Investigating the impact of data-driven decision making on elementary curriculum and its implications for teaching and learning

Sara A. Hofer
University of Northern Iowa

Recommended Citation
https://scholarworks.uni.edu/grp/864

This Open Access Graduate Research Paper is brought to you for free and open access by the Student Work at UNI ScholarWorks. It has been accepted for inclusion in Graduate Research Papers by an authorized administrator of UNI ScholarWorks. For more information, please contact scholarworks@uni.edu.
Investigating the impact of data-driven decision making on elementary curriculum and its implications for teaching and learning

Abstract
Accountability is the new word of importance in the field of education. National attention to schools has caused states and districts to re-evaluate the business of educating children. This review will investigate the many facets that support data-driven decision making in current educational practices. The research will describe the relatively short history of nationally mandated legislation for the use of data to drive instruction and entitlement of services. Then, this paper will report the implications of implementing data collecting and synthesis systems in individual buildings to maintain both student successes in the classroom while fulfilling demands of national reporting requirements. Finally, the research will address strategies for successful implementation of continuous improvement models.
INVESTIGATING THE IMPACT OF DATA-DRIVEN DECISION MAKING ON
ELEMENTARY CURRICULUM
AND ITS IMPLICATIONS FOR TEACHING AND LEARNING

A Graduate Literature Review
Submitted to the
Division of Elementary Education
In Partial Fulfillment
Of the Requirements for the Degree
Master of Arts
UNIVERSITY OF NORTHERN IOWA

by:
Sara A. Hofer
July, 2007
This review by: Sara A. Hofer

Titled: Understanding the Impact of Data-Driven Decision Making on Elementary Curriculum and its Implications for Teaching and Learning

has been approved as meeting the research requirements for the Degree of Master of Arts in Education

Lynn E. Nielsen
Graduate Faculty Reader

Radhi H. Al-Mabuk
Graduate Faculty Reader

Mary C. Herring
Head, Department of Curriculum and Instruction
Table of Contents

1. Introduction ................................................................................................................ 5
   a. Rationale ........................................................................................................ 5
   b. Purpose of Review ......................................................................................... 7
   c. Terminology ................................................................................................... 7
   d. Research Questions ........................................................................................ 8

2. Methodology .............................................................................................................. 9

3. Literature Review ....................................................................................................... 9
   a. Historical Involvement of Federal Government ............................................ 9
   b. Strategies for Effective Implementation in Schools and Districts ............... 18
   c. Implications and Barriers for Success in Schools and Districts ................. 24

4. Conclusions and Recommendations .......................................................................... 30

5. References .................................................................................................................. 33

6. Appendix .................................................................................................................... 37
Abstract

Accountability is the new word of importance in the field of education. National attention to schools has caused states and districts to re-evaluate the business of educating children. This review will investigate the many facets that support data-driven decision making in current educational practices. The research will describe the relatively short history of nationally mandated legislation for the use of data to drive instruction and entitlement of services. Then, this paper will report the implications of implementing data collecting and synthesis systems in individual buildings to maintain both student successes in the classroom while fulfilling demands of national reporting requirements. Finally, the research will address strategies for successful implementation of continuous improvement models.
Introduction

"An education isn't how much you have committed to memory, or even how much you know. It's being able to differentiate between what you do know and what you don't." When 19th century French novelist Anatole France made this assertion, he probably could not have realized the relevance to our current educational practices in the United States. Rose-colored glasses tinted the view of the world when I began my professional teaching career. When beginning my own teaching career, the world was definitely seen through rose-colored glasses. During pre-service training, young teachers are taught to embrace diversity, create a culture of learners and problem solvers regardless of their background both academically and socially, and in essence, develop thoughtful citizens prepared to associate with global issues. In that training, two major things were absent; preparation for statistical analysis and the political fervor surrounding the field of education.

Rationale

When I began my work at the elementary school level, I was eager to show flexibility, knowledge of curriculum and standards, and become a leader within the staff. I was fortunate to gain access to specialized training offered by the district to train a small, specialized cohort of classroom teachers in the art of collecting and synthesizing data at the building level to assist in making decisions to propel student success. This exposure to the details of developing a culture devoted to continuous improvement became a double-edged sword.

The difficulties and challenges of this method were not addressed in our numerous sessions. A major complication was being a colleague to the teaching staff in
the building and being charged with the enormous task of training teachers to not only buy into the philosophy of data-driven decision making, but also in offering the tools necessary to apply research based methods within their own classrooms. Additionally, initial staff resistance to another “new” movement in education could work to decay the direction, efficacy, and authenticity of chosen building wide data that was to be collected. Finally, being a classroom teacher, it was quite difficult to balance the daily tasks associated with maintaining an effective learning environment along with the additional tasks brought on with being the key point person for collecting and synthesizing building data and leading meetings that both re-directed our goals, and provided proper tools for application within all classrooms.

As a school staff, we were finally able to align our goals with district, state, and national expectations due to several choices. The staff gradually became responsive to learning and applying new strategies in their classrooms. We were equipped with financial resources to take some of our ideas, such as individual student data folders that housed progress for school, classroom, and individual goals, and teacher toolkits for research based reading strategies for use across curriculum areas. We met weekly as a staff to analyze current data and make suggestions as to how to plan for future success.

The outward manifestations of our rapid success heralded attention around the district. Due to my role in our building, I was invited to speak to teachers in other buildings. What was not fully understood in this process of alignment was the decay factor that occurs as more and more separation from work with the “experts” in this field. Additionally, due to limited access to experts in the field of data collection, constant change and modifications, which had to occur to ensure goals were specific, measurable,
and aligned with standards and curriculum. It is due to this experience that I wish to investigate how data-driven decision making should be employed in an elementary school setting to produce positive and forthright discussion in creating a multi-layered and purposeful system.

