

Appendix A

Methodology

SEDL researchers examined existing state data to assess their usability for conducting research on fiscal and staff instructional resources; student performance; and student, school, and district characteristics. The five states in SEDL's region (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas) were prospective sites for the study. SEDL contacted the state departments of education in all five states to invite them to participate. Four of the five states agreed to participate; Oklahoma declined. In New Mexico, organizational changes at the New Mexico Public Education Department prevented a timely transfer of sample data for analysis. Due to the variability between state data, we conducted data analyses separately within each state. We also considered the state-specific policy concerns regarding the instructional resource allocation questions of interest to this study by consulting with state education agency officials in each state and assessing how state data have been used to inform policy in these states.

Purpose of the Study and Research Question

For this study, we addressed the question "Do state databases allow the investigation of the relationship between fiscal and staff instructional resources and student performance?" We examined state data in participating study states to discern whether these data supported new, rigorous research about resources and student performance. In order to assess the capacity of existing state data to conduct such research, we (a) identified the key variables within fiscal and staff instructional resources; student performance; and student, school, and district characteristics; (b) developed criteria to assess the usability of these data; and (c) applied these criteria to identify resource allocation questions that can be answered with state data. We also

examined whether commonalities exist in these data across the study states. Five major research activities guided this work, as described below and summarized in Table A1.

Initial Data Identification and Examination

We identified and examined data from state departments of education that measure instructional expenditures; staff characteristics; student performance; and student, school, and district characteristics. We focused attention on data available during a 4-year study period (1999–2003) and used public information sources such as online data descriptions and reports to determine what databases and types of measures were available in each study state. We communicated with state data managers through telephone, e-mail, and face-to-face visits to gain detailed descriptions of databases and definitions of relevant variables. Table A2 provides a list of fiscal, staff, and other measures we used to narrow the range of variables to investigate. We found that each state’s data varied with regard to the variables available, units of measure, and level of aggregation.

Policy Research Needs on Resource Allocation

We conducted an assessment of state data utilization in the four study states to determine the extent to which these data have been used to support resource allocation decision making (see chapter 2 of this report). We identified reports and research studies that used state data on education resources through Web searches, discussions with state policymakers, and searches of relevant databases, such as the Education Resources Information Center (ERIC). We also engaged state policy audiences in discussions at SEDL’s 2003 policy forum and in face-to-face discussions during data collection visits to identify specific policy concerns. Based on these activities and findings from our initial identification of relevant resource allocation variables in state databases, we identified a subset of policy questions to consider for this investigation.

Table A1

Summary of Research Activities

Activity	Description	Objective
1. Identify relevant existing databases and data variables of interest	Researchers reviewed public information sources about existing databases and relevant variables.	<ul style="list-style-type: none"> • Identify existing databases of interest for this study. • Confirm that fiscal, staffing, performance, and demographic data are available in state databases.
	Researchers conducted phone interviews and face-to-face visits with representatives of <ul style="list-style-type: none"> • state departments of education • related state agencies (e.g., teacher certification) 	Collect initial information on relevant variables, including <ul style="list-style-type: none"> • description of variables (level of analysis, longitudinal data, etc.) • definitions of variables (changes in longitudinal data, calculated variables, etc.) • information about supplemental sources of data • measurement of study variable not available in state data sets (e.g., estimating class size)
2. Identify policy research questions about resource allocation	Researchers assessed how state data have been used to support resource allocation decisions.	<ul style="list-style-type: none"> • Identify policy issues that have already been addressed with the support of state data in each of the study states. • Understand the need for additional policy analysis using state education data.
	Researchers facilitated discussion at SEDL's policy forum with representatives from <ul style="list-style-type: none"> • state departments of education • related state agencies (e.g., teacher certification) • state legislature • governor's office 	<ul style="list-style-type: none"> • Identify policy concerns related to instructional resource allocation in each study state. • Establish whether instructional resource, student performance, and demographic data have already been analyzed by researchers or policy audiences. • Discuss upcoming policy challenges and ways that state data could inform them.
3. Assemble data and determine usability of data for policy research	Researchers applied established criteria to assembled data and analyzed data using descriptive statistics.	<ul style="list-style-type: none"> • Assemble data variables relevant to the resource allocation policy questions. • Determine initial usability of data. • Assess data for appropriateness for more sophisticated data analysis.
4. Determine data capacity for supporting new rigorous instructional resource allocation research	Researchers considered the usability of data and research needs.	<ul style="list-style-type: none"> • Assess to what extent existing state data can be used to answer instructional resource allocation questions and what questions could be answered if data were improved.

