TEACHER USE OF DATA TO GUIDE INSTRUCTIONAL PRACTICE IN ELEMENTARY SCHOOLS

A Dissertation in

Educational Leadership

by

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ABSTRACT

This descriptive study focused on the degree to which data-driven decision making as envisioned by the NCLB legislation was actually occurring in the elementary schools studied. A multi-stage random sample of six Pennsylvania school districts out of 19 located within the service area of Pennsylvania Intermediate Unit #17, one of 29 regional educational service agencies in Pennsylvania, was utilized. A cross sectional survey was developed and administered to 262 teachers in 15 elementary schools. Usable responses were received from a total of 103 (39.3%).

A picture emerged of both progress toward NCLB expectations as well as the existence of substantial obstacles which threatened to prevent the attainment of those expectations. Although the teachers studied had access to multiple types of data, they tended to rely on only one. Teachers lacked critical supports such as training, time and procedural guidelines. They made good-faith attempts to engage in data driven decision making but relied almost exclusively on their own conceptions/definitions of what counted as data driven decision making and this called into question the very efficacy of those decisions. The overall conclusion of this study was that teachers in the schools studied, despite their efforts to do so, were unable to engage in data driven decision making as envisioned by NCLB.
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CHAPTER 1
INTRODUCTION

The passage of the *No Child Left Behind Act of 2001*, with its strong focus on data, is seen by many as a seminal event in American education. Upon closer inspection, however, it appears that the federal government has long been concerned with educational data. In *Cyclopaedia of Political Science*, Lalor (1899) described the creation of the first federal education agency:

By act of March 2, 1867 (14 Stat. at Large, p. 434), a department of education, with a commissioner and three clerks, was organized ‘to collect statistics and facts showing the condition and progress of education in the several states [italics added] and territories, and to diffuse such information respecting the organization and management of schools and school systems, and methods of teaching, as shall aid the people of the United States in the establishment and maintenance of efficient school systems, and otherwise promote the cause of education throughout the country.’ (para. II.6.2)

The *No Child Left Behind Act* (NCLB) differs from previous federal data gathering efforts in the expectation of what will be done with the data and who will do it. For more than a century, data were collected by the federal government, and sometimes by state governments, for use by state and federal officials and statisticians. Such data were often aggregated and compiled in such a way that it became devoid of any identifiers and could not be traced to any individual student, school or district. It
represented random samples or large anonymous averages. The type of data collected was of little interest to educators in schools across the country, since they relied primarily on classroom instruments and other informal assessments to gauge student progress. NCLB reverses this approach and restructures expectations for the role of data, requiring that it be returned to educators in a usable form with the expectation that educators will make use of it to improve educational performance at the local level. This shift came about following a series of largely unsuccessful attempts at educational reform over a period of nearly five decades.

Prior to the 1950s, Americans viewed their system of education, on the whole, as ranking among the best in the world. That view began to change in 1957 when the Union of Soviet Socialist Republics (USSR) demonstrated the ability to launch the first earth-orbiting satellite before the United States was able to launch one of its own. As a result, demands were made for a stronger focus on science and mathematics in American schools and for increased federal funding for education. For the first time, Americans began to question the quality of their schools.

Those concerns continued to mount during the next two decades. A drop in Scholastic Aptitude Test (SAT) results was observed during the 1960s and 1970s (Peterson & West, 2003). In its continuing efforts to gather data, the federal government introduced the National Assessment of Educational Progress (NAEP), which was administered nationwide to random samples of students at specific ages for the first time during the 1969-1970 school year. Jones (1996) stated, “The goals of the NAEP were to report what the nation’s citizens know and can do and then to monitor changes over time
using objective-referenced assessment…” (p. 15). Petersen and West report that, from 1970 to 1982, NAEP results showed a decline in performance in the areas of mathematics and science. Public dissatisfaction persisted. The social upheavals of the 1960s brought the first significant federal involvement in education, the passage of the *Elementary and Secondary Education Act* (ESEA), which was designed to remedy inequities experienced by disadvantaged students. Federal funding was appropriated in support of additional educational services mandated by the act.

The release in 1983 of *A Nation at Risk: The Imperative for Educational Reform* by the National Commission on Excellence in Education was the next milestone in the growing movement toward educational reform. The report, issued by a national commission appointed by Reagan administration Secretary of Education Terrel H. Bell, sounded an alarm concerning low academic standards (Herrington & Fowler, 2003). It was followed by demands for enhancements in teacher training and compensation, more rigorous educational programming, and extended school hours (Peterson & West, 2003). The primary focus continued to be on “inputs” into the educational environment with some minor, and certainly discretionary, provisions for outcome assessment (Elmore & Fuhrman, 2001).

The economic recession of the early 1990s further focused public attention on education, with suggestions of a linkage between poor educational performance and the country’s economic and political presence on the world stage (Herrington & Fowler, 2003). As public dissatisfaction with and attention to education continued, demands for education standards and documentation of attainment grew, as did bipartisan support for
such measures. The 1994 reauthorization of the Elementary and Secondary Education Act signaled a shift in legislative focus from inputs to include outcomes. For the first time, in exchange for federal funds, states were required to document student progress through test results, which would become public. The states had considerable leeway in determining how to do this and the legislation left much to interpretation. However, the first steps toward outcome accountability had been taken and the role of data at the local level began to emerge.

It was upon this framework that the No Child Left Behind legislation was based. NCLB has at its core the expectation that educators will utilize research and hard data to guide and improve practice as well as meet standards and progress expectations. NCLB also differs from previous legislation in that it provides for consequences ranging from corrective action all the way to reconstitution of schools when goals outlined in the law are not met. It is with its focus on accountability for outcomes and application of consequences that the No Child Left Behind legislation becomes distinct from previous reform efforts. In the years since its passage, NCLB has been a lightening rod for controversy, a subject of vigorous debate, and the focus of numerous examinations and studies. It has also brought about visible changes in the practice of education, although whether or not some of those changes are positive ones is a subject of contention as well. One of the most noticeable changes relates to the new focus on data at arguably all levels of educational practice, from classroom teachers to building administrators to central office personnel and board members. *NCLB: A Desktop Reference* (U.S. Department of Education, 2002) states,
The NCLB Act is designed to help all students meet high academic standards by requiring that states create annual assessments that measure what children know and can do in reading and math in grades three through eight. These tests, based on challenging state standards, will allow parents, educators, administrators, policymakers, and the general public to track the performance of every school in the nation. (p. 9)

Implicit in this requirement is the tacit assumption that the scores generated by these assessments will be utilized to improve educational outcomes. In spite of the fact that the use of these assessment results is and has been the subject of considerable controversy and debate, and that there is little agreement on issues of test validity, relevance to instructional practice, alignment with standards and a host of other issues, test results have in fact become a primary component of accountability systems. The public release of school and district test results can bring considerable pressure for improvement upon educators in schools and districts reporting less than satisfactory results. These test results alone are insufficient to guide educators in improving practice. Supovitz and Klein (2003) described the mismatch between annual test results and educators’ needs for information when they wrote,

External assessment results are primarily intended to be used for accountability purposes outside of the school and should be understood as such. From the school’s perspective, they provide some useful information, but their utility is limited. While school leaders and teachers can glean much information from them, they are not designed to be frequent and specific enough to provide the
timely and fine-grained information necessary for precise instructional guidance and feedback. (p. 39)

Most annual test results are provided to educators long after the conclusion of the school year when it is too late for intervention. In addition, while they indicate the degree to which students have achieved learning goals according to established standards, they do not indicate why such goals were met or not met. To obtain the “timely and fine-grained information” suggested by Supovitz and Klein as well as many others, educators need to access and analyze a much broader and deeper range of data than can be provided by annual test scores. Such data often reach well beyond the narrow focus of numeric representations such as grades and test scores and expand to include the multitude of factors, which influence both student and school performance. These can include student and faculty attendance reports, gender and ethnicity data, formative assessment results, school scheduling data, English language proficiency data, community services data, community surveys, socioeconomic levels, results from daily and weekly quizzes, professional development data, and a host of other types of data. This list is by no means exhaustive. Bernhardt (2004) has suggested grouping the multitude of factors into four measures of data which she identified as: student learning; demographics; school processes; and perceptions data. Fox (2001) recommended a model that identifies three types of data: outcome data; demographic data; and process data. In Whole School Reform: How Schools Use the Data-Based Inquiry and Decision Making Process, Feldman and Tung (2001) suggested the need for a wide scope of data by stating,
It requires looking at the broader picture of the school, of being more reflective and less reactive, of basing one’s ideas in a larger context—data—instead of using anecdotes, and of creating analytical arguments relating points of data to one another. (p. 21)

Access to such data allows educators to place data in context and to develop the knowledge they need to increase student learning and work toward school improvement goals. As Fox (2001) so succinctly stated, “Without data, instruction becomes a series of well-intentioned, but random, acts of teaching” (p. 11).

In the decade since passage of the Elementary and Secondary Act of 1994, the use of data has become recognized as central to the process of school improvement (Wayman, Stringfield, & Yakimowski, 2004). School improvement models are nearly unanimous in their inclusion of some form of data review and analysis procedure.

According to Killion and Bellamy (2000),

Understanding and using data about school and student performance are fundamental to improving schools. Without analyzing and discussing data, schools are unlikely to identify and solve the problems that need attention, identify appropriate interventions to solve those problems, or know how they are progressing toward achievement of their goals. Data are the fuel of reform. (p.27)

Although the role of data in school improvement processes is described extensively in the literature, much less is known about the extent to which data are actually utilized in educational practice. This is due in part to the fact that the focus on data at the school
level is a relatively recent phenomenon, having gotten its start as a result of the Elementary and Secondary Education Act of 1994, which mandated testing and the posting of test results for public scrutiny. Given the intense pressure for accountability and school reform related to NCLB and the assumption that reform will be achieved in large part through data-driven decision making, much needs to be learned about the actual use of data by educators. Findings from the limited number of existing studies suggest that, while some successes have been documented, there may be substantial barriers and challenges to data-driven decision making in schools (Ingram, Louis, & Schroeder, 2004; Mason, 2002; 2003). These include the extremes of both data overload (Feldman & Tung, 2001) and inadequate data (Cromey, van der Ploeg, & Masini, 2000). In addition, there are indications that educators may not be prepared to conduct data analysis work since few colleges and universities have included data analysis in the required coursework for teacher and administrator preparation programs. Concerns have also been raised about the incompatibility of data-driven decision making procedures with traditional school cultures, the substantial amount of time needed to engage in data analysis, and the lack of information technology infrastructure and financial supports necessary to conduct such work. In addition, the question of which school personnel should assume data analysis responsibilities has yet to be conclusively determined. Several recent studies (Englert, Fries, Goodwin, & Martin-Glenn, 2003; Englert, Fries, Goodwin, Martin-Glenn, & Michael, 2004; Torrance, 2002) have described the use of data by school administrators and central office personnel, much of which has come about due to the high-stakes consequences which can be imposed under NCLB. Less
information is available concerning teachers’ use of data to guide instructional practice. Yet it is teachers who have direct contact with students in their classrooms on a daily basis and who have the greatest potential effect on their learning. It appears that the type of systemic reform and school improvement envisioned by NCLB cannot be accomplished by administrative personnel alone. It will require the creativity and efforts of classroom teachers and administrators working together to accomplish genuine and lasting improvements in schools (N. A. Prestine, personal communication, April 19, 2005). Teacher use of data to guide instructional practice is a topic yet to be fully explored and adequately documented. According to Brunner, et al (2005),

School personnel are working hard to develop strategies that support the cohesive use of data across different levels of a school system, and the exploration of how data can inform educational decision making is becoming a main topic of educational policy (Salpeter, 2004; Secada, 2001). Currently, however, research about data-driven decision making is limited. Researchers have only a cursory understanding of educators’ existing practices, and they know little about how these practices are informed by the influx of data-driven tools. (pp. 241-242)

With full implementation of NCLB and its attendant consequences for schools not meeting performance goals less fast approaching, educators, policy makers, and others concerned with the future of public education will need to be fully aware of the extent to which data-driven decision making is occurring in schools as was envisioned by the legislation. Even more importantly, if data-driven decision making is key to improving student learning, it is a topic that must be fully investigated and understood.
Purpose of the Study

The purpose of the proposed study is to contribute to the knowledge base by providing a descriptive picture of the extent and manner in which elementary school teachers utilize data to guide educational practices and instructional decisions.

Specifically, this study proposes to address the following questions: What types of data do teachers utilize? What methods and tools do teachers use to manage and analyze data? For what purposes do teachers utilize data? What factors do teachers identify as either hindering or promoting their use of data in decision making? The proposed study will attempt to characterize the role played by data in elementary school teachers’ day-to-day activities and decisions as well as the conditions under which these teachers utilize data. It will seek to describe the types and quantities of data available to teachers; the types of data most frequently used by teachers, the tools used by teachers to manage data, and provide a descriptive picture of the degree to which teachers’ decisions are influenced by data. In so doing, the study will investigate the extent and the manner in which elementary school teachers are utilizing data to develop information and create the knowledge needed to improve schools. Although issues surrounding the quality of American schools have become the focus of both legislation and the public’s attention, much knowledge is needed to prevent those issues from being clouded by unproven assumptions or hijacked by political agendas. Inherent in NCLB is the supposition that school improvement activities will be guided by data-driven decisions. The study will provide a window into the extent and manner in which teachers are actually using data to
guide their decisions and in so doing will help to clarify the degree to which the assumptions made about the role of data are borne out in actual practice. Educational leaders must be armed with such knowledge if they are to acquire the necessary resources and make the type of informed decisions needed to improve schools.

**Conceptual Framework**

Data-driven decision making in public schools is one of the key reforms sought through the NCLB legislation as well as the ESEA of 1994. Indeed, data-driven decision-making has become a mantra of policy makers and reformers during the last decade. According to Streifer (2002), “Data-driven decision-making can be defined as the process of selecting, gathering, and analyzing data to address school improvement or student achievement problems and challenges and acting on those findings” (p. 8). In an attempt to capture the essence of what exactly constitutes data-driven decision making and to what degree this is actually occurring, the proposed study will investigate four distinct aspects of data-related activities in schools. This four-part framework will be utilized to provide a descriptive picture of the extent to which elementary school teachers utilize data. The four categories, each representing a discrete aspect of data utilization, are: Existence of school data policies, access to data, support for data usage, and application of data. By investigating and measuring activities across each of the four categories, the proposed research will attempt to describe the degree to which data-driven
decision making as envisioned by the federal legislation is actually occurring in the elementary schools under study.

The proposed study will utilize Empson’s framework for knowledge management to measure the degree to which teachers move from managing data to developing information and ultimately to producing knowledge which can be utilized to improve practice. In *Knowledge Management for Educational Information Systems: What is the State of the Field?* Thorn (2001) quoting Empson, wrote,

> It is perhaps easiest to understand knowledge in terms of what it is not. It is not data and it is not information. Data are objective facts, presented without any judgment or context. Data becomes information when it is categorised, analysed, summarized, and placed in context.

Information therefore is data endowed with relevance and purpose. Information develops into knowledge when it is used to make comparisons, assess consequences, establish connections, and engage in a dialogue. Knowledge can, therefore, be seen as information that comes laden with experience, judgment, intuition, and values. (para. 12)

He then goes on to state,

> There is clear progression along the path in which value is added to data, as context is combined with it to create information. A further transformation occurs when human experience is added to information to make value judgments about, and comparisons of different information. (para. 13)
In studying teachers’ use of data, the intent will be to investigate and describe the processes and the degrees to which data are transformed into information, and ultimately into knowledge, which is then utilized to guide instruction.

**Significance of Study**

Given the intense pressure for accountability and school reform related to NCLB and the assumption that reform will be achieved in large part through data-driven decision making, much needs to be learned about the use of data by educators. It is anticipated that the proposed study will contribute to the body of knowledge concerning the extent to which teachers in elementary schools actually engage in data-driven decision making as envisioned by the framers of NCLB. In so doing, it will help to clarify the degree to which the assumptions made about the role of data are borne out in actual practice. Educational leaders are increasingly called upon to make changes at all levels and to deliver results that the public demands. They need to have a knowledge base that is predicated upon a thorough exploration of the actual practices which occur in schools and the degree to which those practices are in actuality data-driven. Such knowledge can enable them to make informed decisions about practices in the schools for which they are responsible. The NCLB legislation has altered the ground rules for public education and initiated changes that few would have thought possible just a decade ago. A body of knowledge must be developed upon which these changes can be investigated and evaluated. At the present time, development of that body of knowledge is in its
infancy, especially with regard to teacher utilization of data for decision making, and many aspects of teacher utilization of data remain completely unexplored. This study proposes to provide a descriptive picture of the degree to which a key portion of the NCLB reform strategy, data-driven decision making is actually being practiced in elementary schools.

The issue of data utilization by educators is an immediate concern. It is more than simply an issue of ensuring that schools meet the requirements imposed upon them by NCLB. If data-driven decision making is being used by teachers, and it can be conclusively shown that student learning outcomes are improved as a result, the potential exists for true, meaningful, school reform. By investigating aspects of data access, school data policies, support for data utilization, and school policies concerning data, the proposed study will take a small but significant step toward building the knowledge base for further research on school reform. The passage of NCLB has brought issues surrounding data-driven decision making to the forefront for educational leaders at the local, state and federal levels. Although a sufficient research base for data-driven decision making in educational organizations has yet to be developed, NCLB has presupposed its value and applicability to schools and holds educational leaders accountable based on the premise that they and those they supervise have the know-how to collect, manage, interpret and apply data. Much hangs in the balance, from the success of individual students to that of entire schools, to educator compensation and job security to the content of degree programs, which prepare future educators. It appears imperative that research related to the use of data in educational practice be conducted on a variety
of fronts to inform educational leaders, policy makers, and the public as they make decisions and plans for the future in these areas.
CHAPTER 2

REVIEW OF THE LITERATURE

“The key to promoting high levels of student achievement is targeted, systematic, and purposeful teaching. Effective teaching is based on informed instructional decision-making, and data provide the fuel for that decision-making.”

Dennis Fox, Consultant, Southern California Comprehensive Assistance Center, Los Angeles County Office of Education.

Today’s educators are under intense pressure to meet accountability requirements related to the No Child Left Behind Act of 2001. Those who do not are at risk of facing potentially severe consequences. As Ingram, Louis, and Schroeder (2004) suggested, the underlying assumption is that educators will use data such as results from standardized tests and other sources, to determine what actions need to be taken to meet standards and criteria established for them and demanded by the public. The accuracy of that assumption has yet to be conclusively verified by a sufficient body of research.

Recognizing that classroom teachers play an instrumental role in school improvement efforts, the proposed study will focus on the extent to which elementary school teachers use data to guide instructional practice. It will attempt to describe the types of data useful to teachers, the tools they use to manage data, the purposes for which they use data, and the factors that support or impede teacher use of data. In studying teachers’ use of data, the intent will be to explore both the processes and the degrees to which data are
transformed into information, and ultimately into knowledge, which can be utilized to
guide instruction.

The review of the literature will focus first on an exploration of the types of data
that are relevant to school improvement efforts. This will be followed by a discussion of
the processes that can be utilized to develop the knowledge needed to inform
instructional practice. The final section of the literature review will concentrate on the
factors, which hinder or promote the use of data in teacher decision-making.

**Identification of Relevant Data**

In the years since the passage of the ESEA of 1994, a growing body of literature
has developed which focuses on the types of data, which are relevant to school
improvement efforts. The literature reflects both narrow and expansive definitions of
pertinent data. Love (2002) suggested a wide characterization of data as “any
information that can guide decision makers as they work toward improving student
learning” (p. 15). Streifer (2002) identified three categories of data, which he described
as input variables, instructional processes, and outcome measures. According to Streifer,
input variables are those items over which educators have little control, such as student
and teacher demographics and fiscal resources. Factors such as curriculum, instructional
materials, school programming, and professional development activities are classified by
Streifer under instructional processes. Streifer’s third category, outcome measures, is
comprised of assessment results, grades, dropout and graduation rates, and enrollments in
post-secondary institutions. To obtain the depth of understanding needed for school improvement, Streifer suggested that analysis across all three categories of data is necessary and that longitudinal data can be utilized to provide depth to the analysis.

Bernhardt (1998 & 2004) provided what is perhaps the most comprehensive description of educationally relevant data when she suggested a schema of four categories of data which she classified as: student learning data, demographic data, school process data, and perceptions data. A description of each of those four categories follows.

Student Learning Data

Student learning data can include measures such as results from standardized tests, authentic assessments, grades, and teacher observations of student aptitudes. Due largely to requirements imposed by the NCLB legislation, test scores have become the basis for, and focus of, accountability efforts in most states. Most prominent among the test scores available are those resulting from administration of the instruments selected for use by each state for federal reporting. NCLB permits states to select their own testing instruments, administer them, establish proficiency levels, and then report results (Finn, 2004). Many of the instruments selected by states have been the focus of debate. A 2004 report from the Thomas B. Fordham Foundation, which rated the accountability systems in 30 states focused on six measures, four of which were related to the testing instruments utilized for accountability purposes in those states. Tests utilized in the 30 states received an overall rating of poor for test rigor, and overall ratings of fair for test
content, alignment of tests to standards, and test trustworthiness and openness (Cross, Rebarber, & Torres, 2004). According to Jamentz (2001),

These measures are valued by the general public for providing reliable and objective comparisons of students across schools, districts, and states. But educators often complain that these tests, given only once a year, provide an inaccurate or incomplete picture of student performance. Numerous opponents claim the tests are biased, favoring students of certain cultural or linguistic backgrounds. (pp. 13-14)

Powers (2003) provided further basis for criticism when he cited evidence that the most significant factor influencing ratings on California’s Academic Performance Index was socioeconomic conditions. Acknowledging the debate, Bernhardt (2004) listed eleven arguments in favor of standardized assessments and fifteen arguments against such assessments. These included pros such opportunities to measure student progress and abilities and alignment of tests with state standards, as well as cons such as narrowing of curriculum to focus on material to be tested and difficulty in measuring students’ critical thinking skills. Despite these concerns, state assessment scores are widely used and widely distributed.

While state assessment scores may be suitable for external accountability purposes, such scores rarely provide the type of information needed by district-level educators to make instructional and programmatic decisions. In addition, basing a course of action on any single measure is unwise. According to Love (2003), “When it comes to student learning, no one test, not even a good one, can possibly give us a full picture of
what students understand and can do in relation to national or local standards and curricula” (para. 7). She suggests the use of multiple measures from different levels, which include national and state assessments, course assessments, and classroom assessments. Test scores, such as those from the ACT, Scholastic Aptitude Test, National Assessment of Education Progress and other instruments can be utilized to provide a broader picture.

An August 2000 Issue Paper (Education Commission of the States) cites examples of multiple measures of student learning which include standardized, norm-referenced and criterion referenced tests; authentic, performance and standards-based assessments; and teacher-made tests as appropriate sources of data. Individual classroom measures such as portfolios, chapter tests, and journals (Supovitz & Klein, 2003) as well as quizzes, student self-assessments and projects, grades and teacher observations provide elements of data which can provide a window on both individual student and classroom progress. While valuable individually for the insights they can provide, these elements become even more valuable when used together to confirm or eliminate assumptions, verify perceptions, and provide a more comprehensive and accurate picture.

In addition to state assessments and individual classroom measures, Supovitz and Klein (2003) suggested that school-wide assessment data, which they defined as “assessments that are not only administered systematically across groups of students within a school, but whose results are aggregated and systematically analyzed for patterns that are then used to guide school and individual teacher decision-making” (p. 10) could be utilized to provide additional insights. According to O’Day (2002), “For the
improvement of instructional practice at the school and classroom level, fine-grained and frequent information, including instructionally integrated diagnostic assessments of student learning and feedback on instructional practice tied to that learning, provides the basis for professional reflection‖ (p. 329).

Demographic Data

Both narrow and wide characterizations of the term demographics are present in the literature. According to Bernhardt (2004), “Demographics are typically known as the statistical characteristics of human populations (such as age or ethnicity)” (p. 32). She went on to state,

Demographics clarify who our ‘clients’ are and who the staff are as service providers. Demographics build the context of the school and help us begin to predict future conditions, so we can take an active approach to serving the needs of our current and future students. These contextual variables are critical and required for understanding any other information gathered about the school. (p. 32)

Palmer (1998) ascribed the ability of teachers to reach their students, at least in part, to their use of demographic data when he stated, “Good teachers possess a capacity for connectedness. They are able to weave a complex web of connections among themselves, their subjects, and their students so that students can learn to weave a world for themselves” (p. 11). Demographic information can help teachers connect with their students and can assist in building knowledge. As Bernhardt conceptualizes demographic
information, it is not confined to the usual fields of ethnicity or socioeconomic status. It encompasses a range of items such as a community’s history, student participation in programs such as Head Start, levels of student employment, student language fluency, staff turnover rates, parental involvement in school activities, etc. Marshall, Sears, and Schubert (2000) wrote,

Teachers who are immersed in practice have again taught me that we need additional information upon which to make sound curricular decisions. We need general knowledge about the implicit curriculum that resides in spheres of student life outside of school, and perhaps more, we need to encourage and enable educators to discover the idiosyncratic patterns of outside curriculum in the lives of students in their schools and classrooms, and what they have learned from these outside curricula. (p. 175)

Student demographical information can be utilized to identify correlations with formal assessment results and to place results in context. Attendance patterns of individual students as well as groups of students may indicate possible reasons for poor performance. Social and economic status as evidenced by free/reduced lunch eligibility may indicate needs for supplementary programming. Ethnicity information may enable educators to better understand the effects of schooling on sub-groups of students. Disability information may allow educators to ascertain whether needs of disabled children are being met. Student levels of English proficiency may confirm need for additional English language classes/programming. For example, in schools where students lack English proficiency, programs may be developed to boost English language
skills through summer and after school programs, English language evening classes for parents, by adding teaching assistants or other support staff to classes, by providing supplemental individualized tutoring, or by using texts that are more appropriate for students with limited English proficiency.

