CHANGING TEACHER ATTITUDES THROUGH DATA ANALYSIS

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Abstract

The focus of this research thesis is a middle school in a moderately sized urban setting designated by the Massachusetts Department of Elementary and Secondary Education as consistently underperforming as determined by lack of progress on statewide yearly assessments. Beginning in September of 2010, all staff participated in a yearlong district initiated data analysis process to identify systemic underachievement, and then to use that information to redesign curriculum and instruction. This investigation included individual interviews with 6 representative staff members focusing on the attitudinal changes noted in the two surveys as well as the impact of data analysis on instructional design. The individual interviews were followed by a focus group to discuss the themes emerged from the teacher interview responses. Faculty surveys were used as historical data sources. This case study asks: Does participating in data analysis impact teachers’ attitudes relative to the relationship between student achievement and their instructional practices? Qualitative analysis of teacher responses in individual interviews as well as the focus group conversation was completed to ascertain the degree to which data analysis played a role in changing teacher attitudes. Key findings included that even after data analysis to find root causes of student lack of achievement, teachers continued to have the attitude that poverty and lack of family structure were important indicators for student lack of achievement, that teachers did not significantly change their instructional practices following intensive data analysis training, and that teachers found minimal value in the training and the time invested in data analysis professional development. Recommendations included personalizing both the data and the analysis for each teacher to impact instructional design and change in teacher attitude toward student achievement.
Chapter 1: Introduction

Purpose of the Study

The focus of this research was a smaller sized middle school in an urban setting designated by the Massachusetts Department of Elementary and Secondary Education (DESE) as consistently underperforming as determined by repeatedly failing to make adequate yearly progress on state spring assessments in English Language Arts and Mathematics for grades 6 through 8. Until 2003, the school had been known as the home of the top academic achieving students in the city. The general perception among the school’s teachers has been that the demographic changes among the student community led to a measurable drop in student achievement as measured by the annual state assessments. An increase in minority students as well as a dramatic change in the numbers of students identified for financial support through free or reduced lunch applications has altered the profile of the collective student body. Parent participation and presence at school events have also declined in recent years. In determining other factors that might contribute to declining achievement, teachers have been reluctant to attribute any responsibility to curriculum or instruction.

Before any work toward improvement could be initiated, it was necessary to understand the factors that informed the beliefs held by the faculty. The district in which this school was located, as part of a Recovery Plan (see Appendix A, constructed in cooperation with the Massachusetts Department of Elementary and Secondary Education (DESE), included specific work in data analysis by members of the district’s teaching staff. In the summer of 2010, six volunteer teachers from this middle school worked with the consultants from The Educational Research Center (TERC) in the Understanding Data Project. One of the team’s members was
later appointed as the data coach for the school and was accountable for posting current information, expediting information between the consultants and the team members, and being present during several work sessions outside of school time. The other members of the volunteer team facilitated work done in school during the school day on data analysis following the ‘train – the – trainer’ model. In addition to the district cost of the consultant’s fees, the dedication of hours of professional development within each school placed an enormous emphasis on the importance of understanding and analyzing data to determine root causes of lack of student achievement. For the staff of the school in which this research project took place, one hour of each week – actually the only hour each week that could be dedicated strictly to in-house Professional Development – was spent by every person in working through the Understanding Data Project. The work undertaken through this research examined the effect of school and student data analysis by faculty to determine the impact on teacher attitudes toward student achievement and instructional design. Individual interviews with teachers focused on changes noted between pre and post survey responses surrounding a yearlong district initiative of data analysis. A focus group from those teachers who participated in the solitary conversations addressed the themes and questions that emerged from the individual interviews.

In the current milieu of educational examination and accountability with the spotlight on data driven decision making, this project was both timely and relevant. Other districts with similar demographic profiles will be able to use the process and the results of this research in their efforts to improve student achievement.

As part of the historical background to this research, a teacher survey that investigated teachers’ attitudes of classroom practices, relationships with parents and peers as well as the
effectiveness of the current school leadership was utilized. The original survey of 145 prompts was given to teachers within the school at the conclusion of 2009-2010 academic year. Teachers randomly selected to respond to this initial survey included only those teachers who were actually teaching students during a specific block of time. All students and staff identified through convenience in the school had been asked to complete a district survey that focused on the factors and attitudes of school climate and culture. Staff was directed to use as their basis of responses, the students who were in front of them at the time of the survey completion. From that original teacher survey, thirty-eight prompts were identified as being related to teacher’s attitude of students, of students’ preparedness, of the daily work by teachers, of students’ parents and of administrative support. Prompts eliminated from the second survey include those referring to topics outside the boundary of this research, as well as repetitive statements.

In the interim between the first and second surveys completed in the school years ending in 2010 and again in 2011, all teachers participated in weekly professional learning communities that focused on data analysis tasks as assigned by the district initiative outlined by The Educational Research Consultants (TERC), contracted for three years by the superintendent specifically for this purpose. Work by Shulman (1987) in the theoretical frame of pedagogical content knowledge, Love, Stiles, Mundry & DiRanna (2008) in the area of data analysis and Bolman and Deal (2008) in the dissection of organizational structure were keys to understanding how to affect a positive change in teacher attitude that ultimately impacted the culture and climate of the middle school where this research was based and eventually resulted in greater student achievement.
Significance of Problem

Since the 1960s, the urgency of earning a top international reputation in education led to reform efforts in local classrooms across the United States. In 1981, the National Commission on Excellence in Education was charged with the examination and evaluation of the educational practices in the schools of the United States. The findings were published in the United States Department of Education 1983 report *A Nation at Risk*. “The recommendations set forth in *A Nation at Risk* promised lasting reform through demanding the best effort and performance from all students, whether they are gifted or less able, affluent or disadvantaged, whether destined for college, the farm, or industry” (U.S. Dept. Ed., 1983). President George W. Bush proposed sweeping mandates in the Elementary and Secondary Education Act in January of 2002, formally known as the No Child Left Behind Act (NCLB). This legislation addressed multiple facets of the educational system, but emphasized the importance of achievement testing of students in every grade, kindergarten through high school, primarily in the areas of English Language Arts and mathematics.

With NCLB, a new era began where accountability, local control, parental involvement, and funding what works became the cornerstones of the nation’s education system. If our children aren’t learning, the law requires that we find out why. If our schools aren’t performing, options and help will be made available. Massachusetts opted to use yearly measures of student achievement in MCAS (Massachusetts Curriculum Assessment System) as the indicator for student achievement. Each school needs to demonstrate that they are on track to achieve the national standards of NCLB in order to make adequate yearly progress goals. The most recent effort in President Obama’s Race To The Top (RTTT) has offered monetary incentives to districts and classrooms that increase student achievement, reduce student drop-out rates, and increase rigor in classrooms (Jorgenson & Hoffman 2003, p. 6)

Following years of not meeting district adequate yearly progress (AYP) goals, in 2009 this public school district that is the location of this research project was identified as chronically
underperforming – a Level 4 district. As a consequence of that labeling, members of the district administration team met with representatives of the Department of Elementary and Secondary Education (DESE) to examine current practices and procedures and to construct a plan to remediate areas of deficiencies. The product of these meetings was an agreed upon 43 page District Recovery Plan. 119 areas were identified as in need of improvement. The goals of the district had been established and agreed to and the targets and timeline for improvement had been set for each citation. Areas addressed through this Recovery Plan included organizational structure, oversight responsibilities, curriculum, instruction and assessment. (see Appendix A). The district improvement plan (DIP, see Appendix B) served as the template for each of the 19 schools’ improvement plan (for this school that is the focus of this research, SIP, see Appendix C). The district goals included improvements in both English Language Arts and mathematics that were in line with curriculum performance indicators (CPI) that would meet the planned improvement projection towards the goal of 100% proficiency by the year 2014. All schools in which testing took place had to include goals on the school improvement plan that addressed the gap in student achievement as measured by these yearly state assessments.

Of all the schools in this urban district, four are middle schools. Of these four, in terms of achievement and of progress, the specific school where this research project is based is at the bottom in both of these categories.

As part of the Recovery Plan, staffs who were teaching at a certain time in each of the four middle schools in June of 2010 completed a survey of 145 prompts of teacher attitude towards teaching and learning, students and parents, and administrative practices. The school district engaged Cambridge Education Consulting Group to construct the survey. Thirty eight prompts
from this original survey formed the second, shorter survey administered in 2011. The basis of individual teacher interviews that comprised the first part of this research was a study of the changes in teacher responses between 2010 and 2011, as well as the individual interviewee’s reflections upon the actual use of data that had been examined. A more detailed conversation concentrating on the themes that emerged from these interviews comprised the second part of this research.

**Framing the history of the middle school.** Conversations focusing on the current critical status of this middle school between the superintendent and the newly appointed principal began two weeks before school opened in September, 2010. A school based redesign team formed by volunteers of twenty members from staff, parents and community was given the task of drafting a proposal to create an academic culture that would maintain what was successful and valued, eliminate what was not and result in a school where high academic achievement is expected and honored. Decisions surrounding the need for change or the support of current conditions that were made with regard to the redesign of the school needed to be supported by data from the school itself.

The pervading belief among this city’s educational community has been that it is still a privilege to be a faculty member at this middle school. For most of the 20th century, the neighborhood of this school which is located in the north end of the city was the home of the citizens of the town with professional occupations and substantial wealth. Parent involvement was constant and student success was evident not only during the middle school years, but also when these same students moved to local public and private high schools. In fact, the school was nicknamed “The Academy” for the academic successes of its graduates when they continued on
to high school and college. However, over the past ten years, there has been significant redevelopment in areas throughout the city and the wealth of its residents is no longer concentrated in this one section of the city. Subsidized cluster housing has become more commonplace, inhabited by families of different ethnicities and minimal incomes. This has altered the neighborhoods whose students attend this middle school. In 2007, the district-based Gifted and Talented Program was moved from this middle school to a different middle school within the city. In addition, district parents have the option of applying for a permit to move from their neighborhood school to another district middle school for any of multiple reasons including such factors as transportation, program offerings, or academic opportunities. In the most recent year, 67 students whose neighborhood school is the school where this research was based have opted to attend another middle school.

**Research Question**

In the past ten years, there have been four different principals in this one school. Since 2001, there has been minimal staff turnover but there was significant reassignment of teachers to different grades or subject areas by the principal who served from 2009-2011. Lack of consistent, focused leadership, combined with a myriad of social, academic, and fiscal problems have served to exacerbate the lack of student achievement. This research focused on just one aspect of underachievement at this middle school. Does participating in data analysis impact teachers’ attitudes relative to the relationship between student achievement and their instructional practices?
**Practical and intellectual goals.** Under the conditions of the Recovery Plan created by the district in conjunction with the Department of Elementary and Secondary Education, decisions that were made with regards to student achievement and classroom instruction had to have evidence of need as well as evidence of achievement. The evidence was to include assessments created by the state – the MCAS, assessments created by the district – benchmark tests, as well as summative assessments created by teachers.

To accomplish this condition, it needed to be ascertained that teachers and administrators understand the process by which that evidence can be gathered. Significant amount of time over the summer of 2010 was dedicated to training administrators and volunteer teams of teachers in the process of understanding data and using information gleaned from the data analysis in instructional design. Each member of the data team from this school’s teachers trained through the summer was assigned a team of teachers to be guided through the understanding data process. Each group of teachers met for over 30 hours – which is the total amount of time allotted by contract for professional development throughout the year (with the exception of state mandated training sessions).

Each year, the principal of the school has the responsibility to plan the scope and topic of professional development provided for the school staff. The practical goals of this research project were twofold:

1. to determine if participation in the Understanding Data Project changed teachers’ attitudes regarding the root cause of lack of student achievement
2. to determine if participation in the Understanding Data Project changed teachers’ instructional practice.

In this current milieu of academic accountability, ‘data driven decision making’ seems to be the mantra of schools and school districts. Significant amounts of time and monies have been expended on teaching school staff members how to work with the numbers that are generated through assessments. The fundamental intellectual goals were:

1. to determine if teachers attitudes changed regarding the value of using data when they are planning their lessons.

2. to determine if teachers attitudes changed regarding the actual use of the information gleaned from examining data when they are designing their instructional practice.

Theoretical Framework

In Massachusetts today, teachers must pass a content knowledge test in the field in which they hope to teach in order to earn a preliminary license – the first step in becoming a teacher with professional license. It is critically important that the teacher, who is in charge of students learning a large body of knowledge in any one content area, is him/herself solid in the major concepts of that particular subject matter. Subsequent to earning a preliminary license, teacher candidates must participate in a specific pedagogical experience that is approved by the state in order to earn the next level of licensure – the initial license. Administrators and teachers in cities far and wide recognize the difference between the knowledge of content and the knowledge of pedagogy. “Even teacher assessment practices and associated research on teaching in the United States have tended to maintain a distinction between teachers’ knowledge of subject matter and
teachers’ knowledge of pedagogy” (Rowan, Schilling, Ball & Miller, 2001, p. 2). These researchers noted that while pedagogical knowledge is recognized as being separate, in most evaluative systems, there is the common misconception that a set of instructional practices are “….effective no matter what the academic subject or grade level being taught and without regard for the knowledge that the teachers have of the academic content they are teaching” (p.2).

**Pedagogical Content Knowledge.** Shulman (1987) theorizes that while the content knowledge is important, what is equally if not more critical is the not just pedagogy, but pedagogical content knowledge – how the teacher designs instruction so that students can learn the content of the material that the teacher is teaching. Shulman proposes that each discipline is distinct and the pedagogical content knowledge is a form of practical knowledge which includes several aspects: “knowledge of how to structure and represent academic content for direct teaching to students, knowledge of the common conceptions, misconceptions and difficulties that students encounter when learning particular content, and knowledge of the specific teaching strategies that can be used to address students’ learning needs in particular classroom circumstances” (Rowan, Schilling, Ball & Miller, 2001, p. 3). As Shulman’s ideas gained more validity, his theories resulted in changes in many teacher preparatory programs. In many states, the Praxis series, constructed by the Educational Testing Service as a bar for prospective teachers, measures not only content knowledge, but pedagogical content knowledge in a specific area of curriculum.

Shulman’s work of pedagogical content knowledge (PCK) has been primarily in the field of science education. However, the principals of PCK can be applied to any discipline. The fundamental tenet in his theory is that content knowledge is distinct from pedagogical content
knowledge, that one does not take precedence over the other, but the intersection of both is when true learning can take place. (Endfield, 1999) “It (PCK) represents the blending of content and pedagogy into an understanding of how particular topics, problems or issues are organized, represented and adapted to the diverse interests and abilities of learners and presented for instruction” (Shulman, p. 8). Loughran, Milroy, Berry, Gunstone and Mulhall (2001) theorize that PCK is “the knowledge that a teacher uses to provide teaching situations that helps learners to make sense of a particular….content” (p. 287). According to Baxter and Lederman (1999), “PCK is both an external and internal construct, as it is constituted by what a teacher knows, what a teacher does, and the reasons for the teacher’s actions” (p. 158).

The common understanding is that Pedagogical Content Knowledge is knowledge used to transform subject matter content into forms more comprehensible to students (Geddis et al. 1993; Grossman 1990; Marks 1990; Shulman 1986, 1987). This means that the teacher must make a complete shift in thinking “from being able to comprehend subject matter for themselves, to becoming able to elucidate subject matter in new ways, reorganize and partition it, clothe it in activities and emotions, in metaphors and exercises, and in examples and demonstrations, so that it can be grasped by students” (Shulman, 1987, p. 13). What changes over time is the ability of the teacher to possess such knowledge; in other words “the capacity of a teacher to transform the content knowledge he or she possesses into forms that are pedagogically powerful and yet adaptive to the variations in ability and background presented by students” (Shulman 1987, p. 15).

According to Shulman (1987), Pedagogical Content Knowledge has several distinct components. For the purposes of this research project, three key ones have been identified:
knowledge of students’ prior knowledge, knowledge that might be either facilitative or dysfunctional for the particular learning task at hand, and knowledge of teaching strategies that incorporate appropriate conceptual representations, to address learner difficulties and misconceptions and foster meaningful understanding.

While the base of PCK is content knowledge, what is critically important is knowledge of the students. Veal and MacKinster (1999) break down these two keystones into nine different categories: assessment, socioculturalism, pedagogy, context, environment, classroom management, the nature of the subject and the curriculum. This research project focuses on one specific component – if the teachers are professionally developed to analyze student assessments, will that analysis lead to a change in attitude regarding student achievement and instructional design. The following figure illustrates Veal and MacKinster (1999) interrelationship among the components of Shulman’s PCK.

Figure 1 – 1: Components of PCK as understood by Veal and MacKinster (1999).
In their study of Pedagogical Content Knowledge, Parker and Oliver (2008) examined previous studies of 11 different researchers concerning key components to effective teaching and learning as compared with the major facets of PCK. The judgment of these researchers were assessed with regards to subject matter, media, pedagogy, assessment and context and their connection with its inclusion as an integral part of the framework of Pedagogical Content Knowledge. The same researchers were evaluated about the inclusion of purposes for teaching subject matter, student understanding, curriculum, and instructional strategies and representations.

Researchers in this study by Parker and Oliver (2008) recognize the importance of determining student conceptions of the skill or concept being investigated or learned – looking at the background of the student in terms of previous skills, prior knowledge, exposure to the topic, connections to the experiences of the student. If by examining results of students assessments, teachers have been taught the process of teasing apart the data to determine the root cause of student lack of achievement on a specific assessment or even a specific question, teachers may be more able to then adjust classroom instructional design to rectify either the misconception or the student’s lack of ability to learn the concept or skill. This research project focuses on this one aspect of PCK.

In applying the lens of PCK to the academic status of this middle school, it seemed logical to attempt to investigate the attitude of teachers towards the ability and preparedness of the students with whom there was a subject-matter relationship. With every instructional staff member dedicating over 30 hours of professional development in an Understanding Data Project so that root causes of student lack of achievement could be hypothesized, the question is -did that
participation change the attitude of the teachers with whom the student worked? If the thrust of
the theory of Pedagogical Content Knowledge is how the teacher designs instruction so that
students can learn the content of the material then this theoretical lens was best suited for this
specific study. Once teachers gained an understanding of the factors that may impact eventual
student success, then they may understand a change must take place in their instructional
practice. The following figure connects the relevant knowledge categories of Shulman’s PCK
with specific attitude factors studied in this research project.
Figure 1 – 2: Shulman’s PCK components and teacher attitudes relevant to this study

**Change process.** Understanding what needs to be done and actually changing so that it can be done is a formidable task in any arena. In education, changes come rapidly in some instances and extremely slowly in others. At the present time, education is generally in a reactive climate.
Scores go down, or international ranking slips, or new technology emerges, or business leaders complain of the preparedness of workers any of which can lead to a new approach in teaching, a more concentrated focus on a specific instructional area, or a new strategy for learning. However, change is a generative process and it must be accomplished by people (Shahan, 1976, pp. 53-54). Too often, the process of change is given greater priority than the people who actually must make it happen (Evans, p. xii). Shulman’s theory of how teachers can be best equipped to teach the material in a manner that students can learn best has been slowly gaining wider acceptance. Professional developments for staff within schools as well as teacher preparatory programs at the college or university level are slowly incorporating the changes that are advocated under the PCK umbrella. While there is rigorous instruction in the main content area, courses are now being offered that address specifically the best and most effective manner in which that content material should be taught. The pressure for students to achieve greater success on state mandated tests is a heavy burden on the backs of central administrators and principals, but the actual change that often needs to be made is within the teachers themselves.

**Figure 1 – 3: Progression leading to increased student achievement**

In considering change that is needed, Duke (2004) identifies layers of change as first order or second order levels. The ultimate goal is very basic – students successfully learning through rigorous and relevant instruction. In order to make that happen, several target areas can be identified such as transformational leadership, professional development, school climate and
culture, teacher expectations, child development theories and tiered instruction. For the purposes of this case study, only one facet was investigated: the attitude that teachers have towards teaching and learning at one school. To make an impact on teacher beliefs was the first order change for this endeavor. The purpose of this research was to determine if participation and training in data analysis would change the attitudes that teachers had regarding the ability and the preparedness of students within one middle school in one urban setting. The trickle effects of a change in teacher attitude may be seen in the other identified areas – these could be considered the second order changes.

**Research Design**

A qualitative research case study approach was selected for this specific investigation for several reasons. This method of investigation typically follows an inductive style, whereby the investigator digs deeply into an event or a process involving one or more individuals. This qualitative research project was bound by “time and activity during which this researcher(s) collected detailed information using a variety of data collections procedures over a sustained period of time” (Stake, 1995, as cited by Creswell, 2009, p. 13). The purpose of this project was to determine if participation in data analysis changed an individual teacher’s instructional design, to uncover themes that emerged from interviews with individual teachers, and to discover if the responses in both the individual interviews and the follow up focus group were similar to historical school based data.

The case study methodology of qualitative research was selected as the means of research because of the need to determine the individual impact of participation in data analysis on
individual teacher’s instructional practice – this fits the criteria of qualitative research whereby one or more individuals are involved in a practice or process. After several such individual interviews, general themes were determined – this process meets the criteria of qualitative research whereby data analysis is used to uncover trends or thoughts which can then be generalized. And lastly, qualitative case study research was selected as the best methodology because of the inclusion of several sources of data over sustained period of time – in this case, historical teacher survey results from the school years in 2010 and again in 2011.
Figure 1 – 1: Process of research project

- 2010 survey of teacher attitudes
- Participation in Understanding Data Project 2010-2011
- 2011 survey of teacher attitudes
  - Teacher attitude changed
  - Teacher attitude did not change
  - Individual teacher interviews
- Focus group
Research Question

This case study asked one basic question:

Will participating in data analysis impact teachers’ attitudes relative to the relationship between student achievement and their instructional practices?

Summary

In attempting to successfully address the problem of lack of student achievement in district public schools, and for the purposes of this research, specifically this middle school, the public school district invested significant financial resources in hiring a consultant company to train all educational staff in the process of data analysis. In addition, at this middle school each staff member was assigned 30 hours of paid professional development for instruction in and implementation of data analysis to determine possible root causes of lack of student achievement. Outside of the yearly mandatory trainings regarding all public schools in Massachusetts, the Understanding Data Project was the sole topic for professional development for the 2010-2011 academic year within the school.

Shulman’s theory of Pedagogical Content Knowledge (PCK) is used as a theoretical lens to probe deeper into the effectiveness of participation in the Understanding Data Project at this middle school. Specific to his theory is the blending of both the knowledge of the subject matter to be taught as well as the pedagogical approach that is best suited for that specific content. Shulman identifies distinct areas of pedagogical content knowledge. However, for the purposes of this project the three areas that are most applicable are: the need for the teacher to have knowledge of the students’ prior knowledge, knowledge of the teaching strategies that
incorporate appropriate conceptual representations to address the learner difficulties and misconceptions, and knowledge that might be either facilitative or dysfunctional for the particular learning task at hand. If by examining results of students assessments, teachers have been taught the process of teasing apart the data to determine the root cause of student lack of achievement on a specific assessment or even a specific question, teachers may be able to then adjust classroom instructional design to rectify either the misconception or the student’s lack of ability to learn the concept or skill. It was the intent of the district and the school, that after teachers had participated in the training for purposeful data analysis, to have a change in either or both the teacher’s attitudes towards the ability or preparedness of the students, and the teacher’s instructional practice.

The qualitative research form of a case study approach was used for this project. Six teachers were interviewed and responses were examined to uncover common themes. Interview participants then came together in a focus group to discuss and expand upon the common themes that emerged from the individual interviews. Results were coded framed by three of the basic tenets of Shulman’s PCK that focused on teachers’ knowledge and perceptions of students. Limitations of the study included the small teacher sample size, the time lag between professional development session and the individual interviews and possible bias on the part of the interview participants regarding the project researcher who was also the building administrator.
Chapter 2: Literature Review

In order to begin this educational learning process, it was critically important to first examine the works of experts in the areas under investigation. This review will have three major areas – first to understand teacher attitudes regarding the factors that impact teaching and learning, next to the use of data in identifying root causes of chronic student underperformance, and lastly an investigation of the relationship of the teacher to the process of change. The examination of literature on these topics will focus on two fundamental research questions: Why is it important to consider the impact of teacher attitude when seeking causes for the lack of student achievement? How can data analysis be used to identify root causes of student underachievement?

Impact of Teacher Attitude and Perception

In addressing the first area of investigation, the focus was on research that examined factors that would impact a teacher’s attitude, and what affect that would have on student achievement. Factors in previous studies included demographics of the students, change in student populations over time, age of the faculty, prior teaching assignments, professional development offerings to teachers, involvement of parents, previous teaching experiences and organizational structure of the school.

