B: Prior Work Related to the Teacher-Student Data Link

The following is a brief summary of some of the prior work related to the TSDL. This implementation guide builds on lessons learned from these and other initiatives.

Teacher-Student Data Link Project – Success Categories

The categories defined by the Center for Education Leadership Technology (CELТ) for the Teacher-Student Data Link Project provide a framework for identifying best practices that lead to a high quality data link.⁷¹

The ten categories are


1. Purpose and Use of a Teacher/Student Data Link;
2. Data Governance Structure;
3. Policies and Definitions for TSDL (e.g., Teacher of Record);
4. Unique Educator Identifier;
5. Courses and Schedules;
6. Daily Attendance/Membership;
7. Assessment and Outcomes Data;
8. Data Linkages, Flow and Integration; and
9. Interagency Data Systems.

Teacher of Record

One of the most important policy questions for implementation of the TSDL is the definition of Teacher of Record (TOR). A framework for defining TOR was developed by CELТ. The following description and tools are available at <http://www.tsdl.org/TORFramework.aspx> and were developed by CELТ for the Teacher-Student Data Link Project:

The Teacher of Record definition framework is the starting point for a dialogue within and between state education agencies (SEA), local education agencies/school districts (LEA), and schools about the purposes, characteristics, and data elements required for effective, reliable teacher-student data links (TSDL). These discussions would include near-term uses of the TSDL, as well as longer-term uses that leverage emerging teaching practices and technologies. The framework provides the structure for a common understanding of the TOR concepts along with the flexibility to customize a TOR definition to reflect a state’s education policies and priorities. The CELТ framework begins with this definitional template: *a Teacher of Record is an “educator” who is responsible for a “specified proportion” of a student’s “learning activities” that are within a “subject or course” and are aligned to “performance measures.”* From this starting point, the SEA, the LEAs or school districts, and individual schools select the appropriate words to replace or modify those in

⁷¹ The Teacher-Student Data Link Project is funded by the Bill & Melinda Gates Foundation.



quotation marks depending on how they intend to use the term. They identify the data elements required to support their specific TOR definition and whether these can be gathered in a cost-effective manner. If the data cannot be gathered to support the definition, the term needs to be redefined.

The Data Quality Campaign, a partner in the Teacher-Student Data Link Project, surveyed states about their TOR policy. Data for Action 2011: DQC's State Analysis found that 25 states reported a statewide TOR definition, including 10 states whose definitions reflect current promising practices (i.e., reflects instruction and is inclusive of multiple educators).⁷²

Current promising practices reflect the recognition that teachers are linked to students for different purposes. Different policy questions and operational uses of the TSDL call for a differentiation between the teacher with primary accountability for a student's learning, teachers partially responsible for student learning, and education professionals that are linked to students for operational purposes. For example, Ohio has adopted a three-part TOR definition:

1. Primary assignment (one teacher): An Assigned Educator is the educator assigned to a student, usually for HQT assignment purposes. In some cases, this translates into the teacher responsible for assigning a grade.
2. Precise accounting of instructional time for teacher-level Value-Added and other evaluation metrics including student growth in non-tested subjects: A Teacher of Record is an educator who is responsible for a significant portion of a student's instructional time (based on enrollment) within a given subject or course that is aligned to state assessments. The relevant Teachers of Record should represent the 100% proportion of a given student's instructional time for a specific subject/course.
3. Multiple linkages: A Contributing Professional works with/has responsibility for a student and/or teacher, and should be specifically linked with relevant students. This is a yes/no flag to allow for simple and non-mutually exclusive linkages. Numerous educators could be linked to a student.⁷³

State accountability policies may determine the need to identify an individual teacher with primary responsibility for a student's learning in a subject area, or to recognize shared responsibility, such as with co-teaching assignments. Arkansas has adopted a two-part definition that recognizes a "Teachers of Record" for accountability and "Contributing Professionals" that provide additional support for student learning:

A **Teacher of Record** is an individual (or individuals in co-teaching assignments) who has been assigned the lead responsibility for a student's instruction in a subject/course with aligned performance measures. AND A **Contributing Professional** is an individual who has been assigned the responsibility to provide additional services that support and increase a student's learning.

⁷² For more information, refer to The Data Quality Campaign's "Analysis of State Promising Practices in Defining Teacher of Record and Linking Teachers and Students," available at <http://bit.ly/Wwo8dd>.

⁷³ Source: Ohio "Teacher/Student Data Linkage" Definitions (2011-12), available at <http://bit.ly/XnumJo>.



In some cases there are multiple state or local policies for accountability, or non-accountability uses of the data. Each use may require different rules for determining the teacher-student link.

School and District Evaluation Using Value-Added Assessment

Value-Added Models use past student performance as a predictor of future achievement and then compare predicted results to actual results. If the results are better than predicted it is assumed that the district, school, and teacher linked to the student “added value.”

Tennessee and Pennsylvania

The Tennessee and Pennsylvania Departments of Education have adopted a variation of the SAS® Inc.’s EVAAS® model (the Tennessee Value Added Assessment System [TVAAS] and Pennsylvania Value Added Assessment System [PVAAS]). The PVAAS webpage (<http://tinyurl.com/cm86eoy>) includes information for districts and schools on the purpose of the PVAAS system, uses of the data, and methods of implementing the system in school districts.

According to the SAS website, the following LEAs also use EVAAS:

- Wake Forest-Rolesville Middle School
- Granville County Schools
- Memphis City Schools
- High Point Central High School
- Hershey Intermediate
- Nashville
- Person County Schools
- Beaufort County Schools

(<http://www.sas.com/govedu/edu/k12/evaas/index.html>)

Los Angeles Unified School District

Los Angeles has released school ratings based on a value-added model developed with Education Strategy Consultants (ESC). A paper about ESC’s value-added methodology is available at <http://static.escmatrix.com.s3.amazonaws.com/ESC+Performance+Matrix+Methodology+Extended.pdf>.

Other Related Resources

The Annenberg Institute for School Reform at Brown University

(<http://www.annenberginstitute.org>) publishes a variety of information related to education reform. Two documents provide particularly helpful information on New York City’s teacher-student links. First, the presentation, “Can NYC Teachers be Evaluated by Student Test Scores? Should They Be?” by Sean P. Corcoran provides an overview of value-added modeling (VAM) and discusses New York City’s Teacher Data Initiative (<http://www.annenberginstitute.org/pdf/CorcoranPPT.pdf>). Second, a 2010 article by Corcoran, “Can Teachers be Evaluated by their Students’ Test Scores? Should They Be? The Use of Value-Added Measures of Teacher Effectiveness in Policy and Practice,” provides a more in-depth discussion of VAM and its use in New York



City; Houston's ASPIRE program is included as a comparative case study (<http://annenberginstitute.org/pdf/valueaddedreport.pdf>). The 2010 paper also contains information on challenges to the practical implementation of VAM, and it provides an example of the teacher report generated by the Teacher Data Initiative.

Guilford County Schools

In South Carolina, Guilford County Schools' Mission Possible program is a pay-for-performance system. Documents for linking students and teachers within the system are provided by SAS, Inc. Information on the process, including a timeline of when documents are sent from SAS, Inc. to schools and teachers for verification, is available in the Mission Possible Data Quality Plan ([http://www1.gcsnc.com/depts/mission_possible/pdf/Mission Possible Data Quality Plan.pdf](http://www1.gcsnc.com/depts/mission_possible/pdf/MissionPossibleDataQualityPlan.pdf)).

Battelle for Kids

Supported by funding from the Bill & Melinda Gates Foundation, Battelle for Kids will make its web-based roster verification solution available to all states and school districts to capture accurate teacher-student data linkage. (<http://www.battelleforkids.org/how-we-help/strategic-measures/data-services-roster-verification>)



Appendix C: Example State Policies Related to the Teacher–Student Data Link

The following are examples of state laws and executive orders adopted in 2011 and 2012 that relate to the TSDL used for teacher evaluation and effectiveness. This information has been adapted from content on the Education Commission of the States website and is up-to-date as of May 2013.⁷⁴ **Emphasis added** to highlight examples of TSDL-related provisions.

NY	Issued 04/2012	Establishes the New NY Education Reform Commission to provide guidance and advice to the governor on education policy, performance, and innovation. Directs the commission to study the best national and international public education models and best practices to recommend ways to increase educational productivity and student performance in the state. Requires that the review include, among other things, studying teacher recruitment and performance, including incentives to keep the best teachers, and the teacher preparation, certification and evaluation systems. <i>http://www.governor.ny.gov/executiveorder/44</i> Title: E.O. No. 44 Source: <i>http://www.governor.ny.gov</i>
TN	Signed into law 04/2012	Directs the department of education to follow through and fulfill its publicly stated plan to provide multiple opportunities for feedback and future revision of the Tennessee Educator Acceleration Model (TEAM). <i>http://www.capitol.tn.gov/Bills/107/Bill/HJR0520.pdf</i> Title: H.J.R. 520 Source: <i>http://www.capitol.tn.gov</i>
ME	Signed into law 04/2012	Requires school administrative units to develop and implement comprehensive performance evaluation and professional growth systems for teachers and principals. Sets forth standards that must be met by the systems, including a requirement that multiple measures of effectiveness must be used in evaluations, that evaluators must be properly trained and that a system must include a process for using information from the evaluation process to inform professional development. The Department of Education is required to adopt rules regarding the requirements of the system. The requirement for development and implementation of the system is phased in with full implementation required in school year 2015-2016. ... Requires the department to collect data on the success and retention of teachers who complete approved teacher preparation programs in the State. ... <i>http://www.mainelegislature.org/legis/bills/bills_125th/chappdfs/PUBLIC635.pdf</i> Title: H.P. 1376 Source: <i>http://www.mainelegislature.org</i>

⁷⁴ For up-to-date policy information, refer to the ECS website, available at *http://bit.ly/YGrVTB*. ECS notes, “Summaries are collected from state Web sites, state newsletters, StateNet, LexisNexis and Westlaw. Descriptions often reflect the content of bills as introduced and may not reflect changes made during the legislative process. To assure that this information reaches you in a timely manner, minimal attention has been paid to style (capitalization, punctuation) or format.”



