DOCUMENT RESUME

ED 449 186 TM 032 294

AUTHOR Reichardt, Robert
TITLE The State's Role in Supporting Data-Driven Decision-Making: A View of Wyoming.
INSTITUTION Mid-Continent Research for Education and Learning, Aurora, CO.
SPONS AGENCY Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE 2000-12-00
NOTE 33p.
CONTRACT RJ96006101
AVAILABLE FROM Mid-continent Research for Education and Learning, 2550 S. Parker Road, Suite 500, Aurora, CO 80014. Tel: 303-337-0990; Fax: 303-337-3005; e-mail: info@mcrel.org; Web site: http://www.mcrel.org.
PUB TYPE Reports - Research (143)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Administrators; *Data Analysis; *Decision Making; *Educational Policy; Elementary Secondary Education; Evaluation Methods; Interviews; State Programs
IDENTIFIERS *Wyoming

ABSTRACT

This study: (1) examined the role of state policies and programs in facilitating and encouraging the use of data in decision-making at the school and district levels across the state of Wyoming; and (2) identifies ways in which the state can increase and improve the use of data-driven decision-making (DDDM) in districts and schools. The study methodology was a combination of a literature review and semistructured interviews with officials at the state and district levels. Three clear roles for states in DDDM emerge from the literature and the interviews: (1) creating a policy structure to support and encourage DDDM; (2) provision of data; and (3) building capacity to use data. Data must be placed in context to have meaning. One way to do this is to compare results with predetermined expectations such as standards, and another is to compare a school or district with other similar schools or districts. The third source of context is to examine a school's or district's performance over time. Wyoming has an extensive policy structure for supporting DDDM. The state assessment system provides data for schools to discuss, and the accreditation program and its required school improvement plans provide incentives for schools to examine data. Some potential areas for DDDM action are outlined. (Contains 1 figure, 1 table, and 26 references.) Appendix A is an annotated bibliography of DDDM Resources. (SLD)

The State's Role in Supporting Data-Driven Decision-Making:

A View of Wyoming

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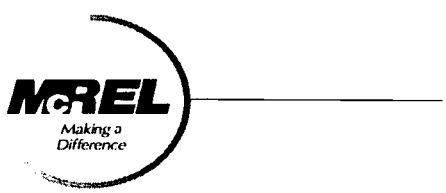
REL Contract #96006101
2000 Deliverable #00-10

Submitted to
Office of Educational Research and Improvement
U.S. Department of Education

by

Robert Reichardt, PhD



Mid-continent Research for Education and Learning
2550 S. Parker Road, Suite 500
Aurora, CO 80014
(303) 337-0990 – (303) 337-3005 fax

December 2000

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Mid-continent Research for Education and Learning
2550 South Parker Road, Suite 500
Parker, CO 80014-1678
Tel: 303-337-0990
Fax: 303-337-3005
Web site: www.mcrel.org
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Published by Mid-continent Research for Education and Learning, a private nonprofit corporation.

This publication is based on work sponsored, wholly or in part, by the Office of Educational Research and Improvement (OERI), U.S. Department of Education, under Contract Number RJ96006101. The content of this publication does not necessarily reflect the views of OERI, the U.S. Department of Education, or any other agency of the U.S. Government.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

This report could not have been written without the enthusiastic participation of Wyoming state and district officials. Their willingness to share with me the inner workings of their programs is gratefully acknowledged. I am also very grateful for Becky Van Buhler's able assistance in completing the annotated bibliography, and Mya Martin's administrative support. Thanks are extended to the following persons at McREL for reviewing the document and providing valuable suggestions: Helen Apthorp, Mariam Manley, Ravay Snow-Renner, Nancy Sanders, and Lou Cicchinelli.

APPENDIX A:
Annotated Bibliography of DDDM Resources

This bibliography is intended to serve as an introduction to resources available on DDDM. It is not an exhaustive list, and the presence of a item on this list should not be considered an endorsement.

Bernhardt, V.L. (1998). ***Data analysis for comprehensive school improvement.*** **Larchmont, NY: Eye on Education.**

This book takes a systems approach to assisting schools in seeing the usefulness of data, identifying and gathering the right kind of data, how to analyze and use data to support comprehensive school improvement. The author suggests beginning this process by considering some "getting started questions" to clarify the school's purpose. There are four types of measures which a school should gather and analyze including demographic data, perception data, student learning, and school processes. In order to get a truly comprehensive picture of the learning environment these measures should be looked at together. How do they interact with each other? The book describes ten levels of data analysis and the steps in problem identification and problem solving. Everyone should be included in the process to a certain extent to ensure that staff members will be open and willing to identifying the problems and implementing solutions. The book includes several sample questionnaires for teachers, students, and parents. In addition, the book includes suggestions for designing your own questionnaire, interview, or other data collection instrument. Also included were helpful worksheets that help guide you through this process.

Bernhardt, V.L. (2000). ***Designing and using databases for school improvement.*** **Larchmont, NY: Eye On Education.**

A student-based database includes who the students are (demographics), what they are experiencing (school processes), what their perceptions are, and what they know (achievement results). In order to collect the appropriate data needs analysis should be conducted. After data is collected and is entered into a database the next step is to transform that data into useful information. There are four categories of analysis which that should be examined: (1) overview (How well are we doing?), (2) examine (Are all students succeeding?), (3) predict (Can we identify students who are at risk of failing?), and (4) prevent (What do we need to do differently?).

Education Commission of the States. (August, 2000). ***Informing practices and improving results with data-driven decisions.*** **Denver, CO: Author.**

This report describes the data-driven decision process in seven steps: (1) goal and issue identification, (2) indicator selection, (3) data collection and analysis, (4) dissemination and dialogue, (5) action planning and implementation, (6) progress monitoring and documentation, and (7) continuous improvement. The most important question to guide a school team in deciding what data to collect is "What is the purpose of the school?" In addition, several other issues need to be considered before deciding what data to collect. These include how well the

data will address the issues being looked at, the usefulness of the data, the quality of the data, the validity and reliability of the data, and the actual feasibility of collecting the data. After collecting the data, the school team can begin its analysis. Disaggregating data can reveal issues that otherwise would not be detected. In addition, tracking cohorts over time can lead to identifying trends for a particular group. It is very helpful to look at standardized test data by quartiles. Bernhardt's classification of data analysis is referred to in this book. Group analysis processes are suggested for engaging stakeholders in the process and to increase understanding for the data. The next step is to develop a comprehensive action plan that includes the seven elements: goals, activities, responsible parties, costs, timeliness, progress indicators, and progress documentation. Data collection should be continued to monitor the effects of the actions that were implemented. School teams should follow the same data-driven process annually.

Johnson, J.H. (1996). *Data-driven school improvement.* Eugene, OR: Oregon School Study Council.

This report describes several types of data that are useful in school improvement. There are data that already exists such as archival data. This existing data provides a baseline as well as a picture of a school's current status. There are also conventional sources of data obtained from individuals including survey data, observations, and interviews. This data comes directly from students as opposed to school records. Lastly, there are inventive sources of data. This refers to assessment of student outcomes including such things as portfolios, project exhibits, and expositions. In addition, data could include performance appraisals of educators such as looking at instructional units and presentations by the teacher. To determine the whether data are useful one should keep in mind: who are the decision-makers, what decisions are they going to make, in what form do they want the information to assist them in the decision-making process, and when do they want the information. To look at patterns and trends data should be disaggregated by ways such as grade, race, socio-economic status. It is suggested that some kind of analysis software be used to help provide an effective way to organize, analyze, and present the data.