“Making significant progress in improving student learning and closing the achievement gap is a moral responsibility and a real possibility in a relatively short period of time. It is not children’s poverty or race or ethnic background that stands in the way of achievement; it is
school practices and policies and the beliefs that underlie them that pose the biggest obstacles”  
(Love, Stiles, Mundry & DiRanna, 2008, p. 4)

Studies as far back as Barr, Eustice and Noe in 1955 in their examination of classroom teachers and the achievement of their students came to the conclusion— it is not the certifications or degrees held by the teacher that gives the best indication of student success. (Barr, Eustice and Noe, 1955). These researchers also noted that the examination of 275 teachers and their students, led Ryans and Wandt in their research in that same year to conclude that teacher behaviors and classroom interpersonal qualities had the most positive correlations with student achievement. In a similar study by Strauss and Sawyer, a .5% to .8% impact on student achievement could be connected with only a 1% improvement in teacher qualifications as measured by the aforementioned indicators (1986). Lemov (2010) refers to the Pygmalion study of randomly selected teachers. Given information about the background and knowledge of the students, teachers were told that these students would be strong academically successful students. Through the year, the students achieved to the level of expectation. The reality was that the background information given to the teachers was incorrect, and in fact included low socioeconomic as well as low academic factors. “One consistent finding of academic research is that high expectations are the most reliable driver of high student achievement even in students who do not have a history of academic achievement” (p. 27).

In discussing *The Mystery of Good Teaching*, Goldhaber (2002) notes that researchers have long attempted to determine the extent of the “influence teachers have over student achievement and what specific teacher attributes lead to higher student achievement” (p. 1). In the examination of characteristics and qualities of effective teachers as indicated by student
scores on state tests, Goldhaber noted that the measurable features accounted for only 3% of student achievement. These included such easily documented factors as educational level, years of experience and performance on vocabulary tests. What he did find that was 97% of teachers’ influence was due to the intangible qualities such as enthusiasm and skill in conveying knowledge (p. 3).

The effect of the intangibles, including informal social dynamics that include belief systems, is the focus of complexity theories in organizational sciences. Russ Marion from Clemson University concluded that it is important to examine such factors especially in light of the current shift from production based to knowledge-based economies. It’s a paradigm shift that is emerging within the last twenty years, moving from a direct link causal system to an interlocking, interwoven dynamic process (2006).

Isabelle Gatt (2009) in Changing Perceptions, Practice and Pedagogy: Challenges for and Ways into Teacher Change used the word ‘orchestrate’ in referring to the change process in schools. Each of the players – or stakeholders - can add to the richness of the piece that is performed and as well as play even a little off resulting in an ending product that is not as rich or even what was intended. Gatt surveyed teachers before and after professional development to determine if their attitudes and beliefs had changed as a result of the information that was shared. Her three year study tracked 14 teachers for two years while the professional development had taken place and then a year later to see if the change was sustained. Gatt found that some teachers’ beliefs had changed immediately after the professional development. However, she found that even a year after the professional development, the practice that was initiated was evident with more teachers who continued to affirm the belief change that resulted from the
professional development program. However, Guskey (2002) found that many teachers needed to see success in student outcomes before they would change their beliefs and attitudes of specific initiatives. His view parallels works by Fullan (1999) working independently as well as in tandem with Heargraves (1996) and Harootunion & Yagar (1980) who all concluded through their studies that “teachers relate success to improvement in student outcomes and not in terms of themselves or other criteria” (Gatt, p. 166). Ainscow extended that thought through research that focused on comparisons between experienced and inexperienced teachers. Ainscow concluded that in order for professional development to take root within a school, it must be focused at the individual teacher level rather than at the organizational system (2005). He cited Lipman’s (1997) research in that “without some specific attention to change at the individual level it will simply result in teachers coming together to reinforce existing practices rather than to confront the differences they face in different ways” (p. 247).

While Ainscow’s (2005) work focused on teaching for diversity, he directed his suggestions to the beliefs and practices of teachers. “…changing outcomes for a student is unlikely to be achieved unless there are changes in the behaviors of adults…. (the work) must also address and sometimes challenge the thinking behind existing ways of working” (pp. 254-255)

Much work has been done through the use of the School Level Environment Questionnaire (SLEQ) in measuring teachers’ perceptions in schools throughout the United States (Blose & Fisher, 2003; Henson, 2001; B. Johnson & Stevens, 2000; C.E.Johnson & Templeton, 1998).

School climate has a variety of meanings, including the social system of shared norms and expectations (Brookover et al., 1978), the set of norms and expectations that others have for students (West, 1985), teachers’ morale (Brown & Henry, 1992), level of teachers’ empowerment (Short & Rinehart, 1992),
students’ perceptions of the ‘personality of the school’ (W.L. Johnson & Zimmerman, 1996) or the environment for students as indicated by the amount of negative student behavior in the school (Bernstein, 1992) (Johnson, Stevens & Zvock, 2007, pp. 833-834).

The National Center for Educational Statistics organizes surveys that are completed by members of educational institutions across the United States. Researchers frequently disaggregate their data as a basis for further conjectures regarding educational factors. In a project completed by Wolfe, Ray and Harris (2004) and reported in *A Rasch Analysis of Three Measures of Teacher Perception Generated from the School and Staffing Survey* a study was done of the quality of the data surrounding the school’s atmosphere: perception of influence, perception of students and perception of school climate. The study found reliability across the teacher responders who agreed that the following were “common, but relatively benign issues that were the most serious problems at their schools: students being unprepared for class, parent involvement, student apathy, student absence and student disrespect for teachers” (Wolfe, Ray & Harris, p. 852). Previous work by Lortie (1975) found that “collegiality is another critical component of school climate. When teachers collaborate with their peers, it increases their learning opportunities. Teachers spend much of their work life in classrooms, isolated from their peers. Having the opportunity to interact with their peers is one way that teachers cope with the self-contained nature of their work and reassure themselves that their efforts are worthwhile” (Wolfe, Ray & Harris, p. 844).

In the 2007 study of Johnson, Stevens and Zvock, 4,290 teachers were sent surveys in large urban districts in the southwestern part of the United States. Their 42 questions mixed in equal numbers, factors related to school environment and factors dealing with teachers’ perceptions of academic press, leadership, job satisfaction and school quality. Using exploratory factor analysis
and confirmatory analysis, it was found that the models fit the data reasonably well. Statistically significant results were highest with regards to teachers’ perceptions of students’ relations with staff, students being well behaved, motivated and respectful. However, the authors noted limitations to their conclusions, such as only half of the surveys were returned and that they were concentrated in specific school settings – large, urban and in Southwestern United States. Johnson, Stevens and Zvock (2007) did recommend the use of either this specific tool (SLEQ) or one similar in investigating issues related to teachers’ perceptions.

In an examination of the importance of parent involvement in student achievement from both the teacher and parent perspectives, Lawson (2003) surveyed 12 teachers and 13 parents from an urban elementary school. Depending on the school and the community, parents may have little or minimal influence over school making decisions, but rather concentrate on making home a place where learning can continue (Eagle, 1989; Epstein, 1995; Okagaki & Frensch, 1998; Peressini, 1996; Rich, 1996; Walberg, Bole & Waxman, 1980). There is also a mid-range of parent involvement in the schools or districts that allow parents to have an active role in the school day by helping out in classrooms, working with the PTO on public and popular projects or events, and serving on school or district based advisory councils (Comer & Haynes, 1992; Eagle, 1989; Swap, 1993 Winters, 1993). At the most extreme level, parents are included as advisors or partners in school problem solving, helping schools with redesign initiatives, reform or restructuring strategies (Comer & Hayes, 1992; Epstein, 1996; Hopfenburg, Levin & Associations, 1993; Winter, 1993). Hoover-Dempsey and Sandler (1997) found through their research that the lower the school’s expectation for parent involvement, the less likely parents would become involved. Lightfoot (1978) concluded that when teachers viewed children as a
reflection of their parents, it was likely to “frame discontinuities, disconnects and blaming cycles that are hurtful and harmful to children, families and teachers alike” (Lawson, p. 81).

In his study, Lawson (2003) found that the teachers’ perceptions of the parent involvement revolved around the willingness of the parents to cooperate and submit to the needs of the school as defined by the teachers. “Because teachers believe that the children’s valuation of education is directly linked to the expectations and values of their parents, home-based involvement is perceived as the primary means of stressing educational importance” (p. 106). Lawson (2003) concluded that the teachers had a different opinion of the child whose parent was involved and the child of parents who were not, believing that the child from ‘involved’ parents would be ready to learn, and the others would not. In large part, Lawson (2003) found in his study that if there were any teacher-parent conflicts, the teachers believed that it was because of a personality disagreement rather than an issue based reason. In his interviews with the teachers, Lawson (2003) also uncovered resentment on the part of the teacher who felt that the teachers in the school had to take on responsibilities for the children that should really be owned by the parents.

Teacher attitude also impacted the expectation of student achievement when different ethnicities were involved. In a study of the attitudes and opinions of teachers who had white students as well as minority students, Morris (2010) concluded that the black teachers believed the low income white students were middle class and good kids, while the white teachers saw these same students as low income and unremarkable.

All of these research projects involved professional development either at the school or district level. Kaiser, Rosenfield and Gravois (2009) in Teachers’ Perception of Satisfaction,
Skill Development and Skill Application after Instructional Consultation Services found that there was significant positive feedback when an initiative involved working with one teacher at a time in an effort to change an entire faculty. In a 20 question survey, the researchers found that teachers believed that they did learn new skills and were able to positively transfer new learning in a generalized manner to other students. However, a limitation of the study was that the researchers never surveyed teachers who did not participate in the individual counseling to see if there really was a significant advantage to this process.

Love, Stiles, Mundry & DiRanna (2008) examined the impact of teacher beliefs on data interpretation and found it can be significant. Teachers can have the perspective that the learning that takes place is the responsibility of the student, and if the student is not successful on a teacher constructed assessment, then it is the student’s fault. The teacher need not feel the imperative to change the teaching that took place – it was the responsibility of the student to learn. The authors note that such an attitude by a teacher who believes in the existence of an achievement gap can be supported by their interpretation of data – the test results of the students confirm the teacher’s belief. The authors categorize this attitude as self-righteous and sanctimonious. “On the other hand, when one is open to critically examining assumptions, data can be a catalyst to discarding old frames of reference and embracing new ones. We have seen educators….become outraged by inequities they had not been aware of before…When teachers observed that teaching in a new way actually reached more students, they changed their assumptions about teaching and learning” (p.5)
Organizational Frames

While the examination of teacher attitudes is critical to this research project, it is important to study the organizational structures within which these teachers work. Bolman and Deal (2008) recognize the need to look at systems in more than one way. Specifically, they propose that to accomplish reformation of organizations, an examination must be made of that organization from several lenses – structural, political, symbolic and human. By studying the system from these specific frameworks, the reformer will have a better understanding of the organization itself including both the assets and weaknesses of people and process. Time and again, organizations are reformed or reframed and the bottom line results do not change (Elmore, 1978; Freduenberg and Gramling, 1994). In the United States the history of planning for the achievement of change by creating policy that mandates change actually produces minimal results. Frequently only one aspect of an organization is studied, with little attempt to form a complete picture of the system itself, whether it be manufacturing, educational or political (Bolman and Deal, 2008).

Examining an organization through a variety of lenses will help the reformer gain a better picture of the organization itself. “Like maps, frames are both windows on a territory and tools for navigation” (p. 13).

One of the key goals for the work at the middle school where this research was based is to enable the staff to become what they believe they already are. The common perception among the faculty has been that it is a privilege to be a staff member at this middle school because the teachers are the best in the city since the students historically eventually became the top students in all local high schools, both public and private. While the high achievement student status may have been true in years up through 2003, it no longer is the reality. (For recent history of scores,
see Appendix D). However, the perception among the teachers who still work within the school lives on. An examination must be made of the fundamental beliefs held by staff in the areas of teacher strength, work ethic, student ability and performance as well as parent interactions and involvement. This human resource perspective, “rooted in psychology, sees an organization as an extended family, made up of individuals with needs, feelings, prejudices, skills and limitations. From a human resources view, the key challenge is to tailor organizations to individuals – finding ways for people to get the job done while feeling good about themselves and their work” (Seng, p. 16).

In *The Challenges of Educational Change*, Daniel Duke (2004) states that “when teachers perceive that they are doing a good job or the best job they are capable of doing, they are more likely to become set in their ways. Even when they realize they are not meeting desired goals, teachers can grow complacent because they believe that the reasons for their lack of success are beyond their control” (p. 189). At this middle school, the family dynamics of the students have changed dramatically in the last ten years, with an increase of students of Hispanic ethnicity more than doubling, and the percentage of students at the poverty level increasing from 40% to 67% in the same time period (DESE, 2010). Through the analysis of the teacher survey responses, it may be revealed how strongly these statistical shifts globally impact teacher beliefs on the possibility of student achievement. The study of both teacher interviews and focus group conversations may shed light on the effect on the individual teacher.
Human Resistance to Change

In continuing to identify the factors that would impact a teacher’s attitude, Evans (1996) notes that an older, more veteran staff member views change with passive resignation. In addition to this complacency, it is important to also research human resistance to change. Fullan (2001) found that it is critical to find out the reasons for resistance in order to confront the resistors. Factors such as job security, the need for change, the timetable of the change process, the specific plan to address the gap in achievement, the rubric to determine if the change is succeeding all can lead to a resistance factor; the need to tease out the cause is critical, before one begins to work with the resistors.

In The Human Side of School Change, Robert Evans (1996) examines the resistance of a reluctant faculty. Restructuring schools often becomes a more complex task because of the aging faculty who are often comprised of

…..veteran practitioners who are not eager to embrace a new round of innovation. Their human aversion to change is intensified by three factors: their stage of life, their stage of career, and what demographers would call their ‘cohort factor’ – their unique composition as a group and the unique historical context in which they have worked. Their resistance is thoroughly normal, but it presents an unprecedented challenge to innovation, one that cannot be met by standard recommendations for staff revitalization or the implementation of change (p. 92). Evans notes that in general, there has been a large demographic shift among the teachers in public schools, with a larger number of teachers who are veteran, middle-aged and immobile. The aging problem also brings two additional pressures that complicate the teacher’s energy and attention – the downside of a lifelong career, and the care of both or either college children and aging parents. ‘Teachers’ dissatisfaction is broad and deep but is closer to passive resignation
than to active indignation, closer to dejection that deflates energy than to anger that inspires action” (p. 94). Of particular note to this research project is the breakdown by age among the staff members: of the 61 members at this particular middle school, 80% are at least 40 years old. Of these, 22 are in their 50s, and 8 in their 60s. All but seven members of the staff have been working at the school for at least five years. The faculty is entrenched, gray, and tired. For any change process to take place that would result in increased student achievement, the importance of the human side of the organization cannot be overlooked. It has been noted in the investigation of school change from the human perspective, that the older and more veteran the teacher, the more likely that the teacher must see the positive change from an initiative before the experienced teacher would adopt the new strategy or process into instructional design (Evans, 1996).

While the actual research itself will focus on the impact of data analysis on teacher’s instructional design and student achievement supported by historical data gleaned from attitudinal survey responses, this research is limited to just one facet of school change, while recognizing that it cannot be the only factor to be addressed if student achievement is the ultimate goal.

**Use of Data in Transforming Schools**

The second question to be answered through this literature review, focused on the use of data in transforming schools. “No organization is ever going to be able to survive and be effective without having good data to guide its journey and what it’s doing….Now how we actually use that information is going to be the big question” (Weinstock, p. 6). Data have been used for
numbers of reasons and in a variety of manners. However, the main goal of the gathering and examination of data is to solve problems with the ultimate focus being to “create a community of learners….looking at data is the crucial first step in the process of making meaningful changes in instructional practice” (Martin & Taylor, 2009). “Data provide both a stark picture of how we are doing and a wonderful tool for stimulating dialogue about how a school community is faring and what it considers to be important” (Olsen, 1997).

Data have been used to determine the impact of national initiatives, such as teacher evaluations which became a policy target in most states because of the Federal Legislation No Child Left Behind (NCLB) requirement of highly qualified teachers in every classroom. In an examination of practices in all fifty states, Hazi and Rucinski (2009) researched the evaluation statues and department of education regulations in archival records for data used to construct a comparison matrix for practices mandated by NCLB. Through their work, Hazi and Rucinski sought to determine by analytical deduction the effects and implications on teacher evaluative practices which had been targeted by the National Board of Governors as a “tool for instructional improvement” (p. 3). While their conclusions showed that national movement towards the greater use of consistency of evaluations, the analysis of the data also led to some concerns. The authors note the emergence of data cottage industries such as data warehouses, and express concern over the extent of the data that is gathered, such as the expansion into surveillance and its potential helpful and harmful results. Hazi and Rucinski also conclude that the reliance on data cannot be the sole basis for teacher evaluations but advocates the continued inclusion of personal professional judgments about teaching and teachers (2009).
Narrowing the focus of the use of data, Park and Datnow in *School Leadership and Management* (November, 2009) examine the practice of school systems that use data driven decision making through distributed leadership. In their study of four urban school districts using qualitative data, the authors concluded that

First, leaders at all levels co-constructed the vision and implementation of productive data-driven decision-making by creating an ethos of learning and continuous improvement rather than one of blame; second - in order to give data relevance, leaders also distributed decision-making authority in a manner that empowered different staff members to utilize their expertise and third - the school systems directed their resources on building human and social capacity mainly by focusing on modeling and knowledge brokering amongst their staff (p. 1).

With a similar scope of targets, Weinstock (2009) led a research team that first studied two large schools systems – Chicago Public Schools and the Texas Plano Independent School District – in 2008 at the beginning of their data analysis initiative and again in 2009 to determine the effectiveness of this change in practice of decision making. What Weinstock and his team found was that both large urban districts “have broken through to a more developed, thoughtful and consequential use of data by uncovering fresh ways to look at data that they had not considered before…Both districts found that starts and stops along the way were not setbacks, but learning opportunities, enabling them to fill holes in their data with additional variables that create a more accurate portrait of students’ abilities and needs” (pp. 1-2). Lachat and Smith (2005) in their examination of data and urban schools found that “increasing demands for accountability are paralleled by equity concerns arising from the enormous diversity of the student population – in culture, language, prior educational experiences, home situations, learning styles, attitudes towards learning and future aspirations” (p. 333). Their case study of five low-performing
schools in three high poverty urban areas, relied on qualitative data collected over four years through school reform documents, field notes and archival records. In addition to the findings regarding the achievement of these schools, Lachat and Smith (2005) uncovered problems with the process of collecting and distribution of the data. They observed and advised that “district data-system personnel were burdened with data requests from multiple projects, often without being informed of how the data would be used. Developing better understandings with them about the data the schools needed and when the data were needed became an important strategy for improving school access to data” (p. 341). However, once the data was in the hands of the teachers, it truly became ‘their data’ and it could be used to answer the questions the teachers had raised (Lachat & Smith, 2005).

In a study completed by the Center City Schools Initiative in partnership with the Center City District and the School District of Philadelphia, interviews were conducted by stakeholders including parents, teachers, administrators and neighborhood business owners to determine how best to engage the parents of prospective students so that the students would remain in the public schools, specifically a public school in a ‘fringe’ area in Philadelphia. Implicit in this initiative was the perception of the teachers and administrative staff of the school that the “children from these families (from parents who were upper middle class and involved in their children’s schooling) would be more motivated and possess better academic skills and would, as a result, have a civilizing effect on other students” (Cucchiara, p. 172). Teachers and administrators cultivated relationships with these families because they believed that these children would “accept the teachers’ authority, follow the rules and with their families, become invested in the broader project of achieving academically” (p. 172). While the intent of this specific study was
to examine a questionable practice of target marketing to one class of parents, it does show the need to emphasize a ‘customer service’ approach in dealing with parents and that district employees needed to be mindful of and more responsive to parents that had been the previous practice (Cucchiara, 2008).

With a wider spread approach in the use of data to examine in part teacher perceptions and family support, a major study was undertaken by the American Indian and Alaskan Native Mental Health Research organization. Utilizing Triad surveys of staff, teachers, parents, as well as personal interviews and focus groups, information was gleaned on a wide variety of topics related to the changes affected by the increase in support funds on schools for this disaggregated group of students. The approach for this research was not that of a “classical research study, but rather that of a field study patterned on chaos theory” (DeJong, 1995). Data was collected at each of the schools being studied on what “seemed to be relevant factors and to then backtrack from outcome results to possible causes” (DeJong & Hall, p. 179). One stark conclusion was that most staff considered families to be a major problem in the lack of student success. While the information provided by this research led to additional supports for families and students to be created and program offerings to be modified, a significant limitation was noted in that staff responding received “heavy pressure to provide only positive perspectives in future surveys” (DeJong & Hall, p. 179).

A 2005 qualitative case study was completed of Mumford Academy, a Traditional African American School (TAAS) in an urban setting. Data gathered for this research project included an interview with 8 teachers, 7 parents and the principal in a two hour session, an additional five interviews with the principal, formal and informal observations and archival records from
newspapers, state assessment results, local and state reports and report cards. The multiple sources of data allowed triangulation to “clarify meaning and verify the repeatability of observations of interpretations” (Lincoln & Denzin, p. 454). The base line data was used to set the stage for improvement and the needed change process. Through the analysis of the information, the administrative team noted that in order to have their students be more successful, the school also needed to provide support and community for the parents. For example, “one practice was initiating forums that taught school protocol and enabled two-way conversations between the principal and parents in non-threatening atmospheres” (Shujaa, 1996).

Data also showed that the increased opportunities for parents to work with the teachers and administrative staff resulted in changes in the surroundings of the school – such as elimination of drug dealers and traffickers – as well as enabling the parents to work against perceived social injustices (Brooks, 2009).

Much has been written about the data analysis of state wide assessments as well as summative and formative classroom assessments. These provide the opportunity to draw conclusions based upon quantitative information. Qualitative analysis is different. Makel (2009) found that “numerous social, emotional and cognitive factors needed to be taken into account when investigating how attitudes change over time” (p. 128). In his examination of the perceptions of both students and parents regarding a district’s gifted identification process, Makel used a 5 point Likert scale questionnaire with five subscales. The internal reliability of each of the subscales was calculated using Cronbach’s alpha level. “Between-subjects and within-subjects analyses were conducted with subscales. The nonparametric Wilcoxon signed ranks and Wilcoxon rank-sum tests were used for all analyses that contained a group with an
Reflections on his research project noted the need to consider the timing of the surveys, the importance of similar grouping in using a control group, and students who may be similar to those in the study group, but not identified as such.

In the widely used guide, *Teach Like a Champion*, Lemove (2009) notes that today teachers in the vast majority of public schools work with some form of data system that allows the teacher to assess students’ progress more frequently than just through the yearly state assessments. However, “despite the proliferation of such systems, many teachers still leave value on the table when it comes to using data to inform their teaching” (p. 11). The veteran teacher who is established in instructional design for his/her classroom and reluctant to change frequently does not take advantage of the information that can be learned from frequent student monitoring. “Teachers who are most proficient at using data examine them not only to tell them who got what right and what wrong, but why… They use a process for turning results into re-teaching. They use the data to understand not only how to spend their time in the classroom but how to teach better in the time they allocate to each topic” (p.11).

Schools that invest time and resources in the process of data drill downs and constructively use that information in instructional design are powerful examples. Love, Stiles, Mundry & DeRanna (2008) developed a systemic process that guides teachers through the investigation of results seeking to identify root causes of lack of understanding and learning. What they found was that when teachers took the time to seek and understand the results of assessments, significant change took place. These schools dispel the myth that some students cannot learn; they inspire us to even greater levels of commitment and action to take on the biggest problems that schools
face: cultures rife with resignation, isolation, stagnation and mistrust; racist and classist attitudes and practices that result in failure to see and serve students who do not look or act like members of the dominant culture; outdated and inexcusable instructional practices; teachers who are not well prepared as they need to be to teach to rigorous content standards; and ineffective and dangerous uses of student data. (p.1)

The literature reviewed for this research project examined three major areas – first to understand teacher attitudes regarding the factors that impact teaching and learning, next to the use of data in identifying root causes of chronic student underperformance, and lastly an investigation of the relationship of the teacher to the process of change. The examination of literature on these topics focused on two fundamental research questions: Why is it important to consider the impact of teacher attitude when seeking causes for the lack of student achievement? How can data analysis be used to identify root causes of student underachievement? The information gleaned from this literature review frames the focus of this research project.
Chapter 3: Research Design

Introduction

In searching for the answers to the proposed research question, several different approaches have been investigated. Qualitative research – that which primarily focuses on words – and quantitative research – that which primarily focuses on numbers - are different ends of the range of approaches to a specific investigation. Mixed methods, a process which includes elements of both types, tends to reside in the middle.