AZ	Signed into law 04/2012	<p>Requires the State Board to adopt four state performance classifications (highly effective, effective, developing, ineffective) and guidelines for school districts and charter schools for the teacher and principal evaluation instrument by December 1, 2012. Permits periodic adjustments. Requires school districts and charter schools to adopt definitions for the performance classifications in a public meeting and apply the performance classifications to their evaluation instruments by the 2013-14 school year. Requires school boards to adopt policies for principal evaluations by the 2013-14 school year. Determines the term of employment contracts for principals to be 3 years. Directs the school boards to make each principal's evaluation and performance classification available to school districts and charter schools that are inquiring about the principal for hiring purposes. Requires school boards to adopt policies for teacher evaluations by the 2013-14 school year. Requires board to provide incentives to teachers with highest performance classifications to work in schools assigned with letter grades "D" or "F"; to protect for teachers who are transferred to schools that are assigned a letter grade of "D" or "F"; to incentivize teachers in the highest performance classification with multi-year contracts not to exceed three years; and to provide protections for teachers if the principal of the school is designated in the lowest performance classification. ... Requires board to post best practices for the implementation and assessment of principal and teacher evaluation systems on its website on or before September 15, 2012. Chapter 259:</p> <p>http://www.azleg.gov/legtext/50leg/2r/laws/0259.pdf</p> <p>Title: H.B. 2823</p> <p>Source: www.azleg.gov</p>
LA	Signed into law 04/2012	<p>Requires school boards to adopt policies that delegate education in force to local superintendents to dismiss teachers and other employees. Requires reduction in force policies to be based solely upon demand, performance, and effectiveness, as determined by the performance evaluation program. Any reduction in force must dismiss the least effective teacher first, and then proceeding by effectiveness rating. Reduction in force policies adopted by a school board for use by the superintendent in dismissing school employees who are not evaluated must be based upon the following criteria: performance and effectiveness as determined by school board policy; and certification or academic preparation, if applicable. No reduction in force policy adopted by a school board will include seniority or tenure as the primary criterion.</p> <p>http://legiscan.com/LA/text/HB974/id/596556</p> <p>Title: H.B. 974</p> <p>Source: http://legiscan.com</p>
WI	Signed into law 04/2012	<p>Requires that beginning July 1, 2012, each teacher preparatory program in the state submit to the department a list of individuals who have completed the program and who have been recommended by the program for licensure, together with each individual's date of program completion, from each term or semester of the program's most recently completed academic year and sets filing requirements. Also creates an educator effectiveness section (115.415) that applies to all public schools, including charter schools, and whereby 50% of the total evaluation score is based on measures of student performance, including performance on state assessments, district-wide assessments, student learning objectives, school-wide reading at the elementary and middle-school levels, and graduation rates at the high school level. The other 50% of the total evaluation score is based on the extent to which the teacher or principals' practice meets the core teaching standards adopted by the 2011 Interstate Teacher Assessment and Support Consortium. (Act 166)</p> <p>https://docs.legis.wisconsin.gov/2011/related/acts/166</p> <p>Title: S.B. 461</p> <p>Source: https://docs.legis.wisconsin.gov</p>



NY	Signed into law 03/2012	<p>Part A, Section 1: Requires a school district, to be eligible for an apportionment of general support for public schools from the funds appropriated for the 2012-13 school year in excess of the amount apportioned to the district in the base year, to submit documentation, approved by the commissioner of education, demonstrating a plan adopted by the local governing board, and full implementation of new standards and procedures, for conducting annual performance reviews of teachers and principals, including (1) state assessments and other comparable measures comprise 20% or 25% of the evaluation; (2) locally selected measures of student achievement comprise 20% or 15% of the evaluation; (3) subjective measures that meet certain criteria comprise 60% of the evaluation; and (4) a four-tiered scoring rubric. Provides that if such deduction for the 2012-13 school year is greater than the sum of the amounts available for such deductions, the remainder of the deduction must be withheld from payments scheduled to be made to the district for the 2013-14 school year. For New York City, additionally makes receipt of 2012-13 funds in excess of base amount contingent upon submission of documentation, approved by the commissioner of education by January 17, 2013, demonstrating adoption of an expeditious appeals process for teacher and principal annual performance reviews that is consistent with the 2012 amendments to the education law. Chapter 57:</p> <p>http://assembly.state.ny.us/leg/?default_fld=&bn=A09057&term=2011&Summary=Y&Actions=Y&Text=Y</p> <p>Title: A.B. 9057 - Portion of State Funding Contingent on Adoption of Teacher and Principal Evaluation Process</p> <p>Source: assembly.state.ny.us</p>
WV	Signed into law 03/2012	<p>Establishes a new system of performance evaluations of teachers, principals and assistant principals; provides exclusions from the definition of professional personnel for certain evaluation purposes; providing for phased implementation and legislative oversight; requiring state board rules and submissions of draft rules to legislative oversight commission; providing minimum provisions of evaluation processes for teachers and principals and specific percentages of evaluation score to be based on standards and student performance; including plans of improvement and personnel actions for unsatisfactory performance; requiring certain employee training prior to implementation of new evaluation processes; providing intent of new comprehensive system of support; requiring the state board to publish guidelines for county boards on design and implementation of comprehensive system of support; restricting certain funding subject to adoption of comprehensive system plan by county that is verified by state board as meeting certain requirements; specifying contents of plan; and providing for transition of appropriations to support execution of plans and use of funds.</p> <p>http://www.legis.state.wv.us/bill_status/bills_text.cfm?billdoc=HB4236%20SUB%20ENR.htm&yr=2012&sesstype=RS&j=4236</p> <p>Title: H.B. 4236</p> <p>Source: www.legis.state.wv.us</p>
UT	Signed into law 03/2012	<p>Requires each district employee to be evaluated annually in accordance with state board rules. Requires provisional or probationary educators to be evaluated at least twice each school year. Establishes parameters for state board rules, including requiring a teacher's summative evaluation to be based in part on student learning growth or achievement, and directs the state board to report to education interim committee, as requested, on progress in implementing employee evaluations. Permits a local board's joint committee to adopt or adapt an evaluation program for teachers based on a state board-developed model, or create its own evaluation program for teachers. Requires a local evaluation program to differentiate among four levels of performance, and requires districts to fully implement an educator evaluation system in accordance with the state board framework by the 2014–2015 school year. ... Directs the state board to prescribe standards for an independent review of an educator's summative evaluation. Establishes requirements for districts to report educator evaluation results to the state board, and requires such data to be included in the state superintendent's annual report.</p> <p>Pages 1-30 of 35: http://le.utah.gov/~2012/bills/sbillenr/sb0064.pdf</p> <p>Title: S.B. 64 - Educator Evaluation</p> <p>Source: http://le.utah.gov/</p>



TN	Signed into law 03/2012	<p>Requires local boards of education to consider a transferring teacher's evaluations from a prior LEA in making tenure decisions. Allows the local board to shorten the probationary period for a teacher transferring into the LEA under certain circumstances.</p> <p>http://www.capitol.tn.gov/Bills/107/Bill/HB2328.pdf</p> <p>Title: H.B. 2328</p> <p>Source: http://www.capitol.tn.gov</p>
UT	Signed into law 03/2012	<p>From bill summary: Requires the state board of education to establish a three-year pilot online school survey system that includes surveys for students to evaluate their teachers and school administrators; parents to evaluate their children's teachers, schools and administrators, and themselves (including attendance at parent teacher conferences, involvement in the school, and involvement in their children's homework); and teachers to evaluate their schools and school administrators. Requires the state board to contract with a provider or develop a system to provide technology for the pilot online school survey system. Requires a participating district or charter school to administer online student surveys of teachers, make available to parents online access to surveys which they may complete for their children's teachers and schools, and make available to teachers online access to a survey of their school which they may complete. Directs the state board to make rules establishing procedures for administering surveys or making available online access to surveys. Requires the state board to analyze and aggregate the survey data. Provides that survey results must be made available to school districts and school administrators for the purpose of determining how to better meet the needs of students and parents, monitoring school improvement efforts, and obtaining data that may be used as part of an educator evaluation system and to inform decisions on employment and professional development. Makes a one-time appropriation of \$40,000 to the state board of education.</p> <p>http://le.utah.gov/~2012/bills/hbillenr/hb0149.pdf</p> <p>Title: H.B. 149</p> <p>Source: http://le.utah.gov/</p>
WY	Signed into law 03/2012	<p>Requires state board, no later than July 1, 2013, to implement and administer an annual teacher performance evaluation system, based on performance measures and student longitudinal data. Provides the evaluation system will prescribe standards for highly effective and ineffective performance. Provides flexibility for districts to refine system to meet local needs.</p> <p>http://legisweb.state.wy.us/2012/Enroll/SF0057.pdf</p> <p>Title: S.F. 57</p> <p>Source: http://legisweb.state.wy.us</p>
WA	Signed into law 03/2012	<p>Provides a framework for professional development for implementation of new teacher and principal evaluation systems.</p> <p>http://apps.leg.wa.gov/documents/billdocs/2013-14/Pdf/Bills/Senate%20Bills/5895.pdf</p> <p>Title: S.B. 5895</p> <p>Source: apps.leg.wa.gov</p>