Purpose of Review

There are many facets that hold the gem of education up high. One that is getting a vast amount of attention is the proper collection, synthesis, and analysis of data in an effort to align standards and curriculum, and to ensure accountability with stakeholders. The purpose of this review is to investigate the history of the use of data in schools as legislated by the national government. Then, this paper will report the implications of implementing data collecting and synthesis systems in individual buildings to maintain both student successes in the classroom while fulfilling demands of national reporting requirements. Finally, the research will address strategies for successful implementation of continuous improvement models.

Terminology

"Data-driven decision making is a rapidly evolving and dynamic trend" (Carroll and Carroll, 2002, p. ix). This topic is fairly new in the grand scheme of education in the United States. Clearly understanding terminology in this specific field is essential to moving systems forward in an effective form.

- Continuous improvement: a foundational and multi-layered model made of aligned goals, action plans, and measurable assessments.
• Data analyst: a person or group of people who serve as a resource to staff with technical expertise in data analysis. They also aid in coordinating data synthesis in a timely manner to coincide with staff planning.

• Data-driven decision making: "...use of data analysis to inform, when determining courses of action involving policy and procedures" (Picciano, 2006, p. 7).

• Data warehousing: a tool of technology that allows for storage of data. This tool is flexible in its ability to sort specific information for multiple purposes. This tool will also allow for storage of data over time for comparison of cohorts of students, curriculum effectiveness, grade level achievement, etc.

• Data mining: searching through a variety of data to understand a particular phenomenon that appears and requires further study.

• Data disaggregation: use of a variety of data broken down into specific characteristics.

• Staff mobilization: moving a staff to operate together toward common goals through clear directives.

**Research Questions**

This research review will focus on the following questions:

• What role has the federal government played in public education?

• What steps should be taken for effective implementation of data-collection methods at the state, district, and building levels?

• What barriers will diminish the success of data-driven decision making systems?
Methodology

The materials that were collected for this review began with review of notes and materials collected while working at the district level with experts in the field such as Susan Leddick and Lee Jenkins. Based upon some key ideas presented during that work, searches occurred on the internet to determine specific points to review. Research then began at the Rod Library, located on the campus of the University of Northern Iowa. Key word searches included terms such as data-driven decision making and continuous improvement. After reading several books and journals, additional material was obtained from various websites to gain specific information regarding the involvement of the federal government in educational decision-making through law-making bodies.

Literature Review

Historical Involvement of Federal Government

The role of the federal government in the field of education is relatively new in the grand scheme of our nation. According to the United States Department of Education website, the current department of education was established in 1980 with the mission to, "...promote student achievement and preparation for global competitiveness by fostering educational excellence and ensuring equal access." The act of combining several agencies under one roof allowed for a more streamlined and effective use of focus on the part of the government. However, prior to the establishment of this agency, there had been attempts at federal intervention made in public education attempting to utilize data
for making decisions. The first such government legislation established Title I programming.

Title I of the Elementary and Secondary Education Act was established in 1965 with the sole purpose of "...addressing equity issues in elementary and secondary education at the national level" (Wong & Meyer, 1998, p. 115). This act was passed under the Johnson presidency during much turmoil in the realm of civil rights in the United States. The purpose was to give disadvantaged students access to individualized programs funded by the federal government rather than using state and local funding. This initiative was the first in the evolution of using federal funds being directed to a categorical group of students.

With all systems there must be evaluation of progress. After reviewing the success of the program, it was discerned that,

…many of the initiatives were 'free floating', rather than representing a systematic, programmatic and coherent approach to school change. There was correspondingly, in this phase, an emphasis upon organizational change, school self-evaluation and the 'ownership of change' by individual schools and teacher. But these initiatives were loosely connected to student outcomes, both conceptually and practically, were variable and fragmented in conception and application, and consequently, in the eyes of most school improvers the practices struggled to impact upon classroom practice. (Hopkins & Reynolds, 2001, p. 459)

The first attempt at providing federal funding was indeed sporadically beneficial in placing a magnifying glass upon students who did not have access to an education that fit their needs. However, there were many points that required improvement upon the model. First and foremost, the basis for success was inconsistent and relied heavily upon individual schools and teachers and their chosen curriculum. Due to this shortcoming in the fundamentals, inconsistency in student success varied greatly.
Growing pains naturally occur when anything new enters into a deeply rooted institution. However, with time and reflection on the Elementary and Secondary Education Act, a redefinition occurred in the 1970s which, “…became an era of regulation development during which federal policy makers and Office of Education officials attempted to define the nature and intent of Title I through an increasingly expansive and detailed set of rules and regulations” (Sabatier & Mazmanian, 1979, p. 387). Rather than focusing on how to implement the mission of the legislation, regulators were more intent on the fiscal dispersal of funds, thus fragmenting the program into the realm of inconsistency.

“By the end of the 1970s, then, concern began to emerge about the obtrusiveness of the federal (and state) categorical regulatory structure…and how structures could be changed to improve program quality and impact on students” (Odden, 1987, p. 233). Title I programming regularly pulled-out students from their regular classes, thus forcing them to master two separate curricula. “Title I was more a funding mechanism than a specific program or policy for helping at-risk students” (Vinovksis, 1999, p. 189). Districts were happy to accept federal funding, but did little to alter the curriculum to show significant differences between identified students and their classmates. By the 1980s, the program did not look very different than when it first began, other than it’s renaming to Chapter I.