According to Creswell (2009) “qualitative research is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem” (p.4). In such investigations, the researcher collects data from locations specific to individuals that are part of the study, merging information from several individuals and eventually forming general themes which then may or not be investigated further. This method of investigation typically follows an inductive style. A specific form of qualitative research is a case study, whereby the investigator digs deeply into an event or a process involving one or more individuals. In this form of qualitative research, the project is bound by “time and activity during which researchers collected detailed information using a variety of data collections procedures over a sustained period of time” (Stake, 1995, as cited by Creswell, 2009, p. 13).

Quantitative research, as Creswell (2009) notes, is a very different approach, where the researcher investigates the relationship among variables, and then analyzes that information following specific statistical protocols. The method of this form of investigation generally follows a deductive style.
Mixed method “is an approach to inquiry that combines or associates both qualitative and quantitative forms. …..It is more than simply collecting and analyzing both kinds of data: it also involves both approaches in tandem so that the overall strength of a study is greater than either qualitative or quantitative research” (Creswell, 2009, p. 4).

A qualitative research case study approach was selected for this specific investigation for several reasons: the purpose of this project was to determine if participation in data analysis changed an individual teacher’s instructional design, to uncover themes that emerged from interviews with individual teachers, and to discover if the responses in both the individual interviews and the follow up focus group were similar to historical school based data.

Research Question

This case study asked one basic question:

Does participation in data analysis impact teachers’ attitudes relative to the relationship between student achievement and their instructional practices?

The case study methodology of qualitative research was selected as the means of research because of the need to determine the individual impact of participation in data analysis on individual teacher’s instructional practice – this fits the criteria of qualitative research whereby one or more individuals are involved in a practice or process. After several such individual interviews, general themes were determined – this process meets the criteria of qualitative research whereby data analysis is used to uncover trends or thoughts which can then be generalized. And lastly, qualitative case study research was selected as the best methodology
because of the inclusion of several sources of data over sustained period of time – in this case, historical teacher survey results from the school years ending in 2010 and again in 2011.

**Methodology**

Qualitative research was the format used for the investigation into the impact of data analysis on an individual teacher’s instructional design. The repeated process of interviewing a single different teacher to document each individual’s responses to selected questions created units of analysis. These units were reviewed and coded into patterns or categories which were then collectively discussed in a focus group of interview participants. In addition, historical school data collected from teacher surveys and practices for school years ending in 2010 and again in 2011 were used to support or refute individual and/or group responses. This process of investigation followed the approach of qualitative research.

Qualitative interviewing was selected because of the importance of finding the perspective of the person – in this case the teacher – who was trained in how to drill-down data, how to interpret the data and then how to use the data to change instruction. “Qualitative interviewing begins with the assumption that the perspective of others is meaningful” (Patten, p. 341). In discussing why interviews are critical in trying to find answers to research questions, Patten, in *Qualitative Research and Evaluation Methods* (2002) notes “The issue is not whether observational data are more desirable, valid or meaningful than self-reporting data. The fact is that we cannot observe everything…….We have to ask people questions about those things” (p. 341).
Of the multiple forms of qualitative research, a case study approach was best suited for this particular investigation. “Case study is not a methodological choice, but a choice of what is to be studied. We could study it analytically, or holistically, entirely by repeated measures or hermeneutically, organically or culturally, and by mixed methods, - but we concentrate, at least for the time being on the case (Stake 2000:435, as cited by Patton, 2002, p. 447)”

This research project included intellectual goals: to determine if teachers attitudes changed regarding the value of using data when they are planning their lessons and to determine if teachers attitudes changed regarding the actual use of the information gleaned from examining data when they are designing their instruction. This investigation also included practical goals: to determine if the time and finances dedicated to the Understanding Data Project changed teachers’ attitudes regarding student achievement and to determine if the time and finances dedicated to the Understanding Data Project changed teachers’ instructional design. This case study approached these goals in the most logical way of gathering individual responses and coding them into emerging themes which were then discussed in a focus group. Themes that develop will be supported or refuted by additional historical school based data.

Site and participants. This research was based in a middle school of grades 6 through 8 in a moderately sized urban city. The school, founded in 1929, had been relocated to a temporary site during the time of this research project while the original school was being demolished and rebuilt on the same location to open in 2013. During the time of this research project, the student body hovered around 540, with 63% qualifying for free or reduced lunch (a poverty indicator) and 19% population of students with special needs. The largest minority group (23%) of students was Hispanic, followed by double digit representations of African American and
Asian. The staff of the school includes 61 members of instructional staff. The school that is the focus of this research project was designated in 2007 by the Massachusetts Department of Elementary and Secondary Education (DESE) as consistently underperforming as determined by repeatedly failing to make adequate yearly progress on state spring assessments in English Language Arts and Mathematics for grades 6 through 8. Until 2003, the school had been known as the home of the top academic achieving students in the city. The general perception among the school’s teachers was that it was the demographic changes among the student community that have led to a measurable drop in student achievement as measured by the annual state assessments. An increase in minority students as well as a dramatic change in the numbers of students identified for financial support through free or reduced lunch applications has altered the profile of the collective student body. Parent participation and presence at school events have also declined in recent years.

Six selected teachers were each invited to participate in an individual interview. Each of these teachers was informed of the process in which they were invited to participate, including all conditions outlined by the IRB. The six teachers were selected to ensure an adequate and equal representation of age (20s, 30s, 40s, 50s and 60s), years of teaching (0-5, 6-10, 11-15, 16-20, 21-25, more than 25), all major content areas (English Language Arts, mathematics, science, social studies) as well as a representative from those who teach in special education and in related arts, every grade (6, 7, 8), and a proportional gender ratio. Individual teachers were interviewed in the library of the school, during a time that was mutually convenient. The focus group consisted of those who were individually interviewed and that session was also conducted in the library at the middle school.
From those teachers who had volunteered to participate, teachers who fit the criteria for staff representation were personally invited to participate in the private session. Each session was held during the school day during a teacher’s personal time. Time dedicated to this project did not impact time for student learning, teachers’ common planning time, or in-house professional development. Each interview was held in a quiet location. Participants were given a history of this research development, and the reason why the individual was asked to participate. Each participant reviewed the information and disclaimers submitted to the IRB as part of the approval process for this research. Each participant was asked to comment on 12 statements or questions. The opening questions solicited information on a teacher’s background and experience. Questions also asked for a teacher’s opinion on what student achievement looks like. Included in the personal sessions was a discussion of how participation in data analysis had affected the teacher’s attitudes towards the preparedness and ability of students as well as any change in the teacher’s instructional design.

**Data collection.** The questions for each of the interviewees were identical. The questions focused partly on the changes that were calculated between the first survey completed by members of the school staff, and the second survey which again was completed by representative members of the school staff. The interviews also allowed the teacher the opportunity to expand upon the specific use in instructional design that the teacher made from the skills developed during data analysis. These six teachers agreed that the interviews could be audio taped for purposes of analysis. All staff members – included those who completed either of the surveys as well as the six members invited for an individual interview, participated in school based data analysis professional development of 30 hours during the school year prior to the administration
of the second survey. The interviews were qualitatively analyzed to identify themes. Once the themes had been isolated, the teachers who completed the individual interviews were invited to participate in a focus group for a discussion surrounding those themes. The focus group discussion was also qualitatively analyzed to again identify predominant themes.

**Teacher interview questions.** Qualitative analysis was used to identify common factors seen in individual teacher attitudes expressed during personal teacher interviews. In individual sessions, each teacher was be asked to expand upon the following statements or respond these questions:

1. What is your experience as a teacher? Have you had other background experiences that have helped you in working with students similar to ours? *(Opening)*

2. How would you describe a high achieving student? *(Introduction)*

3. In terms of student achievement, how would you describe a typical student in our school? *(Transition)* Follow up: how would you know this? What do teachers look for? What are indicators that the student is not able to achieve academically?

4. The two surveys that were completed by our staff in June of 2010 and again in June of 2011, showed that there was a change in how teachers perceived students were prepared to learn. Do you think that the work in data analysis led the teachers to change their perception? *(Key)*

5. The two surveys that were completed by our staff also showed that there was a change in how teachers viewed the ability of our students. Do you think that the work in data analysis led the teachers to change their perception? *(Key)*
6. The two surveys that were completed by our staff also showed that there was a change in how teachers viewed their relationships with our students. Do you think that the work in data analysis led the teachers to change their perception? (Key)

7. What do you think is the role of the teacher in student achievement? (Key)

8. What has been the value of your participation in the Understanding Data Project? (Key) Follow up: what has changed in your practice? Is this change (if there is one) connected with your participation in the data analysis project? What do you still need to do?

9. Has the training that you have experienced in the Understanding Data Project, affected your perception of why students are not able to achieve academically? (Key)

10. What are the challenges that teachers and students must overcome if they are to reach the goal of high academic achievement for all students? (Key) Follow up: Has your work with understanding data helped in identifying the challenges? Has your work with understanding data helped in overcoming those challenges?

11. If you were asked to justify the expense of time and consultants to sustain the practice of understanding data, what would you say? (Ending)

12. The purpose of this interview, was to have an in depth conversation regarding your participation in drilling down data relative to the relationship between student achievement and your instructional practice. Is there anything that we missed in our discussion? Is there something that you would like to add to this discussion? (Final)
Tri-pod Survey

Additional historical data included in this research was gleaned from a Tri-pod Survey analyzed to determine a change in responses from before participation in the Understanding Data Project to after participation in the year-long initiative. The survey the teachers were asked to complete in both 2010 and 2011 was constructed by the Cambridge Consultancy Group. The teachers were asked to respond to several prompts by choosing the descriptor that most closely reflected their particular opinion or belief on that specific prompt. There were three different Likert scales used to categorize the responses. For two of the sections, the participants were asked to choose among five categories, and for one of the sections, they were asked to choose among six possible indicators. The responses were categorized by percentages and the base of the analysis was the total number of respondents rather than the total number of teachers from whom the respondents were culled. The structure of the second survey aligned with the first, though with a reduced number of prompts. The same Likert scales were utilized for both surveys for analytical purposes. The calculated changes in percentages as noted between these two surveys were used as the beginning questions in the individual teacher interviews. Subsequent questions asked of the interviewees referred to the use of data by the teachers in their instructional design.

Data Analysis

The data that results from this investigation will follow the process as outlined by Creswell (2009). This can be both a linear hierarchical and interrelated approach. The suggested levels included the following steps as applicable to this specific research:
1. Organize the data and prepare it for analysis. This involved transcribing the interviews, collecting the statistical changes in the teacher surveys, and having available relevant school based management system data.

2. Read through all the data to get an understanding of the information and the correlation to the questions that were posed.

3. Coded the material. This process included several steps:

   a. read all the material several times. Notes were taken during each reading referring to ideas emerging from participants.

   b. started with one interview – determine the underlying meaning of the information. Write notes referring to ‘What is this about?’ Repeated with each individual interview.

   c. made a list of all topics. Clustered together similar topics. Organized into major topics, unique topics and leftovers.

   d. took the list and reviewed data again. Assigned a code to each relevant piece of information in the interviews.

   e. turned the codes into categories, and reduced categories by grouping topics that were related to each other

   f. assembled like-coded material together to do a preliminary analysis.

4. Made use the coding process to generate four to six themes that led to the titles in the findings section of the final report.
5. The timeline of data analysis included:
   
   a. analysis of individual teacher interviews

   b. once themes were identified, then focus group responses were analyzed in the same manner, using first the themes discussed, and then identifying any additional categories that emerged from the focus group discussion.

   c. examined the quantitative historical data to support or refute themes.

6. Determined the best manner in which to show the results of the research findings.

7. Personally interpreted the data based upon the researcher’s background in the school, with the teachers and through the process of data collection for this specific research project.

Validity

The notion of validity and reliability vary between quantitative and qualitative research methods – even the names are different. Creswell (2009) notes that in quantitative research analysis, the relevant terms are validity, reliability and generalizability. Yin (2009) names the terms according to the U.S. Government Accountability Office (2009) for similar tests in qualitative research to be trustworthiness, credibility, confirmability and data dependability. In general, according to Creswell (2009) in quantitative research, the ‘validity’ of the research requires the examination of the researcher’s ability to control other variables other than the one being examined, so that the conclusion can reasonably supported by the manipulation of a single isolated variable. In qualitative research, however, the researcher checks for accuracy of findings by following specific procedures. In this particular research project, each of the
interviews followed the same protocol of place, order of questions, transcription and cross walk of the audio and transcribed form. A second reader was used to cross check the coding of interview and focus group responses.

In quantitative research, ‘reliability’ means that the results are likely to be similar if not identical if the research was repeated in similar circumstances. In qualitative research, reliability means that the approach was consistent through the research process (Creswell, 2009). For this specific project, each of the steps in the research was approved by the IRB as well as this researcher’s advisor. The protocol of forms of questions consistently followed standard interview formats of introductory questions, key questions and follow up questions.

In this specific case study, the primary researcher was also the principal of the school in which all of the teachers worked who participated in the interviews. The researcher was not the principal for the year during which the first teacher anonymous survey used as historical secondary data was completed, but was the principal during the year of completion of the Understanding Data Project, the interviews, the focus group as well as the second survey. In all cases of data collection – both anonymously and in person – the protocols of obtaining permission and giving information were supplied to all participants. All the interviews were transcribed by an individual trained in transcription, and both the audio and hard copy of each interview were available for review by participants.

At the conclusion of both the interview and the focus group discussion, this researcher used reflective memos to summarize the main points of the discussion. During the reading of the transcribed copies of both the interviews and the focus group discussion, reflective memos were
used in several ways. Notes were made by this researcher regarding possible themes, possible questions, or connections to the memos made following the original sessions. Rereading the transcribed copies as well as the self-notes again elicited further memos. A review of the reflective memos led to the organization of the information into themes which were then organized into a series of codes. Throughout this process, specific notes were made related to Shulman’s theory of PCK as it connected with the responses of the participants. Coding of interviews and focus group conversations was reviewed by a peer with an earned educational doctoral degree.

Conversations surrounding results and conclusions were similarly reviewed by peers with earned educational doctoral degrees as well as the researcher’s doctoral advisor.

**Protection of Human Subjects**

As part of the submission for the IRB approval, the following concerns were addressed:

**Recruitment.** In some part, many teachers from this middle school were involved in the project. The total number of teachers who were members of the group from which the samples were selected number 61. The age ranges of these people were from 24 through 67. All were in reasonable good health sufficient to complete their professional responsibilities as teachers. 10 were men, 51 were women. 1 female was Hispanic, 1 female is African American. All are highly qualified teachers according to the criteria of Massachusetts Department of Elementary and Secondary Education (DESE), and economically considered to be members of the middle to upper middle class. All were participants in the data collection through the computer based data management system for the examination of their records of personal grade distribution and
disciplinary referrals. In the two instances of teacher surveys, only teachers who were teaching at a specific block were included as respondents completed that specific survey, in each case basing their responses on the students seated in front of them at that specific time. If a teacher did not have an assigned class during that time, or if the teacher was absent, the teacher was not invited to respond at another time.

**Recruitment procedures.** In the two instances of teacher surveys, only teachers who were teaching at a specific block were included as respondents, in each case, the teacher based his/her responses on the students seated in front of the teacher at that specific time. If a teacher did not have an assigned class during that time, or if the teacher was absent, the teacher was not included.

Teachers who volunteered for the interview portion of this research project responded to the following email message:

*As part of my research project for my doctoral degree, I am hoping to talk with six staff members, one at a time. Each conversation will last no more than 30 minutes and will take place at a time that is convenient for you. The focus of the conversations will be an expansion of responses to prompts that were on the perception survey that many of you completed. You need not to have completed the survey in order to take part in these conversations. After all the interviews have been completed, you will be invited to participate in a 30 minute focus group that will discuss the themes that emerged from the individual interviews. Please let me know if you would be willing to volunteer. All responses and respondents will be coded to ensure anonymity. There is no intent to publish this beyond the dissertation submission*
There was no remuneration for survey responses. Participants in the interview were offered refreshments and a token gift card of $10 to a local coffee shop.

**Detailed description of all activities.** Survey 1: 29 participants completed a survey during a class period by circling in pencil an indicator that best aligned with their perception of the prompt. This survey took place during one block of time of 47 minutes when the students in front of them were completing a different survey assigned by the district. Information from the teacher survey was used as historical data for this research project.

Survey 2: 24 participants completed the second survey during a class period by circling in pencil a category that best aligned with their perceptions. This took place during one block of time of 47 minutes when the students in front of them were completing a different survey. This information was also used as historical data for this research project.

Interviews: Individually, each of the 6 people sat with this researcher in the library for a single session of no more than 30 minutes. They were asked to respond to the same statements or questions in expanded answers. The interviewer took notes during the interviews. Interviews were transcribed and coded. Both copies were available for review by participants.

Focus Group: Once interview responses were coded, interviewees were invited to participate in a focus group to expand upon the themes that emerged from the individual interviews. The focus group conversation was audio recorded and transcribed. Both copies were available for review by participants.

Historical supportive data collection: The data housed in the student management system was accessed through the district web site.
**Risks.** There were no physical risks to the participants. Since there was no coding of any participant’s personal information in the surveys, complete anonymity was ascertained. The interview participants had been assured anonymity. While the relationship between the interviewer and interviewee is hierarchical, only those who had volunteered knowing that this is the relationship were asked to participate. The potential risk could have been for the interviewee to respond with a statement that was so radical that it may warrant further investigation that was school based. As with all teachers within the building, if there was a concern regarding professional conduct or responsibilities, union protection was available.

**Confidentiality.** All participants in this research project were active teachers at the time of their responses – this means that although a teacher may have responded to the first survey, if the teacher had retired or moved from the district, there was no effort to contact that teacher to complete any of the second sets of data collected. Likewise if a teacher was not employed in the district for the first set of responses, but was in the classroom for the second set of responses, the teacher was included in the data sets for the second set. In both instances of survey responses, only those teachers who were teaching at that particular period of the day were asked to respond. For the data that included teacher attendance, numbers of referrals, grade distribution, all teachers employed at that time were included in the responses. The interviewees were members of the teaching staff who were employed at the middle school during both data times of collections.

The study was completed at a mid-sized middle school in a moderately sized urban district. Respondents to the first survey developed by the district hired consultants included teachers who were selected through a random block selection. On the chosen day, following a
regular schedule, a specific block was selected by the outside research group. Teachers who were teaching a class at that time completed the survey basing their responses on the students who were in their class at that time. Teachers who did not have a scheduled class, or teachers who were absent did not complete the questionnaire. If the class was an inclusion class where a content teacher and a special education teacher were assigned and present, both teachers completed the survey. When the surveys were completed, while there was a listing of classes by grade and subject, there was no individual set of responses connected to any singular grade, subject or person. All teachers were the recipients of the survey results, but no teacher, grade or subject list was distributed. Of the 48 instructors within the school, 29 were teaching at this specific block and completed the questionnaire of 145 statements.

Following participation for 10 months in an instructional learning team project based on a district initiative that focused on the dissection and analysis of school based data, randomly selected teacher team members received a second survey of these focused statements. Similar to the first study, teachers who were teaching during a specific time block were asked to respond using the students in that particular class as the reference for their answers. From the original questionnaire, 38 statements that addressed teaching practices, instructional design and relationship between students and parents were isolated for the post professional development survey. While all grades and subject areas were represented in both surveys, no identifying information was solicited in order to connect responses with positions or participants. Of the 48 instructors within the school, 24 teachers participated in this second set of surveys. Again, no individual response was connected to a single teacher and no grade or subject matter was singled
out. Responses in both cases were deposited into a collection box and only examined when all were submitted.

If needed to additionally support or refute of conclusions reached through the interview and focus group sessions, historical data information on attendance, referrals and grade distribution was available through the student data management system of X2. This source is a local site for use within the district or by those who have permission for access, such as outside consultants. The data collection for this aspect of the case study included all teachers who were employed at the time of the first survey as well as all those who are employed at the time of the second survey.

Interviews were conducted with volunteers who were employed within the school during the time of both sets of data collections. The six participants were chosen from those who had volunteered. The time for the interview was selected by the interviewee and the interview was conducted in the school library for a period of approximately 30 minutes. The focus group was arranged in a similar manner. The focus group took place at a time convenient for five of the members who participated in individual interviews. The first survey responses were available to all members of the school community. The second survey responses were public to the school. The data based information is available to all staff and district personnel. The interviews were used for only this research project, and were not intended to be publicized.

**Bias.** The initial portion of this research project focused on the Tripod Teacher Survey constructed by the Cambridge Education Consultant Group and completed by representatives of the staff in June of 2010. A specific day and time was assigned by the research consultants to
best represent the spectrum of classes and teachers teaching within the school. For example, the
time chosen was a specific time block during the week when all academic subjects for each of
the grades could be reflected in teachers’ responses. While the teachers and the consultants were
disconnected, there may have been bias on the part of the respondents since the principal of the
building at that time had been told that she would not be in the same position next year. The new
principal had not been appointed at that time. There may have been bias on the part of the
teachers as they reflected upon the leadership of the school as well as the success of
administrative functions because of the known dissatisfaction of central administration with the
performance of the school administration.

The second survey again, was completed by a convenience selection of teachers. At the time
of this second survey, there was certainty of administration, but the fact that the school redesign
was not supported for financial backing by the state Redesign Grant Committee may have
affected some of the staff members, specifically those who had worked on the redesign grant.
However, these same people on the Redesign Grant were also privy to higher level conversations
regarding the meaning of the data that was examined in order to support the redesign plan.

**Data Storage**

Data from the surveys was available on the school based Moodle web site. It was used as a
touch stone for the progress in school improvement. The survey will most likely be completed
again through a district follow up. The information on the student management system is
warehoused but accessible by administrators for previous years’ information. Only current year
information is available for staff members. Interview records are stored in the principal’s office
in the locked file cabinet of sensitive materials. The signed consent documents are stored with that as well. Because there was no information collected as to survey respondents all that is known is that they were assigned a group of students at that specific time. All interview identifiers include only the number of the person in the order in which they were interviewed. No other information was collected.

**Summary**

The focus of this research was a middle school designated by the Massachusetts Department of Elementary and Secondary Education as consistently underperforming as determined by lack of progress on statewide yearly assessments. A survey completed by representative members of the faculty in June of 2010, showed that a considerable percentage of the school’s staff supported statements that identified students and parents, as opposed to curriculum and instruction, to be the root causes of student underachievement. Beginning in September of 2010, all staff participated in a yearlong district initiated data analysis process to identify systemic underachievement, and then to use that information to redesign curriculum and instruction. At the end of the school year, a follow-up survey was administered to a representative group of faculty. This case study included individual interviews with 6 representative staff members that focused on the attitudinal changes noted in the two surveys as well as the impact of data analysis on instructional design. The individual interviews were followed by a focus group to discuss the themes that emerged from the teacher interview responses.
This case study asked one basic question: Will participating in data analysis impact teachers’ attitudes relative to the relationship between student achievement and their instructional practices?

A qualitative research case study approach was selected for this specific investigation for several reasons: the purpose of this project was to determine the effect of participation in data analysis on an individual teacher’s instructional design, to uncover themes which emerged from such several interviews with individual teachers, and to discover if the responses in both the individual interviews and the follow up focus group were similar to historical school based data.

The case study methodology of qualitative research was selected as the means of research because of need to determine the individual impact of participation in data analysis on an individual teacher’s instructional practice – this fits the criteria of qualitative research whereby one or more individuals are involved in a practice or process. After several such individual interviews, general themes were determined – this process meets the criteria of qualitative research whereby data analysis is used to uncover trends or thoughts which can then be generalized. And lastly, qualitative case study research was selected as the best methodology because of the inclusion of several sources of data over sustained period of time – in this case, historical teacher survey results from the school years ending in 2010 and again in 2011.

Qualitative research was the format used for the investigation into the impact of data analysis on an individual teacher’s instructional design. The repeated process of interviewing a single teacher to document each individual’s responses to selected questions created units of analysis. These units were then reviewed and coded into patterns or categories which were then
collectively discussed in a focus group of interview participants. In addition, historical school data collected from teacher surveys and practices for school years ending in 2010 and again in 2011 were used to support or refute individual and/or group responses. This process of investigation followed the approach of qualitative research.

Qualitative interviewing was selected because of the importance of finding the perspective of the person – in this case the teacher – who was trained in how to drill-down data, how to interpret the data and then how to use the data to change instruction.

Conversations regarding the interpretation of the data were carried out among several education partners as well as fellow doctoral students.