SD	Signed into law 03/2012	<p>Provides that beginning in the 2014-2015 school year, any public school district seeking state accreditation must evaluate each certified teacher on an annual basis and each certified principal not less than every other year. Each school district must adopt the model evaluation instrument and procedures for evaluating the performance. (Sec. 38-42)</p> <p>Teacher evaluations require multiple measures of performance as follows:</p> <ul style="list-style-type: none"> o 50% based on quantitative data o 50% based on qualitative data <p>Teacher and Principals evaluations are based on the following four-tier rating system:</p> <ul style="list-style-type: none"> o Distinguished; o Proficient; o Basic; and o Unsatisfactory. <p>Maintains that the procedures for evaluation and the model evaluation instrument referenced in may not be the subject of any collective bargaining agreement between a district and the district's teachers. (Sec. 38-42)</p> <p>Establishes the South Dakota Education Reform Advisory Council to advise upon the implementation of this Act. (Sec. 64)</p> <p><i>http://legis.state.sd.us/sessions/2012/Bills/HB1234ENR.pdf</i></p> <p>Title: H.B. 1234</p> <p>Source: <i>http://legis.state.sd.us</i></p>
CO	Signed into law 02/2012	<p>Senate Bill 10-191, enacted in 2010, requires the general assembly to review and approve the rules adopted by the state board of education implementing a statewide system to evaluate the effectiveness of licensed personnel employed by school districts and boards of cooperative services (statewide system). The bill contains the recommendations of the committee on legal services to approve the rules of the state board of education, department of education, adopted on November 9, 2011, to implement the statewide system. The bill postpones the scheduled expiration of the rules on the statewide system, thereby continuing the rules.</p> <p><i>http://www.leg.state.co.us/clics/clics2012a/csl.nsf/fjsbillcont3/7DA622E1E23231E387257981007F53B2?open&file=1001_ren.pdf</i></p> <p>Link to rules: <i>http://www.cde.state.co.us/EducatorEffectiveness/downloads/rulemaking/1CCR301-87EvaluationofLicensedPersonnel11.9.11.pdf</i></p> <p>Title: H.B. 1001</p> <p>Source: <i>http://www.leg.state.co.us</i></p>
WI	Signed into law 12/2011	<p>Among other provisions, allows use of value-added analyses of scores on the results of examinations administered to pupils to evaluate teachers if the school board has developed a teacher evaluation plan that includes all specified elements. Such analyses, however, may not be used as the sole reason to discharge, suspend, or formally discipline a teacher or as the sole reason for the nonrenewal of a teacher's contract.</p> <p><i>https://docs.legis.wisconsin.gov/2011/related/acts/105</i></p> <p>Title: S.B. 95 - Section 5 (118.225)</p> <p>Source: <i>https://docs.legis.wisconsin.gov</i></p>



MI	Signed into law 07/2011	<p>From Legislative Staff Summary - Specifies provisions that must apply to personnel decisions concerning teachers when a school district or intermediate school district (ISD) conducts a staffing or program reduction or otherwise makes a personnel determination resulting in the elimination of a position, conducts a recall from a reduction, or hires after a reduction.</p> <p>Teacher and Administrator Evaluation: Establishes requirements for the teacher evaluation system, including an annual year-end evaluation and a mid-year progress report, beginning with the 2013-2014 school year. Requires a teacher to be dismissed if he or she is rated as ineffective on three consecutive year-end evaluations. Allows a nonprobationary teacher who is rated as ineffective on a year-end evaluation to request a review of the rating by the district superintendent. Specifies classroom observation requirements. Establishes requirements for the evaluation of school administrators. Requires the dismissal of an administrator who is rated as ineffective on three consecutive year-end evaluations, if the same evaluation tool and system are used in the three evaluations. Requires teachers' and administrators' year-end evaluations to be based at least 25% on student growth and assessment data in 2013-2014, 40% in 2014-2015, and 50% beginning in 2015-2016. Exempts a district from the teacher and administrator evaluation requirements for a public school if the district is already using a performance evaluation system that meets certain criteria, or if it adopts an evaluation system that is identical to that of an exempt school. Requires notification to parents if pupils are assigned to teachers whose last two year-end ratings were ineffective, beginning in 2015-2016.</p> <p>Governor's Council on Educator Effectiveness: Creates the Governor's Council on Educator Effectiveness. Requires the Council, by April 30, 2012, to submit a report that recommends a student growth and assessment tool, State evaluation tools for teachers and administrators, and parameters for effectiveness rating categories. Specifies a legislative intent to enact legislation to put in place a statewide performance evaluation system taking into account the Council's recommendations. <i>http://www.legislature.mi.gov/documents/2011-2012/publicact/htm/2011-PA-0102.htm</i> Title: H.B. 4627 Source: <i>http://www.legislature.mi.gov</i></p>
MN	Signed into law 07/2011	<p>Allows a school board and the exclusive representative of the teachers to develop through joint agreement a teacher evaluation and peer review process, premised on the content of this section, for probationary and continuing contract teachers.</p> <p>Establishes an annual teacher evaluation process that: provides probationary teacher evaluations; establishes a three-year professional review cycle and includes at least one summative evaluation performed by a trained evaluator; is based on professional teaching standards; is coordinated with staff development activities; allows time for peer coaching and teacher evaluation; allows mentoring and induction programs; allows teachers to develop and present a portfolio; requires agreed upon teacher value-added assessment models and state and local measures of student growth, the data from which provide the basis for 35 percent of teacher evaluation results; uses longitudinal data on student engagement and connection and other student outcome measures; requires qualified and trained evaluators to perform summative assessments; gives support to improve the performance of teachers not meeting professional teaching standards; and establishes discipline for a poorly performing teacher who fails to improve.</p> <p>Directs the department, in consultation with teachers and administrators and other education stakeholders to create and publish a teacher evaluation process that complies with the requirements of this section and applies to all teachers without an annual teacher evaluation agreement.</p> <p>Makes this section effective for the 2014-2015 school year and later. (Article 2, Secs 14&19) <i>http://wdoc.house.leg.state.mn.us/leg/LS87/1/HF0026.0.pdf</i> Title: H.F. 26 Source: <i>http://www.house.leg.state.mn.us/</i></p>



OR To Directs the State Board of Education, in consultation with the Teachers Standards and Practices Commission, to adopt statewide core teaching standards to improve student academic growth and learning by assisting school districts in determining the effectiveness of teachers and administrators and improving professional development and classroom and administrative practices.

http://www.leg.state.or.us/11reg/measures/sb0200.dir/sb0290.en.html

Title: S.B. 290

Source: *http://www.leg.state.or.us*

CT Signed Secondary School Reform Act - Delays by two years the implementation of the secondary school reform into law requirements enacted in 2010 that: (1) Increase the minimum number of credits required to graduate from 07/2011 high school; (2) Require school districts to offer students support and alternative ways to meet the new graduation requirements; and (3) Require the State Department of Education (SDE) to develop **end-of-course exams** in various subjects. Eliminates a requirement that the state provide grants to help districts implement the new graduation requirements and instead requires SDE to offer technical assistance to districts wishing to start implementing them. Revises and delays by one year the start of biennial status reports on the implementation of the new graduation requirements. Establishes a task force to address implementation issues arising from enhanced high school graduation requirements.

Teacher Evaluations/Tenure - Moves up the deadline for the State Board of Education (SBE), in consultation with the Performance Evaluation Advisory Council (PEAC), to adopt guidelines for teacher evaluations to July 1, 2012 from July 1, 2013. Requires, for tenure purposes, that teachers whose employing boards enter cooperative arrangements to provide educational services retain their credited service with those boards if their employment is transferred to a committee administering the cooperative arrangement.

Student Success Plan - Requires districts to establish a student success plan for each student starting in grade 6.