“The 1980s was a time when education could be front page news, when education became the business of business, when state legislatures and “education” governors set out to legislate “excellence”…” (Barton & Coley, 1990, p. 4). In 1983, an alarming report that began with “An Open Letter to the American People” was issued by members
of the newly formed National Commission on Excellence in Education. This group was charged by then Secretary of Education T.H. Bell to "...examine the quality of education in the United States..." (National Commission on Excellence in Education. 1983. p. 4). The report attempted to "...widen its focus to include the learning and achievement of all children, in part as a reaction to U.S. students' mediocre performance rank in international achievement comparisons" (Baker, 2004, p. 3). The report made the assertion that the more global impact of failing schools put "...American prosperity, security, and civility" (Baker, 2004, p. 3) at risk. The report continued to explain the purpose for concern,

Our concern, however, goes well beyond matters such as industry and commerce. It also includes the intellectual, moral, and spiritual strengths of our people which knit together the very fabric of our society. The people of the United States need to know that individuals in our society who do not possess the levels of skill, literacy, and training essential to this new era will be effectively disenfranchised, not simply from the material rewards that accompany competent performance, but also from the chance to participate fully in our national life. A high level of shared education is essential to a free, democratic society and to the fostering of a common culture, especially in a country that prides itself on pluralism and individual freedom." (Commission on Excellence in Education, 1983. p. 5)

The Commission's recommendations focused mainly on the role of secondary and post-secondary schools and relied heavily upon the use of data and grading systems to accurately assess the individual student's ability to comprehend the curriculum. With the focus shifted to the frightening prospect of our nation's student population, national discussion ensued. However, what was actually achieved, and what impact did this report have on the elementary school level?

In response to this report, "...congressional enactment of a set of technical amendments in 1983. Their primary effect was to restore many Title I provisions, including evaluation. States were required to collect data and evaluate programs every 2
years” (Timar, 1994, p. 55). Nevertheless, the gap between students remained. “Chapter 1 students have gained more than similar students who did not receive Chapter 1 services. Their gains, while positive, have not been great enough for them to catch up with their non-Chapter 1 peers” (LeTendre, 1991, p. 328). Funding was dispersed based on categorical necessity rather than academic need. However, evaluations used were not consistent therefore measure of student achievement could not be compared at the national level.

In 1988, congress was faced with reauthorizing the Elementary and Secondary Education Act.

By 1988 or so, evaluations of the educational situation were changing once more. The state-led movement, regulatory top-down, appeared to have completed its agenda, yet widespread dissatisfaction with education remained. The new term for reforms was “restructuring” and with it came a call for a fundamental break with the organizational, governmental, and pedagogical practices of the past. This new call included the proposition that change should start from the bottom, that there should be room to exercise discretion at the school building level, and that professionalism should be restored to the teaching profession. (Barton & Coley, 1990, p. 5)

New amendments were proposed and this piece of legislation became known as the Hawkins-Stafford Elementary and Secondary School Improvement Amendments of 1988. These amendments provided for expansion and clarification on the use and guarantee of funding to schools. It also provided grant opportunities to develop programming that would impact student achievement and involve parents in the acquisition of student learning. “Authorizes appropriations for FY 1989 through 1993 for Federal evaluation, coordination, technical assistance, research activities, and authorized studies under Chapter 1…Requires local evaluations of Part A programs and State evaluations of Chapter 1 programs” (Hawkins & Stafford, p. 9, 1988). The legislation
continues to state, "Sets forth recordkeeping and information requirements for SEAs under Chapter 1."

The legislation guaranteed five years of funding so districts could make long-term planning of programming and student evaluation. "For the first time in a federal education program, Congress, in the Chapter 1 program improvement provisions, mandates accountability for student performance, provides opportunities for flexibility and creativity in the pursuit of improved performance..." (LeTendre, 1991, p. 328). "The putative glue that binds Chapter 1 program effectiveness to accountability is the amendments' school improvement provisions" (Timar, 1994, p. 56). The new revisions made to the Chapter 1 program allowed for local decision making to determine student need, type and duration of instruction, and success goals.

The Department of Education put forth an evaluative process of Chapter 1 effectiveness, which had not formally been done before that would address "...program improvement, schoolwide projects, funds allocations, recipients of services, background and training of Chapter 1 staff and the regular program, effectiveness of parent involvement, procedures, and effective curricula" (LeTrende, 1991, p. 334). Additionally, "There was much debate in the 1980s about whether the excellence movement was addressing the goals of increased access and equality...Thoughtful observers saw that the twin goals of excellence and equality did not necessarily conflict" (Barton & Coley, 1990, pp. 5-6).

Coinciding with the duration between the Hawkins-Stafford Amendments between 1988 and 1993, a vision of goals was laid out to direct the future education. President George H.W. Bush proposed America 2000 in 1991 that focused on voluntary
testing of core curriculum at grades 4, 8, and 12 and challenged schools to offer a “world-class” education to their students. These major ideas were underscored with the idea that, “No civil society of compassionate nation can neglect the plight of these children who are, in almost every case, innocent victims of adult misbehavior” (p. 13). While this was not legislation, it did become a loose source of strategy for the stakeholders in education.

When President Clinton took office, strategies for education were expanded in the Goals 2000: Educate America Act developed in 1994. “Confronted with the continued apparent failure of Chapter I and the growing demands for higher academic achievement in Goals 2000, the Clinton administration and the 103d Congress significantly restructured the program” (Vinovskis, 1999, p. 192). This act built a framework in the development of school improvement plans and deploy funding based on submitted grants to make school based plans move into action. In addition to the six original goals “...concerning school readiness, school completion, student academic achievement, leadership in math and science, adult literacy, and safe and drug-free schools” (Paris, 1994, p. 25), it also added the goals of “...encouraging teacher professional development and parental participation” (p. 25).