Perceptions Data

Bernhardt (2004) categorizes the observations, viewpoints, and opinions of those involved in school situations as “perceptions” data. The ways in which actors perceive situations and occurrences will determine their reactions to them, their willingness to hold fast or change, to act or remain passive, to contribute or withhold action. Perceptive differences must be taken into account since schools answer to a variety of stakeholders. According to a report by the American Association of School Administrators (2002), “Engaging the public begins with listening. It’s not uncommon for an educator’s view of success to differ significantly from the views of a taxpayer, parent, or business leader” (p.28). The focus on the perceptions of stakeholders is preliminary to understanding the school and community cultures within which initiatives are to be undertaken. It is these cultures, which can facilitate success or condemn to failure the best-intentioned school improvement efforts. For many schools, the move to data-driven decision making represents a significant change in operations. Perceptions data is of substantial importance both in understanding the status quo and in guiding and informing change efforts directed toward improvement. According to Bolman and Deal (2003),
Too many change initiatives fail because they rely too much on ‘data gathering, analysis, report writing and presentations’ instead of a more creative approach aimed at grabbing the ‘feelings that motivate useful action.’ In other words, change agents fail when they rely almost entirely on reason and structure and neglect human, political, and symbolic elements. (p. 383)

Data which can identify and illuminate the perceptions of faculty, staff, administrators, students, parents, community members and other stakeholders in schools can be used to inform planning, decision-making and instruction.

*School Process Data*

The final category that Bernhardt (2004) identifies is school processes, which she describes as the didactic and mental procedures that occur at both school-wide and individual classroom levels. Bernhardt’s examples of school processes include staff development, technology utilization, teacher assignments, instructional strategies, assessment strategies, and student grouping. According to Hoachlander, Levesque and Mandel (1998),

Schools willing to critically examine their core operations will increase the odds that their students will succeed . . . Internally, the availability of such information can lead to a new and healthy conversation among the faculty—one that promotes reflection on practice, healthy skepticism about trendy ideas, and a school culture that values professional knowledge and expertise and finds ways to channel and use it to yield the greatest good for the greatest number. (p.56)
Oftentimes school processes are so ingrained that they are taken for granted. Bernhardt (2004) suggested the use of flow charts and curriculum mapping to illuminate school and classroom processes. By studying these graphic representations, she suggests that educators can begin to determine the impact of processes.

Data concerning school programs and policies may be useful in determining the correlation between educational and community goals and program content as well as the relevance of programming and policies to societal demands and expectations. It can be utilized to determine when programmatic changes and updates are needed. School process data can be used in conjunction with demographic data to illuminate the outcomes realized for groups of students. Bernhardt (2004) stated,

If we are acting on the belief that all students can achieve, any breakdown of subgroups of students should show few differences. Disaggregation also helps us find subgroups that are not responding to our processes in the way that others are—enabling us to understand why and to search for new processes so all students can learn. (p. 36)

Nunnaley (2004) provided a functional example of the use of school process data. She discussed Surveys of Enacted Curriculum (SEC), which are used to provide a window on actual content and instructional practices. She describes a four-part curriculum framework. Part one, according to Nunnaley, is the intended curriculum, or that which is mandated by state content standards. Part two is the enacted curriculum, or that which is actually taught by teachers. She identifies part three as the assessed curriculum, or that which is measured by state and other forms of assessment. The fourth
and final element, according to Nunnaley, is the learned curriculum, or that which students have learned as evidenced by assessment results. Data from each of these parts is gathered and displayed “in a way that allows educators to compare what they are teaching with what they should be teaching, what is being tested, and how students perform on the tests” (Nunnaley, 2004, p. 4).

Multiple Measures

Bernhardt (2004), Love (2002), Johnson (2002) and Holcomb (1999) have suggested that multiple measures of data can be triangulated to verify accuracy. Triangulation involves the use of at least three independent sources of data which, when compared, can serve to either confirm or cast doubt upon assumptions (Love). According to Supovitz and Klein (2003),

Within the school, the availability of multiple data sources of student performance provides administrators and teachers with more frequent evidence with which to act. The confirming or disconfirming of results can provide stronger evidence to support fundamental conclusions or call them into question. (p. 42)

The process of confirming or disconfirming results or assumptions can serve as the springboard from which change occurs in schools. Lachat and Smith (2004) provided an illustrative example of this phenomenon when they described a situation in which school staff assumed that high levels of student absenteeism were the cause of low scores on standardized tests. An examination of the data indicated that, while students with high levels of absenteeism did indeed score poorly, students with low levels of absenteeism
scored poorly as well. This information caused school staff to seek additional explanations for the low achievement scores and to address those issues.

In addition to triangulation across multiple sources of data, longitudinal data or historical data can provide context, signal trends, and serve as a frame of reference. According to Streifer (2002), “Data-driven decision-making’s greatest strength lies in its ability to drive instructional change based on a review of past performance” (p. 15). The value of longitudinal data combined with multiple sources of data was succinctly described in a series of articles by McREL (“Data-driven,” 2003),

By going beyond simple data analysis (examining one year’s results on a single test) to in-depth analysis (examining the interaction of multiple types of data from varied sources over multiple years), educators can determine the effects of their programs and practices and modify them to improve student performance. (p. 2) Love (2002) suggested that longitudinal data from cohorts of students, over periods of years, can be useful in assessing the impact of interventions and changes, because the cohort membership, by remaining constant, eliminated an intervening variable.

Processes for Building Knowledge

The substantial volume and variety of data have necessitated the development of tools and procedures designed to enable educators to manage and make sense of the data available to them. Petrides and Nodine (2003) described the emerging concept of
knowledge management in the context of K-16 education. While acknowledging that a single definition of knowledge management does not yet exist, they suggested that,

…knowledge management in education can be thought of as a framework or an approach that enables people within an organization to develop a set of practices to collect information and share what they know, leading to action that improves services and outcomes. (pp. 10-11)

Thorn (2001) described knowledge management as “…the use or application of information” (p. 8). Petrides and Nodine (2003) suggested that the intersection of three key elements—people, processes and technology—makes possible the effective sharing of information. Knowledge management is distinct from information systems, they emphasized, because of its focus on people rather than technology. According to Petrides and Nodine, “people, not systems, manage knowledge” (p. 11). They believe that knowledge management supports the existence of communities of practice, and that these communities of practice, which are characterized by collegiality and teamwork are critical components.

Breiter (2004) also addressed issues surrounding implementation of knowledge management in schools. He examined the organizational learning difficulties experienced by schools and found that implementation of knowledge management systems in schools was made difficult because schools represent loosely coupled systems. Breiter suggested that knowledge management systems must be integrated into a school’s organizational structure. He also suggested that a shift from traditional whole-class
teacher led instruction to a more differentiated model of individualized and small group learning was needed.

Wellman and Lipton (2000) suggested a model for data-driven discussion among educators. Like Thorn (2001), they recognized that data alone have little meaning, suggesting instead that, “Individuals and groups create meaning by organizing, analyzing and interpreting data” (Guiding Assumptions, para. 1). Wellman and Lipton focused on the importance of collective processes to the success of data analysis and emphasized that meticulous discussion of significant matters results in the development of understanding and knowledge. They suggested a three-phase model and guiding principles for use by groups of educators when engaging in data-driven dialog. Phase one of the model focuses on the expertise, experiences and knowledge of group members and provides an opportunity for them to communicate expectations and make predictions. Phase two focuses on group data exploration as opposed to individualized exploration. In phase two, data is presented to the group visually in a clear and uncluttered manner, making use of color and graphics as appropriate and the group is given sufficient time to examine it and consider multiple meanings which may be derived from it. In the third and final phase, groups develop conceptualizations of problems and formulate solutions. The focus in this phase is on thorough consideration of possible causes of problems before moving on to planning actions to solve them. The emphasis throughout the three phases is on collective processes and actions (Wellman & Lipton, 2000).

Lachat and Smith (2004) suggested teacher collaboration and reflection focused on specific questions can form the basis for effective data analysis of student learning.
They identified potentially valuable outcomes of these processes, which included: (1) the ability to verify or refute assumptions concerning learners and their achievement or lack of achievement, and (2) the ability to identify and address specific areas where students need help. The importance of mechanisms for faculty collaboration and reflection with regard to data is a recurring theme the literature. These mechanisms form a continuum from highly structured approaches to ad hoc groups.

Mason (2003) suggested that professional learning communities can provide a framework for effective data utilization. Her work focused on three studies which examined issues surrounding staff use of data in the Milwaukee public schools. According to Mason, “…professional learning communities appear to provide an ideal organizational structure to address the challenges of schools and the needs of teachers as they seek to learn from data and use it effectively to improve student learning” (p. 24).

The formation of data teams as an apparatus for collaboration and reflection focused on school data is a frequently cited approach. Data teams may be comprised exclusively of faculty members or may include administrative and support staff. Their membership may be prescribed by requirements to have representatives from specific departments, grade levels, and programs, or may be entirely voluntary or subject to appointment by school administration. Some data teams may include representation from parents and community members or school information technology staff members (Chen, Heritage, & Lee, 2005). Love (2002) recommended the inclusion of both teachers and administrators in data teams and suggested that team membership mirror the gender and racial make-up of school staff. Studies by Huffman and Kalnin (2003) and Lachat and
Smith (2004) supported broad representation and suggested that such broad representation expanded the team’s influence.

The roles of data teams vary widely from those which serve to support or model data use to those which are advisory in nature or have the power to make significant decisions or changes. According to Lachat and Smith (2004),

The roles of a data team may incorporate improving the quality and accuracy of school-level data files, ensuring the timely retrieval of data from the district, disseminating data to different groups in the school, helping staff analyze and interpret data, targeting and monitoring goals for improvement, and responding to additional data requests by school staff. (p. 37)

In a paper presented at the 2005 American Educational Research Association conference, Wayman, Midgley, and Stringfield discussed preliminary findings of a study which examined the process of establishing collaborative faculty data teams to improve both practice and student achievement. The study was conducted at four large school districts that had worked in partnership with the Stupski Foundation, a non-profit entity focused on access to high quality education for all children regardless of race or income (Wayman, Midgley, & Stringfield, 2005). Findings suggested that collaborative faculty data teams can play a constructive role in supporting the use of data to improve educational practice. It was noted, however, that there are difficulties inherent in the establishment and operation of such teams, and situational impediments to their effectiveness. Kalnin and Huffman (2003) studied collaborative teams and noted that
participants indicated that collaborative inquiry conducted by teams led to enhanced teacher knowledge and better instruction.

Team approaches to data utilization have been supported by both the North Central Regional Educational Laboratory (NCREL) and Mid-continent Research in Education (McREL) projects. In December 2004, NCREL, in association with Dr. Judy Sargent of the Cooperative Educational Service Agency 7 in Green Bay, Wisconsin, produced a guide for educators embarking on data utilization for school improvement purposes. It provided an overview of types of data and their respective application to school improvement efforts as well as an eight-step process for using data to improve schools. The recommended process included a team approach, which encompassed reflective collaboration and allowed sufficient time for educators to devote to the process. It incorporated the use of four types of data as suggested by Bernhardt (2004), in a continuous process of planning, implementation, evaluation and adjustment.

According to a McREL (2003) series of articles focused on sustaining school reform,

Working as a team builds a sense of community that provides support for improvement over the long run. Also, distributing the work across team members lightens the burden on any one person and ensures that if a member leaves, the team continues to function. In addition, a team is likely to view data from multiple perspectives, which increases the probability that interpretation of data will be less biased and more complete. (p. 2)
While team approaches appear to be among the most successful mechanisms for making use of data, Chrispeels, Castille, and Brown (2000) suggested a reciprocal relationship between data and teams. In a California study of school leadership teams, they found that the use of school data was the strongest predictor of a team’s ability to focus on teaching and learning. This relationship was further highlighted by Kalnin and Huffman in a 2003 study of collaborative inquiry and teams. They wrote, “Data helped break down the cycle of isolation. Data helped break down the barriers faced by teachers. Data helped the teachers critically inquire about teaching. Data helped focus on evidence-based decisions” (p. 579).

Using the Data

The literature has begun to reflect promising examples of situations in which teachers have made use of data to guide and improve practice. Frequently referred to as informing instruction, such applications of data have included targeting instruction to student proficiency levels (Lachat & Smith, 2004; Supovitz & Klein, 2003) as well as for identification of students needing supplemental assistance (Feldman & Tung, 2001). Mason (2003) and Fox (2001) noted that teachers can use data to evaluate instructional strategies as well as to gauge progress. Data can also elucidate student strengths and weaknesses. Cromey, Van der Ploeg, and Masini (2000) described a process of “precision teaching” which involved the use of data to inform instruction by identifying learning goals, measuring student progress against goals, and then delivering subsequent instruction targeted to meet the needs of each student. Teachers have used data to group
students according to specific instructional needs and then deliver instruction targeted to
the needs of small groups (Supovitz & Klein, 2003).

Lachat and Smith (2004) explored data use in urban high schools as part of a four-
year case study that focused on high school restructuring. Their initial findings suggested
that the use of data allowed educators to sharpen the focus on factors related to student
performance, to identify issues that were not otherwise apparent, and was instrumental in
informing decisions.

Supovitz and Klein (2003) conducted an examination of the ways in which
student performance data were used to improve instruction in a study of schools that were
using the America’s Choice comprehensive school reform model. They observed that
teachers used multiple measures of student performance data to identify lesson
objectives, individualize instruction, and to monitor student progress relative to
standards. Supovitz and Klein suggested that the use of each of the three types of data for
different, yet related, purposes might form the underpinnings of an effective school data
system. They wrote,

The ultimate purpose of an intertwined system of assessment built upon different
data sources with different uses is to develop and exercise the habits of inquiring
into the complex meaning of student results as they relate to the instructional
practices of teachers and the organizational capacity-building strategies of school
leaders. (2003, p. 42)
A study by Brunner et al. (2005) suggested that teachers’ primary use of test data was to determine allocations of their own resources, including time, attention, practice, and homework. They also suggested that, to a lesser extent, teachers used test data provided to them for activity planning as well as for lesson and unit planning.

Armstrong and Anthes (2002) reported on a study conducted by the Education Commission of the States that explored the ways in which exemplary districts used data. The study focused on six school districts located in California, Colorado, Iowa, Maryland, and Texas. The districts studied used data to track student achievement for diagnostic and placement purposes and to provide teachers with a context in which to view their students’ results as they compared to other schools with similar demographics. They also used assessment data as a mechanism for identifying teachers’ professional development needs and to determine the effectiveness of instructional interventions.

The experiences of six Massachusetts schools using data based decision making were the focus of a 2001 study in which Feldman and Tung explored the effects of data-based decision making on practice. They found that increased levels of teacher reflection on practice were evident in schools successfully implementing data-based decision-making, and that the culture of these schools took on a more professional context.

**Barriers and Supports**

It appears that considerable supports are necessary to facilitate the effective use of data by teachers and, in the absence of such supports, substantial barriers are
encountered. These inter-related supports include: (a) time to devote to data activities, (b) access to appropriate data, (c) tools for managing that data, (d) a school culture which supports data utilization, (e) leadership and professional development focused on data, and (f) opportunities for data-related collaboration with colleagues.

Time

The need for time devoted to data-related activities emerged as a recurring theme within the literature (Armstrong & Anthes, 2001; Cromey, van der Ploeg, & Masini, 2000; “Data-Driven”, 2003; Feldman & Tung, 2001; Lachat & Smith, 2004). Teachers need time both to participate in professional development activities that build their data utilization skills as well as to apply what they have learned to their practice. According to Mason (2003),

Having time to learn about and use data was critical to many teachers. Without support from school administrators, including a commitment to provide time for teachers to learn how to use data, they felt their personal use of data would remain sporadic. They wanted time, in school, to learn with each other how to use data and share results. (p.13)

Even after receiving data-related training, teachers require time and ongoing support to make use of data. Data analysis and knowledge development are time consuming work, which, in order to be done well often require teamwork, meetings, and ongoing discussion and debate. Teachers need time to analyze and discuss the data, place it into context, and apply it to their work. Typical school day schedules in which the
majority of teacher time is spent in class do not readily accommodate such activities. In a 2004 study of principals’ use of data, Englert, Fries, Goodwin, Martin-Glenn, and Michael wrote, “Lack of time to work with data was mentioned repeatedly as a limitation. One principal listed his or her school’s top three issues around data usage as ‘Time to crunch data. Time to study data. Time to plan curriculum adaptations (p. 13).’” This concern was echoed by Ingram, Louis and Schroeder (date), who noted that, even in schools known for their Continuous Improvement practices, time allotted to teachers for data-related pursuits was insufficient. Cromey (2000) recommended that schedules be readjusted or additional time made available to allow teachers to work with data.

The issue of time for data-related activities is closely related to the issue of collaboration between and among teachers, since collaboration requires not only time, but communal time among multiple teachers at once. Collaboration appears repeatedly in the literature as an important ingredient in using data to improve practice. In schools that are often characterized by the isolation of teachers (Kalnin & Huffman, 2003; O’Day, 2002), opportunities for collaboration may be severely limited. Some schools have addressed this need through the scheduling of common planning time for groups of teachers. While this is one avenue for facilitating collaboration, it presents additional challenges related to the scheduling logistics and costs involved. Other mechanisms for facilitating collaboration include “early release” afternoon meetings or after school meetings for which additional compensation is provided (“Data-driven, 2003). An added barrier to collaboration may arise in situations where teachers already feel overloaded by job
demands and are, therefore, unwilling or unable to take on the added responsibility of finding time to collaborate with colleagues.

Access

To create the knowledge that will enable them to improve practice, teachers need access to accurate data that is relevant and comprehensive in nature. This necessitates the availability of multiple sources of data as well as longitudinal data that are reliable and accurate, timely, and in workable formats which place them in context. According to Thorn (2001),

A robust knowledge management system must reflect the information and knowledge management needs of all levels. In particular, data must be gathered at a level of aggregation appropriate to the user with the most fine-grained analytical needs. (p. 11)

It appears that such data may not yet be universally available. Some schools face an overall lack of data (Choppin, 2002), others are overwhelmed by too much data and many fall somewhere in between. In a paper presented at the conference of the American Educational Research Association in 2002, Sarah Mason wrote,

For many schools, obtaining clean and timely data, in a useable format, is easier said than done. Commonly, schools collect and enter data on a daily basis into computer terminals that automatically send the data to district databases for accountability and compliance purposes. However, many older district information systems make it difficult for schools in turn to retrieve and download
the data once it has been compiled; or, the data are in the wrong units (e.g.,
attendance data reported by school quarter, when the school wants to look at daily
attendance patterns). Assessment data can also be problematic in that the data are
often returned to schools months after test administration and often will after the
school has closed for the summer. When data are available, they may often be in
a format incompatible with local school software. (p.8)

O’Day (2002) noted that teachers receive too much information and that much of the
information they do receive is not relevant to the enhancement of teaching and learning.
She stated, “For the improvement of instructional practice at the school and classroom
level, fine-grained and frequent information, including instructionally integrated
diagnostic assessments of student learning and feedback on instructional practice tied to
that learning, provides the basis for professional reflection” (pp. 293-329).

In addition to access to multiple and longitudinal forms of data, teachers need to
see data in formats which integrate disparate items of data with other items, thus
providing context and identifying relationships (Lachat & Smith, 2004). Teachers need
access to such data in a timely manner, which allows them to analyze the data and adjust
instruction while the students for whom they have data are still in their classrooms.

Culture

The importance of a data-friendly organizational culture is a persistent theme in
suggested that school culture might be the ingredient most critical to the success of data utilization. Schein (1993) defined culture as,

*A pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.* [italics original] (p. 364)

Because data utilization has not traditionally been a part of school activities, it is reasonable to assume that some measure of cultural change is required to successfully incorporate its use. Cultural change in schools, as in other organizations, can be a difficult and time-consuming process. Choppin (2002) and Mason (2003) acknowledged the need for cultural shifts related to data collection. According to Mason, “The first challenge is for schools to create a school culture that not only encourages the use of data, but that looks upon data as a source of information that can contribute to problem-solving and knowledge-building” (p. 19). For many schools, this represents a significant and, in some cases, fundamental change. As discussed earlier, schools for decades have been measured not by the outcomes they produced, but by the inputs they provided. A shift to a focus on outcomes requires numerous changes in the ways schools and their teachers conduct their activities and view themselves and their work. In a data-driven culture, teachers’ traditional reliance on professional judgment and intuition would have to be joined by a focus on inquiry and objective data. In such a culture, working with data is viewed as a routine activity, not an added one. This activity is valued by the
members of the organization because it produces desirable outcomes. In a data-friendly culture, the organization provides supports for data-related activities, which include time, resources, professional development, and opportunities for collaboration and reflection. Administrators in data-friendly cultures support faculty inquiry and input, model effective data-for-decision-making behaviors, and ensure that data is not misused. The issue of misuse can significantly affect the culture of an organization tasked with embracing data-related activities. Herman and Gribbons (2001) and Holcomb (1999) cited situations in which teachers expressed apprehension that data would be used against them or to unfairly evaluate or blame them. In such an environment, teacher resistance to a culture that embraces data can be particularly challenging.

Mason (2003) observed that, “…many schools simply are not organized to use data to improve teaching and learning” (p. 3). Supovitz and Kline (2003) and Ingram, Louis, & Schroeder (2004) have cautioned that issues related to the values, expectations, and traditions which affect the ways in which schools conduct their business will need to be examined before the necessary cultural changes can occur.

Leadership

Closely aligned with issues of school culture in using data to improve practice is the issue of leadership. According to Schein (1993), “Organizational cultures are created in part by leaders, and one of the most decisive functions of leadership is the creation, the management, and sometimes even the destruction of culture” (p. 360). A key aspect of moving to a data-driven culture is the presence of leadership within the school. Although
such leadership frequently is provided by administrators, they are not the only school personnel who can effectively provide the leadership needed for successful data utilization. Effective leadership related to data utilization can also be provided by teachers, data coaches, or other individuals as well as by teams and additional groups. Data-focused leadership can take a variety of forms, which are closely related to conditions within individual schools and the school districts and communities to which they belong. The presence of data-related leadership is critical, and that leadership can be provided by a variety of actors holding a variety of positions and/or titles. The cultural and operational changes needed to move to a data-driven approach rarely occur spontaneously. Rather, they are more often the result of advocacy and guidance of those who believe in or who have experienced the benefits of using data to improve practice. According to Trice & Beyer (1993), “Members cannot be expected to change their convictions without some organized presentation and discussion of the new ideas they are expected to internalize” (p. 390).

Principals and other building-level administrators are frequently well positioned to initiate a shift to data-driven practices, both because of the authority conferred upon them by their positions and through their abilities to make available the necessary resources. In a study of urban high schools, Lachat and Smith (2004) confirmed that principals played a pivotal role in promoting data utilization. They observed that principals, “created a vision of data use . . . emphasized the use of data for both accountability and improvement . . . modeled the use of data . . . [and] supported the use of data by providing time for staff to analyze and use data” (p. 32). Armstrong and Anthes
(2001) noted that principal leadership, in the form of establishing data use expectations for teachers and routinely reviewing data with teachers was among the factors, which supported school improvement. Providing such leadership is not without its challenges. Much like their colleagues who teach, building level administrators often find themselves with inadequate time to attend to all of the duties with which they are charged. Also like teachers, administrators may lack formal preparation in data collection, management, analysis, and application. Even when administrators have the time and skills, they may face only minimal, unenthusiastic compliance from teachers who do not see value in using data and simply “go through the motions” to comply with administrative directives. According to Trice & Beyer (1993), “The successful management of the processes of culture change or creation thus often entails convincing people that likely gains outweigh the losses…” (p. 383). Inducing teachers to consider the potential gains from data utilization can be another function of leadership.

An additional challenge to data-related administrative leadership comes in the form of pressure, either from central office, parents, community, or state education offices, to show improvement in the measures upon which schools are judged each year. This pressure to meet adequate yearly progress requirements can sometimes cause administrators to focus on demonstrating short-term or statistical gains at the expense of focusing their efforts on those activities which can bring about long-term substantial improvements in student learning (Mitchell & Conrad, 2003).

Teachers, whether at the request of administrators, as members of professional learning communities, or simply as motivated individuals or teams, can be very effective
in advocating for and demonstrating the benefits of data-driven practice. Conversely, they can present substantial obstacles should they find it necessary to resist a move toward data utilization. According to Feldman and Tung (2001) teacher leadership is critical, “Teachers must own the process, provide leadership for inquiry groups, facilitate meetings, push the thinking of others, and coordinate other aspects of the process” (p. 23).

Professional Development

Because the focus on data has come about fairly recently, few teachers, administrators, and others in the ranks of school personnel have adequate, or in some cases any, professional training or preparation in the management, analysis, and application of data to instructional practice. Concerns about formal preparation of teachers to manage and analyze data were expressed by Massell (1998) when she wrote, “Even when teachers receive individual student data, interpreting the results can be a difficult task because teacher education programs traditionally have offered little training in using assessments or interpreting implications for learning and instruction” (p.46).

In Getting Excited About Data, Holcomb (1999) echoed these concerns, My observations are that more than half of our teachers have graduate degrees and have taken at least one course in tests and measurements or statistics. I have four graduate degrees myself and can recall no class discussion of what to do with assessment information in planning how to help the students do better. (p. 22)
This lack of pre-service preparation has necessitated that professional development focused on data analysis and application be provided to teachers already in service. Although in-service professional development programming can often be costly, both in time and resources, one benefit of providing data-related training in this manner is that it can be customized to meet the specific needs of the teachers in a given school.