Johnson, R.J. (1996). *Setting our sights: Measuring equity in school change.* Los Angeles, CA: The Achievement Council.

This book stresses that reform efforts should be targeted at all students with specific attention to equity issues. The approach to change described in this book is a whole-systems approach. Building a leadership team or data team is the first step. The team should be trained and willing to make and maintain a commitment to communicate and build a consensus around the change process. This team is responsible for defining the questions that will determine what and how to use the data. Dissatisfaction with the current situation that becomes apparent in the data and the analyses will drive the reform process. Before an action plan is developed key participants should revisit their vision and revise it to fit and guide their efforts. Lastly, a plan to monitor progress should be developed and put into place at the school. Baseline data should be established and data should be gathered at consistent times in order to monitor progress over time. The type of data that needs to be collected is determined by what the questions or concerns are. Types of data that could be collected are numeric data like test scores and grades and descriptive data such as instructional approaches or classroom observation data. The authors suggest that data users seek technical assistance to help them with recording the information so it

can be organized and analyzed appropriately and accurately. In addition, it is suggested that three kinds of evidence should be collected about whatever it is that is being looked at in order to provide more comprehensive data. The data that are collected should be disaggregated by race, ethnicity, gender, or socioeconomic status. Instruments are included to help guide this process.

Leithwood, K., & Aitken, R. (1995) ***Making schools smarter: A system for monitoring school and district progress.*** **Thousand Oaks, CA: Corwin Press.**

This book describes how to create a monitoring system in which "regularly collected information (can) be transmitted into courses of action." This system emphasizes strategic planning, accountability, and school restructuring. The system also defines the learning organization to include schools and districts. Furthermore, the learning organization is defined as "a group of people pursuing common purposes (and individual purposes as well) with a collective commitment to regularly weighing the value of those purposes, modifying them when that makes sense, and continuously developing more effective and efficient ways of accomplishing these purposes (p. 6). The monitoring system is based on five components, which include inputs, district and school processes, and immediate and long-term outcomes. Survey instruments are included to collect information in each of these five areas of the monitoring system. These include questionnaires relating to district characteristics and conditions, questionnaires about school characteristics and conditions, and a questionnaire on student participation and engagement. An understanding of sampling issues is imperative before distributing the surveys to a representative sample. The authors suggest data users seek expert consultation to determine the appropriate analysis. The author suggests cross-tabulating data to look at interactions or doing multiple regression analyses. Other statistical analyses are encouraged but not discussed any further.

Levesque, K., Bradby, D., Rossi, K., & Teitelbaum, P. (1998). ***At your fingertips: Using everyday data to improve schools.*** **Berkeley, CA: MPR Associates.**

This attractive book describes six steps in developing a performance indicator system. They are: (1) establish goals, (2) identify related outcomes, practices, and inputs (3) determine data sources and indicators, (4) examine the data, (5) set performance targets, and (6) monitor performance over time. Establishing an improvement team is highly recommended to lead this process. Useful data describes things such as students, staff, curriculum, instruction, school climate, and parent and community members. Raw data should be turned into indicator statistics (i.e., percentages). The author suggests contacting a person with statistical experience to help organize, analyze, and interpret the data if necessary. In addition, the author suggests using computer software such as a statistical program or spreadsheet. Some analyses that are explained in the book include examining the distribution of the data, examining the differences between subgroups based on demographics and educational experiences to identify any trend or difference in the data, examining relationships among outcome, practice, and input data. Lastly, data should be presented effectively utilizing tables, charts, graphs, or scatter-plots. In order to monitor progress toward the performance indicators data needs to be collected on an ongoing basis. Several factors should be considered when figuring out a schedule to collect data such as the availability of the data, the quality of the data, how the data will be used, whether it is timed with local decision-making, and what the expected time frame is for reaching the performance

targets. In addition, it is important to revisit the six steps about once a year in order to make any necessary changes. The book includes a variety of worksheets to help guide you through the six steps.

Love, N. (2000). ***Using data-getting results: Collaborative inquiry for school-based mathematics and science reform.*** **Cambridge, MA: Regional Alliance at TERC.**

The detailed workbook is "about inquiry as it applies to mathematics and science reform." Once a team has identified a question for inquiry the next step is to decide what data should be collected that will help answer the question. Three important considerations to remember when collecting data are validity, reliability, and feasibility. Furthermore, you should use two or three independent sources of data for information about the same question or problem. The person who analyzes the data will need to be familiar with basic statistics. Several analysis techniques are recommended including dis-aggregation, examination of trends over time, and examination of student cohorts. Lastly, before making quick conclusions about the data, the team should engage in "data-driven dialogue" with key stakeholders such as staff, parents, and school board members. The book describes eight different uses of data.

McCary, M., McColskey, W., & Peel, J. (1997). ***Using accountability as a lever for changing the culture of schools: Examining district strategies.*** **Greensboro, NC: SERVE.**

This report describes a school district's process to developing a more locally owned accountability and self-assessment plan. To begin with the district added indicators to the state accountability plan that were more meaningful and in alignment with their goals and values. The indicators were grouped into the following six categories: (1) expanded student achievement outcomes, (2) community involvement, (3) parent involvement, (4) teacher professional development, (5) quality work designed by teachers, and (6) school climate. District leaders played an important role in communicating these to schools by visiting and meeting with school staff. A district-wide committee of teachers was established to participate in decision-making around technology and professional development funds. In addition, the superintendent modeled action research and recruited volunteer teachers to be part of this process. Evaluating progress is done through informal sources of information from site visits, meeting observations and feedback from teachers and administrators. In addition, formal evaluations are also utilized and conducted by the district's Director of Research and Testing. Furthermore, the district encouraged teacher and student self-evaluation. Included in the report are rubrics and evaluation forms to measure communication skills instruction and a senior project presentation.

McLean, J.E. (1995). ***Improving education through action research: A guide for administrators and teachers.*** **Thousand Oaks, CA: Corwin Press.**

This short book describes action research as "the process of systematically evaluating the consequences of educational decisions and adjusting practice to maximize effectiveness" (p. 3). There are three phases to action research: conceptualization, implementation, and interpretation. During the conceptualization stage the research is determined by looking at the inputs and the expected outcomes. The implementation phase involves three steps, (1) measurement of outcomes, (2) identifying a standard of comparison , and (3) comparing current performance

with the standard. The final phase of action research, interpretation, involves making a judgment about whether the practice that is the focus of the study is effective. The author stresses that action research can be implemented at any level in the education system (classroom, school, and district). To make the task of comparing current performance with a standard (such as a previous class) the author suggests using an analysis software package. Using an example of an action research project, data are presented and directions are provided about what kind of analyses might be conducted and how to do them using the statistical packages that were suggested. However, the data user would need to be familiar with statistical concepts and measures especially if they were to use other tools to organize and analyze their data than what was presented in the book.

