TRADITION VS. INNOVATION:

TWENTY-FIRST CENTURY LEARNING

AND

SCHOOL READINESS FOR CHANGE

By

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CHAPTER I

INTRODUCTION

School Issues

Challenging problems face today's policy makers, administrators, and teachers. Nearly thirty percent of the nation's youth do not graduate from high school. Our students are not academically competitive with international students. Students do not receive instruction that prepares them for a rigorous post-secondary education or the demands of a competitive workplace (Philips, 2009). Consequently, educational leaders must re-evaluate traditional practices and envision new instructional models.

Nationally, "just over 70 percent of students graduate from high school. Graduation rates for African-American, Hispanic, and low-income students are lower still, hovering at slightly more than 50 percent" (Bill and Melinda Gates Foundation, 2009, p. 1). "The American public school system's lack of effectiveness in teaching children and youth with low socioeconomic status is our nation's single greatest educational failure" (Barr & Parrett, 2007, p.24). Despite gains as measured by the 2002 No Child Left Behind legislation (NCLB), the achievement gap among socioeconomic and ethnic groups persists. The 2007 Trends in International Mathematics and Science (TIMSS) Report indicates overall score improvements since 1999, but no "detectable change… in public schools categorized by poverty" (National Center for Education Statistics, 2009, p.26).

History and tradition provide several insights into why the achievement gap continues and why progress is elusive. The landmark 1966 Coleman Report concluded that teachers impact 10% of the effects of poverty (Coleman, Campbell, Hobson, McPartland, Mood, Weinfield, 1966) which led to decades of misconceptions about the influence of effective instruction on students of poverty. Consequently, teachers believed in the bell curve and willingly accepted poor performance of at risk students.

Today, the federal government makes it clear that "no child is to be left behind," but this directly conflicts with the original learning and assessment structures that the bell curve mentality built into schools. New programs and activities cannot be added to these underlying structures and be expected to have sustainable results (J.J. Burgard & Associates, Inc., 2008). Traditional teaching practices, i.e. lecture, drill and practice, and worksheets have been common approaches to classroom instruction, but these practices do not meet the learning needs of at risk students (Barr & Parrett, 2007). "Few would disagree that the root problem is that too many students aren't engaged in school by their teachers" (Miners, 2009, p. 37).

In addition to the nation's dismal dropout rate, schools are not preparing our students to live and work in the Twenty-first Century (Bellanca & Brandt, 2009). Today, low paying jobs are in short supply (Jerald, 2009; Tucker, 2008). High school dropouts are woefully under-skilled and have extremely limited opportunities for employment sufficient to meet basic financial obligations. High school graduates will need to be equipped to seek post secondary education at a college, university or trade school in order to obtain employment in today's global economy (Allsid, 2010 & Jerald, 2009). Even one year of post secondary education, especially when connected to employers' needs, will make a significant difference

for young adults trying to enter the work force (Dionne, 2009). When compared to global numbers, the percent of high school graduates with post-secondary training has dropped from 30% to 14% in 30 years (Tucker, 2008).

Other factors affect the United States' ability to compete in a global economy. Many jobs that previously provided a middle class life style are now automated. U.S. companies used to handle every stage of production, but companies now outsource many aspects of production to outside vendors in order to get price breaks and increase company profits (Tucker, 2008; Friedman, 2006; Pink, 2006). Most importantly, workers in more impoverished countries are willing to work for much less than Americans are. For example, Indian engineers make $7,500 yearly compared to Americans who expect $45,000 for the same job and qualifications (Tucker, 2008, p.5).

Tomorrow's graduates will be competing with young adults all over the world for jobs that may not exist today. The number of children born in China and India compared with the United States forebodes a crisis of numbers (Fisch & McCleod, 2007). Young adults seeking employment will face global competition unlike anything experienced by their parents. Not only do American students fall short in terms of academic requirements, they also receive inadequate instruction in the Twenty-first Century Skills (Pearlman, 2006). The prolific amount of research and writing about Twenty-first Century Skills shows the perceived importance of this topic. The Chapter II Literature Review will introduce Twenty-first Century Skills based on the work of the Partnership for Twenty-first Century Skills (P21). The P21 Framework focuses on 21st Century Student Outcomes: Core Subjects, Life and Career Skills, Learning and Innovation Skills, and Information, Media, and Technology Skills (Bellanca and Brandt, 2009).

Today's students are often called digital natives, but educators may not have a clear understanding of the term. Prensky (2001) coined the term in to describe students who were born into a digitally rich environment. "Our students are all 'native speakers' of the digital language of computers, video games, and the Internet" (Prensky, p. 5). Natives interact with information differently than immigrants.

The younger generation desires control, with the ability to access content and communicate whenever they choose, regardless of location. Impatience is also characteristic of this age group, as they seek to make the most efficient use of time through multitasking and "media snacking." The youth constantly engage in community interactions, sharing opinions on what content is worth seeing or experiencing. Additionally, they look for avenues of self expression that enable them to showcase their creativity and portray their originality (Buvat, Mehra, & Braunschvig, 2007).

The dropout crisis and the demand for Twenty-first Century skills suggest a need for educational reform (U.S. Department of Education, 2009). Especially important are clear educational vision, attentiveness to teacher effectiveness, assessable and clearly defined standards, and supported break-through innovations (Philips, 2009; Hargraves & Shirley, 2008). The Twentieth Century model is outdated and will not resolve the problems facing tomorrow's educators.

> Over the past 20 years, school reform efforts have identified teacher professional development as a key component of change and as an important link between standards and student achievement. After all, as students are expected to learn more complex and analytical skills in preparation for work and life in the 21st century global economy, teachers in turn must be expected to teach in ways that develop

those higher order thinking and performance skills, experts say (Miners, 2009, p.35).

Technology integration in schools "is taking a long time and the time frame is best described in terms of decades" (Thorburn, 2004). Quick fixes to increase technology integration do not lead to sustained results. Strategic planning is imperative. Educators must focus on research-based strategies of effective teaching, learning, and leadership. With the advent of more research on the art and science of teaching, educators have more knowledge than ever about how to teach effectively (Marzano, 2007). There is increasing need for sustained, job-embedded professional development with an improved emphasis on technology integration. Teaching teachers to use technology tools is not the answer. Teacher-driven learning must change to student-centered, project-based learning (21st Century Schools, 2008; Bellanca & Brandt, 2010; Jerald, 2009; Pearlman, 2009).

Leadership is central to reform and to development of a culture of academic achievement for all students. Educational leadership is "at its core, the responsibility for policy formation and, where appropriate, organizational transformation" (Bolman, 1999, p. 194). Management is no longer central to school administration. Instead, instructional leadership is the new mantra. A principal must influence staff to achieve new goals (Northouse, 2007). The instructional leader must have an articulated vision of where the school needs to go in order to affect change. "Schools improve when purpose and effort unite" (Schmoker, 1999, p.111).

Problem Statement

Technology integration and the acquisition of Twenty-first Century Skills in teachers' daily instructional practices and students' learning experiences continue to be challenging goals. After years of expense and mixed results to develop technically rich curriculum,

district leaders face new dilemmas to prepare students for the demands of the Twenty-first Century workplace. Schools do not necessarily have the willingness to change and to undergo instructional reform. This case study will analyze school readiness for change.

The current American educational model is lecture driven and task oriented. Classrooms tend to be teacher-centric. Learning may occur through lecture, worksheets, and individual interaction with content. Assessment of student learning is based on questioning, short quizzes, bell work, and the proverbial multiple choice tests (Bellanca & Brandt, 2010). Despite as much as $60 billion invested in the last two decades to integrate technology tools into the classroom, instruction looks similar to the way digital immigrants were instructed thirty years ago (Christensen, Horn, & Johnson 2008, p. 10).

In order for high school graduates to succeed in an increasingly diverse, globalized, complex, and technically demanding society, students will need more than traditional content knowledge. They will also need learning and innovation skills, digital literacy skills, and career and life skills defined by The Partnership for 21st Century Skills (Bellanca & Brandt, 2010). Skill demands are changing because of the influences of computer automation, an inexpensive labor force (especially in China, India, and Eastern Europe), and new collaborative tools that change traditional work to a 24/7 anytime, anywhere environment (Friedman, 2006). Because of these forces, corporations are radically restructuring to a lean, collaborative, global, electronic workforce (Jerald, 2009). Today's schools must change to prepare students for the demands of the Twenty-first Century global workplace.

Finally, today's schools and classrooms must develop a Twenty-first Century learning environment that converges traditional best practice with multimedia and web resources where students have more ownership in and engagement with their learning (Powell &

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Powell, 2009). Twenty-first Century education "is bold. It breaks the mold. It is flexible, creative, challenging, and complex. It addresses a rapidly changing world filled with fantastic new problems as well as exciting new possibilities" (Shaw, 2009).

Purpose of the Study

The purpose of this case study was to analyze the willingness of staff within one district's three secondary schools to change, and to determine the schools' readiness to transition from traditional instructional practice to Twenty-first Century learning. Twenty-first Century learning will require organizational change from traditional instruction to a student-centered, project based, high tech model (Pearlman, 2006, p.5). Because of the complexity of organizational change, *Diffusion of Innovations Theory* was the theoretical framework to analyze staff willingness to change. Based on research findings, I made inferences about the three schools' readiness for Twenty-first Century learning.

Research Questions

1. How do the schools currently integrate technology into instruction?
2. What characteristics of Twenty-first Century instruction are observable at the schools?
3. Within each school, what indicators of staff willingness to change instructional practice are observable?
4. Using Diffusion of Innovations Theory, what is the distribution of adopters at each school?
5. What can be inferred about school readiness for Twenty-first Century instruction?

Theoretical Framework

Qualitative research seeks to explain why and how relationships exist between different variables or elements. Qualitative research is constructivist and takes place in

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natural settings. Unlike quantitative studies that are tightly configured, qualitative research evolves. Qualitative studies are unique because of the elements being observed. In qualitative research, theory's relevance to and placement in the study depends upon the study itself. Creswell (2003) offers several pieces of advice regarding the use and placement of theory. First, researchers should decide if theory will be used. If theory will be used, the researcher should decide how it will be used and where the theory will be placed in the study. Placement depends on use. Options are at the beginning, at the end or as a supporting lens.

The theoretical framework--a structure that seeks to explain phenomena--provides the researcher with a scaffold to address problems and questions (Anfara & Mertz, 2006) and a reference point to begin study. Placement of the framework at the beginning or end of the study depends upon theme development and data interpretation. The decision to use a theoretical framework should be made based on whether a theory will be used at all and, if so, whether it will be used to explain, advocate or conclude the study. From there, the researcher must locate the right theory to fit the "manner consistent with its use" (Creswell, 2003). A theoretical framework can also provide a lens to identify personal biases, develop a broader perspective of the phenomena being studied, analyze data, and work with emerging themes.

> Qualitative researchers are keenly aware of the existence of subjectivity and bias in their research. The theoretical framework helps the researcher to control this subjectivity by the self-conscious revisiting of the theory and a concomitant awareness that one is using a particular perspective.
> (Anfara & Mertz, 2006, p. 192)

Staff willingness to change was observed through the Diffusion of Innovations (DOI) lens. Consequently, I placed discussion about DOI at the beginning of my study. DOI provided a framework to understand the process of change, but also provided a means to analyze staff adoption of an innovation. Although diffusion research dates back to beginning of the Twentieth Century and has been applied to many social and cultural phenomena, DOI is often credited to Rogers (1995) in his seminal work, *The Diffusion of Innovations.* Rogers defined diffusion as the "process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers & Singhal, 1996).

The DOI process includes four components: innovation, communication, time, and social system. An innovation is an idea, practice or object that is perceived as new by the members of a social system (Rogers & Scott, 1997). Acceptance of an innovation depends on the relative advantage of the innovation to the user, the compatibility of the innovation to the mission, vision, and values of the system, how complex the innovation is to learn and use, the opportunity to experiment with the innovation (triability), and the observability or degree to which the innovation is visible to others (Minishi-Majanja, M. K., & Kiplang'at, J. 2005).

Of particular interest to this study was DOI's time component. How fast the innovation will be diffused in the social system depends upon three factors. First, each individual decides whether to try the innovation based upon his knowledge of the innovation, his attitude toward it, the person's decision to accept or reject it, and a personal confirmation that the innovation is worthwhile. The second factor involves "innovativeness, the degree to which an individual (or other unit of adoption) is relatively earlier in adopting new ideas than other members of a system" (Rogers, 2003, p. 267). Rogers (1995) divided members of the social system into five categories that, interestingly, form a normal distribution as shown in

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Figure 1 (Rogers, 1995, p. 281). DOI's individual innovator categories are innovators, early adopters, early majority, late majority, and laggards.
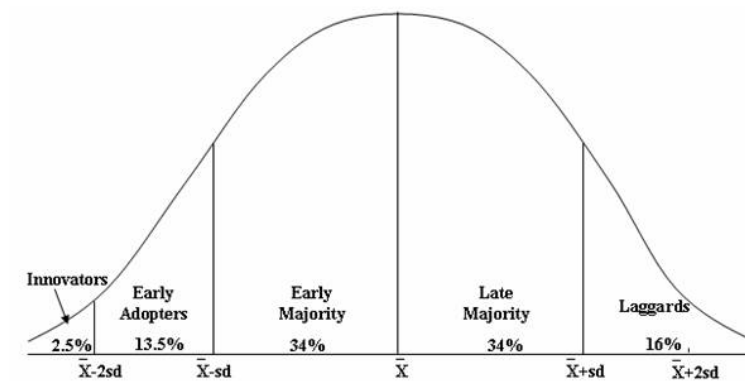
Figure 1. DOI Categories of Innovativeness

Finally, the rate of adoption is the time taken to adopt the innovation across the entire social system. Rogers confirmed that the rate of adoption follows an s-shaped curve common to implementation of new products over time as illustrated by Figure 2 (Schneberger, S. & Wade, M. 2010).
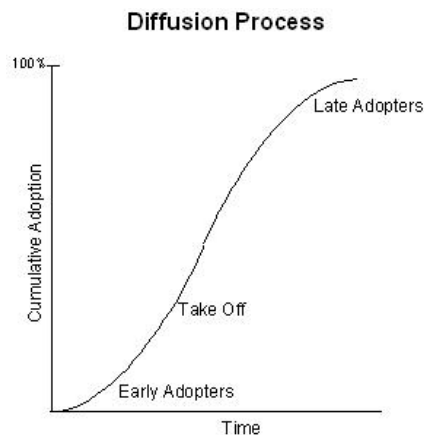
Figure 2. The Diffusion of Innovations Process and the S-Shaped Curve

Of particular significance to this study was the innovativeness of the individual. I

analyzed whether schools conformed to the bell curve, i.e., at least 2.5% of staff are

innovators and a majority of staff are willing to adopt change. Savery (2008), in her study

"Innovators or Laggards: Surveying Diffusion of Innovations by Public Relations

Practitioners," developed an instrument to identify and analyze Rogers' (2003) five adopter

categories. With Savery's (personal communication, January 1, 2010) permission, I adjusted

this survey to ask questions relevant to the educational environment and to evaluate teachers'

willingness to change.

Methodology and Procedures

Methodology depends upon the reason for the inquiry, the primary audience, the

needed data, the available resources, and the criteria to support quality findings (Patton,

2002, p.13). Central to the purpose of this study was analysis of leadership style, teacher

willingness to change, and school culture. I utilized a qualitative methodology to analyze the

research problem and questions. The nature and purpose of qualitative research was to

understand social phenomena inductively and holistically through human experience,

qualitative methodology, and theoretical frameworks (Patton, 2002; Hancock & Algozzine,

2006). The qualitative study took place in a natural setting where the research was

"emergent rather than tightly prefigured" (Creswell, 2003, p. 181).

Answers to research questions were pursued through a case study of a purposefully

selected school district and its three secondary schools. Hancock (2006) described case study

as an attempt "to present a complete description of a phenomena within its context" (p.33).

Because the study sought to describe school readiness for Twenty-first Century Learning

within the context of staff willingness to change, a descriptive case study methodology was

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used to answer research questions. Data was collected through document and artifact analysis, interviews, and observation. I took an interpretivist perspective during data collection and analysis.