5. Disseminate findings to policy audiences	Researchers are disseminating findings in written reports and discussions at meetings convened with policy audiences in each of the study states.	<ul style="list-style-type: none">• Present findings and assessment of the type and scope of research that can be conducted to answer the instructional resource allocation questions.• Get feedback on implications for state policy decision making.• Raise awareness of how data can contribute to instructional resource allocation decisions.• Discuss possible uses of information, including improving data management systems, prioritizing policy issues/areas related to instructional resources, and conducting new research on instructional resource allocation.
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Table A2

Study Variables and Data Sources

Major Variable Category	Variable Descriptions	Data Sources
Fiscal expenditures	<p>Operation expenditures for activities dealing with the interaction between teachers and students:</p> <ul style="list-style-type: none"> • function, program, and object expenditures related to instruction, instructional staff support, and student support • payments from all funds for salaries, employee benefits, supplies, materials, and contractual services 	State departments of education data disaggregated to the lowest level of detail possible
Instructional resources	<p>Data variables related to teachers, aides, and administrators that include information:</p> <ul style="list-style-type: none"> • reflected as head counts, full-time equivalency counts, and ratios (e.g., pupil:teacher, teacher:administrator) • about classroom assignment (e.g., subject area and grade level) • on teacher characteristics (e.g., teacher experience, certification, and education type/degree level) 	State departments of education and other supplemental state data disaggregated to the lowest level of detail possible
Student performance	<ul style="list-style-type: none"> • Data from state achievement tests (norm- and criterion-referenced tests administered by state) 	State departments of education
Student, school, and district characteristics	<p>Exogenous characteristics that describe the students, schools, and districts:</p> <ul style="list-style-type: none"> • student socioeconomic status • student race/ethnicity • school size • district size • district wealth • locale • family income • parental education • social services available 	State departments of education

Determine Usability of Data for Policy Research

Once we identified data and refined and prioritized a list of variables for each state, we examined and determined their usability on a range of criteria (Table A3). The following three activities informed the data usability assessment:

1. We discussed databases with state data managers in order to gauge availability, accessibility, completeness, accuracy, consistency, and alignment.
2. We examined data elements, focusing on completeness, accuracy, consistency, and alignment.
3. We identified those data elements that were usable for further analysis and used descriptive statistics (frequencies, means, ranges, etc.) to gauge variability of data elements, show the level of disaggregation possible, determine if units of measure can be modified to fit specific analysis needs (e.g., staff full-time equivalency [FTE] counts vs. head counts), and discern whether missing data can be calculated or imputed. We also identified related variables that would align fiscal, staffing, performance, and demographic data.

We considered the results from our examination of education data in the study states to determine how they can be used to conduct new rigorous research about instructional resources, student performance, and demographic characteristics. For example, if instructional resources cannot be aligned with student performance data, researchers are limited in methods of answering the question of whether instructional inputs influence student achievement. We applied our knowledge about state data (e.g., variability of data points, levels of disaggregation, and availability of longitudinal data) to determine whether informative statistical approaches could be applied to these data (cohort analysis, longitudinal study, etc.). We also gained insights

about how state data can be improved to better address the goal of supporting instructional resource allocation research.

Table A3

Data Usability Criteria

Criterion	Indicators	Information Source
Availability and accessibility	Do sufficient data exist to measure instructional resources, student performance, and demographic characteristics at a useful level of analysis?	• Codebooks and/or visual examination of data points
	Do data reflect current (2002–2003) measures? Are data contained in accessible formats? Do state policies regarding confidentiality balance privacy concerns and need for access?	• Discussion with state data managers
	Are data complete? Do data measure all levels of the education system (classroom, school, district, and state)?	• Codebooks and/or visual examination of data points • Examination using descriptive statistics (frequency, ranges)
Completeness	Has completeness been maintained through standardized data collection procedures?	• Discussion with state data managers
	Do data accurately measure intended variables?	• Codebooks and/or visual examination of data points • Examination using descriptive statistics (frequency, ranges)
Accuracy	Has accuracy been maintained through data cleaning, editing, calculations, and storage?	• Discussion with state data managers
	Is consistency evident among student-, school-, and district-level data? Do data reflect uniform use of definitions? Are data consistent over time so that comparisons can be made longitudinally?	• Codebooks and/or visual examination of data points • Examination using descriptive statistics (frequency, ranges)
Consistency	Has consistency been maintained through uniform reporting procedures?	• Discussion with state data managers
	Are there common data elements that can link fiscal, staffing, performance, and demographic data systems? Do data identify each record unit by all standardized identifiers that apply to the unit (e.g., do school-level data elements contain the school name, state ID for the school, and district ID for the school)?	• Codebooks and/or visual examination of data points • Examination using descriptive statistics (frequency, ranges)
Alignment		

Dissemination of Study Findings

These findings are of importance to state and local education decision makers, education researchers, and data managers in each of the study states. We will disseminate findings through written reports, summary policy papers, and meetings with targeted audiences in the four study states.

Limitations of this Study

A number of limitations impacted this study. Resource, performance, and demographic data are collected by school districts and managed by state data managers. We could not fully account for the validity and reliability of these data from diverse district-level recording methods and other sources of data such as teacher certification applications and test scoring entities. States continually make changes and additions to their data systems; consequently, a point-in-time assessment of data capacity is useful for only a short time, after which updates are required. Finally, the time and capacity of data managers and other staff to assist data users varied widely from state to state. State education agency procedures for responding to data requests varied widely, ranging from formal procedures to informal practices to lack of capacity to provide data.