School Governance Councils - Exempts boards of education with low-achieving schools that have only a single grade or that already have substantially similar school governance councils from the existing requirement to establish school councils according to the existing law. Reorganizes and clarifies the sequence and contents of required SDE reports on the implementation and effectiveness of school governance councils.

http://www.cga.ct.gov/2011/ACT/Pa/pdf/2011PA-00135-R00HB-06498-PA.pdf

Title: H.B. 6498

Source: *http://www.cga.ct.gov*

IN Signed Establishes an annual staff performance evaluation that categorizes teachers as highly effective, effective, improvement necessary, or ineffective. Allows school corporations to meet requirements for evaluation into law plans by using any of the following models: A plan using master teachers or contracting with an outside 07/2011 vendor for master teachers; the System for Teacher and Student Achievement (TAP); or the Peer Assistance and Review Teacher Evaluation System (PAR). Specifies components that plans must include, such as annual evaluations for all certificated employees; **objective measures of student achievement and growth to significantly inform the evaluation**; rigorous measures of effectiveness, including observations and other performance indicators, and an annual designation of highly effective, effective, improvement necessary or ineffective; an explanation of the recommendations for improvement and the time in which improvement is expected; and **a provision that a teacher who negatively affects student achievement and growth cannot receive a rating of highly effective or effective. Specifies that a teacher rated ineffective or improvement necessary may not receive a raise or increment for the following year. Provides that a student may not be instructed two years in a row by two different teachers who have been rated as ineffective in the year preceding the student's placement in that class if avoidable.** ...

http://www.in.gov/legislative/bills/2011/PDF/FISCAL/SB0001.007.pdf

Full text: *http://www.in.gov/legislative/bills/2011/SE/SE0001.1.html*

Title: S.B. 1—Teachers

Source: *http://www.in.gov/legislative/*



Appendix D: Typical Structure of the TSDL in the Local Source System

Technical Considerations

Many of the uses of the TSDL require linking teachers to student outcomes, such as subject-specific test results. The use of a reference model can provide the relationships for the course section to a state's standard course identifiers. The reference model reflects a promising practice of linking specific learning standards to a course that may not exist in local source systems, but could be added as the data moves from the source system to a reporting system. This more granular context for a course, and related course sections, allows for more precise analysis of student outcomes expected based on the class objectives. For example, instead of comparing a sixth grade math class's results to the aggregate score on a mathematics state test, the comparison can be to the specific strands for the test that were expected to be taught according to the state defined course code and description.

Figure 2 (next page) shows a model structure for data in a typical source system. Source systems may represent some of the data related to the TSDL at a point in time (i.e., the current state). Source operational systems typically use normalized data structures optimized for transactional data; the structure would be different for data in a data warehouse system used for reporting and analytics. The field names in this model represent element names defined by the Common Education Data Standards (CEDS). More information about CEDS, including updates on TSDL data elements, is available at <https://ceds.ed.gov/>.

The key relationships in the structure are the student assignment to a class (i.e., course section) and teacher assignment to the class. The reference model in Figure 2 represents an operational system that would collect change over time in the TSDL with start and end dates for each assignment. The scope of the data for an instance of a class is bounded within a single school year or session. Other data about the staff assignment support uses that require weighting of multiple teacher contributions to a class, such as in co-teaching or classrooms with a lead teacher and an assistant teacher or one or more paraprofessionals. Many of the uses of the TSDL require linking student outcomes (e.g., subject-specific test results) to teachers. The RefCourse table provides the relationships for the course section to the state standard course identifiers.

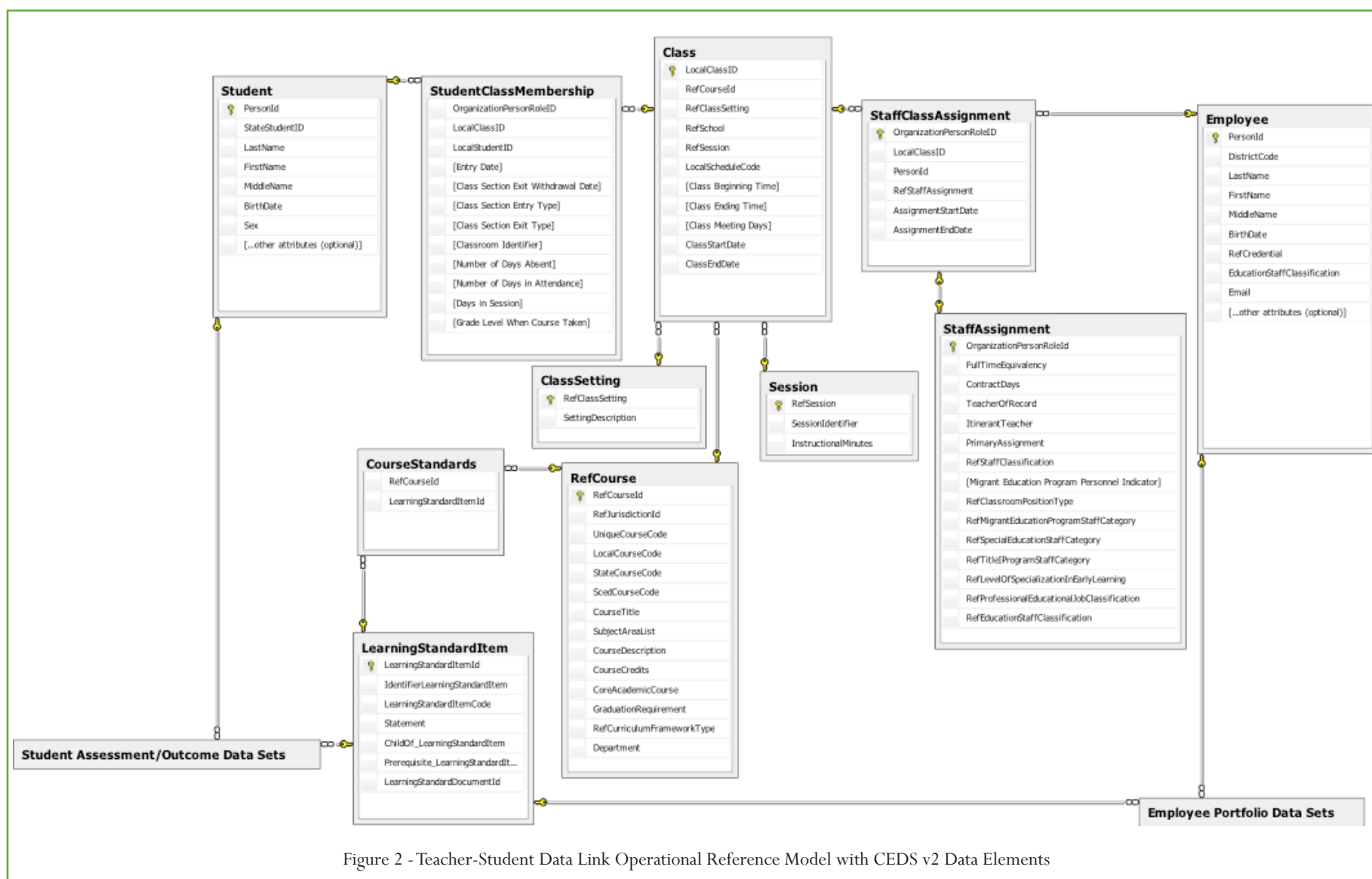


Figure 2 - Teacher-Student Data Link Operational Reference Model with CEDS v2 Data Elements

Figure 3 shows the TSDL as is represented in the CEDS version 3 Normalized Data Schema (NDS). The NDS is designed to support data across the P-20W spectrum—for example, the ability to capture data about one person who is both a teacher and a student in different contexts (e.g., a teacher in a K12 school as well as a student in a professional development program or postsecondary institution).