Setting and Participants

The setting was a small Midwestern school district with a 15 year history of technology integration. Two middle schools and one high school participated in this study. One middle school housed sixth and seventh graders with an enrollment of 700 students; the second housed an average of 400 eighth graders. The high school enrollment exceeded 1400 students.

Leadership style at the three schools varied, but all three shared transformational characteristics. The sixth and seventh grade middle school principal had more than 30 years of experience. She clearly articulated her vision for the school, set clearly defined action steps to reach school goals, and carefully maneuvered staff toward those goals. The eighth grade center's principal served 15 years as a district administrator. Her style was more formal, political, and transactional, but she had the ability to stay on course to reach school goals while building a strong sense of community in her building. The high school principal had 6 years of administrative experience and was not new to the school or district, but was in his first year as principal. He was a no nonsense leader with a good understanding of high school reform.

The sixth and seventh grade middle school had one assistant principal, a principal intern, 22 support staff, and 57 teachers who worked within teams and departmental groups. The eighth grade center had one assistant principal, nine support staff, and 31 teachers who also worked in teams and departmental groups. The high school had three assistant

principals, 25 support staff, and 100 teachers. At each site, staff who taught courses with state mandated tests in math, reading, language arts, social studies, and science met in collaborative groups using the Professional Learning Community (PLC) model.

The sixth and seventh grade school's culture was student focused. Annual climate surveys confirmed collaborative, positive relationships between staff. Frequent comments revealed respect and appreciation between teachers and administrators. The eighth grade motto, "Learning is the Only Option," was indicative of the school's culture. With a small number of teachers and administrators, collegiality was strong. The high school was focused on a traditional lecture teaching model rather than student-centered learning, but the principal was aggressively reforming instructional practice and implementing new programs to support at risk students. Teachers were in the early stages of implementing the PLC model.

Secondary teachers reserved labs for student access to computers and mobile laptop carts were available for classroom use. The High School had 4 computer labs and 2 mobile carts. The 6th and 7th grade Center had 3 labs and 2 mobile carts. The 8th grade center had 1 fifty station lab and 1 mobile cart. Additional tools such as smart boards, computer response systems (CPS), and Apple iTouch carts were unevenly distributed throughout the schools. Ninety percent of the sixth and seventh grade school teachers had smart boards and CPS systems compared to 50% at the eighth grade center and 15% at the high school. The two middle schools had iTouch carts, but the high school did not. Each school had an onsite technology coach, but the eighth grade center's coach was part-time. Each school's technology coach provided job embedded professional development and was expected to be in teachers' classrooms on a daily basis. District technology committees were designed to

increase interaction with curriculum specialists and to improve professional development for certified staff.

The three lead principals and three secondary technology coaches were asked to interview. Based upon the recommendation of principals and site technology coaches, teachers were purposively selected to represent varying degrees of classroom technology integration and previous history of innovativeness. Teachers independently determined their interest in participating in the case study and signed informed consent forms. Because I was a central office administrator, I sought to avoid coerciveness by offering the option not to participate.

Data Collection

Qualitative research creates the opportunity to deal with real people rather than statistics, leading to deeper understanding (Patton, 2002). Qualitative research takes place in a natural setting with an emergent, interactive, and interpretive methodology (Gillham, 2000; Hancock & Algozzine, 2006; Yin, 2003). Gillham (2000) explained that data collection allows researchers to "get under the skin" (p. 21) of the schools, to view them from the inside out, and to explore school complexities.

Case study requires careful planning and fidelity to procedure. Because human subjects were involved, I had a higher responsibility to protect confidentiality and to work within the employment constraints of the subjects. Balancing personal biases, I examined data multiple times to develop common themes and to analyze school readiness for change.

Data was collected through documents and artifacts, observations, interviews, and surveys. Multiple sources allowed me to analyze research questions by broadening my understanding of historical, attitudinal, and behavioral issues (Yin, 2003). Because case study

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usually involves more variables of interest than data points, multiple sources were needed to converge data and to protect the quality of the study (Yin, 2003).

Hancock and Algozzine (2006) provided details about the interview process, i.e. identify key staff within the schools and get access to them, develop questions and create an interview guide, consider the interview setting, and determine the recording method (p.39). Open-ended questions were developed by cross-referencing between research questions, surveys, and the study's theoretical framework (Hancock & Algozzine; 2006; Yin, 2003). As I conducted the interviews, l listened closely to perceive causal inferences and to spot reflexivity, i.e. interviewees providing the answers they thought I wanted (Yin, 2003).

Staff willingness to change was analyzed using Savery's (2008) *Diffusion of Innovations Practitioners' Survey* (Savery, 2008). Savery (personal communication, January 1, 2010) agreed to my use of her survey (see Appendix G). All school staff received an e-mail requesting voluntary participation in the research project (see Appendix H). Survey submissions communicated participation consent.

An electronic research log was used to record evidence details, maintain personal notes, and provide an audit trail to backtrack through the data collection process. All data was secured on my password protected computer and backed up on a flash drive kept at home in a secure location. Teacher surveys were answered anonymously online; then the data was stored on my computer. Upon transcription and coding of staff interview questions, I erased the audio tapes. After the case study was complete, all electronic data was deleted and hard copies shredded to protect the anonymity and confidentiality of participants.

My research was conducted with fidelity to qualitative research methodology. Because of the subjectivity of qualitative research, different approaches to determining the

reliability and validity of the inquiry were required. Most importantly, I sought to demonstrate the inquiry's trustworthiness i.e. "its truth value" (Erlandson et al, 1993). The trustworthiness of the findings was established through a number of strategies including triangulation, member checking i.e. sharing data analysis with study participants, and adequate length of time in the field. Hancock and Algozzine (2006) provided direction on how to demonstrate the trustworthiness of a case study:

1. share results with those examined in the study

2. review the report with fellow case study researchers

3. solicit scrutiny of the final report from experts

4. articulate researcher bias and how the bias will be mitigated

5. triangulate the data (p. 6).

Data Analysis

Qualitative research (also called naturalistic inquiry) brings a number of specific techniques into the methodology of the study. I validated the accuracy of my findings (Creswell, 2003). Because of the partnership I had with school staff and the vulnerability of participants, naturalistic inquiry obligated me to uphold the integrity and trustworthiness of the study. Techniques included prolonged engagement, persistent observation, peer debriefing, triangulation, reflective journaling, and audit trail.

I brought both experience and bias into the study. After six years as a central office administrator, I had developed views on the needs of at risk students, investigated the art and science of teaching, gained extensive experience with technology integration and developed policies and programs to reform schools. I came into interviews and observations with prior

knowledge and experience, but worked diligently to protect the integrity of the qualitative study.

Significance of the Study

The study is significant in that it provides an example for determining staff readiness for change. Although numerous articles document the need for school reform, districts have few models or theoretical frameworks for determining staff readiness for change. This case study added to the literature and, with additional research, could lead to the development of a model for districts assessing their readiness for change in order to implement Twenty-first Century learning.

Limitations and Assumptions

This case study focused on one Midwestern district. Therefore, findings were not generalizable from the sample study to an entire population. Future research might include additional case studies of different districts and follow-up analysis on whether staff willingness to change analyzed by *Diffusion of Innovations Theory* correlates with successful implementation of Twenty-first Century learning.

Assumptions were based on personal observation. Primarily, I assumed that the district retained professional and generally motivated staff. District culture appeared to be collegial. Teachers worked in a collaborative environment and almost all staff functioned within the Professional Learning Community (PLC) model. Leadership styles seemed to be transformational.

Definition of Terms

- Staff willingness to change is defined as the individual's willingness to adopt an innovation at a particular time. Rogers' (1995) Diffusion of Innovations Theory identifies

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five categories to describe rate of adoption: innovators, early adopters, early majority, late majority, and laggards.

- Change is defined as transformation from one practice or model to another.

- Twenty-first Century Learning converges traditional best practice with multimedia and web resources where students have more ownership in and engagement with their learning.

- Innovation is an idea, practice, or object considered as new by the individual.

- Diffusion of Innovations is a "process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers & Singhal, 1996).

Summary

Public schools are charged with educating America's children. The purpose of school can vary according to the person or patron asked. Common goals are:

- To prepare children for citizenship

- To cultivate a skilled workforce

- To teach cultural literacy

- To prepare students for college

- To help students become critical thinkers

- To help students compete in a global marketplace (PBS,2009)

This study analyzed staff willingness to change within one district's three secondary schools to determine readiness for Twenty-first Century learning.

Chapter Two provides a review of the literature regarding Twenty-first Century learning. First, using research on dropouts and at risk students as well as addressing the

demands of a global economy, a case was made that schools must change from a traditional, Twentieth Century model to a new paradigm of learning and instructional delivery. Investigation of digital natives explored "how technology's unstoppable march has altered the way young minds develop, function, and interpret information" (Small, G. & Vorgan, G., 2008). Next, the literature review addresses student learning and instructional practice as applied to digital natives. Twenty-first Century skills, assessment, technology tools, and professional development were also analyzed. Finally, staff willingness to change was presented within the context of organizational theory and the DOI theoretical framework.

Chapter Three further explains the Methods used in this study. Chapter Four presents the results of this study, and analysis of the data, findings, conclusions, recommendations, and my reflections are articulated in Chapter Five. Appendices will present surveys, graphs, and interview questions.

CHAPTER II

LITERATURE REVIEW

School Reform

Today, there is conclusive evidence that schools can impact student achievement regardless of the poverty rate. Effective schools can produce results "that almost entirely overcome the effects of student background" (Marzano, 2003, p. 7). A number of factors contribute to schools becoming effective, including a guaranteed and viable curriculum, a safe and orderly environment, challenging school-wide goals, collegiality, and student motivation. None are as significant as the effectiveness of the classroom teacher (Marzano, 2003). When students are instructed by an ineffective teacher, the results are detrimental to academic progress. Effective and ineffective teachers can cause huge discrepancies in a student's learning (Marzano, 2003). This can result in the difference between "a remedial label and placement in an accelerated or even gifted track … a difference between a selective college and a lifetime at McDonald's" (Haycock, 1998, p. 4). The issue of teacher effectiveness obviously contributes to national problems with academic achievement. This literature review will present information about the skills needed to live and work in the Twenty-first Century, characteristics of digital natives, and possible differences between traditional and Twenty-first Century schools. In order to respond to these challenges, schools will need the leadership, teacher willingness, and culture to prepare for the instructional and

systemic changes needed to educate Twenty-First Century students.

The Dropout Crisis

"Every nine seconds, a student drops out … they're bored, disengaged, or feel no one truly cares if they stay or go" (Pascopella, 2007). The dropout crisis affects every school district in the United States. Instructional leaders have an ethical and administrative responsibility to develop a curriculum and an organizational structure that is relevant and meaningful to the Twenty-first Century learner. Today's students, often called digital natives, do not see classroom connections to their world. They are bored and unmotivated.

Dropouts are especially susceptible to these attitudes. "The Silent Epidemic, Perspectives of High School Dropouts", a study commissioned by the Bill and Melinda Gates Foundation, found that "this tragic cycle has not substantially improved during the past few decades when education reform has been high on the public agenda. During this time, the public has been almost entirely unaware of the severity of the dropout problem due to inaccurate data. The consequences remain tragic" (Bridgeland, DiTulio, & Morison, 2006, p. 1).

Even if local schools do not have a significant dropout problem, they still have students who do not graduate and, consequently, are vulnerable to various lifetime complications. The consequences of dropping out in today's global economy are clear: poor health, poverty, government assistance, prison, divorce, and poor role modeling for future children. "High school dropouts, on average, earn $9,200 less per year than high school graduates, and about $1 million less over a lifetime than college graduates"

(Bridgeland, DiTulio, & Morison, 2006, p. 2).

In decades past, unskilled and uneducated workers had opportunity to gain employment and provide for their families, but in today's high tech workplace, dropouts have few options and little chance to make ends meet. The lack of employment opportunities is exacerbated by the increasing demands for highly skilled workers, the trend toward outsourcing jobs to third world countries, and the increasing availability of undocumented workers who will accept low pay for menial tasks. Additionally, communities face the unwelcome consequences of the decline in productive workers and the increased cost of social services. Snyder and Sickmund (1999) stated, "Studies show that the lifetime cost to the nation for each youth who drops out of school and later moves into a life of crime and drugs ranges from $1.7 to $2.3 million" (p. 82).

The profile of a high school dropout is not entirely predictable, but there are common characteristics. 50% of dropouts come from 15% of the nation's high schools. Often called dropout factories, the 15% serve high poverty families (The Center for Public Education, 2007, p.1). Most of the high schools are located in eastern and western cities with a few scattered throughout the south and southwest. Poverty is the fundamental cause of high dropout rates with a "near perfect linear relationship between a high school's poverty level and its tendency to lose large numbers of students between ninth and twelfth grade" (Balfanz & Legters, 2006, p. 1).

The relationship of minority students to dropout rates is only correlated through their corresponding poverty status. Minority students in successful schools do not have higher dropout rates than their Caucasian peers. Nevertheless, between one third and one half of minorities do not earn a high school diploma. According to Balfanz and Legters

(2006), students who enter high school with marginal academic skills rarely or barely make it out of the ninth grade. They disengage from school, attend infrequently, fail too many courses to be promoted to the tenth grade, try again with no better results, and ultimately drop out of school. Our data show 20-40% of students in these cities repeat the ninth grade, but that only 10-15% of repeaters go on to graduate (p. 2).

"The Silent Epidemic, Perspectives of High School Dropouts" gave voice to the students to determine why they dropped out. There was no single reason, but the responses established a framework for understanding the problem and developing solutions.

- 59% to 65% of respondents missed class often the year before dropping out.

- Young people who dropped out of school almost universally expressed great remorse for having left high school and expressed strong interest in re-entering school with students their age. 74% said that if they were able to relive the experience, they would have stayed in school and 76 % said they would definitely or probably re-enroll in a high school for people their age if they could.

- 47% said that not having a diploma makes it hard to find a good job (Bridgeland et al., 2006, p. 2).

Students do not suddenly become dropout candidates. They send loud distress signals early. Recent research by Belfanz and Herzog (2007) reported in the *Education Week* article, "An Early Warning System," clearly articulated middle school signals. Any sixth grader with one of four signals--an F in math, an F in English, less than 80% attendance, or an unsatisfactory behavior mark in at least one class--has a 75% chance of dropping out of high school. Eighth graders with these signals have a 50% chance of

dropping out. Because of the complications of transitioning to high school, ninth graders who come to high school with adequate academic skills are still at risk, although they send slightly different signals, including earning less than two credits or attending less than 70% of the time. The earlier the signal, the greater the chance the student will drop out (Balfanz, McPartland, & Shaw, 2007, p. 2).

Finally, students shared details about why they dropped out. In the "Silent Epidemic" survey, 47% of respondents said classes were not interesting and school was boring. 43% said they missed too many days to catch up, 42% were involved with friends who were not interested in school, and 38% said they had too much freedom and not enough rules in their lives. Three-fourths of ninth and tenth graders were unmotivated. "The work wasn't even hard… once I figured I wasn't going to get any learning done in there, there wasn't any need to go," said one young man from Philadelphia (Bridgeland et al., 2006, p. 13).

Research consistently indicates that there is no magic fix, no model, and no canned program to solve the nation's dropout problem. Each state, district, and school must analyze the problem thoroughly; use data effectively, determine needs and correspondingly develop local solutions. Understanding of adolescents and the impact of poverty can benefit teachers and staff as they deal with this unique age group. Development of preventive and proactive strategies to mitigate academic failure as well as behavioral and attendance problems are necessary. Ideally, middle schools must begin to address the needs of at risk students when early warning signals are detected. Schools should create strong, school-wide instructional programs, hire effective teachers, and offer relevant professional development (Balfanz & Herzog, 2006). Systems of

intervention to support students and hold them accountable for learning will be critical. Sites must develop clearly articulated and systematic processes to address absence, behavior problems, failure, and motivation. Not only can middle schools develop preventive programs, they can also work with other secondary schools to help students transition through the system.

> When one school begins successful work with high-risk students, the best
>
> plan of action is to continue some or all aspects of student and parental support
>
> from one building to the next. It is practical and very helpful to the students to
>
> experience consistency of expectation and support and it makes good sense for
>
> teachers, whenever possible, to share anecdotal information about their students
>
> (Mizelle, 1999, p. 18).