This framework acted as an impetus to the Improving America’s Schools Act of 1994, which was formally identified as the Elementary and Secondary Education Act and the Stafford-Hawkins Amendments. Under the 1988 form of this legislation, for school-wide programming to be financed, 75% of the student population had to come from low-income backgrounds. Improving America’s Schools Act loosened the eligibility requirement to 50% of the school population, thus making “…virtually all Title I schools eligible to operate school wide programs. These regulatory changes are intended to prove
the effectiveness of entire schools rather than targeting services to meet the needs of the most disadvantaged subpopulations” (Wong & Meyer, 1998, p. 116). Expanding the program to encompass a more diverse population of learners aided schools in developing a holistic approach to not only special programming, but also to the regular curriculum. The curriculum was focused because, “…the new legislation stressed standards-based education that mandated the creation of state-level high academic content standards, coordinated with authentic student assessments, and linked to local school curriculums and practices” (Vinovskis, 1999, p. 193).

By the end of the 1990s, questions still abounded regarding the effectiveness of federal intervention in school improvements and reducing the achievement gap of the nation with attention to global competitiveness as well as equity issues within the schools. The first wave of reform focused mainly on comparisons based on inconsistent testing. By the 90s, attention was drawn to research-based curriculum, engagement of adults, and a goal for global competitiveness. “While fundamental philosophical questions about a federal role in promoting elementary and secondary education have abated somewhat, concerns about the effectiveness and efficiency of those federal programs have grown” (Vinovskis, 1999, p. 188). The new millennium brought forth a push for total school restructuring.

With the review of what began as the Elementary and Secondary Education Act looming, President George W. Bush proposed his version of educational reform titled No Child Left Behind Act of 2001. This act calls for “…educational practitioners to use ‘scientifically-based research’ to guide their decisions about which interventions to
Data-Driven Decision Making 17

implement” (National Council for Excellence in Government, 2003, p. 5). This legislation,

...emphasizes the importance of measured achievement of all students. It has raised the consequences of test score results while at the same time requiring more grade levels to be tested and more detailed reporting on the performance of groups within schools. Although there are numerous other provisions, involving requirements for teacher quality, the use of evidence in making decisions, and so on, NCLB early became known for its emphasis on testing and accountability. As the dominant, legislated form of education improvement, NCLB enjoins states to rely on student test results as the primary information source to assess progress and to guide the improvement of learning. In a framework that emphasizes accountability as the path to growth, NCLB archetypically demands a system where responsibility for outcomes is located and sanctions (or rewards) are assigned. (Baker, 2004, pp.1-2)

This act moves attention from the delivery and quality of chosen curriculum to student based outcomes. Evaluative processes are moved to the forefront in an attempt to compare effectiveness of educational opportunities. “The fate of school reform seems to lie within the current debate between those who are calling for the centralization and standardization of school practices and those who are calling for decentralization and individualization of schools” (Conti, Ellsasser, & Griffin, 2000, p. 58).

With this legislation due for renewal in 2007, a review of the success or failure of the program will be quick to follow. Relevant concerns abound when realizing that, “Achieving these goals is challenging, as the rigor of tests, content standards, and performance standards vary greatly from state to state, and each state has a different starting point” (Linn, Baker, & Betebanner, 2002, p. 3). The reliance on standardized testing goes hand-in-hand with consequences.

By implication, student assessment was the driving force behind school improvement. If assessment could turn the spotlight on schools that failed to show adequate progress in student achievement, the resulting glare of public scrutiny might pressure them to do better. There are, however, several flaws in this line of reasoning. It assumes schools’ capacity and willingness to make
significant changes in instructional practices in response to public pressure and assumes that they are organizationally competent to effect sustained learning gains for poor inner-city students. (Timar, 1994, p. 55)

Although federal legislation is relatively new in the realm of education, there is little doubt that the pairing will be eliminated. What will the role of the government play in the volatile world of educational development? “And although the policy shift was conceptually a positive move toward consonance between performance, it has fallen short of policymakers’ expectations…Policymakers’ have learned a good deal since 1965 about policy implementation. It is a more nuanced and difficult process than had been imagined” (Timar, 1994, p. 65). What voice will be dominant in decisions made at the national level?

...educational reform flaws grow out of the fact that those who are in charge of determining educational policy and practice are non-educators, which contributes to the fact that American education is rooted in a hodgepodge of assumptions, causing Americans to avoid establishing a professional agenda and mistaking symptoms rather than deeply seated conditions as the cause of educational difficulties. (Conti, Ellsasser, & Griffin, 2000, p. 18)

What can we take from government involvement in education, specifically with impact to district and individual schools? “…there has been growing evidence of an enhanced utilization of the insights of school improvement and school effectiveness by many governments and official agencies generating considerable controversy” (Hopkins & Reynolds, 2001, p. 460). Invariably, calls for reform in public education will persist, and schools will continue to strive for educational excellence.

Strategies for Effective Implementation in Schools and Districts

“National Conference of State Legislatures…identified accountability as a top priority... To achieve accountability, the states needed a set of achievement tests and data
about school characteristics used to create ‘indicator’ systems to track progress and spot underperforming schools and school districts” (Barton & Coley, 1990, p. 10). To comply with federal regulations, states, districts, and schools are busy developing a systematic approach toward collecting and synthesizing data focusing on schools demographics, categorical groups, and individual students. Districts are not only streamlining their systems, but also looking at the infrastructure of their curriculum, and the proper deployment of staff.

The studies suggest the need for a constructivist approach to facilitate school reform. Restructuring school sites need to promote forms of close collaboration, a strong sense of community, shared governance structure, shared understandings of purpose, and empowered teachers who recreate the school structures and conditions needed to better educate students and solve problems and dilemmas associate with schools. (Conti, Ellsasser, & Griffin, 2000, p. 54)

The purpose of this section is to identify the components that are necessary for success in developing and maintaining data collecting systems to drive decision-making and establish a model of continuous improvement.