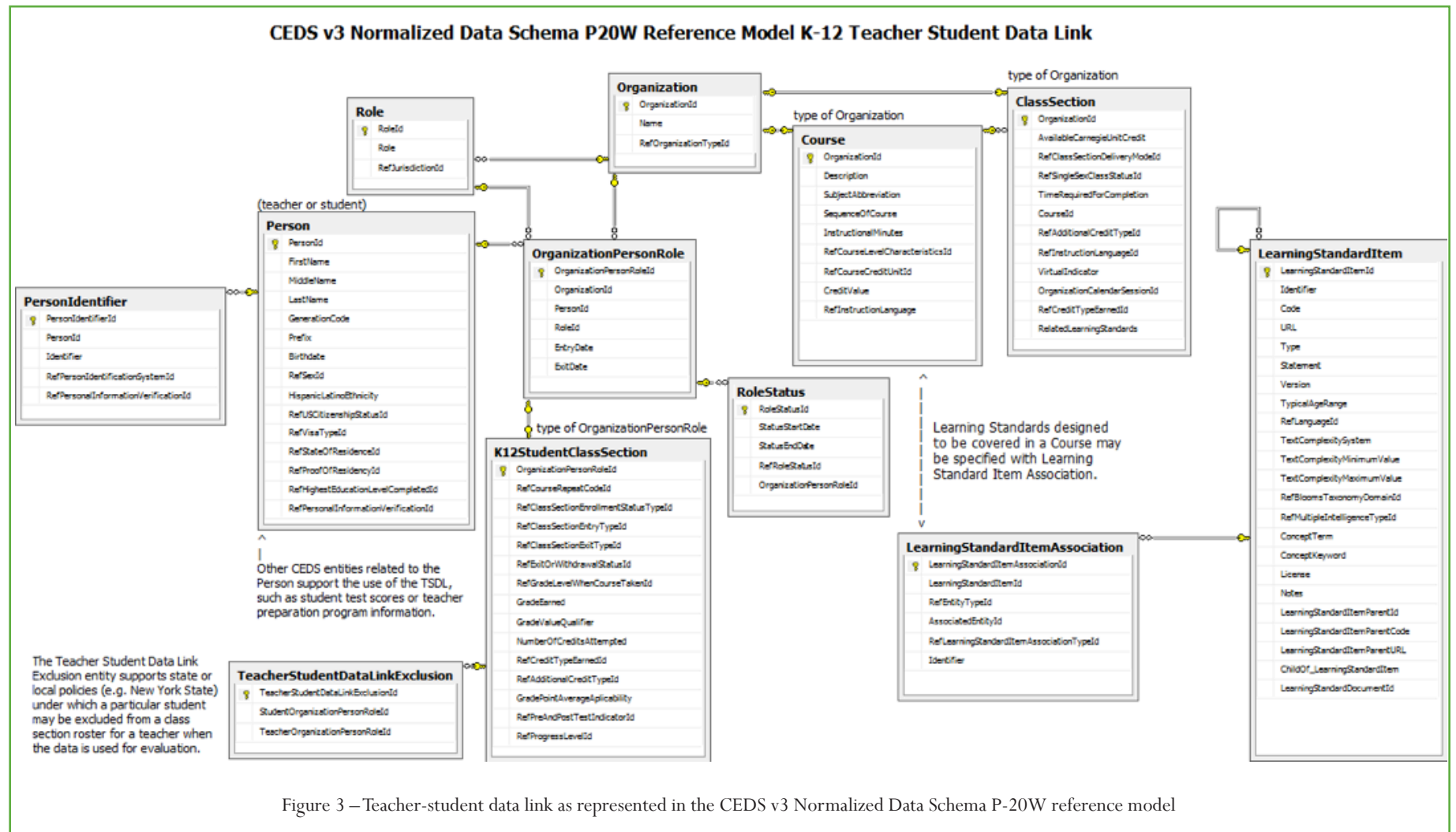


Figure 3 – Teacher-student data link as represented in the CEDS v3 Normalized Data Schema P-20W reference model

Appendix E: Lifecycle of Teacher–Student Data for Student Growth Attribution

Local and state education agencies often use data from multiple systems for reporting (after validating and transforming the data into a database optimized for analytics and reporting). Often this transformation includes denormalizing the data into a dimensional data warehouse model, which simplifies the structure of the data by allowing redundancy. Such a model typically separates the data into facts (numeric, quantitative elements) and conformed dimensions (labels or attributes used to filter and sort), dramatically increasing the usability, flexibility, and performance for ad-hoc analytics.

The path of linked teacher and student data typically moves from a source system into other physical data structures on its way to a data structure optimized for reporting and analytics.

Typical Source SIS -> Normalized/Longitudinal Model/Operational Data Store -> Data Warehouse/Reporting Model

Best practices for the reporting suggest a “star schema” data structure with fact tables representing numeric measures (e.g., student growth), with conformed dimension tables containing attributes by which the fact data are filtered, sorted, and labeled (e.g., school name, teacher identifier, course section identifier). Figure 4 (next page) shows an example of a “star schema” data model that might be used in a dimensional data warehouse.⁷⁵

⁷⁵This example is examined further in the Common Education Data Standards (CEDS) Version 3 Data Model Guide, available at <https://ceds.ed.gov/pdf/ceds-v3-data-model-guide.pdf>.

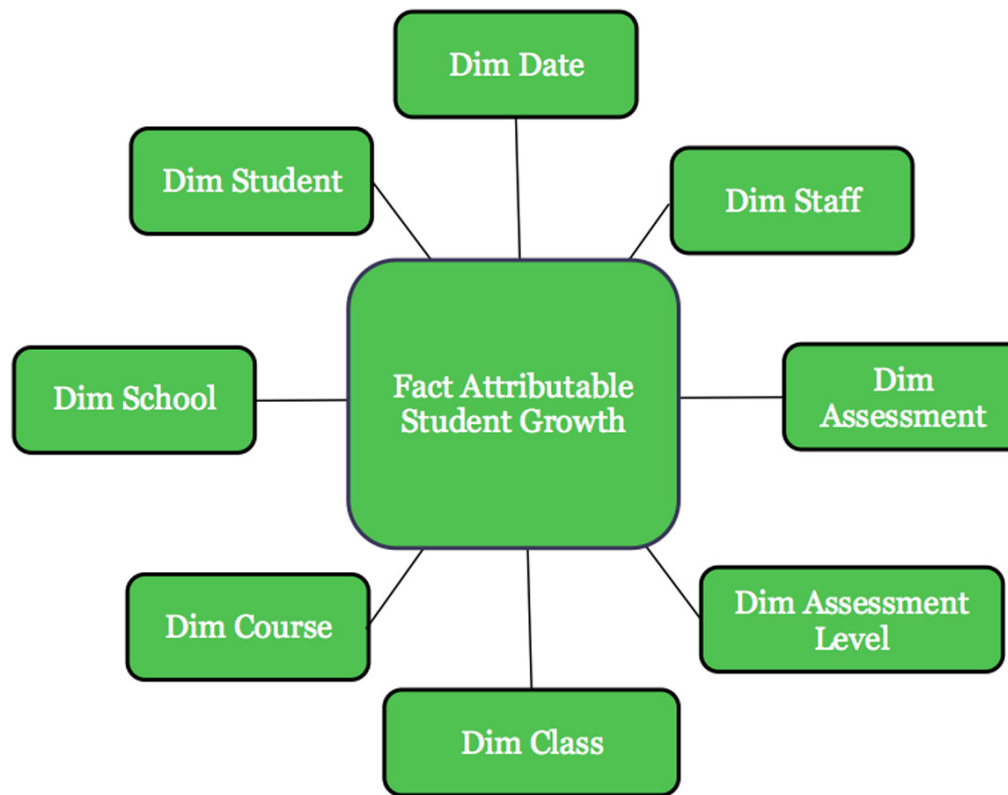


Figure 4 – Student Growth Attribution Dimensional Model from *Teacher-Student Data Link* in *Data Models From Transactional Systems to the Data Warehouse* presentation at NCES Winter Data Conference

(Decker; Goodell; Sonn; 2011, http://nces.ed.gov/whatsnew/conferences/MIS/2011/presentations/VI_A.pdf)

Appendix F: Summary Matrix: Considerations Across TSDL Uses

Considerations								
	Access to Student Data	Research and Analysis	Professional Development	Educator Prep Programs	Teacher Placement	Compliance Reporting	Educator Evaluation	Teacher Compensation
<i>* = common across uses</i>								
Data Governance								
Implement written data governance policies adopted by all relevant organizations.*	X	X	X	X	X	X	X	X
Establish well-defined user access policies.*	X	X	X	X	X	X	X	X
Communicate clear directives for handling of personally identifiable and de-identified data.*	X	X	X	X	X	X	X	X
Define TSDL elements and relationships, secure agreement across stakeholders, and confirm those elements and relationships exist in the available data.*	X	X	X	X	X	X	X	X
Define ownership of data as part of agreements between stakeholders.*	X	X	X	X	X	X	X	X
Define ownership of data as part of agreements between IHEs and K12 agencies.				X				
Involve preparation program leaders in planning and development of policy, including a data governance policy for cross-agency/institution data sharing and use.				X				
Put in place written agreements for all relevant organizations.		X						
Establish clear guidelines for use of disclosure avoidance techniques when micro data are involved.		X						

Considerations								
	Access to Student Data	Research and Analysis	Professional Development	Educator Prep Programs	Teacher Placement	Compliance Reporting	Educator Evaluation	Teacher Compensation
* = common across uses								
Adopt data governance policy at the LEA level, appropriate to LEA size and needs.			X					
Clearly identify and differentiate state-level committee and local-level committee roles. For example, for a state hosted dashboard the state level committee might determine security roles and the LEA would determine the individuals to fill those roles.	X							
Establish committee(s) to guide development of system(s) and data use. Include stakeholder representation in committees.	X							
Include policy and technical components in governance committees.	X							
SEA has a uniform data reporting requirement with LEAs.								
Ensure that the SEA or cross-agency data governance policy adopted by the governing authority, e.g., state board of education.						X		
Ensure that the SEA has put the data governance policy into practice, e.g., a data quality director and data management committee exists and is functioning according to the defined policy.						X		
Ensure that the data governance practice includes implementation of an effective communication plan, e.g., timely public posting of data collection schedules, SEA-LEA communication, issues and resolutions process.						X		
Determine with which relevant organizations there should be written agreements.							X	
Establish guidelines for how the data are collected and how the results are disseminated.							X	
Establish process for escalation and resolution of data quality issues.							X	X
Adopt policy defining key stakeholders and their roles in determining awards.								X

Considerations								
	Access to Student Data	Research and Analysis	Professional Development	Educator Prep Programs	Teacher Placement	Compliance Reporting	Educator Evaluation	Teacher Compensation
* = common across uses								
Align and comply with all state and federal regulations related to employee rights and compensation.								X
Policies and Practices to Support Implementation								
Adopt a data quality audit process.*	X	X	X	X	X	X	X	X
Decide whether current collections can be used (and with what limitations) or if additional data will be needed.*	X	X	X	X	X	X	X	X
Implement a Teacher of Record policy, and separate policies or administrative guidance defining what it means for the teacher and student data to be linked in the context of each use.*	X	X	X	X	X	X	X	X
Adopt policies and practices to support timely updates to scheduling and other data.*	X	X	X	X	X	X	X	X
Adopt policies and practices to support elementary scheduling by subject.*	X	X	X	X	X	X	X	X
Adopt policies that provide timelines for entering and refreshing data.*	X	X	X	X	X	X	X	X
Adopt policies for appropriate use of data.*	X	X	X	X	X	X	X	X
Determine whether to use the same student growth attributions or value-added measures as used for other purposes.				X				
Determine policies describing the articulation of linking the teacher to the prep program.				X				
Clearly communicate limitations of the data to researchers.		X						
Establish separate policies and procedures exist for institutional review boards that may apply to research.		X						
Establish process for staff to report errors in roster data and for timely correction in the source systems.	X		X		X		X	X