Wagner, M., Fiester, L., Reisner, E., Murphy D., & Golan, S. (1997). ***Making information work for you: A guide for collecting good information and using it to improve comprehensive strategies for children, families, and communities.*** **U.S. Department of Education.**

This guide follows five stages in conducting an evaluation. The first is to identify goals and objectives for your comprehensive strategy and use them to guide continuous evaluation. The second stage is to spell out the chain of assumptions connecting activities to goals. The third stage is to select indicators of results. The fourth stage is to then set up a system for managing information. The final stage is to analyze the information and use what you learn.
Sources of information include both qualitative and quantitative data. This information can pertain to children and families, activities and services, staff and other resources, collaborative partners, and community perceptions. Included in the guide is An Evaluator's Tool Kit.

Wahlstrom, D. (1999). ***Using data to improve student achievement: A handbook for collecting, organizing, analyzing, and using data.***

This handbook uses a four-step model for using data to improve student achievement: collect, organize, analyze, and use. Data are organized into three groups: outcomes, demographics, and process data. Data are viewed as the center of the change process. When interpreting data one should examine at least three different indicators to get a complete picture. Data users should be able to transform raw scores into other scores such as percentile scores, scaled scores, percent correct scores, mean scores, median and mode scores, percent passing scores, relationship between school/district mean and percent passing scores, range of scores, stanines, grade equivalent scores, and gain scores. To determine whether there is learning for all students, data should be disaggregated. After the data analysis, it is helpful to use visual tools to present the data. Examples in this book include statistical graphs, graphic organizers, charts and tables, time displays, and flowcharts. This book includes a list of questions to ask and data indicators for reading, writing, science, and mathematics to consider that will help determine what kind of data to collect and analyze. In addition, a needs assessment and a teacher culture survey are included. Lastly, it includes a template for a data-based school improvement plan.

Provision of Data

Wyoming is taking clear, positive steps towards improving the utility of the data it controls. These actions include creating a consolidated web site for information on submitting data, and designing District Profiles and Uniform Reports that will provide data on districts and schools on the web when implemented. The actions already taken should be applauded and planned actions supported. Future actions should include:

1. Conversations with districts about whether formats used for electronic data submissions could also be useful to districts for DDDM.

2. Provision of additional data, preferably on the web. This additional data includes school level reports that are similar to District Profiles, additional variables reported in both these profiles, and provision of the raw data to allow districts to do their own cross-district analysis.

3. Provision of additional contextual information in the District Profiles. Possible ways to provide this information would be with flags similar to those used in the Uniform Report and/or by allowing users to select similar districts and provide easy comparisons.

Capacity for Data-Driven Decision Making

While the state does not bear the sole responsibility for building district capacity for DDDM, it can take a leadership role in helping smaller districts understand and articulate their needs for outside technical assistance. The key capacity issue facing many smaller districts is they cannot support the administrative time needed to acquire and maintain the technical expertise necessary to implement DDDM. Two possible methods of addressing this need are suggested. One is to create a grant program to help districts better articulate their needs, either by supporting a group of districts working together in coming to consensus on their needs, or supporting an outside service provider as it works with districts to create a slate of services that could be purchased by districts. An alternative to consider is the creation of a state-wide web-based data system that would manage the data and provide easy to use analysis for teachers and administrators.

EXECUTIVE SUMMARY

The purpose of this report is to examine the role of state policies and programs in facilitating and encouraging the use of data in decision-making at the school and district level across the state of Wyoming. It identifies ways in which the state can increase and improve the use of data-driven decision-making (DDDM) in districts and schools. The study methodology was a combination of a literature review and semi-structured interviews with officials at the district and state level.

Three clear roles for states in DDDM emerge from literature (Massell, in press) and interviews with Wyoming officials:

1. Creating a policy structure to support and encourage DDDM,
2. Provision of data, and
3. Building capacity to use data.

Data must be placed in a context to have meaning. There are three ways to place data in context. The first is to compare results with predetermined expectations such as standards. Standards provide an agreed upon context to evaluate schools and districts which greatly facilitates DDDM. The second way to provide context is to compare a school or district with other similar schools or districts. The third source of context is to examine a school or district's performance over time (McLean, 1995).

Policy Structure

Wyoming has an extensive policy framework for supporting DDDM. The standards system helps direct data inquiry. The state assessment system provides data for schools to discuss. The accreditation program and its required school improvement plans provide incentives for schools to examine data. Potential areas for action include:

1. Improve the ability of districts to use their assessment systems to identify when students will have problems on the Wyoming Comprehensive Assessment System (WyCAS), potentially through studying, and publicizing the alignment of the TerraNova with Wyoming standards and the WyCAS,

2. Study the use of DDDM at the district level, to create examples of best practices that other districts could also use, and

3. Pilot programs that use DDDM on a more rapid schedule, i.e. on a quarterly basis, and for decisions at the classroom or grade level instead of the yearly school improvement process.

INTRODUCTION

The purpose of this report is to examine the role of state policies and programs in facilitating and encouraging the use of data in decision-making at the school and district level across the state of Wyoming. It identifies ways in which the state can increase and improve the use of data-driven decision-making (DDDM) in districts and schools. The report begins with a description of data-driven decision-making (DDDM), followed by a discussion of the key role that standards play in giving meaning to data and helping to direct questions asked of the data. The next section contains with a brief description of the methods used and the Wyoming context. The remainder of the report describes Wyoming's current efforts in supporting DDDM and provides suggestions for how the Wyoming Department of Education could further support DDDM.

Data-Driven Decision-Making

Using information in decision-making is not a new idea. In 1973, Ernest House argued that a role of school evaluators is to provide decision makers with useful information to make decisions. House and his co-authors describe many issues that impede the use of this information in decision-making, stressing the political nature of educational decision-making, the lack of consensus on educational goals, and lack of familiarity of decision-makers with the use of evaluation data (House, 1973). As technology, sophistication and experience with gathering and reporting information has increased, interest in using data has also increased. Advocates for DDDM have used several different labels including action research (McLean, 1995), continuous improvement (Schmoker, 1996), and continuous evaluation (Wagner, 1997). Today there are a many how-to guides on DDDM. Appendix A of this report contains an annotated bibliography of a sample of these guides available to schools and districts.

Districts in the McREL region are using DDDM. For example, Pueblo School District Number 60 in Colorado uses quarterly indicator reports and value added analysis to support its mission that includes "...increased student achievement through continuous improvement of instruction, curriculum and standards using measurable data to support accountability and high expectations" (Bales, Slide 4). An important aspect of DDDM in Pueblo is the use of gain scores to help direct professional development within the district (Bales, 2000).

DDDM can also be found embedded in comprehensive school reform designs. A well-known example is *Success For All* (SFA) that assesses student progress every eight weeks. The assessments are curriculum-based, include both oral and written assessments, teacher observation and formal measures of reading comprehension. The data obtained from the assessments help monitor the progress of each child. The data can be used to identify students that are performing well and can be moved up to a higher level reading group or students who are struggling and need tutoring.

Interest continues to grow in learning about how data can be used to inform decisions. Examples of current efforts to increase the use of DDDM include work by the Council of Chief State School Officers State Collaborative on Assessments and Student Standards Data Based Decision-Making Working Group, the Department of Education's Chief Information Officer (see http://www.educationadvisor.com/ToC.html), and the ongoing efforts of the Education

Commission of the States available electronically at http://209.151.83.18/clearinghouse/18/47/1847.htm.