Elements of successful dropout prevention programs can be grouped into five categories: organization and administration, school climate, culture, service delivery/instruction, and instruction and curriculum (Woods, 1987, p. 4). Organization primarily refers to the size of the school. Woods (1987) explained that high-risk students do not handle the chaos of larger schools, get lost in the shuffle and do not have adequate adult relationships to offset the loss of connections in large settings. Alternative programs and smaller schools can provide options. Low student/teacher ratios are needed to provide increased opportunities for support and relationship. Additionally, strong instructional leadership, fair but uncompromising discipline programs, flexible programming and scheduling, community and business collaboration, careful staff selection and strong professional development; and transition programs can make a difference (p. 5).

The Digital Native

Technology has changed at lightning speed in the first decade of the Twenty-first Century. Web 2.0, social networking, communication tools, and virtual communities have accelerated the influence of technology upon the learning styles of today's youth. Consequently, in order to evaluate school readiness for Twenty-first Century learning, teachers must understand changes in the way digital natives live, think and learn. Educators must evaluate traditional practice, be willing to consider instructional changes, research non-traditional models, and devise local plans to meet the needs of today's learners and to prepare students for life beyond high school. Instructional leaders must not create educational environments focused on state graduation mandates, but should also articulate Twenty-first Century learner outcomes (Pearlman, 2006).

In 2001, Prensky coined the term "digital native" to describe a new generation of children growing up with technology. "Our students today are 'native speakers' of the digital language of computers, video games, and the Internet" (Prensky, 2001, p. 6). People born before 1980 are often tagged digital immigrants (Corbett, 2008; Palfrey & Gasser, 2008). They have learned the digital language, but retain an accent and are not bilingual. For example, they prefer reading books rather than web pages, they research in libraries rather than online, and they prefer traditional relationships rather than social networking (Prensky, 2001). Digital natives are constantly connected. They communicate with local and virtual friends via cell phones, pagers, instant messaging, Skype, e-mail, and social networking sites. They reinvent themselves at will by creating avatars that live in virtual communities. Digital natives do their homework while

simultaneously listening to music, talking on the phone, watching TV, and instant messaging friends. It can be argued that this lifestyle is chaotic and unmanageable and that educators should be teaching students to become wiser technology consumers.

Digital immigrants were raised on the proposition that the brain is hardwired and that capacity is determined by age three. Over the years, brain research has challenged this traditional position. The brain is actually very pliable, and, because of ongoing stimulation, is re-wired and re-organized throughout life. "The brain is constantly learning things, so it constantly re-wires itself like a muscle--the more activity you do, the larger and more complex it can become" (Crockett & Jukes, 2009). Using neuropsychology and neuroimaging, researchers can detect stimulation points in the brain that provide insight into how digital natives think. For example, digital natives' brains process information in a simultaneous rather than sequential fashion. Digital natives also read differently with eye movement forming an F pattern rather than the traditional Z pattern, causing them to ignore the bottom right portions of web pages. Digital natives prefer red or hot pink text on a dark background rather than the traditional black on white found in books; they prefer introduction of new material using sounds and pictures rather than text (Jukes & Crockett, 2009; Nielsen, 2006). When students have access to a variety of hand-held media, including MP3 players, cell phones, DVD players, and netbooks, text is still important in the learning process, but is not a digital native's only access to information. Children have an "MTV mindset" (Dosaj & Jukes, 2006) and consume information not only in a variety of ways, but also for varying amounts of time as shown in Figure 3 (Churches & School, 2008, p. 2).
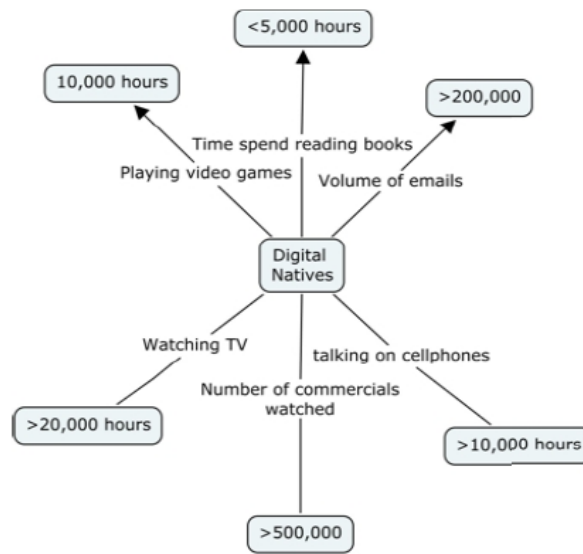
Figure 3. Digital Natives and the time spent on technology integrated activities

Because of the technological influence, today's youth are over-stimulated, impatient, and want immediate access to information. When surfing the Internet, they often spend minimal time reading and tend to scan for information. Children with access to technology want their experiences to be interactive, they want control, and they want instant gratification (Capgemini, 2007). Digital natives operate at "twitch speed" (Dosaj & Jukes, 2006). They prefer to graze for information. Because they are multi-tasking at lightning speed, they may not adequately process the huge amount of information available at their finger tips.

Authors, educators, and parents often describe students as digital natives. Three aspects of the digital native debate are presented: whether technology access is creating a generational divide, whether brain function is changing, and whether students are successful multi-taskers. The position that people born after a certain year are digital natives is countered by research that finds that digital natives should be classified by

socioeconomic status, identity traits, or life experiences rather than from a generational perspective (Bennett, Maton & Kervin, 2008; Vaidhyanathan, 2008). "It may be that there is as much variation within the digital native generation as between the generations" (Bennet, Maton & Kervin, 2008, p. 779). Vaidhyanathan (2008) contends that people "should drop our simplistic attachments to generations so we can generate an accurate and subtle account of the needs of young people – and all people for that matter" (p. 5).

Practitioners make statements that digital natives think differently than people from other generations. Prensky (2001) makes a case that "digital natives' brains are likely physically different as a result of the digital input they received growing up" (Prensky, 2001, p. 2). Researchers counter with an argument that neurological differences between people exposed to the Internet and technology versus those who are not is a matter of experience and choice. For example, Small, Moody, Siddarth & Bookheimer, (2009) and a team of researchers conducted a study that analyzed the effect of Internet searching on brain activity. They found that people with searching experience had greater brain activation than people who had never searched the Internet. Specifically Internet savvy people, "demonstrated significant increases in signal intensity in additional regions controlling decision making, complex reasoning, and vision" (Small et al. 2009). However, when people with no prior searching experience were trained and re-tested after as little as one week, they showed similar neurological activity (Herther, 2009; Small et al. 2009). Herther (2009) quotes Georgopoulus, University of Minnesota Director of the Center for Cognitive Sciences, asserts that there "is absolutely no scientific basis for claiming that young people's brains have changed in recent times or that there is such a major difference between the brain at different ages (p. 18)."

In addition to discussion about the neurological differences between digital natives, authors are prone to stating that today's students are good multi-taskers. Multi-tasking is not a phenomenon exclusive to digital natives. Common sense aligns with the research. Brains are wired to handle a lot of stimulation, but cognitive overload is a reality. Today's media snackers are more interested in being busy and connected rather than being productive (Sprenger, 2009). They are in "continuous partial attention" (Sprenger, 2009, p. 36) and, in terms of learning, are not successfully multi-tasking.

Twenty-First Century Skills

In addition to understanding the digital native, educators also must examine the skills needed to live and work in the Twenty-first Century. Numerous articles and books present a vast array of Twenty-first Century descriptors. Public school administrators seeking to define the skills needed by today's young adults should begin by investigating Twenty-first Century workforce trends.

Automation heavily influences today's workplace. Because technical tools are automating production and routine tasks, yesterday's factory jobs are no longer needed. Machines are doing the work. Automation has even replaced professional jobs. For example, because the program *Turbo Tax* provides a much cheaper and easier way for people to file income taxes, accountants' traditional services are not needed. Any task that has clearly defined patterns and can be digitized is likely to become automated. Companies covet workers who can handle non-routine jobs, problem solve and think critically, handle complex communication, and create and manage the tools that automate so much of today's products (Jerald, 2009, p. 3).

Globalization also influences employment in a variety of ways. Because of vast amounts of online information, communication tools, and work flow software, today's economy has been flattened (Friedman, 2006). Work is not bound by time and space. Consequently, there is a new platform, a new way of conducting business that includes "off shoring, outsourcing, supply-chaining- signaling a shift from 'vertical' production to 'horizontal collaboration'" (Jerald, 2009, p. 7). *Wired* author Howe (2008) sums up the effect of globalization on today's labor force, "The network doesn't care if you're down the block, downstate, or down under—if you can perform the service, design the product, or solve the problem, you've got the job" (Howe, 2008, p.17).

The effect of globalization and automation upon United States employment needs is significant. Unskilled workers have little chance for employment other than in the most basic service jobs. Although service workers (janitors, security guards, cafeteria workers, waitresses, etc.) will still be needed, hourly wages will not provide financial stability. Because the work force is global, competition has exponentially increased. Americans no longer compete with each other for today's jobs. Most production will be automated and the employees needed to run remaining assembly lines will be readily available in other countries. China and India have huge numbers of employees ready to work at rates far below American expectations. Due to advances in telecommunications and the Internet, plus the large number of well-educated English-speaking people in India and elsewhere, more and more high-skill jobs that require expert thinking and/or complex communication will be outsourced (Jerald, 2009).

As a result of automation and the global economy, Twenty-first Century skills become more clearly defined. Today's workers must be critical thinkers and problem

solvers. They must be creative. Workers must be collaborative, effective communicators, and they must be able to interact with people from other cultures. Because organizations are less hierarchical, employees must be self starters. Because work is often about problem solving and new solutions to unexpected issues, today's workers must be able to learn, un-learn, and re-learn according to the assigned project. Jerald (2009) recorded a statement by a former United Parcel Service (UPS) CEO describing what characteristic he was looking for in UPS employees.

> We look for people who can learn how to learn. While information is much richer today, complexity and uncertainty have not abated. In fact, they've increased. That's also why we want to make it possible for people to have six or more different jobs in the course of a career at UPS. (p. 15)

Twenty-First Century School

Despite the dramatic changes in the way digital natives experience learning and interact with information outside the classroom, school has not changed.

> Hasn't it been long enough? Over 100 years of public mass education, nearly 10 years into the new century, you still see the 30-student same- look classrooms with students sitting in rows and columns listening to teachers and doing monotonous worksheets. (Pearlman, 2009, p.14)

 Students are immersed in technology outside the school day, but their educational experiences typically do not offer similar opportunities. According to a 2008 *Speak Up National Research Project* survey, 35% of student respondents said teachers limit technology use, 43% related that filters or firewalls block access to needed websites, and 33% complain that they were prevented from using mobile devices. "It is widely accepted

by students that arrival at school means 'powering down' for a few hours" (Moore, 2009, p.2).

Although schools have spent vast amounts of precious educational dollars on technology, instruction has not changed much. Steiny (2007) explained the factory model still exists and

> High schools and junior highs — the latter were invented around 1910 — put students on a self-propelled conveyer belt that moves from classroom   to classroom to get a rivet of English, a bolt-tightening of math, and so forth. To improve efficiency, schools sorted students into "tracks," grouped according to their economic prospects — college, general, vocational. The final product at the end of the line was an educated student, which in today's terms means acceptable test scores (p.7).

The traditional Twentieth Century school model is standards and assessment driven. All students must meet pre-determined learning outcomes at the same time and in the same way. Teachers, students, administrators, and patrons are driven by the bell schedule and school calendar. This model is well entrenched in today's educational environment (Bellanca & Brandt, 2010) and educators are very accustomed to doing school this way. Unfortunately, the current model does not fit the rapidly changing world and its demands upon individuals, business, and society (Crockett & Jukes, 2009).

The new model will completely change instruction. Teaching in the 21st century model, an extreme school for Net-Gen learners, will force a paradigm shift for educators and students alike. Educators will no longer use the same old traditional methods to teach the same old traditional curriculum. The new model (See Figure 4) will focus on

project-based learning that incorporates the 21st century technology standards (NETS-S), and state content standards.
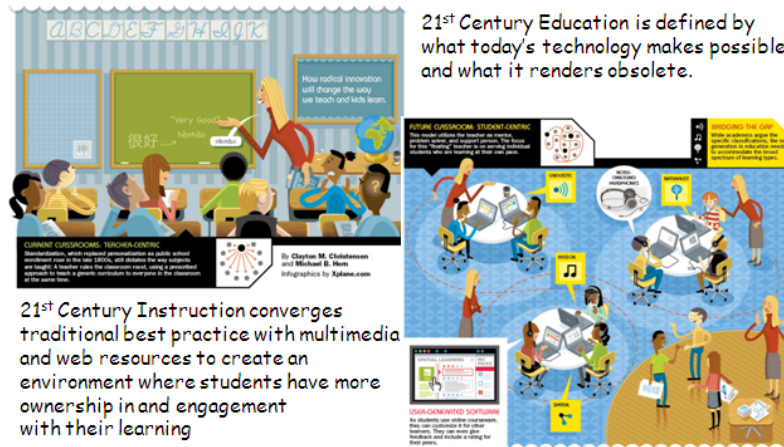
Figure 4. Twenty-First Century School. Reprinted from *Disrupting Class: Student-Centric Education Is the Future*, by Clayton Christensen and Michael B. Horn, 2008, Retrieved from http://www.edutopia.org/student-centric-education-technology. Copyright 2010 by the George Lucas Educational Foundation. Reprinted with permission.

Classrooms will shift from being teacher-centered to being student-centered. Learning will be integrated, differentiated, student-led, collaborative, and project-based. Students will engage in ongoing diagnostic and formative assessments that will provide teachers with timely data to drive instruction. Students will also receive timely feedback about their own learning. Students and teachers will work together to set and achieve specific learning goals (SMART goals). Students will track their progress and communicate their success as they take ownership in their education.

New Tech Network, an organization that guides schools through implementation of project based learning, supports 41 schools across the nation. The Network's findings

about student achievement are positive. For example, during the 2007-2008 school year, New Tech Network reported a number of positive statistics.

- At Manor High School, Texas, students scored 15% higher than comparison schools in Reading/Language Arts and 21% higher in Mathematics on the TAKS assessments.

- "Ninety-eight percent of students graduated from New Tech High School in Sacramento, California. This is the highest graduation rate of any high school in the city and one of the highest graduation rates in all of California, particularly for high-poverty schools."

- "The Student Empowerment Academy at Jefferson High School in Los Angeles, California, had a 120 percent increase in student test scores on the California State Assessment in just one year. The majority of Academy students are first-generation Latinos who are English-language learners." (New Tech Network, 2010).

Teachers in technology rich schools found that student motivation and engagement increased when video, YouTube, Internet research, communication and project management tools, online learning, and rubrics were used to allow students "to become active and critical consumers of knowledge" (Gourgey, 2009). Alumni of non-traditional schools using project-based learning models report increased technology skills, proficiency in Twenty-first Century skills, and preparation for post secondary education collaboration and communication skills (Rockman, 2006).

Organizations and Change, a Theoretical Perspective

When practitioners overlook theory, quantifiable and qualitative interpretation of school phenomena is neglected in favor of experience. "Theory is valuable and significant if it helps to explain practice and provide managers with a guide to action" (Bush, 2003, p. 23). In the analysis of school readiness for change, a variety of theories apply. Twenty-first Century learning will require a change in instructional practice. For the purposes of this study, emphasis will be placed on staff willingness to change.

Change Theory

In *The Challenge of Change,* Fullan (2009) called change a process: "The change process is about establishing the condition for continuous improvement in order to persist and overcome inevitable barriers to reform. It is about innovativeness, not just innovation" (p. 11). Change definitions often include words like *alter, convert, modify, adjust, transform, and revolutionize.* Terminology reflects paradigm shifts over the last sixty-five years: evolutionary versus revolutionary, transactional versus transformational, incremental versus punctuated. Organizational change is usually evolutionary and occurs because of incremental adjustments to known problems or because of attention to continuous improvement (Burke, 2008, p.69). Revolutionary change is dramatic, disruptive, and challenging. It may transform the deep structure, the underlying culture or design of the organization.