Considerations								
	Access to Student Data	Research and Analysis	Professional Development	Educator Prep Programs	Teacher Placement	Compliance Reporting	Educator Evaluation	Teacher Compensation
* = common across uses								
Be aware of policies regarding what autonomy school or district administrators have in assigning teachers and students to particular courses and sections.			X		X			
Adopt policies and practices to support timely updates to schedule data, e.g., policy for timeframe within which formative assessment data are updated in the student information system by school office staff, with accountability and oversight to ensure timely updates.			X					
Determine the methodology (EVAAS, Colorado Growth, etc.), which will guide many business roles related to the link.							X	
Adopt policies that define the model and rules for calculating compensation variations/merit pay.								X
Adopt policies and practices that ensure transparency of award criteria.								X
Student and Staff Attendance								
Determine what student and staff attendance is needed based on student outcome data used.*	X	X	X	X	X	X	X	X
Determine questions regarding thresholds, dosage, weighting, etc.		X		X			X	X
Ensure that attendance data are of sufficient granularity and frequency to be able to link teachers to particular units of instruction within a given course and section.			X					
Determine if attendance data are needed, e.g., to set thresholds for including/excluding or making adjustments when calculating student growth attribution.					X			
Formal Roster Verification Process								
Determine what level of roster verification, if any, is required to support the level of data integrity needed.*	X	X	X	X	X	X	X	X
Clearly define, document, and communicate procedures for correcting data.*	X	X	X	X	X	X	X	X

Considerations								
	Access to Student Data	Research and Analysis	Professional Development	Educator Prep Programs	Teacher Placement	Compliance Reporting	Educator Evaluation	Teacher Compensation
* = common across uses								
Adopt policies and procedures, including appeals, to verify rosters for high-stakes circumstances.							X	X
Ensure that an LEA administrator has final sign-off on the roster verification to mediate conflicts, ensure completeness, and serve as general check and balance.							X	X
Data Components								
Include data that link both a student and educator to the course section for a specific time period. This may include unique identifiers for students, staff, course, schools, programs, and course section time period.*	X	X	X	X	X	X	X	X
Determine, based on use, the need for the ability to link students to multiple educators in different roles in any given course section.*	X	X	X	X	X	X	X	X
Ensure that teacher certification areas are matched to teacher class schedules.				X				
Develop rules for attributing a teacher to a particular teacher prep program.				X				
Establish that the research project and supporting agency has fully identified all elements and relationships that are dependent on TSDLs.		X						
Establish the ability to link assessment data to individual teachers; this could include formative and interim assessments.			X		X			
Establish the ability to link teachers to their professional development history.							X	
Consider establishing the ability to link teachers to their professional development history.			X					
Consider including student demographics (subgroups) and program participation if available.							X	
Include student demographics (subgroups) and program participation if available.			X		X			X

Considerations								
	Access to Student Data	Research and Analysis	Professional Development	Educator Prep Programs	Teacher Placement	Compliance Reporting	Educator Evaluation	Teacher Compensation
* = common across uses								
Determine the data elements required by federal and state reporting requirements.						X		
Determine data to support thresholds, dosage, and weighting.							X	X
Business Rules								
Develop rules for a metric for teachers in classes that are tested in state testing.				X				
Develop rules for a metric for teachers in classes that are not part of state testing.				X				
Develop rules for system of record based on data governance/master data management policies.				X				
Determine whether to link students to more than one teacher in a course section.	X			X	X	X	X	X
Ensure that relevant policy and research questions have been addressed by business rules.		X						
Verify that business rules can be implemented with existing data.		X						
Determine the research purposes needed to link multiple educators to students.		X						
Ensure that all instructors are tied to particular students for particular content areas.			X					
Determine the comprehensive professional development needs in collaborative learning environments.			X					
Define rules for matching all instructors tied to particular students for particular content areas.					X			
Determine if there is administrator approval before permissions are provided to student data.	X							
Determine if the Common Education Data Standards were used as a guideline.	X							

Considerations								
	Access to Student Data	Research and Analysis	Professional Development	Educator Prep Programs	Teacher Placement	Compliance Reporting	Educator Evaluation	Teacher Compensation
* = common across uses								
Develop a complete set of business rules for LEAs defining when and how students and teachers are linked in the data, (e.g., minimum thresholds, data element definitions and acceptable values, and various exceptions). Rules should be constrained by policies, such as a Teacher of Record policy, and include scenarios such as co-teaching.						X		
Establish business rules for non-traditional cases (virtual, etc.).							X	
Consider adding business rules for subjects not assessed.							X	
Consider adding dosage language.							X	
Determine the level of transparency, accuracy, etc., critical for high-stakes uses.								X
Systems Requirements								
Determine identification and access needs required to support varying instructional groupings and models (refer to Appendix A: Emerging Learning Systems).*	X	X	X	X	X	X	X	X
Ensure that source systems have the ability to track student movement/transfers on a daily basis.*	X	X	X	X	X	X	X	X
Ensure that the source system can support elementary scheduling.				X				
If it is necessary to gather data from multiple systems (certification data, student data, HR data), develop technical specifications for the data extraction, transformation, and loading into a longitudinal data system.				X				
Develop technical specifications (and implementation plans as needed) detailing how a new or existing system will manage, and report the TSDL data to support program feedback and evaluation.				X				
Establish the ability to identify the necessary common elements across multiple source systems.		X						

Considerations								
	Access to Student Data	Research and Analysis	Professional Development	Educator Prep Programs	Teacher Placement	Compliance Reporting	Educator Evaluation	Teacher Compensation
* = common across uses								
Determine which identifiers are necessary to answer the research or policy question(s).		X						
Establish the capacity to provide views of teacher-level student growth history to principals or other relevant administrators.			X		X			
Ensure the capacity to display menu of professional development options linked to areas targeted by the data to teachers, principals, or others involved in assigning/selecting professional development.			X					
Ensure that districts are prepared to submit data in a standard format.	X					X		
Ensure flexibility for the systems to use local fields.	X							
Ensure that LEAs collect the required fields in source data systems or have a process for a crosswalk/conversion prior to submission.						X		
Establish ability to link more than one educator to a student.							X	
Ensure that required data elements are collected and stored.								X
Ensure that systems have the capability and capacity to exchange the data.								X
Student Outcome Data (frequency and granularity to support this use case)								
Determine whether annual student outcome data are sufficient for an annual assessment of teacher prep programs.				X				
Determine the level of the student outcome data needed to support the research question(s).		X						
Determine the needed frequency (once per year or more) and number of longitudinal data points needed to support the research questions, e.g., some questions may require multiple years of annual student assessment results for growth and trend analysis.		X						

Considerations								
	Access to Student Data	Research and Analysis	Professional Development	Educator Prep Programs	Teacher Placement	Compliance Reporting	Educator Evaluation	Teacher Compensation
* = common across uses								
Ensure that item-level data are collected multiple times per year for targeted professional development.			X					
At a minimum, collect summative teacher-level data on student growth prior to beginning of school year; preferably more frequently if teacher placement decisions occur more than once a year, ideally using multiple years of data.			X					
Ensure that teachers receive more frequent, necessary professional development based on student outcomes, and that the professional development is targeted to correct for teacher placement.			X					
Collect item-level data per year for placements.					X			
At a minimum, collect summative teacher-level data on student growth prior to beginning of school year, and ideally data from multiple years.					X			
Determine which data are needed on a daily basis.	X							
Determine which data are to be provided by the state and LEA and on what schedule.	X							
Determine the data elements required across all federal and state reporting requirements.						X		
Student outcome data will depend on the methodology being employed. SEA assessment data will likely only be collected once a year.							X	
Teacher effectiveness measures using formative assessment data may be collected more frequently, and would require data systems capable of updating as necessary.							X	
Annual aggregation at teacher-course-section level.								X

Considerations								
<p>* = common across uses</p> <p>Frequency ofTSDL Data Collection to a Longitudinal Data System</p>	Access to Student Data	Research and Analysis	Professional Development	Educator Prep Programs	Teacher Placement	Compliance Reporting	Educator Evaluation	Teacher Compensation
	Daily (to capture longitudinal schedule changes)	Determine based on the research and analysis questions.	Annual or more frequently (local use)	Annual	Annual or more frequently (local use)	In conjunction with SEA reporting requirement	Daily (to capture longitudinal schedule changes)	Daily (to capture longitudinal schedule changes)

(1) Assumes SLDS to support both state and local uses. Even though some LEAs have longitudinal data systems (LDS), most or all states have LEAs without the capacity to maintain an LDS.

(2) *Annual certification of scheduled rosters*: a formal process in which teachers and principals review annually the data collected about students enrolled in each course section, teaching assignments for each course section, and any longitudinal changes to student enrollments and teacher assignments during the year/session. In such a process, teachers and school administrators make corrections that are reflected in the source system and then certify the data as accurate to the best of their knowledge. The process includes steps to correct data errors with appropriate checks and balances. The certified data set includes data at a granularity to report students enrolled and teachers assigned to the course section on any given day. (Some roster verification processes only capture end-of-year *estimates* of the percentage of time during the session/year that a teacher and student have been linked. This may be suitable for some uses, but certification daily longitudinal schedule data is preferred for high-stakes use.)