Before collection and analysis of data can occur, fundamental foundational supports must be in place. Resources, both tools and personnel, are essential in the beginning phases. The first phase includes deploying a data team composed of staff members and advised by a data coach or strategist. The data team has the essential task of building “…a sense of community that provides support for improvement over the long run”, and additionally “…lightens the burden on any one person and ensures that if a member leaves, the team continues to function…and is likely to view data from multiple perspectives” (McREL, 2006, p. 4). Reducing bias when interpreting the data collected allows for more complete insights and recommendations for how to proceed with the next phase of collection, specifically when making decisions about a specific child. The data
team will report to staff and share their conclusions while also proposing ways to modify activities with research based strategies to maximize student achievement.

“Decision making is a people-intensive activity that relies extensively on insight, experience, and expertise” (Picciano, 2006, p. 33). A data coach or strategist is a key component on assisting and informing the data team with the technical aspects of interpreting raw data collected. “The most difficult aspect of using data, our study found, is linking it to an appropriate intervention. The challenge is not to provide more of the same, but instead, provide different instructional strategies to reach a variety of learning styles” (Armstrong & Anthes, 2001, p. 3). A data strategist should not be a member of the staff, but rather viewed as a resource to offer ideas and research-based strategies.

“The use of a data coach as a mentor to the data team is a related strategy that can strengthen the use of data in the school” (Lachat, et. al., 2006, p. 18). This person is also charged with the task of taking care of the technical aspects of creating synthesized reports for review by the data team and school staff.

Once these resources are in place, schools must identify essential questions regarding the student population. When the system begins, staff must rely upon data that may not be consistent, however, as the review process ensues, alignment will occur.

“Organizing data use around the most essential questions about student performance is an effective strategy for building staff members’ ability to use data and maintaining a clear focus on student progress and program effectiveness” (Lachat, et. al., 2006, p. 16).

“Purposeful data collection and analysis efforts focus on answering questions that are tied to identified needs and goals...” (McREL, 2006, p. 3).
The types of data collected are varied and offer outcomes that drive decisions. “To make appropriate decisions about programs, data may need to be analyzed over multiple years; to make appropriate decisions about students, data may need to be disaggregated, analyzed across classes and teachers and draw on more than one source” (McREL, 2006, p. 3). Disaggregation is the ability to parse data down to the most detailed information to recognize nuances that effect outcomes, and offers the option to compare a variety of sources.

“Historically, public schools have had access to volumes of data... Despite this wealth of data, decision making in school districts, at best, has been based on frequency counts of raw data or on the averaging of standardized test scores on the aggregate level” (Carroll & Carroll, 2002, p. ix). What data do we need and should be used? Schools and districts have many choices depending upon the guiding questions they have chosen to answer. “When data are used to make decisions about students’ learning and about schools, the decision makers need to be confident that their interpretations and uses of the information are credible and defensible” (Earl & Katz, 2006, p. 57). Focus could be on categorical data collection such as demographic data that includes background information, achievement data may include student results on state, district, or teacher-developed assessments, or possibly instructional-processes data, which includes records of the curriculum, programs, classroom practices, etc. The data collected must be obtained from sources that are reliable, valid, and offer a variety of ways to measure and compare.

Many data teams at the beginning of this journey are seduced by the infamous mean or average of data sets. While this statistical measure is appropriate to understand
the central tendency. "But when outliers appear, the median is an alternative that is not affected by these unrepresentative scores. If you're in a hurry...the mode will work with a quick glance at the frequency distribution table" (Carroll & Carroll, 2002, p. 42).

Additional attention needs to be given to how the data will be used. If it is for a comparison over time, cross-sectional data may be created. "Each year, information is reported for different groups using a common time frame" (Rudner & Boston, 2003, p. 63). This type of collection is useful when assessing the efficacy of curriculum or disaggregating trends in a grade level. Longitudinal data is quite useful when making systematic changes and there is a need to follow the progress of a single child or a cohort of students to make decisions based on their failure or success.

"Not all schools...have felt the positive impact from what they believe is data-driven decision making. The most common reason: most districts in this country believe they are being data-driven when they have analyzed the dickens out of their state assessment results" (Bernhardt, 2004, p. 16). Essentially, many teams are relying only on summative data, usually pulled from standardized test scores and item analysis. These offer a one-dimensional view about curriculum, schools, or districts, but very little information about planning for individual student programming. The key to making this process useful is to utilize summative data along with formative data. "Formative evaluation is everyday work. It does not need to be complicated, expensive, or time-consuming...It describes something that teachers, principals, and educational leaders do everyday: monitor and adjust programs to get the best possible results" (Champion, 2000, np). Using summative data as a dipstick to check the systems is useful for expansive
decision making, but it must be used in line with formative data so the immediacy of student change can be maximized.

Schools and districts need to be equipped with tools to properly collect, store, and separate the data that has been collected. Federal guidelines mandate that public schools must be able to demonstrate annual progress and show achievement trends over time. Storing this data and being able to separate needed information quickly is necessary for reporting at all levels. Technology has been developed to assist in this enormous task.

“Data warehouses exist to help transform the growing mountains of data useful information and to help managers identify key trends” (Rudner & Boston, 2006, p. 63). They also serve to store and generate needed reports from raw data to aid teams in making decisions in a timeline that is appropriate for change.

After empowering teachers with tools, resources, and research-based strategies to aid in delivery of materials, they must also have access to resources to individualize their instruction and make it work with their own delivery style. Being equipped with resources to assist not only struggling students, but also those who are accelerated is essential. “One of the most intriguing ways schools use data, we found, is to change teachers’ attitudes toward the potential success of previously low-performing students” (Armstrong & Anthes, 2001, p. 2).

There are so many who are invested in the results of the data that is being collected at the building level. Not only those who serve to collect and interpret the building level data, but also the classroom teachers, support staff, community members, parents, and of course, students. Communication of findings to stakeholders is the final phase in this cycle, but is also the beginning of making decisions for developing or
refining the essential questions for the next round of review. The results of the data collected need to be shared, along with the purpose or motivation for why the specific data was collected. “Sharing data and developing strategies for using data to drive instructional and administrative decisions are at the heart of an effective process” (Piccaiano, 2006, p. 9).