In *Organization Change, Theory and Practice*, Burke (2008) identified key questions that must be asked when leaders consider change. First, an analysis of the external environment is essential. Educational leaders must consider what patrons, politicians, and businesses are seeking. Are they satisfied with the school organization?

Secondly, staff must take a hard look at the internal environment. Is the mission in line with the data? Is the school culture positive? Do school processes support the mission? Third, is the school ready for change? Fourth, how influential is the status quo? Will the way we do things around here overrule change? Fifth, can leaders make a case for change? Lastly, how can leaders guide staff through the process of change (Burke, 2008, p. 275)?

Change initiatives fail for a variety of reasons. Kotter (1996) articulated the most common errors leaders make during periods of change. The biggest mistake is to jump into action without establishing a sense of urgency with staff. Other mistakes include "underestimating the power of vision…permitting obstacles to block the new vision…failing to create short-term wins… [and] neglecting to anchor changes firmly in the corporate culture" (Kotter, 1996, pp. 4-14).

Without a leader who reflects on key questions, organizations will drift rather than change. Leaders must take followers through a number of phases to fully implement change. While the process may seem linear, it is not. People and events skew the process, but leaders will benefit if they grasp the basics. Leader reflection on self-awareness, motives, and values are part of initial planning--the pre-launch phase (Burke, 2008, p. 248). The leader must have a humble understanding of power, have a clear vision and sense of direction, and establish a need for change. In order to communicate goals, the new leader must have a "vision of school-- a mental picture of a preferred future- which is shared with all the school community" (Beare, Caldwell, & Millikan, 1989, p. 99). It is difficult to influence followers and mobilize them toward a common goal if the leader does not have an articulated vision of where the school needs to go.

Leadership

Evaluation of successful leadership requires a formal definition. According to Burns (1978), "leadership is the reciprocal process of mobilizing, by persons with certain motives and values, various economic, political, and other resources, in a context of competition and conflict, in order to realize goals independently or mutually held by both leaders and followers" (p. 425). Northouse (2007) defined leadership as a "process whereby an individual influences a group of individuals to achieve a common goal" (p. 3). The difference between management and educational leadership is straightforward. Bolman (1999) defined educational leadership as "the responsibility for policy formation and, where appropriate, organizational transformation" and management leadership as an "executive function for carrying out policy" (p. 194). Using Northouse's (2007) definition of leadership, leaders initiating transformational change must influence staff to achieve new goals. In order to communicate the goals, the new leader must have a "vision of the school-- a mental picture of a preferred future- which is shared with all the school community" (Beare, Caldwell, & Millikan, 1989, p. 99). To influence followers and mobilize them toward a common goal is difficult if the leader does not have an articulated vision of where the school needs to go.

The new leader must be transformational. Transformational leadership was initially identified by Downton (1973), but was firmly established as a leadership style by political psychologist J. M. Burns (1978). Burns extended traditional characteristics to include the relationship between leaders and followers. Transformational leaders take followers where they would not independently go. They inspire followers to reach beyond individual goals and expectations and are attentive to followers' personal needs

(Northouse, 2007). Burns further distinguished between transformational and transactional leaders by stating that transactional leaders are primarily concerned with the exchanges between leaders and followers. They are focused on management issues, not in developing the full potential of the follower.

The principal must "shape the goals of followers through the vital teaching role of leadership. This is transforming leadership…united in the purpose of 'high goals,' the realization of which is tested by the achievement of significant change that represents the collective or pooled interests of leaders and followers" (Burns, 1978, pp. 425-426). Leithwood (1994) conceptualized transformational leadership along eight dimensions:

- Building school vision

- Establishing school goals

- Providing intellectual stimulation

- Offering individualized support

- Modeling best practices and important organizational values

- Demonstrating high performance expectations

- Creating a productive school culture

- Developing structures to foster participation in school decisions.

     (Leithwood,1994)

School leadership is not only about management and administrative positions. The workload is too great for any one person to singlehandedly lead a school, let alone transform the organization (Marzano, Waters, & McNulty, 2005). Consequently, a leadership team comprised of the principal, assistant principals, teacher leaders, students, and parents is the answer.

School Culture

Culture impacts school readiness for change. Goodenough (1981) stated, "Culture is not the material artifacts or observed traditions; rather, it is what is learned … the things one needs to know in order to meet the standards of others" (p. 50). Theorist E.H. Schein (1989) defined culture as

> a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way you perceive, think, and feel in relation to those problems. (p. 12)

Culture is also defined as the norms, values, belief systems, and traditions of an organization.

The correlation of school culture to new innovations is straightforward, but profound. For example, teachers may have developed patterns of shared assumptions about students' ability to learn. Teachers may not have the will to consider organizational change and the instructional paradigm shift needed to introduce Twenty-first Century learning. Staff may not have a successful history of problem solving. Consequently, any attempts to develop new programs must be tackled within the culture of the school.

Structural Contingency Theory

Change cannot be understood without investigation of organizational theory. In terms of organizational theory, Structural Contingency Theory explains why schools face a realignment or paradigm shift in today's educational environment. Structural Contingency Theory explains the effectiveness of an organization based upon contingencies, usually related to growth, size, or other environmental conditions. One key

component of the theory is that organizations move in and out of "fit"— successful organizational productivity based on environmental factors—and, therefore, need structural adaptation to regain fit and become productive again. "The cycle of adaptation is fit, contingency change, misfit, structural adaptation, new fit" (Donaldson, 1999, p. 59). There is, however, an organizational tendency to retrench and take a protective stance when under attack. In fact, when schools are faced with criticism, self preservation often takes precedence over goal achievement. Moreover, external pressures often produce feelings of insecurity (Blau, 1955) and insecurity leads to rigidity and impedes an organization's ability to successfully confront its challenges, especially when faced with increased and conflicting demands from the broader environment (Sinden, 2004, p. 465).

In order to regain fit, a school organization must develop new systemic approaches to support students and insure academic achievement. School structure can help or hinder the effective operation of a school. Bureaucratic structures often alienate, breed dissatisfaction, hinder creativity, and demote employees. Yet organizational structures that guide behavior, clarify responsibility, and reduce stress, enable individuals to be more effective (Hoy and Sweetland, 2004).

Staff Willingness to Change

Staff willingness to change was examined through the lens of Diffusion of Innovations Theory (DOI). DOI explained change phenomena by identifying a process of communication within a social system (Rogers, 2004). Formal DOI research dates back to 1943 when researchers Ryan and Gross studied adoption of hybrid corn in Iowa (Murray, 2009). Rogers (2004) conducted diffusion research as a doctoral student at Iowa

State University, but extended the study to domains other than agricultural innovations. His seminal book, *Diffusion of Innovations,* was published in 1962 with four subsequent revisions. Rogers (2004) stated that DOI is "not bound by the type of innovation studied, by who the adopters [are], or by place or culture, but focuses on the communication process in which the messages are about new, uncertain, unpredictable, ideas" (p. 7).

While adoption does not depend on the adopters, a key component of DOI's process and rate of adoption is individual innovativeness. Prior to Rogers' research, a variety of terms were used to describe an individual's willingness to embrace new ideas. In order to improve research efficiency and consistency, Rogers (2003) developed an adopter classification system to describe social system members. "Because increased innovativeness is a main objective of many change agencies, it be [comes] the main dependent variable of research…the bottom line behavior in the diffusion process" (p. 268). The adopter categories are innovator, early adopter, early majority, late majority, and laggard. Adoption categories form a normal, bell-shaped distribution and the adoption, when plotted over time, concurrently forms an s-shaped curve (Rogers, 2003).
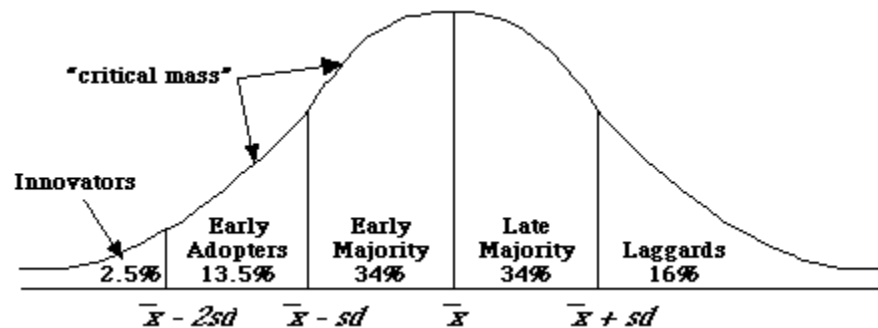
Figure 5. Rogers (1995) Diffusion Curve

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Innovators are adventurous. They understand complex technical information and are not afraid to risk. They can manage a high degree of uncertainty, yet do not mind when occasional setbacks occur. Although a vocal minority of 2.5%, innovators are not necessarily leaders, but they serve as "gatekeepers" to help control the flow of new ideas into the social system (Rogers, 2003).

Early adopters comprise 13.5% of the social system, are highly respected, and are an integral part of the diffusion process. While very similar to innovators, early adopters hold more prestige among the rest of the staff. They often serve as "opinion leaders" and are known as "the person to check with" regarding the new idea. They serve as the organization's role model and are considered change agents. Early adopters will usually "trigger the critical mass….put their stamp of approval…when they adopt an innovation" (Rogers, 2003, p. 283).

The early majority is very deliberate and takes longer to adopt an innovation. They interact frequently with all staff, but usually do not hold leadership positions. Early adopters are an important link in the diffusion process because they communicate adoption by their actions rather than their words.

The last two categories comprise 50% of the normal distribution curve. Late adopters, 34% of the social system, are skeptical of new ideas. They are cautious and often adopt because of social pressure or financial need to keep their jobs. They must believe that adoption of the new idea is within the culture and social norms of the organization. All uncertainty must be removed before late adopters will embrace the innovation. As expected, laggards are traditionalists who are suspicious of any change and the agents promoting the change. They like their position as the remaining few hold-

outs who must protect the way things are done around the organization until the bitter end.

According to Swan (2009), "If an innovation is to be successful, the adoption process of the individual must be taken into account" (p. 441). While leaders invested in strategic planning for transformational change may initially seek to evaluate whether they have enough innovators, the more important issue to the diffusion process and the rate of adoption is opinion leadership. Opinion leaders, i.e. early adopters, are key to determining how fast the innovation will be diffused into the social system. Because early adopters are respected by their peers and considered change agents, they influence others' decisions about whether to try the innovation. They increase others' knowledge of the innovation. They influence attitudes toward the innovation and influence decisions to accept or reject the innovation. They confirm that the innovation is worthwhile (Rogers, 2003).

Staff willingness to change can be viewed through the DOI lens, but additional comprehension of change should be sought in regard to how the innovation is initiated. Understanding the different effects of imposed or participatory change on staff will benefit school leaders who seek to bring about school reform. Patterson and Patterson (2001) explained that teachers often talk about how imposed change (change mandated from outside their school) drains them of energy and deters local plans for school reform.

> Although well-intentioned outsiders who initiate school change may care about
> student achievement, huge gaps remain between intentions, actions, and
> consequences. With good intentions, those outside the school take action to
> improve the school by mandating specific school changes. The consequence is

that those inside the school resent these outside intrusions by those who don't

know or care to know the context of the school (p. 50).

Teachers, school administrators, and people in general tend to resist change that is "done

to them, not *by* them" (Patterson & Patterson, 2002, p. 50). People prefer to participate in

the change process.

Leaders should understand the effects of power and coercion when introducing

innovation from central office. Teachers bring emotions, stress, and personal issues into

the workplace. School leaders would be wise to understand the effect of outside change

upon teachers and site staff. They should build support by connecting outside changes to

internal school values, mission, and culture. They can provide alternative ways to

understand imposed change within the context of school goals and they can create

positive situations out of perceived conflicts (Patterson & Patterson, 2001).

Various models provide theoretical and practical approaches to the change

process. Bridges (1980) articulated three phases to transition toward new ideas and

change. First, staff go through an ending phase in which they must let go of old ways of

doing things. Second, staff experience a state of limbo, or the neutral zone, where there

are feelings of anxiety and emotional disconnection. The final phase, new beginnings,

transitions staff toward full adoption of the change. Schein's (1987) model also

articulates three steps: unfreezing or creating a stage of readiness, changing, and

refreezing. Regardless what model is employed to transition change, research indicates

that policy makers commit huge mistakes when teachers are ignored during the reform

process and do not feel buy-in for the changes required of them (Fullan, 1991, Astuto,

Clark, Read, McGree, and Fernandez, 1993). Additionally, the roles of individual as well

as collective efficacy must be understood, promoted, and protected by today's educational leaders. Theorists state that collective efficacy is strongly correlated to student achievement (Goddard, Hoy, & Hoy, 2000).

Summary

The literature review covers the national dropout crisis, the skills needed to live and work in the Twenty-first Century, characteristics of digital natives, and the differences between traditional and Twenty-first Century schools. High dropout rates, lack of student motivation, and failure to prepare students for life outside the classroom are all large pieces of the educational problem. Nearly 30% of American youth do not graduate from high school. Today's digital native learners feel a lack of motivation in the traditional classroom and a disconnection between school and their personal and social lives. The traditional curriculum, taught in the traditional way, must be re-examined. Educators need to take a drastically different approach to education in order to prepare students for life and work in an increasingly technological and global economy.

The literature review provides a theoretical look at school readiness for change. While change involves school culture and leadership, this study will examine staff willingness to change through the theoretical lens of Rogers' (1995) Diffusion of Innovations Theory. Chapter Three will articulate research methodology for the study.

CHAPTER III

METHODOLOGY

This chapter describes the methodology used in this research study. Central to the purpose of this study was analyis and evaluation of staff readiness for change. Qualitative methodology was selected because it was best suited to answer the research questions. Qualitative methodology puts researchers in position to deal with real people rather than statistics, which leads to better understanding of the data (Patton, 2002). Research was conducted in a natural setting allowing for a deeper level of detail about the individuals and setting being studied (Creswell, 2003).

Case study was the preferred method of qualitative research for this dissertation. Case study describes a "single unit or system bounded by space and time" (Hancock & Algozzine, 2006; Hatch 2002) and focuses on a current phenomenon within a real-life context (Yin, 1994). Case study is the preferred strategy when the researcher asks "how" and "why" questions (Yin, 2003). The researcher "must strive to keep an open mind, to go on looking for data, deferring analysis until the array is comprehensive" (Gillham, 2000, p.13) enough to begin to see patterns and themes. Case studies employ thick description in order to ground the study with varied sources of information, including quotes, anecdotes, interview prose, and literary techniques which bring the study to life (Hancock & Algozzine, 2006). Finally, this descriptive case study sought to present a

complete discussion of staff and schools in order to provide a thorough discussion of staff willingness to change.

Setting and Participants

Qualitative research occurs in natural settings to observe life experiences of real people as well as to understand the stories and viewpoints of the individuals within the unique setting (Hatch, 2002). The school district was purposively sampled for several reasons. First, according to the superintendent, the district needed to immediately begin strategic planning for school change and Twenty-first Century learning, and, consequently, he was interested in formal analysis of the district's secondary schools. Secondly, my physical proximity to the district made data collection possible. Finally, the district provided a rich environment and an open door to research staff readiness for change.

The case study involved one Midwestern school district and its three secondary schools. The district was in an industrial community 100 miles from each of the two largest state cities. According to the 2000 census, the community had 25,919 residents (U.S. Census Bureau, 2007). At the same time as the Census, approximately 2000 professionals and support staff worked in the corporate headquarters of the town's major employer. However, as a result of a merger with another oil company, all of the remaining 750 professional jobs were to be relocated by the end of 2011.

Typically, community support for the district was strong, patrons affirmed their local schools, and, for the most part, the five member school board interacted positively with district administrators. Historically, the schools' state and national test scores were above state averages. However, with changes in the local workforce, the district had seen

a sharp increase in poverty indicators, drug and alcohol use, teenage crime rates, and a decline in academic indicators. For example, the dropout rate was more than double the state average.