According to Supovitz and Klein (2003), “Research on effective professional development points to the advantages of staff improvement activities that are embedded within the school and constructed around content to fit the needs of the teachers at that particular school (Kennedy, 1998; Little, 1993; McLaughlin & Darling-Hammond, 1995)” (p. 20). Depending upon the needs of the school, in-service professional development programming can provide support for data utilization by addressing a wide range of topics including: assessment literacy and curriculum alignment (Mason, 2003), inquiry methodologies; student evaluation; collaborative processes; teamwork; teacher leadership roles; utilization of data to create knowledge; data collection; data analysis; triangulation; self and peer evaluation strategies; information technology fundamentals that include commercial spreadsheet and database applications as well as use of specialized products purchased by the school or district; and a host of other topics specific to the challenges facing a particular faculty or school. Light, Wexler, and Heinze (n.d.) suggested that, “…in order for data-driven decision-making to change teaching and learning practices, the focus of professional development should be on teaching and learning, rather than on data analysis” (p. 1). Professional development programs can also be utilized to address issues related to school culture, change, and faculty concerns.
In addition to structured professional development activities in which faculty have opportunities to learn new skills and concepts, teachers preparing for data utilization need less structured time to reflect, collaborate, apply, discuss, experiment, plan and evaluate. This may present another significant challenge in that, as Huffman and Kalnin (2003) pointed out, “Numerous studies have shown that teachers have very little time during the day to work with other teachers, plan lessons as a team, or even talk with their colleagues (US Department of Education, 1996a)” (p. 569). Armstrong and Anthes (2001) found that schools engaged in successful data-based decision making had revamped daily schedules to allow additional time for teacher professional development.

**Information Technology Applications**

Information technology applications have the potential to be the tools that will allow educators to harness the power of data and apply it to the improvement of instruction (Streifer, 2002; Wayman, 2005; Wayman, Stringfield, Yakimoski, 2004). These applications have the power to categorize, store, and show relationships among large quantities of data in both aggregated and individualized formats, over multiple school years. Streifer suggested that the use of information technology applications to handle multiple data items corresponds to the nature and value of the actual inquiry process. Bernhardt (2004) acknowledged the role of information technology as an important support for data utilization when she wrote,
If a school wants to improve student learning, it has to use data. Using data effectively requires data tools—particularly student information systems, data warehouses, and instructional management systems. Such tools are necessary to get student data into teachers’ hands when they need it, without their having to wait for the district’s data guru to provide an analysis. Without data tools, our vision of data-smart schools is merely a dream. (p. 66)

Wayman, Stringfield, and Yakimoski identified several ways in which information management systems can support teachers: storage and retrieval of individual student performance data, provision of a breadth and depth of student data appropriate for teacher research, and fast and efficient access to data suitable for guiding day-to-day classroom instruction. Mitchell and Conrad (2003) recommended that teachers, as well as administrators and parents, have facile access to multiple forms of student data throughout the school year. Wayman (2005) suggested that, to maximize the use of data to guide and improve classroom practice, teachers should have access to the universe of data from their own desktops in their classrooms at any time. Such access usually requires the presence of a data warehouse, which Bernhardt (2004) defined as,

A single, large database that has collected relevant information from several other sources into a single, accessible format designed to be used for decision making. The data warehouse is created to house data imported from many other data sources that are not designed to work together or to share information. (p. 285)
Although data warehouses promise to facilitate access to data and thereby support its use, they can be costly and both time and labor intensive to develop. Even more challenging is the determination of what data will be included, how it will be characterized, and most importantly, the identification of relationships between data elements. These tasks often require the contributions of both highly skilled database designers in conjunction with well thought out and detailed input from professional educators.

When data warehouses are not available, there are a number of other information technology applications that can be utilized by educators. These range from readily available individual spreadsheet and database programs to data support tools such as Quality School Portfolio (QSP). Salpeter (2004) described a continuum of components that can be used to create a data support system: support services from specialized consultants; the use of applications that can perform analyses, identify or predict trends, and produce graphical representations; and utilization of software that supports decision-making and prescribes activities in addition to those stated above.

While the literature seems to suggest that these tools hold much promise, the degree to which information technology tools are effective in supporting data utilization in schools has not yet been documented. According to Chen, Heritage, and Lee (2005), “A strong research base on technology-supported data use in schools and districts, specifically with reference to identifying at-risk students, does not yet exist” (p. 329).
Summary

NCLB remains a highly charged issue and divisions between stakeholders remain deep. It appears, however, that perspectives concerning the use of data may be changing. Cromey, van der Ploeg, and Masini (2000) described the shift in attitudes that has begun to occur with regard to the role of data when they stated,

At this point, there is some consensus among researchers and policymakers regarding the need to use data better in schools. The accountability movement has apparently pressed this issue to the point of recognition, if not acceptance, by practitioners as well. Therefore, questions regarding ‘why’ data should be used for educational decision making have been somewhat quelled. The lingering question is ‘How?’ (p. 31)

Recent research by Feldman & Tung (2001), Supovitz & Kline (2003), Lachat & Smith (2004), and others has identified ways in which data can be utilized by teachers to guide and improve practice. Yet, as Cromey, van der Ploeg, and Masini (2000) have pointed out, it appears that the problems and challenges associated with acquiring, managing, and interpreting the large amounts of data related to both school and student performance are considerable. What then, is the status of the field with regard to the use of data as a means of informing instruction? As with many questions facing educators, more study is needed.
CHAPTER 3

METHODOLOGY

Today’s educators are under intense pressure to meet accountability requirements related to the No Child Left Behind Act of 2001 (Public Law 107-110). In the years since its passage, NCLB has brought about visible changes in educational practices, although whether or not some of those changes are positive ones remains a subject of contention. One of the most noticeable changes relates to the new focus on data and the use of data at arguably all levels of educational practice, from classroom teachers to building administrators to central office personnel and board members. As Ingram, Louis, and Schroeder (2004) suggested, the underlying assumption is that educators will use data, such as results from standardized tests and other sources, to determine what actions need to be taken to meet standards and criteria established for them and demanded by the public. According to Killion and Bellamy (2000),

Understanding and using data about school and student performance are fundamental to improving schools. Without analyzing and discussing data, schools are unlikely to identify and solve the problems that need attention, identify appropriate interventions to solve those problems, or know how they are progressing toward achievement of their goals. Data are the fuel of reform. (p. 27)

While there appears to be some agreement as to the value and role of data in school reform efforts, not enough is known about the extent to which educators actually utilize
data. Given the intense pressure for accountability and school reform related to NCLB and the assumption that reform will be achieved in large part through data-driven decision making, much needs to be learned about the use of data by educators. Conclusions from previous studies indicate that there are substantial barriers and challenges to data-driven decision making in schools. Feldman and Tung (2001) note,

Schools are inundated with a wide variety of data and are looking for ways to understand how to interpret the data that is provided to them, as well as how to use the process of inquiry to improve the quality of instruction offered by their school. Many schools are currently working with data in limited ways, often as a reactionary response to external pressure, with little thought given to what process can do for the school. (p. 4)

Recent studies have described the use of data by school administrators and central office personnel, much of which has come about due to the high-stakes consequences that can be imposed under NCLB. Less information is available concerning teachers’ use of data to guide instructional practice. Yet it is teachers who have direct contact with students in their classrooms on a daily basis and who have the greatest effect on their learning. Because the focus on data-driven decision making is relatively new, having begun in small measure following passage of the Elementary and Secondary Education Act of 1994 and undertaken in earnest since the passage of NCLB in 2001, the topic of teacher utilization of data has been insufficiently explored. Are teachers using data to guide their instructional practices? Two recent studies suggest the existence of many challenges related to effective utilization of data by teachers (Ingram, Louis, &
Schroeder, 2004; Mason, 2002; 2003). The type of systemic reform and school improvement envisioned by NCLB cannot be accomplished by administrative personnel alone. It will require the creativity and efforts of classroom teachers and administrators working together to accomplish genuine and lasting improvements in schools (N. A. Prestine, personal communication, April 19, 2005).

The study will attempt to add to the knowledge base by focusing on the use of data by classroom teachers. The purpose of this study is to provide a descriptive picture of the extent to which teachers utilize data to guide instruction. As suggested by Shavelson and Towne (2002),

Questions are posed in an effort to fill a gap in existing knowledge or to seek new knowledge, to pursue the identification of the cause or causes of some phenomena, to describe phenomena, to solve a practical problem, or to formally test a hypothesis. (p. 55)

In an effort to achieve a descriptive picture, the proposed study solicited teacher responses to the following questions:

1. What types of data are relevant to teachers’ classroom-related needs?
2. What processes do teachers utilize to transform raw data into information and ultimately to build knowledge?
3. How is the knowledge gained from data utilization applied to classroom practice?
4. What barriers prevent teachers from making effective use of data?
5. What supports are needed to enable and facilitate effective use of data by teachers?
Logic and Rationale

Given the high stakes surrounding school improvement and the key role of data-driven decision making envisioned under NCLB, a broad base of knowledge concerning the use of data by classroom teachers is needed. It is clear that no single research design can provide all of the necessary knowledge and the need for multiple studies is evident. As Nardi (2003) stated,

There are many different ways of gathering data, depending on the questions we are asking, whom or what we are studying, the financial and time limitations of our project, and the amount of detail we desire. Each method not only comes with strengths and weaknesses that must be evaluated carefully before selecting, but it also comes with a set of assumptions about the nature of knowledge, beliefs in the efficacy of science, and other philosophical questions about how we can make sense of the world in which we live. (p.14)

Extensive consideration was given to both qualitative and quantitative approaches for the proposed study. A post-positivist approach was selected because it appeared to offer the best means for examining teachers’ use of data. According to Creswell (2003),

The knowledge that develops through a postpositivist lens is based on careful observation and measurement of the objective reality that exists “out there” in the world. Thus developing numeric measures of observations and studying the behavior of individuals become paramount for a postpositivist. (p. 7)
Given the limited knowledge base that currently exists with regard to teacher use of data, a primary consideration will be the acquisition of empirical information that begins to describe data utilization by teachers working under the mandates of NCLB. This empirical information, in conjunction with data from other studies, can be utilized to build a descriptive picture of the state of teaching with regard to data utilization.

A non-experimental quantitative study was proposed. Creswell (2002) indicated that quantitative research is used to study research problems requiring a description of trends. He stated,

In *quantitative research*, the investigator studies problems in which trends need to be described or explanations need to be developed for relationships among variables. Describing a trend means that the research problem can best be answered by a study in which the researcher seeks to establish the overall tendency of responses from individuals and to know how this tendency varies among people. (p. 50)

Following the passage of NCLB, phrases such as “data-driven decision making” quickly entered the educational lexicon and became buzzwords for reformers and critics alike. Yet these terms have not been adequately defined, and in fact, have multiple meanings. By focusing a lens on actual practice, it may be possible to contribute to efforts to better define and understand the many buzzwords that are frequently used with regard to data utilization and in so doing, to shed some light on the actual state of teacher practice under NCLB. It can also help to assess the degree to which data utilization can be a valuable practice or determine if it is just another of the many education fads which have
permeated the last three decades. Creswell suggested that the results of such a study “…can inform the researcher about how a large population views an issue and how diverse their views are about the issue” (pp. 50-51).

**Delineation and Justification of the Selected Research Design**

With more than six years of NCLB implementation already in place, an accurate portrayal of the degree to which teachers are actually utilizing data as envisioned by the law is needed. A cross-sectional survey design appeared best suited to developing such descriptions. According to McMillan and Schumacher (2001),

> Research using a descriptive mode of inquiry simply describes an existing phenomenon by using numbers to characterize individuals or a group. It assesses the nature of existing conditions. The purpose of most descriptive research is limited to characterizing something as it is. (p. 33)

With NCLB passage in 2001, and implementation of its mandates stretched over several years, time and opportunities for adequate research have been limited. Many, if not all of these mandates are now in place, and schools have had several years to consider and respond to them. Researchers and educators are in need of a base of knowledge that helps them to understand and assess the changes that have actually occurred. A descriptive study, which paints a picture of what teachers are or are not doing with data, can serve as one piece of the foundation of the required knowledge base. Johnson and Christensen (2000) wrote,
The primary purpose of descriptive research is to provide an accurate description or picture of the status or characteristics of a situation or phenomenon. The focus is not on how to ferret out cause-and-effect relationships but rather on describing the variables that exist in a given situation, and, sometimes, on how to describe the relationships that exist among those variables. (p. 302)

Researchers, policy makers and those in the field of education need to know if teachers actually have access to data, if that data is relevant to their classroom needs, how they are using it or not using it, what barriers prevent them from making use of it as the legislation envisioned, and what supports are needed to facilitate use of data. Such information can then become part of the debate with regard to the efficacy of data utilization and of NCLB itself.

**Site and Sample Selection**

A multi-stage random sample of six school districts out of 19 located within the service area of Pennsylvania Intermediate Unit #17, one of 29 regional educational service agencies in Pennsylvania, was utilized. The Intermediate Unit #17 region is comprised of Bradford, Lycoming, Sullivan, and Tioga counties in North Central Pennsylvania. There are 47 elementary schools located with the 19 school districts that comprise the Intermediate Unit #17 region.
Superintendents of the initial six districts selected using a random numbers table were contacted for permission to conduct the survey of teachers at elementary schools within their districts. When a selected district superintendent declined, an additional district was selected using the random numbers table. This process continued until permission was obtained from six superintendents. Signed Letters of Permission were requested and received from each superintendent. Concerns that surveys took up too much time and that teachers were being asked to participate in too many surveys were common themes echoed by superintendents and other school administrators contacted by the researcher. One Superintendent simply remarked that “teachers are being surveyed to death.”

The six districts selected were given the pseudonyms Alpha School District, Beta School District, Gamma School District, Delta School District, Epsilon School District, and Kappa School District.

In situations where a selected district contained three or fewer elementary schools, all elementary schools were included. When a selected district contained more than three elementary schools, a random numbers table was used to select three elementary schools from that district. Using this method, a total of 15 elementary schools were included in the sample, which was made up of three elementary schools from Alpha School District, three from Beta School District, two from Gamma School District, one from Delta School District, three from Epsilon School District, and three from Kappa School District. The sampling frame consisted of all teachers in selected elementary schools. The number of elementary school teachers by district is shown in Table 3.1.
Table 3.1  Elementary School Teachers by District

<table>
<thead>
<tr>
<th>District Name</th>
<th>Elementary Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>55</td>
</tr>
<tr>
<td>Beta</td>
<td>59</td>
</tr>
<tr>
<td>Gamma</td>
<td>48</td>
</tr>
<tr>
<td>Delta</td>
<td>35</td>
</tr>
<tr>
<td>Epsilon</td>
<td>43</td>
</tr>
<tr>
<td>Kappa</td>
<td>22</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>262</strong></td>
</tr>
</tbody>
</table>

According to Babbie (1990), “Survey samples must represent the populations from which they are drawn if they are to provide useful estimates of the characteristics of that population” (p. 70). According to Gravetter and Wallnau (1988), “One way to ensure that the sample is representative is to use random selection. In random sampling, every individual in the population has the same chance of being selected” (p. 5). Random sampling procedures were utilized to reduce bias and in so doing obtain a sample population from which generalizations might be made. Babbie (1990) stated,

The ultimate purpose of survey sampling is to select a set of elements from a population in such a way that descriptions of those elements (statistics) accurately describe the total population from which they are selected. Probability sampling provides a method for enhancing the likelihood of accomplishing this aim, as well as methods for estimating the degree of probable success.
Random selection is the key to this process. A random selection process is one in which each element has an equal chance of selection independent of any other events in the selection process. (p. 75)

**Research Strategies/Instrumentation**

Initial contacts with superintendents were made through a letter, identifying the researcher as a graduate student in Educational Leadership at Penn State University, explaining the goal of the study, and asking permission to contact teachers within his or her district. Every effort was made to emphasize that the only contact with the teacher would be via e-mail, that the survey could be completed online, and that no visits, meetings, or other activities would be conducted that could in any way interfere with the teacher’s schedule. The letter stated that the survey was expected to take approximately 25 minutes of a teacher’s time and that individual responses would be kept confidential. The letter contained contact information for the researcher and indicated that the researcher would call the superintendent to answer any questions he or she might have while considering the request. A form that the superintendent could complete and sign to indicate his or her decision was included with the letter. Upon obtaining the superintendent’s permission, the principal investigator requested lists of elementary school teacher e-mail addresses from the districts’ offices or by contacting individuals designated by the superintendent of each of the participating districts. Copies of the
Superintendent Letter and Permission Form are included as Appendix A and B respectively.

Instrumentation consisted of a cross-sectional survey containing five content areas corresponding to the research questions. By utilizing a cross-sectional survey, it was anticipated that responses would reflect the state of practice of the participating teachers during the 2008-2009 academic year, thus offering a “slice-of-life” view of teachers’ data-related activities as they existed at that moment. According to Babbie (1990),

In a cross-sectional survey, data are collected at one point in time from a sample selected to describe some larger population at that time. Such a survey can be used not only for purposes of description but also for the determination of relationships between variables at the time of the study. (p. 56)

A primary goal was the compilation of data that characterized teacher actions and perceptions regarding the utilization of data in relationship to their classroom practices as well as the supports and barriers they faced with regard to data utilization. The study focused on providing a descriptive picture of what they actually did. Babbie (1990) stated,

Surveys are frequently conducted for the purpose of making descriptive assertions about some population, that is, discovering the distribution of certain traits or attributes. In this regard, the researcher is concerned not with why the observed distribution exists but merely with what that distribution is. (p. 52)

The survey instrument was reviewed for content validity by a panel of five individuals selected for their relevant expertise. The panel included a currently-employed
elementary school teacher from a district not participating in the study, a retired elementary school teacher, a retired secondary English teacher who served as an English language specialist, and two professors who were members of the researcher’s committee. Based on recommendations from the panel, terminology was revised, questions were grouped and ordered, and the number of questions was reduced. The final instrument contained 36 questions of which 23 were multiple-choice, 9 utilized an intensity (Likert) scale and 4 were yes/no questions.

**Data Collection Techniques**

An online search of Buros Mental Measurements Yearbook did not identify appropriate existing survey instruments, or parts of instruments, necessitating the development of an instrument specifically for this research study. According to Fowler (1993),

Designing a good survey instrument involves selecting the questions needed to meet the research objectives, testing them to make sure they can be asked and answered as planned, then putting them into a form to maximize the ease with which respondents and interviewers can do their jobs. (p. 94)

The survey was comprised of five content areas that corresponded to the research questions. These were: (a) types of data relevant to teachers’ needs, (b) processes for using data to build knowledge, (c) applications of data-related knowledge to practice, (d) barriers to teacher use of data, and (e) supports needed to enable and facilitate effective
teacher use of data. Nested within each of the five areas of the survey are questions which relate to the four parts of the conceptual framework: (1) existence of school data policies, (2) access to data, (3) support for data usage, and (4) application of data.

The confidential web-based survey was constructed utilizing the Survey Monkey platform. This platform is readily accessible using any computer with Internet access and offers a convenient, user-friendly interface which facilitates ease of completion of surveys by respondents. To address confidentiality and privacy concerns, Survey Monkey offers SSL (secure socket layer) encryption which was required by the Penn State Institutional Review Board (IRB). SSL encryption provides an added layer of security for information transmitted via the Internet.

Measurement was done using both continuous scales and categorical scales (Creswell, 2003). The use of both continuous scales and categorical scales allowed for the collection of fine-grained descriptive data. Prior to actual administration, the survey instrument was pilot-tested with teachers who were not part of the random sample and then revised as necessary using the evaluations and feedback from teachers who participated in the pilot testing. A group of retired teachers from the Keystone Central School District served as the pilot test group. Keystone Central School District is not located within the designated testing region and was not among the school districts from which teachers participating in the actual study were recruited. Fowler (1993) stated,

Once a survey instrument has been designed that a researcher thinks is nearly ready to be used, a field pretest of the instrument and procedures should be done.
The purpose of such pretests is to find out how the data collection protocols and
the survey instruments work under realistic conditions. (p. 100)

Establishment of both reliability and validity of the survey instrument designed for this
study are discussed in detail in the upcoming section entitled Reliability and Validity.

Administration of the survey followed a series of steps in an effort to increase
response rate. These steps were loosely modeled on those suggested by Salant and
Dillman (1994), with modifications for the use of e-mail correspondence. Salant and
Dillman advocated the use of at least four separate mailings. The initial mailing,
according to their recommendations, is sent to every member of the sample population
and is utilized to inform them that they have been chosen to participate. It notifies all
members of the sample population that survey instruments will be sent to them. The
initial mailing is followed by a second mailing to all sample members, which provides
additional information and a hyperlink to its World-Wide Web location. In this case,
additional information included a cover letter and implied consent form. Salant and
Dillman recommended a third mailing, approximately one week after the second, this
third contact serves to thank respondents and encourage those who have yet to respond to
do so. A fourth and final message issued two weeks after the third advises sample
members that the survey will be closed on a stated date and will ask those who have not
yet responded to do so before the stated date.

Bourque and Fiedler (1995) provided very useful guidance regarding formatting
and content of cover letters that are sent to members of the sample population and
suggested that inclusion of these items serves both to convey information as well as to
encourage participation. They included the use of both letterhead and details concerning sponsorship of the study as well as the name and telephone number of a person to be contacted for additional information. Bourque and Fiedler also recommended that cover letters include a salutation, a description of the purpose of the study, the means by which an individual was selected for participation, and an elucidation of the importance of participation by the individual. Also recommended for inclusion in the cover letter is an estimate of the time necessary for an individual to complete the survey as well as instructions for submitting the survey and a description of confidentiality provisions and procedures for managing the data obtained from the surveys. If incentives are to be provided to prospective respondents, Bourque and Fiedler recommended that these be described and potential participants advised of the means by which these inducements will be provided. Bourque and Fiedler’s recommendations were utilized as a guide for cover letter development and were modified to allow for the use of electronic communications. The survey of data utilization by teachers in elementary schools did not utilize incentives. Copies of the survey, cover letter, and implied consent form are included as appendix F, C, and D respectively.

Initial contact with teachers was made via e-mail beginning on May 1, 2009. Teachers were asked to complete the survey using a hyperlink contained in the e-mail message. Reminder messages were sent to teachers as a means of increasing participation. These e-mail reminders were sent at intervals beginning on May 12, 2009 and concluding on June 4, 2009. A total of four reminder messages were sent.
Participant Characteristics

Participants’ demographic information is presented in Tables 3.2 and 3.3. As shown in Table 3.2, participants’ teaching assignments ranged from kindergarten through sixth grade classrooms. In addition, 15 participants selected “other” and listed the following instructional responsibilities: speech therapist (2), reading (5), literacy coach (1), learning support (1), autism (1), speech and language (2), special education (2), and inclusion support (1).

Table 3.2 Grades Taught by Participants (n=90)

<table>
<thead>
<tr>
<th>Grades currently taught</th>
<th>n</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>kindergarten</td>
<td>29</td>
<td>32.2%</td>
</tr>
<tr>
<td>1st grade</td>
<td>26</td>
<td>28.9%</td>
</tr>
<tr>
<td>2nd grade</td>
<td>21</td>
<td>23.3%</td>
</tr>
<tr>
<td>3rd grade</td>
<td>26</td>
<td>28.9%</td>
</tr>
<tr>
<td>4th grade</td>
<td>23</td>
<td>25.6%</td>
</tr>
<tr>
<td>5th grade</td>
<td>16</td>
<td>17.8%</td>
</tr>
<tr>
<td>6th grade</td>
<td>3</td>
<td>3.3%</td>
</tr>
<tr>
<td>7th grade</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>8th grade</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Participants’ years of teaching experience ranged from those with 5 years or less to those with more than 30 years (see Table 3.3). Participants were almost evenly divided
between those with 10 or less years of experience (47.6%) and those with more than 10 years of experience (52.4%).

Table 3.3 Years of Experience of Respondents (n=103)

<table>
<thead>
<tr>
<th>Teaching Experience</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5 years</td>
<td>20.4%</td>
<td>21</td>
</tr>
<tr>
<td>6-10 years</td>
<td>27.2%</td>
<td>28</td>
</tr>
<tr>
<td>11-15 years</td>
<td>10.7%</td>
<td>11</td>
</tr>
<tr>
<td>16-20 years</td>
<td>12.6%</td>
<td>13</td>
</tr>
<tr>
<td>21-25 years</td>
<td>5.8%</td>
<td>6</td>
</tr>
<tr>
<td>26-30 years</td>
<td>15.5%</td>
<td>16</td>
</tr>
<tr>
<td>more than 30 years</td>
<td>7.8%</td>
<td>8</td>
</tr>
</tbody>
</table>

answered question 103
skipped question 0

Responses to the survey questions were grouped to reflect the conceptual framework which focused on: (a) types of data relevant to teachers’ needs, (b) processes for using data to build knowledge, (c) application of data-related knowledge to practice, (d) barriers to teacher use of data, and (e) supports needed to enable and facilitate teacher use of data.

Data Analysis Strategies

Descriptive statistics offered the best approach for data analysis for the proposed study. According to McMillan and Schumacher (2001),
Descriptive statistics transform a set of numbers or observations into indices that describe or characterize the data. Descriptive statistics (sometimes referred to as summary statistics) are thus used to summarize, organize, and reduce large numbers of observations. Usually the reduction results in a few numbers, derived from mathematical formulas to represent all observations in each group of interest. (p. 206)

Data was analyzed using percentages and measures of central tendency. For example, mode was useful in identifying the types of data most commonly available to and used by teachers. Distributions of scores were plotted to determine the degree to which data were positively or negatively skewed. Tables, charts and other graphic representations were utilized to facilitate display of the data. The first such table showed the initial sample size, the number of respondents, and the number of non-respondents in both absolute numbers and in percentages as suggested by Creswell (2003). Frequency distributions, showing both actual numbers and respective percentages were utilized extensively to represent survey responses, as were bar and line graphs. The most useful measure of central tendency for this study was the mode, which provided representations of typical scores within the distributions. Use of these measures demonstrated the homogeneity or heterogeneity of the distributions, allowing for the construction of a more descriptive picture. Presentation of the data in this manner appears to be consistent with the overall goal of the study, which is to provide a lens through which to view and describe the current data-related practices of elementary school teachers. SPSS software, available from SPSS Science, Inc. was used in this analysis.
Reliability and Validity

Reliability

“A reliable survey results in consistent information. A valid survey produces accurate information” (Fink & Kosecoff, 1998, p. 6). Because an appropriate existing survey instrument could not be identified, it was necessary to develop an instrument specifically for the proposed study. Because this newly devised instrument had no prior documentation with regard to reliability and validity, the research design included measures addressing both reliability and validity.

