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# The Impact of Professional Development in Data Based Decision Making on the Teaching Practices of Educators

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2011

Abstract

The Impact of Professional Development in Data Based Decision Making on the

Teaching Practices of Educators

by

Nancy Harris

M.Ed., Montclair State University, 1991

B.S., Bloomsburg University, 1989

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Teacher Leadership

Walden University

August 2011

## Abstract

The utilization of educational data by teachers' at the classroom level to plan lessons and assessments is limited. Professional development is one tool that can be used to build data literacy in teachers. This study assessed how professional development in data based decision making impacted educators' efficacy and use of educational data. This research was based on constructivists learning theories and used professional development as a model for changing teachers' instructional practices. The purpose of this study was to evaluate the impact of professional development in data-based decision-making on teacher efficacy and use of data at the classroom level. A one group pretest posttest quantitative study was used on a sample group of public school educators (N=226) from a school district in the Northeastern US. Surveys were administered before and after the intervention to determine if a significant difference in the efficacy and use of data to plan instruction resulted from professional development in data-based decision making. A Mann-Whitney-Wilcoxon test was used to analyze the data. The analysis indicated no significant difference in teacher efficacy ( $W=27.50$ ;  $p=1.00$ ) but did show a significant increase in the use of data at the classroom level ( $W=70.00$ ;  $p=.003$ ). Based on this study, professional development is an effective tool for increasing the use of data-based instructional methods at the classroom level; however, it is not effective in changing teacher efficacy. This study contributes to positive social change by promoting meaningful conversations about the power of professional development models in data-based decision making as an effective means to change teaching practices.



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## Dedication

I dedicate this study to my parents, William and Violet Zimlinghaus. Throughout all of my life they have supported and encourage me in all of my pursuits. Their unconditional love and selfless sacrifices set the foundation for me to pursue this challenge.

I would also like to dedicate this study to my nephew and niece; Michael and Claire, and all the students with whom I have had contact in my tenure as an educator. It is through these children that I recognize my passion as an educator and my desire to not only teach, but also learn side by side with them.



## Acknowledgements

This study would not have been possible without the encouragement and guidance of my doctoral chair and mentor Dr. Colin Winkelman, his time, involvement, and wisdom were appreciated every step of the way. I would also like to acknowledge Dr. Pamela Warrick, Dr. Christine Chan and Dr. Kevin Schwandt, whose commitment to scholarly research is commendable. Thank you too, to Dr. Leanne Bettsworth and Dr. Scott McLeod whose research was instrumental in formulating my study.

As a student and an educator I have had the opportunity to come in contact with a number of fantastic educators and educational organizations that have had a positive impact on my teaching. I would like to acknowledge Mr. Jerry Schierloh, Mr. Kevin Moore, Mr. Robert Grivner, Dr. Randall FitzGerald, Mrs. Erin Maiello, Mrs. Jean McCarney, Mr. Leigh VanHouten, Mr. Kenneth Kuzmiak, the New Jersey School of Conservation and Eagle Rock School in Estes Park Colorado.

Finally I would like to thank my family and friends who sacrificed and supported me in more ways than one; Anna, Bill, Doris, Mike, Michael and Claire and most importantly my friend Marilyn Steneken. We have been down many roads together and through the turns and bumps we have always been able to depend on one another. Thank you for your forever friendship.

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## Section 1: Introduction to the Problem

### **Introduction**

In 2001, the United States Congress passed legislation known as *No Child Left Behind* (NCLB), which, in essence, sent the public education systems in America on a course led by accountability and standardized testing. Along with standardized testing, has come a wealth of data that are now beginning to be scrutinized by states, districts, and individual schools. With the mandates of *No Child Left Behind* only recently making an impact on districts' funding and programming, the research concerning data-literacy and data-driven decision making is still relatively new. Of the research that does exist, many studies support the need to use data to evaluate programming (Cohen 2003; Killion & Bellamy 2000; Zavadsky 2006). In this research, I examined whether or not the use of data is an important factor in the planning and implementation of programs in a standards-based educational system.

Researchers have shown that many districts now use educational data to design schedules and implement new programming (Bernhardt, 2000; Bettsworth, 2006; Killion & Bellamy, 2000). These researchers have been quick to point out the importance of using data at the district level for decision making and planning, but further exploration is needed to determine to what extent data is used by the classroom teacher. By focusing on how professional development in data-based decision making impacts the use of data at the classroom level, this study builds on an increasing body of

research that contends that the use of data to drive instruction has a positive influence on student learning.

Researchers in this field have targeted access to educational data and how data should be used as critical components of an effective classroom. (Garcia & Rothman, 2002; Love, 2004; Miller, 2009). The utilization of educational data at the classroom level has been linked to increased student achievement (Bernhardt, 2004; Firestone & Gonzalez 2007). Although the use of data has been cited as an important tool in school improvement, studies indicate that educational data is used sparingly in the classroom (Love, 2004). Understanding what data is important and how to use it to improve student learning are two limiting factors that need to be addressed in order to make teachers effective data users. Researchers have analyzed the importance of having skills in gathering and interpreting data as crucial elements in the data driven classroom. (Bettesworth, 2006; Earl and Katz, 2006). Johnson (2004) also addressed this in a study that identified building data analysis and interpretation skills as a key in making data mining meaningful. He cautions, “Few of us are statisticians at heart, but the need to make meaning out of raw data is a skill administrators, teachers, and parents need to develop” (Johnson, 2004, p.6).

Although there is a trend to make data more accessible, Wayman (2005) argued that these components need to work in conjunction with one another, “The data access provided by technology is a necessary condition for informed inquiry into educational practice, but such access is not sufficient on its own; educators need support to use these data to the fullest extent” (p.296). He underscored this in his discussion of the

importance of in-servicing staff, “The transformation of these data and summary statistics into practical, serviceable information is more difficult and requires proper training and professional development” (Wayman, 2005, p.301). Similar researchers contended that, if data are placed in the hands of teachers who have been trained to use them, they can and will be used to improve instruction (Protheroe, 2001; Streifer, 2003; Love, 2005; Datnow, 2008). Researchers consistently acknowledged that understanding what data to use and how to use them is a common concern of teachers. These and similar studies will be discussed in more detail in chapter two of this study.

Effective data use that will lead to school improvement is dependent on the skills of education practitioners to collect, analyze, and interpret data and then make accurate decisions. However, the development of these skills has not been part of administrative or teacher preparation programs (Cromey, 2000; Frey & Schmitt, 2007). Being able to understand that data comes in many different forms, from descriptive statistics to formative assessments is the first step in understanding data driven decision-making and its implications at the classroom level. Taking that information and using it to adjust and alter teaching to maximize learning is the next step. Proper training in the form of professional development is necessary to dovetail theory into practice. Exploring the impact professional development has on the data-literacy of educators and its ability to change teaching practices was the focus of this study. Many studies sited limited knowledge and lack of confidence in dealing with data as barriers for educators (Bettesworth, 2006; Creighton 2001; Fullan & Earl, 2003). If these factors are addressed it should follow that data use would be more likely to increase. This research has the

potential not only to change the practice of those educators already in the field of education, but also to have far reaching implications in terms of new teacher preparation programs. Professional development may seek to place more emphasis on teaching new teachers how to use student data most effectively in planning lessons and assessments. Findings from this study can inform professional development and instructional practices, while providing practical applications of data analysis.

### **Problem Statement**

Currently, most school districts have at their disposal a wealth of student achievement data that are largely unused for instructional purposes. However, with the mandates of NCLB starting to make a significant impact on district's funding, staffing, and programming, schools are starting to take notice. Many districts are using data to drive school-wide programming but on a more intimate level, the use of data in a typical teacher's classroom is still intermittent. According to Creighton (2007), "most schools use the collection of data to satisfy administrative requirements rather than to assess and evaluated school improvement" (p.1). Love (2004) and Datnow (2007) both pointed out that, although schools have more data available, the use of data to improve instruction is still limited. Love (2004) stated that in order to improve educators need to "Influence school culture to be one in which educators use data continuously, collaboratively, and effectively to improve teaching and learning" (p.1). In order to accomplish this, teachers must have practical working knowledge of educational data that can be implemented into their classroom.



This study contributes to the body of knowledge needed to address this problem. Specifically, the research focused on two variables. First, I explored the impact that professional development can have on the data-literacy of the classroom teacher. Secondly, I examined the teachers' uses of data to plan instruction. I addressed this problem by exploring the impact of a systematic effort to in-service middle school teachers in adopting data driven instructional practices.

My intent was to assess how professional development in data-based decision making may impact educator's efficacy in using data to plan instruction. The one group pretest-posttest study used a repeated-measures methodology to measure educators' uses of data in their classrooms both before and after participating in professional development.

### **Nature of the Study**

In this repeated-measures study, I examined if providing teachers with practical data-driven decision making tools through a professional development experience increases their efficacy in using data at the classroom level and changes their instructional practices in terms of including these tools in their lessons. The participants included 226 public school teachers. The group was not stratified by ethnicity, gender, education, or subject certification. This research incorporated a singular group, pretest/posttest survey design as suggested by Creswell (2003). The study was a comparative analysis of teachers' efficacy and uses of data-based instruction before and after participating in the treatment of a professional development experience. Data collection entailed a pre- and post-treatment survey. The professional development

experience followed the state guidelines and standards for professional development. I reported to the stakeholders as to the findings of the study and the educational implications.

Two Likert-scale survey instruments, one focused on data-driven readiness, and one focused on efficacy, were combined into one instrument and adapted for use in this study. Both pre- and postsurveys were administered within a mandatory daily team meeting period by the researcher, thus limiting the problem of nonrespondents (Creswell, 2003). The researcher was responsible for identifying the participants, gaining appropriate permission from all stakeholders, conducting the professional development training, implementing the pre- and postsurveys, and data analysis. The interpretation of data involved the collection, correlation, and interpretation through statistical analysis using a Mann-Whitney-Wilcoxon rank-sum test. The duration between the professional development training and the postsurvey was 6 weeks, which allowed the participants' time to implement new practices into their existing curriculum. This methodology and research instrument will be further discussed in section 3.

The dependent variable, data-literacy, is defined as the knowledge the educators possess in terms of how to access and analyze educational data for instructional purposes as well as design and use instruments for collecting educational data. The independent variable is the professional development training session that was administered to all the participants. To assess changes in participant's efficacy and use of data, the Mann-Whitney-Wilcoxon non-parametric test was used to analyze the pre and postsurvey data. This choice is appropriate for ordinal data. The first part of the survey addressed the first

research question that speaks to teacher's perceived efficacy in dealing with data. The second part of the survey concentrated on job-embedded data use.

### **Research Question and Hypotheses**

Research Question 1: What is the difference in teachers' efficacy in using data in their classrooms after participation in professional development, in data-driven instructional practices?

Research Question 2: What is the difference in teachers' uses of data to plan instruction and assess learning in their classrooms after participation in professional development in data-driven instructional practices?

H<sub>01</sub>: There is no difference in teachers' efficacy in using data in the classroom after participation in a professional development workshop in data-driven instructional practices.

H<sub>1</sub>: There is a difference in teachers' efficacy in using data in the classroom after participation in a professional development workshop in data-driven instructional practices.

H<sub>02</sub>: There is no difference in teachers' uses of data to plan instruction and assess student learning in the classroom after participation in a professional development workshop in data-driven instructional practices.

H<sub>2</sub>: There is a difference in teachers' uses of data to plan instruction and assess student learning in the classroom after participation in a professional development workshop in data-driven instructional practices.