If participation in these two events had an impact on teacher perceptions and resulted in a change in some teacher practices, it was hoped that a change in teacher instructional design was seen and student achievement would improve as measured by the state yearly assessments - MCAS. The yearly state assessment results are included in this document in Appendix D.
Chapter 4: Findings

This research project was initiated to investigate the effect of data analysis on teacher attitude towards student achievement and instructional design as a means of increasing student achievement. The focus of this research was a middle school designated by the Massachusetts Department of Elementary and Secondary Education (DESE) as consistently underperforming as determined by repeated failure to make adequate yearly progress (AYP) on state spring assessments in English Language Arts and Mathematics for grades 6 through 8. Until 2003, the school had been known as the home of the top academic achieving students in the city. The general perception among the school’s teachers has been that the demographic changes among the student community led to a measurable drop in student achievement as measured by the annual state assessments. An increase in minority students as well as a dramatic change in the numbers of students identified for financial support through free or reduced lunch applications has altered the profile of the collective student body. Parent participation and presence at school events have also declined in recent years. In determining other factors that might contribute to declining achievement, teachers have been reluctant to attribute any responsibility to curriculum or instruction.

In the school year 2010-2011, the district contracted with an outside consultancy firm to use a train-the-trainer model of data analysis. All teachers at the middle school dedicated 30 hours of professional development time to learn and apply the process of data analysis to get to the root cause of lack of student achievement. This research project was undertaken after the Understanding Data Project was completed for the academic year 2010 through 2011.
The research focused on one question: Will participating in data analysis impact teachers’ attitudes relative to the relationship between student achievement and their instructional practices?

**Primary Data Sources**

The qualitative case study approach was used to investigate the impact of data analysis on teacher attitude and practice. The qualitative analysis was guided by Creswell’s (2009) research design as well as Salkind’s (2007) tools to describe, organize and interpret the data that was gathered. These results are reported in a manner consistent with a qualitative research investigation in which smaller units of analysis are eventually integrated into a supported conclusion (Creswell, 2009).

This research began formally after the teachers had completed the yearlong data-focused professional development. Six teachers were interviewed individually and asked to discuss their thinking about the ability and preparedness of the students within the school. The responses to the statements or questions were reviewed to identify common themes. The interview process yielded multiple responses to selected questions and created units of analysis. These units were reviewed and coded into patterns or categories. The same teachers who were interviewed were then invited to participate in a focus group to discuss and expand upon these common themes. A similar process of analyzing and coding was completed with the focus group conversation.

**Participants in the individual interviews and focus group.** Teachers of this middle school were invited to participate in individual interviews with this researcher to discuss the impact that participation in data analysis had on the individual teacher’s attitude regarding student
preparedness or ability and if the data analysis had led to any changes in instructional design. A detailed breakdown of the staff demographics is included in Appendix E. From the teachers that volunteered, six were selected to approximate each age bracket, each cluster of years of teaching, each of the disciplines, and in equal proportion of males/females. The participants are coded by letters in their names following a system known only to this researcher.

II, the first interviewee, is a middle aged male teacher of English Language Arts for the over 10 years. This teacher had previously worked in a facility for students with behavioral issues for 15 years. This teacher commented on the transition from a behavioral setting to an urban public school: “There was a misconception on my part that coming to teach in a public school was going to remove me from the crazy environment, but it was just another kind of crazy…It was easier working coming from a behavioral treatment facility to the public schools.”

Interviewee EA is a middle aged female art teacher. This instructor worked only for a short time as an English teacher in an alternative public high school prior to becoming an art teacher, the discipline in which she had been trained. This teacher was assigned first to elementary schools, until she later opted to move to this middle school, a school that she had attended as a junior high school student.

The third teacher interviewed was AH, a middle aged female mathematics teacher with 21 years of teaching in the public schools, including years as a substitute public school teacher in three different neighboring towns. In addition, she has had experience teaching in a Catholic elementary school in this same city as well as working as a director of a child-care center. In speaking of the students at this school, the teacher commented “they want your recognition, they
need your approval, they really are a needy bunch, I think, about social skills as well as academics."

AO, the youngest of the interviewees, was the next person interviewed. A teacher of students with special needs, this teacher has been trained in Special Needs Education and is in her 4th year at this middle school. Prior to her assignment here, this teacher did home based visits with autistic children with Cerebral Palsy through a Rhode Island Collaborative to help with the students basic functioning skills, homework and daily routines. She is currently completing a graduate program in Special Education Administration.

The fifth person interviewed, was EO, a female teacher of social studies with 16 years of teaching experience, the last 7 at this middle school. This teacher has had previous experiences as a math tutor as well as several long term substitute positions. In responding to one of the interview questions, this teacher responded “I don’t see a whole lot of struggle. I don’t see kids looking for that sense of pride in them. I think the school is preparing them, but I don’t think they are committed to their own success.”

The last person interviewed, was a middle aged science teacher with 20 years of experience, 15 years at the middle school which is the focus of this research, following 5 years of teaching at a Catholic school. This teacher had been seriously injured in the last several years in an incident during which the teacher was inadvertently hurt by one student who was targeting another student.
A summary of the teachers’ demographic information is included in the table that follows.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Gender</th>
<th>Subject</th>
<th>Relative Age</th>
<th>Years of Teaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>M</td>
<td>ELA</td>
<td>middle</td>
<td>11</td>
</tr>
<tr>
<td>EA</td>
<td>F</td>
<td>Art</td>
<td>middle</td>
<td>6</td>
</tr>
<tr>
<td>AH</td>
<td>F</td>
<td>Math</td>
<td>veteran</td>
<td>21</td>
</tr>
<tr>
<td>AO</td>
<td>F</td>
<td>SPED</td>
<td>younger</td>
<td>1</td>
</tr>
<tr>
<td>EO</td>
<td>F</td>
<td>History</td>
<td>younger</td>
<td>16</td>
</tr>
<tr>
<td>AE</td>
<td>F</td>
<td>Science</td>
<td>veteran</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 4 - 1: Demographics of interview participants

Secondary Data Sources

This research project also used historical data to support or refute the expressed opinions of the participants. In 2010, as part of the Recovery Plan created by members of this urban school district and representatives of the Massachusetts Department of Elementary and Secondary Education (DESE), teachers, students and parents were asked to complete a survey created by outside consultants, The Cambridge Education Consultants. The express purpose of this survey was to identify the perceptions and beliefs of all stakeholders in order to provide the district with a deep understanding of the culture of the school. Student and teacher participants were asked to respond to the survey with reference to the individuals in the classroom at the time the survey was taken.
School-wide results were given to teachers at the beginning of the following year. All identifying criteria, such as grade level, content area specialty, gender, number of years of teaching were all eliminated from the report. Permission from the superintendent of schools was given for the results of that survey to be used for this investigation. Of the 48 members of instructional staff 29 teachers completed the survey.

In 2011, a year after the first survey, 38 prompts were selected to be further studied after the teachers had completed professional development that focused on data analysis. In a similar fashion as the first survey, teachers teaching at a specific time were asked to complete the smaller number of prompts. These prompts addressed specific topics such as: preparedness of students, work ethic of students, work needed by teachers, teacher relationship with students, teacher relationship with parents, teacher relationships with school administrators, teacher relationship with peer educators, and teacher perception of parents. For the purpose of this analysis, only those prompts related to teachers and students or teachers and parents were utilized. The remainder of the prompts was used as follow-up for school administrative purposes. Each survey was constructed using Likert based responses. In some prompts, the responder at five choices: never, usually not, sometimes, usually, always. For other prompts, the responder may have had a different five choices, or even six choices. For the purposes of this research, the responses were grouped into three basic groups – below average, average, or above average. The responses were reported as per cents of respondents.

In some prompts, the desired response may be “never”; an example of such a prompt includes: It is unreasonable to assume that all students can succeed in my class. In other prompts, the desired response is “always”. An example of such a prompt includes: Teachers at
our school actively seek parent involvement. A summary of the prompts and the changes noted between the two surveys is included in Appendix F.

The importance of data analysis cannot be minimized. In education, political and business environments, it is critical to continually assess the strategies that are being implemented and the results that are being produced. In the current arena of accountability, the measure of the effectiveness of the work that is being done is justified through the changes in data that is gathered. Because of the work that teachers do, it is critically important for them to understand if their efforts in the classroom with students will lead to greater student achievement. Shulman places great emphasis on the use of assessment results in instructional design. Data analysis and understanding the meaning of the data that are gathered should drive the instruction for districts, for schools and for the teacher in the classroom. It is a major component that leads to greater student achievement. It is under this premise that this research project was conducted.

**Key Findings**

From these principal and secondary sources, three key findings have emerged that even after data analysis to find root causes of student lack of achievement, teachers continued to have the attitude that poverty and lack of family structure were important indicators for student lack of achievement. These findings include:

1. Even after extensive training in data analysis to identify root causes of student lack of achievement, teachers continued to connect poverty and lack of family structure with student inability to achieve at high levels.
2. Teacher attitudes towards student achievement or instructional design had minimal change following training in data analysis to identify root cause of lack of student learning.

3. Teachers found that participation in training in data analysis that was the focus of professional development was of limited value.

**Finding #1: Even after extensive training in data analysis, teachers continued to connect poverty and lack of family structure with student inability to achieve at high levels.**

**Individual interviews.** In each interview session, the conversation began with introductory questions regarding the teacher’s background and previous teaching experience. The questions then turned to what the teacher considered to be a high achieving student – what that student would ‘look like’ in a classroom setting, and if the teacher thought there were high achieving students at the middle school. Responses were coded, whereby four major themes were identified: low work ethic of students, high work ethic of teachers, lack of home/family supports and the overall value of data analysis in attempting to uncover learner difficulties.

II, in his interview, spoke mostly about the atmosphere of learning in this school. He talked often of the sense of community that the school attempted to provide for the students and how it was so important because of the lack of that sense of community or family within the homes of the students. At the same time, the teacher was expecting that the students of their own volition would be ready to partner in their potential success. “<name of school> is not just a place, <name of school> is a community, and unless the kids come into that door ready for us to be co-conspirators in their own success… then it is not going to happen.” II said that he considered his job to be available to all students to encourage them to learn, but repeatedly said that the
student had to be an equal partner of the effort. However, he also said that he was not sure that it could happen with the students at the school because of the hurdles in the child’s life that no one has identified yet.

Of all the teachers interviewed, EA had the most hopeful perspective of any of the teachers regarding the ability of students regardless of the backgrounds from which they came. This teacher recognized that kids will shut down for any number of outside reasons, but it is the teacher’s responsibility to keep working until the teacher has all the students on board.

II, with 11 years of teaching experience and AO a teacher in her first year of teaching connected the high achieving student at this middle school with one who would cooperate and participate, someone who was willing to accept the help and guidance of a teacher. However, when they each were asked why there were not many high achieving students at this middle school, the responses from both teachers connected experiences outside of the school with the ability to be able to well in school. AH noted that because of lack of exposure to places such as museums, or trips to places such as Boston, or conversations with family members regarding school, the students at this middle school could not be expected to be high achievers. Individually, AE noted that the students have the potential to do the work presented but either choose not do it or lack the motivation even to make that choice. EO stated that the students will do what is expected, but will not do anything more, stating that the students “are not committed to their own success.”

II, a veteran teacher commented in the interviews on the work ethic of peers “I think everybody in this school is to the point where they try their best to bring them to that (high
achieving) level. Outside family life faults that but as teachers I think we try to push them as hard as we can.”

In individual interviews and in the focus group conversations, teachers were asked if their participation in the Understanding Data Project which guided them through the process of analyzing student assessments, informed or changed their perceptions of students’ preparedness to learn in their class. The responses were similar for each individually and collectively. II, an English Language Arts teacher, expressed a willingness to be open minded about the process. “I know that there are communities that when you walk into the school everyone is ready (to learn). It could be age; it could be a variety of things. I think it is the community. It is just not conducive to academic success for everyone yet. I knew it all along. I was ready to be dissuaded (by the data) but I wasn't.” AO relied on the worth of her ability to understand the culture. “Maybe the parents don't have the expertise to help them and they can get a little frustrated. The parents are hard-working and they don't have time to their job. It's not just a school life problem, it is a family life problem - I didn't get that from the data project, it is my perception.”

II stated that the data just confirmed what the teachers had believed all along – that the reason why the assessment scores were low for the students at the middle school was because of the demographics of the student population. “When I came here, that's what they told me - we are the highest achieving school in the city. So when the data came out and showed our attendance rates dropping and our free and reduced numbers going up, I think a lot of people were taken aback. I do think that it showed why we have the scores that we do.”
A summary of relevant remarks by the participants in individual interviews is included in the table that follows.

<table>
<thead>
<tr>
<th>Responder</th>
<th>Teachers connect poverty and lack of family structure with the ability for students to academically achieve at high levels</th>
<th>Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AU</td>
<td>Many of them don't seem to care about their grades. They do not have the support at home, they put more time in trying to get out of something that they do in doing it.</td>
<td>Low work ethic of students; lack of home support/structure</td>
</tr>
<tr>
<td>EO</td>
<td>I think that the school is preparing them, but I don't think they are committed to their own success.</td>
<td>Low work ethic of students; high work ethic of staff</td>
</tr>
<tr>
<td>AH</td>
<td>I think that our students don't bring in enough background information with them or knowledge - a lot of them don't experience those things because of the poor families they come from. High achievers have all that extra good experience. I think we do have students who are capable of high achievement, but they have to experience more.</td>
<td>Lack of home support/structure</td>
</tr>
<tr>
<td>AH</td>
<td>I think everybody in this school is to the point where they try their best to bring them to that (high achieving) level. Outside family life faults that but as teachers I think we try to push them as hard as we can.</td>
<td>Lack of home support/structure; high work ethic of staff</td>
</tr>
<tr>
<td>II</td>
<td>Maybe the parents don't have the expertise to help them and they can get a little frustrated. The parents are hard-working and they don't have time to their job. It's not just a school life problem, it is a family life problem - I didn't get that from the data project, it is my perception.</td>
<td>Lack of home support/structure; high work ethic of staff</td>
</tr>
<tr>
<td>II</td>
<td>I know that there are communities that when you walk into the school everyone is ready (to learn). It could be age; it could be a variety of things. I think it is the community. It is just not conducive to academic success for everyone yet. I knew it all along. I was ready to be dissuaded (by the data) but I wasn't.</td>
<td>Lack of home/family structure; low work ethic of students; value of data analysis</td>
</tr>
</tbody>
</table>
Table 4 – 2: Summary of comments from individual interviews relevant to Finding #1.

**Focus group.** In the focus group conversations that followed the analysis of the individual interview responses, teachers were asked to comment on the theme that emerged of poverty and/or family structure being linked to lack of achievement by the students. AH stated that “I don’t think our students bring in enough background information with them, or knowledge…a lot of them don’t experience these things because of the poor families they come from.” EA agreed with the statement which supported AH to continue to expand her thinking. She said that the reason for the lack of experience is directly connected to family life in the city, and as teachers we had to know that and try to enhance the background knowledge that the student had to make them capable of being a high achieving student. When the researcher asked how a teacher would know that was missing from a student’s prior knowledge, both II and AH stated that they just do. EO talked of how her children would be more successful than the students that she taught because she is involved in her children’s lives, and that is not the case with the students that she teaches. “The socioeconomic issues are huge. That is what holds a lot of our kids back. I know that my children will have greater success than students who are in a lower income, one parent family.” AH and II agreed that work in data analysis of student assessments did not change their opinions about either what the high achieving student would know or be able to do, or what was missing in prior knowledge to fill in that gap.
A summary of relevant comments by teachers in the focus group regarding the connection between poverty and/or family structure and lack of academic achievement is stated in the table that follows.

<table>
<thead>
<tr>
<th>Respondent in Focus Group</th>
<th>Finding regarding poverty and/or family structure and lack of student achievement</th>
<th>Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>I work on the stereotypes of what high-achieving students look like, and I think we get that perception from what we see on movies and television. I mean we aren't immune from that....because of where we are, our students come with issues and don't seem to have the issue free life that high achieving students are depicted as.</td>
<td>Low work ethic of students</td>
</tr>
<tr>
<td>AH</td>
<td>I also think that our students don't bring in enough background information with them or knowledge - a lot of them don't experience these things because of the poor families they come from.</td>
<td>Lack of home support/structure</td>
</tr>
<tr>
<td>AH</td>
<td>(The lack of experiences) comes from the family life around here.</td>
<td>Lack of home support/structure</td>
</tr>
<tr>
<td>EA</td>
<td>I agree with this (the lack of experiences being connected to poverty and family life of students in &lt;name of city&gt;)</td>
<td>Lack of home support/structure</td>
</tr>
<tr>
<td>EO</td>
<td>I take an active role (in my children’s lives). We visit the library; we visit the museum; we have dinner conversations. The socioeconomic conditions here are huge. That is what holds our kids back. I know that my children will have a greater success than students who are in a lower income, one parent family.</td>
<td>Lack of home support/structure</td>
</tr>
</tbody>
</table>

Table 4 – 3: Summary of relevant comments made in the focus group relevant to finding #1
**Integrated evidence.** Teachers, regardless of age or years of experience, inferred that because of the poverty levels, or lack of family structure, students at this middle school did not have the work ethic that would be required for a student to be prepared to learn in order to be a high achiever. Comments reflective of lack of effort, lack of caring, lack of support, lack of experiences infused both the individual conversations as well as the focus group discussion.

**Secondary Teacher Survey Analysis**

Analysis of the prompts completed by representative teachers in 2010 and again in 2011, showed a major shift in the ‘blame’ for lack of achievement. Teachers connected the lack of supportive family structures to the families’ poverty level. They then used this rationale to explain why students were not invested in their academic success. The Tri-pod Survey specifically asked teachers in the surveys completed before and after year-long participation in data analysis to respond to the prompt: “Because of EFFORT levels, fail to complete their work on a regular basis.” In the year prior to the Understanding Data Project, 85% of the respondents agreed that was usually or always true. However, after yearlong participation in data analysis of student assessments, the number dropped to 53%. In the same survey, teachers noted a shift in responses to the prompt “I think not paying attention is the main reason students fail to understand direction” from 38% responding “usually or always” to an increase of 50% following a year of data analysis.

The teachers interviewed did not considered themselves to be similar to the students currently enrolled at the middle school. Though one of the teachers interviewed, and nine other faculty members are alumni of this middle school, all have repeatedly referred to their time as students
at ‘the old school’ as compared to the current students and time in the building that is now 90 years old. The inference being that the ‘old school’ was the school when student achievement was high, unlike the present time when student achievement is lacking. In the survey responses that were linked to teachers’ perceptions of the current students, teachers were asked if the students that were current students were “young people that you’d want your own children to get to know”, approximately half (53%) of the teachers agreed with that statement, a decline of only 2% after data analysis. In an even more dramatic response, when asked to comment on the prompt “Teachers at this school talk a lot about ways that parents need to improve” the affirmative response jumped from 51% prior to data analysis to 90% after data analysis. This was confirmed by a second prompt in which only 10% of the respondents agreed in 2011 after data analysis of student assessments with the statement “Most of what teachers say about parents in this school is positive.”

Finding #2: Teacher attitudes towards student achievement or instructional design had minimal change following training in data analysis to identify root cause of lack of student learning

Individual interviews. In the coding of this specific frame, four major themes were identified: low work ethic of students, high work ethic of teachers, lack of home/family supports and the overall value of data analysis in attempting to uncover learner difficulties. AU expressed frustration “I see kids in front of me and I know they are not getting it, but there is only one of me and I can’t get to them”. EA noted that if confusion or lack of understanding was visible, then she would observe that and try to go back and fix it. EA would base this practice upon her previous experiences in being able to interpret similar expressions by students. AU noted that in
questioning a class of students, if a student was confused by the question that was asked, she would try to remediate the lack of understanding to the class as a whole. EA in her interview, and it was later agreed upon in the focus group, that the majority of students lacked organizational skills.

More than one teacher in separate interviews spoke to the idea that in general, the numbers on student assessments told them overall what the majority of students knew or did not know and that is where the teacher would begin the instructional design. AH said that “The data project just gave me the guidance that they were low, and where to start from there. I find that the kids here don't have the background knowledge, rather than the data telling me something.” She continued to describe how she would address the lack of knowledge by the students “I look at the overall results for the school so I would know how high or low I could start.”

AO in her interview acknowledged the lack of reaction on their part when confronted with a lack of understanding on an assessment. She stated that “it could have been the wording of the question that threw the kids off; it could have been a lack of comprehension, it could have been some answer found back in the text, but it could have been not having any motivation and not wanted to do it.” EO saw the reason for data analysis, but not for that specific teacher. “If the purpose of the data project was for teachers to take data from any assessment and try to find out how kids could get it wrong, it was helpful, but it didn't change anything that I did.”

AU, a veteran science teacher, very honestly spoke of the personal experiences of data analysis that focused on question analysis. She looked at the question and understood that a student marked an incorrect answer, and as part of the exercise of data analysis was attempting to
find out why the student would have chosen the incorrect answer. “I think trying to find - the answer is 'c' but it should have been 'b' - who knows at that point? That to me is like 'you got me!'”

In his interview, when the conversation turned to the teacher’s personal use of data analysis to address lack of student understanding, II stated that after 30 hours of professional development, he had still not learned enough to be able to really make use of it. “Training in data was of limited value because I think that I need more training in looking at data. I would have to have more training before I could really intellectually own it. I have difficulty with the enormity of it all.” AU agreed when she very bluntly expressed the opinion that “the work in data analysis helped very little.”

In their conversations with this researcher during private interviews, individual teachers expressed the belief that teachers work hard, fulfill more than one role in supporting students and often encounter resistant or stubborn students. Teacher comments included such statements from AH, a veteran mathematics teacher -“right now we are the player of everything - the mother, the father, the teacher that instructs” and by similarly aged English Language Arts teacher, II, who said that “this is what we spend a lot of time doing - giving the pep talk …part of the problem and the solution is that we have to convince them that they can until they see that they can”. Teachers conveyed the opinion that they really knew what the students needed because of the previous experiences that the teacher has had rather than understanding the need from the student’s perspective. EO, the same teacher who stated her own children would be more successful than the student from a poor, single parent household summed up this view by stating “I know that I am giving them what I believe they need, but they are not carrying it on”.
of the topics that were discussed in the interviews, the teachers had more comments about the effectiveness of a teacher in remediating student learning difficulties. One teacher with over 20 years of experience made reference to the importance of relationships with students. This teacher spoke of building relationships with children attempted to make connections through reciprocal learning. “I try to teach them that no matter what the situation, if someone else knows something, they can help each other. Sometimes they can help me - I am just as human as they are.”

Two teachers spoke of their efforts in working with the students who are struggling. AO, a veteran teacher with over 20 years of experience, admitted that the instructional design was deliberately watered so that more students could be engaged and ultimately be successful. II, a teacher with less experience, acknowledged that there was effort in the planned instruction after analyzing data, but did not feel as if that effort was successful. “I am trying to hit the kids that are struggling and I don't know if I am doing it the right way, but I am keeping it in the back of my mind.”

Several teachers referred to the connection of personal or group data analysis and identification of students who were struggling. AU and EA stated that once they learned that kids were struggling, attempts were made to uncover interventions that would potentially support the students’ increased academic achievement. EA continued with that line of thought of the solution of a group application for remediation, noting that data analysis would be best to find an “overall idea of how the students were doing.” AH stated that “I am a firm believer in tracking. I think you should have children of the same level. I think that they should be at the same level so they can move faster with the students that get it and help those that can't.” AO noted that
examining student data to determine what effective instruction was fair. “I think that looking at the teacher does show things - it is a good indicator of where they are and what we are teaching. Obviously if students are doing well, it does have a reflection on us.”

Of all the teachers in individual interviews, only two stated that the work in data analysis actually did affect their instructional design. The youngest and least veteran teacher, AO stated that after analyzing benchmark assessment results for the students with whom the teacher works, “in the math class, if I find that these same students are still having a problem with division, I will pull them aside and just work on that basic skill of division rather than to push them forward.” Mini observations or walk-throughs in which this teacher is observed working with students, gives evidence that this teacher incorporated this strategy into every day practice. The second more veteran teacher, II, told this researcher of the impact of data analysis on his instructional planning process:

“Well, I certainly thought about the data when I was designing my lessons. I think that my lessons changed from inception - the blank page - to print and then translated into action in the classroom - more out of our meetings with our department heads and talk, more than the data. Data came in as a ghost that was looking over my shoulder and making me think. Even if there was never anything overt in my lessons, it was in the back of my mind.”

According to this view, the problem was systemic. “What I did notice that whatever was happening was happening in all four middle schools - all the data hovered around the same things in each of the schools - so it was probably curriculum and methods.”