What are the common threads with districts that are successful in implementing data-collection systems? Armstrong and Anthes (2001) developed a list of key attributes that include:

- Strong leadership, not only in the school building, but also at the district level
- A supportive district-wide culture for using data for continuous improvement
- A strong service orientation toward principals and teacher
- Partnerships with universities, businesses, and non-profit organization
- A mechanism for supporting and training personnel to use data
- Close accounting of every student’s performance on academic standards
- A focused flexibility in how time is used
- A well-defined, data-driven school improvement process

**Implications and Barriers for Success in Schools and Districts**

“Schools today are more data rich than ever, requiring staff members to develop their data literacy – that is, their knowledge of how to use assessment data with other types of data to identify areas of effectiveness and to target instructional improvement effort” (Lachat, et. al., 2006, p. 16). There are many implications to successful implementation of data collecting systems. Identifying those barriers will aid in
addressing situations before they become detrimental to the decision making system.

Missing any piece addressed in the previous section will cause failure of the system. This section will address the major barriers effecting school level data systems.

“In considering resources for data-driven decision making activities, emphasis is usually placed on the hardware and software needed for developing the requisite information systems. However, just as critical is the development of the people resources” (Picciano, 2006, p. 33). Much of the discussion surrounding evidence-based learning in our schools is focused on how to collect and report required information rather than the development of equitable, individualized, and quality based programming. The value and expertise of teachers’ voices are being dismissed and drowned out in these important discussions. “...there are now two largely contradictory school reform movements in the United States, one located mainly inside the education profession and another pressing from outside it” (Zemelman, Daniels, Hyde, 2005, p. 3). When professionals are not validated for their unique perspectives, a brain drain will occur which directly affect the success of students.

Development of action research teams within buildings will enable teachers to have their voices heard and valued. “Clear and authoritative performance goals provide the external impetus for schools to focus on student achievement and to adjust their own expectations of students to the high expectations of the accountability agency” (Mintrop & MacLellan, 2002, p. 277). “This is why an education system must develop a proper context for data-driven school improvement. The challenge is to create a culture for accountability based on professional standards of mutual respect, collegial learning, and regular, open, honest conversations about student performance” (Conzemius, 2000, p.
Focusing staff on common goals based on professional pedagogy aligns classrooms with building objectives.

Current research suggests that the most successful schools are those that have a sense of purpose, a mission, and an identity of their own which grows out of a capacity to honor the values and beliefs of the smaller community while adhering to the standards of education set by the larger society.” (Conti, Ellsasser, & Griffin, 2000, p. 7)

Collegial dissention can work to decay and sabotage authentic collection of data. Along with aligning the goals for the evidence that will be collected, the staff must also be completely on board. “Norms of collegiality do not simply happen. They do not spring spontaneously out of teachers’ mutual respect and concern for each other. Rather, they are carefully engineered by structuring the workplace for frequent exposure to contact and frequent opportunities for interaction” (Rosenholz, 1985, p. 367). Using the analogy of an archery range, if there is one not aiming at the target, everyone is put in danger. All arrows must point in the agreed upon direction.

The criteria used for assessment of success or failure is of constant concern. High-stakes testing and the threat of becoming a school placed on the national “watch list” is a constant concern being held over districts and schools. This trickle down dilemma is passed on to classrooms, which only works to compact problems together. Schools are required to make “Adequate Yearly Progress” (AYP) under the No Child Left Behind Act. If a school slips two consecutive years, they are identified as schools needing improvement and are placed on the watch list. The dominant factor is the use of standardized test results.

As the last decade was drawing to a close, some resistance to so much testing the public schools was becoming evident. Although it was expressed in different ways, much of the criticism focused on using multiple-choice tests as the sole method of determining achievement, and on the effects of such tests on classroom
teaching practices. As the 1990s began, a handful of states were experimenting with new forms of tests that measured actual student performance, or that strived to be ‘authentic.’ (Barton & Coley, 1990, p. 9)

When developing a plan at the school level, action teams need to develop measures that reflect the needs of the student population. These measures serve to provide more frequent information that can be acted upon quickly and drive instruction. Standardized testing serves as a good starting point when looking at item analysis of areas that are lacking. Using information disaggregated from a standardized test should cause discussion about curriculum enrichment. Regardless of standardized testing, there are many other variables at play in the interpretation of data.

Variability in school change scores is generally interpreted to be the result of real changes in the quality of education that is provided by a school. There are, however, many other factors that contribute to changes. Measurement error, differences in the student body from year to year, and nonpersistent factors, such as in the teaching staff, contribute to variability in school change scores. (Lynn & Haug, 2002, pp. 33-34)

Additionally, test scores are reported based on a grade level rather than following a cohort of students. Using cohort data across several years is better for building level improvements to identify trends in stable factors such as curriculum, and remove variability in factors like teachers and class sizes. To get the best information for basing decisions, data should be compared not from year to year, but rather skipping a year in between. “Combining across several years lengthens the accountability cycle, but produces results that are more trustworthy and therefore more likely to lead to real long-term improvements and to the identification of exemplary practices as well as enhancing fairness” (Linn & Haug, 2002, p.35).

Districts have adopted set curriculum based on standards, however, they do not always guarantee they are research-based and proven. The push for use of materials and
strategies that are research based can be intimidating, especially for a seasoned professional. In early stages of this systematic approach to continuous improvement, teachers will often rely upon past practices with curriculum timelines rather than using data to drive the pace and direction of the curriculum. "...the pressure to stay on pace with curriculum – particularly mandated curriculum with pacing plans – and a perceived lack of flexibility to alter instruction when their analysis of data reveals problem areas that require time to remediate" (Marsh, Pane, Hamilton, 2006, p. 9).