Given this variety of efforts and perspectives, it is helpful to define what is meant here by DDDM. For the purposes of this report, DDDM is defined as a method of informing educational decisions (by teachers, principals and other administrators) with data that may track progress, identify specific successes and problems, or match problems with appropriate solutions.

Further exploration into what is meant by DDDM will be useful in understanding the state's role in DDDM. First, what are data? Data are simply one form of information that decision-makers can use. Often data either:

- Summarize or represent larger amounts of information, or
- Represent concepts that cannot be easily observed i.e., "makes the invisible visible" (Schmoker, 1996).

To illustrate, data on the racial composition of the student population within a school represents information that can be observed, but it is time-consuming to make the observations, and yet the information can easily be summarized with a few numbers. Data can also contain measures of student's skills or knowledge, which are concepts that are more difficult to directly observe. This report focuses on existing data. It does not address new data that districts and schools could gather to inform decisions.

Data are not the only element to be considered in decision-making. Educational decision-makers must also consider information based on history, experience, training, and knowledge of a community. Thus, data do not provide answers, instead as Herman & Gribbons (2000) stated:

> ...the data results are rarely prescriptive in informing schools what to do next. Rather, the questions and the data tend to be good starting points for understanding where things are and engaging key constituents in further discussion and inquiry. (p. 8)

In some contexts, data may be redundant to what decision-makers already know. In a small district with little student turnover, information on student's socio-economic background may not provide information beyond what an administrator has learned about her community. But in this case, data may still be valuable in confirming (or disproving) preconceptions, or in communicating issues to people who do not share the same contextual knowledge. The key point is that it may be difficult for a decision-maker to know when she has crossed the boundary between well-informed knowledge of a community and unfounded pre-conceptions.

Giving Meaning to Data: Standards and DDDM

Standards play a key role in DDDM. To understand the role of standards one must look at how data are used to answer questions. According to Herman and Gribbons (2000) decision-makers generally ask three questions of the data:

1. How are we doing?
2. Are we serving all students?
3. What are our relative strengths and weakness?

To have meaning, the answers to these questions must be placed in a context. There are three ways to place answers in context. The first is to compare results with predetermined expectations. Standards (performance, content and delivery) are the prime example of predetermined expectations that can be used to provide meaning to data. As was described earlier, lack of agreement on goals was a key problem in preventing evaluation information from being useful to decisions makers. Standards provide some agreement on goals, helping decision-makers interpret data in light of agreed upon goals. In providing an agreed upon set of goals for students, schools and districts, standards greatly facilitate answering the question "How are we doing?"

The second way to provide context is to compare a school with other similar schools or districts. The third source of context is to examine a school or district's performance over time (McLean, 1995). These three methods of comparison provide context to data that must then be interpreted in light of a community's goals. For example, it is very possible that a school or district has performance goals above the state standards. It is also possible a school or district that is performing above the statewide average is performing poorly given its student's background factors.

By using data about the above set of questions integrated with contextual knowledge, observations and community input, decision-makers can push deeper into the data with three more questions:

1. Why are things the way they are?
2. What can we do to make them better?
3. What are the implications of the data for improving teaching and learning? (Herman & Gribbons, 2000)

As was stated earlier, data rarely provide prescriptive answers to these questions. Instead data helps decision-makers analyze and understand what is occurring in schools. Well-defined standards can provide a structure and focus for further inquiry, by establishing priorities that directs further inquiry and subsequent action.. Thus, standards not only provide meaning to data, but they also provide direction for further questions on what to do with the information data provides.

Methods and Wyoming Context

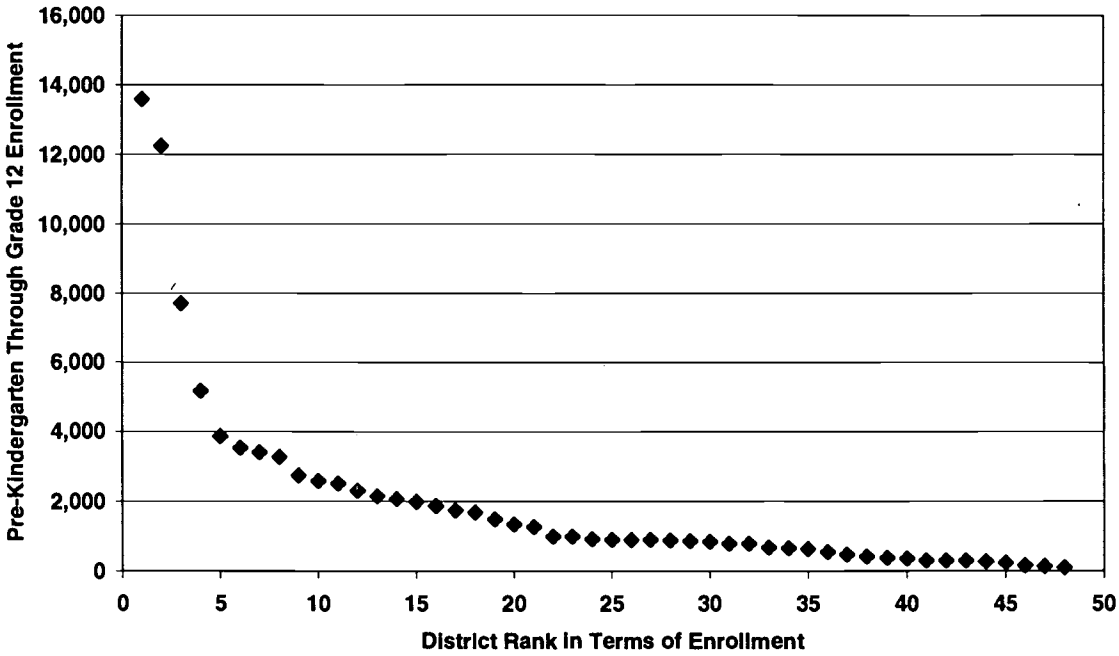
This study addresses the combined interest of the Wyoming Department of Education and Mid-continent Research for Education and Learning (McREL) in building local and state capacity to improve teaching and learning through systematic data collection and analysis. This study focused on three basic issues: the state's role in facilitating and encouraging DDDM in districts and schools, current activities in Wyoming to facilitate and encourage DDDM, and potential future state actions to increase and sustain the use of DDDM.

The methodology used to address these questions was a combination of a literature review, semi-structured interviews with officials from districts and the state, and a review of state documentation. Interviews were held with four district officials and six officials at the state level.

Each state provides a unique environment for schools to operate. There are 48 districts in Wyoming's 24 counties. Many of Wyoming's schools and districts are small and rural. Figure 1 shows the distribution of Wyoming districts in terms of size. The largest district, Laramie County School District #1, had fewer than 14,000 students, and was the 672 largest (out of 13,150) in the nation in 1998. The smallest district in the state, Sheridan County School District #3, has enrollment of about 100 students, which positions it as the 12,145 largest district in the nation. The average enrollment in a Wyoming school district is just under 2,000 while the national average is just over 3,300 (US Department of Education, Common Core of Data, 1998).