A summary of relevant comments by teachers in individual interviews is summarized in the table that follows.
<table>
<thead>
<tr>
<th>Responder</th>
<th>Teacher attitudes towards student achievement or instructional design did not change following training in data analysis to identify root cause of lack of student learning.</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA</td>
<td>students <strong>shut down</strong> for an <strong>outside reason</strong></td>
<td>Low work ethic for students; lack of home/family structure</td>
</tr>
<tr>
<td>EA</td>
<td>sometimes the things we ask them <strong>depend on developmentally if they have those abilities</strong></td>
<td>Low work ethic of students</td>
</tr>
<tr>
<td>EA</td>
<td>I know that if there is a <strong>break in the connection</strong> that I am trying to make, I go back and fix it</td>
<td>High work ethic of teachers</td>
</tr>
<tr>
<td>EA</td>
<td>I am asking more questions along the way to see if they understand, I am <strong>trying to find out if they remember</strong> everything</td>
<td>High work ethic of teachers</td>
</tr>
<tr>
<td>AU</td>
<td>I try to <strong>design lessons</strong> where the kids get most of the support here. I know that many of the kids <strong>don't have any support at home</strong></td>
<td>High work ethic of teachers; lack of home/family structure</td>
</tr>
<tr>
<td>II</td>
<td>They expect us to do so well, but with <strong>limited kids</strong> - if we could have done it by now, wouldn't we?</td>
<td>High work ethic of teachers; low work ethic of students</td>
</tr>
<tr>
<td>AH</td>
<td><strong>Our students need nurturing</strong>, they want your recognition, they need your approval; they are really a needy bunch.</td>
<td>Lack of home/family structure</td>
</tr>
<tr>
<td>AH</td>
<td><strong>The data project just gave me the guidance</strong> that they were low, and where to start from there. I find that the <strong>kids here don't have the background knowledge</strong>, rather than the data telling me something. <strong>Most of the kids are low income and don't have the experiences</strong> that kids from Dartmouth can experience. When they experience these things (like visiting Science museum) it becomes part of their social background</td>
<td>Lack of home/family structure; value of data analysis; low work ethic of students</td>
</tr>
<tr>
<td>AH</td>
<td>I look at the <strong>overall results</strong> for the school so I would know how high or low I could start</td>
<td>Value of data analysis</td>
</tr>
<tr>
<td></td>
<td>Statement</td>
<td>Notes</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>AO</td>
<td>I think it had to do with both - data and working with the kids. It could have been the wording of the question that threw the kids off; it could have been a lack of comprehension, it could have been some answer found back in the text, but it could have been not having any motivation and not wanted to do it.</td>
<td>Value of data analysis; low work ethic of students</td>
</tr>
<tr>
<td>AO</td>
<td>When I came here, that's what they told me - we are the highest achieving school in the city. So when the data came out and showed our attendance rates dropping and our free and reduced numbers going up, I think a lot of people were taken aback. I do think that it showed why we have the scores that we do. Students are struggling and we are not doing what is necessary to meet their needs.</td>
<td>Lack of home support/structure; high work ethic of teachers; value of data analysis</td>
</tr>
<tr>
<td>II</td>
<td>A low achieving student may be non-participative for a variety of reasons that are not apparent versus a child who desperately want to learn stand academic skills that is experiencing hurdles. Hurdles that maybe no one has identified</td>
<td>Lack of home support/structure</td>
</tr>
<tr>
<td>EA</td>
<td>helped me to go further into trying to find things that would be helpful so that students learn even more</td>
<td>Value of data analysis</td>
</tr>
<tr>
<td>EA</td>
<td>helpful to get an overall idea of how all the students were doing - when we narrowed it down to who wasn't doing well and we found it was the majority of the kids; I did research to find out how kids could learn even better - found 'round' flash cards</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Value of data analysis; high work ethic of teacher</td>
</tr>
<tr>
<td>EA</td>
<td>(strategies of using student work as models) I notice that I am doing it more.</td>
<td>High work ethic of teachers</td>
</tr>
<tr>
<td>AU</td>
<td>I think the work in data was interesting to see, I don't think I actually have it in my thoughts when I plan.</td>
<td>Value of data analysis; high work ethic of teachers</td>
</tr>
<tr>
<td>AU</td>
<td>I know that I am watering material down.</td>
<td>High work ethic of teachers</td>
</tr>
<tr>
<td>AU</td>
<td>I am trying to hit the kids that are struggling and I don't know if I am doing it the right way, but I am keeping it in the back of my mind.</td>
<td>High work ethic of teachers; value of data analysis</td>
</tr>
<tr>
<td>AU</td>
<td>Participation did not change anything in the way I design my lessons or evaluate kids</td>
<td>Value of data analysis</td>
</tr>
<tr>
<td>EO</td>
<td>I know that I am giving them what I believe they need, but they are not carrying it on</td>
<td>High work ethic of teachers; low work ethic of teachers</td>
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<tr>
<td></td>
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</tr>
<tr>
<td><strong>AH</strong></td>
<td>I try to teach them that no matter what the situation, if someone else knows something, they can help each other. Sometimes they can help me - I am just as human as they are.</td>
<td>High work ethic of teachers</td>
</tr>
<tr>
<td><strong>AH</strong></td>
<td>Teachers have to give clear and concise directions, have to treat kid fairly, help all of them. I am a firm believer in tracking. I think you should have children of the same level. I think that they should be at the same level so they can move faster with the students that get it and help those that can't</td>
<td>High work ethic of teachers</td>
</tr>
<tr>
<td><strong>AH</strong></td>
<td>Did the data help you get to these conclusions? No it is just my perception. It is my years of experience.</td>
<td>High work ethic of teachers</td>
</tr>
<tr>
<td><strong>AO</strong></td>
<td>I think that looking at the teacher does show things - it is a good indicator of where they are and what we are teaching. Obviously if students are doing well, it does have a reflection on us. This is where the students are not doing well and the areas that we have to work on</td>
<td>Value of data analysis; high work ethic of teachers</td>
</tr>
<tr>
<td><strong>AO</strong></td>
<td>I think now that I look at data - especially math, that the students don't have the basic skills to do the application problems which require those skills. So in the math class, if I find that these students are having a problem with division, I will pull them aside and just work on that basic skill of division before you push them forward. You can't keep pushing them just to move on.</td>
<td>High work ethic of teachers; low work ethic of students</td>
</tr>
<tr>
<td><strong>II</strong></td>
<td>What I did notice that whatever was happening was happening in all four middle schools - all the data hovered around the same things in each of the schools - so it was probably curriculum and methods</td>
<td>Value of data analysis</td>
</tr>
<tr>
<td><strong>II</strong></td>
<td>It is important that know that it can be better. Shared responsibility.</td>
<td>Value of data analysis</td>
</tr>
</tbody>
</table>
Well, I certainly thought about the data when I was designing my lessons. I think that my lessons changed from inception - the blank page - to print and then translated into action in the classroom - more out of our meetings with our department heads and talk, more than the data. Data came in as a ghost that was looking over my shoulder and making me think. Even if there was never anything overt in my lessons, it was in the back of my mind.

Table 4 – 4: Summary of comments relevant to Finding #2 from individual interviews.

Focus group. When this specific finding was presented to the focus group, conversation turned lively. Teachers acknowledged that they could identify where the lower scores were on an assessment, even to the point where they could identify the question that was problematic and a specific student who had a problem with that question. The next step is where the difficulty began. Teacher after teacher agreed that they just didn’t know what to do next. II stated, that the data just confirmed what he already knew – that the students were not academically successful. He said that the process just left him with more questions, when he was looking for the ‘silver bullet’ that would tell him how to fix the problem that led to that lack of student understanding. He went further in the conversation to say that when someone could point out the information to him and identify a problem area shown in the data that was under discussion, he could see it, but would have difficulty in finding it himself. II, a teacher of English Language Arts, readily admits that working with numbers is very difficult for him, though he understands that he needs to gain that skill.

Several teachers, including AH, AU and EA did not look at individual students, but looked at the information in other ways to uncover difficulties in understanding that students may have.
AH says that because of the large number of students she teaches, she just is aware of trends, but not specific students. Her strategy would be to “just go with it (the lesson being taught) and see who gets it and who doesn’t.” AU looks at where her students scored lower in comparison with a peer teacher of the same discipline. She admits in the conversation that she may change her instruction for the following year, but not for the current time. EA looks at questions, but not at the student. This teacher identifies where students in the grade may have gotten an area or a question with poor scores, and then tries to plan lessons that would address that gap. All students would receive the lesson adjustment, not just those that answered it incorrectly.

This researcher framed the purpose of the Understanding Data Project as intended to teach teachers how to analyze data from student assessments to identify student lack of achievement and to target teacher instruction to remediate the lack of learning. It was envisioned by the district that the teachers would be doing the data analysis of student assessments as part of their normal common planning time: that the teachers would take a look at results of student assessments and through the process that they had been taught, they would go through this and see - okay this is the reason why students didn't get it here and this is why students in this group got it and incorporate interventions to remediate the gap or lack of learning. This researcher asked the focus group if that is how it played out during the year. AH spoke first and responded: “Didn’t happen”. The teachers present in the focus group agreed with this opinion. All of the teachers expressed difficulty with trying to understand the amount of data that was given to them through the process outlined in the Understanding Data Project. EA, an art teacher, noted the difficulty of working with the information: “we didn't have a goal when we were doing it, we were trying to figure out one thing one week and then another thing another week but there
wasn’t any continuity. We did the assignment, and once it was documented, there was no further discussion on it. It was like getting a homework assignment and doing it, but not going over it.”

AU, whose background is in the sciences, also had difficulty with the amount of information that teachers were exposed to “All I saw was numbers. When you put it more personal these are **my** numbers, and then it counts a whole lot more.”

Two teachers, II and AH, stated specifically that all the work done didn’t given them any new information, but just confirmed what they had thought, so there was no need to do anything different in designing the lessons for the students. However, others such as AO and AU, found that the use of the information that came from the data that was analyzed may be used in the following year, or when the lesson was repeated, but neither mentioned returning to the students who showed the lack of understanding to fill in the gap or remediate the misunderstanding.

This researcher in concluding the discussion in the focus group, offered this statement as a summarizing thought: “After going through the process of data drill downs, the results had minimal meaning for teachers, but if the data was personalized for the teacher and presented in a different way, then the teacher would likely make a connection between the results and what needed to be changed in the teacher's curriculum and practice.” Individually, each teacher agreed.

A summary of relevant comments regarding this finding is included in the table that follows. Themes that emerged in this focus group analysis were two: high work ethic of teachers, value of data analysis.
<table>
<thead>
<tr>
<th>Responder in Focus Group</th>
<th>Finding #2: Teacher attitudes towards student achievement or instructional design did not change following training in data analysis to identify root cause of lack of student learning.</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>It just <strong>left me with more questions</strong> - like <strong>how do we do it?</strong></td>
<td>Value of data analysis</td>
</tr>
<tr>
<td>II</td>
<td>When we were going over the MCAS and GRADE data it was just <strong>more (meaningful)</strong> because we can see that this kid is at a first grade reading level and here is what they got wrong on the test and what he got right versus other kids and it is just <strong>more personal and we can see it</strong>. M (the department chair) would ask me - do you see that? And I can say 'yes' because I can see it.</td>
<td>Value of data analysis</td>
</tr>
<tr>
<td>AH</td>
<td>You can see a pattern - what didn't work in your class. Like when you look at the data you can go question to question, what class got it, what class did not, what you did differently. That kind of data is more <strong>useful</strong>, rather than just slapping a bunch of numbers</td>
<td>High work ethic of teachers; value of data analysis</td>
</tr>
<tr>
<td>AU</td>
<td>Seeing how my kids, my personal kids did as compared with kids in other middle schools, it <strong>give me a better idea of here is where I need to focus</strong></td>
<td>High work ethic of teachers; value of data analysis</td>
</tr>
<tr>
<td>II</td>
<td>When we look at the <strong>data and the breakdown</strong>, we can see what kids are strong in and what kids are weak in.</td>
<td>Value of data analysis</td>
</tr>
<tr>
<td>AH</td>
<td>I have just so many kids. You just go by what is <strong>happening in front of you</strong>. You are dealing with every day and the now. Now I just go with it and see who picks it up and who doesn't and <strong>who needs extra time</strong></td>
<td>High work ethic of teachers;</td>
</tr>
<tr>
<td>AE</td>
<td>We <strong>look at the questions</strong>, not the kids. We just <strong>try to do things in class towards the one that was a problem question</strong>.</td>
<td>High work ethic of teachers; value of data analysis</td>
</tr>
<tr>
<td>AO</td>
<td>(That's the big part - <strong>you can see the data</strong>, but does it change anything about what you do or what you think?) I can say I try to, but I can't see it. I think well I'll try it next year.</td>
<td>High work ethic of teachers, value of data analysis</td>
</tr>
<tr>
<td>All agreed</td>
<td>After going through the process of data drill downs, the <strong>results had minimal meaning</strong> for teachers, but if the data was personalized for the teacher and presented in a different way, then the teacher would likely make a connection between the results and what needed to be changed in the teacher's <strong>curriculum and practice</strong>.</td>
<td>High work ethic of teachers, value of data analysis</td>
</tr>
<tr>
<td></td>
<td>I think that we can probably tell you the results before you even give a survey. I think we are pretty well aware of what is going on.</td>
<td>High work ethic of teachers, value of data analysis</td>
</tr>
<tr>
<td>---</td>
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<td>---</td>
</tr>
<tr>
<td>II</td>
<td>I think it just confirmed what we had thought. Not in terms of hard numbers, because you are never really sure of what the hard numbers are, but in general in the complexity, it was kind of what I thought.</td>
<td>High work ethic of teachers, value of data analysis</td>
</tr>
<tr>
<td>II</td>
<td>(Do you think that working with the data helped you come to the conclusion &lt;high achieving students&gt;?) I automatically do it.</td>
<td>High work ethic of teachers, value of data analysis</td>
</tr>
<tr>
<td>II</td>
<td>I think it is seductive to look at these vast numbers and say 'ooh' and now we have to share these vast numbers with everyone. I just don’t see how much good it does without being broken down further and the intellectual digestion that we need to see.</td>
<td>High work ethic of teachers, value of data analysis</td>
</tr>
<tr>
<td>II</td>
<td>Even the nature of the question can show you whether it is a skills thing - like recognizing grammar or mechanics, or if it is a literary focus or comprehension of the idea. When we look at the data and the breakdown, we can see what kids are strong in and what kids are weak in or see maybe where we can tweak our instruction to either include all of them.</td>
<td>High work ethic of teachers, value of data analysis</td>
</tr>
<tr>
<td>AH</td>
<td>(It was envisioned that the teachers would be doing the data analysis as part of their normal common planning time. That the teachers would take a look at results of student assessments and through the process that they had been taught, they would go through this and see - okay this is the reason why students didn't get it here and this is why students in this group got it). Didn’t happen. Didn’t happen.</td>
<td>High work ethic of teachers, value of data analysis</td>
</tr>
<tr>
<td>AH</td>
<td>I personally don't think that the data thing helped me one way or the other with my teaching skills. I just did it myself.</td>
<td>High work ethic of teachers, value of data analysis</td>
</tr>
<tr>
<td>AU</td>
<td>I do it even with one question - I didn't hit that hard enough or what can I do as an activity or something that can make that better.</td>
<td>High work ethic of teachers, value of data analysis</td>
</tr>
</tbody>
</table>

Table 4 – 5: Summary of findings relevant to Finding #2 from Focus Group discussion.
**Integrated evidence.** As part of the Understanding Data Project, a room within the school had been set aside as to the sole location for data analysis. Working charts and graphs were posted on the walls and were ‘living’ documents as the work unfolded. One of the areas on the walls was a place for teachers to write comments regarding different general aspects of data analysis. One such area included comments by teachers after data analysis of student assessments regarding possible student learner difficulties. Teachers’ comments included: “students show a lack of mastery of the English language”, “students are moving at too fast a rate, they have to move on before they can master a concept or skill”, “basic skills are not mastered”, “there is an inability of students to apply knowledge of one concept to another”, and “students are unable to understand what the question is asking.” This was similar to the views expressed during the interviews and focus group discussions – data analysis could be used to identify a generalized problem, but the next step of identifying a possible solution was never part of the discussion. In addition, identified learner difficulties at the individual student level were never part of the process. Instead, broad stroke conclusions of group, or grade or content area lack of student learning were segregated.

AH believed that students knew that they could come to that teacher if the student was frustrated. In fact that specific teacher was the only teacher who was hugged by students during a recent awards celebration. The support that gives students, however, is more emotional rather than remediating learning difficulties. This teacher spoke of building relationships with children attempted to make connections through reciprocal learning. “I try to teach them that no matter what the situation, if someone else knows something, they can help each other. Sometimes they can help me - I am just as human as they are.”
What was interesting to note was that in the responses to prompts on the teacher surveys completed in 2010 and again in 2011 that were specific to teachers learning new strategies to remediate student gaps, or as a result of data analysis teachers had improved instruction, teacher affirmative responses dropped significantly. In the prompt “I’d like to learn better ways of explaining things that students find difficult to understand” affirmative responses dropped from 83% before data analysis, to 50% after data analysis training. To the prompt ‘We have improved instruction here by analyzing and learning from student work”, again the change in responses was similar- a significant decline in agreement. In 2010, before data analysis, teachers said that was usually or always true 76% of the time, and after data analysis, agreed with the statement only 55%.

Finding #3: Teachers found that participation in training in data analysis that was the focus of professional development was of limited value.

In individual teacher interviews and again in the focus group conversation, significant time was spent in speaking to the general use by teachers of data analysis in any part of their educational practice – specifically of what use did teachers find of the time and cost spent in the Understanding Data Project. In previous sections, teacher responses were generally negative as to the value of participation of the Understanding Data Project as it related to specifically changing instructional design that would increase student achievement. However, when the conversation focused solely on the general use of data analysis, teachers expressed the worth of the training. The teachers’ responses were coded into themes including high work ethic of teachers and value of data analysis. In addition, responses that included themes of the value of data analysis were broken into three major categories – those who did not see any value in the
training, nor did the teacher use anything that was included in the training (low), a second group who could see the value of the use of data, but would have modifications to the way it was presented (some), and the third group who could see the benefit of incorporating data analysis prior to working with students (high).

EA, AH and EO saw little or no value in the training, and their comments were very straightforward: “I didn’t use it.” At the other extreme was II who expressed the value of learning the information that can come from data analysis and spoke of good intentions to be more dutiful in working with the skills in data analysis that was taught. “I think that the data project made me more aware. Before I would just look at the numbers and I didn't know what to do with them. But now I have somewhere to go with it. I have some questions to ask and maybe break it up into categories, maybe make the data make a difference in teaching.” At another point in the conversation, the same teacher stated that “I think it would benefit me because I will think about this conversation and I will have to pay more attention to it. I know that data can be very useful and I have to commit. I am asking students to commit to their achievement and I have to do so as well.”

What was very helpful were the suggestions made by the teachers in both individual conversations and in focus group discussion so that data could be of more use to the individual teacher. EO, a teacher who did not use data in instructional design, stated that just as teachers are expected to differentiate information to students based upon the prior knowledge and current skills of students, data would be more useful to individual teachers if the data presentation was differentiated as well. AU, another veteran teacher who admitted to not using data in her instructional decisions, could see the teacher utilizing the information to support student learning
if the data was disaggregated and specifically given to the teacher rather than the teacher going through the process of analyzing it.

AH, an experienced older teacher stated that the process of going from the school data, to the grade data, to the discipline data, to the disaggregated groups, to the student and then finally to the question was just too much. The teacher said all the information at the beginning – the global perspective –, and the question and student analysis - the specific analysis where the crux of the critical information would be - was interesting. However, the teacher stated that all ‘that stuff in the middle’ was distracting and not worthwhile. This teacher felt that fellow teachers became bogged down by the long process and lost interest and motivation in continuing to be invested in the process.

One teacher, EA, near the beginning of her career expressed hope:

I think I understand that there is a human quality in the data too, and that sometimes some things may not just go the way you like or had planned to go. But every time we are shown something that we could improve upon, we should try to take the opportunity to see both sides and we should do the best we can. And if we are doing the best we can and are not being successful, then we should ask more questions until we can find things that can actually help us.

The following table summarizes the findings of the individual interviews
<table>
<thead>
<tr>
<th>Responder</th>
<th>Finding #3  Value of data analysis by the teacher</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA</td>
<td>I think I understand that there is a human quality in the data too, and that sometimes some things may not just go the way you like or had planned to go. But every time we are shown something that we could improve upon, we should try to take the opportunity to see both sides and we should do the best we can. And if we are doing the best we can and are not being successful, then we should ask more questions until we can find things that can actually help us.</td>
<td>High work ethic of teachers</td>
</tr>
<tr>
<td>EA</td>
<td>I think if they (teachers) get the reasons why, it might make the teachers see something differently.</td>
<td>High work ethic of teachers</td>
</tr>
<tr>
<td>EA</td>
<td>didn't change anything for me, but I kept it in the back of my mind; it was registering</td>
<td>Value of data analysis (low)</td>
</tr>
<tr>
<td>AU</td>
<td>There were certain pockets that I found valuable, but making charts and having them around - it was just charts, it didn't mean a whole lot to me</td>
<td>Value of data analysis (some)</td>
</tr>
<tr>
<td>AU</td>
<td>All the information was from the prior year so it was hard to fix the problem because the students had moved on</td>
<td>Value of data analysis (low); high work ethic of teacher</td>
</tr>
<tr>
<td>EO</td>
<td>I don't know how to interpret data. I really have a hard time with that. And that is my fault, and I really haven't tried to get better at it. It isn't something that I practice.</td>
<td>Value of data analysis (low); high work ethic of teacher</td>
</tr>
<tr>
<td>EO</td>
<td>Administration can see the value of it, then they should present it to us in a differentiated way - then I could see it would be valuable. I know that I have to commit strong to using it.</td>
<td>High work ethic of teachers</td>
</tr>
<tr>
<td>EO</td>
<td>I think it would benefit me because I will think about this conversation and I will have to pay more attention to it. I know that data can be very useful and I have to commit. I am asking students to commit to their achievement and I have to do so as well.</td>
<td>High work ethic of teachers; value of data</td>
</tr>
<tr>
<td></td>
<td>Analysis (some)</td>
<td></td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td><strong>EO</strong></td>
<td>It was difficult to understand the numbers in the manner in which it was presented. It would be more helpful if people could interpret it and tell you what it looked like.</td>
<td>Value of data analysis (low)</td>
</tr>
<tr>
<td><strong>AH</strong></td>
<td>Value of the data project - it made me aware of how low they are, but it really hasn't done much for my classroom</td>
<td>Value of data analysis (some); high work ethic of teachers</td>
</tr>
<tr>
<td><strong>AH</strong></td>
<td>I think if you give all the overall data at the beginning that would be good, but all those things in between really didn't help. We did all the exercises - put the chart paper up and the exercises - but did we bring it back to the classroom? No it didn't, It made us aware - oh wow!, but that was all.</td>
<td>Value of data analysis (some); high work ethic of teachers</td>
</tr>
<tr>
<td><strong>AH</strong></td>
<td>Other than the original overview of the data, I didn't use it</td>
<td>Value of data analysis (low)</td>
</tr>
<tr>
<td><strong>AO</strong></td>
<td>Teachers saw the data and were like shocked by what students had said. I do think that it made a difference with what the students said. I think that it made the teachers question themselves, but I don't think that the data from that was used as it should have been. I don't think we did enough with it.</td>
<td>Value of data analysis (some); high work ethic of teachers</td>
</tr>
<tr>
<td><strong>AO</strong></td>
<td>I think that the data project made me more aware. Before I would just look at the numbers and I didn't know what to do with them. But now I have somewhere to go with it. I have some questions to ask and maybe break it up into categories, maybe make the data make a difference in teaching.</td>
<td>Value of data analysis (some)</td>
</tr>
</tbody>
</table>
Data can be overwhelming and difficulty to process. Looking at the numbers it shows that our scores are doing down, but that is something that we can learn from. We need to share what we are doing that is working.

I have to admit - I am not a numbers person - I know that is trite. But if someone who studies data can point out to me what the data means, then it is very helpful to me.

I hope that as we continue to look at data that it continues to inform our practice - the way we run our classes, the way you run the school - that we see a change in the data and see that our efforts to become fruitful and not as fruitless as they have been in the past.

Table 4 – 6: Summary of comments relevant to Finding #3 from Individual Interviews.