Measures taken to increase reliability were employed in the design of individual questions that comprised the survey instrument. Questions were developed according to procedures recommended by Bourque and Fiedler (1995), Fowler (1993), and Nardi (2003). Accordingly, questions were created utilizing terminology which is familiar to and commonly used by teachers. Each question was designed to focus on only one variable and to be as short as possible. Every effort was made to avoid ambiguity. As much as possible, questions were presented in a consistent format. The majority of questions were closed-ended, with open-ended questions utilized only when absolutely necessary. Where appropriate, closed ended questions utilized a Likert-type scale, were mutually exclusive and exhaustive, and were directionally consistent (Nardi, 2003).

Two types of reliability estimates were planned to obtain reliability coefficients. The survey instrument was administered to a group of test subjects, all current or retired educators from school districts not under study, to allow for calculation of a coefficient of
stability using a test-retest procedure to provide a measure of the reliability of the instrument. According to McMillan and Schumacher (2001),

A coefficient of stability is obtained by correlating scores from the same test on two different occasions of a group of individuals. If the responses of the individuals are consistent (that is, if those scoring high the first time also score high the second time, and so on) then the correlation coefficient, and the reliability are high. (p. 246)

The researcher contacted representatives of the Delta Kappa Gamma Society, an association of women educators with chapters in Central Pennsylvania, to request their participation in the pilot phase of the study. A representative from Delta Kappa Gamma responded indicating that the Society would not be able to participate during the timeframe which the researcher had allotted for piloting. The researcher then contacted a representative of the Keystone Central School Retirees. This group agreed to participate and was available during the timeframe which had been identified for piloting of the instrument.

The survey was administered to the pilot group of 15 retired teachers from Keystone Central School District on January 5, 2009. The survey was administered to this same group of retired teachers again on February 9, 2009 following an interval of five weeks. At the recommendation of her Dissertation Committee Chairperson, the researcher sought assistance from Dr. Edgar Yoder, a member of her committee with expertise in statistics and the use of SPSS, and from the Penn State University Statistical Consulting Center, to calculate the reliability coefficient. She was advised that because
each of the pilot respondents had not been individually identified, it would not be possible to calculate a reliability coefficient as originally planned. The researcher had purposefully avoided collecting any individually identifiable information from respondents in order to comply with Office of Research Protections Institutional Review Board (IRB) confidentiality requirements. She did not realize that such identification would be needed to perform the reliability coefficient calculation.

To address this situation, the researcher followed the recommendations of Dr. Yoder to manually compare the responses given by pilot responders to each survey question on each of the two dates for which the survey was administered. The intent in doing so was to eliminate questions for which responses differed by a given percentage. However, comparison of responses showed more variation than anticipated on some questions, especially those which sought fine-grained detail and utilized a matrix format. Such questions represented a large portion of the survey. One possible explanation is that the pilot group, comprised entirely of retired educators, may not have been able to report details of actions which occurred several years ago as concisely or consistently currently employed educators. The inability to identify pilot respondents, or to devise another method to address this problem, is a weakness of this study.

The original proposal design called for the second type of reliability estimate, internal consistency, to be measured using the Cronbach Alpha method. According to McMillan and Schumacher (2001), “The Cronbach Alpha is generally the most appropriate type of reliability for survey research and other questionnaires in which there is a range of possible answers for each item” (p. 247). To determine internal consistency
using this method, the degree of correlation between responses to questions on the survey, which are designed to ask for the same information in different ways, is measured.

The researcher again sought assistance from Dr. Yoder and the Statistical Consulting Center to measure the degree of correlation between responses and obtain a reliability estimate. The researcher was advised by both Dr. Yoder and the Statistical Consulting Center that Cronbach Alpha would not be an appropriate method. Therefore, Cronbach Alpha was not computed.

Validity

Because a researcher-constructed survey instrument was utilized, particular attention was paid to validity. Creswell (2003) cautioned that, “threats to construct validity occur when investigators use inadequate definitions and measures of variables” (p. 171, italics original). Construct validity was addressed through a two-phase process. The first phase involved a panel of individuals, each of whom had expertise related to specific aspects of the study. This panel included a currently employed elementary school teacher from a district not participating in the study, a retired elementary school teacher, a retired secondary English teacher who served as an English language specialist, and two professors who were members of the researcher’s committee. Panel members reviewed the initial version of the survey instrument prior to its administration to the pilot group. The panel was asked to address items such as relevance, wording, scope and depth of questions, as well as terminology, grouping of questions, etc. The researcher
utilized information from the review to revise the instrument. The second phase provided an opportunity for the revised survey instrument to be critiqued by a group of elementary school teachers who were representative of the target audience. The researcher presented the revised version of the survey to elementary school teachers from a district not under study. These teachers were asked to critique all aspects of the survey and to make suggestions as to how it might be revised and improved to better define and measure the constructs under study. Responses from this group informed a second revision of the survey instrument.

Survey questions were grouped into five major areas to include: (1) the types of data relevant to teachers’ classroom-related needs; (2) the methods and tools teachers use to manage and analyze data; (3) the purposes for which teachers utilize data; (4) the barriers that prevent teachers from making effective use of data; and (5) the supports needed to enable and facilitate effective use of data by teachers.

Response Rate

Initial contact with teachers was made via e-mail beginning on May 1, 2009. Teachers were asked to complete the survey using a hyperlink contained in the e-mail message. Reminder messages were sent to teachers as a means of increasing participation. These e-mail reminders were sent at intervals beginning on May 12, 2009 and concluding on June 4, 2009. A total of 3 reminder messages were sent. A total of 103 teachers out of 262 completed the survey for a response rate of 39.3%. This rate appears to fall within expectations for a survey questionnaire of this type. In a recent
meta-analysis of 463 studies published studies, Baruch & Holtom (2008) found an average return rate of 48.3%, with a standard deviation of 21.6%. Similarly, Hamilton (2009) analyzed data from 199 online surveys and found the average response rate to be 32.52%.

Limitations of the Design

Several limitations of design were identified. These included response rate, the restrictions imposed by the use of closed-ended questions, and the use of self-report data. A final limitation was imposed by the descriptive nature of the study itself, which can provide a window through which to view the state of data utilization as it currently exists in the schools under study, but cannot support the identification of cause-effect relationships. Descriptions of each of the four limitations appear in the following four sections.

Response Rate

While survey designs offer many strengths, the problem of non-response, which is inherent in the use of surveys, was clearly a limitation in this study. Fowler wrote, “For most surveys, nonresponse is potentially one of the most important sources of systematic error; it is likely to be one of the most problematic concerns regarding the accuracy of sample estimates” (pp. 52-53). Nardi (2003) emphasized this point when he stated, “Low
response rates seriously affect how accurately researchers can generalize the results to a larger population” (p. 59).

Mindful of the problems resulting from non-response, the design for this study included specific strategies to increase response rate. These strategies were loosely modeled on those suggested by Salant and Dillman (1994), with modifications for the use of e-mail correspondence. In addition the researcher adhered to procedures recommended by Bourque and Fiedler (1995) in their Checklist for Motivating Respondents and Writing Cover letters.

Salant and Dillman advocated the use of at least four separate mailings which included reminder notices. As recommended, the researcher utilized a series of mailings following the initial mailing of the cover letter, instructions, and consent form. The first reminder mailing occurred between 8 and 11 days after the initial mailing. A second reminder mailing followed 18 days later and included notification of the date on which the survey would close. Because the response rate remained low, the researcher extended the closing date of the survey for an additional week and sent a third reminder advising of the extension and requesting participation by those who had not already done so.

Although the response rate improved following the reminder mailings, the final response rate of 39.3% was lower than desirable and therefore restricted generalizability of the results.
Restrictions Imposed by the Use of Closed-ended Questions

The survey instrument utilized uniform questions and fixed responses which, according to Nardi (2003), restrict the ability of researchers to compensate for cultural differences, thus raising the possibility of biased results. In addition, the use of closed-ended questions within the survey by their very nature confined responses. Nardi (2003) suggested the use of Likert-type scale questions, which can allow for greater variation while still making use of closed-ended questions. The researcher used Likert-type scale questions and was careful to maintain directional consistency. For example, questions which used scaled response choices such as “almost always”, “frequently”, “occasionally”, and “rarely” showed left to right intensity, with highest intensity on the left and lowest on the right. The researcher also utilized a matrix format for questions, as recommended by Nardi (2003), which decreased the overall number of questions by allowing them to be combined. While the use of more open-ended questions might have allowed for less confined responses, the researcher was mindful of Nardi’s caution that “Respondents often don’t like to answer too many open-ended items, because it takes more time, despite the advantage of being able to put the issue into their own words” (2003, p. 65).

Self-report Data

Self-administered surveys allow researchers to avoid the pitfalls of using interviewers who may inadvertently influence participant responses. However, one drawback to self-administered versus interviewer-administered surveys is the risk that
participants may misinterpret survey questions and have no opportunity to ask for clarification (Creswell, 2002). Another drawback identified by Creswell concerns the issue of self-reporting, in which participants respond to survey questions by indicating what they think as opposed to what they actually do, which may differ substantially. Respondents may also answer questions by providing the answers that they think the researcher may want to hear, or that place them in a favorable light, but provide an inaccurate description.

To decrease the likelihood that respondents might misinterpret survey questions, the researcher sought input from a panel of five individuals selected for their relevant expertise and pilot tested the survey with a group of retired educators. The panel included a currently-employed elementary school teacher from a district not participating in the study, a retired elementary school teacher, a retired secondary English teacher who served as an English language specialist, and two professors who were members of the researcher’s committee. The researcher attempted to utilize language and terminology that would be familiar to professional educators and therefore easily understood by them. Based on recommendations from panel members, terminology was revised, questions were grouped and ordered, and the number of questions was reduced.

*Cause and Effect Relationships Not Supported*

According to Burke and Christensen (2000),

The primary purpose of descriptive research (italics original) is to provide an accurate description or picture of the status or characteristics of a situation or
phenomenon. The focus is not on how to ferret our cause-and-effect relationships but rather on describing the variables that exist in a given situation, and, sometimes, on how to describe the relationships that exist among those variables.

(p. 302)

This study was designed to provide a “slice of life” view of the data utilization by elementary school teachers as it existed at the time the research was conducted and no effort was made to identify the reasons for what was viewed. If the response rate had been higher, it might have been possible to infer that the observed conditions could be generalized to a larger population, thereby increasing the usefulness of the study. However, any such generalization would be inappropriate given a response rate of 39.3%.
THE PRIMARY PURPOSE OF THIS RESEARCH STUDY WAS TO PROVIDE A DESCRIPTIVE PICTURE OF THE EXTENT TO WHICH ELEMENTARY SCHOOL TEACHERS UTILIZED DATA TO GUIDE INSTRUCTION. THE PRIMARY QUESTIONS ADDRESSED BY THIS STUDY INCLUDED:

1. WHAT TYPES OF DATA ARE RELEVANT TO TEACHERS’ CLASSROOM-RELATED NEEDS?
2. WHAT PROCESSES DO TEACHERS UTILIZE TO TRANSFORM RAW DATA INTO INFORMATION AND ULTIMATELY TO BUILD KNOWLEDGE?
3. HOW IS THE KNOWLEDGE GAINED FROM DATA UTILIZATION APPLIED TO CLASSROOM PRACTICE?
4. WHAT BARRIERS PREVENT TEACHERS FROM MAKING EFFECTIVE USE OF DATA?
5. WHAT SUPPORTS ARE NEEDED TO ENABLE AND FACILITATE EFFECTIVE USE OF DATA BY TEACHERS?

THE STUDY DESCRIBED THE DEGREE TO WHICH DATA-DRIVEN DECISION MAKING AS ENVISIONED BY THE NCLB LEGISLATION WAS ACTUALLY OCCURRING IN THE ELEMENTARY SCHOOLS STUDIED.

THIS CHAPTER PROVIDES A BRIEF REVIEW OF ACTIVITIES CONDUCTED TO GATHER DATA AND THE ANALYSIS AND STATISTICAL TREATMENT OF THAT DATA. IN IS ORGANIZED WITH REGARD TO THE FIVE RESEARCH QUESTIONS. AT THE SUGGESTION OF HER DOCTORAL COMMITTEE CHAIRPERSON, THE RESEARCHER REQUESTED EXPERT ASSISTANCE WITH DATA ANALYSIS FROM DR. EDGAR YODER, A MEMBER OF HER COMMITTEE WITH EXPERTISE IN STATISTICAL ANALYSIS, AS WELL AS FROM THE PENN STATE UNIVERSITY STATISTICAL CONSULTING CENTER. AS A RESULT OF THEIR GUIDANCE AND
assistance, several changes were made to the original plan for data analysis. According to Nardi (2003),

Typically, research lurches forward, is set back for any number of reasons (delays in getting questionnaires back, typos and other errors only noticed later, computer glitches, and other petty annoyances), gets refined, then some other unexpected finding emerges in your data, or reinterpreted when another article is discovered that sheds new theoretical light on your results. Your findings may lead to a modification of the theory you started out with in an ongoing deductive and inductive process. Although the report or article you complete presents a summary in linear fashion and thereby reinforces the illusion, it might make for interesting reading if you included a list of shortcomings and caveats along with a few of the ways your project veered from the standard journey. (p. 217)

Following Nardi’s suggestion, the researcher has included references to both shortcomings as well as needed modifications in this chapter as well as in the Limitations section of Chapter 5.

**Availability of Relevant Data**

To begin to develop a descriptive picture, the researcher first examined teacher responses to ascertain the types of data available to them. Data types were loosely organized around Bernhardt’s (2004) classification of data as: (1) student learning data;
(2) demographic data; (3) school process data; and (4) perceptions data, with emphasis on the first three categories.

**Student Learning Data**

The first of these types of data to be examined was student learning data which included results from tests, authentic assessments, grades, and teacher observations of student aptitudes. As such measures are classroom-based, they are immediately available and can be employed at the discretion of the classroom teacher. For that reason, the researcher sought to ascertain the level of teacher use of these measures as well as the purpose for their use. The following questions were posed with regard to chapter tests, quizzes, student journals, student portfolios, student projects, teacher developed tests, student self assessments, teacher observations, and authentic assessments:

1. Please indicate how often you have used each of the items listed below in your classroom during the past two years. Please mark all that apply.

2. If you have used any of the items listed below, please indicate how you used the results. Please mark all that apply.

Responses indicated that student learning data such as scores from chapter tests and quizzes, student journals and projects, teacher observations, and authentic assessments were widely utilized by respondents, with more than 70% indicating use of these measures. Frequency of use of each of these student learning measures is shown in Table 4.1. Because the measure of central tendency most suited to describing these responses was the mode, areas within the table have been shaded to assist the reader in
identifying the mode (most frequently occurring value) for each type of student learning data listed.

Table 4.1  Utilization Frequency of Classroom Learning Measures  (n=75)

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Used frequently</th>
<th>Used sometimes</th>
<th>Used occasionally</th>
<th>Never used</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter tests</td>
<td>37.8% (28)</td>
<td>18.9% (14)</td>
<td>14.9% (11)</td>
<td>28.4% (21)</td>
<td>74</td>
</tr>
<tr>
<td>Quizzes</td>
<td>31.1% (23)</td>
<td>18.9% (14)</td>
<td>21.6% (16)</td>
<td>28.4% (21)</td>
<td>74</td>
</tr>
<tr>
<td>Student journals</td>
<td>38.7% (29)</td>
<td>24.0% (18)</td>
<td>29.3% (22)</td>
<td>8.0% (6)</td>
<td>75</td>
</tr>
<tr>
<td>Student portfolios</td>
<td>23.3% (17)</td>
<td>26.0% (19)</td>
<td>27.4% (20)</td>
<td>23.3% (17)</td>
<td>73</td>
</tr>
<tr>
<td>Student projects</td>
<td>38.4% (28)</td>
<td>35.6% (26)</td>
<td>21.9% (16)</td>
<td>4.1% (3)</td>
<td>73</td>
</tr>
<tr>
<td>Teacher developed tests</td>
<td>34.2% (25)</td>
<td>37.0% (27)</td>
<td>17.8% (13)</td>
<td>11.0% (8)</td>
<td>73</td>
</tr>
<tr>
<td>Student self-assessments</td>
<td>9.5% (7)</td>
<td>25.7% (19)</td>
<td>37.8% (28)</td>
<td>27.0% (20)</td>
<td>74</td>
</tr>
<tr>
<td>Teacher observations</td>
<td>85.3% (64)</td>
<td>4.0% (3)</td>
<td>6.7% (5)</td>
<td>4.0% (3)</td>
<td>75</td>
</tr>
<tr>
<td>Authentic assessments</td>
<td>46.6% (34)</td>
<td>31.5% (23)</td>
<td>16.4% (12)</td>
<td>5.5% (4)</td>
<td>73</td>
</tr>
<tr>
<td>Peer assessments</td>
<td>4.1% (3)</td>
<td>15.1% (11)</td>
<td>39.7% (29)</td>
<td>41.1% (30)</td>
<td>73</td>
</tr>
</tbody>
</table>

Distributions of scores were also plotted to determine the degree to which data were positively or negatively skewed as shown in Figure 4.1. (It should be noted that response scale choices began with “frequently” and diminished to “never”.)
Figure 4.1  Frequency of Usage of Student Learning Measures

- Question 4/Student Projects
- Question 4/Teacher Developed tests
- Question 4/Student Journals
- Question 4/Teacher observations
Responses for chapter tests, quizzes, student journals and projects, teacher developed
tests and observations and authentic assessments were all skewed to the right, indicating
the high degree to which such measures were used by respondents. Alternately,
responses for peer assessments, student portfolios, and student self-assessments were left-
skewed indicating the relative infrequency of their use by respondents.

Teachers were asked about their access to results from tests they did not
personally administer using the following question: “If test scores for all students
enrolled in the school in which you teach have been provided to you, please indicate
which scores you received.” Teachers were asked if they had access to scores from the
National Assessment of Educational Progress (NAEP) or the Pennsylvania System of
School Assessment test (PSSA). Respondents were almost unanimous (96.9%) in
indicating that NAEP scores were unavailable. Two-thirds indicated that Pennsylvania
System of School Assessment (PSSA) scores were available to them while the remaining
one-third (33.9 %) of respondents indicated that PSSA scores were not available. In
Pennsylvania, administration of the reading and mathematics sections of the PSSA begins
in grade three. The science portion of the PSSA is administered beginning in the fourth
grade and the writing portion in grade 5. Analysis of the data revealed that respondents
who indicated they did not have access to PSSA scores were those with teaching
assignments at the kindergarten, 1st, 2nd, and 3rd grade levels. Responses from those
teaching at the 4th grade level or higher indicated that they had access to PSSA scores as
shown in Figure 4.2.
Teachers were also asked if they had access to school-wide test scores and scores from other instruments. More than 70% of respondents indicated that school-wide test scores and other scores were available to them. Due to an oversight on the part of the researcher, however, teachers were not asked to identify the specific instruments from which these scores were obtained. Teacher responses are presented in Table 4.2.

Table 4.2  Availability of Test Scores

<table>
<thead>
<tr>
<th></th>
<th>Percentage Indicating Scores Available</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSSA Scores</td>
<td>66.1 (37)</td>
<td>56</td>
</tr>
<tr>
<td>NAEP Scores</td>
<td>3.1 (1)</td>
<td>32</td>
</tr>
<tr>
<td>School wide test scores</td>
<td>75.0 (39)</td>
<td>52</td>
</tr>
<tr>
<td>Other</td>
<td>72.2 (13)</td>
<td>18</td>
</tr>
</tbody>
</table>
School Process Data

Teachers surveyed indicated a high degree of availability (>83%) of school process data but responses suggested they were selective in which types of school process data they actually used. Teachers were asked about both their access to and use of the following types of school process data: current year attendance data, historical attendance data, ethnicity, free/reduced lunch eligibility, prior participation in Head Start or pre-school programming, presence of handicap or disabling condition, level of English proficiency, grades or other performance reports as well as disciplinary reports from prior years of schooling, and special needs such as physical, mental, emotional, or developmental disabilities. The most frequently used types of school process data related to students’ special needs and levels of English proficiency, both of which were right-skewed. The least used types of school process data were those relating to student attendance, ethnicity, and prior Head Start participation which were left skewed. Figure 4.3 shows the availability of such data and the degree to which respondents used those types of data.
### Demographic Data

Teachers were asked about their access to demographic data and the degree to which they utilized such data. Bernhardt’s concept of demographic data includes the usual fields of ethnicity and socioeconomic status as well as a range of items such as a community’s history, largest employers, levels of student employment, high school
completion rates, as well as other factors. Teachers were asked if they had access to specific data and if so, how they used such data using the following question:

If you have access to the types of data listed below, please indicate how you have used these data. If you do not have access to these data, please indicate by marking the column labeled ‘These data are not available to me.’

Types of data listed in this question were as follows: local area history, local economic situation, local area unemployment rate, area’s largest employers, composition of community population by ethnicity, religious affiliations of community residents, high school graduation rates, approximate percentages of residents who fall below the poverty line, consider themselves working class, consider themselves middle class, as well as approximate percentage of single parent homes, retired residents, families receiving government assistance, non-English speakers, high school students who are employed, and high school graduates who pursue higher education or enter military service.

Responses indicated that while such demographic data were available to more than 60% of respondents, respondents frequently did not make use of it. With the exception of data related to local history and poverty levels, more than half of respondents indicated that they did not use the demographic data that was available to them, as shown in Figure 4.4. The most frequently occurring response (mode) for all types of student demographic data was the choice indicating that respondents did not utilize that data. The mode is shown in boldface type to make it easily visible to the reader.
### Availability and Use of Demographic Data

<table>
<thead>
<tr>
<th>Category</th>
<th>Data Used</th>
<th>Data Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of single-parent homes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of local high school graduates who enter military service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of local high school graduates who pursue higher education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school completion rates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of non-English speakers in the area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composition of community population by ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of high school students who are employed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of families receiving government assistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of retired residents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of residents who consider themselves middle class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of residents who consider themselves working class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of residents who fall below the poverty line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religious affiliations of community residents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area's largest employers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local area unemployment rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local economic situation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local area history</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Purposes For Which Data Was Used

Having ascertained the extent to which data related to student learning, school processes, and demographics were available to and used by respondents, the researcher then examined the purposes for which respondents used such data.

When presented with a series of choices to characterize the purposes for which they used student learning data, respondents’ selections ranged from student motivation to determining students’ grades. Chief among these was the use of student learning data to determine student mastery of material, which was the most frequently occurring response (mode) for chapter tests (92.3%), quizzes (82.4%), student portfolios (51%), teacher developed tests (86.0%), teacher observations (86.6%), and authentic assessments (78.7%) (Table 4.3). Determining lesson effectiveness was the most frequently cited (mode) use for student journals at 48.3%. Student motivation was the purpose most frequently cited for using both student projects (56.9%) and self-assessments (51.1%).
Table 4.3  Purposes for which Teachers Used Student Learning Data

<table>
<thead>
<tr>
<th>Purpose</th>
<th>To determine students' grades</th>
<th>To determine students' mastery</th>
<th>To determine effectiveness of my lesson(s)</th>
<th>To determine if more time should be spent on a topic</th>
<th>To determine what homework to assign</th>
<th>To determine readiness for the PSSA or other standardized test</th>
<th>To determine if state standards have been met</th>
<th>To motivate students</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter tests</td>
<td>67.3% (35)</td>
<td>92.3% (48)</td>
<td>67.3% (35)</td>
<td>61.5% (32)</td>
<td>7.7% (4)</td>
<td>26.9% (14)</td>
<td>46.2% (24)</td>
<td>5.8% (3)</td>
<td>52</td>
</tr>
<tr>
<td>Quizzes</td>
<td>60.8% (31)</td>
<td>82.4% (42)</td>
<td>62.7% (32)</td>
<td>58.8% (30)</td>
<td>21.6% (11)</td>
<td>31.4% (16)</td>
<td>47.1% (24)</td>
<td>9.8% (5)</td>
<td>51</td>
</tr>
<tr>
<td>Student journals</td>
<td>23.3% (14)</td>
<td>46.7% (28)</td>
<td>48.3% (29)</td>
<td>43.3% (26)</td>
<td>5.0% (3)</td>
<td>16.7% (10)</td>
<td>21.7% (13)</td>
<td>31.7% (19)</td>
<td>60</td>
</tr>
<tr>
<td>Student portfolios</td>
<td>30.6% (15)</td>
<td>51.0% (25)</td>
<td>38.8% (19)</td>
<td>28.6% (14)</td>
<td>4.1% (2)</td>
<td>8.2% (4)</td>
<td>30.6% (15)</td>
<td>36.7% (18)</td>
<td>49</td>
</tr>
<tr>
<td>Student projects</td>
<td>32.3% (21)</td>
<td>53.8% (35)</td>
<td>40.0% (26)</td>
<td>23.1% (15)</td>
<td>3.1% (2)</td>
<td>9.2% (6)</td>
<td>24.6% (16)</td>
<td>56.9% (37)</td>
<td>65</td>
</tr>
<tr>
<td>Teacher developed tests</td>
<td>57.9% (33)</td>
<td>86.0% (49)</td>
<td>68.4% (39)</td>
<td>63.2% (36)</td>
<td>10.5% (6)</td>
<td>29.8% (17)</td>
<td>43.9% (25)</td>
<td>8.8% (5)</td>
<td>57</td>
</tr>
<tr>
<td>Student self-assessments</td>
<td>6.7% (3)</td>
<td>44.4% (20)</td>
<td>33.3% (15)</td>
<td>44.4% (20)</td>
<td>11.1% (5)</td>
<td>8.9% (4)</td>
<td>8.9% (4)</td>
<td>51.1% (23)</td>
<td>45</td>
</tr>
<tr>
<td>Teacher observations</td>
<td>49.3% (33)</td>
<td>86.6% (58)</td>
<td>73.1% (49)</td>
<td>82.1% (55)</td>
<td>35.8% (24)</td>
<td>23.9% (16)</td>
<td>37.3% (25)</td>
<td>26.9% (18)</td>
<td>67</td>
</tr>
<tr>
<td>Authentic assessments</td>
<td>49.2% (30)</td>
<td>78.7% (48)</td>
<td>62.3% (38)</td>
<td>65.6% (40)</td>
<td>18.0% (11)</td>
<td>34.4% (21)</td>
<td>52.5% (32)</td>
<td>31.1% (19)</td>
<td>61</td>
</tr>
</tbody>
</table>
While student learning data was widely used for a variety of purposes as shown in Table 4.3, it was clear from responses that teachers’ use of available school process and demographic data was much more limited. When asked how they used eleven different types of school process data, the most frequent response for 8 of those 11 types was the choice labeled “I did not utilize this data.” This response occurred for current year attendance data (76.8%), historical attendance data (81.7%), ethnicity (69.6%), free/reduced lunch eligibility (76.8%), prior participation in head start (62.0%), level of English proficiency (47.8%), and disciplinary reports from prior years (44.1%).