Appendix G: Referenced Federal Legislation

America Competes Act

Section 6401(e)(2)(D)

(D) REQUIRED ELEMENTS OF A STATEWIDE P-16 EDUCATION DATA SYSTEM- The State shall ensure that the statewide P-16 education data system includes the following elements:

(i) PRESCHOOL THROUGH GRADE 12 EDUCATION AND POSTSECONDARY EDUCATION- With respect to preschool through grade 12 education and postsecondary education—

- (I) a unique statewide student identifier that does not permit a student to be individually identified by users of the system;
- (II) student-level enrollment, demographic, and program participation information;
- (III) student-level information about the points at which students exit, transfer in, transfer out, drop out, or complete P-16 education programs;
- (IV) the capacity to communicate with higher education data systems; and
- (V) a State data audit system assessing data quality, validity, and reliability.

(ii) PRESCHOOL THROUGH GRADE 12 EDUCATION With respect to preschool through grade 12 education—

- (I) yearly test records of individual students with respect to assessments under section 1111(b) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 6311(b));
- (II) information on students not tested by grade and subject;
- (III) a teacher identifier system with the ability to match teachers to students;**
- (IV) student-level transcript information, including information on courses completed and grades earned; and
- (V) student-level college readiness test scores.

(iii) POSTSECONDARY EDUCATION- With respect to postsecondary education, data that provide—

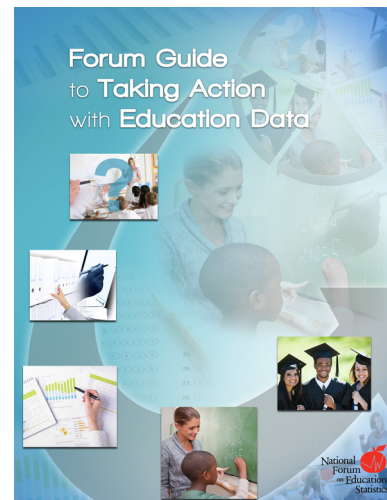
- (I) information regarding the extent to which students transition successfully from secondary school to postsecondary education, including whether students enroll in remedial coursework; and
- (II) other information determined necessary to address alignment and adequate preparation for success in postsecondary education.

Appendix H: Related Resources

Forum Guide to Supporting Data Access for Researchers: A State Education Agency Perspective (SEA) (2013)

http://nces.ed.gov/forum/pub_2013801.asp

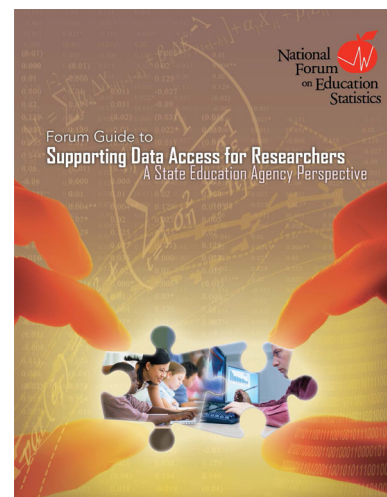
The Forum Guide to Taking Action with Education Data provides stakeholders with practical information about the knowledge, skills, and abilities needed to more effectively access, interpret, and use education data to inform action. The document includes an overview of the evolving nature of data use, basic data use concepts, and a list of skills necessary for effectively using data. The Guide recommends a question-driven approach to data use, in which the following questions can help guide readers who need to use data to take action: What do I want to know? What data might be relevant? How will I access relevant data? What skills and tools do I need to analyze the data? What do the data tell me? What are my conclusions? What will I do? What effects did my actions have? What are my next steps? The Briefs that accompany the Introduction are written for three key education audiences: Educators, School and District Leaders, and State Program Staff.



Forum Guide to Supporting Data Access for Researchers: A State Education Agency Perspective (SEA) (2012)

http://nces.ed.gov/forum/pub_2012809.asp

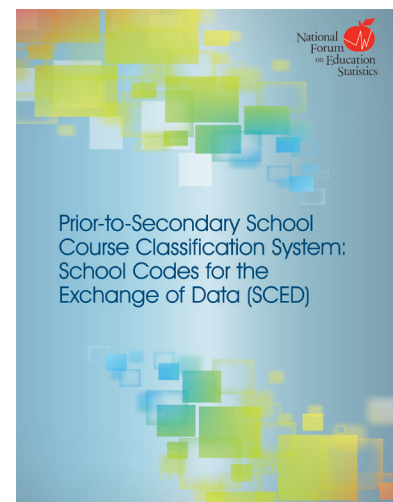
The Forum Guide to Supporting Data Access for Researchers: A State Education Agency Perspective recommends policies, practices, and templates that can be adopted and adapted by SEAs as they consider how to most effectively respond to requests for data about the education enterprise, including data maintained in longitudinal data systems. These recommendations reflect sound principles for managing the flow of data requests, establishing response priorities, monitoring appropriate use, protecting privacy, and ensuring that research efforts are beneficial to the education agency as well as the research community.



Prior-to-Secondary School Course Classification System: School Codes for the Exchange of Data (SCED) (2011)

http://nces.ed.gov/forum/pub_2011801.asp

This document presents a taxonomy for assigning standard codes to elementary and middle school courses. It is intended to make it easier for school districts and states to maintain longitudinal student records electronically—and to transmit coursetaking information from one student information system to another, from one school district to another, and from a school district to a state department of education.



Traveling Through Time: The Forum Guide to Longitudinal Data Systems (Series)

Book I: What is an LDS? (2010)

http://nces.ed.gov/forum/pub_2010805.asp

Book II: Planning and Developing an LDS (2011)

http://nces.ed.gov/forum/pub_2011804.asp

Book III: Effectively Managing LDS Data (2011)

http://nces.ed.gov/forum/pub_2011805.asp

Book IV: Advanced LDS Usage (2011)

http://nces.ed.gov/forum/pub_2011802.asp



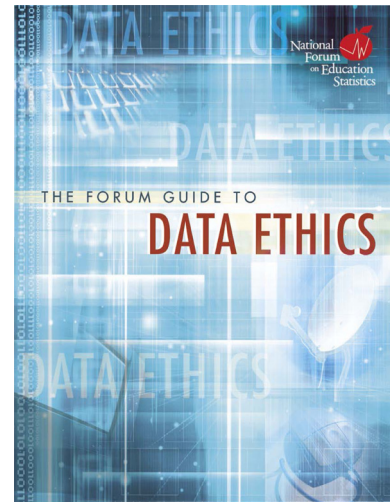
Longitudinal data systems (LDSs) are increasingly becoming the state of the art in education data. An LDS makes it possible to not only monitor the success of individual students, but also to identify trends in those students' education records. These systems provide powerful and timely insights about students and allow educators to tailor instruction to better meet individual needs. They can also reveal with great clarity the effects our policies, programs, and decisions have on schools. The Traveling Through Time series is intended to help state and local education agencies meet the many challenges involved in developing robust systems, populating them with quality data, and using this new information to improve the education system. The series introduces important topics, offers best practices, and directs the reader to additional resources related to LDS planning, development, management, and use.



The Forum Guide to Data Ethics (2010)

http://nces.ed.gov/forum/pub_2010801.asp

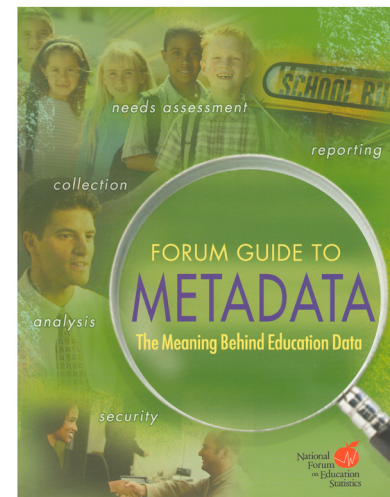
While laws set the legal parameters that govern data use, ethics establish fundamental principles of “right and wrong” that are critical to the appropriate management and use of education data in the technology age. This guide reflects the experience and judgment of seasoned data managers; while there is no mandate to follow these principles, the authors hope that the contents will prove a useful reference to others in their work.



Forum Guide to Metadata: The Meaning Behind Education Data (2009)

http://nces.ed.gov/forum/pub_2009805.asp

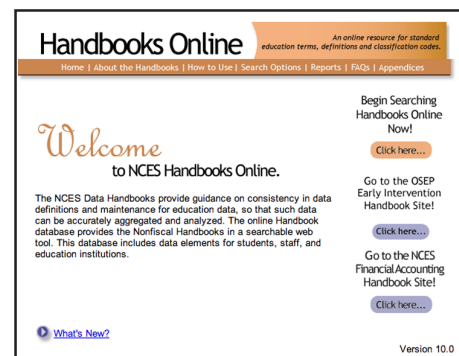
This document offers best practice concepts, definitions, implementation strategies, and templates/tools for an audience of data, technology, and program staff in state and local education agencies. It is hoped that this resource will improve this audience’s awareness and understanding of metadata and, subsequently, the quality of the data in the systems they maintain.