Time considerations need to be addressed early in the process. "Time delays associated with receiving test results also affected educators’ ability to use the information for decisions" (Marsh, et. al., 2006, p. 9). In addition to obtaining data for immediate use, teachers must be equipped with time for dealing with logistics of putting learning into practice with students. Making time to administer assessments is another major concern due to the frequency needed to continuously make improvements. One misnomer many have is that all assessments must include all students. "For most purposes we can obtain suitable accuracy quickly and inexpensively on information gained from a sample" (Carroll & Carroll, 2002, p. 63). Using a sample of a few randomly chosen students can offer a time-saving alternative when looking for a quick reference point for instruction.

There are innumerable tasks that teachers and staff must take care of on a daily basis. Prioritizing is difficult, especially when data-driven decision making can be viewed as long-term, not requiring immediate attention. "Some of this work occurs during the district’s...professional learning days...Currently, elementary school faculties dedicate one staff meeting per month to professional development. Teachers’ planning
periods are scheduled by grade levels so they can collaborate” (Newman, 2006, p. 11).

Individual and collaborative time needs to be provided for use in developing appropriate assessments, create and obtain materials, collect, synthesize, and discuss data, and finally, share and discuss the results for use in future planning. “Planning is a key mandate for persistently low-performing schools on probation in many accountability systems” (Mintrop & MacLellan, 2002, p. 275.) Data teams will require more time beyond this to work together to disseminate the future course of action.

Access to and practice with technology tools is also intimidating. Having access to hardware and software that should make data collection simple needs to be used frequently. “A technology tool is required to manage data flow” (Schwarz, 2002, p. 4). Technology access can completely stop the purpose for collecting data. When a staff cannot enter or get access to data in a timely manner, frustration will dominate. Additionally, staff must be trained in how to best utilize the tools that are at their fingertips. Ideally, the hardware will be capable of connecting several sources together to aid in data disaggregation. Teachers that have access to data can form strategies to effect positive student outcomes immediately.

The largest barrier to success is the elimination of the personal investment on the part of administrators for teachers, and thus, teachers for students. There is level of distance that results when separating students from the numbers that are produced. Value must be placed on the people that make the system successful.

Educators are driven by a strong sense of purpose and a profound commitment to children and learning. We accept, at a very deep level, the responsibilities that come with our work. We are most excited by the prospect of making peoples’ lives better through learning. (Conzemius, 2000, p. 41)

Conclusions and Recommendations
Education is a business of people, but most importantly, young minds that are yearning to grow. Once students realize that understanding how they match up to standards, they will invest in their success. Through careful guidance, classrooms will become a community and a culture of learning. The process of developing a systematic approach to using data to drive decisions will not happen immediately.

"Much work remains, and many challenges lie ahead. As a point of contrast, the transformation of medicine from a field dominated by authority and professional consensus to one dominated by evidence arguably began in earnest in the 1930s and was not in full bloom until the early 1990s. The yield in health outcomes from that transformation in medicine put public health inarguable. For example, life expectancy at birth in the United States increased by 30 years from 1900 to 2000. Dramatic changes can also be expected from evidence-based education if it receives appropriate support..." (Report to Congress, 2007, p.26)

My experience with developing a continuous improvement model at the building level was unique. To ensure that loathing of the system does not occur, time, resources, and value of people need to be in place. It is appropriate to have a long-term vision of end results, however, when the majority of staff is at beginning level, tasks cannot be mastered with expertise.

A severe lack of expertise in regard to understanding statistical data can become a huge detriment to a school building. Confusion and misdirection of the course of action can, and likely will occur. An in-house data strategist must be at hand to assist in guiding the professional team of teachers. Through an e-mail correspondence with Susan Leddick, I was able to ascertain her advise when the “decay” factor hits a school who is separated from expert guidance.

Dr. Deming used to talk about this all the time, and of course you played “telephone” with your friends when you were a little girl. Deming likened the loss to what happens if you use a pattern to cut a board, then use the cut board for the next cut, the second cut board for the third cut, etc. Before long, you have distorted the desired length. He always used to chide us by saying, “return to the
source.” “Fidelity” is the term that describes your concerns, and it is certainly an issue. It is a primary consideration in the adoption of research-based models, for instance. It is the hardest thing to manage in train-the-trainer processes. About the best you can do is follow Deming’s advice...return to the fundamentals to check and calibrate your practice periodically. (S. Leddick, personal communication, July 5, 2007)

Focus needs to be placed upon what we can do to accelerate American students in the public school system. This movement was driven with equity for all students at the forefront. This mantra has quickly become more of a political talking point than a means for action. Fundamentally, anyone who is invested in this important topic of education is concerned with all students in our country and their continued success and competitiveness with other countries.

Many have criticized seasoned professionals for their perceived inability to adapt to legislation. As evidenced in the first section of the review, there have been so many shifts in educational movements within their career, probably more than in any other time in education. Being skeptical about the flavor of the month (or presidential administration), one has to wonder how long this particular movement will last, or more importantly, how will the lessons we have learned carry over into future decisions about education and the integration of outside voices from the federal level.