Wyoming is the 9th largest state in terms of area and 51st largest state in terms of population, (US Department of Commerce 1999, Hovey & Hovey 1998). This can lead to considerable isolation. In 1999, the population density in Wyoming was 4.9 persons per square mile, compared to the national average density of 77.1 persons per square mile (http://quickfacts.census.gov/qfd/). This isolation often reduces the labor pool available to districts' and schools' for the recruitment of personnel.

The student population in Wyoming can be characterized as relatively homogenous. The 1997 proportion of white students was 88.6% compared to 63.5% nationally (US Department of Education, *Digest of Education Statistics*, 1999). The limited English population averages 2.5%, compared to 6.0% nationally. The majority of Wyoming limited English proficient (LEP) students are concentrated in three districts. If these districts are excluded, the proportion of LEP students drops to 1.1% (US Department of Education, Common Core of Data, 1998).



Source: 1998 Common Core of Data, US Department of Education

Figure 1: Distribution Of Wyoming School Districts By Size
(1998-99 School Year)

Administrators expressed few concerns about high rates of teacher or student turnover. These impressions are hard to verify with the available data. Wyoming has a very small migrant student population, about .1%. However, the national migrant population is also small at .4% of all students. Manley reports a teacher turnover rate of 12-13%, which is comparable to the 10% rate reported by Kirby for Texas in the mid-1990s (Manley, 2001; Kirby, Naftel & Berends, 1999).

STATE'S ROLE IN DDDM

Three clear roles for state's in DDDM emerge from literature (Massell, in press) and interviews with Wyoming officials:

1. Creating a policy structure to support and encourage DDDM,
2. Provision of data, and
3. Building capacity to use data.

The remainder of this report expands on each of these roles, discuss current Wyoming efforts in each of these roles and suggest ways to strengthen Wyoming's current efforts.

POLICY STRUCTURES TO SUPPORT DDDM

While the state governments have responsibility for creating education systems, they rarely have direct control over district and school policies[1]. It is difficult for states to mandate the use of data in decision-making within a system that is often described as "loosely-coupled" (Weick, 1976). Instead, states can create a policy framework that facilitate or encourage the use of data in decision-making.

Wyoming Policies that Facilitate DDDM

The Wyoming policy structure has several aspects that facilitate or encourage DDDM. First, it has created a system of standards and an assessment system for measuring student performance relative to those standards. Second, through the accreditation system, schools are encouraged to use data. The accreditation process requires schools to have school improvement plans. Creating these plans requires data analysis to build school profiles and develop action plans. Third, the state requires districts to measure student performance as part of school accreditation and for Title 1 compliance. Finally, districts are required by the Professional Teachers Standards Board to evaluate some alternative certified teachers.

As was discussed earlier, a key state contribution to DDDM is creation of standards that can be used to examine student, school and district performance and to direct discussions about next steps in school improvement. Wyoming has created content and performance standards for students in grades 4, 8 and 11 in reading/language arts, mathematics, science, social studies, foreign language and physical education.

State assessment systems can provide a mechanism for learning about student performance in relation to standards. The Wyoming Comprehensive Assessment System (WyCAS) is used to test how well students meet the standards in reading/language arts and mathematics in grades 4, 8, and 11. The test includes items developed to reflect Wyoming standards and a norm referenced test (the TerraNova developed by CTB McGraw-Hill). Tests are administered in the spring, with the first administration in April 1999.

Schools are using DDDM in response to the accreditation process. Through accreditation schools are evaluated along seven dimensions that are tied to the state standards. Two of those dimensions require gathering of data on student skills and knowledge, as well as school climate. Three of the other dimensions require the use of WyCAS and district assessment data. Data are used in creation of a school improvement plan, staff development planning, and in working with at-risk students.

Interviews at the Professional Teachers Standards Board indicate their regulations require evaluation of teachers with a Collaborative Certificate using student outcomes. Interviews with school and district officials did not pursue information on how these evaluations are being used.

Recommendations Regarding DDDM Policies

[1] Hawaii is an exception given it has a unitary statewide district.

Interviews with school and district administrators reveal the assessment system has indeed spurred discussions at the school and district level around student performance data. A key issue for districts is how to identify areas (students, classes, or schools) where student(s) may have problems performing proficiently on the WyCAS. Districts are required to have their own assessment systems to evaluate student performance. A key technical issue is linking student performance on district assessments to performance on the WyCAS. A large majority of these districts use the TerraNova as part or all of their district level assessment systems. A avenue for the state action is to help districts learn more about the relationship between the TerraNova, Wyoming standards and WyCAS performance. This information should allow districts and schools to more precisely identify potential problems students will have on the WyCAS, as well as learn from areas of performance strength.

School improvement plans are created on a three to five year cycle with updates created each year. A topic for further exploration is whether the state wants to work towards more intensive use of DDDM, i.e. on a more rapid schedule and for decisions at the grade or classroom level. For example, the SFA comprehensive school reform model uses data every few months to examine grade and classroom activities and respond if necessary. Another example is provided by the Department of Education, Office of the Chief Information Officer's recent work on DDDM. The *Case Study of Classroom Data Needs* describes how detailed information on students can be used to prepare at the beginning of a school year. This vignette can be located at http://www.educationadvisor.com/ToC.html. The state may want to create pilot program(s) to learn more about using DDDM on the grade or classroom level using Wyoming standards. This program could provide grants to a few districts to increase their ability to use DDDM. Another potential program could be to study and disseminate information about effectiveness of DDDM within Wyoming including comprehensive school reform model(s) that use DDDM such as SFA.

An area for further work may be increasing the use of DDDM at the district level. The state's role in encouraging DDDM at the district level is complicated. Key players in district level DDDM can be elected board members who can easily view state direction on how they make decisions as an infringement on their authority. This said, the standards and the accreditation rubrics have provided some incentives for district use of DDDM, in particular with regards to staff development and at-risk students. One way to increase the use of DDDM is to make it easy for school and district officials to access data. The state is pursuing this as will be discussed in later sections. Another way is to model the use of data in decision-making. A potential method for this is to commission a study on how data is being used at the district level and to identify the best practices. The end result could be examples of best practices of DDDM at the district level that other districts could replicate.

There are at least two possible areas for further investigation regarding the use of Collaborative Certificate teacher evaluations required by the Professional Teachers Standards Board for DDDM. These opportunities need to be investigated in the light that most districts may have too few Collaborative Certificate teachers to make efforts in this area cost effective. One area to investigate is the possibility that the evaluations can provide useful models of using data to learn about teacher's strengths and weaknesses. A second opportunity may lie in aligning these evaluations with the professional development portions of school improvement plans.

DATA CONTROLLED BY THE STATE

States control two types of data. First there is data generated at the state level, and second is data provided to the state by districts.

In Wyoming, the only data clearly generated by the state are the annual results to the statewide assessment, the WyCAS. Further analysis would be required to determine if some of the information within PTSB databases is different from what is maintained by districts.

The data provided by districts to the state allow creation of a database that has information on all the districts in the state. The information contained in this database on any one district is no different than the data located at district offices[2]. In fact, it is probably less rich in the sense that district databases contain more variables than the state database. But the state database, and the federal ones that the state information is fed into, are unique because they combine information from many districts. As was discussed earlier, a key way to give data meaning is to compare data between similar units. The state databases are a primary resource for making comparisons between districts and schools, and thus can be very important.