### **Purpose**

The purpose of this study was to determine if training in data-driven instruction would increase a teacher's data-literacy. In this quantitative study, I surveyed a group of public school educators across multiple disciplines to determine the impact of professional development on professional practice. The goal of this research was to provide educators and administrators with data for the development of successful data-based professional development programs. Knowing that data literacy is a factor that inhibits the use of data driven decision-making, this study determined if this limiting factor can be diminished or lessened by way of professional development. Cromey (2000) reports that, although most industries rely on data to adjust their practices, this is a procedure that is used sparingly in education, mainly because teachers are not prepared to do so. Providing teachers with the foundation necessary to begin to use data to monitor learning and adjust instruction is crucial.

### **Theoretical Framework**

In order for educators to utilize data to make educational decisions, the data need to be available and educators need to know how to use it to plan formative educational opportunities for students. This type of analysis is in keeping with classical constructivist learning theories. Dewey (1938) and Bruner (1960) emphasized that learning needs to come from the individual and is based upon his or her ability to relate and internalize the information that is presented. Evidence of these constructivist approaches is apparent in the way teachers organize and interpret the data they have available. How teachers use this information for planning lessons and assessments for their students is truly at the

heart of constructivism. Lambert et al. (2002) summarized the link between our current standards-based educational movement and the constructivists learning theories, “Both outcomes and standards have at their core the recognition that learning is more than recitation; it is instead the process of making sense of new knowledge” (Lambert et al., 2002, p.5). Utilizing data in a formative way to help guide instruction is a crucial component of a data based classroom.

Since this study looked at the impact of professional development on professional practice, it is also important to acknowledge the transformative learning theory. This framework was introduced by Mezirow in the late 1970’s and is widely cited in the research of staff development and adult learning. Since the intent of professional training was to shift an educator’s perspective in terms of classroom practice, it requires the individual teacher to internalize and value what is presented. Mezirow (1991) asserted that:

Perspective transformation is the process of becoming critically aware of how and why our assumptions have come to constrain the way we perceive, understand, and feel about our world; changing these structures of habitual expectation to make possible a more inclusive, discriminating, and integrating perspective; and, finally, making choices or otherwise acting upon these new understandings.

(p.167)

In order for educators to translate their professional learning into professional practice, they need to internalize and adjust their perspectives. “Information becomes knowledge

when it is shaped, organized, and embedded in a context that gives it meaning and connectedness” (Earl & Katz, 2006, p.15).

In order to effectively educate teachers to shift their perspective, accept, and utilize the concepts presented to them in the professional development workshop it is necessary to look at the foundation on which the training rests. The framework for developing and implementing the in-service training was situated in the work of the State Department of Education’s Professional Development Standards for Educators. This framework is a synthesis of the State Department of Education and the work presented by the National Staff Development Council. It provides an outline of context, process, and content standards deemed necessary for effective professional development. This conceptual framework offers participants an experience rooted in best practices and allows optimal conditions to put theory into practice. The research presented by Bandura (1994) and Hoy and Woolfolk (1993) on self-efficacy will provide another theoretical lens by which this work will be viewed. The foundation of self-efficacy is that of Bandura’s (1977) social cognitive theory which links achievement with behavior, environmental, and personal factors. One measure of the professional development portion of this study was to determine if the training had a positive impact on the efficacy of the educators that participate in the study. Studies (Goddard, Hoy, & Woolfolk, 2000; Zambo & Zambo 2008) indicated that teachers with a high degree of self-efficacy are more willing to try new instructional strategies and take the time to work through the stumbling blocks that may be associated with new procedures. The work of Bandura (1994) and Hoy and Woolfolk (1993) ascertained that a logical conclusion would be that

if teachers are provided with experiences that allow them to work with and master a concept their self-efficacy will increase. That is to say, the choices that teachers make, their motivation behind their choices, and their persistence in dealing with a new challenge will be impacted.

### **Operational Definitions**

*Assessment Literacy:* “The ability to understand the different purposes and types of assessment in order to select the most appropriate type of assessment to meet a specific purpose” (Ainsworth & Viegut, 2006, p.53).

*Data-Driven Instructional Practices:* A term coined in this study to refer to collecting and using student learning data to plan lessons and assessments at the classroom level.

*Data-Driven Decision Making:* “The processes of selecting, analyzing, and making meaning of student performance data to inform instructional decisions” (Bettesworth, 2006, p.4).

*Data-Literacy:* The process of knowing how to collect, access, link, manipulate, report, analyze, and critique data for an intended purpose (Earl & Katz, 2006).

*Data Mining:* “The search for hidden relationships and patterns in data that can add to one’s understanding of organizational effectiveness” (Streifer & Schumann, 2005, p.284).

*Data Warehousing:* Databases designed to store and manipulate large amounts of data (Streifer & Schumann, 2005).

*Diagnostic Teaching:* Increasing the accuracy of instruction by making periodic checks in student understanding, and then using this information to adjust instructional strategies (Gregory & Kuzmich, 2004).

*Evidenced-based practice:* “The collection and analysis of data and research and the application of this evidence to teaching and learning” (ACT, 2007, p.2).

*Formative Assessments:* “Ongoing assessments, reviews, and observations in a classroom used by teachers to inform and improve instructional methods and provide student feedback throughout the teaching and learning process” (Fisher & Frey, 2007, p.4).

*Reflective Teaching:* Thoughtfully considering an experience. Applying metacognitive strategies to planning and instruction (Ferraro, 2000).

*Progress Monitoring:* Using student performance data to evaluate the effectiveness of their teaching and adjust instruction accordingly (Safer & Fleischman, 2005, p.81). Examples of frameworks that use progress monitoring include; Responsiveness-to-learning and Curriculum-Based Measurements (Stecker, Lembke and Foegen, 2008) and Growth Modeling (Holt, 2006).

*Self-Efficacy:* A person’s belief about their capabilities to perform certain tasks. (Bandura, 1994). “Convictions concerning ones ability to perform behaviors that will yield expected outcomes” (Bettesworth, 2006, p.31). In terms of data based decision making the terms readiness and capacity are used similarly.



### **Assumptions, Limitations, Scope and Delimitations**

While conducting this study the assumptions were that the responses received from the participating teachers accurately reflected their professional practice and the answers were legitimate and candid. This limitation of the study is that data were collected in one school district known as the Beehive School District (pseudonym). The limited range of this study makes it difficult to generalize about the utilization of data in a broader context. Whether or not a content area has clearly defined national or state standards and whether or not the educator teaches a grade level or a subject that is included on national or state assessments may also have proven to be a limitation of the study. In terms of scope and delimitations, this research is what Creswell (2003) calls a “backyard” study. In order to maintain credibility in the study the researcher did heed Creswell’s (1998) suggestions of “employing multiple strategies of validity” (p.184). Since I also presented the professional development training and am colleague of those participating in the study I assured participants of the confidentiality of the information related to the study. Keeping survey answers anonymous was the main means of protecting participant’s confidentiality. Further explanation is contained in the methodology section of this study.

Caution must also be used in making generalizations about the results of the statistical significance of the quantitative data because the participant’s voluntary participation in this study already indicated some degree of prior interest. Participant’s prior interest may indicate a basic level of awareness of formative assessments and must be taken into consideration in analyzing the results. Additionally, the population size

being limited does not allow for generalizations to a larger population nor does it necessarily correlate to other districts (N=226). Finally, the validity and reliability of the survey was addressed, as the survey is an adaptation of two existing surveys, which have been tested for these factors. More information is provided in section three of this study.

### **Significance of the Study**

The correlation between understanding how to use and interpret educational data, and the importance of developing lessons and assessments that utilize data is the foundation for this research. Killion and Bellamy (2000) declared, “Understanding and using data about school and student performance are fundamental to improving schools” (p.1). Improving classroom instruction and assessments is an on-going process that should be grounded in evidence-based data. As Protheroe (2001) stated, “The real question should not be *whether* to integrate the use of data in decision making, but *how*. Finding good data and using it effectively is actually a complex process—one that many schools and districts are just beginning to address” (p.1). Encouraging teachers to use the wealth of data that is available may not be enough, rather providing teachers with the knowledge needed to understand how to use data is a necessary first step. According to Black and Wiliam (1998), “Teachers will not take up ideas that sound attractive, no matter how extensive the research base, if the ideas are presented as general principles that leave the task of translating them into everyday practice entirely up to the teachers”(p.145). It is imperative to provide teachers with examples and activities they can utilize in their classrooms. Therefore, the primary purpose of this study was to identify if professional development, which gave practical tools in data-driven

instruction, can alter a teacher's professional practice. Although the study focused on educators in just one school district, the implications are far-reaching. Data-literacy is an area of educational design that can, and should, include parents and students. School administrators can utilize the components gained from this study to direct district goals and to guide articulation. Data-literate educators are an essential component in a standards-based educational system that is managed by accountability. This study provides information necessary to tailor professional development initiatives for veteran teachers as well as inform the structure and scope of novice teacher preparation programs. Ultimately, the significance of this study lies in the development of educational activities that will result in teaching that is more effective for learning. The link between data-driven instruction and student learning is best summed up in the framework presented by the Australian Capital Territory Department of Education (ACT) (2007). It stated, "The prime purpose and professional responsibility of teachers and school leaders is to progress student learning. Data and research help them to carry out this responsibility in an informed, purposeful, and systematic way" (ACT, 2007, p.2). If effective data driven decision-making at the classroom level can have a positive effect on student achievement, then it is necessary to find a way to promote this practice.

### **Summary**

Although a number of researchers (Protheroe, 2001; Streifer, 2003; Love, 2005; Datnow, 2008) report that data-based decision making is a crucial element in today's standards-based educational system, many also agree that time, access to data, and data-literacy are factors that prevent the use of data for effective decision making on a regular

basis. This study focused on the belief that educators do not have the knowledge necessary to use data effectively. According to Earl and Katz (2006), “Educators are woefully under-prepared to engage in data-based decision making. There is little in most educators’ backgrounds or training to prepare them to engage in using data or in systemic inquiry” (p.4).

The purpose of this study was to determine if professional development can increase the capacity of educators in terms of data-driven instruction and subsequently increase the use of data in instructional planning. A preexperimental research method was employed to quantify the impact of data-literacy and the effectiveness of professional development in changing instructional practice. Given the tremendous focus on accountability and standards-based achievement, it is critical that data based decision making be utilized to improve instruction at the classroom level. Fullan, Hill, and Crevola (2006) stated, “For the most part, the average classroom teacher begins each lesson with a generalized knowledge of what students know and do not know and of where to focus instruction and provide assistance so that each student’s learning needs are met” (p.34). As a result, the educational activities fall short in terms of differentiation and therefore do not provide an optimal learning experience. In order to develop these skills, educators need to know how to use educational data to create differentiated lessons and assessments. A review of literature relevant to this study is found in Section 2 while Section 3 describes the research design, instrumentation, and methodology. Section 4 includes the presentation of findings and analysis of data. The interpretation of findings, their implication for social change, and recommendations are found in Section 5.

## Section 2: Review of the Literature

### **Introduction**

This study was designed to gauge if professional development in data-driven instruction can have an impact on the professional practice of educators. This chapter will focus on current literature related to data-driven decision making and its practical applications in the classroom. The review of the current literature is intended to familiarize the reader with issues and terminology that served as the foundation for this research. This review of literature organizes the current findings by describing data literacy, professional development related to data based decision making, and sources concerning reflective teaching practices and self-efficacy. The review also highlights literature relating to the methodology for the research. The literature addresses issues that can have educational implications for social change as it relates to professional development, new teacher training, and teacher efficacy.