Until ten years ago, there were two seventh through ninth grade junior high schools: one on the east side of town, the other on the west side (commonly referred to as the school located on the other side of the railroad tracks). There was a negative perception about the west side school, that it was on the wrong side of the tracks, and that students were not as academically or socially successful. The east side school was usually considered the rich kids' school. In order to remove the stigma and move to a middle school concept, the school board and central office administrators changed the configuration of the secondary schools. All sixth and seventh graders were moved to the west side school, eighth graders went to the east side school, and ninth graders transitioned to the high school.

The sixth and seventh grade middle school educated an average of 700 students under the direction of two administrators, one principal intern, and 57 teachers. Faculty worked within a team-teaching concept to foster student learning, creativity, and cooperation. Core teachers collaborated within the PLC model. Remediation and intervention programs were in place to promptly identify at risk students and provide additional support for academic, social, and behavioral needs. Students were frequently rewarded for academic success. Student and staff climate survey data indicated a positive learning environment for all.

The principal had a transformational style and was considered a technology leader in the district. She methodically purchased resources to increase technology integration in

her building. The school had three computer labs, two mobile laptop carts, two iTouch carts, a career technology lab, and a variety of technology tools. About 90% of the staff had interactive white boards. The onsite technology coach provided job embedded professional development in the school and across the district.

The principal was calm under pressure, innovative, and motivational. According to annual climate surveys, the principal was well respected by her staff and teachers believed she had an open door approach to address concerns and share ideas. Consequently, there was a mutually respectful atmosphere and a sense of collective efficacy.

The eighth grade building was small and served an average of 400 students. One principal, her assistant and 31 teachers worked in a collegial environment. The principal was alert to faculty needs. The principal was also transformational. Her vision for the school had been to create a culture focused on learning with the primary indicator of student success based on state test results. Students performing below grade level were enrolled in additional remedial courses in order to close achievement gaps. All students participated in enrichment mini-courses unless the instructional time was needed to master state standards. Weekly meetings allowed staff to collaborate in PLCs, focus on data driven decision making, and share instructional best practices.

The principal was not technically competent and had not been as attentive to technology integration as the other middle school administrator. While her vision for Twenty-first Century learning was not formulated yet, she was attempting to increase technical resources for staff and students. There was a 50 station computer lab, one keyboarding classroom, a multimedia computer lab, one mobile laptop cart, and two

iTouch carts. Half of the teachers had classroom interactive white boards and classroom performance systems (clickers). The iTouch and laptop carts were not yet in high demand and the computer lab was frequently empty. The technology coach was new and worked part time.

The high school served ninth through twelfth graders and operated in a traditional 6 period, semester schedule. Students had opportunities to take a wide range of electives, enroll in career technology programs, and take concurrent enrollment college courses. Because of the changing demographics within the community, the high school had an increasing dropout rate over the last 5 years. To address this problem, high school administrators developed a number of programs for at risk students.

The principal was employed in the district for 6 years, but only recently became the lead high school administrator. He was self-confident, visionary, and exhibited remarkable energy in the pursuit of high school reform. His challenge was to change school culture by transforming traditional isolationist practices and teachers' views of controversial topics such as homework, grading policies, and student accountability in a standards-based learning environment. Climate surveys indicated that he was respected for his consistency, decisiveness, and attention to staff concerns. Because of his leadership, collective efficacy was increasing as short term goals were met.

The principal was working with central office staff to increase staff and student access to technology resources. He encouraged the use of technology in all classes, but the high school campus only had four general use computer labs and one mobile laptop cart available on a first come, first served basis for the 95 teachers who do not teach computer classes. Also, class enrollment often exceeded the 25 station computer labs.

Consequently, teachers seldom integrated technology into daily lessons. About 20% of the teachers had access to clickers and interactive whiteboards. There were no iTouch carts on the campus. The technology coach interacted with all 100 teachers, administrators, and support staff and covered a variety of duties beyond instructional technology integration.

Researcher Bias

My familiarity with the district made it essential that I guard against bias and incorrect analysis. I served as a technology coach, worked in the curriculum and instruction department, and held a leadership position at the central office. I was familiar with all three schools, the principals, and the teachers. In the case study, my plan was to keep bias in check by following qualitative research protocols. I assumed that I did not have preconceived answers to the research questions, but this was a bit naïve and was addressed throughout the study. Because I began the study with an unfamiliarity of DOI, I did not have an answer, within this theoretical framework, to the question of staff readiness for change or the extent to which staff were innovators, early adopters, late adopters, or laggards. After many years as a graduate student and assessment coordinator, I learned that data moves a researcher from assumption to precision. Consequently, I tried to be sensitive to the biases inherent in qualitative research while resisting the temptation to ignore relevant and pertinent data (Erlandson, et al., 1993; Merriman, 2001).

Following federal and university policy, I completed all forms and procedures required by the Institutional Review Board. Children were not involved in the case study. The district superintendent and interviewees completed the Informed Consent Form.

Quality of the Research

This study can be called "backyard" (Creswell, 2003) research because of my proximity to the participants. Creswell (2003) recommended "employment of multiple strategies of validity to create reader confidence in the accuracy of the findings" (p. 184). Unlike quantitative study, which relies on empirical and statistical strategies to determine the reliability and validity of findings, qualitative research depends upon trustworthiness for methodological soundness (Erlandson et al, 1993). Trustworthiness is established through strategies that focus on the credibility, transferability, dependability, and confirmability of the findings.

I used triangulation, peer debriefing, and member checking to establish the credibility of my findings. Member checking was conducted during interviews. I frequently double checked what I heard to confirm interviewee meaning. Stake (1995) defined triangulation as "working to substantiate an interpretation or to clarify its different meanings" (p. 173). Triangulation of interviews, survey results, and observation data allowed me to challenge unexplored biases and cross check meanings discerned under different circumstances (Stake, 1995). From a qualitative standpoint, triangulation prompted me to see data from a variety of perspectives rather pinpointing one definite answer to research questions.

Peer debriefing offered the opportunity to take advantage of the skills and knowledge of fellow professionals. Sharing my research and findings with respected peers allowed me to use other sets of eyes and ears to see and hear if my findings were accurate. Member checking refers to offering the interviewee the opportunity to proof transcription or to verify meaning during interviews. Both peer debriefing and member

checking held me more accountable to what I thought I saw, heard, and understood during interviews and observations.

In order to develop the trustworthiness of the case study, transferability, dependability, and confirmability of the findings were tackled in varying degrees. Purposive sampling and thick description addressed transferability or applicability, of my research. Table 1 describes the strategies used to establish trustworthiness.

Table 1

Trustworthiness Table

Strategy	Criteria	Description
Credibility	Prolonged and varied field experience	Data was collected over a five month period
	Reflexivity	A field journal was used to record and cross check research data.
	Triangulation	Interview, document, general observation, and survey data provided multiple avenues to make inferences and reach conclusions.
	Peer examination	Constant interaction with peers and cohort members helped increase the credibility of the study.
	Interview technique	I followed qualitative interview protocols.
	Establishing authority of researcher	I met all university coursework, assessment, and accountability standards which established my authority as a researcher.
	Member checking	Member checking was achieved by verifying answers during the interview process and by cross-checking transcripts to handwritten notes.
Transferability	Dense description	Rich description of the district and schools provides opportunity for

		transfer to other school environments
Dependability	Low inference descriptors	Quotations were frequently used and properly placed to increase the dependability of the data
	Dense description of research methods	Chapter III provides description of research methods.
	Triangulation	"Cross-checking" and constant reflection of multiple data sets were used to develop inferences and conclusions.
Confirmability	Triangulation	"Cross checking" multiple data sources confirmed patterns and themes
	Reflexivity	I was self-aware and exercised critical self-reflection of my biases and predispositions to verify themes and avoid affect on the research process and conclusions.

While this case study was not generalizable, it offers other districts the opportunity to transfer protocols to their own case studies. Dependability and confirmability were attended to by maintaining a field journal.

Data Collection Procedures

The data sources needed to conduct this case study were documents and artifacts, observations, interviews, and surveys. Multiple data sources allowed me to develop patterns and themes and to analyze research questions. Surveys take on "no significance until they are processed using the human intelligence of the researcher" (Hatch, 2002, p. 7). Throughout the data collection process, I used a process of discovery that moved from wide ranging to very selective decisions (Gillham, 2000) about what was collected.

Documents and Artifacts

"Documents are powerful indicators of the value systems operating within institutions" (Hatcher, 2002, p. 116). Documents and artifacts provided stable, exact, and unobtrusive data, but I sought to avoid bias in my selection process (Yin, 2003). In this study, documents and artifacts included meeting agendas, training evaluations, teacher web sites, and district technology communication. I analyzed teacher web sites and utilized an evaluation rubric to assist me in evaluating sites (see Appendix B). Documents and artifacts offered additional insight into staff willingness to change and assisted in confirming other sources of data.

Observations

I conducted general observations in a variety of locations and settings; teacher identities remained anonymous. Because I had access to many site and school district meetings, ongoing and frequent observations were be conducted and catalogued during the course of the study. Therefore, I functioned as a participant observer (Creswell, 2003). In particular, I observed faculty meetings with a technology agenda item, administrative meetings which involved technology discussion, and any technology training involving site staff. In preparation for my observations, I used Hancock and Algozzine's (2006) 5-step protocol: pre-determine what needs to be observed, create an observation guide (See Appendix C), gain access using appropriate channels, recognize my role and bias before observations, and follow all ethical and legal requirements.

The purpose of the observations was three-fold. First, I wanted to observe how the schools currently integrated technology with instruction and whether there was evidence of Twenty-first Century learning in the schools. I looked for innovative instructional

practices that infused technology tools with curriculum in such a way that students were

learning Twenty-first Century skills. Second, I looked for indications that teachers and

principals were willing to change instructional practice and to examine characteristics of

Rogers' adopters. Finally, the observations provided another data source to assist me in

the development of school patterns and themes. While interviews can reflect interviewer

bias, observations provided an opportunity to collect objective information (Hancock &

Algozzine, 2006).

Interviews

Interviews provided the opportunity to explore participants' experiences and

perceptions (Hancock & Algonzzine, 2006 & Hatcher, 2002). The interviews also

provided me with data to triangulate with observation and survey data in order to develop

themes and patterns as field notes were recorded, sorted, and coded.   In this study,

formal interviews were conducted. Formal interviews are often called "structured"

because the researcher is in charge of leading the interview at a prescribed time and place

with pre-determined questions (Hatcher, 2002).

Guiding questions were carefully and intentionally crafted to get interviewees to

talk about personal experiences, perceptions, and opinions. Questions were not intended

to prompt for predetermined answers. Questions were:

- Open-ended

- Clear

- Neutral

- Respectful

- Understandable

- Relevant to the study. (Hatcher, 2002)

Questions were simple, standardized, and open-ended with additional probes to deepen my understanding of staff willingness to change and school culture. In order to protect confidentiality, all names were changed and the interviews were conducted after school hours in locations comfortable to the interviewees. Specific questions were developed within the context of the research questions and my theoretical framework. All staff were interviewed with the same questions. (See Appendix D).

Three groups of people were interviewed: three principals, purposively selected teachers from each school, and the three site technology coaches. The principals assisted me in the selection of teacher interviewees. The principals did not provide any details about why they chose certain people or how they described them.

Principals received an e-mail requesting participation in this research. Upon acceptance, an appointment was set up with each principal to explain the project in detail, sign the Informed Consent form, and set an interview date. The purpose of the principal interviews was to describe my case study and to make sure they were comfortable with my presence in their building. I also wanted to get principals' responses to interview questions, to collect data about their understanding of Twenty-first Century learning, and to ask about their perceptions about their own staffs' willingness to change.

The purpose of the teacher interview was to delve into the teacher's perceptions of Twenty-first Century Learning and to provide insight into individual willingness to change. The interviewees were carefully selected to assure a representative cross section of the five types of DOI adopters. A few of the originally selected teachers did not accept

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my invitation to participate and others were asked. Interviews were conducted at a place and time selected by the teachers. (See Appendix E).

Technology coaches were interviewed for three reasons. First, I wanted to get their perceptions of current technology integration. Second, I wanted to know about their understanding of Twenty-first Century learning. Finally, I was interested in their perceptions about teacher readiness. Their perceptions were strictly confidential and anonymous to assure frank and honest dialogue. (See Appendix F).

The Innovations Practitioners' Survey

Because this case study involved the DOI theoretical framework, a DOI survey was used to measure staff willingness to change. Teachers, technology coaches, and principals were asked to complete the survey and were not requested to provide personal information. The survey was posted online using Quia.com, an e-learning website. I created the online survey and personally exported the data.

A reliable survey for teacher willingness to change was difficult to find. After much investigation, I located Savery's (2005) master's thesis on DOI, *Innovators or Laggards: Surveying Diffusion of Innovations by Public Relations Practitioners,* which included a "practitioners' survey" designed to analyze the five individual innovator descriptors (Savery, 2008). An e-mail was sent to Savery requesting permission to use the survey. Savery sent an immediate positive response with the caveat of citing the source within this study. Savery also indicated her survey (see Appendix H) was a pilot test without reliabilities and she requested reliability feedback from this research. According to Savery,

Rogers' (1996) innovativeness and adopter category descriptions were used

to create specific survey questions addressing the classifications of the public

relations practitioners. Rogers' five categories include innovators, early adopters,

early majority, late majority, and laggards. Special care was taken to incorporate

many of the precise words that Rogers used (1962, 1986, & 1995) in innovation

characterization descriptions (e.g., venturesome, eager, suspicious, and resistant).

The adopter categories in the survey were questions 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10

using a 4-Point Likert forced answer scale (1-Strongly Disagree, 2-Disagree, 3-

Agree, and 4-Strongly Agree) (p.19)

In keeping with Savery's (2005) work and her intention of avoiding participant

bias, the survey did not define innovation. Rogers and Shoemaker (1971) defined

innovation as

an idea, practice, or object perceived as new by the individual. It matters little, so

far as human behavior is concerned, whether or not an idea is objectively new as

measured by the lapse of time since the first use or discovery. It is the perceived

or subjective newness of the idea for the individual that determines his reaction to

it. If the idea seems new to the individual, it is an innovation. (p. 19)

In order to increase participation in the survey, principals discussed the case study

and requested participation at school faculty meetings. Teachers identified their site, but

no personal or confidential information was requested. All survey data was stored on my

password protected laptop and backed up to a flash drive kept at my home.

Data Analysis

Data analysis is a "formidable task" (Gillham, 2000, p.93). In order to meet the

challenge, I reviewed all the evidence and procedures to develop a logical narrative that

painted a clear picture of the schools I was studying, and I kept going over the data in a reflective process of "intellectual discovery." The steps I used were:

1. determine analytical categories or constructs

2. sort the data multiple times to determine classifications and categories

3. based on the sorting, develop patterns and themes. I connected patterns and statistics to the literature review and theoretical frameworks. (Hancock & Algozzine, 2006)

Yin (2003) recommended thinking about rival explanations, recognizing bias, yet remaining open to contradictions, and playing "with the data to develop a systematic sense of what is worth analyzing and how it should be analyzed" (p. 138). Other strategies included ongoing aggregation of instances until patterns, consistencies and common descriptors developed, but only within the context of the case study (Stake, 1995).

Analysis of staff willingness to change followed specific steps. Staff received an e-mail inviting their participation in the online The Diffusion of Innovations *Practitioners' Survey.* Results were downloaded into an Excel file to manipulate data. Using descriptive statistics, I determined the percentages of staff which fell into DOI's adopter categories then cross referenced to Rogers' (1995) bell curve. This provided key information on whether each school had adequate numbers of teachers who were willing to change. Principals,' teachers, and technology coaches' answers to interview questions about willingness to change were compared to survey results. Further data collection via document analysis was needed to thoroughly analyze the question of staff willingness to change.

Document and artifact analysis and observations provided additional information about the schools. After data collection was complete, my research log was transferred to notations on index cards to expedite data categorizing and coding. Repeated reclassification and sorting helped me observe patterns and develop themes. Multiple sources of data increased research quality and the construct validity of the case study. Research reliability was protected by member checking with purposively selected case study participants, peer and expert review, and continual reflection of personal bias. After much reflection, investigation, and triangulation of data, I completed my analysis of staff readiness for change.

Summary

In this chapter, I described my research methodology. Strategies for data collection and analysis provided structure to my research. Chapter IV will present my case study and data.