Data collected by the state from districts has two key intersections with DDDM. First is the method used to define and collect the data. At best the state can use definitions, formats and structures that districts can also use for DDDM. At a minimum, the state should use formats and structures that minimize the burden on districts. The burden of completing state mandated forms can reduce the time analysts have to work with data. Use of formats and definitions that are currently being used in DDDM increase the likelihood that the data provided are accurate, and may spread best practices from districts using DDDM to districts that are not.

Data provision by the state also has two key aspects. First, the data should be provided in a fashion that allows easy analysis and use. These reports should help administrators answer the common questions that all administrators will ask of the data. Second, raw data should be provided that allows analysts to dig through the data, and more importantly link the data with other data and across time.

Data Controlled by the State Of Wyoming

The Wyoming Department of Education regards data provision as a key part of its mission. According to its strategic plan, one of its objectives is to "Develop a coordinated, integrated, quality information system and department technology plan." Strategies to meet this objective include "Continue to refine and expand the departments (sic) web-site offerings and capabilities" (Wyoming Department of Education, 1999). The methods used by the Department of Education for gathering and providing data are changing as it works to reach these goals.

Data Collected by Wyoming

[2] This study did not address the issue of whether data at all districts is stored in a manner that facilitates analysis, i.e. in usable databases. As discussed under Data Collected by the State, the state may have a role in spreading best practices for storing data.

Data gathering efforts have changed to include a web-based directory that lists all the forms districts need to submit, with information on due dates. The directory also contains links to allow downloading many of the forms and their instructions. Interviews at the state and district level indicate this web page has not only helped clarify district's data submission requirements, it has also served as a vehicle for discussions at the state about reducing duplication in the data requested from districts.

The forms districts use to submit data are either paper or electronic. There are two types of paper forms, those that must be mailed from the state to districts, and PDF files that can be downloaded and printed. The electronic forms are either Excel or FoxPro files that are electronically submitted to the state. Interviews with state officials indicate the electronic forms are used for two reasons. The first is to reduce the burden of completing forms because districts can update old information instead of having to enter all new information. The second is to increase accuracy and decrease the burden at the state level because the electronic submissions can be read directly into the state database, reducing the need to key in data by the state. State officials hope the establishments of electronic forms for data submission will create a market for software vendors to help districts directly download information from their data-systems into the forms. This should reduce the time and burden at the district level and reduce the possibility of keying errors since information is not re-keyed at state offices.

Recommendations Regarding Data Collection

The Wyoming Department of Education is clearly working to change the way districts submit data to the state to reduce the burden on districts. Efforts to increase the number of electronic forms should continue as well as efforts to reduce the duplication of information requests. As these efforts continue, conversations with districts should be held about the format of electronic submissions and how to make them useful. At least two related questions should be pursued. First, can the format used in the data submission be the same as reports already used by districts in existing DDDM efforts? For example, if districts are already creating reports that analyze changes in enrollment, these reports could also be used by all districts in submitting enrollment data to the state. This dual use of forms will reduce the burden on districts that are already creating the forms for their own use. It may also serve as a way to spread "best practices" from districts that are already analyzing their data in useful ways to districts that are not currently doing that analysis. A related question for this conversation would be, can the formats for the data submissions be in a form that could be used for DDDM? Again, this conversation with districts could serve as a forum for the spread of best practices.

Another issue to consider is the software used to submit data. It is possible that the state can use data submission as a mechanism to provide incentives to districts to invest and maintain software, databases and skills that can be used in DDDM. Excel is an easy submission format since most, if not all, districts already use that software. Interviews with district officials and DDDM how-to books suggest that much of the data analysis done for DDDM can be done with Excel. However, Excel is not good for data manipulation or for linking current data with other data sources or from previous years. In other words, Excel is not the appropriate software for database management. The Wyoming Department of Education and districts should visit the issue of whether a software format used to submit forms should be the one that encourages use of

data-base software that will allow more sophisticated data manipulation. A book that may be helpful in exploring the database needs of schools and districts is *Designing and Using Databases for School Improvement* by V.L. Bernhardt (2000).

Districts will derive different benefits from these conversations. A key benefit could be the sharing of best practices, knowledge and experience. Smaller districts that do not have enough administrators to have an individual with primary responsibilities to manage and analyze the district's data can benefit from the experience of larger districts. A possible product of these conversations would be a report on best practices. Smaller districts may be able to model their procedures on these best practices.

Data Provided By Wyoming

As discussed above, the state provides two types of data to districts and school: WyCAS data and reports based on data submitted by the districts. The WyCAS data are provided in paper reports with disaggregation by categories provided by the districts and in electronic form. Data provided by the districts are currently distributed in a three volume statistical series, which reports current year information in large data tables.

The state is in the process of updating the data it provides. First, as mandated in 1997, the state is in the process of creating Uniform Reports that present information on schools including assessment performance, and student population along with district and school interpretation of the results. These reports will be distributed to the community on the web. It also provides contextual information using state averages. The format used in these reports was developed by the Center for the Study of Evaluation at the University of California, Los Angeles (Herman & Gribbons, 2000).

The state is also in the process of creating a web site that provides access to information on districts including historical data. The information is categorized in a framework consistent with recommendations from the National Forum on Education Statistics contained in the publication *Basic Data Elements: For Elementary and Secondary Education Information Systems* (US Department of Education, 1997). This framework categorizes information into four areas; student and community background, school process, education resources, and student outcomes.

Recommendations On Data Provided By The State

The state is obviously working toward providing useful information for officials and citizens to learn and make decisions about their schools. This work should be supported and encouraged to continue. Key areas for further work are in providing more meaning for the data, and in some instances providing more data. As was discussed earlier, data has meaning when it is placed in context. That context for education data can most easily come from three different comparisons.

- With set levels of expectations such as standards,
- With change over time at the school or district, or

- With comparable schools or districts.

The Uniform Report was expressly designed for easy and clear interpretations by minimizing data overload and by providing context through simple, easy to read comparisons to state averages. The planned reporting of trend data in 2001 will add valuable context for the data. These are important goals and outcomes and no changes are recommended. Instead, suggestions are made regarding providing avenues for users to get additional data on schools and districts beyond the Uniform Report, with expanded data provision on the web as an easy avenue for accessing more data.

Recommendations for changes in the data being presented on the web are threefold:

- Provide more variables,
- Allow alternative comparisons, and
- Change a detail in the financial data reported.

Table 1 is provided to illustrate some of the additional variables that could be provided. It shows the categories of data being used now in the planed district web page, with the current data elements presented in bold and suggested additional data elements presented in normal font. The suggestions are not meant to be exhaustive or prescriptive. Instead, they are presented to stimulate discussion about what additional data is available and how it could be useful to those accessing the web page.