To conduct the review of current literature, I utilized several databases, including, the Academic Search Premier, the Educational Resource Information Clearinghouse, EBSCO and Proquest Dissertations and Theses database. Searches were performed using keywords and terms such as data-based decision making, formative assessments, data analysis, data coaching, NCLB, and data literacy. I also corresponded online with the researchers whose data collection materials I utilized for my research. They were extremely helpful in suggesting several articles and on-line sources that might be pertinent to my review of literature and in conducting my study. By examining these

sources, I obtained a great deal of information that had not been previously found using the standard search methods I had employed.

Several websites and books, including many on research methodology, were also reviewed to expand the scope of literature. All resources were examined for relevance to the study and provided the foundation for this research.

### **The History of Data Driven Decision Making**

Some of the first research on data based decision making in the 1980s spoke of using data for instructional changes (Popham, 1987; Popham et al., 1985) as well as district based decisions about programming and personnel (Massell, 2001, Schmoker, 2004). Currently, the use of data to inform educational decisions has made its way to the forefront of state and district discussions due to accountability measures such as NCLB. Additionally, advances in technology have made warehousing large amounts of data practical and has provided educators with easier accessibility to the data. According to Earl and Katz (2006), processing data is only the first step, knowing how to interpret the findings is no less important. The standards-based movement, along with the accountability associated with federal mandates, has presented new demands, incentives, and opportunities for educators to utilize data to inform decision-making (Massell, 2001). Thus according to Mitchell, Lee & Herman (2000), the ability to make data based decisions about instruction are essential in this environment. In 2000, the National Education Goals Panel synthesized the results of their study to determine conditions that ensure effective schooling. Rothman (2000) reports the findings of this study showed data driven decision making as an important component of success. Data was cited as

being used to direct programming, adjust classroom instruction, and set goals. Rothman (2000) contends by using data driven procedures schools can generate their own data by measuring their own successes or failures. With standards-based reform efforts as the fuel for change, using data to direct educational reform is imperative. According to Killion and Bellamy (2000), schools cannot be certain what deficiencies exist, problems that need attention, or the right solutions to these problems without data analysis. Research indicates that understanding and using educational data is an important factor for school improvement. (Earl & Katz, 2002; Killion & Bellamy, 2000; Protheroe, 2001). Similarly, studies have shown that if data is used efficiently the results will have a positive effect of student learning (Garcia & Rothman, 2002; Killion & Bellamy, 2000; Supovitz & Klein, 2003). Data provides a common tool by which a school can work toward common goals. Creating assessments that yield useful educational data is a tool that links the theory behind data driven decision making with practical classroom applications. In her formula for school reform, Bernhardt (2004) describes why data-driven decision-making is important. Schools that actively compile and use data to inform themselves on what changes need to be implemented are more successful than those who do not. Although research supports the utilization of data as an effective tool in school improvement, Heritage and Chen (2005) remind us that using data effectively depends on the ability of educators to set corresponding goals and targets indicated by that data. In essence, the effectiveness of data based instruction is determined by the data literacy of the teacher.

### **Data Literacy**

Many studies (Johnson, 2004, Love, 2004; Streifer & Schumann, 2005) speak of the importance of teachers having the skills necessary to make meaning out of the data they collect. Mitchell, Lee, and Herman, (2000) offered a continuing thought:

The expectations, that schools monitor their efforts to enable all students to achieve, assume that school leaders and teachers are ready and able to use data to understand where students are academically and why, and to establish improvement plans that are targeted, responsive, and flexible. (p.22)

Necessary components for educators to use data in their classrooms are proper preparation, consistent support, and access to the tools necessary to understand data (Wayman, 2005). Without the support and skills necessary, it is no wonder that research often reports that teachers find working with data to be frustrating, overwhelming, and confusing (Gregory & Kuzmich, 2004; Holland, 2000). Echoed throughout the literature is the lack of preparedness of pre-service and current educators in data based decision making. Research indicated that data driven decision making skills and the related skills used to develop assessment literacy are missing or occur on a limited basis in most teacher preparation classes (Cromey, 2000; Frey & Schmitt, 2007; Heritage & Chen, 2005; Volante & Fazio, 2007). An effective framework by which to increase the data-literacy of educators is through the development of professional learning communities that focus on data analysis skills. The implementation of these communities encourage metacognitive strategies to improving teaching while at the same time focus on skills that



can be directly related to data based decision making Earl and Katz (2006). Volante and Fazio (2005) stated that the majority of provinces and states in Canada and America use some form of standardized achievement testing and therefore ascertain that, a noted gap occurs in teacher preparation in understanding data analysis practices and the link to teaching and learning. Similarly, Cromey (2000) echoed this claim stating, “Most states do not require assessment training as a condition for teacher or administrator certification” (p.5). Although the trend is leaning toward included these skills in professional development opportunities and to make them a focus of professional learning communities, the progress seems to be lagging behind. According to Resnick (2006) the trend towards accountability schemes that reward or punish schools based on a rapidly developing and lucrative assessment industry has moved far beyond the skills of educators to turn data into effective practice. Likewise, Stiggins (2002) noted that few professional development opportunities are directly focused on understanding and using assessments in the classroom.

Unfortunately, training teachers at the preservice level or through professional development at the school level is not an easy task. It requires educators to internalize often unfamiliar concepts and then use that information to change their practice. In his research, Johnson (2004) acknowledged the difficulties associated with data literacy in terms of drawing valid conclusions and finding and using appropriate data. It is important to keep in mind that educators are dealing with children as subjects and therefore it is necessary for these educators to be fully proficient in their understanding and utilization of data for educational purposes. In their work, Firestone and Gonzalez

(2007) cautioned that an ill-prepared educator attempting to use educational data for instructional purposes could end up doing more harm than good. Providing teachers with the foundations of data literate thinking includes giving them practical applications for using data in their instructional planning. The literature shows an emerging number of frameworks that have been tested and provided for teachers to give practical ways to apply data driven instructional practices. Here, a few of the most current are reviewed.

### **Putting it into Practice**

According to Cohen (2003), student achievement is directly related to teacher effectiveness. Therefore, creating the most effective classroom is a priority of most districts. How data can be used to aid in this objective is an area of research that is gaining much attention. Research (Baines & Stanley, 2006; Gregory & Kuzmich, 2004; Streifer, 2003) is quick to point out that high stakes federally mandated and state implemented test data are just a small portion of data that should be considered in planning classroom activities. Additionally, it is noted that this data should be used cautiously so as not to draw false conclusions. Dalton (2009) documented that the use of data to make decisions involving student achievement has become a critical part of school and district initiatives. Schools can no longer make curricular decisions based on assumptions; data analysis has become a necessity. Ainsworth and Viegut (2006) examined the importance of connecting the data from annual standardized assessments with more frequent teacher-made assessments. They contended that educators that implement specific classroom assessments for their students based on the findings of large group standardized tests increase the chance of improving individual student

achievement. Similarly, Butler & McMunn (2006) echoed the importance of using classroom assessment data in conjunction with state testing data. They maintained using classroom generated assessment data in more focused ways resulted in uncovering individual proficiencies and needs. In contrast, Mandinach, Honey and Light (2006) cautioned that focusing on multiple classroom measures limit the educators focus in terms of using assessment data to discover broader trends and patterns. They maintained that by drawing conclusions from teacher-made data sources, it is likely that the conclusions will be riddled with bias and distortion.

Studies also recognized that understanding how to use assessment data to structure classroom lessons is the first step in putting data driven instruction into practice (Volante & Fazio, 2007; Wayman, 2005). The research of Nichols and Singer (2000) attested to this, they concluded that school leaders and staff have to be taught to analyze and implement data after is it gathered and compiled. Although having access to data is a key component for effective data driven instruction, more skills are paramount. Research contended that knowing what data to use and how to use it are keys to successfully integrating data decision making into practice (Holland, 2000; Love, 2004; Protheroe, 2001). In their research Supovitz and Klein (2003) stated, “If teachers stomp through standards in the same way that they have traditionally tramped through textbooks, then they are no more likely to produce greater gains in student learning than in the past” (p.15). They supported the belief that data driven instruction is an important component for effective schooling. Further studies (Firestone & Gonzalez, 2007; Supovitz & Klein, 2003) suggested that the most common ways to include data into classroom decision

making is by using it to identify objectives for lessons, group students by ability, and align lessons with standards. In her research concerning standards-based education and special education students, Thurlow (2002) spoke of the promise that assessment data has shown in terms of assisting teachers in making instructional improvements and adaptations to their lessons and programming. Going further Gregory and Kuzmich (2004) laid out a framework for diagnostic teaching, which utilized data to create units, lessons, and assessments that accurately, differentiated for each student thus, maximizing the quality of a student's education. They reported, "Effective use of classroom data increases the probability that more students will demonstrate proficient and higher levels of performance" (Gregory & Kuzmich, 2004, p.10).

Current trends use data to monitor and address what the United States Department of Education (2005) calls "substantial academic progress". The ACT (2007) presented an extensive framework for what they call evidence-based practice. They concluded that student learning, pedagogic practice and overall school success improved with the use of evidence based practice. The ACT (2007) defined evidence based practice as "the collection and analysis of data and research and the application of this evidence to teaching and learning" (p.2), therefore indicating that this is clearly a framework for data-driven decision making. Holt's (2006) research illustrated how another data based framework, called the growth-modeling strategy, was adapted for use in educational settings. This model used language development data and mathematical achievement data to adjust instruction. Additional research showing how performance data can be used in practice comes from Safer and Fleischman (2005) who discussed the benefits of

progress monitoring. Their research indicates student learning improves using progress monitoring and teacher effectiveness improves as both teachers, and students more clearly see performance needs and progress (Safer & Fleischman, 2005).

Acknowledging, assessment data is a vital element in monitoring student growth, their research went on to explain that state assessment data is not sufficient by itself. Research maintained, “If teachers must produce high levels of achievement among all students, they also need assessment tools that will guide their instructional decision making” (Stecker, Lembke & Foegen 2008, p.48). Bernhardt (2004) and Cromey (2000) discussed the importance of gaining educational data from a planned assessment system. Specifically, Cromey (2000) stated, “Effective school-based student assessment systems consist of a deliberately organized set of assessment tools that are used for a clearly articulated purpose” (p.4). Recently, assessment tools have received much attention in educational research. Tomlinson and McTighe (2006) reported that using data sources, such as assessments, could assist teachers in designing lessons that are better able to meet the various learning styles present in their classrooms.

One type of assessment practice that has sustained over many years is the use of formative assessments. Formative assessments make a natural link between learning and data. Black and Wiliam (1998) have done extensive studies on using formative assessments in the classroom to improve learning. The work of Gijbels and Dochy (2006) synthesizes the use of formative assessments as a tool for data driven decision making as it highlights how to use it in modifying teaching and learning activities. According to Searle (2004), “When assessment data are used to determine what to do

next to help the student achieve the target behaviors and understandings, the assessment is being used well”(p.23). Formative assessment strategies are an essential tool in data driven instruction. To this end, Marzano (2006) stated, “Research supports the conclusion that formative classroom assessment is one of the most powerful tools a classroom teacher might use” (p.11).