Focus Group. Again, it was in speaking of this specific aspect of data analysis – that of it’s worth, the conversation in the focus group became livelier. While teachers in individual interviews in the majority had negative opinions as to the effect of data analysis on their identification of student learning difficulties, or its impact on instructional design, teachers in the focus group conversation did affirm two basic things – first that it was difficult for them to go through the process, and second, that if the teacher had the data broken down for, it would be more likely to affect their instructional practice and eventually lead to greater student achievement. AU, a science teacher, said that “it was too much numbers for me …. all I saw was numbers. When you put it more personal these are my numbers, and then it counts a whole lot more.” This same teacher spoke of when her department chair broke down the data on a recent
benchmark assessment, and compared the results of this teacher’s classroom as compared to a peer teacher whose students took the same benchmark assessment at the same time. “When we do a benchmark and see how my kids did in comparison to EW (peer teacher) or other kids in middle schools, it gives me a better idea of here is where I need to focus.” However, while the teachers spoke of the potential value of the impact of data analysis on instructional design and student achievement, two things are missing – the teachers rarely, if ever discuss the identification of learning difficulties at the individual student level, and while there was some affirmation of the process leading in some cases to a question, or topic, or area of low scoring, there was never a discussion or strategy about what to do with the students whose results were analyzed to show lack of understanding.

In the table that follows, a summary of relevant statements during a focus group conversation by teachers individually or in collective agreement is presented.

<table>
<thead>
<tr>
<th>Respondent in Focus Group</th>
<th>Finding #3: Value of data analysis by the teacher</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>When we went through the data drill downs it didn’t change what we thought before we did that</td>
<td>Value of data analysis (low)</td>
</tr>
<tr>
<td>EA</td>
<td>(Was the data project worth it?) All - No. We didn’t have a goal when we were doing it, we were trying to figure out one thing one week and then another thing another week but there wasn't any continuity. We did the assignment, and once it was documented, there was no further discussion on it. It was like getting a homework assignment and doing it, but not going over it.</td>
<td>Value of data analysis (low)</td>
</tr>
<tr>
<td></td>
<td>(Do you think that working with the data helped you come to the conclusion &lt;high achieving students?&gt;)?</td>
<td>High work ethic of teachers</td>
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<td>---</td>
<td>---------------------------------------------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>AH</td>
<td>I personally don't think that the data thing helped me one way or the other with my teaching skills. I just did it myself.</td>
<td>Value of data analysis (low); high work ethic of teachers</td>
</tr>
<tr>
<td>AH</td>
<td>(Did you use the process?) No</td>
<td>Value of data analysis (low)</td>
</tr>
<tr>
<td>AH</td>
<td>(Did it change your teaching style?) No</td>
<td>Value of data analysis (low)</td>
</tr>
<tr>
<td>AH</td>
<td>I don't think every kid is a number. I think you have to take their whole different aspect to it. Teaching is a far different ball game than just data.</td>
<td>Value of data analysis (low)</td>
</tr>
<tr>
<td>AU</td>
<td>It was too much numbers for me. Like I have to put a face to the numbers</td>
<td>Value of data analysis (low)</td>
</tr>
<tr>
<td>AU</td>
<td>All I saw was numbers. When you put it more personal these are my numbers, and then it counts a whole lot more.</td>
<td>Value of data analysis (some)</td>
</tr>
<tr>
<td>AU</td>
<td>When we do a benchmark and see how my kids did in comparison to EW (peer teacher) or other kids in middle schools, it gives me a better idea of here is where I need to focus.</td>
<td>Value of data analysis (some); high work ethic of teachers</td>
</tr>
</tbody>
</table>

### Table 4 – 7: Summary of comments relevant to Finding #3 from Focus Group discussion

**Integrated evidence.** With the beginning of the school year that followed the Understanding Data Project, focused professional development on data analysis was not included in the plan for the year. The person who was trained as the data coach for this middle school resigned and is now working in another district as a math coach. The data ‘war room’ had to be reassigned as a classroom. However, data from spring time MCAS, GRADE results from the fall assessment, and frequent periodic benchmark results are broken down by a district data analyst, shared with the department chairs of the four major disciplines, who in turn work with the content teachers in
small groups in each grade to review the data. It is during these discussions, that the data work is being done with fidelity. However, while it is data analysis, it still is not at the level to address two factors absent from the discussions for this research project. The data analysis is still at the question, content or skill level, and not at the identification of the individual student lack of understanding. While there is discussion about what to change in the scope and sequence of the material that had been analyzed for the next presentation, there is still no remediation for the students whose scores were low.

**Theoretical Framework**

One of Shulman’s major tenets of Pedagogical Content Knowledge speaks to the teachers’ knowledge of students’ prior knowledge as one factor leading to eventual successful learning by students. From the analysis of individual interview comments, the focus group conversation and the integration of historical data, the teachers at this middle school do believe it is important for a teacher to know the prior knowledge of a student. In the vast majority of discussion, teachers believed that either from their long experiences with students, the teachers could correctly assume the appropriate background knowledge or experiences of their students. From the focus group conversation, the teachers assume a general lack of support, experiences and skills because of the demographics of the students in the current school, and make no effort to individualize the background knowledge of the student. The first key finding – even after data analysis of student assessments, teachers continued to connect poverty and lack of family structure with student inability to achieve at levels - confirms Shulman’s major component of successful student learning. Teachers feel prior knowledge is important in being a high achieving student, but
teachers rely on their experiences and collective judgment of the students to determine what that background knowledge is.

The second finding was that teacher attitudes toward student achievement and the teachers’ instructional design changed minimally following training in data analysis to identify root causes of lack of student learning. After analysis of individual interviews and focus group discussion this finding again confirms what Shulman lists as one key component of Pedagogical Content Knowledge, that being teacher knowledge of learner difficulties as a necessary factor that would lead to student achievement and that teachers should design instruction based on what the students know and are able to do. Shulman understood the critical importance that instruction needed to change if student assessments did not show student achievement. The teachers in this research project confirmed that if the overall results showed that there was lack of success on student assessments in a type of question or content area, then the teacher would adjust instruction for the next time that concept or skill was taught. In some cases, teachers said that they would look to see if a partner teacher was more successful in a particular student assessment and investigate what could have been done differently. However, in the teachers’ conversations the practice of adjusting instruction was at the global level and not the individual student. What may be called into question is the process of the Understanding Data Project and its effective use by the teachers during the professional development sessions. Teachers may have been led to the conclusions that were evident through the data, but never pushed to theorize as to the reason why the data showed what it did, nor why a particular student answered in a specific manner. In addition, the Understanding Data Project process never reached the level where the teachers
would design a corrective or remediative strategy for the unsuccessfully learned concept or skill, either for future instruction or for recovery of lost learning.

The third key finding was related to the value teachers placed on professional development that trained them in the effective use of data analysis. After the integration and analysis of individual teacher interviews, focus group discussion and relevant data, it was found that teachers viewed the professional development process that focused on data analysis of student assessments to be of limited value in their work towards increasing student achievement. Since data analysis can be used to identify root cause of student lack of learning, student learning difficulties as well as targeting successful teaching strategies, training in this skill would be critical for a teacher. However, teachers did not feel that the process of the Understanding Data Project allowed them to reach that point. These findings also confirm Shulman’s Pedagogical Content Knowledge theory. Teachers all agreed that it was important to examine how students demonstrated their knowledge of a concept or a skill through student assessments. Teachers also agreed that it was important to look at the analysis of these assessments. The fact that they did not do it to the point that Shulman believes was critical – that of the identification and scaffolding for the individual student - does not mean that the teachers disagreed with it. In fact several teachers thought the manner in which they currently were addressing gaps in learning as shown on student assessments, would prevent the gap from occurring in a subsequent group of students.
Summary

The theoretical framework, through which this research project was undertaken, was Shulman’s (1987) Pedagogical Content Knowledge (PCK). Pivotal to this instructional approach was the idea that teachers needed to have a blending of pedagogy and content, and that this blend had to fulfill specific needs of the student if the student was to be a successful learner of that particular discipline. While Shulman’s (1987) approach is separated into multiple areas, three of these were used as a frame for the qualitative analysis of the results of the interviews and focus group conversations. These three include: knowledge of students’ prior knowledge, knowledge of learner difficulties and knowledge of teaching strategies that result in better teaching.

This research project included individual interviews with 6 separate teachers, focusing on the use of data and its impact on the teacher’s attitude towards student achievement, and the use of data analysis of student assessment to improve instructional design. After individual interviews were analyzed and identified into four separate themes, the individual teachers were then invited to participate in a focus group to discuss the common themes. The process of review, analysis and categorization was repeated with the focus group conversation.

Once all primary sources of interview responses and focus group conversations were analyzed and coded into the four different themes, they were then organized into three major findings. In the previous section, the findings were reported through both individual interview and focus group conversation analysis. Secondary sources such as historical data that either supported or refuted the findings were included. The next section includes the discussion of the response analysis. Each of the sections focuses on the fundamental research question: Will participating
in data analysis impact teachers’ attitudes relative to the relationship between student achievement and their instructional practices?

From these principal and secondary sources, three key findings have emerged. These findings include:

1. Even after data analysis of student assessments, teachers continued to connect poverty with the ability for students to academically achieve at high levels. This finding confirms Shulman’s theory of PCK. For the majority of teachers who participated in this research study, based upon their previous experiences or assumptions, assume a general lack of support, experiences and skills because of the demographics of the students in the current school, and make no effort to individualize the background knowledge of the student.

2. Teacher attitudes towards student achievement or instructional design changed minimally following training in data analysis to identify root cause of lack of student learning. This finding confirms Shulman’s theory because the teachers did use data analysis of student assessments to uncover lack of student achievement on the school, grade or class level but did not continue to refine their investigation to change their instructional design or to apply the analysis to the individual student.

3. Teachers found that professional development that focused on data analysis of student assessment to be of limited value in their work towards increasing student achievement. This finding confirmed Shulman’s Pedagogical Content Knowledge theory which emphasizes the need for the teacher to know and understand the background of the student as well as the effectiveness of the instruction that is being conducted. However, while some teachers could see
the benefit of using data analysis, there was significant criticism of the process through which the professional development was conducted

**Relevant information.** In 2010, the district administration entered into a three year contract with The Educational Research Center (TERC). The intent of this agreement was to use a train-the-trainer model to instruct all staff within every public school in the process of data analysis to uncover and then to remediate reasons for student lack of achievement. During the school year 2010-2011, staff at the middle school – as well as in every other public school in the district – devoted all professional development time to the Understanding Data Project.

At the end of the 2010-2011 school year, two significant events occurred. The yearly MCAS assessments for the middle school students showed minimal change. (Appendix E). The district cancelled the remainder of the contract for the Understanding Data Project.
Chapter 5: Summary, Conclusions and Recommendations

Introduction

This chapter begins with a statement of the problem of practice that was the crux of this qualitative research project. The second section of this chapter, presents a discussion of the principal findings. The next section offers the conclusions based upon the principal findings. The chapter concludes with a discussion of the limitations of the study, recommendations for current practice and possible future research.

Statement of Problem

The focus of this research was a moderate sized middle school in an urban setting designated by the Massachusetts Department of Elementary and Secondary Education (DESE) as consistently underperforming as determined by repeatedly failing to make adequate yearly progress on state spring assessments in English Language Arts and Mathematics for grades 6 through 8. Until 2003, the school had been known as the home of the top academic achieving students. The general perception among the school’s teachers has been that the demographic changes among the student community led to a measurable drop in student achievement as measured by the annual state assessments. An increase in minority students as well as a dramatic change in the numbers of students identified for financial support through free or reduced lunch applications has altered the profile of the collective student body. Parent participation and presence at school events have also declined in recent years. In determining other factors that might contribute to declining achievement, teachers have been reluctant to attribute any responsibility to curriculum or instruction.
Research Question

This case study asked one basic question:

Will participating in data analysis impact teachers’ attitudes relative to the relationship between student achievement and their instructional practices?

Practical and intellectual goals. Under the conditions of the Recovery Plan created by the district in conjunction with the Department of Elementary and Secondary Education, decisions that were made with regards to student achievement and classroom instruction had to have evidence of need as well as evidence of achievement. The evidence was to include assessments created by the state – the MCAS, assessments created by the district – benchmark tests, as well as summative assessments created by teachers.

To accomplish this condition, it needed to be ascertained that teachers and administrators understand the process by which that evidence can be gathered. Significant amount of time over the summer of 2010 was dedicated to training administrators and volunteer teams of teachers in the process of understanding data and using information gleaned from the data analysis in instructional design. Each member of the data team from this school’s teachers trained through the summer was assigned a team of teachers to be guided through the understanding data process. Each group of teachers met for over 30 hours – which is the total amount of time allotted by contract for professional development throughout the year (with the exception of state mandated training sessions).
Each year, the principal of the school has the responsibility to plan the scope and topic of professional development provided for the school staff. The practical goals of this research project were twofold:

1. to determine if participation in the Understanding Data Project changed teachers’ attitudes regarding student achievement

2. to determine if participation in the Understanding Data Project changed teachers’ instructional design.

In this current milieu of academic accountability, ‘data driven decision making’ seems to be the mantra of schools and school districts. Significant amounts of time and monies have been expended on teaching school staff members how to work with the numbers that are generated through assessments. The fundamental intellectual goals were:

1. to determine if teachers attitudes changed regarding the value of using data when they are planning their lessons.

2. to determine if teachers attitudes changed regarding the actual use of the information gleaned from examining data when they are designing their instruction.

Discussion of Findings

The theoretical framework, through which this research project was undertaken, was Shulman’s (1987) Pedagogical Content Knowledge (PCK). Pivotal to this instructional approach was the idea that teachers needed to have a blending of pedagogy and content, and that this blend had to fulfill specific needs of the student if the student was to be a successful learner of that
particular discipline. While Shulman’s (1987) approach is separated into multiple areas, three of these were used as a frame for the qualitative analysis of the results of the interviews and focus group conversations. These three include: knowledge of students’ prior knowledge, knowledge of learner difficulties and knowledge of teaching strategies that result in better teaching.

Once all primary sources of interview responses and focus group conversations were analyzed and coded into the four different themes, they were then organized into three major findings. In the previous section, the findings were reported through both individual interview and focus group conversation analysis. Secondary sources such as historical data that either supported or refuted the findings were included. The next section includes the discussion of the response analysis. Each of the sections focuses on the fundamental research question: Does participation in data analysis impact teachers’ attitudes relative to the relationship between student achievement and their instructional practices?

In reviewing and evaluating the responses from the interviews and the focus group, four major themes emerged. These themes included low work ethic of students, lack of home or family support, high work ethic of teachers, and the value of data analysis. The themes then were organized by response into three major findings. From the principal sources of teacher interviews and focus group conversation and secondary sources of school based data, three key findings have emerged. These findings include:

1. Even after training in data analysis of student assessments, teachers continue to connect poverty and lack of family structure with student inability to achieve at high levels.
2. Teacher attitudes towards student achievement or instructional design had minimal change following training in data analysis to identify root cause of lack of student learning.

3. Teachers found that participation in training in data analysis that was the focus of professional development was of limited value.

**Finding #1: Teachers connect poverty and lack of family structure with student inability to achieve at high levels.**

For the purposes of this research project, this researcher interpreted Shulman’s ‘prior knowledge’ as not only what facts or academic skills the student may possess, but the general idea of what work habits the student may have, what family structures are available to the student for help, and what experiences the student may have had – in other words, with what supports, experiences, concepts, habits or skills does the student enter the classroom. In the minds of the current middle school teachers who participated in this research project, these factors are strongly connected to family structure and economic level. In posing questions to each of the interviewees, this researcher began with a general question of what the interviewee’s perception of what a student with high achievement would ‘look like’ in terms of work habits and background knowledge. Once the interviewee could conceptualize what the high achieving students could have come with into the classroom in terms of work habits and prior knowledge, the questions would eventually turn to the teacher’s attitudes toward knowing his/her students and their background. This portion of the interviews and discussion eventually led to the question if working through data analysis changed the perception or attitude of the teacher in this regard.
The majority of the teachers believed that in general, the high achieving student was one who would try hard, one who would “follow exactly what is being taught to them”, a student who was willing to do things on his/her own. The focus then turned to the students within the middle school where these teachers worked, and their identification as high achieving students. Two teachers connected the high achieving student at the middle school associated with this study with one who would cooperate and participate, someone who was willing to accept the help and guidance of a teacher. However, when the interviewees were asked why there were not many high achieving students at their school, the responses connected experiences outside of the school with the ability to be able to well in school. The teachers within the middle school could generalize what a high achieving student would bring with him/her if that student entered a classroom in any school, but when the teacher would form an opinion of the student in the school sitting in front of that teacher, the additional qualities of previous cultural or out of town experiences, family structure and family support became factors. In conversations with individuals and the group, no one teacher suggested a way to actually determine what had been the previous experiences of the group or individual student. It was assumed by the teachers, that the students had minimal. The generalization about the lack of skills, prior experiences and previous content knowledge was across the poverty line, even though almost 33% of the students were not in the below poverty category.

In a similar manner, several teachers stated that the high achieving student would be supported by a strong family structure, yet there never was an attempt to determine what supports or family structure could provide support for the students outside of the classroom. No teacher mentioned either through the interviews or in any notations on data walls, or
conversations concerning the attempts of any teacher to investigate the family structure through phone calls or conversation. In the Tri-pod Survey completed by teachers at the end of the school years 2010 and 2011, responses in the section focusing on teachers’ opinions of parents was concerning. 90% of the teachers responding in 2011 said that ‘teachers at this school talk a lot about ways that parents need to improve’ – an increase of 39% in only one year, and after completing data analysis of student assessments. A relatively stable response of only 10% in both years was seen in the teachers’ response to ‘most of what teachers say about parents is positive.’ It was generally assumed by the teachers that because of the economic status of the student, the student lacked cultural experiences, family structure and home supports – all of which in the opinion of the teacher, were characteristics of the high achieving student. In a reflective memo, it was noted that teachers repeatedly reported how difficult it was to have parents return phone calls, attend scheduled parent meetings or respond to requests to contact the teacher through email or phone. It was further noted in a reflective memo that when teachers were able to meet with parents, the conversations often times were antagonistic. This researcher reflected if this trend of limited parent response and unfavorable conversations was again generalized to all students, even though neither was the case with all families and potential contacts. This research supports conclusions made by Hoover-Dempsey and Sandler (1997) who found that the lower the school’s expectations for parent involvement, the less likely parents would become involved. Lightfoot (1978) concluded that when teachers viewed children as a reflection of their parents, it was likely to “frame discontinuities, disconnects and blaming cycles that are hurtful and harmful to children, families and teachers alike” (as cited in Lawson, 2003, p. 81).
In terms of work habits, several teachers mentioned that non-achieving students lacked motivation and effort – two characteristics that teachers at the middle school which is the focus of this research study, connect with low economic status. This was mentioned both in the interviews and in the surveys. All of the teachers connected the qualities of motivation and strong effort as being part of the responsibility of the student rather than a factor that must be considered in the teacher’s instructional planning. In a reflective memo, it was noted that exact exchange of thoughts occurred in a recent email memo to a parent from a teacher in which was copied to this researcher. The teacher noted that the child, diagnosed with ADHD, should be at the age of responsibility in being the vehicle of exchanged written progress reports between the teacher and the parent. The parent argued that was the exact nature of ADHD and the teacher needed to support the gap in the student’s inability to follow through on not only the expected teacher/parent communication but the classroom assignments as well. The impact of data analysis on this particular factor was strong – the teachers decreased the connection between student effort and student achievement by almost a third, but increased by a third the number who said that the reason why a student wasn’t successful was because of effort. This lack of motivation and effort on the part of the students has long been a discussion point at this middle school at faculty meetings, private conversations and professional development conversations. Conversations with the faculty regarding student engagement addresses this point – that if the lessons are rigorous and relevant, that students will be more likely to be engaged in the learning. While the Understanding Data Project highlighted the data process of identifying the gaps in skills or content, it never reached the stage of changing the instructional design to address the student lack of learning. The process of this professional development did not go deeply enough
into the reasons why; that part of the training was left to the teacher to do, but it was evident that this part of the UDP never took place.

In notes to self this researcher made during the interviewees and subsequent coding, the theme of historical success was prevalent. In the days of successful student achievement, the income demographics were higher and parent presence was much more evident. However, in a note to self, this time frame was prior to mandated MCAS testing and accountable scores. Ironically, this ownership of prior success was evident in both the long term teachers as well as the teachers who were not present in the ‘glory days’ of this middle school. Teachers repeatedly have referred to the previous reputation of this middle school as ‘the Academy’ – noting the success of the students in the middle school, local high schools, colleges and professional careers. Teachers believed the students were successful because of their teaching ability as well as the ‘prior knowledge’ of experiences, supports, concepts, skills and habits with which the students entered the classrooms each year. In a reflective memo, it was noted that current teachers refer often to the successful students of years past as ‘our students’, but when referring to the current students, it is ‘these students’. To this researcher, this is a subtle but significant change. While the teachers recognize the difference in prior knowledge in the current students from the historical students, there is not an effort made to adjust the curricula to meet those changes. On the part of the teachers, there are broad assumptions that in general, the current students lack the components of ‘prior knowledge’ as seen in a high achieving student. However, there is not an effort to either identify or fill in the gap of what is missing. The change that is seen in lesson plans is not a change in instructional design, but a change in expectations of what the teacher reasonably believes the student will complete or achieve. While the teachers
must comply with district mandated curricula maps and pacing guides, records of teacher prerogative homework assignments reflect non-demanding, minimal time, and non-engaging tasks. As noted in the interview responses, a teacher admitted that the curriculum and resultant academic expectations were watered down to hopefully allow for greater success on assignment completion and test results. In a reflective note, this researcher theorized that the teachers believe that if the work is easier, then the student is more likely to do it, rather than if the student is challenged in a lesson that has relevance to him/her. Independent outside of the classroom assignments is assigned only 10% of the quarterly grade for close to 75% of the academic teachers. In his interviews with teachers, Lawson (2003) also uncovered resentment on the part of the teacher who felt that the teachers in the school had to take on responsibilities for the children that should really be owned by the parents. Lawson’s conclusion was similar to the findings of this research project.

In the focus group that was conducted after the individual interviews were transcribed and categorized into ‘themes’, teachers were asked to comment on several statements. Each teacher in the focus group could expand upon the statement, refute the statement, or agree with the statement. One of the statements posed to the focus group was: “Working through the professional development sessions that followed the Understanding Data Project protocols did not change teacher opinions regarding the preparedness or the ability of the students at <name of middle school>.” No teacher participant chose to expand or refute the statement. Every teacher in the focus group agreed that working through data analysis, did not change the attitude of teachers regarding student preparedness or ability. This researcher begs the question at this point as to if the UDP was presented with the follow up of connecting the instructional design of the
lessons that addressed a specific lack of learning or skill as measured by one of the assessments, if the conversation and work among the teachers would result in a change in the lesson itself.

After participating in the Understanding Data Project, the teachers’ attitudes towards the Pedagogical Content Knowledge frame of knowledge of students’ prior knowledge, the findings can be summarized into these statements: teachers have a common understanding of what a high achieving student would ‘look like’, and the majority of the students at the middle school do not ‘look like’ high achieving students; teachers believe that family supports, experiences, habits, concepts and skills are lacking in general by students in the school, but have relied on perception rather than data analysis in forming that belief; teachers do not place value on the parent supports or structure that are available to the students; teachers have not identified specific gaps in student prior knowledge resulting in a lack of addressing those gaps through the teachers’ instructional design.

One of Shulman’s major tenets of Pedagogical Content Knowledge speaks to the teachers’ knowledge of students’ prior knowledge as one factor leading to successful learning by students. From the analysis of individual interview comments, the focus group conversation and the integration of historical data, the teachers at this middle school do believe it is important for a teacher to know the prior knowledge of a student, but they do not believe it is necessary to figure out what it is. From the discussion, the teachers assume a general lack of support, experiences and skills because of the demographics of the students in the current school, and make no effort to individualize the background knowledge of the student. The first key finding - teachers connect poverty and lack of family structure with student inability to achieve at levels - confirms Shulman’s major component of successful student learning. Teachers feel prior knowledge is
important in being a high achieving student, and the majority of teachers interviewed assumed from their previous experiences, that they understood what the prior knowledge of the student actually was.