CHAPTER IV

DATA COLLECTION

In this chapter I present my analysis of the data gathered throughout the course of the case study. The purpose of this case study was to analyze the willingness of staff within one district's three secondary schools and to determine the schools' readiness to transition from traditional instructional practice to Twenty-first Century learning. Data collection and analysis intended to answer my research questions:

1. How do the schools currently integrate technology into instruction?

2. What characteristics of Twenty-first Century instruction are observable at the schools?

3. Within each school, is staff willingness to change instructional practice observable?

4. Using Diffusion of Innovation Theory, what is the distribution of adopters at each school?

5. What can be inferred about school readiness for Twenty-first Century instruction?

Sonland School District, an industrial community 100 miles from each of the two largest state cities, served 5100 students in a small Midwestern community. Six years ago, the primary employer merged with another national oil company resulting in a steady reduction of professional jobs to new corporate offices in a different city. All

remaining 750 employees will be terminated or relocated out of Sonland by 2011.

Despite challenging economic news, community leaders were optimistic. Community volunteerism was high; local charitable organizations were continuing to meet or exceed donation goals; and community advocates had aggressive plans in place to attract new business. Sonland's Chamber of Commerce had an active Education Committee and local foundations continued to raise money for scholarships and teacher grants.

For over 100 years, Sonland patrons set education as a top priority. The public school system officially began in 1894 with 169 students in a one room schoolhouse. During the time of the study, 81% of recent Sonland graduates had a 2.0 or higher GPA during their college freshman year and 54.5% graduated from college. The 2010 graduating SHS class earned $3,000,000 in scholarships. Current enrollment was 5157; and students received instruction in 11 fully accredited schools; 31% of the faculty members had advanced degrees, 31 teachers were National Board Certified, and the average years of teaching experience was 13.4 years. The breakdown of student ethnicity is listed in Table 2.

Table 2

Breakdown of Sonland Public Schools' Student Ethnicity

Caucasian	**67%**
Native American/ Alaskan	18%
Hispanic	8%
Black	5%
Asian/Pacific Islander	1%

Superintendent Jake Dennison came to Sonland in 2004. Under Dennison's leadership, the District not only continued to be an exemplar in the areas of early childhood, after school tutoring, summer school, and alternative programs, but also was a model for credit recovery programs, virtual school, and high school reform. Dennison was visionary and aggressive regarding educational innovation and change. At a recent administrative meeting, Dennison told principals and district leaders that despite financial challenges and declining funding, the District would not succumb to a wait and see attitude, but would continue to move forward with innovative programs focused on increasing student learning. Dennison stated, "We are proud of our current programs, but we consider the academic environment to be a dynamic 'work in progress.' To that end, we constantly pursue opportunities for improvement and program enhancements" (State of the Schools, 2009, p. 3). Dennison is also focused on developing a Twenty-first Century education. During the Fall of 2009, he created a District Administrative Committee called the "Dream Team" which was charged with determining what Twenty-first Century Learning looks like, how a Twenty-first Century School functions, and what Sonland would need to do to become a Twenty-first Century District. Dennison recognized the impact of technology on student learning and was intent upon "providing all children with the skills necessary to excel in the 21st Century" (State of the Schools Report, 2009, p. 1). With the help of a nationally recognized consultant, Dennison was in the process of developing a 5 year strategic plan to not only open a technology high school, but also to advance technology rich learning environments at all Sonland schools. Dennison believed "21st Century Education is defined by what today's technology makes possible and what it renders obsolete" (personal quote).

Sonland Public Schools had 7 elementary schools, 2 middle schools, 1 high school, and 2 alternative programs. Sonland employed 394 teachers, 27 administrators, 337 support personnel totaling 758 staff. The student to teacher ratio was 13 to 1. Table 3 identifies the schools and staff involved in the study.

Table 3

Schools and Staff Members Involved in the Case Study

School	Name	Title
Sonland Public Schools	Jake Dennison	Superintendent
Washington Middle School	Connie Boyd	Principal
	Rock Stenson	Technology Coach
	Angie Hoyt	Math Teacher
	George Smith	Geography Teacher
Eaton 8th Grade Center	Sylvia Dressler	Principal
	Dana Chiwa	Technology Coach
	Patty Hall	Reading Teacher
	Jonna Martin	Math Teacher
Sonland High School (SHS)	Ben Simpson	Principal
	JJ High	Technology Coach
	Ginger Cammer	Language Arts Teacher
	Rom Aguilar	Math Teacher

Research Study Context

Because I worked for the District for 10 years, I had a great deal of history with staff. I served as technology coach for 4 years and then worked as a Central Office administrator. I directly observed staffs' professional development, their integration of technology into lesson plans, administrators' vision for Twenty-first Century learning, and their leadership skills. While I brought bias into the study and became a data collection instrument, I considered my background knowledge of the District, schools, and staff to be a strength. My years of employment with the District provided an invaluable look into the District's journey toward introducing Twenty-first Century Learning. Over the years, I spent a great deal of time visiting with staff in halls, classrooms, and faculty lounges. I set up discussion groups and encouraged teachers to voice opinions. When dealing with issues unrelated to this case study, I found teachers to be open and willing to share both positive and negative views. During my research, I relied on my long term efforts to develop positive relationships within the district to counteract possible teacher reactions that their participation was mandatory or that they needed to figure out what answers I was looking for. While I recognize that my personal opinion that I was servant leader who respected and listened to teachers was not a reliable indicator that teachers overlooked my position as a district administrator, I believe that I had worked hard to establish trust and that I had good working relationships with staff.

Data Collection extended over a five month period. I began with a presentation to the superintendent about my research and received his approval of my survey and interview questions. Prior to sending out the survey request and setting up interviews, I spoke with each principal and also received their approval to collect data in their

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buildings. I also made interview appointments with each principal. At the conclusion of each principal's interview, I explained the adopter categories and requested recommendations for teachers to interview who would reflect a good cross section of adopters. Each teacher received an email explaining my research, asking permission to interview them, and requesting a possible time and day to meet. I tried to manage the coercion issues by minimizing verbal cues and text that might imply an exercise of power of my position as a district administrators. One teacher refused my interview request stating that she was too busy to help.

Most of the interviews were conducted at teachers' schools, took no more than one hour, and usually occurred after school or during planning time. After going over consent forms, I conducted all interviews, kept hand written notes, and recorded sessions using a tape recorder. A court reporter transcribed tapes, saved data in PDF form, and returned tapes for cross checking. Unfortunately, there were several problems with the tape recorder, but handwritten notes filled gaps and provided adequate data for analysis. Each principal, the site's technology coach, and two teachers participated. In all, 9 interviews were conducted and one participant chose to communicate by e-mail. As is often the case with educators, interviews were often hurried and, especially with the principals, occasionally interrupted.

During the first round of interviews, I realized that my questions were not correlated well with my research questions. Some were vague and some were redundant. Therefore, I began to tell interviewees more about the study, about DOI and adopter categories, and to ask them to provide specific percentages of each category. This helped tremendously because the staff answered within the context of the study. I was concerned

that I was leading too much, but I reasoned that I was getting much better data without compromising the study. Also, I was concerned about interjecting my own bias and views into the interviews. I frequently reminded myself that qualitative research considers the researcher to be part of the data collection. Another concern was not getting enough out of the interviews. Due to time constraints, the pressures of state testing, and school calendars, staff were extremely busy and often fit me in between a variety of tasks.

Observations were informal, general, and did not identify specific people. Attendance at faculty meetings, technology training, site leadership meetings and other school events provided insight into school culture. PLC meetings were particularly helpful in providing data about staff willingness to change. Each school had different ways to allocate time for teachers to meet. For example, Washington's PLCs met at the end of the day during an advisory period. Math, English, Language Arts, and Science teachers met on a rotating schedule and saw each other every week. Elective teachers covered core teachers' classrooms during PLC meetings. PLC meeting were orderly and focused. I attended one Math PLC in a teacher's room. Her room was dark, but cleverly decorated with fun posters, creative presentation of math concepts, and fun manipulatives. For example, there was a black and white larger than life caricature of the building principal, directions about how to multiply and divide integers, and motivational posters. The teacher's electronic whiteboard was a focal point in the room and sent a message that she used technology on a regular basis. During the PLC, the Math teachers rearranged desks to form a circle, but the arrangement did not seem to support open communication. The Math Department Chair ran the meeting and closely followed her agenda. Topics were discussed then consensus was reached about pending issues. One

topic involved how to assign students who needed additional tutoring to math teachers during advisory.

The Washington English PLC was held in a classroom which was also dimly lit. I do not recall and did not record any details about the classroom because the conversation was so intense. Teachers were hotly debating the value of a project historically used by all the 7th Grade English teachers. A few teachers questioned whether the project was instructionally worthwhile, whether it was aligned to state learning objectives, and whether it helped prepare students for state assessments. The discussion mainly involved two teachers who had different opinions about the project. Occasionally, they would directly ask the other7th Grade teacher what his opinion was, but he seemed tongue tied and uncomfortable with speaking his mind. The meeting was uncomfortable for all and I left early because I felt my presence as a Central Office administrator was encumbering the conversation and Connie Boyd, building principal, did not need my support.

I attended several Eaton PLC meetings. The Eaton English and Reading PLC was held in the Main Office Conference Room. Eight teachers crowded around a small conference table and sat in bumpy, uncomfortable chairs. Because Sylvia Dressler kept a supply of sacks and drinks in the room, the teachers enjoyed food while they worked. Books, notebooks, folders, stacks of data, snacks and drinks cluttered the table. Conversations were lively, but appropriately controlled by the English Department Chairman. Every meeting was driven by an agenda with ongoing emphasis on instructional practice and data driven decision making. Science PLCs were conducted in similar fashion, but were held on the second floor in the Department Chairman's classroom. Like most science rooms, gerbil cages, fish tanks housing unidentified

creatures, and lab paraphernalia were everywhere. Teachers met at a classroom table and did not have free drinks or snacks. Nevertheless, conversations were lively and teachers were engaged. Under the direction of the Department Chair, teachers maintained focus on the agenda and increasing student achievement as measured by state test scores. On the other hand, the Social studies and Math PLCs were not as functional. The Social Studies teachers met in the Library. Two of the teachers were coaches and communicated their disinterest by leaning back in their chairs or, even worse, showing up late or not at all. The Math Team met in a second floor classroom in a secluded part of the building which was the farthest distance from the Main Office. The room was painted an odd shade of blue and made me think of what Pepto Bismol would look like if it were blue. The teachers arrived on time to the meetings, but they seldom started on time. The PLC Chair did not have an agenda, and the group often wandered through topics without reaching conclusion or accomplishing anything. There was no sense of urgency about instruction or learning. This group often lamented about students' lack of prior knowledge, their inability to master eighth grade skills, and their lack of motivation.

Sonland High School PLC Meetings were elaborately scheduled during a school wide study hall called MUST, Mandatory Uninterrupted Study Time. During MUST, a 45 minute period scheduled after lunch, everyone had an assigned place to be which varied from day to day. Most students were assigned to an advisory teacher and used the time to read, work on homework, attend club meetings, or take online courses in computer labs. Sometimes, students were sent to tutoring to have additional time to work on academic problems. Teachers' schedules rotated according to the PLC schedule. Teachers often paired up to attend PLCs or cover advisory classes. The complicated

schedule was coordinated by the site curriculum specialist who also ran PLC meetings. PLCs were held in her classroom. The room was functionally arranged with a large work table, storage bins conveniently located on shelves and counters, a multimedia cart, and a teacher desk. The work table had everything needed for meetings i.e. pens, markers, paper, post it notes, and a big bowl of candy. The walls were not decorated, but a myriad of resources were pinned to the walls and provided teachers with revolving schedules, test dates, curriculum maps, etc. Observations indicated that the curriculum specialist was an unusually organized woman.

I attended a number of PLC meetings over the course of the study. Each group had a unique personality and set of characteristics. For example, math teachers arrived on time, were ready to work, and quickly got to the task on hand. The Math Department Chair ran meetings and kept teachers on track. She stayed focused on student learning. All teachers interacted and contributed to discussions. On the other hand English teachers often arrived late to PLC meetings, got into tangents, and usually did not accomplish meeting objectives. Science teachers were usually on time, but seldom discussed student learning or shared instructional strategies. They routinely spent time writing and rewriting common assessments. Social Studies were not only late, they often did not show up.

Document review focused on teacher web sites as a way to cross check technology integration into lesson planning and infusion of Twenty-first Century learning characteristics in the instructional process. I observed math, science, social studies, reading, language arts, and high school business education teachers' websites at each school. I developed a rubric to evaluate web sites, but after looking at a number of sites,

I determined the rubric was not useful because most sites were under construction, out of date, or seldom used for anything other than announcements. I changed my document review strategy to a basic observation of whether sites were current and whether the sites were used for instruction. My determination of whether a site was being used for instructional purposes was very simplistic. If I saw any indication of lessons that included online activities, research, blogging, collaboration, projects, or communication, I recorded web-based technology integration.   I simply created a chart, browsed each school's teacher sites, and tallied how many sites met the criteria previously listed. Because most web sites were not well developed, my analysis and data collection took a minimal amount of time.

I also spent time reviewing District public relations materials and online resources. Hard copy reports were available at the District's administrative offices. A few brochures were conveniently placed at the receptionist's desk; other materials were placed on a small table outside the superintendent's office. The District Public Relations Coordinator provided an electronic copy of the latest State of the Schools Report (See Figure 6) which provided ample details on the District's Mission and Vision, Finances, Technical Infrastructure, and school reports.
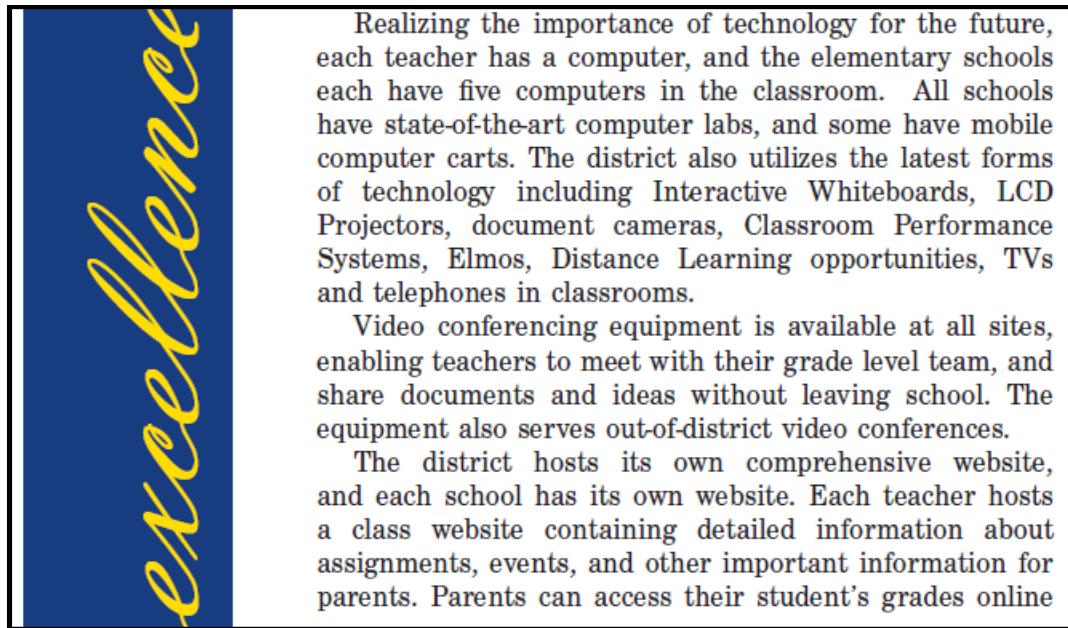
Figure 6. State of the Schools Report District Technology Section

The Survey

The survey was a key component of determining whether there was a normal distribution of adopters at each school. Of particular significance to this study was the innovativeness of the individual. Survey results provided data to analyze whether schools conform to the bell curve, i.e., at least 2.5% of staff are innovators or laggards and a majority of staff are willing to adopt change. Triangulation of the survey results, interviews, observations, and document review improved my data analysis.