Table 1: Data For The State Web Page
(**bold shows existing data provided**, standard font show suggested additions)

Background Factors	Resources	Processes	Outputs
Enrollment history	**Revenues**	**Expenditures**	**WyCAS results**
-By grade	**Staff**	**Staffing:**	**Drop out rate**
-By race	**FTE by function**	**Student teacher ratio**	**Graduation rate**
-By sex	**Average teacher experience**	**Secondary staff subject certification**	**Attendance**
-By disability	Teacher certification	Accreditation scores	College attendance rates
-By free & reduced lunch	Average teacher salary	Class offerings	Technical school attendance
-By gifted & talented	New teacher salary	Class participation	Title 1 performance
Teacher education	Number of classified staff	AP enrollment	AP scores
Census data, i.e.	Number of buildings	Enrollment in vocational education courses	SAT/ACT scores
Household factors	Building age	Disciplinary actions	Univ. of WY entrance requirement completion rate
Parental factors	Supplies, i.e. -computers -library books -laboratories	School schedule (day & year)	
Community factors			

Additional data do not only mean additional variables, but also additional formats. First, provision of similar data on the web at the school level will be a good complement to the district information in the Uniform Report, providing that individual privacy is not compromised. Second, since the state database is unique because it allows users to make comparisons across districts, key components of the entire database should be available on the web to allow users to make in-depth analysis, and to link various data variables together. A recommendation is that the "raw" data used to create both the Uniform Report and the District Profiles be available, except when individual privacy, either student or teacher, will be compromised. This raw data must contain identifiers that allow linking of data-sets at the county, district, school, and with due consideration of privacy issues, at the classroom level3.

The currently planned District Profiles provide context for some variables through comparisons of current data with past years data. A recommended goal is to provide contextual information for all variables. More importantly, the value of the web page would be improved with multiple ways for users to get context. The Uniform Report effectively uses flags to indicate relative state-wide data to school level data. These flags may also be used on the District Profile to indicate contextual data points.

[3] For information on privacy issues and student records see U.S. Department of Education, National Center for Education Statistics, *Protecting the Privacy of Student Records, NCES 97-527, by Oona Cheung, Barbara Clements, and Ellen Pechman, Washington, DC: 1997*

The state should also work to allow users to compare districts, and possibly schools, with similar districts. Currently, in order to make comparisons, a web user would have to save or print data from one school, and then download new information from a comparison school. Choosing comparison schools or districts can be difficult. The basis for choosing appropriate comparisons can vary depending on the variables being used in the comparison. There are at least two examples of existing web pages that help users choose comparison districts. These web pages can serve as models for potential Wyoming efforts. The first, called Ed-Data, allows users to compare districts within the state of California. It is run by a partnership of California state education agencies, a not-for-profit, and a county school district. It can be found at: http://www.ed-data.k12.ca.us/welcome.htm. To locate the comparison districts, look in District Profiles, under reports for the "Find Districts Like Mine." The Education Finance Statistics Center allows expenditure comparisons between districts. It is located at http://nces.ed.gov/edfin/search/Search_Intro.asp. The key goal of this line of work is to provide transparent information on how the comparable districts are selected, and to provide the comparisons on the same page.

One change is recommended regarding the financial data contained in the Wyoming School District Profiles. The financial data should be reported on a per student basis to facilitate comparisons. At this point the data only provide total amounts for a district, which is impossible to compare with other districts since each district operates on a different scale. This scale is a function of the number of students attending in that district. Provision of information on a per student basis provides a similar scale for comparisons. At best, both totals and per student amounts will be shown on the School District Profiles, but if only one amount can be shown, the per student amounts would allow more useful interpretations.

BUILDING CAPACITY FOR DDDM

Building capacity for DDDM means helping districts with the technical ability to manipulate data, provide meaning to data, and learn about relationships. A recent report by the Center for the Study of Evaluation described DDDM technical assistance efforts that worked to "...articulate data-based questions, access data, and generate reports that could inform...." (Herman & Gribbons, 2000, p 2). The capacity for DDDM includes the knowledge and ability to use basic spreadsheet software and often more sophisticated statistical and database software.

Much of the initial data manipulation required for DDDM can be done with spreadsheet software packages such as Excel. But as DDDM sophistication grows, it can quickly require technical skills associated with running data base software such as Access or FoxPro, and/or powerful statistical software such as SPSS, STATA or SAS. A key issue is the need to link datasets, i.e. student performance with teacher background, or 1998 data with 1997 data. Excel is particularly weak in its abilities to link data. The statistical software can link data sets, but is not well suited for managing a large database. Furthermore, database software is not suited to run the analysis necessary for DDDM. In other words, DDDM can require the ability to use spreadsheet, statistical and database software depending on the questions posed and the format of the data available to districts.

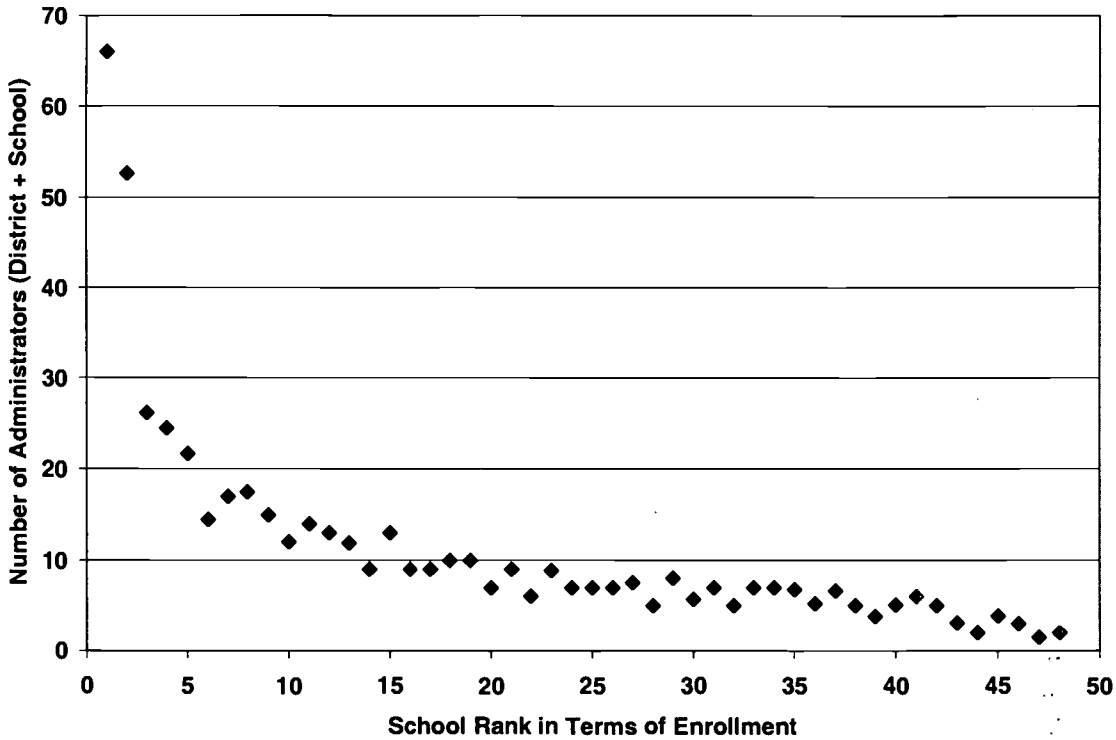
Data presentation is another crucial issue. School level decision-makers do not have the background knowledge needed to interpret the raw output of statistical analysis. Data presented in a graphical format communicates much more effectively with teachers and administrators (Herman & Gribbons, 2000). In other words, capacity for DDDM includes the ability to present data in graphical formats that have meaning to the audience.