Having a toolbox of data driven instructional strategies is an important factor in giving teachers the confidence to use these skills to monitor their instruction. Wayman (2005) aligned the trends of the last five years with the reality of where we are now:

Although the NCLB legislation has provided much-needed stimulus for the gathering and presentation of student data at the school and district levels, it remains necessary to move beyond reporting mandates to provide teachers with access and support needed to use these data in improving instruction. (Wayman, 2005, p. 296)

To that end, Firestone and Gonzalez (2007) emphasized that both teachers and administrators need to be trained in using educational data effectively in the decision making process. They go on to say that, effective decision-making requires staff to understand the limitations of the data and what interpretations are considered valid. Current literature addresses the importance of incorporating data literacy into professional development.

### **Professional Development Related to Data Driven Decision Making**

According to a comprehensive review of studies associated with academic achievement, Marzano (2006) stated, “An effective teacher enhances student learning

more than any other aspect of schooling that can be controlled” (p.1). With this in mind, it is crucial that the goal of reform efforts is to make educators as effective as possible. In terms of data driven decision making, having access to data is not sufficient, educators need support and training in order to properly understand and utilize data effectively. Wayman (2005) goes on to acknowledge the difficulties associated with data analysis and concluded that professional development is the means by which these difficulties can be addressed. The research of Fusarelli (2008) also acknowledged that effective use of educational data is reliant on developing the data literacy of administrators and teachers. In light of the fact that most teachers have not received prior training in the areas most commonly associated with data driven decision-making, professional development in this area is a necessity. Furthermore, Cromey (2000) asserted that improvement in student achievement and the way it is assessed is influenced by professional development and thus the two are inseparable. Likewise, Holland (2000) stated that a school’s efforts at improvement rely on professional development that informs teachers on what to teach, how to teach it, and how to assess and, if necessary, remediate students’ learning.

According to Wiggins and McTighe (2006) in order for professional development to be most effective, it needs to address teacher’s personal classroom situations and provide them with skills that can transfer into useable tools. Similarly, in their framework for using student performance data, Supovitz and Klein (2003) discussed the importance of professional development that is personalized, job embedded, and conducted at the school level. Many researchers (Elmore, 2002; Lieberman & Miller, 2002; Valli & Hawley, 2002) have listed characteristics for effective professional development. In just

about any book or article on professional development, the author's include a menu for success. Professional development focused on data driven decision-making is no exception. Of the literature that exists, the Department of Education's Professional Development Standards for Educators (2008) synthesizes the work of the National Staff Development Council to provide an outline of context, process, and content standards they deem necessary for effective professional development.

Feldman and Tung (2001) reminded us that when implementing change, creating ownership of the process is just as important as providing access to useable information. In the framework that Black and Wiliam (1998) proposed for effectively training teachers, they stress the importance of providing "teachers with a variety of living examples of implementation" (p. 145). Likewise, Fullan, Hill and Crevola (2006) specified that professional learning only change practice if it provides educators with practical applications specific to their individual teaching assignments.

Studies indicated that in order for training in data based decision making to be most effective, it also matters who presents the instruction. Cromey (2000) spoke of the importance of localized information that is applicable to the unique situations in each school, that teachers, and the information they garner from their students is a valuable resource that needs to be tapped in order for data use to be effective. Similarly, Wayman (2005) highlighted the positive effect that professional development concerning data literacy had when an in-house expert presented it. Supporting this was a study conducted by Zhoa and Frank (2003) that indicated the most effective training occurred when there was teacher-to-teacher articulation. Creating professional learning communities that



focus on common goals is essential to effective professional development. Attesting to the importance of a shared vision free from blame Firestone and Gonzalez (2007) concluded that stressing accountability is not as effective as building a culture where shared planning, implementation, and analysis of results are employed. Reoccurring throughout the literature is the reminder of the importance of including staff in effective professional development as well as providing additional support when implementing changes in professional practice (Black & Wiliam, 1998; Feldman & Tung, 2001). Butler and McMunn (2006) reported for professional development to change professional practice, it needs to be apparent that student learning is positively affected. Ultimately, in order for educators to translate their professional learning into professional practice, they will need to internalize and adjust their perspectives. According to Ferraro (2000) the most effective professional development encourages reflective practices.

### **Reflective Teaching Practices and Self Efficacy**

Although the intent of professional training is to shift an educator's perspective in terms of classroom practice, it requires the individual teacher to internalize and value what is presented. Supported by Mezirow's transformative learning theory of the 1970's, as well as more contemporary works (Black & Wiliam 1998; Gregory & Kuzmich, 2006) the ability to shift perspective, internalize information, and reflect on data is a important factor in the process of changing teaching practices. Similarly, Wiggins and McTighe (2006) contested that reflective teaching practices are an important component of educational systems that promote learning. They go on to say that professionals in the education field need to stay current with policies and procedures, use data to gauge

instruction, and focus on standards of best practices. They encouraged educators to ask questions of themselves and their practices to continually enhance learning for all students. “A great weakness of our craft is that we typically do not require faculty members to justify their teaching methods, course designs, and assessments against a set of learning principles” (Wiggins & McTighe, 2006, p.27). In order to connect data to learning Gregory and Kuzmich (2004) emphasized the importance of reflective teaching and maintain, “We must retool our metacognition about teaching and learning to include the relationship of research based strategies to what we know about achievement levels of the students” (p.8). In their guide to using data, City and Murnane (2008) alluded to the connection between improving instructional practice with the use of data and utilizing metacognitive strategies. They state that educational articulation needs to, “look past what students are and aren’t doing to look at what teachers are and aren’t doing” (City & Murane, 2008, p.100). Quantifying this in their case study of six schools in Massachusetts that implemented a data driven school reform initiative, Feldman and Tung (2001) reported the use of data lead educators to be more reflective in terms of their teaching. Similarly, Ferraro’s (2000) research concluded that when teachers engage in reflective practices, their teaching effectiveness improves. One way to increase efficacy is through the attainment of practical working knowledge. Ikemoto and Marsh (2007) found that by organizing, analyzing, and then summarizing data, teachers are more likely to gain the working knowledge needed to make changes in their instruction.

Taking the time to reflect on the effectiveness of instruction naturally leads itself into a discussion of a teacher’s confidence as an educator. Self-efficacy deemed by

Bandura (1994) as the belief in one's ability, is an important variable for effective education. In terms of data based decision-making, an educator's confidence in their aptitude and skills necessary to use data is often referred to as the educator's readiness or capacity. Studies in many disciplines indicate a correlation between self-efficacy and effectiveness. Similarly, a look at research focused on data based decision-making offers the same claims. Bettesworth (2006) reported, "With regard to education, this means that learners will be more likely to attempt, to persevere, and to be successful at tasks at which they have a sense of efficacy" (p.30). This is not only true of students but teachers as well. Studies (Bandalos, 2004; Lukin, 2004; Volante & Fazio, 2007) showed that in districts where professional development placed an emphasis on assessment literacy and its related data analysis skills teacher's confidence and efficacy increased. Affirming this Ainsworth and Viegut (2006) found that educators gain confidence in using a wider array of assessment tools the more knowledgeable they become in using assessments as a basis for data driven instructional practice. It is apparent that the links between understanding the value of using data to drive instruction and having the skills necessary to make that happen directly influence a teacher's efficacy. Heritage and Chen (2005) supported this stating, "Our view is that educators are more likely to believe in the value of data if they have the skills to use them" (p.710). Frameworks for data use can provide educators with practical tools for data based analysis (Marsh, Pane, & Hamilton, 2006). Training, such as the utilization of frameworks in data based instructional practices, is the key to increased readiness and therefore increased confidence.

## **Methodology**

Research concerning professional development and teacher's instructional practice is often analyzed through quantitative methods. A number of current studies (Otto, 2009, Kelani, 2009, LaBombard, 2009) that focused on implementing initiatives through the use of professional development and then documenting the use of those initiatives employed qualitative case study methodology. As Bettsworth (2006) noted in her study, a quantitative approach to this topic allows the researcher to better understand the educational as well as statistical significance of the research. After reviewing research projects that examine the effect of a specific treatment on a group of participants, it was determined that data analysis of pre- and post-treatment can be effectively assessed by quantitative methods. The research of Bettsworth (2006) and Volante and Fazio (2007) who conducted similar studies both utilized a quantitative methodology to justify their findings. According to Creswell (2003) quantitative studies are best used when variables are tested and when there is a need to verify explanations, both of which form the foundation of this study.

## **Gaps in the Current Research**

Rarely does the literature that exists on data driven decision-making fail to mention the importance of professional development as a necessary component for schools to implement this practice. However, with all the research that supports the use of data to drive programming and instruction, few studies quantify the impact of training in changing practice. Studies do exist that (Bettsworth, 2006) have focused primarily on

the data-literacy of administrators but there is a noticeable gap in the research as it applies to the classroom teacher. This claim is supported by the work of Volante and Fazio (2007), which focused on the assessment literacy of pre-service teachers. They stated that although professional development has been noted as having a positive impact on teacher's skills and confidence, "there is still relatively little research devoted to understanding the assessment literacy of classroom teachers" (Volante & Fazio, 2007, p.750). The synthesis and review of current literature associated with data literacy and professional development supports the need to continue to study these topics. Dalton (2009) asserted that there is still not enough research on how teachers effectively use data and why, and a number of studies (Johnson, 2004, Love, 2004; Streifer & Schumann, 2005) indicate that the lack of data-literacy is a significant variable that affects data driven instruction, yet few, if any quantify this notion particularly with a large group of teachers.

## Section 3: Methodology

### **Introduction**

In order to educate a diverse population of learners, teachers face the challenge of utilizing a variety of instructional strategies to service the learning needs of all students. One area of research that has been noted to increase student achievement levels is the use of educational data (Bernhardt, 2004; Firestone & Gonzalez 2007). In this research, I investigated if participation in a professional development experience based on data literacy impacted teachers' efficacy toward using data to plan classroom instruction. I administered a pre- and postsurvey to the participants in order to determine whether the treatment changed teacher efficacy and use of data in the classroom. The impact of this treatment was analyzed through the Data-Driven Instruction Survey. This survey used Likert-style questions from which the results were collected and investigated. Statistical analysis were conducted using the Mann–Whitney-Wilcoxon test to determine if there was a change between pre- and postsurvey scores. The purpose of this repeated-measures quantitative study was to determine if professional development in data literacy influenced educators in making data-driven decisions, which may subsequently increase the use of data in instructional planning.

### **Research Design**

The goal of the research was to address the questions stated herein with the attached hypotheses:

Research Question 1: What is the difference in teachers' efficacy in using data in their classrooms after participation in professional development, in data-driven instructional practices?

Research Question 2: What is the difference in teachers' uses of data to plan instruction and assess learning in their classrooms after participation in professional development in data-driven instructional practices?

H<sub>01</sub>: There is no difference in teachers' efficacy in using data in the classroom after participation in a professional development workshop in data-driven instructional practices.

H<sub>1</sub>: There is a difference in teachers' efficacy in using data in the classroom after participation in a professional development workshop in data-driven instructional practices.

H<sub>02</sub>: There is no difference in teachers' uses of data to plan instruction and assess student learning in the classroom after participation in a professional development workshop in data-driven instructional practices.

H<sub>2</sub>: There is a difference in teachers' uses of data to plan instruction and assess student learning in the classroom after participation in a professional development workshop in data-driven instructional practices.

Since the study compared a variable before and after treatment affecting a specific population it lends itself to a quantitative methodology (Creswell, 2003). As Creswell (2003) asserted, the goal of quantitative research is to show how specific factors influence an outcome.