**Finding #2. Teacher attitudes towards student achievement or instructional design had minimal change following training in data analysis to identify root cause of lack of student learning.**

To this researcher, the predominant interpretation of interviews and discussion was that the teacher relied heavily on individual impressions or perceptions that were based upon the teacher’s years of experience rather than information gleaned through data analysis. This confirms Duke’s (2004) statements in *The Challenge of Educational Change*. In this book, Duke states that “when teachers believe they are doing a good job or the best job they are capable of doing, they are more likely to become set in their ways. Even when they realize they are not meeting desired goals, teachers can grow complacent because they believe that the reasons for their lack of success are beyond their control” (p. 189). However, in this research project, there was a shift in how strongly the teacher embraced this perception that was connected to the number of years of teaching experience that the teacher had – very strongly in the more veteran teacher, not so strongly in the new teacher. Teachers with more than 15 years of experience stated that the reasons why students had difficulty in learning was because of their (the students) lack of organizational skills, and that they shut down for an outside reason. The younger, less experienced teacher stated that the teacher’s current classroom practice is to ask more questions, trying to see if the teacher can uncover where the difficulty in learning or lack of understanding could be. Current classroom observations have noted that if a lack of learning has been
demonstrated, it is more likely to be addressed in whole classroom instruction rather than in targeted work for specific students who have shown that gap in learning through some form of student assessment. Only one of the teachers interviewed noted that if she was aware of the lack of student ownership of a previous skill that was needed for a current assignment, that teacher would work just those students to hone in on the ‘gap’ skill while completing the current assignment. Evans (1996) in *The Human Side of School Change* found that “their (the older faculty members) resistance is thoroughly normal, but it presents an unprecedented challenge to innovation, one that cannot be met by standard recommendations for staff revitalization or the implementation of change” (p. 92). In a reflective memo, when presented with a change in strategy or instructional approach, the response from the veteran teacher is that it won’t work – tried it before, and it didn’t work then, so it won’t work now.

One veteran teacher expressed the frustration with knowing that the student did not get the concept or skill that was the focus of the lesson, but the teacher was unable to deal individually with the student to remediate. In a reflective memo to self, teachers have frequently said that they are unable to remediate individual students because of several factors, among which are lack of time, lack of personnel, too numerous to be handled in a single classroom block of time, lack of effort or motivation by students. To this researcher, the solution would be in instructional design that would incorporate a student led work period, during which the teacher could move about the groups, strategically allowing for some students to work on their own, while the teacher specifically worked with students showing a gap in learning. Another option for the teacher would be through creative construction of group members, mixing levels of abilities within the groups for peer-to-peer support. A third available choice for the teachers would be to
communicate strategically with the teacher of the daily Academic Center so that immediate clarification or reteaching of that concept or skill could take place. None of these options has been seen as a regular part of that specific teacher’s classroom practice. In fact, in both district and state reviews of teachers’ instructional practice, it was noted in both reports that classroom instruction is whole group, regardless of whether the students are sitting isolated in rows or in clusters of fours. The absence of tiered instruction was noted in both the state and district evaluations.

The focus group discussion confirmed an individual teacher’s interview response which identified student’s lack of organizational skills as a major reason why students had difficulty in learning. In conversations throughout the 2010-2011 school year, teachers repeatedly stated this in formal or informal staff meetings, and in Redesign Committee meetings. To address that gap, a course was created in the school year 2011-2012 for students who were not successful either in quarterly report cards, or in yearly state mandated assessments. This course, Academic Center for Education, has 18 different sections, taught by 10 different teachers. Each teacher had been provisioned with a curriculum that addressed Executive Functioning Skills that were to be infused into support for the student’s daily homework assignments, or current class work. In a recent review at the halfway point of the year, instruction in organizational skills was not being included in the class work. According to the teachers of that course, several have commented that ‘the kids just don’t use them (the skills)’, so the teacher stopped the lessons that would address these needed skills.

The teachers who participated in the individual interviews and in the focus group talked about the value of data analysis in identifying student learner difficulties. Their documented
conversations were similar to what has been said in professional development sessions during the 2010-2011 school year and into the following year. Teachers found the information about the school ‘interesting’ on the global (school wide) level – it affirmed what the teachers had believed all along, that the students were low achieving. Teachers would look at the increase or decrease in a specific subject or grade area and gain an overall impression – ‘we did good’, or ‘we didn’t do so good’. In general, it was an overall impression of how the students performed, but not an evaluation of the teachers’ effectiveness. When analyzing subject specific data, the teachers felt that the information was again ‘interesting’, but in their admission, it really didn’t change anything. In casual conversations with this researcher, teachers stated that the data was about the kids that the teacher used to have, so they really couldn’t do anything with those kids anyway. When asked about the current students, the teachers would make broad adjustments – stating that they would have to spend more time on that particular section.

When the conversations became even more specific, referring to the item analysis and a specific student’s response, one teacher expressed the feeling that has been heard by this researcher in several teachers’ conversations. This interviewed teacher stated that the teacher looked at the question and understood that a student marked an incorrect answer, and as part of the exercise of data analysis was attempting to find out why the student would have chosen the incorrect answer. “I think trying to find - the answer is 'c' but it should have been 'b' - who knows at that point? That to me is like 'you got me'!”

Overall, teachers did not find any new purpose to the data analysis in which they took part in an effort to identify student learning difficulties in the question content. What was seen in data analysis and observed in classroom instruction was that the analysis of the type of question
resulted in a change in practice. Traditionally, students have scored a lower percentage of correct points on answers that were in the form of an open response to a writing prompt. Teachers did look at exemplars of high scoring responses; they have collaborated in department meetings with peer content teachers on adopting a school wide template for responding to an open response prompt; and they have incorporated the practice in regularly scheduled open response assessments. The results have shown an increase in every grade in every content area on department benchmark assessments in the school year 2011-2012. In a reflective memo, it was noted that perhaps the UDP project was structured as a funnel – looking at state, then school, then grade, then subgroups. The question to self was if the process of the UDP devoted much less time to that, but concentrated on the teachers’ specific areas of instruction – MCAS, benchmark, or unit assessments and followed the UDP protocol, perhaps there would have been more buy-in by the teachers because they could see the usefulness of that information on their daily practice.

After participating in the Understanding Data Project, summarizing teachers attitudes through the frame of knowledge of student learning difficulties, this researcher made these conclusions: the more veteran the teacher, the more likely the teacher relied on teacher perceptions rather than data analysis in identifying student difficulties in learning; teachers found the value in looking at data as a confirmation of what they already believed about the students; teachers in working through the department chairs, were more likely to address a lack of success in the type of question as to the content of the question.

Shulman (1987) considers of critical importance the teacher’s knowledge of teaching strategies that would result in better teaching. In their individual interviews, the focus group
conversations, the responses in the attitudinal surveys in both years, teachers believed that they were effective teachers. However, this researcher understands that what the teachers believe is effective is if the teacher creates and implements what the teacher believes to be a ‘good’ lesson, not if it results in student engagement and successful learning. A comment by one of the interviewees was a common perception, though hearing it was difficult. The teacher stated that “I know that I am giving them (the students) what I believe they need, but they are not carrying it out.” However, a major concern is that as well intentioned as the teacher is, the identification of what the student needs is problematic – it is not grounded in data, and it is universal. The ideal would be that the teacher knows what the student needs because of data analysis on student assessments and that what the student needs is personal to that student, not necessarily to the group of students in the teachers’ class. In fact, in analyzing teacher lesson plans, there is no distinction by any teacher among any of the four classes for which the teacher is responsible on a daily basis. While this researcher completes mini-observations on a regular basis, this researcher has not spent an entire day through all four of any teacher’s classes to determine if in fact there is or is not discrimination among the lessons designed for each of the groups or for any individual within any group.

When teachers spoke of their effectiveness in remediating student learning difficulties, one teacher very honestly stated that the material was simply watered down so that more kids would ‘get it’. Unfortunately, this strategy was used on a whole class basis, so whether the student understood the concept or not, all students received the watered down instructional planning. Another veteran teacher stated, and in the focus group was supported by the more veteran teachers, that the best way to address student learning difficulties was in the antiquated system of
tracking, whereby students would be grouped by any one of four ability levels and travel with that group throughout the day, regardless of subject matter. According to the teachers who participated in this discussion, the system of tracking worked in the past when the school was considered to be the ‘Academy’ and the students were successful. What was written in this researcher’s notes during the focus group conversation was that the discussion was among the veteran content teachers and neither the related arts teacher nor the teacher of students with special needs voiced an opinion.

In connecting student achievement with teacher effectiveness on a philosophical level, one teacher voiced a common perception. When a student achieved success on a benchmark or statewide assessment, it truly was a measure of a teacher’s effectiveness. However, this same teacher did not agree that the reverse was true – that if the students were not doing well, it was not necessarily a reflection of the teacher, but of the students’ unwillingness to try, or lacking appropriate skills or knowledge. This opinion reflected back to the teachers’ conversations regarding the historical results on students’ assessments. The conversations always focused on the numbers of students that achieved success – generally in the 70% range – but never in any conversation, discussion, or reference was any connection made to the more than 30% who were not successful as measured by the state yearly assessments – on average almost 180 students per year.

The second finding was that teacher attitudes toward student achievement and the teachers’ instructional design changed minimally following training in data analysis to identify root causes of lack of student learning. After analysis of individual interviews and focus group discussion this finding confirms what Shulman lists as one key component of Pedagogical Content
Knowledge, that being teacher knowledge of learner difficulties as a necessary factor that would lead to student achievement and that teachers should design instruction based on what the students know and are able to do. An alternative approach to this finding could also be a confirmation of Shulman’s PCK. Teachers believed they knew what the learner difficulties necessary for student achievement were and believed their instruction was designed to address those difficulties. However, the perception was that when that instruction did not result in student successful learning, it was not because of their instruction, but rather because of a factor that could be student based – effort, work ethic, motivation, background.

**Finding #3: Teachers found that participation in training in data analysis that was the focus of professional development was of limited value**

It was evident in talking of the effect of data analysis on instructional design, that there was a split between the older teachers and the younger teachers. This confirms research undertaken by Ainscow (2005) who concluded through his work that in order for professional development to be successful, it must be undertaken at the individual level, and not at the organizational system. Lachat & Smith (2005) had similar results in their research. They concluded that once the student personal data was in the hands of the teacher connected with those students, it truly became ‘their’ data and it could be used to answer the questions the teachers had raised. The youngest teacher involved in this specific research project, who also had the fewest years of experience, was the only one who described remediation on an individual level. The teacher would reteach a concept or skill that a specific student showed lack of understanding when the concept or skill was needed in class to complete a subsequent assignment. This was observed in mini-observations of this teacher during unannounced visits. However, another relatively
younger teacher as compared to the more veteran teachers also stated that data analysis was used to uncover student lack of learning on specific skills, and that the teacher would address it, yet this researcher has never observed this second teacher as actually practicing what the teacher said was part of the normal classroom routine.

Rather than placing blame or accountability on the effectiveness of teacher instructional design, several teachers assigned it to the district instructional system of curriculum assignments, noting that as a whole, students in the district were not successful on state wide assessments or district benchmarks. Lipman (1997) research found that “without some specific attention to change at the individual level, it will simply result in teachers coming together to reinforce existing practices rather than to confront the differences they face in different ways” (p. 247). What is neglected from the perception of the teachers involved in this research project, is that while the students in the district schools are not performing on state wide assessments with as much success as several neighboring towns, among the four middle schools in the district, the students at this middle school are at the bottom of the student growth percentiles – students at the other schools are improving at a faster rate than the students at this middle school. What was disappointing was to learn that after data analysis there was a drop from 83% to 50% in the numbers of teachers who wanted to learn better ways of explaining things that students found difficult to understand. In a recent state review, it was noted by the evaluators that the teachers feel defeated and morale is very low because the teachers believe that the lessons are rigorous, that the teachers are working very hard, and that because the students are still not able to be successful, the blame is on the teachers.
After participating in the Understanding Data Project, there are major points uncovered in the interview and group discussion: teachers still believe they are effective, but the students are not receptive to their teaching; teachers believe tracking students will lead to greater success; teachers believe the problem is systemic at the district level; teachers in increasing numbers do not feel the need to learn any new strategies; teachers recognize the importance of data, but leave it to others to tell them what the data means; teachers found that understanding data could be of use to the teacher if it was given to the teacher in a personal manner – if the data were about the teacher’s specific students, or results of an assessment given by that teacher, or a comparison of effectiveness in results between teachers who work together.

In individual teacher interviews and in the focus group conversation, significant time was spent in speaking to the general use by teachers of data analysis in any part of their educational practice – specifically of what use did teachers find of the time and cost spent in the Understanding Data Project. In previous sections, teacher responses were generally negative as to the value of participation of the Understanding Data Project as it related to specifically changing instructional design that would increase student achievement. However, when the conversation focused solely on the general use of data analysis, teachers expressed the worth of the training. As stated in a previous section, if the process of the UDP project focused more on the specific teacher’s results as seen through student work on MCAS, benchmarks, or unit tests or assessments, perhaps a change in practice in both attitudes toward student achievement and adjust instructional design would be present.

Teachers through their individual interviews and in the focus group conversation had differing views of the relative value of the training – from minimal value with no impact on
instructional design, to a greater awareness of the overall achievement of the group of students or
general content area. However, the teachers had suggestions for the greater use of the
information available through data analysis. The teachers were not opposed to the use of data in
instructional design and student achievement; they would, however, be more receptive if the
information was personalized and disaggregated for them. The teachers understood that specific
areas of a content area or skill identification for a particular student could be spotlighted through
the use of data. What the teachers intimated in their conversations was that they would prefer if
someone else did the analysis and targeted identification for specific students for them, and just
told them what to do with what students. There were several reasons for this recommended
approach – they expressed being overwhelmed with numbers to the point where instead of
working through the information to get what was needed, the teachers simply ignored the
specific numbers and stopped at the first level of broad categorization of a trend.

All the participants in this research project spoke to the conclusion that the data was
interesting. However, as the year progressed, and the data analysis became narrower and
narrower, teachers in the focus group said it become too complicated and they soon lost interest
and motivation to continue. It is theorized by this researcher because the teachers in multiple
sessions had examined data that had no direct classroom connection for that particular teacher,
the motivation to repeat the process for yet another set of data was of no interest to the teacher.

One teacher near the beginning of the career expressed hope:

I think I understand that there is a human quality in the data too, and that
sometimes some things may not just go the way you like or had planned to go.
But every time we are shown something that we could improve upon, we should
try to take the opportunity to see both sides and we should do the best we can.
And if we are doing the best we can and are not being successful, then we should ask more questions until we can find things that can actually help us.

Conclusion

Key findings. This research project was designed to answer a single question: Will participating in data analysis impact teachers’ attitudes relative to the relationship between student achievement and their instructional practices? After participating in a year-long Understanding Data Project for 30 hours of professional development, this research project concluded with the following findings.

1. Teachers continue to connect poverty levels with the ability for students to academically achieve at high levels.

   a. Teachers have a common understanding of what a high achieving student would ‘look like’, and the majority of the students at this middle school do not ‘look like’ high achieving students.

   b. Teachers believe that family supports, experiences, habits, concepts and skills are lacking in general by students in the school, but have relied on perception rather than data analysis in forming that belief

   c. Teachers did not place value on the parent supports or structure that is available to the students; teachers have not identified specific gaps in student prior knowledge resulting in a lack of addressing those gaps in instructional design.

2. Teacher attitudes towards student achievement or instructional design changed minimally following training in data analysis to identify root cause of lack of student learning.
a. The more veteran the teacher, the more likely the teacher relied on teacher perceptions rather than data analysis in identifying student difficulties in learning.

b. Teachers found the value in looking at data as a confirmation of what they already believed about the students.

c. Teachers in working through the department chairpersons were more likely to address a lack of success in the type of question as compared to the content of the question.

d. Teachers still believe they are effective, but the students are not receptive to their teaching.

e. Teachers believe the problem is systemic at the district level.

f. Teachers in increasing numbers do not feel the need to learn any new strategies.

3. Teachers found that professional development that focused on data analysis to be of limited value in their work towards increasing student achievement.

a. Teachers did not use the information that was uncovered as part of the Understanding Data Project.

b. Teachers found working through the numbers was daunting, difficult and non-engaging.

c. Teachers would be more likely to use the information if the information was analyzed by someone else along with suggestions for remediation and then given to the teacher.
As supported through teacher interviews, focus group discussion, historical school based survey data, the conclusion is that data analysis undertaken through the Understanding Data Project did not substantially change a teacher’s attitude towards student achievement nor did it have significant impact on instructional design. While this research project was intended to focus on the value of data analysis in one middle school, all schools in the district were undergoing the same professional development in this same year. While the district had initially contracted the TERC group to coordinate the training for 3 years, after the first year feedback from individual schools, the district cancelled the contract with TERC to continue the training.

Limitations

While there was validity to this research project, the research itself had limitations which included the small sample of teacher participants, the time lag between the most recent time of participation in an Understanding Data Project professional development session and the interview time itself, the fact that the district dropped the Understanding Data Project as a focus for the current academic year, and finally a possible but unlikely bias on the part of the participants due to the fact that the researcher was also the principal administrator in their building.

Recommendations

The following recommendations are offered for a change in educational practice regarding the more effective utilization of data analysis:

1. Training for data analysis should be at the department chairperson level. After analysis of student and teacher results, conversations with the individual teacher with specific target goals
for that teacher should be constructed. Teachers should have frequent, regularly scheduled conversations with the department chairperson to examine assessment results as part of continuous ongoing content meetings.

2. Teachers should work with coaches, department chairpersons or exemplar teachers to design lessons that remediate multiple students learning gaps. Assessments connected with data analysis and conversation should focus on the effectiveness of the remediation lessons.

3. Teachers should make use of ACE classes to specifically target individual student demonstrated lack of learning. Tier 2 focused interventions only for those students who have shown the need for additional learning should be followed by assessment that would be analyzed to demonstrate the gap in learning had been addressed.

4. Professional development should focus on creating lessons that are engaging for students, building upon connections that the student can make between life and the lesson to be learned. Data can be used to determine the extent to which the student learning takes place.

5. Opportunities should be created by the school administration or teacher teams for families of students to take part in school based activities, celebrations or ceremonies as a means of gaining a better, more effective home-school partnership. Continuous accrual of data regarding attendance, interests, and feedback should drive the structure, frequency and purpose of such gatherings.

6. Teachers should continue to be trained in effective gathering of relevant data on their students, as well as making use of the data that is uncovered. There should be a gradual release
of responsibility between the department chair and the teacher regarding the gathering and analyzing data and the resultant change in instructional design.

7. Administrators should continue to model the use of data in preparing teacher as well as school based goals or improvement targets. Teachers should be kept updated through visible data regarding the progress towards these goals or targets.

Further Research

This research project found that data analysis was not an effective tool when the responsibility for analyzing that data was placed in the hands of reluctant teachers. However, the inclusion of data in instructional design is critical. Further research as an expansion of this project could include:

1. If the data was analyzed to the student learning level by someone else and then shared with the teacher along with lessons/time/support to remediate identified gaps or misunderstandings, would it make a change in student achievement. The gradual release of responsibility may result in greater teacher ownership of the process and resulting actions.

2. If instead of starting with the large school data to analyze and narrow it down to the student/question level, would it be more effective for the teachers to work at the student/classroom level of data gathering and then broaden the practice?

Final Thoughts

During the initial analysis of the primary and secondary data, it appeared to this researcher that the teachers found no value in data analysis, and had little belief in Shulman’s theories as it
related to student achievement or their instructional design. However, after deeper and more careful examination of their responses from interviews and the focus group, it was clear that the teachers did believe in the importance of understanding the prior knowledge of their students and of uncovering ways to have students be more successful learners. What was missing was the process in which the teachers could learn how to use the data to uncover that information. In teasing apart their thoughts, the teachers did express value in information pertaining to the assessments of their students’ learning as well as the teacher’s successful or unsuccessful instructional practices. In their analysis, however, it never reached the level of individual students, but rather broad strokes of group learning, whole topic knowledge, or type of question.

The teachers who participated in this study were very willing to work with data that was specific to their practice, and were very open to discussions and suggestions when the data discussed was relevant to them. Personalization, relevance and a clear process are the keys.
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doi: 10.1016/j.econedurev.2007.05.005


Lawson, M.A. (2003). School-family relations in context: parent and teacher perceptions of

knowledge, and pedagogical content knowledge constitute the ideal gas law of science


Basic Books.


doi: 10.1016/0272-7757(86)90161-5


doi: 10.1002/1520-6807(198507)22:3<343


Appendix A

Recovery Plan (selected relevant sections)

The economic and demographic backdrops of this urban city have changed drastically. The percentage of low-income students in the district has increased from roughly 50 to 75 percent in the past decade. This city currently ranks 346th out of 351 in per capita income. These statistics reflect the steady decline in unskilled manufacturing jobs that once provided economic stability to the community, signaling the need to prepare students for post secondary success in college and careers. The Public Schools along with support from community partners share the responsibility of changing the face of economic hardship and low educational attainment that blankets the city. The challenge to prepare all students for career and college readiness serves as the unifying and driving force of all district improvement efforts and is reflected in the district vision:

All students in the district’s Public Schools will graduate from high school career and college ready with the academic knowledge, motivation, aspiration, and social consciousness necessary for personal and professional success.

The goals and priority areas for improvement of the District Improvement Plan (DIP) are chosen with the backdrop of career and college readiness. Measures that help us assess our progress toward this goal include dropout, graduation, and college attendance rates. The 2010 data show some significant improvement in 4 year graduation rates, climbing from 56% to 62.5%, however, in 2008, only approximately 52.6% of our high school graduates enrolled in college, with significant gaps existing for English Language Learners (13%) and Special Education students (19.4%). If we are to change the economic opportunity and make-up of the Fall River Community and reach the district vision, then we will need to graduate a greater percentage of students prepared to be successful in college and related careers. Success at the end of a student’s high school career is dependent upon the learning that takes place in prerequisite years. It is necessary to set performance outcomes from Pre-K – 12 to ensure all students are on track to reaching their potential.

Adolescent Education: Grades 4 – 10

MCAS data provides a unifying measure for student performance in the adolescent grade span for both Mathematics and ELA. In addition to the overall performance measures, the DIP goals include targets for the median Student Growth Percentiles (SGP). The SGP measures student growth by comparing one student’s progress to the progress of other students with similar MCAS performance histories. Students with similar score histories are referred to as academic peers. Although a student may perform well below the proficiency mark, that student could potentially have a high growth percentile. Such an occurrence could indicate that a program, a new approach, or something else is working for this student. The SGP is not dependent upon pre-requisite performance and therefore, levels the playing field for a
student, teacher, school, and district. A median SGP can indicate low growth (less than 40), typical growth (40 to 60), or high growth (above 60). Currently, 8 of 14 schools are exhibiting typical to high growth in Math and 7 of 14 for ELA. The DIP for 2010-2013 has set a target of all schools meeting the typical growth, with a benchmark goal of 45. This goal is set 5 points higher than the low range for typical growth, providing a buffer and thereby ensuring a minimum of typical growth.
Appendix B
(From the District Improvement Plan)
Strategic Implementation of Improvements in Teaching and Learning

**Strategy # 1.** Through a collaborative strategic planning process, develop a 5 year strategic plan (September 2010- June 2015), a 3 year District Improvement Plan (Sept 2011- June 2013) and yearly School Improvement Plans that are strategically aligned.

**Strategy # 2.** Strengthen the ELL expertise of teachers and staff in coordination with revised policies, procedures and plans to improve the achievement of English language learners.

**Strategy # 3.** Strengthen the expertise of teachers to improve the achievement of students with disabilities.

**Strategy # 4.** Strengthen educator capacity to use student assessment data to improve instruction and achievement.

**Strategy # 5.** Evaluate all programs and services utilizing standardized procedures according to a regular timeline to effect periodic improvements to programs and practices.

**Strategy # 6.** Develop and implement a viable curriculum that is aligned with the Massachusetts Curriculum Frameworks for all grades.