Personally, I believe that the standards movement is reaching its limits and that a new paradigm of education is taking shape alongside it. The shape is not definite yet, but some of the outlines seem to be greater personal choice, more individualization (or customization), and more use of technological alternatives, to name a few. See the work of a man named Joel Barker, who wrote about paradigms and paradigm shifts thirty years ago for more explanation of how the new paradigm emerges at the very time the old paradigm seems to be invincible and all-powerful. You also know from CSL that success changes the game – solutions to old problems literally produce new problems. Fun, huh? What will be the emerging new problems that the standards paradigm produces? That’s what young leaders like you need to be asking. (S. Leddick, personal communication, July 5, 2007)
Schools are truly in an era of varied demands. Student populations are fluid, teaching positions are difficult to fill with qualified candidates, broader instructional material needs to be addressed, and so on. Along with all of these are the demands of local, state, and federal demands and agendas. "There was much debate in the 1980s about whether the excellence movement was addressing the goals of increased access and equality... Thoughtful observers saw that the twin goals of excellence and equality did not necessarily conflict" (Barton & Coley, 1990, pp. 5-6). Somehow, when it comes down to the magic of learning, balance is obtained in the classroom when "aha" moments occur and a child is changed forever.
References


HOFER: I was fortunate enough to get information directly from you regarding the continuous improvement model. I found, however, that as satellite classes were formed to teach other teachers the fundamentals of this model, the message began to decay and be skewed. Is there a certain amount of ‘acceptable’ loss of information as it is filtered through several channels?

LEDDICK: Interesting question. Dr. Deming used to talk about this all the time, and of course you played “telephone” with your friends when you were a little girl. Deming likened the loss to what happens if you use a pattern to cut a board, then use the cut board for the next cut, the second cut board for the third cut, etc. Before long, you have distorted the desired length. He always used to chide us by saying, “return to the source.” “Fidelity” is the term that describes your concerns, and it is certainly an issue. It is a primary consideration in the adoption of research-based models, for instance. It is the hardest thing to manage in train-the-trainer processes. About the best you can do is follow Deming’s advice...return to the fundamentals to check and calibrate your practice periodically.

HOFER: What do you feel is the fundamental goal of the use of data driven decision making at the national level?

LEDDICK: The national education system has many goals, but in my opinion, two are primary: equity of results across all subgroups (remember our CSL retreat timeline and the shift in national policy from equity of access to high quality public education to equity of results?) and maintaining international competitiveness in the global knowledge economy. These two goals explain why NCLB emphasizes subgroup achievement and
why the US is participating in international assessments like PISA (see oecd.pisa.org—or is it com?) National policymakers also rely on NAEP scores to indicate overall achievement.

HOFER: Do you find in your travels a gap from state to state in the adoption of these methods? How many do you feel are up to standards?

LEDDICK: For the past 5-7 years there has been a convergence of practices from state to state. Early on, in the Eighties when quality methods were being adopted in industry worldwide, only a very few education leaders were even aware of what was going on. Even the language of performance and results was resisted in education back then. But things began to change in the ‘90’s with the acceptance of standards. The standards movement opened the door for quality methods in education. Today, whether I work in Connecticut or California, I find essentially the same practices being advocated, taught, and practiced. Elements I find throughout: reliance on data for decision making (and the subsequent reliance on testing to provide “objective” data on learning); teachers working in teams to align and improve their practice; curriculum alignment; emphasis on teacher professional development judged by its impact on student outcomes; some form of action research, with various names for the processes. Based on evaluation work I have done in several states, it doesn’t seem to make much difference what people call these things. It does make a difference if the pieces are connected and really focused on student achievement. The connections and focus on student achievement are easier to talk about successfully than to do successfully, however, because of the complexity of education and the obstructive cultures, practices, and beliefs that exist in so many of our schools.
Personally, I believe that the standards movement is reaching its limits and that a new paradigm of education is taking shape alongside it. The shape is not definite yet, but some of the outlines seem to be greater personal choice, more individualization (or customization), and more use of technological alternatives, to name a few. See the work of a man named Joel Barker, who wrote about paradigms and paradigm shifts thirty years ago for more explanation of how the new paradigm emerges at the very time the old paradigm seems to be invincible and all-powerful. You also know from CSL that success changes the game – solutions to old problems literally produce new problems. Fun, huh? What will be the emerging new problems that the standards paradigm produces? That’s what young leaders like you need to be asking.

**HOFER:** Since each building decides upon their goals to be reported to the district, what information is being reported at the state level to meet national standards? What is the “consistent” factor for judgment of success?

**LEDDICK:** NAEP is the only national assessment that gives such information. If you take a look at *Education Week* about a month ago, you will see an article about the gap between state standards and NAEP standards. That article (or more accurately, the report that generated it) is creating a stir in state departments of education, for it shows that there is a wide range of expectations among the states. In fact, the question of 49 sets of state standards (Iowa the only holdout) is an ongoing policy issue in Washington. The differences among state standards lead to differences among the state assessments, leading to differences among “factors for judgment of success,” to use your phrase. This may be part of the reason that we are hearing more and more about the international assessment results. PISA (Program of International Student Assessment) is a way to get
Data-Driven Decision Making

a national measurement rather than a compilation of the state assessments which contain so much measurement error.

**HOFER:** What effect has NCLB had on the adoption of the continuous improvement model?

**LEDDICK:** It has had a strong effect. It was probably only a matter of time before national education policy began to reflect the standards movement. NCLB has tried to make a connection between the goal of student achievement for all sub-groups, the distribution of federal funding, and the effectiveness of school systems in producing achievement. NCLB has made it crystal clear that student achievement levels and gaps matter. As the law comes up for reauthorization this year (or next, depending on when Congress gets it done), the argument is going to be about the nature of consequences for nonperformance, not whether there should be consequences for nonperformance, in my opinion. Expect to see changes in how SPED and ELL subgroups are handled, for instance, but not whether accountability for learning is an appropriate expectation for government to hold for the public education system at large. Former USED secretary Dr. Rod Paige was once quoted as saying, “There is a clear line of sight from *Brown vs. Board of Education* to NCLB.” Civil rights are part of this law. Then there is the global economy and the internationalization of competition among nations as the other part.

As an educator, if you are going to be held to ever-rising expectations for performance, you can’t rely on luck to get you there. You must have a method – a purposeful intention and process – for producing the outcomes you want. Continuous improvement is that kind of intentional process.

- Susan Leddick, 7/5/07