Employing a survey that is a synthesis of two valid and reliable survey instruments, the researcher used inductive statistical analysis to generalize from a sample group to a population (Creswell, 2003). The independent variable, a professional development experience in data-based decision making was the intervention. A survey was administered to the teachers prior to the in-service training and again after completion of the intervention. With the survey as the dependent variable, the numerically scored survey questions were analyzed statistically through a Mann-Whitney-Wilcoxon test.

Through random convenience sampling, one group consisting of approximately 226 public school teachers ( $N=226$ ) within the researcher's school district (which will be referred to by the pseudonym Beehive School District) was surveyed. Participation in the research surveys was voluntary. No teacher is identified in the survey process and demographic information will not be published.

### **Setting and Sample**

This study took place in a suburban public education school district. The district consists of six elementary schools, a middle school, and a high school. The school district consists of grades K-12 and employs approximately 280 full time certified educators with a student population of approximately 2900. The random convenience sampling was 226 public school teachers. The sample size ( $N=226$ ) was calculated using the American Research Group Sample size calculator with a 3% margin of error with a confidence of 95%. According to research, a 3% margin of error is what is acceptable for continuous data (Chadwick, 2001). As part of a whole school initiative plan, the



administration requested that I provide in-service training to the faculty concerning data driven instructional practices. I am part of the professional development committee of the district who has received prior training in data driven practices, and has previously presented district workshops on using educational data. The training took place as part of a district-wide in-service day. Participants varied in teaching experience from first year teachers to those who have taught over 35 years. Additionally, educational background, subjects taught, and prior data literacy varied. Although participation in the training was not voluntary, as it was part of the school improvement plan, participation in the research portion remained voluntary. Even though this sample size was limited, keeping the research in one district allowed for a treatment that was designed specifically for this population and could be differentiated for those teachers. It also allowed for ease of access to participants and their survey results.

### **Treatment**

The intervention consisted of a professional development workshop designed by the researcher to provide practical working knowledge of data driven instructional practices. The Department of Education's Professional Development Standards for Educators (2008) provided the foundation upon which the professional development was based. This guideline comes from the work of the National Staff Development Council and provides an outline of context, process, and content standards deemed necessary for effective professional development. I developed the training from current research and best practices in constructivism and data-driven decision-making. The school principal and director of curriculum decided the format for the workshop and provided final

approval of the content of the workshop. An outline of the contents of the workshop is provided in Appendix A. Permission to survey the teachers was granted by the superintendent of the school district (see Appendix B). The survey instrument is a combination of the survey utilized by Bettsworth (2006) in her study of efficacy related to data use and McLeod (2005) in his study of data readiness in K-12 schools in Minnesota. Participants were asked to use a random number they picked out of a bucket in order to provide anonymous identification on the survey instrument and at the same time allow the researcher to make correlation analysis. The treatment was conducted during a school district in-service training day. Definitions related to data driven decision making were part of the training but the focus was on practical strategies that teachers can use to obtain and use data in order to differentiate instructional practices.

### **Instrumentation and Materials**

In order to survey teachers' efficacy related to data driven instruction along with their data literacy a survey was developed which synthesized two prior instruments used by Bettsworth (2006) and McLeod (2005) respectively. Permission to use each survey was granted from the respective authors in personal e-mail communications (see appendix C and D). The survey used for this research, deemed "Data Driven Instruction", is divided into two parts based upon the origin of the questions (Appendix E). The survey begins with some general demographic information including a question pertaining to the teacher's prior professional development in data based decision making and a question pertaining to the date of their latest certification. Part one of the survey is based on the instrument designed by Bettsworth (2006), which focuses on the efficacy

and confidence of participants trained in a seminar on data-based decision making. The original survey consisted of 10 questions pertaining to efficacy of which five questions are part of this research. According to Bettsworth , using a portion of the survey will not affect the reliability or validity of the questions (L. Bettsworth, personal communication, January 27, 2011). A Likert scale is used for this set of questions that addresses efficacy and confidence in data driven practices. The choices for responding are; disagree strongly, disagree moderately, neither agree nor disagree, agree moderately, agree strongly. According to Bettsworth (2006), “Development of pre- and posttests followed the multi-step Item Creation System advanced by Behavioral Research and Teaching” (p.46). This is a method of checking the reliability and validity of the survey instrument that employs a standardized process for ensuring these factors are met. Bettsworth (2006) acknowledges that in the development of the survey, standardized procedures were followed for administration of the survey and inter-rater reliability was addressed. “Three content experts reviewed the instrument for content, format, and language. Further, three graduate students in Educational Leadership did a read-through of the survey to articulate their understanding and interpretation of all questions. Changes were made as needed based on feedback from content experts and graduate students” (Bettsworth, 2006, p.47).

Part two of the survey is from a bank of questions taken from McLeod’s (2005) survey that was designed to gauge the data-driven readiness of teachers. Of the 17 questions from the survey that relate to data use, seven are included in this research. Another three were included as they pertain specifically to professional development in

data driven decision-making. All questions in part two use a Likert response scale with the following choices; disagree strongly, disagree moderately, neither agree nor disagree, agree moderately, and agree strongly. This part of the survey has been used in a number of other studies, of particular note is the study conducted by Sulser (2006), which looked at the relationship between data driven decision-making, technology skills, and the mathematical achievement of students in Montana. According to Sulser (2006), Dr. McLeod and his colleagues at the University of Minnesota created the data-driven readiness survey in response to NCLB pressures to use educational data to justify decision-making. “The survey is a comprehensive instrument measuring up to 12 individual factors in relationship to data based decision making. The survey was distributed to 11,000 educators in the state of Minnesota” (Sulser, 2006, p.75). These surveys were for a statewide study he conducted for the Minnesota Department of Education and data analysis is still underway (S. McLeod, personal communication, March 9, 2008). The survey was checked for reliability and validity in an extended process that included a review by an expert team for readability, alignment, and consistency. Specifically the team checked for the assessment’s validity and confirmed its alignment to the intended topics. Additionally the survey was piloted to 74 principals prior to administering the final survey. Internal consistency and reliability tested high in terms of the descriptive statistics that were conducted on the survey. An analysis of internal consistency, or reliability, was conducted using the data analysis and statistical software known as Stata. This analysis was conducted on the test as a whole and on each of the six factors. According to information provided by McLeod, the removal of

individual items from the survey will not affect the reliability of the instrument (S. McLeod, personal communication, March 9, 2008). As a result, I am comfortable with the inclusion of some, but not all, of the questions from this instrument.

The postsurvey was altered from the pre-treatment survey with the addition of the phrase, “After participating in the professional development I am more...” or “After participating in the professional development I am more likely...” sentence structure determined which addition was used and the additional phrases have been placed in bold font in the postsurvey (see appendix F).

### **Data Collection and Analysis**

After IRB approval, I visited participants personally during what is called their team meeting in order to distribute the survey and discuss its purpose. Prior to the treatment, the teachers who chose to participate were given a paper and pencil version of the survey to complete and return to me. Most surveys were returned during that initial meeting. However, for those who did not return the survey immediately upon completion, I sent out a reminder e-mail to return the survey within a week to a mailbox in the main office. Approximately six weeks after the staff development was conducted I returned with a second version of the same survey for the teachers to complete.

Participants were asked to return the survey to a box located in the main office of the school. The time lapse between the professional development workshop and the follow-up survey takes into consideration that time is needed to allow the teachers to experiment with some of the practices presented in the training and at the same time considers that time is the primary factor in terms of forgetting. Extensive studies have been conducted

on the rate of forgetting with the most notable being the research of Ebbinghaus (1913). This classic study, along with contemporary studies note a negative relation in terms of time elapsed and memory (Ebbinghaus, 1913; Loftus, 1985; Pavlik & Anderson, 2005). Specifically research states, “Humans acquire knowledge and skills from training, the acquired knowledge and skills can be forgotten with the passage of time, forgetting can cause decreased performance” (Kim, Koubek, & Ritter, 2007, p.255). Joyce and Showers (2002) recommend a similar time frame to what was implemented in the study, but suggest this can be adapted depending on the complexity of the skill that is being implemented by the teacher.

Outcomes of the study were analyzed using the Mann–Whitney–Wilcoxon non-parametric test. The impact of the treatment was quantified using descriptive statistics for a repeated-measures design.

For this research, teacher efficacy, as is being assessed in the first research question, was measured by determining the median for responses to each question contained in part one of the Data-Driven Instruction Survey. Part two of the survey addressed the second research question concerning data use for instructional planning. All portions of the survey were analyzed by comparing the pre- and postsurvey data. All data was analyzed using the statistic computer program, Statistical Package for the Social Sciences (SPSS) software. The hypothesis test was used to compute the Mann-Whitney-Wilcoxon statistic with a .05 level of significance.

### **Protection of Participants**

In addition to receiving approval from the superintendent of the school district other measures were used to protect the rights of the participants. A pseudonym for the school district was used throughout the study and participants used a numerical code to identify their survey. This numerical code provided the participants with anonymity, as it was drawn from a bucket containing five hundred numbers. All participants were given information regarding their voluntary involvement and informed consent. To protect their privacy, no consent signature was requested for participation in this study, if the teacher was comfortable participating in the study as described, they were directed to complete the survey. Return of the completed survey indicated consent.

Any additional information that participants needed clarification on concerning the study was provided and participants were assured that none of the information from this study would be used for evaluative purposes, as all information was kept anonymous.

### **Role of Researcher**

My role, as the researcher in this study was to design and deliver the training program, distribute the pre and post treatment survey, and collect and analyze the results. According to Merriam & Associates (2002), since the researcher is the primary instrument of data collection and analysis it is imperative to identify preconceived biases. I am an advocate of continuing education for faculty members. Current best practices and research based educational initiatives provide a foundation upon which to foster professional development. Ultimately, I am a proponent of whatever educators can do to

educate and challenge all learners through differentiated opportunities. I was certain to align the professional development workshop with best practices and make a concerted effort to provide useable tools and materials for all subject areas while refraining from offering personal opinions.



## Section 4: Presentation and Analysis of Data

### **Introduction**

In this study I assessed if professional development in data based decision-making had an impact on educator's efficacy in using data to plan instruction. The research was guided by the following questions:

Research Question 1: What is the difference in teachers' efficacy in using data in their classrooms after participation in professional development, in data-driven instructional practices?

Research Question 2: What is the difference in teachers' uses of data to plan instruction and assess learning in their classrooms after participation in professional development in data-driven instructional practices?

The population examined in the study consisted of 226 educators from grades K through 12, all from one school district in the Northeast. All teachers participated in the professional development training in data based decision-making, but participation in the research component was voluntary. Volunteer participants anonymously chose random survey identification numbers and all stakeholders were informed of necessary information in compliance with Walden University's policies. The research consisted of a presurvey prior to the professional development training and a postsurvey 6 weeks after the training. The survey utilized was a synthesis of two instruments used by Bettsworth (2006) and McLeod (2005) respectively, both of which are deemed reliable and valid even in their combined form (Bettsworth, 2006; McCleod, 2005). The presurvey was

given to the participants a few days before the professional development training with most returning it at that time. A reminder e-mail followed a few days later for those who wanted to complete the survey on their own time and those surveys were returned to a box in the main office of each school.

The intervention consisted of a professional development workshop designed by the researcher to provide practical working knowledge of data driven instructional practices. This workshop was presented at a district-wide in-service day. The Department of Education's Professional Development Standards for Educators (2008) provided the foundation upon which the professional development was based. The researcher developed the training from current research and best practices in constructivism and data-driven decision-making. The workshop focused on strategies for gaining formative assessment data.