**Strategy # 7.** Focus and coordinate all district strategic efforts and plans to ensure that the stated goals are achieved.
Appendix C

School Improvement Plan (relevant portions)

**In the area of English Language Arts**

**STRATEGY 4**—To conduct a program of embedded professional development for the staff to improve their understanding and ability to use data and to strengthen teaching in the key areas of clear goals and expectations

<table>
<thead>
<tr>
<th>ACTION PLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Steps</strong></td>
</tr>
<tr>
<td>All staff in ELA will have MCAS, GRADE, post tests and running records for their students to assist in identifying areas of weakness and targeting instruction. Teachers will generate and provide data from more frequent formative assessments: Post tests, final products, benchmarks, Unit tests, etc.</td>
</tr>
<tr>
<td>ELA staff will be trained and strategies discussed and developed for interpreting data. Teachers will work with grade level colleagues in teams at their weekly curriculum meetings.</td>
</tr>
<tr>
<td>ELA staff will be trained and strategies discussed and developed for Looking at Student Work (LASW). Teachers will learn,</td>
</tr>
</tbody>
</table>
develop, and share strategies for evaluating, norming and applying rubrics and then offering specific feedback to authentic student work.

| All staff will participate in a program of peer observation and modified lesson study for the purposes of observing, debriefing, sharing elements of effective lessons. | all teachers, Vice-Principal, Department Heads | Meeting room, Weekly common planning time | Monthly target areas, common planning time from SIP meetings | Ongoing, more observations scheduled for this year |

| Teachers will graph and display data in classrooms to exhibit MCAS open response questions based on the benchmarks given in classes | Data coach, Department Head, content teachers | MCAS Data, Meeting Room, | Set monthly targets and graph regularly | Data distributed, graphing will be ongoing |

**In the area of mathematics**

**STRATEGY 3**—To conduct a program of embedded professional development for staff to improve their use of data and to strengthen teaching in the areas of clear goals and expectations

**ACTION PLAN**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Who’s Responsible</th>
<th>Resources Needed</th>
<th>Timeline</th>
<th>Status</th>
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<tbody>
<tr>
<td>All Math staff will have MCAS, Grade, Department</td>
<td>MCAS</td>
<td>Assemble</td>
<td>All teachers</td>
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</table>
progress monitoring and running records for their students to assist them in identify areas of weakness to target instruction. Teachers will generate and provide data from formative assessments: Post tests, final products, benchmarks, Unit tests, etc.

<table>
<thead>
<tr>
<th>Action</th>
<th>Responsible Parties</th>
<th>Data Source</th>
<th>Timeline</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>Generate and provide data</td>
<td>Head, Math Coach, Data Coach and Data Team</td>
<td>Data Master data binders</td>
<td>class profiles by October 1, update as data is collected</td>
<td>have data binders, staff proficiency in data use is improving</td>
</tr>
<tr>
<td>Math staff will be trained and strategies discussed and developed for interpreting data</td>
<td>Department Head, Math Coach, Data Coach and Data team content teachers</td>
<td>Meeting room, Weekly common planning time</td>
<td>Weekly, beginning in September</td>
<td>Teachers have data binders, staff proficiency in data use is improving</td>
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<tr>
<td>Math staff will be trained and strategies discussed and developed for Looking at Student Work (LASW)</td>
<td>Department Head, Math Coach, Data Team, Data coaches, content teachers</td>
<td>Meeting room, Weekly common planning time</td>
<td>Weekly, beginning in September</td>
<td>Ongoing</td>
</tr>
<tr>
<td>All staff will participate in a program of peer observation and modified lesson study for the purposes of observing, debriefing, sharing elements of effective lessons</td>
<td>All teachers, Principal, Vice-Principal, Department Heads</td>
<td>Meeting room, Weekly common planning time</td>
<td>Monthly target areas, common planning time from SIP meetings</td>
<td>Beginning</td>
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</table>
Appendix D – Recent scores on MCAS annual assessments

MCAS Annual Comparisons

* NOTE: Performance level percentages are not calculated if student group less than 10. Data Last Updated on September, 2011.

<table>
<thead>
<tr>
<th>PERFORMANCE LEVEL</th>
<th>2007</th>
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<th>2009</th>
<th>2010</th>
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<tr>
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<td>67</td>
<td>61</td>
<td>64</td>
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### GRADE 08 – MATHEMATICS

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### GRADE 08 - SCIENCE AND TECHNOLOGY

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<td>WARNING</td>
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<td>26</td>
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### Grade 07 - English Language Arts

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### Grade 07 - Mathematics

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### GRADE 06 - ENGLISH LANGUAGE ARTS

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</table>

#### Grade 06 - English Language Arts

Percentage of Students by Performance Level

![Bar chart showing percentage of students by performance level from 2007 to 2010.](chart.png)
## Grade 06 – Mathematics

<table>
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<tr>
<th>Performance Level</th>
<th>2007</th>
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<th>2010</th>
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</thead>
<tbody>
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<td>Advanced</td>
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<td>10</td>
<td>10</td>
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<td>Proficient</td>
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<td>22</td>
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<td>Needs Improvement</td>
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</table>

**Grade 06 - Mathematics**

Percentage of Students by Performance Level
Appendix E - Notes taken during meetings in data ‘war room’

In area of Equity:

- Need more time
- Comprehension weak
- Low vocabulary
- Lack of supplies
- Time
- Lack of technology
- Learned helplessness
- Labeling, stereotyping kids
- Word comprehension and knowledge
- Curriculum in 8th grade might need to change
- Need curriculum to develop skills
- Large class sizes in math
- Gaps in learning
- Program used is not efficient
- Math program

In area of Curriculum:

- Curriculum needs to be changed
- Lack of teacher input
- Inconsistent
- Gaps in standards that are not addressed
- Too much mobility with teachers

In area of Critical support

- Parent involvement
- After school help not being access by students
- No time for conferencing individually with students
- Lack of effort by parent and student
- Lack of administrative support
- Unprepared students are promoted
- Lack of parent involvement
- Not enough support services
- Doesn’t think it is important
- Poor study habits
- Not enough reading intervention
- Lack of interest in topics
- Lack of student engagement
- Hard time relating to real work responses
- Time for individual differentiation
- Lack of sustained effort
- Can’t understand question
- Lack of mastery of the English language
- Students are moving at too fast a rate – before they can master a concept
- Inability to apply knowledge of one concept to another
- Basic skills not mastered

**In area of Instruction:**

- More varied instruction
- Common units
- More content PD
- Standards based units
- Intercurricular lessons needed
- Students lacking basic skills
- Students unable to understand questions

**In area of Teacher preparation:**

- More PD with other teachers
- Need clear common guideline
- Department heads who are content experts with experience in classrooms
- Need certified teachers
- Lack of specific teacher development
- Developing appropriate tools for specific skills
- Common planning with experts
- Identifying teacher strength and weaknesses
- Recognize the difficulty of a question

**In area of Assessment**

- MCAS not critical for middle school
- Lack of relevance or reward
- Need common assessments
• Need writing rubrics
• Lack of motivation
• Lack of academic consequence

Possible reasons WHY:

• new administration and new policies
• less time in ELA
• 2009-2010 SPED accommodations were taken away
• Lack of discipline
  o No consequences
  o Hard to put up with disruptions
  o No after school programs
• Lack of resources
• Library disbanded
• Limited time in computer lab for research
• Staff were reassigned
• Requirements of NCLB
• Change in population
• Transient society
• Lack of school/home communication
  o No parent involvement
  o Lack of student motivation
  o Lack of student consequences
• Principal turnover for the last 5 years
• Curriculum turnover with minimal PD
• No vertical curriculum meetings
• Teacher turnover/redistribution
• Lack of structure in schools
• Lack of structure in homes

Predictions

• This school is just as good (or bad) as the other middle school in the city even though we have less time during the school day on instruction
• Our predictions were off from the actual numbers – we thought we did better than what we actually did.
Appendix F

Demographics of Staff

This section begins with a description of the demographic characteristics of the staff members of the Middle School which was the focus of this research in June, 2011. At that time, the staff numbered 64 individuals. Of these individuals, 6 were paraprofessionals, 2 were administrative clerks, 3 were counselors, 1 served as an attendance office and 4 were administrators. 48 staff members were direct student instructors. It was from this latter pool that representatives completed the original survey. Of these individuals, 24 were major content instructors (English Language Arts, mathematics, science and social studies), 10 were teachers of special education, and 14 were related or unified arts teachers (those instructional areas included world languages, physical education, music, strategies in reading, strategies in math, technology and art).

Of the 2011 staff, 51 were females and 13 were males; the mean age of the staff members was 44.6 and the mean years of service was 11.3. Because this research is based upon the instructional staff, the demographics of the staff will be organized among the 48 teachers within the Morton Middle School. Table 1 shows a breakdown according to gender

<table>
<thead>
<tr>
<th>N = number of teachers</th>
<th>48</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male teachers</td>
<td>11</td>
</tr>
<tr>
<td>Female teachers</td>
<td>37</td>
</tr>
</tbody>
</table>

Table 1 - teachers categorized by gender

In analyzing the age of the instructional staff, the mean average was 46.8 years. Table 2 shows the staff breakdown according to age. The largest cluster of teachers by decade is the group of teachers in their 50s. The analysis by age is relevant according to Evans (1996), who noted in *The Human Side of School Change* the different approach needed to effect change if the staff is an older staff. While 58% of the instructional staff is at least 40 years old, in the most successful – as determined by state yearly assessments - middle school in the same city, only 20% of the staff is in this age bracket.
Table 2 - teachers categorized by age

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = total number of teachers</td>
<td>48</td>
</tr>
<tr>
<td>teachers aged 20 – 29</td>
<td>7</td>
</tr>
<tr>
<td>teachers aged 30 – 39</td>
<td>13</td>
</tr>
<tr>
<td>teachers aged 40 – 49</td>
<td>11</td>
</tr>
<tr>
<td>teachers aged 50 – 59</td>
<td>16</td>
</tr>
<tr>
<td>teachers aged 60 – 69</td>
<td>1</td>
</tr>
</tbody>
</table>

The largest cluster of teachers by decade is found to be a group of 16 teachers who are in their 50s. 1 teacher is in her 60s.

Over the past 5 years, similar to many other public school districts in the state, budgetary issues have impacted the staffing levels in schools. The result is often a direct attempt to hire teachers at the lower end of the pay scale which is determined by years of service, rather than by age. For example, a teacher retiring after 25 years of service, with a master’s degree as well as additional coursework, would earn a salary of approximately $65,000. The teaching position can be filled with a teacher without similar credentials for $39,000. This net savings, called breakage, is used to supplement other line items in the budget that have been reduced because of lack of funding. It is typical for a teacher to retire with 30 years or less of service in any public school system because at that level of service, the pension system is at its maximum. There is no additional monetary benefit for the teacher to continue to be employed within the public school system. Table 3 shows the average numbers of years of service in the district’s public schools by the teachers at this middle school. The mean years of service are 11.
Table 3 - teachers categorized according to years of teaching through 2010

<table>
<thead>
<tr>
<th>Teaching</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 5 years</td>
<td>14</td>
</tr>
<tr>
<td>6 - 10 years</td>
<td>14</td>
</tr>
<tr>
<td>11 - 15 years</td>
<td>8</td>
</tr>
<tr>
<td>16 - 20 years</td>
<td>4</td>
</tr>
<tr>
<td>21 - 25 years</td>
<td>6</td>
</tr>
<tr>
<td>26 or more years</td>
<td>2</td>
</tr>
</tbody>
</table>
Appendix G

**Tripod Survey of Teacher Attitude**

In the tables that follow, the number in each box is the response on the second survey in 2011, after teachers had completed the Understanding Data Project. The number in parenthesis in each box is the either positive or negative change in that value for the original survey results. In the interview questions, teachers were asked to comment on the changes in certain prompts.

**Table 5: Teacher attitude regarding student preparedness on initial survey**

Key:

**Indicates a response that is desired.**

<table>
<thead>
<tr>
<th>Preparedness</th>
<th>never, or usually not</th>
<th>sometimes</th>
<th>usually or always</th>
<th>Did not reply</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe that some students lack preparation to master the material we must cover.</td>
<td>10 (-4)</td>
<td>63 (+11)</td>
<td>27 (-7)</td>
<td>0</td>
</tr>
<tr>
<td>I believe students in this class arrived this school year well prepared for the curriculum</td>
<td>42 (+18)</td>
<td>42 (+11)</td>
<td>16 (-11)</td>
<td>0 (-17)</td>
</tr>
<tr>
<td>because of SKILL levels, fail to complete their work on a regular basis</td>
<td>26 (-15)</td>
<td>42 (+14)</td>
<td>16 (-12)</td>
<td>0 (-10)</td>
</tr>
<tr>
<td>When students first arrive in the fall, they are usually well prepared for my</td>
<td>55 (+14)</td>
<td>25 (-16)</td>
<td>20 (+3)</td>
<td>0 (-1)</td>
</tr>
</tbody>
</table>
Table 6: Teacher attitude regarding work ethic of students on initial survey

Key:
Indicates a response that is desired

<table>
<thead>
<tr>
<th>Work ethic</th>
<th>never, or usually not</th>
<th>sometimes</th>
<th>usually or always</th>
<th>did not reply</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have my students review test-prep questions like those on the state's required tests</td>
<td>12 (-5)</td>
<td>0 (-21)</td>
<td>88 (+40)</td>
<td>0 (-14)</td>
</tr>
<tr>
<td>I use the best students' work as models for other students</td>
<td>0 (-21)</td>
<td>33 (-8)</td>
<td>67 (+33)</td>
<td>0 (-4)</td>
</tr>
<tr>
<td>It is unreasonable to expect that all students can succeed in my class.</td>
<td>94 (+1)</td>
<td>0 (-7)</td>
<td>6 (+6)</td>
<td>0</td>
</tr>
<tr>
<td>I think not paying attention is the main reason students fail to understand directions</td>
<td>0 (-28)</td>
<td>50 (+22)</td>
<td>50 (+12)</td>
<td>0 (-6)</td>
</tr>
<tr>
<td>I explain to students why the lesson is important</td>
<td>0 (0)</td>
<td>5 (-12)</td>
<td>95 (+12)</td>
<td>0 (-6)</td>
</tr>
<tr>
<td>Statement</td>
<td>Score</td>
<td>Agree</td>
<td>Disagree</td>
<td>Neutral</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>-------</td>
<td>-------</td>
<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td>I stay after school to give students extra help.</td>
<td>0 (-10)</td>
<td>30 (+2)</td>
<td>70 (+11)</td>
<td>0 (-3)</td>
</tr>
<tr>
<td>I believe encouraging low achievers to ask questions slows the class down too much</td>
<td>95 (+9)</td>
<td>0 (-10)</td>
<td>5 (+5)</td>
<td>0 -4</td>
</tr>
<tr>
<td>I think students understand that what they learn in my class can help them in their lives.</td>
<td>0 (-3)</td>
<td>16 (-3)</td>
<td>84 (-6)</td>
<td>0</td>
</tr>
<tr>
<td>I feel effective in teaching students at several different skill levels in the same class</td>
<td>0 (-7)</td>
<td>22 (+1)</td>
<td>78 (+6)</td>
<td>0</td>
</tr>
<tr>
<td>I require students to retake tests or re-do assignments if at first they do poorly.</td>
<td>0 (-21)</td>
<td>17 (0)</td>
<td>83 (+37)</td>
<td>0 (-17)</td>
</tr>
<tr>
<td>I am effective at teaching students to recognize and produce high quality work</td>
<td>0 (0)</td>
<td>17 (-1)</td>
<td>83 (+1)</td>
<td>0</td>
</tr>
<tr>
<td>I believe that making students a bit afraid of me is a good way to control the class.</td>
<td>67 (-2)</td>
<td>28 (+18)</td>
<td>5 (-16)</td>
<td>0</td>
</tr>
<tr>
<td>seem to be among the most hard working students that you have</td>
<td>58 (-3)</td>
<td>21 (+3)</td>
<td>21 (0)</td>
<td>0</td>
</tr>
</tbody>
</table>
ever taught

<table>
<thead>
<tr>
<th></th>
<th>never, or usually not</th>
<th>sometimes</th>
<th>usually or always</th>
<th>did not reply</th>
</tr>
</thead>
<tbody>
<tr>
<td>seem not to care how they do academically</td>
<td>42 (-6)</td>
<td>16 (-12)</td>
<td>26 (+2)</td>
<td>0</td>
</tr>
<tr>
<td>need more help with their work than you can give them</td>
<td>84 (+2)</td>
<td>16 (+1)</td>
<td>0 (-3)</td>
<td>0</td>
</tr>
<tr>
<td>seem to lack confidence that they can do well in this class</td>
<td>74 (+10)</td>
<td>21 (+18)</td>
<td>15 (+1)</td>
<td>0 (-19)</td>
</tr>
<tr>
<td>because of EFFORT levels, fail to complete their work on a regular basis</td>
<td>21 (-41)</td>
<td>21 (+4)</td>
<td>53 (-32)</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 7: Teacher attitude regarding work needed by teachers for improvement on initial survey

Key:

**Indicates a response that is desired**
have you participated in a small group discussion lasting AT LEAST HALF AN HOUR looking at student work with other teachers and brainstorming together about how to help students perform more successfully on such work?

<table>
<thead>
<tr>
<th></th>
<th>13 (-10)</th>
<th>5 (-14)</th>
<th>85 (+27)</th>
<th>0</th>
</tr>
</thead>
</table>

I'd like to learn better ways of explaining things that students find difficult to understand

<table>
<thead>
<tr>
<th></th>
<th>15 (+15)</th>
<th>35 (+18)</th>
<th>50 (-33)</th>
<th>0</th>
</tr>
</thead>
</table>

I tend not to wait for students to answer when called on if they take a long time to start.

<table>
<thead>
<tr>
<th></th>
<th>77 (+12)</th>
<th>23 (-12)</th>
<th>0 (0)</th>
<th>0</th>
</tr>
</thead>
</table>

We have improved instruction here by analyzing and learning from our student work

<table>
<thead>
<tr>
<th></th>
<th>5 (-2)</th>
<th>40 (+23)</th>
<th>55 (-21)</th>
<th>0</th>
</tr>
</thead>
</table>

Table 8: Teacher attitude regarding relationship with students on initial survey

Key:

Indicates a response that is desired
Table 9: Teacher attitude regarding parents of students on initial survey

Key:
Indicates a response that is desired

<table>
<thead>
<tr>
<th>Teacher/student relationships</th>
<th>never, or usually not</th>
<th>sometimes</th>
<th>usually or always</th>
<th>did not reply</th>
</tr>
</thead>
<tbody>
<tr>
<td>I use the first few minutes of class time to chat with the students informally.</td>
<td>50 (+12)</td>
<td>28 (-10)</td>
<td>22 (-2)</td>
<td>0</td>
</tr>
<tr>
<td>are young people you'd want your own children to get to know</td>
<td>16 (-5)</td>
<td>31 (-7)</td>
<td>53 (-2)</td>
<td>0</td>
</tr>
<tr>
<td>I would recommend this school to a parent seeking a place for his or her child</td>
<td>40 (+16)</td>
<td>20 (-4)</td>
<td>40 (-12)</td>
<td>0</td>
</tr>
</tbody>
</table>
Most of what teachers in this school say about parents is positive

|       | 50 (-12) | 40 (-15) | 10 (-3) | 0 |
Appendix H

Interim Work by Teachers on Understanding Data Project

In August of 2010, the district administration solicited volunteers from each school to become part of a cadre of instructional staff who could be facilitators back in home schools in the process of data analysis. Described previously in this report, the data dig-down drills followed a formulaic process that was initiated within the schools through a ‘train-the-trainer’ methodology. Each data team was school based, and a data team leader was appointed for each team. With the exception of the leader who was paid a yearly stipend, all other data team members were not paid, but did receive professional development points (professional development points are used for recertification) during school time. Each member of the data team was to lead a school based team through this process. All teaching members of the school community were assigned to a school-based team. All meetings were to be held in a room designated as the “war room” where all notes and records of the meetings were posted on the walls. (see Appendix E). The process included several distinct steps:

1. Specific school data was given to participants. Such data could be as general as whole school results in English Language Arts, or as specific as scores of 7th grade students of Hispanic ethnicity in open response style questions. Participants were asked to graph the data on large poster paper. This part of the process was ‘going visual’.

2. After examining the recent trends, participants were asked to write down predictions as to what the newest data would be. These predictions were posted alongside the visual graph.

3. Participants were given the newest data and asked to graph it onto the initial visual.

4. Participants were asked to state and write observations regarding their newest data and their predictions.
5. Participants were asked to construct inferences as to the cause of any discrepancy in either their predictions or the newest results. These inferences were to be posted. (see Appendix E)

6. Participants were asked to propose remediation of discrepancies or results. Remediation was to be posted.

2011 was the first year of the three year Understanding Data Project implemented through the district contracted consultancy group. The intent of the district is that once the three year consultancy commitment was completed, the practice of data analysis would be sustained within every school.
Appendix I

Data War Room

Following the directions of the consultant group, comments on self-stick notes were posted in the ‘war room’. These comments were made as teachers were participating in the Understanding Data Project weekly sessions. Comments were on going. No names or dates are attached to any of the comments, but were only made by members of the instructional staff during the school year 2010-2011. Comments were posted in the ‘war room’ in an area of high visibility to all members of the school staff who met weekly in that room. While it cannot be validated, the assumption from all members of the staff, was that once posted, no comment would be removed, or argued. The comments listed issues relating to lack of student achievement and were categorized according to major concerns determined by the district data leadership teams surrounding a goal of student high achievement. If a comment was already posted that was similar to another, it was not repeated. The categories were ‘equity’, ‘curriculum’, ‘critical support’, ‘instruction’, ‘teacher preparation’ and ‘assessment’. Other categories for comments included ‘possible reasons why’ and ‘predictions’. For the purposes of this research, comments that were relevant for this project were organized into similar groupings aligned with the teacher survey response analysis. For a full listing of all comments, please see Appendix D.

Table 10: In the area of student preparedness, teachers said:

<table>
<thead>
<tr>
<th>Comprehension was weak</th>
</tr>
</thead>
<tbody>
<tr>
<td>There were gaps in student learning</td>
</tr>
<tr>
<td>Unprepared students are promoted</td>
</tr>
<tr>
<td>Students showed a lack of mastery of the English language</td>
</tr>
<tr>
<td>Students are moving at too fast a rate –have to move before they can master a concept</td>
</tr>
<tr>
<td>There’s an inability of students to apply knowledge of one concept to another</td>
</tr>
<tr>
<td>Basic skills are not mastered</td>
</tr>
<tr>
<td>Students are unable to understand what the question is asking</td>
</tr>
</tbody>
</table>
Table 11: In the area of work ethic of students, teachers expressed concern with:

<table>
<thead>
<tr>
<th>Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learned helplessness</td>
</tr>
<tr>
<td>After school help not being accessed by students</td>
</tr>
<tr>
<td>Lack of effort by student</td>
</tr>
<tr>
<td>Poor study habits</td>
</tr>
<tr>
<td>Lack of interest in topics</td>
</tr>
<tr>
<td>Lack of sustained effort</td>
</tr>
<tr>
<td>Lack of relevance or reward</td>
</tr>
<tr>
<td>Lack of motivation</td>
</tr>
<tr>
<td>Lack of academic consequence</td>
</tr>
</tbody>
</table>

Table 12: In the area of work ethic of teachers, teachers said they were concerned with:

<table>
<thead>
<tr>
<th>Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need curriculum to develop skills</td>
</tr>
<tr>
<td>Large class sizes in math</td>
</tr>
<tr>
<td>Program used is not efficient</td>
</tr>
<tr>
<td>Lack of teacher input</td>
</tr>
<tr>
<td>Gaps in standards are not addressed</td>
</tr>
<tr>
<td>Too much mobility with teachers</td>
</tr>
<tr>
<td>Lack of student engagement</td>
</tr>
<tr>
<td>Lack of time for individual differentiation</td>
</tr>
</tbody>
</table>
Table 13: In the area regarding concerns of relationships with students, teacher comments included:

<table>
<thead>
<tr>
<th>Labeling, stereotyping kids</th>
</tr>
</thead>
<tbody>
<tr>
<td>No time for conferencing with kids</td>
</tr>
</tbody>
</table>

Table 14: In the area regarding relationships with parents, teachers said lack of student achievement was connected with:

<table>
<thead>
<tr>
<th>Lack of effort by parents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of parent involvement</td>
</tr>
</tbody>
</table>

In the area regarding teachers’ opinions as to why students were not succeeding, Table 10 lists the comments posted by the teachers in the ‘war room’.

Table 15: In the area regarding teachers reasons for lack of student achievement

<table>
<thead>
<tr>
<th>New administrations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less time in English Language Arts</td>
</tr>
<tr>
<td>SPED (Special education) accommodations were taken away</td>
</tr>
<tr>
<td>Lack of discipline</td>
</tr>
<tr>
<td>No consequences for students for disciplinary infractions</td>
</tr>
<tr>
<td>Lack of resources</td>
</tr>
<tr>
<td>Change in populations of students</td>
</tr>
</tbody>
</table>
Transient populations of students
Lack of school/home communication
Lack of structure in school
Lack of structure in home

Teachers also had the opportunity to post additional thoughts regarding their data and their predictions. The following table includes the only two comments that were posted.

**Table 16: Additional comments posted on wall in 'war room'**

<table>
<thead>
<tr>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>This school is just as good as the other middle schools in this city, even though we have less time during the school day on instruction.</td>
</tr>
<tr>
<td>We thought we did better than what we actually did.</td>
</tr>
</tbody>
</table>