Responses indicated that the three remaining types of school process data (presence of handicap or disabling condition, prior year performance reports, and special needs of students, were used primarily to modify lessons or revise learning goals. As shown in Table 4.4, less than one-third of teachers indicated that they made use of other types of school process data for any of the purposes surveyed.
Table 4.4 Purposes for Use of School Process Data

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>To design lessons relevant to my students' backgrounds</th>
<th>To modify lessons to better accommodate student diversity</th>
<th>To revise learning goals</th>
<th>To place emphasis on certain skills</th>
<th>To plan class activities</th>
<th>To request a classroom aide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current year attendance data</td>
<td>4.3% (3)</td>
<td>1.4% (1)</td>
<td>10.1% (7)</td>
<td>7.2% (5)</td>
<td>5.8% (4)</td>
<td>0</td>
</tr>
<tr>
<td>Historical attendance data</td>
<td>2.8% (2)</td>
<td>4.2% (3)</td>
<td>4.2% (3)</td>
<td>2.8% (2)</td>
<td>1.4% (1)</td>
<td>0</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>14.5% (10)</td>
<td>18.8% (13)</td>
<td>0</td>
<td>0</td>
<td>4.3% (3)</td>
<td>0</td>
</tr>
<tr>
<td>Free/reduced lunch eligibility</td>
<td>5.8% (4)</td>
<td>5.8% (4)</td>
<td>0</td>
<td>1.4% (1)</td>
<td>1.4% (1)</td>
<td>0</td>
</tr>
<tr>
<td>Prior participation in Head Start</td>
<td>14.1% (10)</td>
<td>12.7% (9)</td>
<td>8.5% (6)</td>
<td>11.3% (8)</td>
<td>9.9% (7)</td>
<td>1.4% (1)</td>
</tr>
<tr>
<td>Prior participation in pre-school</td>
<td>17.1% (12)</td>
<td>12.9% (9)</td>
<td>10.0% (7)</td>
<td>11.4% (8)</td>
<td>8.6% (6)</td>
<td>1.4% (1)</td>
</tr>
<tr>
<td>Presence of handicap or disabling condition</td>
<td>30.6% (22)</td>
<td>55.6% (40)</td>
<td>30.6% (22)</td>
<td>23.6% (17)</td>
<td>33.3% (24)</td>
<td>15.5% (11)</td>
</tr>
<tr>
<td>Level of English proficiency</td>
<td>21.7% (15)</td>
<td>31.9% (22)</td>
<td>17.4% (12)</td>
<td>13.0% (9)</td>
<td>10.1% (7)</td>
<td>7.2% (5)</td>
</tr>
<tr>
<td>Grades or performance reports from prior years</td>
<td>32.8% (22)</td>
<td>32.8% (22)</td>
<td>40.3% (27)</td>
<td>32.8% (22)</td>
<td>23.9% (16)</td>
<td>1.5% (1)</td>
</tr>
<tr>
<td>Disciplinary reports from prior years</td>
<td>16.2% (11)</td>
<td>19.1% (13)</td>
<td>16.2% (11)</td>
<td>17.6% (12)</td>
<td>13.2% (9)</td>
<td>7.4% (5)</td>
</tr>
<tr>
<td>Special needs such as physical, mental, emotional, or developmental disabilities</td>
<td>46.5% (33)</td>
<td>63.4% (45)</td>
<td>47.9% (34)</td>
<td>36.6% (26)</td>
<td>43.7% (31)</td>
<td>16.9% (12)</td>
</tr>
</tbody>
</table>

Teacher responses regarding demographic data indicated very limited use of such data in all seventeen categories that were presented to them. As with school process data, the most frequently occurring choice (mode) was “I did not utilize such data” for all seventeen categories as shown in Table 4.5. Teacher responses indicated that only a very small number, frequently less than 10%, made use of demographic data for any of the surveyed purposes, as shown in Table 4.5.
### Table 4.5 Purposes for Use of Demographic Data

<table>
<thead>
<tr>
<th>Purpose</th>
<th>25.4% (18)</th>
<th>16.9% (12)</th>
<th>4.2% (3)</th>
<th>8.5% (6)</th>
<th>25.4% (18)</th>
<th>0.0% (0)</th>
<th>47.9% (34)</th>
<th>15.5% (11)</th>
<th>71</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local area history</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50.7% (36)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local economic situation</td>
<td>18.3% (13)</td>
<td>14.1% (10)</td>
<td>1.4% (1)</td>
<td>2.8% (2)</td>
<td>7.0% (5)</td>
<td>0.0% (0)</td>
<td>63.4% (45)</td>
<td>28.2% (20)</td>
<td>71</td>
</tr>
<tr>
<td>Local area unemployment rate</td>
<td>5.6% (4)</td>
<td>7.0% (5)</td>
<td>1.4% (1)</td>
<td>0.0% (0)</td>
<td>4.2% (3)</td>
<td>0.0% (0)</td>
<td>70.0% (49)</td>
<td>22.9% (16)</td>
<td>70</td>
</tr>
<tr>
<td>Area's largest employers</td>
<td>5.7% (4)</td>
<td>2.9% (2)</td>
<td>1.4% (1)</td>
<td>0.0% (0)</td>
<td>2.9% (2)</td>
<td>0.0% (0)</td>
<td>60.6% (43)</td>
<td>33.8% (24)</td>
<td>71</td>
</tr>
<tr>
<td>Religious affiliations of community residents</td>
<td>4.2% (3)</td>
<td>7.0% (5)</td>
<td>1.4% (1)</td>
<td>0.0% (0)</td>
<td>2.8% (2)</td>
<td>0.0% (0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of residents who fall below the poverty line</td>
<td>15.5% (11)</td>
<td>12.7% (9)</td>
<td>4.2% (3)</td>
<td>1.4% (1)</td>
<td>2.8% (2)</td>
<td>0.0% (0)</td>
<td>46.5% (33)</td>
<td>35.2% (25)</td>
<td>71</td>
</tr>
<tr>
<td>Percentage of residents who consider themselves working class</td>
<td>7.0% (5)</td>
<td>4.2% (3)</td>
<td>2.8% (2)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>59.2% (42)</td>
<td>36.6% (26)</td>
<td>71</td>
</tr>
<tr>
<td>Percentage of residents who consider themselves middle class</td>
<td>5.6% (4)</td>
<td>2.8% (2)</td>
<td>2.8% (2)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>60.6% (43)</td>
<td>36.6% (26)</td>
<td>71</td>
</tr>
<tr>
<td>Percentage of retired residents</td>
<td>2.8% (2)</td>
<td>1.4% (1)</td>
<td>1.4% (1)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>67.6% (48)</td>
<td>32.4% (23)</td>
<td>71</td>
</tr>
<tr>
<td>Percentage of families receiving government assistance</td>
<td>11.3% (8)</td>
<td>8.5% (6)</td>
<td>4.2% (3)</td>
<td>2.8% (2)</td>
<td>1.4% (1)</td>
<td>0.0% (0)</td>
<td>53.5% (38)</td>
<td>36.6% (26)</td>
<td>71</td>
</tr>
<tr>
<td>Percentage of high school students who are employed</td>
<td>2.8% (2)</td>
<td>1.4% (1)</td>
<td>1.4% (1)</td>
<td>1.4% (1)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>60.6% (43)</td>
<td>38.0% (27)</td>
<td>71</td>
</tr>
<tr>
<td>Composition of community population by ethnicity</td>
<td>7.0% (5)</td>
<td>4.2% (3)</td>
<td>1.4% (1)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>59.2% (42)</td>
<td>36.6% (26)</td>
<td>71</td>
</tr>
<tr>
<td>Percentage of non-English speakers in the area</td>
<td>7.0% (5)</td>
<td>5.6% (4)</td>
<td>2.8% (2)</td>
<td>1.4% (1)</td>
<td>1.4% (1)</td>
<td>0.0% (0)</td>
<td>59.2% (42)</td>
<td>35.2% (25)</td>
<td>71</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>------------</td>
<td>------------</td>
<td>----</td>
</tr>
<tr>
<td>High school completion rates</td>
<td>5.6% (4)</td>
<td>4.2% (3)</td>
<td>2.8% (2)</td>
<td>1.4% (1)</td>
<td>1.4% (1)</td>
<td>0.0% (0)</td>
<td>66.2% (47)</td>
<td>31.0% (22)</td>
<td>71</td>
</tr>
<tr>
<td>Percentage of local high school graduates who pursue higher education</td>
<td>5.7% (4)</td>
<td>2.9% (2)</td>
<td>1.4% (1)</td>
<td>0.0% (0)</td>
<td>1.4% (1)</td>
<td>0.0% (0)</td>
<td>64.3% (45)</td>
<td>32.9% (23)</td>
<td>70</td>
</tr>
<tr>
<td>Percentage of local high school graduates who enter military service</td>
<td>4.3% (3)</td>
<td>1.4% (1)</td>
<td>2.9% (2)</td>
<td>1.4% (1)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>64.3% (45)</td>
<td>32.9% (23)</td>
<td>70</td>
</tr>
<tr>
<td>Percentage of single-parent homes</td>
<td>18.8% (13)</td>
<td>13.0% (9)</td>
<td>4.3% (3)</td>
<td>2.9% (2)</td>
<td>2.9% (2)</td>
<td>0.0% (0)</td>
<td>49.3% (34)</td>
<td>34.8% (24)</td>
<td>69</td>
</tr>
</tbody>
</table>
Teachers surveyed were asked to characterize their review and analysis of data and the frequency of those activities by completing the statement “I review and analyze data ...” through the selection of closed-ended choices as shown in Table 4.6.

### Table 4.6  Review and Analysis of Data as Described by Teachers.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Frequently</th>
<th>Sometimes</th>
<th>About Half the Time</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>by myself</td>
<td>37.3% (25)</td>
<td>26.9% (18)</td>
<td>6.0% (4)</td>
<td>25.4% (17)</td>
<td>4.5% (3)</td>
<td>67</td>
</tr>
<tr>
<td>with other teachers in my school who teach the same subjects</td>
<td>45.3% (29)</td>
<td>18.8% (12)</td>
<td>6.3% (4)</td>
<td>15.6% (10)</td>
<td>14.1% (9)</td>
<td>64</td>
</tr>
<tr>
<td>with other teachers in my school who teach the same grade levels</td>
<td>48.5% (32)</td>
<td>22.7% (15)</td>
<td>4.5% (3)</td>
<td>15.2% (10)</td>
<td>9.1% (6)</td>
<td>66</td>
</tr>
<tr>
<td>with our principal or assistant principal</td>
<td>25.4% (17)</td>
<td>29.9% (20)</td>
<td>13.4% (9)</td>
<td>25.4% (17)</td>
<td>6.0% (4)</td>
<td>67</td>
</tr>
<tr>
<td>at faculty meetings</td>
<td>25.8% (17)</td>
<td>36.4% (24)</td>
<td>3.0% (2)</td>
<td>27.3% (18)</td>
<td>7.6% (5)</td>
<td>66</td>
</tr>
<tr>
<td>informally with other teachers</td>
<td>34.3% (23)</td>
<td>32.8% (22)</td>
<td>3.0% (2)</td>
<td>22.4% (15)</td>
<td>7.5% (5)</td>
<td>67</td>
</tr>
<tr>
<td>as a member of a school improvement team</td>
<td>9.5% (6)</td>
<td>15.9% (10)</td>
<td>3.2% (2)</td>
<td>31.7% (20)</td>
<td>39.7% (25)</td>
<td>63</td>
</tr>
<tr>
<td>with non-instructional personnel such as a data clerk or technology</td>
<td>9.5% (6)</td>
<td>12.7% (8)</td>
<td>1.6% (1)</td>
<td>15.9% (10)</td>
<td>60.3% (38)</td>
<td>63</td>
</tr>
<tr>
<td>coordinator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>as a member of a district-wide team or committee</td>
<td>18.5% (12)</td>
<td>20.0% (13)</td>
<td>1.5% (1)</td>
<td>29.2% (19)</td>
<td>30.8% (20)</td>
<td>65</td>
</tr>
<tr>
<td>as a member of my school's data team</td>
<td>11.9% (7)</td>
<td>11.9% (7)</td>
<td>1.7% (1)</td>
<td>18.6% (11)</td>
<td>55.9% (33)</td>
<td>59</td>
</tr>
</tbody>
</table>
As Table 4.6 shows, review and analysis of data was both a solitary and a collaborative activity of the teachers under study. Nearly two-thirds (64.2%) of teachers indicated that they frequently or sometimes reviewed and analyzed data by themselves. Teachers also reported that they frequently or sometimes collaborated with other teachers in their schools who taught the same subjects (64.1%) and with those who taught the same grade levels (71.2%). Responses suggested that collaborative efforts focused on data were informal in nature rather than part of school or district wide initiatives. As shown in Table 4.7, slightly more than two-thirds (67.1%) of teachers indicated that they frequently or sometimes reviewed and analyzed data informally with other teachers. Less than one third reported frequently or sometimes doing so as members of school improvement teams (25.4%) or school data teams (23.8%) while 38.5% indicated that they frequently or sometimes reviewed and analyzed data as members of district-wide teams or committees.

Collaboration with school administrators was less frequent. Slightly more than 25% of teachers reported frequently reviewing data with administrators while 29.9% indicated that they sometimes did so. While collaboration with professional colleagues for purposes of analyzing data was evident, more than 70% of respondents indicated that they occasionally or rarely did so as members of school improvement committees. This informal approach to data use was underscored by teachers’ responses when they were asked if their schools had data teams. Approximately one-third (35.8%) indicated that they did, while 31.3 % indicated they did not, and the remaining 32.8 % indicated that they did not know, as shown in Figure 4.5.
Another indication of the informal approach to review and analysis of data were teacher responses to the question, “Does the school in which you currently teach have a policy or policies which provide guidelines for the use of various types of data”. More than three-fourths of respondents (76.8%) replied that they did not know if their schools had policies. Another 14.3% stated that they did not, while only 10.7% of respondents indicated that their schools actually had policies that provided guidelines for the use of data as shown in Figure 4.6.
The most frequently cited means by which teachers received data was through computer printouts, which was reported by more than 83% of respondents. Approximately one-third of teachers reported receiving data through their schools’ computer networks (35%), verbally (38.3%), and via announcements (35%), while 10% reported receiving data through their schools’ web sites. Only 8.3% reported receiving data in a handwritten format as shown in Figure 4.7.
Applications to Practice

Responses indicated that teachers made changes in classroom practices based on the data analyzed. A bi-modal distribution resulted when teachers were asked about their use of the data available to them during the last two years. The two most frequently reported responses, which were each selected by 85.2% of respondents, were “allocated more time to some lessons and less to others” and “provided individualized instruction to certain students”. These were closely followed by the “contacted the parents of some of my students” choice that was reported by 80.3% of respondents. Nearly three-fourths (73.8%) indicated that they revised some of their teaching presentations and 72.1% made student special services referrals. More than 60% of respondents indicated that they
added new lessons, divided students into small groups for group assignments, or attempted to obtain new classroom materials based on the available data as shown in Figure 4.8.

Figure 4.8  Teacher Actions based on Data

When asked to characterize their feelings about using data in their work, more than two-thirds of respondents (70.0%) indicated that they frequently or sometimes considered using data to be useful, in contrast to less than one-fifth of their colleagues who occasionally (8.3%) or rarely (10%) who viewed it that way (Table 4.7). Approximately two-thirds stated that it had frequently (32.8%) or sometimes (32.8%) given them insights into their work, while a nearly equal number believed that it had
frequently (31.7%) or sometimes (36.7%) allowed them to make better decisions. Slightly more than half acknowledged that they frequently (27.6%) or sometimes (24.1%) reviewed and analyzed data because it was required. A relatively small percentage of teachers frequently (3.4%) or sometimes (16.9%) considered working with data a waste of time, in contrast with more than two-thirds who occasionally (32.2%) or rarely characterized it that way. Teachers surveyed were nearly evenly divided with regard to characterizing data use as an “educational fad,” with 40.4% indicating a response of frequent or sometimes agreement while only 52.6% occasionally or rarely saw it in that way.

Table 4.7  Teacher Characterization of Feelings Regarding Data

<table>
<thead>
<tr>
<th>Perception</th>
<th>Frequently</th>
<th>Sometimes</th>
<th>About half the time</th>
<th>Occasionally</th>
<th>Rarely</th>
</tr>
</thead>
<tbody>
<tr>
<td>I do it because it is required.</td>
<td><strong>27.6% (16)</strong></td>
<td>24.1% (14)</td>
<td>3.4% (2)</td>
<td><strong>27.6% (16)</strong></td>
<td>17.2% (10)</td>
</tr>
<tr>
<td>I find it very useful.</td>
<td><strong>35.0% (21)</strong></td>
<td><strong>35.0% (21)</strong></td>
<td>11.7% (7)</td>
<td>8.3% (5)</td>
<td>10.0% (6)</td>
</tr>
<tr>
<td>It is a waste of valuable time.</td>
<td>3.4% (2)</td>
<td>16.9% (10)</td>
<td>10.2% (6)</td>
<td>32.2% (19)</td>
<td><strong>37.3% (22)</strong></td>
</tr>
<tr>
<td>I was resistant at first, but now I see value in it.</td>
<td>3.8% (2)</td>
<td>24.5% (13)</td>
<td>26.4% (14)</td>
<td>15.1% (8)</td>
<td><strong>30.2% (16)</strong></td>
</tr>
<tr>
<td>It has given me insights into my work.</td>
<td><strong>32.8% (19)</strong></td>
<td><strong>32.8% (19)</strong></td>
<td>10.3% (6)</td>
<td>20.7% (12)</td>
<td>3.4% (2)</td>
</tr>
<tr>
<td>It has allowed me to make better decisions.</td>
<td>31.7% (19)</td>
<td><strong>36.7% (22)</strong></td>
<td>10.0% (6)</td>
<td>15.0% (9)</td>
<td>6.7% (4)</td>
</tr>
<tr>
<td>It has cleared up some misconceptions.</td>
<td>22.4% (13)</td>
<td><strong>25.9% (15)</strong></td>
<td>17.2% (10)</td>
<td>20.7% (12)</td>
<td>13.8% (8)</td>
</tr>
<tr>
<td>It appears to be just one more educational fad.</td>
<td>12.3% (7)</td>
<td>28.1% (16)</td>
<td>7.0% (4)</td>
<td>14.0% (8)</td>
<td><strong>38.6% (22)</strong></td>
</tr>
</tbody>
</table>
Barriers to Using Data

Teachers’ responses identified several obstacles to working with data in the schools under study. Of these, lack of time to focus on data and inadequate opportunities for professional collaboration around data were the two most significant barriers. Nearly two-thirds of respondents (65.0%) reported that they rarely or occasionally were able to spend as much time as needed working with data. Less than one-fifth of the teachers under study indicated that the opportunities they had to work with their colleagues on data-related matters were frequently (4.9%) or sometimes (13.1%) adequate.

Lack of Time

Respondents with teaching assignments at all grade levels surveyed indicated they had insufficient time to spend on data analysis. Teachers under study were asked to characterize the time available to them for working with data by responding to the statement, “I am able to spend as much time as I need working with data” using a Likert scale of choices labeled “frequently”, “sometimes”, “half-the-time”, “occasionally”, and “rarely”. The mode was “rarely” for kindergarten (29.4%) and sixth grade teachers (50.0%). “Occasionally” was the mode for second (40.0%), third (50.0%), and fourth (36.4%) grade teachers. Bi-modal distributions occurred for first grade teachers’ responses for the choices “rarely” (31.3%) and “occasionally” (31.3%). A second bi-modal distribution occurred for teachers with fifth grade teaching assignments. In this
case, the modes were the choices “occasionally” (33.3%) and “frequently” (33.3%). These distributions are displayed in Figure 4.9.

Figure 4.9 Adequacy of Time Available for Data Use by Grade Level

Nearly two-thirds of all respondents indicated that they rarely or occasionally were able to spend as much time as needed working with data (Figure 4.9).
Respondents overall were nearly unanimous (91.4%) in indicating that their schools did not provide sufficient release time for teachers to work on data (Figure 4.10). Only 3.7% of respondents indicated that additional prep time had been provided for them to work with data. Slightly more than half (51.7%) stated that time is allotted on in-service days for working with data. Only 13.8% of respondents reported that time for data-related activities was allotted on teacher days scheduled prior to the start of the school year. A small percentage of respondents, (10.3%) indicated that no time was allotted for them to work on data during the school year. None of the respondents indicated that their schools held annual data retreats (Figure 4.11).
The respondents were asked, “What do you need to enable you to use data more effectively?” They were then presented with a series of closed-ended items and asked to rate each item as either “high priority”, “intermediate priority”, or “not a priority”. The closed ended item related to time that was included in this question was: “more time to spend working with data”. Nearly three-fourths (73.6%) of respondents overall listed
having more time to spend working with data as a high or intermediate priority. The most frequently occurring choices for respondents with teaching assignments ranging from kindergarten through 5th grade were to rate the need for more time to spend working with data as a high or intermediate priority. Interestingly, respondents with sixth grade teaching assignments, however, indicated that more time to spend working with data was not a priority, as shown in figure 4.12.

**Figure 4.12  Priority of Need for More Time to Spend on Data**

![Graph showing the priority of need for more time to spend on data across different grade levels.]

_Lack of Opportunities for Collaboration_

Lack of opportunities for collaboration with fellow faculty members was the second substantial barrier identified by respondents. The respondents were asked to use a Likert scale to characterize their responses when presented with the statement, “The opportunities I have to work with my colleagues on data-related matters is adequate.”
Nearly one-third of respondents (32.8%) responded by selecting “rarely”, 36.1% selected “occasionally”, 13.1% selected “about half the time,” 13.1% selected “sometimes”, and only 4.9% selected “frequently”.

Less than one fourth (24.1%) of respondents reported that school administrators had revamped school schedules to allow teachers time to collaborate. Despite this lack of school day opportunities, teachers reported that they nonetheless collaborated with colleagues to review and analyze data, as shown in Figures 4.13 through 4.15.

**Figure 4.13  Teacher Collaboration to Review and Analyze Data**
Figure 4.14  Teacher Collaboration as Part of Organized Groups

Figure 4.15  Teacher Collaboration with Non-Instructional Personnel
Responses indicated that formal opportunities for professional collaboration were in short supply in the schools where respondents were assigned. Approximately one-fourth of respondents indicated that they frequently or sometimes reviewed and analyzed data as members of data teams (23.8%) or school improvement teams (25.4%). Just over one-third (38.5%) reported that they did so frequently or sometimes as members of district-wide committees (Figure 4.14). Faculty meetings emerged as the most frequently reported structure within which collaboration around data occurred. Nearly two thirds (62.2%) of teachers reported that they frequently or sometimes reviewed and analyzed data at faculty meetings, although only 19% of teachers indicated that time was allotted for this purpose at faculty meetings (Figure 4.11).
While faculty unions can provide opportunities for professional collaboration, the teachers in this study indicated that their faculty unions did not play significant roles with regard to data utilization. As seen in Table 4.8 nearly two-thirds (72.9%) of teachers indicated that union representatives almost never provided leadership with regard to using data, while 25% indicated that they occasionally did so.