NCES Nonfiscal Data Handbook for Early Childhood, Elementary, and Secondary Education (2007)

http://nces.ed.gov/forum/pub_2003419.asp

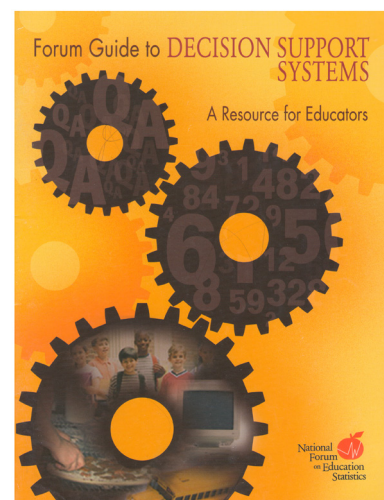
The NCES Handbooks define standard education terms for students, staff, schools, local education agencies, intermediate education agencies, and state education agencies. They are intended to serve as reference documents for public and private organizations (including education institutions and early childhood centers), as well as education researchers and other users of data.



Forum Guide to Decision Support Systems: A Resource for Educators (2006)

http://nces.ed.gov/forum/pub_2006807.asp

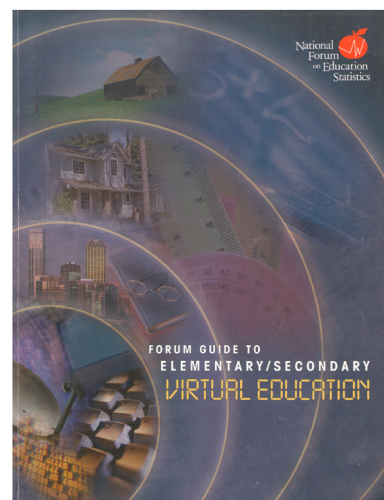
This document was developed to remedy the lack of reliable, objective information available to the education community about decision support systems. It is intended to help readers better understand what decision support systems are, how they are configured, how they operate, and how they might be developed and implemented in an education setting.



Forum Guide to Elementary/Secondary Virtual Education (2006)

http://nces.ed.gov/forum/pub_2006803.asp

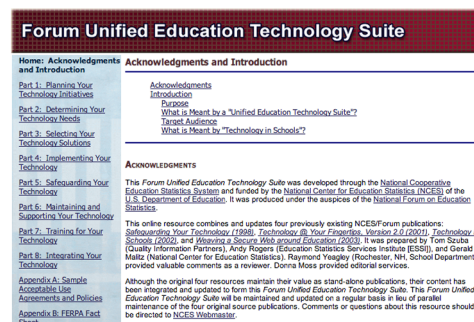
This guide provides recommendations for collecting accurate, comparable, and useful data about virtual education in an elementary/secondary education setting.



Forum Unified Education Technology Suite

http://nces.ed.gov/forum/pub_tech_suite.asp

The Forum Unified Education Technology Suite presents a practical, comprehensive, and tested approach to assessing, acquiring, instituting, managing, securing, and using technology in education settings. It will also help individuals who lack extensive experience with technology to develop a better understanding of the terminology, concepts, and fundamental issues influencing technology acquisition and implementation decisions.

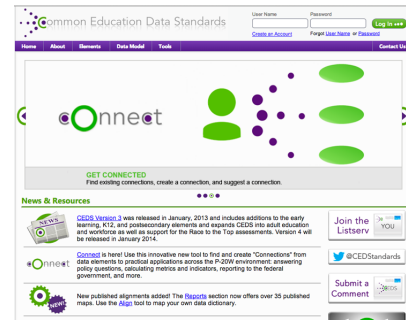




Common Education Data Standards (CEDS)

<https://ceds.ed.gov/>

The Common Education Data Standards (CEDS) is a specified set of the most commonly used education data elements to support the effective exchange of data within and across states, as students transition between educational sectors and levels, and for federal reporting. This common vocabulary enables more consistent and comparable data to be used throughout all education levels and sectors necessary to support improved student achievement. CEDS is a voluntary effort that increases data interoperability, portability, and comparability across states, districts, and higher education organizations.





References and Resources

Aaronson, D., Barrow, L., and Sander, W. (2007). *Teachers and Student Achievement in the Chicago Public High Schools*. *Journal of Labor Economics*, 25(1): 95-135.

This research report is useful for its description of the methodology of matching teachers to students. Student records, classroom scheduling data, and teacher records are all considered, and the method of developing unique teacher identifiers is discussed.

Baker, E.L., Barton, P.E. Darling-Hammond, L., Haertel, E., Ladd, H.F., Linn, R.L. Ravitch, D., Rothstein, R., Shavelson, R.J., and Shepard, L.A. (2010). *Problems with the Use of Student Test Scores to Evaluate Teachers*. [Briefing Paper No. 278]. Washington, DC: Economic Policy Institute.

This paper reviews detrimental effects of using student standardized test scores as a means of teacher evaluation, including problems with VAM. Of interest to this proposal is the section entitled “Practical Limitations,” which reviews problems of attribution; that is, linking students appropriately with teachers and attributing student growth fairly and accurately.

Battelle for Kids. (2011, April 4). *LAUSD Academic Growth Over Time Frequently Asked Questions*. Retrieved September 8, 2011, from LAUSD Academic Growth Over Time: <http://static.battelleforkids.org/images/LAUSD/LAUSDFAQs-041511.pdf>.

Blank, R.K. (2010). *State Growth Models for School Accountability: Progress on Developing and Reporting Measures of Student Growth*. Washington, DC: Council of Chief State School Officers.


This review of states’ use of growth models includes information that reflects back on the implementation of student-educator data links. The paper reports the results of a survey of accountability directors from all 50 states. Survey questions asked about the defined purpose of the growth model, issues or problems encountered with the growth model, whether or not growth data were reported, and if so, for whom the data were intended.

Board on Testing and Assessment, National Research Council. (2009). *Letter Report to the U.S. Department of Education on the Race to the Top Fund*. Washington, DC: National Academy of Sciences.

In this letter, the Board on Testing and Assessment of the National Research Council expresses support for data systems that can link students and teachers, but cautions against growth models as part of evaluations.

Glazerman, S., Loeb, S., Goldhaber, D., Staiger, D., Raudenbush, S., and Whitehurst, G. (2010). *Evaluating Teachers: The Important Role of Value-Added*. Brown Center on Education Policy. Washington, DC: Brookings Institution.

While this article does not discuss teacher-student links, it may be useful for determining appropriate uses of the link with regard to teacher evaluations.



Jerald, C.D., Haycock, K., and Wilkins, A. (2009). *Fighting for Quality and Equality, Too: How State Policymakers can Ensure the Drive to Improve Teacher Quality Doesn't Just Trickle Down to Poor and Minority Children*. Washington, DC: The Education Trust.

This report advocates for data systems that include student-educator links as part of ten measures to improve teacher quality and equity. It calls for local officials to undertake roster verification. Student-educator links are only briefly addressed in this report.

Marsh, B. J., Springer, M. G., McCaffrey, D. F., Yuan, K., Epstein, S., Koppich, J., et al. (2011). *A Big Apple for Educators*. Retrieved December 5, 2011, from [www.rand.org](http://www.rand.org/pubs/monographs/MG1114.html): <http://www.rand.org/pubs/monographs/MG1114.html>.

McDonald, S., Andal, J., Brown, K., and Schneider, B. (2007). *Getting the Evidence for Evidence-Based Initiatives: How the Midwest States use Data Systems to Improve Education Processes and Outcomes*. Issues & Answers Report, REL 2007-No. 016. Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Midwest.

This report explains the role of teacher-student links within the larger discussion of longitudinal data systems. Many of the challenges and constraints discussed apply to the Forum proposal, including states' struggles with analytic capacity, staff and resource constraints, data burden, and compliance with FERPA regulations.

National Association of State Boards of Education. (2005). *Evaluating Value-Added: Findings and Recommendations from the NASBE Study Group on Value-Added Assessments*. Arlington, VA: National Association of State Boards of Education.

Although focused on VAM, this report nevertheless provides useful information for states considering implementing student-educator links. Information is provided on programs in Tennessee, Louisiana, Ohio, and Pennsylvania. The report includes a list of recommendations for uses of VAM that, unlike many such lists, is not focused solely on high-stakes teacher evaluations. Of particular relevance is Chapter 3, which discusses implementation issues.

Pfeiffer, J., Klein, S., and Levesque, K. (2009). *Leveraging ARRA Funding for Developing Comprehensive State Longitudinal Data Systems*. Berkeley, CA: MPR Associates, Inc.

This paper provides guidance to states interested in developing their statewide longitudinal data systems, with information targeted to states pursuing federal funding for these systems. It provides information on developing student and teacher identifiers, as well as matching teachers and students in data systems.

Rose, S. (2010). *Pay for Performance Proposals in Race to the Top Round II Applications*. Briefing Memo. Denver, CO: Education Commission of the States.

For each state that applied for Round II of Race to the Top, this brief addresses reforms that include teacher incentives for performance as well as the percentage of teacher evaluations that will be based on student growth measures.

The Teacher-Student Data Link Project, CELT. (2011). *TSDL Data Model*. Retrieved November 29, 2011, from TSDL.org: <http://www.tsdl.org/DataModel3.aspx>.