Data analysis training is a time consuming process. Recent capacity building efforts in a Colorado school district included three years of training for district staff. (Massell, in press)

Capacity In Wyoming

A key issue associated with smaller districts in Wyoming is simply the ability of districts to hire administrators with the technical ability to manipulate and interpret data. Figure 2 shows that in general, as enrolment decreases, so do the number of administrators. Yet, administering a district requires the completion of many different tasks and responsibilities regardless of the size of a district. Responsibilities of all districts include budgeting, personnel, contracting, purchasing supplies (including textbooks), monitoring federal programs, maintenance (including technology), providing instructional leadership, professional development, and often transportation. In many smaller districts superintendents or other "central office" personnel also carry a double load as both district and school administrators. The bottom line is administrators in smaller districts wear many hats. While the amount of work and expertise required to perform these duties declines when districts get smaller, there is some amount of work and expertise required regardless of district size.

Figure 2 provides additional information on this issue. It is similar to Figue 1 above, except the y-axis now measures the count of administrators (district plus school administrators) instead of students. The x-axis is exactly the same, showing districts ranked by total enrollment with the largest one on the far left.



Source: 1998 Common Core of Data, US Department of Education

Figure 2: Number Of School District Administrators By District Size in Wyoming (1998-99 School Year)

As illustrated in Figure 2, the majority of districts in Wyoming have less than 10 administrators. The smallest eight districts average just over three administrators, and the next largest ten districts average just fewer than seven administrators. Our interviewees argued that as the number of administrators in a district reaches some small number, be it three, seven or ten, the duties and expertise required to run a district do not leave time to master the technical requirements needed to do DDDM. In other words, administrators in many smaller districts simply don't have the time to gain the technical expertise needed to implement DDDM, and Wyoming has many small districts.

At the same time the state is actively providing software and training to school district personnel. The state has provided all districts with SPSS software, has conducted a two-week summer institute on its use, and is planning a two-day training on its use this fall. There is a high level of interest in the training with at least 31 people expected at the fall two-day training.

Strategies For Building DDDM Capacity at the District Level

The state is not the only institution with responsibilities for building district and school level capacity for DDDM. The districts and schools themselves share in this responsibility, as do other state and regional institutions such as the School of Education at the University of Wyoming.

The key issue appears to be that the smaller districts have a need for technical capacity, but do not have the financial or personnel capacity to support an individual at the district with those skills. Two general responses to this issue are either an outside service provider giving assistance to a multiple districts, or districts working together to create a set of analysis that all districts want and need. Each response requires districts to articulate their data and analysis needs.

The first possible response is provision of technical services as needed to each district by an individual or institution. For example, a district could contract for the technical services needed. A key issue is if the provider can generate enough revenue to support his/her technical skills and provision of the services. This requires building a market for these services, which would require a number of districts be able to articulate their data needs.

The other possible response to this problem is some sort of collective action. This collective action could be agreement upon a common set of data analysis and output needed by some or all districts, and securing services to regularly create that output.

Key challenges to collective action are simply organizing the districts to work together and agreement upon common needs. This agreement and action could occur through an ad hoc committee of districts, or could be through collaborations formed through existing institutions such as Boards of Cooperative Education Services (BOCES), or administrator associations. Finally, the state could play a role in creating the necessary consensus and action. The state does have some experience in creating consensus about common data needs and formats, through the production of the Uniform Report.

An important problem in this collective action is that each district is unique in some way, making it difficult to create one format or output that a group of districts can agree upon. There is also the possibility of a free-rider problem. A few districts could band together and spend time/money creating a product that can be used by all. Those districts that did not participate could benefit from the action of others without paying. In other words, it is possible that some districts have an incentive to not participate and free-ride on the efforts of others.

A final strategy is for the state to create a state-wide web based data-system that provides data-base management for districts and easy to use analysis. Teachers and administrators would enter data into this system and be able to create reports for use in decision-making. Examples of these data-systems (this list is not exhaustive, nor an endorsement of those listed), can be located at:

- Just for Kids, http://www.just4kids.org/
- National Center for Research on Evaluation, Standards, and Student Testing (CRESST) Quality School Portfolio, http://qsp.cse.ucla.edu/
- Edmin.com Virtual Education located at:
  http://www.edmin.com/assessment/index.cfm

Creating a statewide data-system may be difficult given the culture of local control in Wyoming. It is a strategy being pursued by neighboring South Dakota. The Education Commission of the States (ECS) is identifying the factors, conditions and policies that support the use of data by schools and districts for improvement purposes. Case studies will be done that includes the analysis of the effectiveness of some web-based data-systems. The information they are creating may be useful to Wyoming if they want to consider this option further.

Recommendations for DDDM Capacity Building in Wyoming

How best (in terms of cost and benefit) to build capacity is a difficult issue. Two strategies are recommended for consideration. Each of them are based upon the state creating a grant program to help pay part of the costs of helping the districts articulate their data needs. Given that this is an issue for many districts, where each district has some incentive to build capacity, but not enough to build their own, the state may be wise to try and leverage that interest through a grant program.

The first grant possibility would go to districts to help them learn about common needs, and how they could support provision of services to meet those needs through pooling their resources. This grant could go to an organization, either existing or an ad hoc coalition of districts, with the expressed purpose of organizing districts to determine their common data analysis needs and the associated technical capacity it requires. Once these needs have been determined, districts can decide how to work together to purchase these services.

A second strategy is for the state to offer grants to institution(s), most likely non-profit institution(s), to support design and provision of technical services that supply or create district capacity for DDDM. It is likely that the grant would be used to create two outcomes. First, the service provider could use the grant to build and increase the technical capacity to provide the needed services to districts. At the same time, the service provider could also work with districts to build their capacity to articulate the services they need. During the initial capacity building phase the services would be subsidized by the states grants. Once a system is built to provide services, and districts had more information on their own needs, the state may not need to provide any more resources to support the service provider.

CONCLUSIONS

Wyoming is making clear positive steps in supporting and facilitating DDDM. The state has created a policy framework that facilitates and supports DDDM through standards, accreditation and an assessment based accountability system. The state is revising its system of collecting and disseminating data focusing on using the web to improve these processes. Finally, the state is providing training to increase the capacity in districts to manipulate and derive meaning from data. These efforts are laudable and concrete steps towards increasing the use of DDDM.

As principals and other administrators respond to the state efforts to support DDDM, they are learning about the data and capacity they need to most effectively use data. On-going discussions with districts should support this learning, as well as improve the ability of the state

to meet school and district administrators' needs. At best, this process will be iterative, with decision makers learning how to glean some useful information from data, and then returning to the data to learn more.

This report provides several recommendations for the state to improve how it supports DDDM at the district and school level. These recommendations all have the same basic approach: work with districts to help them derive meaning from existing data. The new accountability system and the relatively new accreditation regulations have created new incentives for DDDM at the school and district level. A key hurdle they face now is understanding how the results from the district assessments are related to performance on the WyCAS. The state is accomplishing great strides in making the data it controls more user friendly by reducing duplication of submitted data and by building District Profiles and Uniform Reports to go on the web. These efforts should continue and additional data should be provided with a focus on making sure users can make comparisons that provide meaning to the data. The state is also pursuing a strategy to increase the technical capacities within districts by providing training on SPSS. A key problem is smaller districts may not be able to support a technical expert. The state may play a role in assisting the smaller districts articulate their data needs to outside providers, or in providing a state-wide data system that manages data and provides easy to use analysis options.

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