Table 4.8  Leadership Related to Data Use

<table>
<thead>
<tr>
<th>During the last two years, who has provided leadership in your school with regard to using data?</th>
<th>almost always</th>
<th>frequently</th>
<th>occasionally</th>
<th>almost never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>24.5% (13)</td>
<td>24.5% (13)</td>
<td>30.2% (16)</td>
<td>20.8% (11)</td>
</tr>
<tr>
<td>Administrators</td>
<td><strong>49.1% (28)</strong></td>
<td>29.8% (17)</td>
<td>17.5% (10)</td>
<td>3.5% (2)</td>
</tr>
<tr>
<td>Clerical support staff</td>
<td>0.0% (0)</td>
<td>5.9% (3)</td>
<td>23.5% (12)</td>
<td><strong>70.6% (36)</strong></td>
</tr>
<tr>
<td>Technology staff</td>
<td>9.6% (5)</td>
<td>7.7% (4)</td>
<td>25.0% (13)</td>
<td><strong>57.7% (30)</strong></td>
</tr>
<tr>
<td>Guidance counselors</td>
<td>4.2% (2)</td>
<td>12.5% (6)</td>
<td>18.8% (9)</td>
<td><strong>64.6% (31)</strong></td>
</tr>
<tr>
<td>Union representatives</td>
<td>0.0% (0)</td>
<td>2.1% (1)</td>
<td>25.0% (12)</td>
<td><strong>72.9% (35)</strong></td>
</tr>
<tr>
<td>Data team members</td>
<td>21.7% (10)</td>
<td>19.6% (9)</td>
<td>6.5% (3)</td>
<td><strong>52.2% (24)</strong></td>
</tr>
<tr>
<td>Consultants</td>
<td>0.0% (0)</td>
<td>17.0% (8)</td>
<td>21.3% (10)</td>
<td><strong>61.7% (29)</strong></td>
</tr>
<tr>
<td>No one</td>
<td>15.6% (5)</td>
<td>9.4% (3)</td>
<td>12.5% (4)</td>
<td><strong>62.5% (20)</strong></td>
</tr>
<tr>
<td>everyone</td>
<td>6.3% (2)</td>
<td>12.5% (4)</td>
<td>15.6% (5)</td>
<td><strong>65.6% (21)</strong></td>
</tr>
</tbody>
</table>

Although nearly two-thirds (64.2%) of respondents indicated that they frequently or sometimes reviewed and analyzed data by themselves, having time to meet with other teachers to collaborate and reflect on data was deemed a high or intermediate priority by 86.6% of respondents as shown in Figure 4.16.
Figure 4.16  Teacher Prioritization of Time for Collaboration

Supports Needed for Data Use

Teachers’ responses indicated that professional development focused on data use was needed as shown in Figure 4.17.
When asked what type of training they had received to prepare them to work with data, only 30% of respondents overall indicated that their college courses prepared them to work with data. Nearly two-thirds (63%) cited in-service professional development, which was the mode. More than half (53.3%) indicated that they were self-taught. Respondents also relied on informal measures such as trial and error and mentoring from a colleague as shown in Figure 4.18. Nearly one-fifth (18.3%) indicated that they had no preparation for working with data.
Figure 4.18  Means by Which Teachers were Prepared to Work with Data

Given the focus on data driven decision making during the previous decade, respondents’ years of service was cross tabulated with data-related training responses as a means of describing any differences related to the time frames during which respondents entered teaching. As shown in the figure 4.19, those entering teaching between 1995 and 2000 reported receiving no data-related training during their teacher preparation programs. Between 20% and 40% of those who entered the profession before or after that time indicated that they received data-related training as part of their teacher preparation programs.
Teachers in this study were asked, “What type of training have you received to prepare you to work with data?” and provided with a list of closed-ended choices. To develop a more descriptive picture of the ways in which the teachers in this study learned to work with data, the researcher cross-tabulated sources of data-related training with respondents' years of service, as shown in Figure 4.20. Surprisingly, respondents with less years of service did not indicate that college teacher preparation programs had prepared them to work with data to a greater degree than those with many years of professional service. Regardless of years of service respondents cited in-service programming as a primary source of preparation. Although learning to work with data on a trial and error basis was acknowledged by the teachers with various amounts of professional experience, nearly two-thirds (64.3%) of those with more than 30 years of service indicated doing so.
While respondents indicated that many of their school districts had provided data-related professional development opportunities, their responses also indicated that the training they received was limited. Only a third of respondents (33.3%) reported that data-related professional development training was ongoing throughout the school year and only 20% characterized the training they received as adequate. Nearly one-fourth (24.4%) reported being provided with only a single training session and 31% indicated that the training provided was a good start but that more was needed. Teacher
characterizations of the professional development training they received are shown in Figure 4.21.

Figure 4.21  Teacher Characterization of Professional Development Training
Responses suggested that in addition to limitations on the amount of professional development training provided, there were also limitations on the content of that training. As shown in Figure 4.21, half of all respondents indicated that the training they received focused only on data from the Pennsylvania System of School Assessment (PSSA) data. Only 6.5% reported that the training they received addressed the use of demographic data in conjunction with classroom data. More than 80% of respondents cited the need for more data-related training as a high or intermediate priority as shown in Figure 4.22.

Figure 4.22  Teachers’ Data-related Training Needs
In addition to data-related in-service training, the respondents cited having newer classroom materials as a high (44.9%) or intermediate (30.6%) priority to assist them in using data more effectively.

Teachers were asked, “During the last two years, which of the following information technology tools have been made available by your school or district you’re your use in managing data?” and provided with a list of closed-ended choices. Their responses indicated that a variety of information technology tools had been made available to them for their use in working with data as shown in Figure 4.23.

Figure 4.23 Information Technology Tools Made Available to Respondents

![Available Information Technology Tools](image)

Nearly half (44.6%) indicated that a district-wide computer network had been provided, which was the mode. The second most frequently reported technology tool was spreadsheet software, which was reported by 42.9% of respondents. Other
technology-related supports, such as provision of school-wide computer networks and student information systems, database software and commercial data management systems were less prevalent, and reported by less than one-fourth of respondents. Teachers cited the need for both additional software to manage the data and training to prepare them to use that software as needed supports as shown in Figure 4.24.

Figure 4.24 Information Technology-related Support Prioritization
Brief Summary of Findings

This chapter described the analysis of the data and organized it into a format consistent with the research questions, which focused on the types of data relevant to teachers’ classroom needs, processes for building knowledge and applications to practice as well as the barriers teachers face and the supports they need to review and analyze data.

The teachers in this study reported that they had access to student learning, demographic, and school process data. While all three types of data were available to them, they indicated that they primarily used student learning data and made very limited use of demographic and school process data.

Teachers reviewed and analyzed selected data both collaboratively with other teachers and administrators and also by themselves. Respondents indicated that they used the information obtained from working with data to guide classroom practices such as the amount of time spent on lessons, the provision of individualized instruction, contacts with parents, and revisions to presentations. They also used the information to make student referrals for special services, add new lessons, and divide students into groups for group assignments.

Respondents cited lack of time and lack of opportunities for collaboration with colleagues as barriers to working with data. Despite these barriers, the teachers under study reported that they squeezed in time to work with data and found opportunities for informal collaboration with their peers. It was evident, however, that respondents did not
consider this to be adequate. Teachers reported that some in-service training focused on data use had been provided but their responses suggested that more was needed.
CHAPTER 5
DISCUSSION, CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS
FOR FUTURE RESEARCH

In this chapter, results of the study are discussed and explained in the context of existing research and bodies of literature. Conclusions and implications are then presented and recommendations for future research provided. The chapter concludes with a discussion of the limitations of the study.

Summary

This study focused on the degree to which data-driven decision making as envisioned by the NCLB legislation was actually occurring in the elementary schools studied. It sought to provide a descriptive picture of the extent to which elementary school teachers in the six Pennsylvania school districts studied used data to guide instruction. The research questions for this study are listed below.

1. What types of data are relevant to teachers’ classroom-related needs?
2. What processes do teachers utilize to transform raw data into information and ultimately to build knowledge?
3. How is the knowledge gained from data utilization applied to classroom practice?
4. What barriers prevent teachers from making effective use of data?
5. What supports are needed to enable and facilitate effective use of data by teachers?

Because a suitable pre-existing survey instrument was unavailable, an instrument was developed and pilot-tested specifically for this study. The instrument, which consisted of a cross-sectional survey containing five content areas corresponding to the research questions, is included as Appendix F. A multi-stage random sample of six school districts out of 19 located within the service area of Pennsylvania Intermediate Unit #17, one of 29 regional educational service agencies in Pennsylvania, was utilized. A total 262 teachers in 15 elementary schools were included in the sample. Useable responses were received from a total of 103 (39.3%).

Descriptive statistics, primarily measures of central tendency, were used to review and analyze data. Frequency distributions were used to determine the types of data available to teachers as well as the degree to which teachers made use of each type and the purpose for which it was used. The processes used by teachers to review and analyze data as well as the barriers they faced and the supports they needed were summarized and organized using frequency tables and mode calculations. This provided a window through which to view the state of practice as it related to NCLB expectations for data driven decision making.

The picture which emerged illustrated both progress toward NCLB expectations as well as substantial real-world obstacles which threaten to prevent the attainment of those expectations.
The findings of this study suggest three specific conclusions about the degree to which teachers were actually engaging in data driven decision making. First, teachers had access to multiple types of data, but tended to rely on only one type. Second, teachers lacked critical supports such as training, time, and procedural guidelines to assist them in using data. Third and directly related the previous conclusion, while teachers made good-faith attempts to engage in data driven decision making they relied almost exclusively on their own conceptions/definitions of what counted as data driven decision making and this called into question the very efficacy of those decisions. The overall conclusion of this study, predicated upon these three specific conclusions, is that teachers in the schools studied, despite their efforts to do so, were unable to engage in data driven decision making as envisioned by NCLB.

Each of these conclusions is discussed more thoroughly in the following sections.

**Access to and Use of Data**

Access to data is a prerequisite to data driven decision making, and the literature contains numerous references to the types of data needed (Bernhardt, 1998, 2004; Jacobs, 2009, Love, 2002; Marshall, Sears, & Schubert, 2000; Mitchell & Conrad, 2003; Streifer, 2002) as well as the ways in which multiple measures of data can be used (Johnson, 2002; Holcomb, 1999). As described in a 2003 McREL article titled “Data-driven”,
By going beyond simple data analysis (examining one year’s results on a single test to in-depth analysis (examining the interaction of multiple types of data from varied sources over multiple years), educators can determine the effects of their programs and practices and modify them to improve student performance. (p. 2)

Although teacher access to data is not a given in all schools (Choppin, 2002; Mason, 2002), the elementary school teachers in the six districts in this study had access to multiple data measures, including student learning assessments (formal and informal), demographic data, and school process data as classified by Bernhardt (2004). While multiple types of data were available to them, these teachers relied primarily on student learning measures and made limited use of other types of data. The tendency to rely on only one type of data suggests that the ability of teachers to contextualize that data, to uncover relationships, and “connect the dots” was limited. Bernhardt cautioned against using student learning data exclusively when she noted, “Just looking at student learning measures alone could, in fact, keep teachers from progressing and truly meeting the needs of students, because they are not looking at the other elements that have a great impact on student learning and teaching” (2004, p. 30). The use of primarily one type of data suggests a lack of teacher understanding of the various types of data and the appropriate uses of those data. Teachers in this study are hardly alone in that respect. As Lachat and Smith (2004) noted,

While the range of data available to schools is extensive, it is rarely used effectively (Wayman & Stringfield, 2003). Schools that want to use data to drive
their decisions often don’t know where to begin or what type of data to use
(American Association of School Administrators [AASA], 2002). (p.2)

One possible explanation for the tendency of teachers to rely on a single type of data may be found in sensemaking theory. According to Coburn, Toure, and Yamashita (2009),

Sensemaking theory is rooted in the insight that the meaning of information or events is not given, but is inherently problematic; individuals and groups must actively construct understandings and interpretations. People construct these understandings by placing new information into their preexisting cognitive frameworks, also called ‘working knowledge’ by some theorists (Kennedy, 1982; Porac, Thomas, & Braden-Fuller, 1989; Vaughn, 1996; Weick, 1995). Thus, individuals and groups come to understand new information through the lens of their working knowledge, often significantly reconstructing it along the way. (p. 1120)

Because teachers in this study did not receive the type of education and training needed to understand and conduct data analysis, the lens through which they viewed their task was limited to their working knowledge, which in this case encompassed the student learning data familiar to teachers but did not extend to demographic or school process data with which they had little familiarity. Lacking knowledge of the value and utility of such data, they may simply have dismissed it. Another possibility is that teachers may have been predisposed to focusing on student assessment data as a result of their familiarity and prior experience with using it. Assessment data is readily available and its use is an integral part of the practice of teaching.
Lack of Critical Supports

Once teachers have gained access to data, they are then positioned to begin the process of turning that data into information and ultimately into knowledge (Empson, 1999; Thorn, 2001). Key ingredients are required to support the process of moving from data to knowledge and the absence of those supports can stall or even derail the creation of knowledge. This study concluded that the key supports of training, time, and procedural guidelines were lacking in the schools that were the focus of this research.

Education and Training

For teachers tasked with using data to improve practice, education and training focused on data analysis and application have been identified as key ingredients needed to engage in the process of knowledge building (Mandinach, Honey, & Light, 2006). According to Chen, Heritage and Lee (2005),

Effective data use that will lead to school improvement is dependent on the skills of education practitioners to collect and analyze data. Yet, the development of these skills has not routinely been a part of administrator preparation programs, and hardly ever a feature of teachers’ pre-service and in-service training (Cromey, 2000; Herman & Gibbons, 2001). (p. 327)

As more and more schools have attempted to engage in data driven decision making in response to NCLB, concerns about a lack of pre-service preparation related to data use have begun to appear in the literature. Petrides and Nodine (2005) noted that
“...schools of education do not regularly provide prospective teachers with the necessary skills to interpret assessment results, and to then adjust instructional practice accordingly. These tools need to be an integral part of teacher preparation programs” (p. 74).

According to Mandinach, Honey, and Light (2006), “There are relatively few courses offered in teacher training institutions on data, and only recently have such inservice workshops begun to emerge” (p. 13). A 2008 report for the U.S. Department of Education, Office of Planning, Evaluation and Policy Development found that teachers themselves believe they could benefit from professional development related to diagnostic assessments and changes to content and method. That sentiment was evident in this study where, regardless of years of service, teachers expressed a need for education and training to prepare them to work with data effectively. Less than one third of the teachers in this study received data-related instruction as part of their pre-service teacher preparation programs.

In the absence of pre-service preparation for working with data, the need for in-service training was heightened. Teachers cited needs for training focused on managing, interpreting, and utilizing data as well as revising lessons to address issues identified in the data. They indicated in-service training was their primary means of learning to work with data, but did not feel that the training they received had been adequate. Many teachers reported that only a single session of in-service training had been provided. Half the teachers in this study indicated that the in-service training they received focused only on the PSSA. In-service training opportunities were characterized as episodic in nature and restricted in both scope and quantity. Such limited in-service opportunities are ill
suited to providing teachers with the breadth of knowledge and skills needed to use data effectively. Sadly, this is not an isolated situation. According to Bernhardt (2004), “Few people in schools and districts are adequately trained to gather and analyze data or to establish and maintain databases”. She went on to say, “There is a lack of professional development for teachers to understand why data are important and how data can make a difference in their teaching” (p. 6). Mandinach, Honey, and Light (2006) acknowledged the existence of a long term problem related to the lack of training for teachers in how to use data to improve student performance. Petrides and Nodine (2005) focused on 28 urban school systems that were considered leaders in making the transition to the use performance-driven practices. They observed that, “even in these leading-edge schools, the task of training teachers to understand and use assessment results to improve instructional practice was an overwhelming undertaking” (p. 74). A 2008 Center for Rural Pennsylvania report not only listed professional development related to data-driven decision-making in a list of resources needed by rural school districts, but recommended that state support be provided for it.

*Time*

Data driven decision making is a relatively new addition to the landscape of public education and not one that blends easily into existing school structures. Supports required to allocate time for data driven decision making are often related to resource allocation and scheduling, areas where changes are not easily accomplished in light of limited school budgets. According to Young (2006), “In tandem with technical solutions
such as training teachers on data systems, reformers need to effect organizational change in collegial and learning norms, role definitions, and structured time use that permits teachers to make sense jointly of the data they have available” (p. 545). Time, especially time to collaborate with colleagues, appears repeatedly in the literature describing supports needed for data driven decision making (Armstrong & Anthes, 2001; Cromey, van der Ploeg, & Masini, 2000; Feldman & Tung, 2001; Holcomb, 1999; Lachat & Smith, 2004). A 2004 North Central Regional Educational Laboratory guide to using data captured the essence of the need for time, stating,

First, the process requires time—time during the day and the week to involve teachers, always a challenge. Schools that are committed to using data to guide their work allocate time for teachers to meet, discuss, reflect upon data, and make informed instructional decisions. Schools identify the need for this time, then find it through a combination of creative scheduling (e.g., having all first grade teachers share student data while students attend “specials” such as art and music), and priority setting (e.g., using weekly faculty meetings to analyze student data). (p. 2)

Time requirements for data work go beyond simply adding non-class time to individual teachers’ schedules. According to Chen, Heritage, and Lee (2005), “The process of identifying and meeting students’ needs requires a team effort; collaboration among professionals is essential for building school capacity to sustain the practices of using data for school improvement” (p. 326). Time dedicated to collegial collaboration requires that multiple teachers have the same timeframe allotted on the same day or days.
In addition, this collaborative time must be of an ongoing nature. Given the realities of school day scheduling, such coordinated release time is difficult to arrange. Huffman and Kalnin (2002) noted, “Numerous studies have shown that teachers have very little time during the day to work with other teachers, plan lessons as a team, or even talk with their colleagues (US Department of Education 1996a)” (p. 569). Nonetheless, the literature contains numerous references to the importance of teacher collaboration around data (Chen, Heritage & Lee, 2005; Lachat & Smith, 2004; Mason, 2003; Wayman, Midgley, & Stringfield, 2005; Wellman & Lipton, 2000) and the ways in which time can be made available. Mokhtari, Thoma, and Edwards (2009) described the efforts of one elementary principal to make time available by arranging for substitute teachers to cover two-hour time frames that freed teachers from classrooms so they could collaborate around data. Teachers in a Wyoming elementary school met for 1.5 days each quarter in addition to weekly collaboration (Wayman, Cho & Johnston, 2007). Other scheduling supports for facilitating collaboration included “early release” afternoon meetings or after school meetings for which additional compensation was provided (“Data-driven,” 2003).

Making time for data work has been tied to results. According to Armstrong and Anthes (2002),

Schools successful in using data to support decisionmaking and improvement use the district resources available to them, create a school structure where data use is embedded in the daily schedule, and use staff expertise to continually develop data analysis skills. (p. 4)
Port and Datnow (2009) stated, “The ways in which schools structured time around data discussions were probably the most important scaffolding for continuous improvement” (p. 488).

There was little evidence of the allocation of ongoing time for data work within daily schedules in the six school districts studied. In fact, a picture of just the opposite emerged. Teachers in these schools had not been provided with additional preparation time to focus on data. Although disappointing, this situation is by no means unique. Dembosky, Pane, Barney, and Christina (2005) found lack of time to review and reflect on student data was the most common barrier to data driven decision making in a study of southwestern Pennsylvania School Districts. In a 2005 working paper they reported, “Teachers and principals struggle to find the time to study and think about data that are available to them. They lack adequate time to collaborate in analyzing and interpreting data, and to develop interventions to address students’ learning needs” (p. 47). Similar findings were described in an August 2008 U.S. Department of Education Report on teachers’ use of student data systems which cited lack of time set aside for data work as a barrier. It went on to say, “For the most part, teachers continue to be expected to use the data system as an extra activity, either conducted on their own time or substituted for other activities during their regular planning period” (p. 26).

This study brought to light one more example of lack of time serving as an impediment to data driven decision making in schools. Teachers received no additional time for data work and little evidence was found of the establishment of regular meetings or other ongoing activities designated for focusing on data. Less than one-fourth of
teachers indicated that their schedules had been revamped to allow time for collaboration. In-service days and faculty meetings appeared to provide some opportunities for teachers to work with data in these schools, but even those limited opportunities were not available universally. Less than one-fifth of teachers cited the availability of time during faculty meetings to focus on data and only about half indicated time was allotted on in-service days. While in-service days and teacher days prior to the start of the school year were sometimes used to focus on data, teachers studied did not have the benefit of regularly scheduled data analysis time throughout the school year. Because effective data review and analysis is by its very nature a cyclical process, this lack of regularly scheduled time limited the ability of teachers to engage in that process. According to Armstrong and Anthes (2002), “Schools successful in using data to support decisionmaking and improvement use the district resources available to them, create a school structure where data use is embedded in the daily schedule, and use staff expertise to continually develop data analysis skills” (p. 4). A 2003 series of articles on sustaining school improvement from Midcontinent Research for Education and Learning suggested that “Part of maintaining a culture that supports the use of data is ensuring that data are continually reviewed” (p. 3). It is this cyclical process of gathering and analyzing data, developing knowledge, determining actions, applying them, and then gathering more data to evaluate effectiveness that is the essence of data driven decision making, and this process requires both dedicated time and opportunities for collaboration (Mandinach, Honey, & Light, 2005).
The allotment of time during the school day for teachers to devote to data is rarely a revenue-neutral support. Indeed, provision of such time can require added funds for additional staff, faculty or substitute teachers and such funds may not be readily available. According to McREL, “In the world of schooling, it’s impossible to talk about time without talking about money” (Data Driven Decision Making, 2003, p. 2). Lack of funds to support allocation of time during the school day schedule is one possible explanation for the absence of this support in the schools studied. Conceptions of the role of teaching may provide another. According to Supovitz and Klein (2003),

The prevailing view is that teachers are only on the job as long as they are in front of students. Yet, any serious investigations into student performance data require that teachers learn and practice more sophisticated skills and spend more time conducting analyses and designing responses than are currently available. What profession, other than K-12 teaching, spends more time performing than preparing for performance? Systematic data analysis is about more carefully preparing for performance. Implicit to this idea is that systematic analysis of how teaching produces learning is at the core of teachers’ inquiry into how to continually improve their practice. Yet, the structures and opportunities to engage in these inquiries are virtually absent in the American system of education. Only when this occurs on a widespread basis can American education come closer to reaching its goal of improving the learning outcomes of all students. (p. 43)
Procedural Structures

Compounding the difficulties of inadequate training and time was the absence of policies to guide teachers in their work with data. Most teachers simply did not know whether or not their schools had policies relating to the use of data, suggesting not only that data review and analysis in the schools studied was an informal activity, but also that teachers were in need of clarification and direction regarding data analysis. Again, they were not alone in lacking procedural supports. According to Wayman (2007), “…the most important difficulty is that school districts often are attempting to use data without first establishing clear understandings and processes for how data should be used throughout the district” (p. 6). Recognizing the need, Datnow, Park, and Wohlstetter (2007) recommended that teachers be provided with “structured protocols and tools to help facilitate data discussions” (p. 49). Wayman, Cho, and Johnston (2007) cited “the establishment of structures, processes, and materials” (p. 41) in data-informed districts. Dembosky, Patne, Barney, and Christina (2005) recommended that schools and districts either develop or adopt existing processes for data driven decision making. Such procedural supports were not evident in the schools included in this study.

One possible explanation for the absence of data policies and procedures may be that, like teachers, school or district administrators themselves lacked sufficient knowledge and training regarding data applications and therefore were unable to ascertain the supports needed. Wayman, Cho and Johnston (2007) observed that, like teachers, principals lack sufficient skills and preparation for dealing with data and for providing the necessary leadership. Kerr, Marsh, Ikemoto, Karilek, and Barney (2006)
cited a lack of district-level capacity to support school level efforts and noted that the 
lack of expertise in dealing with data affects not only school-level staff, but district-level 
staff as well.

**What Counts as Data Driven Decision Making?**

While acknowledging the lack of supports, teachers in this study made genuine 
efforts to engage in data driven decision making. They recounted squeezing data work 
into their existing preparation time and collaborating informally with their colleagues 
around data. They reported taking actions based on their work with data. These actions 
were focused on classroom practices such as the amount of time allocated for lessons, the 
presentation of those lessons, and the addition or elimination of some lessons. Teachers 
also took steps to obtain resources such as new classroom materials, and to obtain 
assistance for their students by making referrals for special services and requesting 
tutorial assistance. Review and analysis of data also led teachers to initiate contacts with 
parents, provide individualized instruction to students, and make decisions concerning 
groupings of students. Such actions are consistent with applications of data described in 
the literature. In a 2003 study conducted on schools using the America’s Choice school 
reform model that study, Supovitz and Klein found,

First, many teachers reported that they used data as the basis for identifying lesson 
objectives: How they decided what to teach. Second, teachers and administrators 
told us how student performance data were use to guide flexible grouping of
students for more focused instruction. Driven by the number of students in the class who had not demonstrated mastery of the skill in question, this, in some cases, resulted in small group instruction and, in other cases, individualized instruction. Third, teachers described how they used data to align their lessons with standards. (p. 15)

A study by Brunner et al. (2005) suggested that teachers’ primary use of test data was to determine allocations of their own resources, including time, attention, practice, and homework. They also suggested that, to a lesser degree, teachers used test data provided to them for activity planning as well as for unit and lesson planning. Lachat & Smith (2004) discussed the use of data to target instruction to student proficiency levels while Feldman and Tung (2001) cited data use for identification of students needing supplemental assistance. Mason (2003) and Fox (2001) noted that teachers can use data to evaluate instructional strategies as well as to gauge progress. Cromey, Van der Ploeg, and Masini (2000) described a process of “precision teaching” which involved the use of data to inform instruction by identifying learning goals, measuring student progress against goals, and then delivering subsequent instruction targeted to meet the needs of each student.

While the actions taken by teachers in this study were more or less consistent with applications of data-driven decision making described in the literature, the accuracy of their understanding and enactment of “data driven decision making” left much to be desired. Teachers’ efforts to build knowledge were subject to the limitations imposed by their lack of training, reliance on only one type of data, and limited opportunities for
collaboration. Because they didn’t use multiple types of data, their ability to contextually identify relationships and validate assumptions was limited. Gauging their efforts against the conceptual framework for this study, teachers appeared stuck at the beginning of the process of knowledge management. Lack of training and opportunities for collaboration prevented them from turning the data available to them into information and finally into knowledge to guide their actions. Conversations and debates focused on multiple types of data are important steps on the continuum stretching from data to information and ultimately to knowledge. According to Wellman and Lipton (2000), “Data have no meaning. Data are simply information. Individuals and groups create meaning by organizing, analyzing, and interpreting data. Interpretation is subjective; data are objective. Frames of reference influence the meaning we derive from the data we collect” (p. 49). The definition of knowledge creation as espoused by Empson (1999), Thorn (2001), and Petrides and Nodine (2003) requires human collaboration to identify patterns, provide context and develop explanations. According to Petrides and Nodine (2003),

Data can be thought of as the expanse of facts or quantitative measures available to and about an organization. Data become information when humans place them in context through interpretation that might seek to highlight, for instance, patterns, causes, or relationships. Reports and strategic planning documents are examples of information: data placed in context. Information can be shared or hoarded. Knowledge, on the other hand, is the understanding that develops as people react to and use the information that is available to them. Knowledge is
both individual and organizational. It can be described as a belief that is justified through discussion, experience, and perhaps action. Knowledge can be shared with others by exchanging information in appropriate contexts. (p. 13)

Teachers in this study, despite their efforts, appear to have been prevented from developing the knowledge needed to make fully informed decisions because they lacked the appropriate resources. Lacking those resources, they may have been ill equipped to find fresh or innovative ways of viewing and analyzing data, returning instead to traditional explanations and actions. One possible explanation may be found in a 2009 study by Coburn, Toure, and Yamashita which described the ways in which evidence use is shaped by organizational conditions within a district. They suggested that,

…resource constraints make it difficult to use evidence in substantive ways because district personnel have less time to search for new or novel solutions and less time to engage with evidence and each other in ways that encourage and enable them to rethink their assumptions and develop shared understandings. (p. 1144)

With only limited knowledge and deprived of essential supports, teachers cobbled together attempts at data driven decision making as they were able to conceptualize it. These well-intentioned but improvised efforts focused on a few disjointed bits and pieces of the overall process of data driven decision making but could not include all of the necessary components. There was little evidence of the type of ongoing, coordinated processes that are characteristic of effective data driven decision making or of efforts to evaluate the efficacy of the attempts at data driven decision making.
Unable to Engage in Data Driven Decision Making as Envisioned by NCLB

Sadly, the teachers in this study, despite their efforts, were not able to engage in data driven decision making as envisioned by NCLB. Although they had access to multiple types of data and were willing to engage in the process, they were prevented from doing so by a lack of critical supports. They are not alone in that respect. According to Wayman, Midgley, & Stringfield (2005), “School personnel wishing to use data to inform instruction often lack proper systemic supports” (p. 2). Wayman, Cho, and Johnston (2007) found that efforts to use data were characterized by a combination of supports and barriers. Means, Padilla, DeBarger, and Bakia (2009), noted in a recent study, “…the movement to incorporate student data in local education decision making is real (many districts, school leaders and teachers are making good-faith efforts), but there is a significant distance to go before it becomes well executed in practice” (p. 49).