After the survey was approved by Superintendent Dennison and school principals Connie Boyd, Sylvia Dressler, and Ben Simpson, I sent an email request to Washington, Eaton and Sonland High School staff asking them to complete the survey. Teachers were given two weeks to complete the survey. I sent a second request after one week, reminding them of the survey; the principals also corresponded with their respective staff requesting support for my research. See Table 4 for the survey response rate.

Table 4

Survey Response Rate

School	Total Staff	Survey Count	Percent of Staff who Completed the Survey
Washington	60	28	47%
Eaton	33	16	48%
Sonland High School	104	31	30%
District	197	75	38%

After teachers completed the survey, I began to investigate the data with a variety of attempts to effectively analyze and present results. Initially, I exported data from my survey site to Excel and divided entries by school. Next, I tabulated teacher responses to each of the questions by Likert rating (i.e. Strongly Agree, Agree, Disagree, or Strongly Disagree), then calculated percentages.

The calculations and resulting table (See Appendix I) did not help me analyze the percentages of adopter categories or help me conclude if there was a normal distribution of adopters at each school. After I determined that my approach was not sufficient to analyze my data, I contacted survey creator Carol Savery who provided key details on how she interpreted the data. While I knew that Questions 1, 2, 6, and 7 were positively worded and Questions 3, 4, 5, 8, 9, and 10 were not, I did not appropriately apply statistical formulas to my data. When Savery explained that she used reverse coding, I understood what formulas were needed. Using Excel, I reversed coded Questions 3,4,5,8,

and 9, then calculated the average of all the questions to create a total innovation score for each respondent. Teachers with a total innovation score less than 1.5 would be classified as laggards, 1.5 to 2.4 would be late majority, 2.5 to 2.9 are early majority, 3.0 to 3.4 would be early adopters, and 3.5 or more are innovators (see Table 5). I used SPSS to produce correct frequency tables and normal distribution graphs, so that I could analyze adopter categories of the participants by site and District. Table 5 provides a reference list for the normal distribution of adopter categories using The Practitioners' Survey 4 point scale.

Table 5

DOI Adopter Categories on a 4 Point Scale

Category	Range
Laggard	1 – 1.4
Late Majority	1.5 – 2.4
Early Majority	2.5 – 2.9
Early Adopters	3.0 – 3.4
Innovators	3.5 – 4.0

Field notes were recorded digitally after interviews, observations, and document reviews. The woman who helped me with transcription picked up tapes from my office, created PDFs of each interview, emailed the files to me, and returned all tapes after data collection ended. Because the woman I hired was a Certified Shorthand Reporter, she had professional expertise, certifications, and was professionally bound to secure the data, to ethically manage the content of the transcripts, and to protect the identity of the

interviewees. Therefore, I was confident of the integrity of the data. I cross checked her transcripts with my written notes.

Twenty-First Century Learning

Washington Middle School

According to Technology Coach Rock Stenson, the principal and staff wanted Washington Middle School to become a 21st Century School; they saw themselves as a model "for exploring new ways of having technology reach the classroom." He said,

> I think our principal's vision is, is not simply to provide the technology and tools, but to really make it effective as far as utilization in the classroom. We constantly put a lot of emphasis on personal development, professional development when it comes to utilizing technology.

Math teacher Angie Hoyt described her view about the importance of technology integration with learning:

> I think the more technology we have, the better because that's—the kids are— that's all they've ever known… I've had so many more kids pay attention because I bring out the clickers and it's on the screen. They do the work because it's a problem at time and then we go over it, but if I was just to give them a worksheet and do the review, they're not going to do it.

As to 21st Century Learning, Stenson expressed a sense of pride when he saw teachers "with their backs turned to you…they've got the laptops out, they're using digital media… they're using technology in such a way now that I wouldn't have ever seen that three years ago." Nevertheless, Stenson recognized a need for a "transformation in

teaching style" and he did not see student-centered learning, project-based instruction, or a focus on student acquisition of 21st Century skills. He stated,

> They're (the teachers) utilizing the skills for the 21st Century classroom, but I don't know that their teaching styles have accelerated that much… the majority, I believe, are probably still teaching the same materials, but they're doing it in a different presentation method using some of the tools. I think overall we're still pretty traditional in terms of classroom instructions.

Observations and document review confirmed this perception. I heard and observed much excitement about technology integration. Teachers were increasing their own skills in order to use technology in class, but this usually resulted in an increase in their own use, not student use. Students' primary opportunities to use technology occurred in computer labs loaded with reading software and online assessments. Toward the end of my research, I observed increased student access via the new iTouch carts, but I did not see project based learning, web research, or open-ended use of technology tools. Also, because of the lack of teacher time to maintain web sites and lack of resources to use websites on a daily basis, classroom web sites were not typically used for instructional purposes. Figure 7 provides a glimpse of a classroom web site. All web sites are in the public domain.

Figure 7. Washington Middle School - Example of a Classroom Web Site

Eaton 8th Grade Center

During the 2009-2010 school year, Eaton 8th Grade Center received an onsite technology coach who divided professional development duties with District assessment and web editing responsibilities. Ms. Dressler requested that Dana Chiwa meet with teachers at least once a month to discuss personal issues related to technology integration. Dana also presented instructional technology tips at faculty meetings and site professional days. Jonna Martin stated, "She [Dana] comes every Thursday and we sit down and it could be just one question I ask her and I practice that."   Nevertheless, Dressler expressed dissatisfaction with Chiwa's performance and effect on instructional change and incorporation of technology into lesson planning. Observations indicated infrequent use of technology in the classroom, marginal use of computer labs, no noticeable student-centered or project-based learning.

As to Twenty-first Century learning, Eaton 8th Grade Center teachers offered a traditional classroom environment. Students sat in traditional rows listening to traditional lectures with traditional assignments. Technology tools and multimedia rich activities were rare. Of the core teachers, one teacher had a Web 2.0 rich classroom web site. Her

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blogs, wiki's and blogs provided engaging, collaborative and interactive educational

experiences. One teacher had a well developed site which was not updated or interactive.

The rest were simple, out of date, or under construction. Figure 8 provides a quick look at

an underutilized Eaton 8th Grade Center classroom web site, while Figure 9 provides a

glance at an instructional site that used Web 2.0 tools.
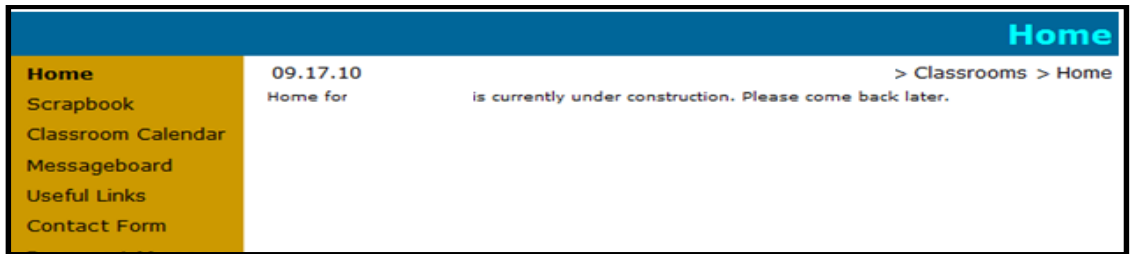
Figure 8: Eaton 8th Grade Center- Underutilized Classroom Web Site
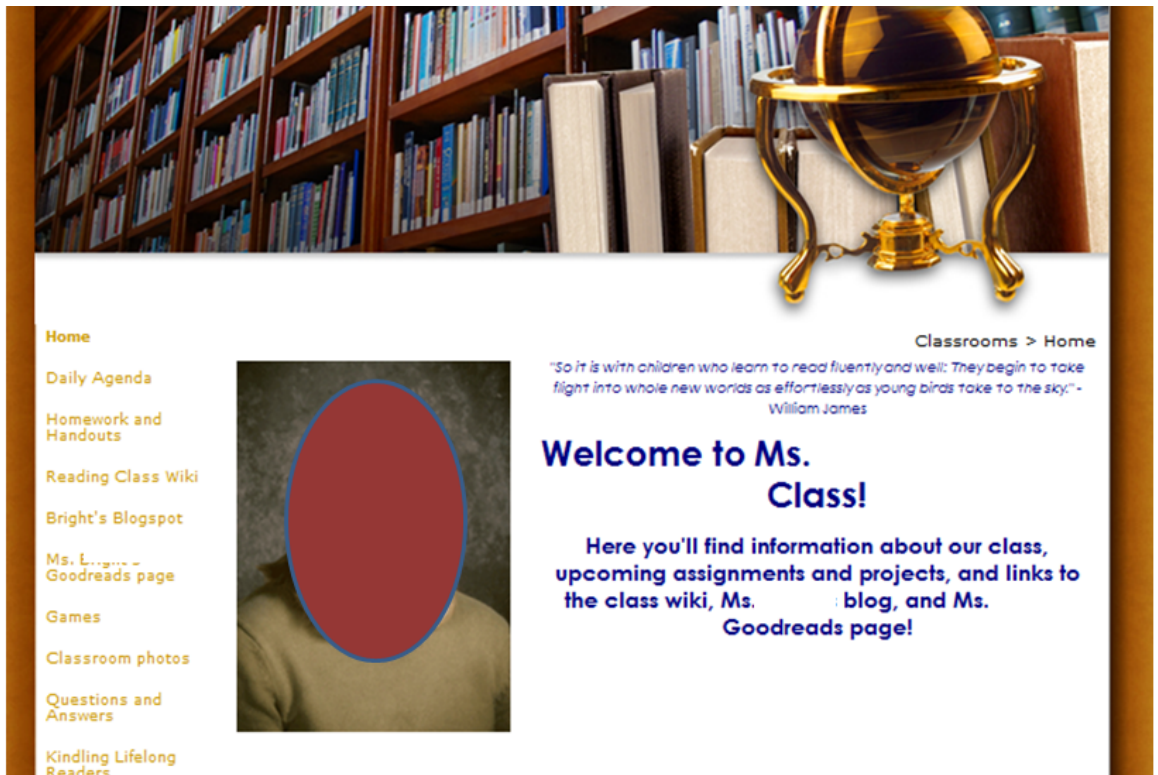
Figure 9. Eaton 8th Grade Center- Instructional Web Site

Sonland High School

The high school had a number of computer labs, but because 100 teachers needed access, availability was a problem especially when sign up was on a first come, first served basis. Technology Coach JJ High often expressed concerns that teachers saw lab availability as a barrier to technology integration when they could not schedule all the class periods needed for the courses they taught. English teacher Ginger Cammer elaborated:

> Technology needs to be accessible consistently and conveniently. Learning technology requires more than a "hit and miss" approach. Of course, I realize technology is costly and not everyone can have it. But, if it is important enough to stress, everyone should have it; it should be standard and not competitive. Staff development is helpful, but only if you have the technology (and time, I must say) to practice. It takes some trial and error to learn to use it in the most effective way. I'm not comfortable with using kids and class times as guinea pigs. Technology is often unpredictable and to be totally reliant on it is a mistake on a practical basis in the classroom.

Access to white boards, classroom performance systems, and other tools was very limited. Approximately 20% of the high school teachers had electronic white boards. Business and technology teachers were the only staff with multimedia tools such as digital cameras, video equipment, and editing software. Similar to Washington and Eaton, Sonland staff lacked technical resources and experienced barriers that justified the time needed to maintain classroom websites. Figure 9 provides an example of an

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underutilized Sonland High School teacher web site. Figure 10 illustrates one of the few

good examples of instructional web sites.
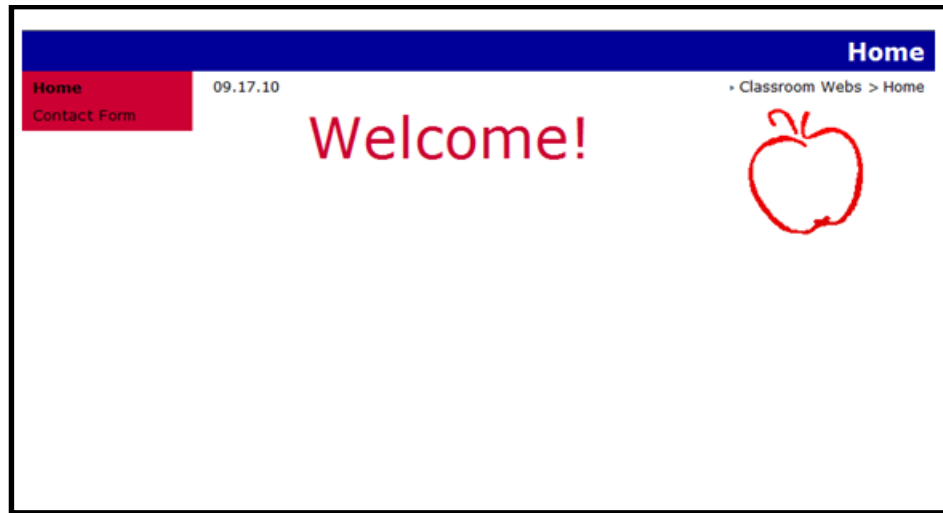
Figure 10. An Example of a Typical Sonland High School Teacher Web Site

Figure 11. An Instructional Sonland High School Teacher Web Site

Sonland School District

During this case study, Sonland School District hired a nationally recognized

technology leader and consultant to observe technology integration and make

recommendations about becoming a Twenty-first Century District. The consultant was a

key leader of national educational reform efforts in a unique 40-year career as a teacher, Co-Director of Computer Education, teacher union leader and negotiator, Foundation President, Director of Education and Workforce Development, and Director of Strategic Planning for the nation's largest network of innovative 21st Century Schools. His experience and expertise included Whole District Reform, New School Development, Business-Education Partnerships and coalitions, School-to-Career and Workforce Development, Union—School District Negotiations, School Restructuring and Technology, Project-Based Learning, Professional Development, Educational Finance, and School-site Assessment and Accountability.

The consultant's findings confirmed my observations that the District was not integrating technology into curriculum that instruction was still very traditional, and that students were not getting instruction in Twenty-first Century skills. The vast majority of the District's current instructional uses of technology were teacher touch as opposed to student access. A document generated by the consultant gives excellent insight into Twenty-first Century Learning in the District. Excerpts from his report follow:

> Technology integration in the district is an inverted pyramid (more at the elementary schools with less and less technology integration as students work through the secondary program).

> The Website competition is an excellent development and some teachers have leveraged this effectively. The annual "Web Star" competition has been effective. However, after 6 years, there is great inconsistency in both the level of resources for students and parents from one classroom web page to another and wide variance in formats. This inhibits increased use by students and parents. At some

point this needs to develop into a single learning platform where students (and their parents) access course and project resources (materials, assessment rubrics, course calendars, etc.).

There is little awareness of and focus on 21st Century Skills in the schools. However, the (Eaton) principal is very keen on promoting Global Awareness, but as yet has no program, although their Holocaust project across classes may provide a model for a school wide Global Issues project. Eventually, it will take board policy to identify those 21st Century Skills that the school should embed into the curriculum and systematically assess.

Teacher-centered and teacher-directed whole group instruction (TDWGI) prevails throughout the school(s). Educational technology supports and enhances TDWGI. The technologies do support increased student participation in classroom activities, and teachers are becoming adept at deploying these technologies. However, there is a difference between student participation in activities and students making things.

The school(s) exhibit an excellent professional culture and positive relationships between administrators, principals, and teachers. The school is poised for increased professional development for 21st Century student-centered learning. "If we can clearly articulate 21st Century Learning, then this staff will move forward," commented the district superintendent.

"Classrooms look the way they did 20 years ago," said the superintendent in a pre-visit conference call. My visit confirmed that view, except that there are Interactive Whiteboards attached to the walls. Otherwise, with some exceptions,

one sees 30 student classrooms in rows and columns and mostly attached seat-desk units, much the same as in the past. Also, most computers are in special labs, and not integrated as a working tool in the everyday classroom. A notable exception to this is the school's library which looks more like the student workplaces that characterize 21st Century student-centered learning.

As to communication and administration, the school embraces commonly used tools, such as, e-mail, Microsoft Office Suite, and a student information system with a parent portal for grades and attendance. One PLC is using a Wiki to collaborate between meetings.

District leadership is working to envision and develop both strategic and implementation plans for 21st Century learning. However, school-based professional discussion is mainly around supporting effective traditional classroom practice and identifying and implementing technologies that support that. Future strategic planning will need to engage principals and teachers in envisioning the next stages of 21st Century School District development.