Six weeks after the workshop, teachers were asked to complete a postsurvey. Participants received this survey in their school mailboxes and were given 1 week to complete them and return them to a box in the main office of each school. A follow up e-mail was sent the following week to remind any teachers who had not turned in their survey that they would still be accepted. Participants were asked to use the same numbers they used on the presurvey when completing the post survey. The answers were translated and the median was found for each survey question on both the pre and the post survey. SPSS software was used to assess the data and determine the results.

### **Strategies for Evaluation**

This study looked at a population of teachers who participated in a professional development training. They completed a presurvey and postsurvey that quantified the impact of the professional development treatment in data based decision-making. The survey used for this research, deemed “Data Driven Instruction”, was divided into two parts (Appendix E). Part one of the survey was based on the instrument designed by Bettesworth (2006), which focused on the efficacy and confidence of participants in terms of data based decision-making. Part two of the survey was from a bank of questions taken from McLeod’s (2005) survey that was designed to gauge the data-driven readiness of teachers. After the postsurvey was completed, statistical analysis was conducted on the cumulative survey as well as on the individual sections.

For both research questions, the presurvey and the postsurvey results were compared to determine if there was a significant difference in the scores. The Lickert-scale data was coded to obtain a median response to each question on the presurvey and postsurvey respectively. The nonparametric scores were analyzed using the Mann-Whitney-Wilcoxon test for statistical significance. For the test,  $\alpha = .05$ . If  $p \leq \alpha$ , then  $H_0$  is rejected. The analysis was completed on section one of the survey which dealt with self-efficacy, section two of the survey which addressed data-use and an analysis of the complete survey was conducted to determine significance.

I calculated the scores based on the alpha level and a 95% confidence level. The random convenience sampling was 226 public school teachers. This is above the

standardized level of acceptance according to the American Research Group Sample size calculator with a 3% margin of error with a confidence of 95%. According to research, a 3% margin of error is what is acceptable for continuous data (Chadwick, 2001). Of the 280 surveys that were handed out, 226 were collected and used, which indicated an 81% return rate. I utilized SPSS (2006) to assess the data with a .05 alpha level and the critical value for a two-tailed test of 1.96. Outcomes of the study were analyzed using the Mann–Whitney-Wilcoxon non-parametric test. The impact of the treatment was quantified using descriptive statistics for a repeated-measures design.

### **Data Analysis for Research Question 1**

Research Question 1: What is the difference in teachers' efficacy in using data in their classrooms after participation in professional development, in data-driven instructional practices?

Based upon the SPSS analysis shown in Table 1, the Mann-Whitney-Wilcoxon did not reveal a significant difference in the efficacy scores of the participants before and after the professional development training as indicated by the  $W$  value ( $W=27.500$ ). The data, as shown in Table 2, shows that the mean ranks are identical. Similarly the  $p$  value supports this conclusion ( $p = 1.00$ ). Since the  $p$  value computed by SPSS is greater than  $\alpha$ , the analysis failed to reject the null hypothesis. Further analysis, contained in Table 1, shows a  $z$  score of 0.00. From the data it can be concluded that there is no significant difference between the two groups of data therefore it fails to reject the null hypothesis. The comparison of the data (pre and post treatment) using a Mann-Whitney-Wilcoxon rank-sum test did not provide sufficient evidence that teacher efficacy in data driven

instructional practices differed significantly after the training.

Table 1

*Mann-Whitney-Wilcoxon Statistics: Data-Driven Instruction Survey; Section One Self-Efficacy*

Statistic	Section One of Survey
Mann-Whitney U	12.500
Wilcoxon W	27.500
Z	.000
Asymp. Sig. (2-tailed)	1.000
Exact Sig. (1-tailed Sig.)	1.000(a)

Table 2

*Mann-Whitney-Wilcoxon Test Ranks: Data-Driven Instruction Survey; Section One Self-Efficacy*

Survey Section	Grouping	N	Mean Rank	Sum of Ranks
Section One	Pre	5	5.50	27.50
Section One	Post	5	5.50	27.50
	Total	10		

Table 2 shows the mean ranking of the presurvey and postsurvey results for section one of the “Data-Driven Instruction” survey which consisted of five questions.

The data obtained by conducting the Mann-Whitney-Wilcoxon rank-sum test consisting of the  $W$  statistic, z score, and the asymptotic significance value ( $p$  value) did not provide sufficient evidence that professional development in Data-Driven Instructional practices impacted the reported self-efficacy in data use both before and after participating in the workshop.

## Data Analysis for Research Question 2

Research Question 2: What is the difference in teachers' uses of data to plan instruction and assess learning in their classrooms after participation in professional development in data-driven instructional practices?

Table 3 shows the SPSS evaluation of presurveys and postsurveys for the Data-Driven Instruction survey for part two. The results show a statistically significant difference as indicated by the  $p$  value ( $p = .003$ ). Since the  $p$  value computed by SPSS is less than  $\alpha$ , the analysis rejects the null hypothesis. Further analysis of Table 3 shows a  $z$  score of -2.936. The Mann-Whitney-Wilcoxon test provided sufficient evidence that teacher's use of data to plan instruction and assess learning differed significantly after the training.

Table 3

*Mann-Whitney-Wilcoxon Test Scores: Data-Driven Instruction Survey; Section Two Data Use*

Statistic	Section Two of Survey
Mann-Whitney U	15.000
Wilcoxon W	70.000
Z	-2.936
Asymp. Sig. (2-tailed)	.003
Exact Sig. (1-tailed Sig.)	.007(a)

Table 4

*Mann-Whitney-Wilcoxon Test Ranks: Data-Driven Instruction Survey; Section Two Data Use*

Survey Section	Grouping	N	Mean Rank	Sum of Ranks
Section Two	Pre	10	7.00	70.00
Section Two	Post	10	14.00	140.00
	Total	20		

Table 4 shows the mean ranking of the presurvey and postsurvey results for section two of the “Data-Driven Instruction” survey, which consisted of ten questions. As a result, the data obtained and analyzed using the Mann-Whitney-Wilcoxon test consisting of the  $W$  statistic ( $W = 70.00$ ),  $z$  score ( $-2.936$ ), and the asymptotic significance value ( $p$  value = .003 ), provided sufficient evidence that professional development in Data-Driven Instructional practices caused a difference in the reported data use by the teachers both before and after participating in the workshop.

### **Collective Data Analysis**

A statistical evaluation of the overall presurveys and postsurveys of the “Data-Driven Instruction” Survey yields statistically significant results. Since the  $p$  value computed by SPSS ( $p = .003$ ) is less than  $\alpha$  which was set at .05, the analysis rejects the null hypothesis. Additionally, the  $z$  score was calculated to be  $-2.957$ . In analyzing the overall median values of the pre and post surveys of the “Data-Driven Instruction” instrument, there is sufficient evidence provided by the Mann-Whitney-Wilcoxon test to

state that the professional development training had a significant impact. Table 5 contains the statistical output of these tests. Additionally, Table 6 provides the mean rank data of the presurvey and postsurvey of the complete “Data Driven Instruction” instrument.

Table 5

*Mann-Whitney-Wilcoxon Test Scores: Data-Driven Instruction Survey*

Statistic	Overall
Mann-Whitney U	55.000
Wilcoxon W	175.000
Z	-2.957
Asymp. Sig. (2-tailed)	.003
Exact Sig. [2*(1-tailed Sig.)]	.016(a)

Table 6

*Mann-Whitney-Wilcoxon Test Ranks: Data-Driven Instruction Survey; Overall Results*

Section	Group	N	Mean Rank	Sum of Ranks
Overall Results	Pre	15	11.67	175.00
Overall Results	post	15	19.33	290.00
	Total	30		

### Summary

The individuals in this study participated in a professional development workshop based on data literacy. The purpose of which was to analyze the impact of the professional development training in terms of teachers’ efficacy toward using data to plan classroom instruction. All teachers in the district participated in the training



but only those who volunteered were included in the study. Using anonymous numbers, the participants were asked to complete the “Data-Driven Instruction” Survey prior to the training and then again six weeks after the training. Of the 280 surveys I distributed 226 were returned and used in the research rendering an  $N=226$ . The Likert-scale data was coded to obtain a median response to each question on the presurvey and postsurvey respectively. The scores were analyzed for statistical significance with the SPSS program. Outcomes of the study were analyzed using the Mann–Whitney-Wilcoxon non-parametric test. The impact of the treatment was quantified using descriptive statistics for a repeated-measures design.

A significant difference was shown in the analysis of section two of the survey, which specifically addressed the issue of data-use for planning and assessment. Therefore, this study indicated that the professional development training in data-based instructional practices had a statistically significant impact on both the teacher’s overall data-driven instruction and more specifically their use of data at the classroom level to plan lessons and assessments. On the other hand, the results of part one of the survey which addressed the self-efficacy of the teachers in terms of their ability to use educational data, did not show statistical significance.

This research may lend itself to social change through more effective and differentiated planning of professional development trainings and developing professional development experiences that give practical working knowledge to new educators. Further implications of the study and recommendations for future research are discussed in section 5.

## Section 5: Discussion, Conclusions, and Recommendations

### **Discussion**

This quantitative study determined if the implementation of professional development training in data-based instruction influences the teaching practices and efficacy of teachers in one school district. The study focused on two research questions:

Research Question 1: What is the difference in teachers' efficacy in using data in their classrooms after participation in professional development, in data-driven instructional practices?

Research Question 2: What is the difference in teachers' uses of data to plan instruction and assess learning in their classrooms after participation in professional development in data-driven instructional practices?

In this study, I employed a quantitative methodology to measure teachers' self-efficacy and use of data to plan lessons and assessments before and after participating in a district-wide in-service training on data-based instruction. The pretest/posttest design assessed the responses of 226 educators from one school district. Before treatment, the "Data-Driven Instruction" survey (Appendix E) was administered to the participants. The intervention consisted of a professional development workshop designed by the researcher to provide practical working knowledge of data driven instructional practices. This workshop was presented at a district-wide in-service day. The workshop focused on strategies for gaining and using formative assessment data. Six weeks after the workshop, teachers were asked to complete a postsurvey. The answers were translated and the median was found for each survey question on both the pre and the post survey. Using

SPSS software, I assessed the data using the Mann-Whitney-Wilcoxon statistical test to determine the results.

In addressing Research Question 1, the teachers' self-efficacy was compared before and after the treatment using section one of the "Data-Driven Instruction" survey. This section of the survey is comprised of five questions related to self-efficacy specifically in using educational data. Research Question 2 focused on data-use by the teacher to plan lessons and assessments. Section two of the survey was used to determine if there was a statistically significant difference in the presurvey and postsurvey scores. Section two of the survey consisted of ten questions related to data-use at the classroom level.

## **Conclusion**

### **Interpretation of Findings**

Recent studies indicate that many districts are using data to drive school-wide programming but on a more intimate level, the use of data in a typical teacher's classroom is still intermittent (Creighton, 2007; Datnow, 2007). Love (2004) stated that in order to improve we need to, "influence school culture to be one in which educators use data continuously, collaboratively, and effectively to improve teaching and learning" (p.1). In order to accomplish this, teachers must have practical working knowledge of educational data that can be implemented into their classroom and have the self-confidence necessary to use this information. This self-confidence, deemed self-efficacy by Bandura (1994) is the belief in one's ability and is an important variable for effective education. In terms of data based decision-making, an educator's confidence in their

aptitude and skills necessary to use data is often referred to as the educator's readiness or capacity. Part one of the "Data-Driven Instruction" survey used in this study was designed to measure if there was a significant change in teachers' perceived self-efficacy in using educational data both before and after participating in the professional development workshop. Having analyzed the pre and post treatment data of part one of the survey using the Mann-Whitney-Wilcoxon test through SPSS there was no significant difference. The results indicated that the professional development training did not influence the teachers' self-efficacy in using educational data. In spite of no significant change in efficacy and keeping in mind the declarations of Love (2004) who highlights the importance of using data to improve teaching, this study went on to explore if the professional development training increased the use of data in the classroom.