Studies such as those by Datnow, Park, and Wohlstetter (2007) and Mason (2001) have shown that, with the proper supports in place, data driven decision making can improve the practice of education. It appears the NCLB legislation presupposed the availability of these supports or the ease with which they could be provided. However, given the realities faced by today’s schools, such supports are neither universally available nor easy to acquire. As Means, Padilla, DeBarger, and Bakia (2009) pointed out,

Data-informed decision making is not a simple intervention not only because it involves so many aspects of education (e.g., assessment, curriculum,
accountability, information technology) but because it requires fundamental improvements in the degree of mutual trust and changes in the way teacher time is used (p. 49).

Shen and Cooley (2008) also recognized that the supports needed for data driven decision making are tied to the core structures of schools, when they remarked,

Data-informed decision-making alone will not renew the educational system, there has to be coherent changes in the system to make sure that the stakeholders have the knowledge and skills in data-informed decision-making and structural arrangements in place to facilitate data-informed decision-making and harness the power of data-informed decision-making.

As Datnow, Park, and Wohlstetter (2007) simply stated, “Data-driven decision making is not a reform that can be implemented in isolation” (p. 20). The implications of changing the core structures of schools are many. Such changes would require substantial political will, substantial resources, and modifications to educator preparation programs.

An important question for further research then is: “Can schools provide the supports necessary to enable the practice of data driven decision making to occur?” An in-depth look at the school-based changes necessary to provide such supports, the costs attached to those changes, and the feasibility of accomplishing them is needed. Another area for further research concerns the types of data-related skills and training needed by school personnel from classroom teachers to superintendents as well as the mechanisms for providing them at both the pre-service and in-service levels. Data driven decision making has been shown to be an effective strategy when appropriate supports are in
...place. If those supports cannot be made available, school improvement based upon data-driven decision making as envisioned by NCLB may not be possible. An extensive body of research will be needed guide and inform educators and policy makers alike.

**Limitations**

This study contributes a small part to the body of knowledge concerning the degree to which teachers in elementary schools actually use data as envisioned by the framers of NCLB. It provides a descriptive picture of the extent to which data-driven decision making was being practiced in elementary schools in six school districts in Pennsylvania. Because of the small sample size and relatively low return rate of 39.3 %, the results of this study cannot be used to generalize to a larger population, but can be useful when viewed as one small slice of the larger picture of teacher use of data in elementary schools. This section of the research report lists and describes the limitations of the study. As suggested by Creswell (2002),

Limitations are potential weaknesses or problems with the study that are identified by the researcher. These weaknesses are enumerated one by one, and they often relate to inadequate measures of variables, loss or lack of participants, small sample sizes, errors in measurement, and other factors typically related to data collection and analysis. These limitations are useful to other potential researchers who may choose to conduct a similar or replications study. (p. 253)
Following Creswell’s recommendations, each of the limitations of the survey design, as well as problems encountered, are listed and acknowledged in the following sections.

_Response Rate_

While there are many assets offered by survey designs, the problem of non-response, which is inherent in the use of surveys, was clearly a limitation in this study. Fowler wrote, “For most surveys, nonresponse is potentially one of the most important sources of systematic error; it is likely to be one of the most problematic concerns regarding the accuracy of sample estimates” (pp. 52-53). Nardi (2003) emphasized this point when he stated, “Low response rates seriously affect how accurately researchers can generalize the results to a larger population” (p. 59).

Mindful of the problems resulting from non-response, the design for this study included multiple strategies to increase response rate which were implemented. Despite the measures taken to limit non-response, the final response rate was 39.3%. Potential participants from one school district had to be eliminated because school administrators in that district had indicated that they would require teachers to complete the survey. Because of the small sample size (N =262, n = 103) and relatively low return rate, the results of this study cannot be used to generalize to a larger population, but can be useful when viewed as one small slice of the larger picture of teacher use of data in elementary schools.
Restrictions Imposed by the Use of Closed-ended Questions

The survey instrument utilized uniform questions and fixed responses which, according to Nardi (2003), restrict the ability of researchers to compensate for cultural differences, thus raising the possibility of biased results. In addition, the use of closed-ended questions within the survey by their very nature confined responses. The design of the survey instrument included measures such as Likert-type scales and presentation of questions using a matrix format to lessen the restrictions imposed by the use of closed-ended questions where possible. However, these limitations cannot be completely eliminated and findings must be considered in light of the use of closed-ended questions.

Self-report Data

Self-administered surveys allow researchers to avoid the pitfalls of using interviewers who may inadvertently influence participant responses. However, one drawback to self-administered versus interviewer-administered surveys is the risk that participants may misinterpret survey questions and have no opportunity to ask for clarification (Creswell, 2002). Another drawback identified by Creswell concerns the issue of self-reporting, in which participants respond to survey questions by indicating what they think as opposed to what they actually do, which may differ substantially. Respondents may also answer questions by providing the answers that they think the researcher may want to hear, or that place them in a favorable light, but provide an inaccurate description.
To decrease the likelihood that respondents might misinterpret survey questions, the researcher sought input into the design and terminology used to construct the survey instrument from a panel of five individuals selected for their relevant expertise and pilot tested the survey with a group of retired educators. Given the somewhat uneasy atmosphere surrounding the requirements of NCLB which has pervaded many school in recent years, it is entirely possible that some respondents answered survey questions by providing information that reflected favorably upon themselves or that they assumed the researcher wanted to hear. Reviewers of the findings of this study should be cognizant of that possibility.

*Cause and Effect Relationships not Supported*

This study was designed to provide a “slice of life” view of data utilization by the elementary school teachers it studied as it existed at the time the research was conducted. It was not intended to identify cause and effect relationships. According to Burke and Christensen (2000),

The primary purpose of descriptive research (*italics original*) is to provide an accurate description or picture of the status or characteristics of a situation or phenomenon. The focus is not on how to ferret our cause-and-effect relationships but rather on describing the variables that exist in a given situation, and, sometimes, on how to describe the relationships that exist among those variables. (p. 302)
Problems Encountered

In addition to the design limitations described above, the following unanticipated problems were encountered.

Reliability Coefficients

Measures taken to increase reliability were employed in the design of individual questions that comprised the survey instrument. The original design also called for the use of two types of reliability estimates, a test-test procedure and the use of Cronbach-Alpha.

The survey instrument was administered to a group of test subjects, all current or retired educators from school districts not under study, to allow for calculation of a coefficient of stability using a test-retest procedure to provide a measure of the reliability of the instrument. According to McMillan and Schumacher (2001),

A coefficient of stability is obtained by correlating scores from the same test on two different occasions of a group of individuals. If the responses of the individuals are consistent (that is, if those scoring high the first time also score high the second time, and so on) then the correlation coefficient, and the reliability are high. (p. 246)

The survey was administered to the pilot group of 15 retired educators from Keystone Central School District on January 5, 2009. The survey was administered to this same group of retired educators again on February 9, 2009 following an interval of
five weeks. The researcher sought and obtained expert advice concerning the calculation of a reliability coefficient. She was advised that because each of the pilot respondents had not been individually identified, it would not be possible to calculate a reliability coefficient as originally planned. The researcher had purposefully avoided collecting any individually identifiable information from respondents in order to comply with Office of Research Protections Institutional Review Board (IRB) confidentiality requirements. She did not realize that such identification would be needed to perform the reliability coefficient calculation. In an attempt to address this situation, the researcher again followed the advice she received and manually compared the responses given by pilot responders to each survey question on each of the two dates for which the survey was administered. The intent in doing so was to eliminate questions for which responses differed by a given percentage. However, comparison of responses showed more variation than anticipated on some questions, especially those which sought fine-grained detail and utilized a matrix format. Such questions represented a large portion of the survey. One possible explanation is that the pilot group, comprised entirely of retired educators, may not have been able to report details of actions which occurred several years ago as concisely or consistently currently employed educators. The inability to identify pilot respondents or to devise another method to address this problem is a weakness of this study.

The original proposal design called for the second type of reliability estimate, internal consistency, to be measured using the Cronbach Alpha method. According to McMillan and Schumacher (2001), “The Cronbach Alpha is generally the most
appropriate type of reliability for survey research and other questionnaires in which there is a range of possible answers for each item” (p. 247). To determine internal consistency using this method, the degree of correlation between responses to questions on the survey, which are designed to ask for the same information in different ways, is measured.

The researcher again continued to rely on expert advice to measure the degree of correlation between responses and obtain a reliability estimate. The researcher was advised that Cronbach Alpha would not be an appropriate method. Therefore, Cronbach Alpha could not be computed. Readers of this study should be cognizant of the fact that a reliability coefficient was not computed using either of the methods contained in the original design of the study and therefore the degree of reliability of the survey instrument cannot be verified.

Although the original design of the study called for the calculation of range and standard deviation, the researcher was advised that these calculations could not be made due to the format of the survey questions. Therefore, these measures were not calculated. Alternatively, the researcher followed the expert advice she was given and made extensive use of frequency distributions and measures of central tendency, as well as tables, charts and other graphic representations.
REFERENCES


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APPENDIX A

SUPERINTENDENT LETTER

Date

Dear (Superintendent's name),

I am writing to request the participation of your school district in a survey of *Data Utilization by Teachers in Elementary Schools* (IRB #30264) which is being conducted for research purposes. The focus on data at arguably all levels of educational practice, from classroom teachers to building administrators to central office personnel and board members is a topic which requires in-depth study.

The purpose of this letter is to ask if you would allow elementary teachers in your district to participate in an online survey. The survey is confidential. Contacts with teachers will be made via e-mail messages which will contain hyperlinks to the survey instrument. Completion of the survey will take approximately 20-25 minutes. No visits, meetings, or other activities will be conducted that could in any way interfere with teachers’ schedules.

The participation of elementary teachers in your district is very important. The information they provide will be used to develop a descriptive picture of the ways in which teachers *actually* use data as well as the supports made available to them and the challenges and barriers they face with regard to data utilization. The information provided by teachers as confidential survey respondents will remain confidential and will be aggregated with other responses from other districts. It will be shared in summary form only.

If you are agreeable to allowing elementary teachers in your district to participate, please indicate your approval by signing the attached permission form and returning it in the postage-paid envelope.

Recognizing that you may want to discuss the research project prior to granting your permission, I will place a call to your office within the coming week as a means of providing any information you may need. You may also contact me if you prefer. I am a graduate student in Educational Leadership at The Pennsylvania State University and the Principal Investigator for this study. I can be reached by telephone at (570) 726-0022 (daytime) or (570) 726-6598 (evenings). My e-mail address is dcb3@psu.edu.

Thank you very much for considering this request.

Sincerely,

Debra C. Burrows
Principal Investigator

cc:  N. Prestine
APPENDIX B

SUPERINTENDENT’S STATEMENT OF PERMISSION

Research Study: Data Utilization by Teachers in Elementary Schools (IRB #30264)
Principal Investigator: Debra Burrows
Department of Educational Leadership, College of Education
The Pennsylvania State University, University Park, PA  16802
February, 2009

Superintendent’s Statement of Permission

I have reviewed the request to allow elementary school teachers in my district to participate in the above-referenced study. I understand that participation entails completion of an online survey and that teachers will be contacted via e-mail. To enable the Principal Investigator to contact teachers via e-mail, I have authorized her to obtain a list of elementary teachers’ e-mail addresses from my district. Teachers e-mail addresses will be utilized for purposes of the above referenced research study only.

My signature below indicates that I have granted permission for elementary school teachers in the Williamsport Area School District to participate in the Data Utilization by Teachers in Elementary Schools research study and that I have authorized the provision of a list of elementary school teachers’ e-mail addresses to the Principal Investigator.

(Signature of Superintendent)                         (Date)

(Superintendent’s Name, District, and District Address)
APPENDIX C

TEACHER PERMISSION LETTER

Date

Dear Elementary Educator,

In the years since its passage, the No Child Left Behind Act has been a lightening rod for controversy and a subject of vigorous debate. It has also brought about visible changes in the practice of education, although whether or not some of those changes are positive ones is a subject of contention as well. One of the most noticeable changes relates to the new focus on data at arguably all levels of educational practice, from classroom teachers to building administrators to central office personnel and board members. The issue of data utilization by educators is an immediate concern to nearly all of us working in education.

With that in mind, I am writing to request your participation in a survey of Data Utilization by Teachers in Elementary Schools which is being conducted for research purposes. Your participation is very important. The information you provide will be used to develop a descriptive picture of the ways in which teachers actually use data as well as the supports made available to them and the challenges and barriers they face with regard to data utilization.

The information you provide as a confidential survey respondent will remain confidential and will be aggregated with other responses. It will be shared in summary form only. Please let your voice be heard by participating in the survey.

Questions concerning the survey may be directed to Debra Burrows, Principal Investigator, Department of Educational Leadership, College of Education, Penn State University at dcb3@psu.edu or (570) 726-6598.

To access the survey please click on the following link ________________ or cut and paste it into your browser.

Thank you,

Debra C. Burrows, Principal Investigator
353 Airstrip Drive
Mill Hall, PA 17751
Phone: 570.726.6598
APPENDIX D

INFORMED CONSENT FORM

Implied Informed Consent Form for Social Science Research
The Pennsylvania State University

Title of Project: Data Utilization by Teachers in Elementary Schools

Principal Investigator: Debra C. Burrows
353 Airstrip Drive
Mill Hall, PA 17751
(570) 726-6598
dcb3@psu.edu

1. Purpose of the Study:
The purpose of this study is to provide a descriptive picture of the ways in which teachers actually use data as well as the supports made available to them and the challenges and barriers they face with regard to data utilization.

2. Procedures to be followed:
You will be asked to complete a confidential online survey focused on your use of data in your work as an elementary school teacher.

3. Duration/Time:
Completion of the survey will require approximately 25 minutes of your time.

4. Statement of Confidentiality:
Your participation in this research is confidential. The survey does not ask for any information that would identify who the responses belong to. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared because your name is in no way linked to your responses. Your confidentiality will be kept to the degree permitted by the technology used. No guarantees can be made regarding the interception of data sent via the Internet by any third parties.

5. Right to Ask Questions:
Please contact Debra Burrows, Principal Investigator at (570) 726-6598 with questions or concerns about this study.

6. Voluntary Participation:
Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. You must be 18 years of age or older to take part in this research study.

Completion and return of the survey implies that you have read the information in this form and consent to take part in the research. Please print off this form to keep for your records.
APPENDIX E

RESEARCH APPLICATION

EXEMPTION DETERMINATION FORM

Form Instructions:
- To complete the form, press TAB or SHIFT TAB between boxes and enter an ‘X’ or text. For assistance, contact the Office for Research Protections.
- Submit recruitment materials, informed consent forms, and all other materials as attachments to the application. Do NOT include within the application.
- Handwritten applications will NOT be accepted.

Project Title: Teacher Use of Data in Elementary Schools

Exemption Screening Questions:

PLEASE ANSWER ALL OF THE SCREENING QUESTIONS. If you answer ‘Yes’ to any of the following questions A through D below, then STOP and use one of the Applications for the Use of Human Participants – Expedited & Full Reviews for initial IRB review.

If you answer ‘No’ to all of the questions A through D below, continue to complete this Exemption Determination Form.

A. For research involving special populations, interventions or manipulations
   1. Does your research involve prisoners? ☐ Yes ☐ No
   2. Does your research involve using survey or interview procedures with children? ☐ Yes ☐ No
   3. Does your research involve the observation of children in settings where the investigator(s) will participate in the activities being observed? ☐ Yes ☐ No
   4. Does your research involve the use of deception? ☐ Yes ☐ No

B. For research using survey procedures, interview procedures, observational procedures, and questionnaires
   1. If data are to be audio or video recorded, is there potential harm1 to participants if the information is revealed or disclosed? ☐ Yes ☐ No
   2. If participants will be identified either by name or through demographic data, is there potential for harm to participants if the information is revealed or disclosed? ☐ Yes ☐ No
   3. Is the research regulated by the FDA and is NOT a food or taste study as outlined in category 6? ☐ Yes ☐ No

C. For research using existing2 or archived data, documents, records or specimens only
   1. Will any data, documents, records or specimens be collected from participants after ☐ Yes ☐ No

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1 Harm to participants means that any disclosure of the human participants’ responses outside the research could reasonably place the participants at risk of criminal or civil liability or can be damaging to the participants’ financial standing, employability, or reputation.

2 Existing means the items exist before the research was proposed or was collected prior to the research for a purpose other than the proposed research.
the submission of this form?

2. If the data, documents, records or specimens are originally labeled in such a manner that the participants can be identified, directly or indirectly through identifying links, is the investigator recording the data for the purposes of this research in such a manner that participants can be identified, directly or indirectly through identifying links (e.g., demographic information that might reasonably lead to the identification of individual participants – name, phone number, or any code number that can be used to link the investigator’s data to the source record – medical record number or hospital admission number)?

☐ Yes ☐ No

3. If genetic tests are conducted on specimens, are the specimens and/or results linkable to participants or contain identifiable information (coded)?

☐ Yes ☐ No

4. Would the data, documents, records or specimens being used in this study be classified as a “restricted usage” dataset?

☐ Yes ☐ No

D. For research using protected health information

1. Will the research involve the use or disclosure of individually identifiable health information including: names, dates (other than years), telephone numbers, fax numbers, electronic email addresses, social security numbers, medical record numbers, health plan beneficiary numbers, account numbers, certificate/license numbers, device identifiers and serial numbers, web URLs, internet addresses, biometric identifiers, full face or comparable images, or any unique identifying number, characteristic or code?

☐ Yes ☐ No

---

Principal Investigator: Debra Burrows
PSU User ID (e.g., abc123): dcb3
University Status (Faculty, Staff, Student, etc.): Staff and Graduate Student
Email Address: dcb3@psu.edu
Dept: Educational Leadership
College: Education
Campus: University Park
Mailing Address: 353 Airstrip Drive, Mill Hall, PA 17751

Faculty Advisor, if PI is a student: Dr. Nona Prestine
PSU User ID (e.g., abc123): nap11
Email Address: nap11@psu.edu
Dept: Educational Leadership
College: Education
Mailing Address: 207D Rackley Building, University Park
Campus: University Park

Is there anyone you wish to include on correspondence related to this study (e.g., a study coordinator, etc.)?

Name: 
PSU User ID (e.g., abc123):
University Status (Faculty, Staff, Student, etc.): 
Telephone Number:
Email Address: 
Dept:
College: 
Campus:
Mailing Address: 
Role in this study: Choose one of the following...
1. **Funding Source:** Indicate the name and mailing address of internal and external sources of funding. If the study is not funded, indicate such. If applicable, a copy of your grant proposal must be included with this application.
   
   Not funded

2. **Class Project:** Is this a class project?
   
   - [ ] Yes → Provide the following information:
     - Instructor’s Name:
     - Course Title and Number:
     - Semester course is being offered:
   - [X] No

3. **Conflict of Interest:** Do you or any individual who is associated with/responsible for the design, the conduct, or the reporting of this research have an economic interest in or act as an officer or a director for any outside entity whose financial interests would reasonably appear to be affected by this research project?
   
   - [ ] Yes → Refer to Penn State Policy RA20 AND HR91 for additional information
   - [X] No

4. **Exempt Research Categories:** Read the following categories and choose one or more that apply to your research. Your research must fit in at least one category in order to be considered for an exemption determination.

   - [ ] Category 1: Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods. *(This category may include children. This category may NOT include prisoners or be FDA-regulated.)*

   - [X] Category 2: Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observations of public behavior unless: (i) information obtained is recorded in such a manner that human participants can be identified, directly or through identifiers linked to the participants; and (ii) any disclosure of the human participants’ responses outside the research could reasonably place the participants at risk of criminal or civil liability or be damaging to the participants’ financial standing, employability, or reputation. *(This category may NOT include prisoners or be FDA-regulated.)*

   - [ ] ♦ Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement) for which participants cannot be identified, or release of the information would not be harmful to the participant. *(This category may include children.)*

   - [ ] ♦ Research involving the use of survey procedures or interview procedures or observation of public behavior for which participants cannot be identified, or release of the information would not be harmful to the participant. *(This category may NOT include children except for research involving the observation of public behavior of children, when the investigator does not participate in the activities being observed.)*

   - [ ] ♦ **PLEASE NOTE:** This category CANNOT include the use of diaries, journals, or asking participants to perform a task(s) [e.g., conducting searches on the Internet & then completing a questionnaire]. The entire study must fit into a category not just portions of it.

   - [ ] Category 3: Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observations of public behavior that is not exempt under #2 of this section, if: (i) the human participants are elected or appointed public officials or candidates for public office; or (ii) Federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter. *(This category may NOT include prisoners or be FDA-regulated.)*

   - [ ] Category 4: Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that participants cannot be identified, directly or through identifiers linked to the participants. *(This category may include children. Existing data means the items exist [are ‘on the shelf’] before
the research was proposed or were collected prior to the research for any purpose. This category may NOT include prisoners or be FDA-regulated.)

☐ Category 5: Research and demonstration projects that are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; (iv) possible changes in methods or levels of payment for benefits or services under those programs. (This category may include children. This category may NOT include prisoners or be FDA-regulated.)

☐ Category 6: Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture. (This category may include children. This category may NOT include prisoners.)

NOTE:
- The Principal Investigator is responsible for ensuring that all individuals conducting procedures described in this application are trained adequately prior to involving human participants.
- All personnel listed on this application who (1) are responsible for the design/conduct of the study, (2) will have access to the human participants (i.e., will consent participants, conduct the study), or (3) will have access to identifying AND confidential information must successfully complete the IRB’s Training on the Protection of Human Participants or provide verification of training from their home institution. PSU’s training may be located at http://www.research.psu.edu/orp/education/modules/irb/index.asp. Approval will NOT be granted until all individuals have successfully completed the training. Verification of training does NOT need to be sent in if the individual completed the Penn State’s training.
- As personnel change, you must submit a Modification Request Form – Exemption to add or remove personnel.

5. Research Personnel: Provide the name of the other individual(s) assisting with this study who (1) will be responsible for the design/conduct of the study, (2) have access to the human participants (i.e., will consent participants, conduct the study), or (3) have access to identifying AND confidential information. If the individual does not have a PSU Access User ID, please provide some other form of contact information. If additional space is needed, attach a separate sheet containing the same information.

<table>
<thead>
<tr>
<th>Name</th>
<th>Email Address</th>
<th>PSU User ID (e.g., abc 123)</th>
<th>Mailing Address</th>
<th>Role in this Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td>Choose one of the following</td>
</tr>
</tbody>
</table>

6. Participants: Estimated numbers of participants/samples/charts to be involved (Enter one number – not a range): 100

7. Participants: Will there be an equal representation of:

<table>
<thead>
<tr>
<th>Gender Identity</th>
<th>☒ Yes</th>
<th>☐ No</th>
<th>If ☐ No, please explain.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Racial/ethnic groups</td>
<td>☒ Yes</td>
<td>☐ No</td>
<td>If ☐ No, please explain.</td>
</tr>
<tr>
<td>Sexual Orientation</td>
<td>☒ Yes</td>
<td>☐ No</td>
<td>If ☐ No, please explain.</td>
</tr>
</tbody>
</table>

8. Participants: Age range – Choose all that apply:

☐ Less than 1 year ☐ 7 – 12 years ☒ 18 – 25 years ☐ 40 – 65 years
☐ 1 – 6 years ☐ 13 – 17 years ☒ 26 – 40 years ☐ 65+ years
9. **Recruitment:** Describe from where and how the participants will be identified or recruited, who will make the initial contact with the participants, and how you plan to distribute or display any recruitment materials for this research (e.g., bulletin board, emails, newspaper advertisement).

The principal investigator will contact superintendents of randomly selected school districts in Bradford, Lycoming, Sullivan, and Tioga Counties in North Central Pennsylvania to request permission to contact teachers in their districts. Initial contacts with superintendents will be done through a letter, identifying the researcher as a graduate student in Educational Leadership at Penn State University, explaining the goal of the study, and asking permission to contact teachers within his or her district. In the text of the letter, every effort will be made to emphasize that the only contact with the teacher will be via e-mail, that the survey can be completed online, and that no visits, meetings, or other activities will be conducted that could in any way interfere with the teacher’s schedule. The letter will state that the survey is expected to take approximately 25 minutes of a teacher’s time and that individual responses will be kept confidential. The letter will contain contact information for the researcher and will indicate that the researcher will call the superintendent to answer any questions he or she might have while considering the request. A form which the superintendent can complete and sign to indicate his or her decision will be included with the letter along with a return envelope. When permission is received, the principal investigator will obtain teacher e-mail address from their respective districts and contact teachers via e-mail to recruit them for participation.

10. **Recruitment:** Indicate how participants will be recruited to participate in this study & attach copies of the materials. Choose all that apply:

- Advertisement
- In-person Script
- Flyer
- Email
- Telephone Script
- Information Sheet
- Letter
- Other → Explain:

A copy of the proposed e-mail text is attached

11. **Consent:** Describe the methods you plan to use in order to obtain informed permission to participate in this research. Attach a copy of the written description or script for oral presentation. If you cannot obtain informed permission for this study, explain why it cannot be obtained (e.g., the data are de-identified).

Because the survey will be completed online, an Implied Consent Form will be utilized. A copy of the proposed Implied Consent Form is attached.

12. **Compensation:** If individuals will be offered compensation, indicate the type and amount of compensation that will be offered.

- Money → Amount:
- Gift Certificate → Amount:
- Extra/Class Credit → Amount:
- Drawing → Explain:
- Other → Explain:

Compensation will NOT be offered → Skip to Question 14

13. **Compensation:** If extra/class credit is being offered, describe the alternative available for earning the extra/class credit. The alternative must be equal in time and effort to participating in the research.

14. **Recordings:** If recording will be done for this research, indicate the type of recording that will be made.

- Audio
- Video
- Photographs
- Recordings will NOT be made → Skip to #16

15. **Recordings:** Describe (a) where the recordings will be stored; (b) who will have access to the recordings; (c) how the recordings will be transcribed and coded, if applicable; (d) who will transcribe the recordings; (e) how and by what year will the recordings be destroyed. If you wish to retain the recordings indefinitely, provide a sound justification for doing so.

16. **Abstract:** The abstract below will assist the ORP in reviewing your research. The abstract must address the important elements of the exemption category you indicated your research meets in Question 4 above. The information in the abstract must include a specific description of the procedure(s) involving human participants to demonstrate the study meets all the requirements for the chosen category (ies). Depending on the category(ies) chosen in Question 4 above, the abstract should address the following:
Category 1: Specify whether 1.i. or 1.ii. applies and briefly explain.
N/A

Category 2: Assure condition 2.i. and/or 2.ii. applies and briefly explain. Attach copies of tests, surveys, interview questions, focus group topics or applicable instruments.

The proposed research involves the use of a survey procedure. The information obtained will be recorded in such a manner that human participants CANNOT be identified, directly or through identifiers linked to the participants; and (ii) any disclosure of the human participants’ responses outside the research COULD NOT reasonably place the participants at risk of criminal or civil liability or be damaging to the participants’ financial standing, employability, or reputation. A copy of the survey is attached.

Category 3: Explain why identifiers or links must be collected. Explain if participants hold a public office (3.i.) or assure federal statutes for maintaining confidentiality apply (3.ii.). Attach copies of tests, surveys, interview questions, focus group topics applicable instruments.
N/A

Category 4: Provide the following information for the data/specimens that will be used in this study:
- a brief explanation about the original study and the origin of the data/specimens – include web address (URL) if known & applicable
- a list of all data points that will be used in this study (or attach the data collection sheet) and what the data/specimens will be used for
- a statement regarding how the data/specimens to be reviewed exist as of the date of the submission of this application (i.e., the data/specimens are ‘on the shelf’ and no new data/specimens will be added to this study
- if the data/specimens are NOT publicly available, a description of how access to the data/specimens will be gained.
  - Submit written documentation of permission/approval from the person authorized to grant access to the data. The documentation must include the following information: (1) a statement indicating identifiers linked to the data/specimens will not be provided OR (2) if identifiers are linked to the data, a statement indicating access to identifiable data/specimens has been granted, why this is necessary, and that the data/specimens will be recorded in such a manner that participants cannot be identified directly or indirectly through coded identifiers linked to the participants
N/A

Category 5: This exemption is extended only to research and demonstration projects conducted by or subject to the approval of Federal Department or Agency Heads and are designed to study, evaluate, or otherwise examine Federal public benefit or service programs. Explain how this study meets these criteria. Identify and describe which of the categories (5.i. – 5.iv.) apply.
N/A

Category 6: For taste and food quality evaluations, assure the safety of the foods by addressing how conditions 6.i. or 6.ii. are met.
N/A

Use the following sections to complete your abstract:

a. Background/Rationale: Briefly provide the background information and rationale for performing the study and any potential benefits.

The issue of data utilization by educators is an immediate concern. It is more than simply an issue of ensuring that schools meet the requirements imposed upon them by NCLB. If data-driven decision making is being used by teachers, and it can be conclusively shown that student learning outcomes are improved as a result, the potential exists for true, meaningful, school reform. By investigating aspects of data access, school data policies, support for data utilization, and school policies concerning data, the proposed study will take a small but significant step toward building the knowledge base for further research on school reform.

b. Key Objectives: Summarize the study’s objectives, aims or goals.
The purpose of this study is to provide a descriptive picture of the extent to which teachers utilize data. A primary goal will be the compilation of data which characterizes teacher actions and perceptions regarding the utilization of data in relationship to their classroom practices as well as the extant supports and barriers they face with regard to data utilization.

c. Study Population, Samples and/or Charts: Describe the characteristics of the participant population, such as anticipated number to be involved, age range, gender, ethnic background and health status.

It is anticipated that approximately 100 elementary school teachers ranging in age from 18 to 65 years of age will participate. Participants will be both male and female and are expected to represent various ethnic groups.

d. Major Eligibility Criteria:

Randomly selected teachers working in Elementary Schools in Bradford, Lycoming, Sullivan, and Tioga counties will be recruited. The only other criteria is that the superintendents of the school districts in which they are employed have granted written permission for participation of teachers in their respective districts.

e. Research Procedures involving participants: Summarize the study’s procedures by providing a step-by-step process of what participants will be asked to do, emphasizing the procedures that may cause risk. Include enough details to demonstrate that the research meets the requirement(s) for the exemption category (ies) chosen in Question 4 above.

Participants will be asked to complete an online survey.

f. Risks and Discomforts: If applicable, describe any reasonably foreseeable risks and discomforts – physical, psychological, social, legal or other.

No foreseeable risks and discomforts are anticipated.

g. Confidentiality & Privacy: Explain how the confidentiality of the data and the privacy of the participants will be maintained.

The survey does not ask for any individually identifiable information. In the event of any publication or presentation resulting from the survey, information will be shared in aggregate form only. No personally identifiable information will be shared. The Survey Monkey service is being used to post the online survey and store the data. Survey Monkey offers SSL (secure socket layer) encryption.

h. Investigator Qualifications & Specific Role in the Research: Describe the role of each individual (including the advisor, if applicable) listed on this form. Clearly state (1) the procedures or techniques he/she will be performing and (2) his/her level of experience in performing the procedures/techniques.

The principal investigator will administer the survey and compile responses using the online Survey Monkey software. The principal investigator has prior experience developing and compiling surveys and survey data. In addition, the Principal Investigator received guidance from Dr. Nona Prestine, Ph.D., Professor of Education, Department of Educational Leadership, College of Education at Penn State. The principal investigator holds an M. Ed. In Educational Administration and is presently a Ph.D. candidate in Educational Leadership.

i. References: If applicable, provide any relevant literature references/citations.

N/A

17. Assurances

I agree to report to the Office for Research Protections (ORP), in a timely manner, information regarding (a) any injury to a human participant, (b) any unanticipated problems involving risks to participants or others, or (c) any new information involving risks to participants. All individuals listed on this form have completed the training requirements. I have adequately explained in this form the role of each individual and their experience in performing that role.

I understand that any changes that occur after the initial exempt determination is made, must be submitted to and reviewed by the ORP before implementation, except where necessary to eliminate apparent immediate hazards to participants. In the latter instance, the ORP must be notified by the next workday.
I affirm that as the principal investigator on this study, I will adhere to the policies and procedures described in Penn State’s Federalwide Assurance with the Office for Human Research Protections as well as Federal regulations for the protection of human participants involved in research (45CFR46; 21CFR parts 50 & 56). Copies of these documents are available in the ORP upon request or on their website – http://www.research.psu.edu/orp/.

_______________________________________________________
Signature of Principal Investigator, REQUIRED                Date

I hereby confirm that I have read this application and my signature denotes the completeness and accuracy of the information provided.

PRINT Name of Faculty Advisor, REQUIRED IF PI IS A STUDENT

_______________________________________________________
SIGNATURE of Faculty Advisor, REQUIRED IF PI IS A STUDENT    Date

I hereby confirm that I have read this application and my signature denotes departmental/unit approval of this project. To the best of my knowledge, the information in the attached application relating to members of my department is correct.

The investigator(s) who are members of my department are qualified to perform the roles proposed for them in this application. Any novice researchers from my department will be supervised by qualified investigators.

PRINT Name of PI’s Department/Unit Head, REQUIRED

_______________________________________________________
SIGNATURE of PI’s Department/Unit Head, REQUIRED            Date
APPENDIX F
SURVEY

Data Utilization by Teachers in Elementary Schools
1. Section 1: Respondent Demographics

Thank you for taking the time to complete this survey.

1. Please indicate the grade or grades you currently teach by checking all that apply.
   - [ ] Kindergarten
   - [ ] 1st grade
   - [ ] 2nd grade
   - [ ] 3rd grade
   - [ ] 4th grade
   - [ ] 5th grade
   - [ ] 6th grade
   - [ ] Other (please specify) [ ]

2. How many years of paid full-time professional teaching experience do you currently have? (Please do not include time spent as a substitute teacher.)
   - [ ] 1-5 years
   - [ ] 6-10 years
   - [ ] 11-15 years
   - [ ] 16-20 years
   - [ ] 21-25 years
   - [ ] 26-30 years
   - [ ] more than 30 years

3. Do you utilize a computer at home?
   - [ ] Yes
   - [ ] No
### Data Utilization by Teachers in Elementary Schools

#### 2. Section 2: Relevant Data

4. Please indicate how often you have used each of the items listed below in your classroom during the past 2 years. Please mark all that apply.

<table>
<thead>
<tr>
<th>Item</th>
<th>Used Frequently</th>
<th>Used Sometimes</th>
<th>Used Occasionally</th>
<th>Never Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student portfolios</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student projects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exams</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Authentic assessments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student self-assessments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher observations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student journals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapter tests</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher developed tests</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer assessments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Page 2
# Data Utilization by Teachers in Elementary Schools

5. If you have used any of the items listed below, please indicate how you used the results. Please mark all that apply.

<table>
<thead>
<tr>
<th>Item</th>
<th>To determine student's grades</th>
<th>To determine student's mastery</th>
<th>To determine effectiveness of my lesson(s)</th>
<th>To determine if more time should be spent on a topic</th>
<th>To determine if standards for the class have been met</th>
<th>To determine if standards have been met for students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choral tests</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quiz</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Student journals</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Student project</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher developed tests</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student self assessments</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Teacher observations</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Authentic assessments</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Please mark all of the test results to which you have access for the students who are currently in your classes and indicate when they were or usually become available to you.

<table>
<thead>
<tr>
<th>Test Results</th>
<th>Prior to the start of the school year</th>
<th>Early in the school year</th>
<th>Midyear</th>
<th>They will be available at the end of the school year</th>
<th>These scores are not available to me</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSSA scores</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>NAEP scores</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>School wide test scores</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

7. Please indicate which test results, if any, you have received to date for the students you taught during the previous school year.

- PSSA Scores
- NAEP Scores
- School-wide test scores
- Other
Data Utilization by Teachers in Elementary Schools

8. Please indicate which test scores you received prior to beginning the current school year for the students you have in your classes this year.

- [ ] PSEQ Scores
- [ ] NAEP Scores
- [ ] Other

9. If test scores for all students enrolled in the school in which you teach have been provided to you, please indicate which scores you received.

- [ ] PSEQ Scores
- [ ] NAEP Scores
- [ ] Other

10. Following is a list of types of student demographic data. Please indicate your degree of access to these data for the students who are currently in your classes.

<table>
<thead>
<tr>
<th>Data Type</th>
<th>This data is readily available to me</th>
<th>This data is available upon request</th>
<th>This data is not available to me</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current-year attendance data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Historical attendance data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socio-economic status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior participation in Head Start</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior participation in preschool programming</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of English proficiency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of other performance reports from prior years of schooling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discipline reports from prior years of schooling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special needs such as physical, mental, emotional, or developmental abilities</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Data Utilization by Teachers in Elementary Schools

11. If you have access to the types of data listed below, please indicate how you have used these data. If you do not have access to these data, please indicate by marking the column labeled "These data are not available to me."

<table>
<thead>
<tr>
<th>Data Type</th>
<th>To design lessons</th>
<th>To modify lessons relevant to my students' backgrounds</th>
<th>To better accommodate student diversity</th>
<th>To revise learning to place emphasis on student skills</th>
<th>To plan class activities</th>
<th>To help select classroom aids</th>
<th>Data available to me</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current year attendance data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Historical attendance data</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free-reduced lunch eligibility</td>
<td></td>
<td></td>
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<tr>
<td>Prior participation in Head Start</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Prior participation in pre-school programming</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Presence of handicap or disabling condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of English proficiency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grades or other performance reports from prior years of schooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disciplinary reports from prior years of schooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special needs such as physical, mental, emotional, or developmental disorders</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This data is not available to me.
Data Utilization by Teachers in Elementary Schools

12. If you have access to the types of data listed below, please indicate how you have used these data. If you do not have access to these data, please indicate by marking the column labeled "These data are not available to me."

<table>
<thead>
<tr>
<th>Type of Data</th>
<th>To design lessons</th>
<th>To modify lessons relevant to my students' backgrounds</th>
<th>To better accommodate student diversity</th>
<th>To improve learning to pass standardized tests or exit exams</th>
<th>To plan class activities</th>
<th>To improve classroom instruction</th>
<th>The data is not available to me</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local area history</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local economic situation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local area unemployment rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area's largest employers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religious affiliations of community residents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate percentage of residents who fall below the poverty line</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate percentage of residents who consider themselves working class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate percentage of residents who consider themselves middle class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate percentage of residents who consider themselves upper class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate percentage of families receiving government assistance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate percentage of high school students who are employed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composition of community population by ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate percentage of non-English speakers in the area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school completion rates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate percentage of local high school graduates who pursue higher education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate percentage of local high school graduates who enter military service</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Data Utilization by Teachers in Elementary Schools**

13. Please characterize the relationships between the various community groups, parents, administrators and other individuals who are involved in activities related to your school by checking the items that best describe them below.

<table>
<thead>
<tr>
<th></th>
<th>Frequently a mutually supportive relationship</th>
<th>Sometimes a mutually supportive relationship</th>
<th>Rarely a mutually supportive relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrators and parents</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Administrators and school board members</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Administrators and students</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>School board members and community members</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>School board members and parents</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>School board members and students</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>School board members and taxpayer groups</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Teachers and administrators</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Teachers and guidance counselors</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Teachers and parents</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Teachers and school board members</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Teachers and students</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Teacher and support personnel such as secretaries, clerks, attendance officers, and other clerical positions</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Teachers and testing attendance attendants</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Teachers and technical support personnel such as computer operators, data clerks, and technology coordinators</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
### Data Utilization by Teachers in Elementary Schools

#### 3. Section 3: Processes for Using Data

14. Please complete the statement, "I review and analyze data..." by checking all of the items below that apply.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Occasionally</th>
<th>Rarely</th>
</tr>
</thead>
<tbody>
<tr>
<td>as a member of a district-wide team</td>
<td></td>
<td></td>
</tr>
<tr>
<td>as a member of a school improvement team</td>
<td></td>
<td></td>
</tr>
<tr>
<td>as a member of my school's data team</td>
<td></td>
<td></td>
</tr>
<tr>
<td>at faculty meetings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>by myself</td>
<td></td>
<td></td>
</tr>
<tr>
<td>interact with other teachers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with non-instructional personnel such as a data clerk or technology coordinator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with other teachers in my school who teach the same grade level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with other teachers in my school who teach the same subjects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with my principal or assistant principal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15. Does your school have a data team?

- [ ] Yes
- [ ] No
- [ ] I don't know.

16. If you indicated that your school has a data team, are you a member of that team?

- [ ] Yes
- [ ] My school does not have a data team
- [ ] No
17. If you indicated that your school has a data team, please describe the membership of that team by checking all those listed below who currently serve on that team.

- [] parents
- [] district level administrators
- [] building level administrators
- [] community members
- [] school board members
- [] guidance counselors
- [] school psychologist
- [] teachers
- [] business leaders
- [] my school does not have a data team

18. If your school has a data team, please mark all of the responsibilities of that team.

- [] analyzing data
- [] collecting data
- [] displaying data
- [] helping colleagues work with data
- [] interpreting data
- [] making instructional recommendations based on data
- [] making psychological recommendations based on data
- [] obtaining data in a timely manner
- [] preparing for the PSCA
- [] producing reports using data
- [] providing reports to parents
- [] responding to requests for data

Other (please specify):
### Data Utilization by Teachers in Elementary Schools

19. Which of the items listed below have you used during the last two years to determine whether your students have achieved sufficient mastery of material before moving on to new material. Please mark all that apply.

- [ ] student journals
- [ ] peer assessments
- [ ] authentic assessments
- [ ] student self-assessments
- [ ] student portfolios
- [ ] teacher observations
- [ ] journal entries
- [ ] student projects
- [ ] chapter tests
- [ ] other (please specify):


20. Please complete the following sentence by checking all the choices which apply to your situation in your present school. "Based on the data available to me during the last two years I have..."

- made no changes
- added new lessons
- made referto of my students for special services
- requested tutorial help for some of my students
- divided students into small groups for group assignments
- contacted the parents of some of my students
- assigned less homework
- attempted to obtain new selection materials
- assigned more homework
- eliminated some lessons
- revised some of my teaching presentations
- continued to follow the established curriculum
- allocated more time to some lessons and less to others
- provided individualized instruction to certain students
## Data Utilization by Teachers in Elementary Schools

21. Please characterize your use of data during the last two years by checking all that apply.

<table>
<thead>
<tr>
<th>Frequent</th>
<th>Sometimes</th>
<th>About half the time</th>
<th>Occasionally</th>
<th>Rarely</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am able to spend as much time as I need working with data.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I do not feel that I have sufficient training to work with data.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The data that I need is available to me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The opportunities I have to work with my colleagues on data-related matters is adequate.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am able to meet with colleagues during the school day to focus on data.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If I want to discuss data with my colleagues, I have to wait until an in-service day or faculty meeting.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The volume of data I receive is overwhelming.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The data I receive is not in a format which allows me to readily utilize it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am able to obtain reports on my students which provide comprehensive data such as attendance records, demographic information, student achievement records, prior year's grades, and source needs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I receive data in a timely manner.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Data Utilization by Teachers in Elementary Schools

22. Please characterize your feelings about using data in your work by checking all that apply.

<table>
<thead>
<tr>
<th>Frequently</th>
<th>Sometimes</th>
<th>About half the time</th>
<th>Occasionally</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>I do it because it is required.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I find it very useful.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>It is a waste of valuable time.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I was resistant at first, but now I see value in it.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>It has given me insights into my work.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>It has allowed me to make better decisions.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>It has cleared up some misapprehensions.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>It appears to be just one more emotional test.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Data Utilization by Teachers in Elementary Schools

5. Section 5: Barriers and Supports

23. How much time, if any, is allotted for you to work on data during the school year? Please check all that apply.

- [ ] None
- [ ] Very little, I have to squeeze it into my prep time
- [ ] My school provides sufficient release time for teachers to work on data
- [ ] Too much time is spent on data
- [ ] Time is allotted during faculty meetings
- [ ] This is allotted on in-service days
- [ ] Our school has an annual data day
- [ ] Time is allotted on teacher days prior to the start of the school year
- [ ] Teachers are not expected to work with data at my school

24. If your school has a data team, please indicate the ways in which that data team has affected you. Please check all that apply. If your school does not have a data team, please skip to the next question.

<table>
<thead>
<tr>
<th>The team has provided me with the data I needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual</td>
</tr>
<tr>
<td>[ ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The team has helped me in interpreting data on my students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual</td>
</tr>
<tr>
<td>[ ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The team has helped me to plan revisions which address needs identified in the data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual</td>
</tr>
<tr>
<td>[ ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The team has requested information from me</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual</td>
</tr>
<tr>
<td>[ ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The team has taken up too much of my time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual</td>
</tr>
<tr>
<td>[ ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The team has been ineffective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual</td>
</tr>
<tr>
<td>[ ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The team has made recommendations that resulted in curricular revisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual</td>
</tr>
<tr>
<td>[ ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The team has had an effect on my teaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual</td>
</tr>
<tr>
<td>[ ]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The team has decreased our school’s use of anecdotal evidence and replaced it with numerical evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual</td>
</tr>
<tr>
<td>[ ]</td>
</tr>
</tbody>
</table>
Data Utilization by Teachers in Elementary Schools

25. During the last two years, in what format or formats have data most often been made available to you? Please check all that apply.

- [ ] Computer printouts
- [ ] Announcements in meetings
- [ ] Staff reports
- [ ] Handwritten
- [ ] On our school computer network
- [ ] Electronically
- [ ] On the school website

Other please specify: ______________________

26. During the last two years, who has provided leadership in your school with regard to using data?

<table>
<thead>
<tr>
<th>Role</th>
<th>Almost Always</th>
<th>Frequently</th>
<th>Occasionally</th>
<th>Almost Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Administrators</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Clinical support staff</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Technology staff</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Guidance counselors</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Other representatives</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Data team members</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Consultants</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>No one</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
<tr>
<td>Everyone</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
</tr>
</tbody>
</table>
Data Utilization by Teachers in Elementary Schools

27. What type of training have you received to prepare you to work with data? Please check all that apply.

- Teacher preparation courses in college
- College courses not part of teacher preparation program
- In-service professional development training
- Professional conferences
- Mentoring from a colleague
- Mentoring from a consultant
- PATTAN sponsored training
- On the job training
- Trial and error
- None
### Data Utilization by Teachers in Elementary Schools

#### 6. Section 5: Barriers and Supports Part B

**28. Please check all of the items below which accurately characterize the professional development training related to data use you received during the last two years.**

<table>
<thead>
<tr>
<th>Item</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>A single session was provided</td>
<td>☐</td>
</tr>
<tr>
<td>Training was ongoing at intervals throughout the school year</td>
<td>☐</td>
</tr>
<tr>
<td>Training provided was useful</td>
<td>☐</td>
</tr>
<tr>
<td>Training provided was not very useful</td>
<td>☐</td>
</tr>
<tr>
<td>Training provided was a good start, but more is needed</td>
<td>☐</td>
</tr>
<tr>
<td>Training was adequate</td>
<td>☐</td>
</tr>
<tr>
<td>Too much time was spent on training</td>
<td>☐</td>
</tr>
</tbody>
</table>

**29. Please check all of the items below which accurately characterize the professional development training related to data use you received during the last two years.**

<table>
<thead>
<tr>
<th>Item</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was focused only on PDSA data</td>
<td>☐</td>
</tr>
<tr>
<td>It was focused on multiple sources of data</td>
<td>☐</td>
</tr>
<tr>
<td>It addressed the use of demographic data in conjunction with classroom data</td>
<td>☐</td>
</tr>
<tr>
<td>It focused on graphic representations of data such as charts, graphs, and spreadsheets</td>
<td>☐</td>
</tr>
<tr>
<td>It was up to the support and guide teams to teach</td>
<td>☐</td>
</tr>
<tr>
<td>It emphasized the difference between anecdotal evidence and numerical data</td>
<td>☐</td>
</tr>
</tbody>
</table>
### Data Utilization by Teachers in Elementary Schools

#### 7. Section 5: Barriers and Supports Part C

30. During the last two years, which of the following information technology tools have been made available by your school or district for your use in managing data? Please check all that apply.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database software</td>
<td>Student information system</td>
</tr>
<tr>
<td>Spreadsheet software</td>
<td>Course management system</td>
</tr>
<tr>
<td>Data warehouses</td>
<td>Commercial data management system</td>
</tr>
<tr>
<td>School-wide computer network</td>
<td>No information technology tools have been made available</td>
</tr>
<tr>
<td>District-wide computer network</td>
<td></td>
</tr>
</tbody>
</table>

Other (please specify):
Data Utilization by Teachers in Elementary Schools

8. Section 5: Barriers and Supports Part D

34. Who have you gone to during the last two years when you needed assistance using the information technology tools for managing data that were made available to you by your school or district?

- [ ] A fellow teacher
- [ ] The school’s technology coordinator
- [ ] The data team coordinator
- [ ] I call the help desk

- [ ] The principal
- [ ] No one is available
- [ ] Technology department support staff

Other (please specify)
### Data Utilization by Teachers in Elementary Schools

#### 9. Section 5: Barriers and Supports Part E

32. What has your school’s administration done to support teachers’ use of data at your school? Please check all that apply.

- [ ] Provided professional development opportunities
- [ ] Provided additional preparation time
- [ ] Advanced school schedules to allow teachers time to collaborate
- [ ] Purchased a data management system
- [ ] Hired staff members who have responsibility for managing data
- [ ] Brought in a data consultant
- [ ] Formed a data team
- [ ] Installed a school-wide data network
- [ ] Purchased classroom management software
- [ ] Nothing
Data Utilization by Teachers in Elementary Schools

33. What do you need to enable you to use data more effectively? Please list your needs in order of priority.

<table>
<thead>
<tr>
<th>Need</th>
<th>High priority</th>
<th>Intermediate priority</th>
<th>Not a priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>More time to spend working with data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time to meet with other teachers to collaborate and reflect on the data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More training on how to interpret the data</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>More training on how to utilize the data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More training on how to manage the data</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Management data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More detailed data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test detailed data</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>More current data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Help in revising my lessons to address issues identified in the data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower classroom materials</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software to manage the data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training on how to use the software that manages the data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nothing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

34. Does the school in which you currently teach have a policy or polices which provide guidelines for the use of various types of data?

☐ Yes
☐ No
☐ I don’t know
The following survey questions were eliminated: 4, 7, 8, 9, 10, 13, 16, 17, 18, 19, 20, 24, 31, 35, 36.
VITA

DEBRA C. BURROWS

EDUCATION


LICENSEURE/CERTIFICATION


1999 Instructional Technology Integration Certification. The Pennsylvania State University, University Park, Pennsylvania.


PROFESSIONAL EXPERIENCE

2007- The Pennsylvania State University, College of Agricultural Sciences

1982 - 2007 Central Intermediate Unit #10, West Branch Technology Center

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