Research Question 2 focused on the teachers' use of educational data to plan lessons and assessments at the classroom level. The professional development workshop that I conducted provided teachers with a toolbox of instruments that could be used and adapted to any subject or grade level to collect data to use for planning lessons and assessments. Supovitz and Klein (2003) discussed the importance of professional development that is personalized, job embedded, and conducted at the school level. The findings of my study are in agreement with this claim and other studies, which stated that professional development is an effective means by which to inform and in-service staff (Holland, 2000; Wiggins & McTighe 2006). However, my study takes it one step further by quantifying this claim. The comparison of the pretreatment survey and the post treatment survey as analyzed using the Mann-Whitney-Wilcoxon shows that there is a

significant difference in the teachers' reported use of data after participation in a professional development workshop in data-based instruction. According to Wiggins and McTighe (2006) in order for professional development to be most effective, it needs to address teacher's personal classroom situations and provide them with skills that can transfer into useable tools. Since I conducted the workshop, I was able to tailor the information to the specific district. Knowing what resources were available and what prior district trainings were offered in this area allowed for further differentiation.

### **Research Considerations**

According to the findings, this study helped teachers utilize educational data in their classrooms to plan lessons and assessments. However, at the same time it did not have an impact on the self-efficacy of the teachers in the area of data-based decision making. Without further studies it would be impossible to quantify other variables that could have had an impact on this portion of the research. The timing of the treatment and the data collection was synchronous with a few major educational issues. Much talk of merit pay at the state and federal level has infiltrated the newspapers, educational periodicals, and educational union reports. States in the Midwest have seen their teachers' unions dissolved and reports from the current Governor indicate a desire for a similar change. Combine this with local school district's budget cuts from the state government and on local levels and it is certain to have an impact on teachers and become a valid variable in the study. In a climate where a teachers' pay may become dependent on their students' performance as measured by state testing data and where teaching positions are being cut, it would seem likely that a teacher might be hesitant to assess their efficacy in

anyway but confident and competent, even knowing that their data is anonymous. As described by Weiner (1980) in his theory of attribution, it is human nature to want to report a positive self-image and perhaps in a climate where job security and salaries may be based on merit it is also human nature to shy away from self-depreciating comments. This reaction could not be determined from the analysis of the data contained in the scope of this study. However, future studies that correlate variables such as merit pay and self-efficacy may show some interesting results.

In contrast, the data from this study showed that the teachers who participated in the professional development workshop did show a significant difference in their use of data at the classroom level after the treatment. According to Bandura (1994) a person's self-efficacy directly effects their choices, effort, and persistence in tackling new tasks. Perhaps the second parts of this study showed a significant change as a result of the fact that the participants came into the study with a strong sense of efficacy in terms of using educational data and therefore were more likely to try implementing new techniques and tools at the classroom level. The participants average 8.2 hours of professional development related to data-based decision making prior to this training. Studies (Goddard, Hoy, & Woolfolk, 2000; Zambo & Zambo 2008) indicated that teachers with a high degree of self-efficacy are more willing to try new instructional strategies and take the time to work through the stumbling blocks that may be associated with new procedures. This correlation could not be determined within the scope of this study but may be fodder for future research.

Another consideration involves the small sample utilized for this study. Due to the limitation of convenience sampling, the results may not be representative of a larger population. The small number of participants used in this study all from one district, although valid, should not be generalized beyond the sample. To substantiate the impact of the treatment and provide population validity, further research with a larger sample using various school districts would be necessary.

One other factor that may have affected the outcome of the research was the fact that I am a member of the faculty in this school district. Specifically, having been part of this district for over twenty years, it was easy to differentiate the professional development training to the specific needs and dynamics of the schools within the district. There is no way to verify from this study that this treatment would have an impact on changing practice in any other school district. Recommendations for further research are discussed below.

## **Recommendations**

### **Implications for Social Change**

As reflected in current research, data-based instruction is a necessary component of effective classrooms (Volante & Fazio, 2007; Wayman, 2005). The standards-based movement along with the accountability associated with federal mandates has presented new demands, incentives, and opportunities for educators to utilize data to inform decision-making (Massell, 2001). However, echoed throughout the literature is the lack of preparedness of novice and veteran educators in data based decision making. Research indicates that data driven decision making skills and the related skills used to develop

assessment literacy are missing or occur on a limited basis in most teacher preparation classes (Cromey, 2000; Frey & Schmitt, 2007; Heritage & Chen, 2005; Volante & Fazio, 2007). This research provides a foundation for social change in changing the way we educate future teachers and in continuing to foster the growth of our current educators. Training current educators in successfully integrating data-based decision making into the classroom through professional development is essential and can be effective. Gaining knowledge and literacy in data-driven decision making is crucial in the educational climate that exists today.

Similarly this study demonstrates the impact of in-house professional development and supports studies that indicated that in order for training in data based decision making to be most effective, it also matters who presents the instruction. Cromey (2000) spoke of the importance of localized information that is applicable to the unique situations in each school. Similarly, Wayman (2005) highlighted the positive impact that professional development concerning data literacy had when an in-house expert presented it. Supporting this was a study conducted by Zhao and Frank (2003) that indicated the most effective training occurred when there was teacher-to-teacher articulation. Past research united with this current study, gives school districts useful information to format professional development that is meaningful and effective for their staff.

### **Recommendations for Action**

Currently, the use of data to inform educational decisions has made its way to the forefront of state and district discussions due to accountability measures such as NCLB.



Additionally, advances in technology have made warehousing large amounts of data practical and has provided educators with easier accessibility to the data. According to Earl and Katz (2006), processing data is only the first step, knowing how to interpret the findings is no less important. The standards-based movement along with the accountability associated with federal mandates has presented new demands, incentives, and opportunities for educators to utilize data to inform decision-making (Massell, 2001).

Although the use of data has been cited as an important tool in school improvement, studies indicate that educational data is used sparingly in the classroom (Love, 2004). Understanding what data are important and how to use them to improve student learning are two limiting factors that need to be addressed in order to make teachers effective data users. “Schools must have not only the desire to use data, but they must also have the capacity to use data” (Bettesworth, 2006, p.1).

Educators and administrators can benefit from this study’s findings. The study offers encouragement for educators to develop professional development in data-based instructional practices. The results confirm that linking professional development, with practical data-based decision making tools can encourage teachers to adjust their practice and increase their use of data for planning lessons and assessments. The utilization of educational data at the classroom level has been linked to increased student achievement (Bernhardt, 2004; Firestone & Gonzalez 2007). Ultimately, the significance of this study lies in the development of educational activities that will result in teaching that is more effective for learning.

Forming professional learning communities, creating experts in data analysis, and giving educators time to collaborate can provide the support and tools needed to encourage them to use data-based instructional methods in planning and assessing lessons.

### **Recommendations for Further Study**

This study contributes to the body of research by confirming the positive aspects of professional development in encouraging teachers to use educational data to plan lessons and assessments within their classroom. While much research has focused on data-based decision making at the district and administrative level, this study focused solely on the teachers' use of data at the classroom level. The professional development workshop was presented by the researcher who is a member of the faculty and who differentiated the workshop to the resources and climate of the district. Further studies could be conducted to determine if the same workshop would yield similar results in other districts or if differentiating the workshop to the district is a factor in affecting change.

While no significant difference was calculated in the teachers' self-efficacy in this study, it would be interesting to correlate the teacher's reported self-efficacy with their previous educational experiences in data-based decision making. Similarly, seeking information pertaining to merit pay, budgetary concerns, and self-efficacy may yield some interesting and informative results.

While this study encourages the use of professional development to change instructional practices in data-based decision making, more extensive research is needed

to verify the impact of professional development in other areas of educational practices. Since this study utilized convenience sampling additional research could extend to an independent measures study with a control group. A larger population would also enhance the data field, thus giving more validity to the results and analysis. Further research could help discern the true impact of professional development in data-based instructional practices and self-efficacy.

### **Final Comments**

According to Cohen (2003), student achievement is directly related to teacher effectiveness. Therefore, creating the most effective classroom is a priority of most districts. How data can be used to aid in this objective is an area of research that is gaining much attention. Currently, most school districts have at their disposal a wealth of student achievement data that is largely unused for instructional purposes. Although having access to data is a key component for effective data driven instruction, obtaining tools and skills to use the data are paramount. Research contends that knowing what data to use and how to use it are keys to successfully integrating data decision making into practice (Holland, 2000; Love, 2004; Protheroe, 2001).

This study takes a small step towards helping educators use educational data to plan lessons and assessments, but just as importantly it provides information for administrators and professional development committees to help guide them in planning professional development workshops. Research supports the importance of using data driven instructional practices, but this study goes a step further by examining the influence of using professional development as a way to dovetail theory into practice.

The information gained from this study could advance the course of professional development to improve educators' use of data at the classroom level, ultimately creating a learning environment that is the most conducive to fostering student achievement.

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## Appendix A: Professional Development Outline

### **Monitoring Teaching and Learning in a Standards-Based Educational system A Metacognitive Approach to Using Data and Standards to Guide Instruction**

#### **I. A Word about Metacognition:**

##### **The Foundation for Monitoring Teaching and Learning**

“A great weakness of our craft is that we typically do not require faculty members to justify their teaching methods, course designs, and assessments against a set of learning principles. In some settings, even raising the point is viewed as an assault on academic freedom”

(Wiggins & McTighe, 2006, p.27).

**A.** Taking time to regularly self-assess practices and collaborate with peers on best practices is essential if we approach our teaching as professionals.

**B.** Professionals in any field:

1. Act on the most current knowledge
2. Meet the needs of their ‘clients’
3. Are results-oriented
4. Uphold the standards of their profession

(Wiggins & McTighe, 2006, p. 27)

#### **II. Why use data to monitor teaching and learning?**

“There is a relationship between the quality of *our* work and the quality of *student* achievement”

(Cox, 2007, p.13).

**A.** What the research says

**B.** Teaching and learning

#### **III. Data Terms- A Primer**

#### **IV. The Relationship Between Standards and Educational Data**

“The first step in the process is to ensure that you’re teaching something important, something students need to know. Otherwise you risk producing well-designed, intensive units that nonetheless lack connections to state, district, or school level learning standards”

(Rulon, 2005, p.6)

- A. The purpose of content standards as set forth by NCLB is to set benchmarks that *all* students should meet.
- B. Standards do not have to mean an end to creativity or individuality.
- C. It is important to make standards manageable by considering the individual district’s resources and time constraints.

## V. Sources of Educational Data

“Data mining is the search for hidden relationships and patterns in the data that can add to one’s understanding of organizational effectiveness”

(Streifer & Schumann, 2005, p.284).

- A. What data is available?
  - 1. How is this data accessed?
  - 2. What is the best way to view/organize it?
  - 3. Stakeholders and data
- B. What data is useful?
  - 1. External
  - 2. Internal
    - a. Classroom
    - b. School/district

## VI. Practical Applications

“In order create an enriched learning environment which will meet individual needs, instructors must be able to assess the current abilities of their students”

(Jacobson, 1998, p. 579).

- A. Gathering Data
  - 1. Homework and class work
  - 2. Assessments

3. Focus groups/interviews

4. Formative feedback

**B. Adjusting Instruction**

1. Using data to differentiate

2. Focus on Standards

## **VII. Data-Warnings**

**A. Drawing conclusions**

**B. Focus on teaching**

## Appendix B: Approval to Conduct Research

October 1, 2010

Dear Ms. Harris:

Based on my review of your research proposal, I give permission for you to conduct the study entitled The Impact of Professional Development in Data Based Decision Making on the Teaching Practices of Middle School Educators within the School District. As part of this study, I authorize you to use a pre- and post-survey concerning data-based decision making. Staff participation will be voluntary and at their own discretion. We reserve the right to withdraw from the study at any time if our circumstances change.

I confirm that I am authorized to approve research in this setting.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the research team without permission from the Walden University IRB.

Sincerely,



Kathaleen Fuchs, Ph.D.  
Superintendent of Schools

## Appendix C: Approval to use Survey; Bettesworth

From: Leanne Bettesworth

To: Nancy Harris

Date: Tuesday, November 18, 2008 11:55:35 PM

Subject: Re: Permission to use survey

Hi Nancy,

I am honored for you to use the survey.

Please let me know if you would like it in electronic format or if there is anything else that you need.

If you use it or parts of it...could you send me an electronic version of your dissertation when it is done so I am able to read it?

It is best that you use this account to reach me:

[lrбетtes@ucalgary.ca](mailto:lrбетtes@ucalgary.ca) or [leбетtesworth@cbe.ab.ca](mailto:leбетtesworth@cbe.ab.ca)

Let me know if you need any assistance. Good luck as you move forward.

Leanne

Leanne Bettesworth, PhD

Director - International Education

Central Okanagan International Education

School District 23 (Central Okanagan)

1040 Hollywood Road

Kelowna, BC, Canada

V1X 4N2

Phone: (250) 860-9729 ext 4188 or ext 4186

"A smile is the same in every language"

## Appendix D: Approval to use Survey; McLeod

From: Scott McLeod

To: Nancy Harris

Date: Sunday, March 09, 2008 8:48:44 AM

Subject: Re: Doctoral student with a question

Nancy, these surveys were for a statewide study I conducted for the Minnesota Department of Education. That project is now over but I'm attaching some screenshots from the web site so you can learn more. We ended up doing modified phone interviews just of high school principals. We still have most of our data analysis to do so I don't have much in the way of results to send you right now (but see the attached PowerPoint, which has some quick descriptive stats).

You have my permission to use these as desired. Please just keep me in the loop along the way. I often work with doctoral students from other universities as an informal advisor and like to see how our resources at CASTLE get used. For example, we've already had one student use parts of these surveys for his dissertation in Montana and also have several doc students using another survey of ours for their dissertations.

FYI, we have all of these in our online survey tool. If you decide to go that route, we'd be happy to host your (modified) online surveys for you and then send you the data file...

Let me know as you have further questions.

SCOTT

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Scott McLeod, J.D., Ph.D.

Associate Professor, Iowa State University

Coordinator, Educational Administration Program

Director, CASTLE UCEA Associate Director, Communications and Marketing

[www.scottmcleod.net/contact](http://www.scottmcleod.net/contact) [www.schooltechleadership.org](http://www.schooltechleadership.org) [www.dangerouslyirrelevant.org](http://www.dangerouslyirrelevant.org)

## Appendix E: Data-Driven Instruction Survey

### Data-Driven Instruction Survey

To protect your privacy, no consent signature is requested for participation in this study. If you are comfortable participating in the study as described, please complete the survey. Your return of the complete survey will indicate your consent, if you choose to participate

**Directions:** When marking your responses, please fill in bubbles completely. You may use either a pen or pencil. Please mark the responses that most accurately reflect your experiences with educational data. When you have finished, please place your survey in the box provided.

Thank you for taking the time to complete this survey.

Please put your survey ID # here

#### Background Information

I. On average, how many hours of professional development or course work have you completed specifically geared to using educational data for decision making purposes to date?  0-3 hours  4-6 hours  7-10 hours  More than 10 hours

II. What year did you obtain your most recent teacher certification?

Before 2001  2001 or After

#### Part I Efficacy

Question	Disagree Strongly	Disagree Moderately	Neither Agree nor Disagree	Agree Moderately	Agree Strongly
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1. I am confident in my ability to explain to others why I would use a certain approach to analyze educational data.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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<b>Question</b>	<b>Disagree Strongly</b>	<b>Disagree Moderately</b>	<b>Neither Agree nor Disagree</b>	<b>Agree Moderately</b>	<b>Agree Strongly</b>
2. Overall, I am confident in my ability to work with student learning data.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I am confident in my ability to use student learning data to inform my decisions about how well students are progressing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I am confident in my ability to use student learning data to inform instructional decisions I make in my classroom (e.g., how effective I am in my teaching).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<b>Question</b>	<b>Disagree Strongly</b>	<b>Disagree Moderately</b>	<b>Neither Agree nor Disagree</b>	<b>Agree Moderately</b>	<b>Agree Strongly</b>
5. Overall, I am confident in my ability to use student learning to support decision making.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### **Part II Data-Use**

6. I use assessment data to identify students who are not experiencing academic success.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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7. I know what instructional changes to make when data show that students are not successful.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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8. I use assessment results to measure the effectiveness of my instruction.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Question	Disagree Strongly	Disagree Moderately	Neither Agree nor Disagree	Agree Moderately	Agree Strongly
9. I use student data to verify my assumptions about the causes of student behavior and performance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I have clear criteria for determining the success of instructional activities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I make changes in my instruction based on assessment results.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. I use data from student assessments to set instructional targets and goals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. My professional development has helped me use data more effectively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<b>Question</b>	<b>Disagree Strongly</b>	<b>Disagree Moderately</b>	<b>Neither Agree nor Disagree</b>	<b>Agree Moderately</b>	<b>Agree Strongly</b>
<b>14.</b> I have received adequate training to effectively interpret and act upon yearly state assessment results.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>15.</b> Professional development has improved my skill in developing classroom assessments.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Thank you for taking the time to complete this survey.*

## Appendix F: Data-Driven Instruction Post-Survey

## Data-Driven Instruction Post-Survey

Directions: When marking your responses, please fill in bubbles completely. You may use either a pen or pencil. Please mark the responses that most accurately reflect your experiences with educational data. When you have finished, please place your survey in the box provided.

Thank you for taking the time to complete this survey.

Please put your survey ID # here

### Part I Efficacy

Question	Disagree Strongly	Disagree Moderately	Neither Agree nor Disagree	Agree Moderately	Agree Strongly
<p><b>1. Having participated in the professional development, I would say that I am more confident in my ability to explain to others why I would use a certain approach to analyze data.</b></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p><b>2. Having participated in the professional development, I would say that overall, I am more confident in my ability to work with student learning data.</b></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question	Disagree Strongly	Disagree Moderately	Neither Agree nor Disagree	Agree Moderately	Agree Strongly
<p><b>3. Having participated in the professional development, I would say that I am more confident in my ability to use student learning data to inform my decisions about how well students are progressing.</b></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p><b>4. Having participated in the professional development, I would say that I am more confident in my ability to use student learning data to inform instructional decisions I make in my classroom (e.g., how effective I am in my teaching)</b></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p><b>5. Having participated in the professional development, I would say that overall, I am more confident in my ability to use student learning to support decision making.</b></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<b>Question</b>	<b>Disagree Strongly</b>	<b>Disagree Moderately</b>	<b>Neither Agree nor Disagree</b>	<b>Agree Moderately</b>	<b>Agree Strongly</b>
<p><b>6. Having participated in the professional development, I would say that I would be more likely to use assessment data to identify students who are not experiencing academic success.</b></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p><b>7. Having participated in the professional development, I would say that I better understand what instructional changes to make when data show that students are not successful.</b></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p><b>8. Having participated in the professional development, I would say that I am more likely to use assessment results to measure the effectiveness of my instruction.</b></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question	Disagree Strongly	Disagree Moderately	Neither Agree nor Disagree	Agree Moderately	Agree Strongly
<p><b>9. Having participated in the professional development, I would say that I am more likely to use student data to verify my assumptions about the causes of student behavior and performance.</b></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p><b>10. Having participated in the professional development, I would say that I have a clearer criteria for determining the success of instructional activities.</b></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p><b>11. Having participated in the professional development, I would say that I will be more likely to make changes in my instruction based on assessment results.</b></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Question	Disagree Strongly	Disagree Moderately	Neither Agree nor Disagree	Agree Moderately	Agree Strongly
<p><b>12. Having participated in the professional development, I would say that I use data from student assessments to set instructional targets and goals.</b></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p><b>13. My professional development has helped me use data more effectively.</b></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p><b>14. I have received adequate training to effectively interpret and act upon yearly state assessment results.</b></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p><b>15. Professional development has improved my skill in developing classroom assessments.</b></p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Thank you for taking the time to complete this survey.*

## Curriculum Vitae

Nancy A. Harris

[nzimbo@yahoo.com](mailto:nzimbo@yahoo.com)

### EDUCATION:

Walden University, Minneapolis, MN (2006-2011)  
Doctorate of Education; Teacher Leadership ABD

Seton Hall University, South Orange, NJ (2000-2001)  
Educational Supervisor Certification Program

Montclair State University, Montclair, NJ (1990-1991)  
Master of Education; Environmental Education

Bloomsburg University, Bloomsburg, PA (1985-1989)  
Bachelor of Science; Biology Education

### CERTIFICATIONS:

Secondary Science; Biology  
Elementary Education  
K-12 Educational Supervision

### TEACHING EXPERIENCE:

Current School District (1991-Present)  
Schuyler Colfax Middle School (1989-1991)

### AWARDS AND GRANTS:

Teacher of the Year; Current District  
Geraldine R. Dodge Foundation Grant Recipient  
Gerald R. Dodge Foundation; Professional Development Foundation  
National Education Association Grant Recipient  
PRIDE in Public Education Grant Recipient  
Local PTA Grant Recipient  
New Jersey School of Conservation; Coordinator of the Year

**PROFESSIONAL SERVICE:**

Team Coordinator  
Outdoor Education Program Coordinator  
Scheduling Committee Member  
Professional Development Committee Member  
Mentoring Committee Member  
Teaching Assistant; Whales and Dolphins in the Gulf of Maine  
College of the Atlantic, Bar Harbor ME  
Teaching Assistant; Conservation Photography  
College of the Atlantic, Bar Harbor ME

**WORKSHOP PRESENTATIONS:**

Planning and Implementing Experiential Field Trips  
Formative Assessments and Data Based Decision Making

**CURRICULUM WRITING:**

Gifted and Talented Curriculum; Current District  
Life Science-Grade 7; Current District  
Nature Photography- New Jersey School of Conservation  
Whales and Dolphins of the Gulf of Maine; College of the Atlantic  
Conservation Photography; College of the Atlantic  
Right Whales; Lesson from the Past, Hope for the Future.

**PROFESSIONAL AFFILIATIONS:**

National Staff Development Council  
National Middle School Association  
New Jersey Science Teachers Association  
Association for Supervision and Curriculum Development  
Local Educators Association  
Morris County Education Association  
Morris County Gifted and Talented Consortium