During the interview process, I asked participants for their perceptions about the future of technology in the classroom. Short term views about the future were varied, but there were consistent points. Almost all of the interviewees talked about the quantity of technology in the classrooms rather than the use. Sonland High School Math Teacher Aguilar summarized most people's comments when he said that staff would have more equipment, but there would be minimal instructional change. High stated "unless we see some money coming down, it's probably not going to look a whole lot different than it does right now." As to more than five years out, the most common answer was "no idea."

Site principals gave more details and showed a bit more vision when addressing what learning might look like. Sylvia Dressler talked about the need for students to become problem solvers and to learn new skills for the world of work. She also stated, "Families have changed, the kids have changed, the times have changed." Boyd talked about reinventing school with more technology, a new building, pods, "so that our schools hopefully will meet the needs of the students instead of the students being buried in the same type of structure." Simpson was interested in online learning and more technology in the classroom.

Staff Willingness to Change

As I began to look at schools, their integration of technology with student learning, and observable characteristics of 21st Century Learning, I was initially interested in principals' vision for their schools and teachers' knowledge of the vision. Boyd's vision was recorded in the 2009 State of the Schools Report, "Washington's Vision is 'to be an innovative, nurturing, supportive environment, which promotes positive self-concept and ensures social and academic success." During our interview, Boyd verbally communicated her vision for Washington Middle School as an environment where students learn and teachers grow. One interviewee confirmed Boyd's vision and described the school as a "learning atmosphere" where "everyone should learn and everyone is equal." The technology coach and one teacher emphatically talked about Boyd's ability to "step outside the boundaries" and look further out than most. One teacher said, "Connie's vision is past the next one, two, three years. I think she pictures five, six, ten years down the line." All three staff I interviewed mentioned that Boyd supported teachers' innovations, made sure to satisfy resource requests, and held teachers

accountable to improve their practice. Field observations confirmed the cohesiveness of the staff, their collective collegiality, and their sense that they were technically more advanced than other secondary schools.

Eaton 8th Grade Center's formal vision, as stated by Sylvia Dressler, was "to be a high achieving, safe, disciplined, and productive learning community, with a commitment to insure that eighth grade students are successful." During our interview, I asked Dressler about her vision for Eaton. She said there was a difference between "what I saw and what I wanted…which was a place where kids want to learn." Therefore, she set about building a culture with the motto "Learning is the Only Option." The teachers I interviewed reinforced Dressler's vision except Chiwa, the tech coach, who was new and had a strained working relationship with Dressler. Dressler also repeatedly mentioned change: the relevance of change to visioning the school's future, change in families, cultural change, instructional change with technology being an integral part of all the changes. One math teacher said all students can learn, but how and when is "what we're all trying to figure out." Field observations and document review confirmed that Dressler had successfully communicated her vision to staff and they understood the mission. "Learning is the Only Option" signs were everywhere; teachers frequently stated the motto; it was mentioned at all faculty meetings I attended; and it was posted on the school web site. Figure 12 provides a portion of the school's home page graphic.

Figure 12. Portion of Eaton Home Page and Motto

Sonland High School's formal mission recorded in the District's State of the Schools report is to "a collaborative learning community that develops citizens committed to lifelong learning, academic achievement, and personal excellence." Ben Simpson's stated vision for Sonland High School was to prepare graduates for the future and to build a collaborative school culture. However, the interviewees were vague about Simpson's vision. For example, the tech coach had no idea what Simpson's vision was, She believed he was open to change and valued technology, but repeatedly stated that the high school was restricted by lack of funds. One teacher mentioned Simpson's interest in technology and shared several examples of Simpson fighting for resources to make technology more available. Observations during faculty meetings confirmed that his vision was incorporated in decision making and program development, but I did not hear it articulated by Simpson, other administrators, or staff. I was struck by the lack of knowledge of Simpson's vision, but recognized that it was his first year as principal.

As interviews transitioned to discussion about innovation and change, I began to gather fascinating data about the schools and staff. When I asked people to define innovation, most confirmed DOI's definition as "a new idea." A math teacher said "innovation to me means adding a new part." A technology coach who was involved in a doctoral program used a more academic description, "It requires a paradigm shift to move from something we used to do to something that is new." Interviewees were not as clear about the relationship between innovation and change. Many interviewees interchanged innovation and change as if they shared the same meaning. Most agreed that innovation required some type of change, but a technology coach thought innovation could occur without change if it was "a new idea." Some thought there were nuisances between

change and innovation and that change might occur when a new approach to a common task is developed rather than an innovative shift in the way tasks are completed. One interviewee thought that innovativeness required a willingness to change; another thought they go "hand in hand," and a math teacher described innovation as a product of change. One principal thought innovation came before change and referred to innovation as a process of change. Another principal thought school culture impacts the change process. Other change descriptors included:

Washington

- out of the ordinary

- stretch

- new way of doing something that was traditional… not in the norm

- experimenting

Eaton

- what you are doing now will change to something else

- changing the way we do things

- wrestle with a new idea

- cutting edge…on the edge

- something new

- something new to where you are

Sonland High School

- something that's new, it's different, and it's change… to help the students

- change for the better

- totally new… hasn't been tried

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- improves the way you do things

- not normal

- risk

Opinions about change yielded interesting comments. Several talked about how "scary" change is and that it takes risk and courage. One woman talked about her fear of change especially when other people are watching "and in a way that's scary because, you know, you're looking at what happens if we fail or what happens if we succeed, where do we go from there?" Other comments about change were;

- Change is a "fact of life."

- Change requires people to grow and adapt.

- Change is "scary."

- "Different way of doing things"

- "getting better"

- "risk taking"

- Different for the right reasons

- Change for a reason and not just the flavor of the month.

- Change is me stopping what I have been doing and doing something else

When I asked Washington Geography teacher George Smith how he handles change at his school, he discussed his opinion of his adopter category in the DOI model. He emphatically said that the innovation must get the same or better results and that he must be convinced of the value of the change in relationship to his belief that his instructional strategies are effective.

Well, I'm one of those laggards, I would say. I have an idea of what I want to do and I have an idea of what works the best, and I will think about it. I'm not opposed to it, but if it doesn't fit exactly with what I think works best I don't necessarily drag my feet, but I try to think how I can get it in what I already do… I don't want to change what I know works…I want to make sure for me it's the right thing to do… I have to be sure in my head that it would work for me."

An Eaton Reading teacher voiced a similar need to reflect, research, and come to conclusion about the value of a particular change.

Well, when we have an administrative change I have to remind myself I really don't need to find another job. It will be ok. People change administrators all the time. You know, so you talk yourself through all the different changes. Versus like with my classroom when something is changing… I go and find everything I can and read, read, read and think I've got my mindset and I'm already thinking about it and when we're in a meeting it doesn't bother me so much because I've already thought it through. I'm prepared. Well versed in what we're talking about."

After several interviews and questions about how staff handles change, I began to notice a common thread at Eaton and the High School about who initiates innovation or change. I heard comments that staff were much more willing to embrace change when it was introduced by someone in the building. There was a common undercurrent of resistance when new ways of doing things were promoted or expected by Central Office. An Eaton teacher stated, "when innovations come from the outside, you immediately divide the camp … this is one more thing they're asking us to do… we can wait it out."

Interestingly, Principal Sylvia Dressler said something very similar, "You feel like it's done to you." She also talked about how she leads staff through periods of change. She talks to her staff, presents an idea, provides time to rethink the idea and to gather alternatives, and to "think before I act." High School Technology Coach JJ High was very frustrated about the District's expectation to change instructional practice by integrating technology without the financial backing of District administrators. She stated, "We seem to be stifled by finding the funding to get more technology in place…because I don't see anything coming down the pipe…it's (technology integration) probably not going to look a whole lot different than it is right now." Another high school teacher stated,

> One more thing about dialogue and change.... If the change is really on the
> agenda, then listening to a teacher's view, especially if it differs from the agenda,
> doesn't seem useful to me. Ultimately, it feels like a dismissal of teachers'
> experience, education, and thoughtful considerations. (Sometimes they have more
> experience or education than the changemaker's). If there is another rationale for
> the change (besides the formal discussions) that trumps all other rationale, then
> the reason for change must be explained since teachers' views are mute points.

As I began to dig deeper into data collection and interview questions, I began to see DOI in practice. I observed that the DOI communication process was accurately described by the interviewees. When asked about the influence staff have on each other when faced with innovations and undergoing change, all three principals talked about or alluded to the importance of leadership, relationship, trust, and buy-in when introducing innovations or change. All three principals recognized the need for "key people" to lead

change and influence peers. Simpson and Boyd talked about the importance of principals working with key people first then having those key people communicate with the "middle group" then the resistors. Simpson talked about how key people take the "pulse" of the staff. To describe the communication process, Simpson also made an analogy to the game of chess in which the leader must make calculated moves to infuse an innovation over time. After we concluded our interview, Boyd casually remarked that the school organization is like a garden and must be fertilized in order to change and to create a learning environment which is "good for kids."

Teachers shared fascinating insight to the influence of others on change and adoption of innovations. Common threads were the influence of culture and teams upon the process and the effect of positive and negative communication between staff. Dana Chiwa commented that Eaton "seems like a very team-oriented environment." Jonna Martin told me that everyone is supporting each other. Geography teacher George Smith believes that Washington has a "very close knit staff that works well together." Angie Hoyt, a Washington math teacher, told me that her PLC and department meetings "really help" support her and provide examples of how to adopt the innovation. Smith stated that Washington has a

> real teamwork sharing approach. We always seem to have one or two individuals that are really progressive in their thinking…and the cohesiveness of our group really sets the stage for them to share and teach and bring them along. I mean, it's much more effective when they see their peers doing it or their peers can train them on an issue. So, it's not a --, it's not a push type of situation. It's more of a pull within the team.

Sonland staff did not talk as much about teamwork, but emphasized the communication process. Only Ginger Cammer expressed a belief that PLC's were a "perfect avenue" for discussion about change. Aguilar shared his perspective on the importance of leadership and the need to have people who can communicate. High emphasized the importance of teachers seeing results. She believes that when teachers see other teachers being successful, laggards "will come around."

Of all in interviewee responses regarding the influence of staff on others, Hall had the most intriguing response. She talked about negative aspects of influence. She talked about the complications of innovations which are initiated outside of the school. Her point was that internal innovations are easier.

> … When innovations come from the outside, you immediately divide the camp. So you have the people that are willing to try something that's new, and the people that are saying this is one more thing they're asking us to do… we can wait it out, have been pretty successful waiting it out… It's a larger group that's waiting.

Hall also talked about the communication process, especially in regard to conversations in the teachers' lounge and at faculty meetings. She said both were common places where negative communication occurs, and she believes laggards are often the loudest. She made a funny comment about peoples' "rumps activating a negative switch" which made people more prone to adverse comments about innovations and change. Additionally, she said good PLC chairs can overcome the 'rump switch' and diffuse negative comments. On the flip side, she said that positive discussions about innovations often occur between

classes when teachers are standing. She added that those precious minutes between classes can become show and tell times when teachers share ideas and innovations.

My two requests "Without identifying anyone, describe staff willingness to change" and "based on your understanding of 'Twenty-first Century Learning,' explain your staff's readiness to change" were often used interchangeably, and typically, I got the same data. Therefore, after the first few interviews, I changed gears and simply asked staff to tell me how many innovators, early adopters, early majority, late majority, and laggards were in their school. Interviewees had a hard time distinguishing between early adopters, early majority, and late adopters. They tended to group people into three categories, i.e. innovators, laggards, and everyone else. As we discussed DOI adopter categories, interviewees agreed that there was a theoretical difference between innovators and early adopters, but when pressed, they seldom articulated actual numbers of teachers in the five categories.

DOI Adopter Distribution

When I asked interviewees about their perceptions of adopter categories, responses tended to suggest they perceived their schools as having a number of laggards and innovators with a distribution skewed toward innovators. See Tables 6, 7, 8 and 9 for information on survey data.

Washington Middle School

- Technology Coach Rock Stenson expressed a "real sense of pride" about Washington staff. He believes that 53% are innovators or early adopters, 17% are early majority, 9% are laggards and the rest, about 30%, are late majority (See table 6).

- Geography Teacher George Smith grouped innovators and early adopters in the same category and estimated about 33% of Washington staff were in the group. He thought over 50% were early majority and 10% were in the "extreme minority" of grumblers.

- Washington Principal Connie Boyd thought she had a bell curve.

Table 6

Washington Survey Data n = 27

Category	Range	Normal Distribution		Washington Distribution	
Laggard	1.0 – 1.4	4	16%	0	0%
Late Majority	1.5 – 2.4	9	34%	5	19%
Early Majority	2.5 – 2.9	9	34%	19	70%
Early Adopters	3.0 – 3.4	4	13.5%	3	11%
Innovators	3.5 – 4.0	1	2.5%	0	0%

- Eaton

    o Dana Chiwa did not think Eaton had a bell curve and believed 6% are innovators; there were no laggards, and the rest fell in the early adopter category. She thought that Sylvia Dressler would not keep laggards on her staff.

    o Jonna Martin identified 20% as innovators or early adopters, 50% as early majority, 20% as late majority, and 10% laggards.

    o Patty Hall said 10% were innovators, 27% were early adopters, 50% were early and late majority, and 13% were laggards.

- o Sylvia Dressler thought she had 4 innovators or 12%, but was not able to complete this portion of the interview because she had an unexpected interruption.

Table 7

Eaton Survey Data n = 15

Category	Range	Normal Distribution		Eaton Distribution	
Laggard	1.0 – 1.4	2	16%	0	0%
Late Majority	1.5 – 2.4	5	34%	0	0%
Early Majority	2.5 – 2.9	5	34%	11	73%
Early Adopters	3.0 – 3.4	2	13.5%	3	20%
Innovators	3.5 – 4.0	1	2.5%	1	7%

- Sonland High School
  - o JJ High thought 30-40% of the staff were innovators, 10-20% were laggards, and the rest were somewhere in the middle.
  - o Rom Aguilar thought 10% of the staff were innovators, 40-50% were early adopters, and 20-30% of the staff were laggards.
  - o Ben Simpson stated that 2-4% were "risk takers," up to 25% were early adopters, and 10-15% were laggards.

Table 8

Sonland High School Survey Data n = 31

Category	Range	Normal Distribution		SHS Distribution	
Laggard	1.0 – 1.4	5	16%	0	0%
Late Majority	1.5 – 2.4	11	34%	5	16%
Early Majority	2.5 – 2.9	10	34%	23	74%
Early Adopters	3.0 – 3.4	4	13.5%	3	10%
Innovators	3.5 – 4.0	1	2.5%	0	0%

Table 9

Sonland Public Schools Survey Data n = 76

Category	Range	Normal Distribution		SHS Distribution	
Laggard	1.0 – 1.4	12	16%	0	0%
Late Majority	1.5 – 2.4	26	34%	10	13%
Early Majority	2.5 – 2.9	26	34%	56	74%
Early Adopters	3.0 – 3.4	10	13.5%	7	12%
Innovators	3.5 – 4.0	2	2.5%	1	1%

Laggards Speak Out

Data gleaned from interviews provided insight about laggards' positions on change. I heard interesting comments about interviewee's perceptions of themselves and others. In particular Washington Geography teacher George Smith, Eaton Math teacher

Jonna Martin, and SHS Language Arts teacher Ginger Cammer either indicated that they were laggards or shared characteristics of late adopters, but each had different reasons. Martin identified herself as slow to adopt technology because she had been afraid of technology integration. She said she was not a quick thinker, needs practice and time, and had been afraid to fail and to ask questions, but because she has had access to Chiwa, her Technology Coach, who met with her every Thursday to answer questions, Martin now says, "I'm not passing out any more. I'm ready, I'm ready."

Smith identified himself as a laggard because he was usually unwilling to try anything new. After years of perfecting his instructional strategies, he believed his way of doing things was best for him and got the best results.

Well, I am one of the laggards, I would say. I have an idea of what I want to do and I have an idea of what I think works the best and I will think about it. I'm not opposed to it, but if it doesn't fit exactly with what I think works best … And I feel like I have a track record of what I do works. And I don't want to change what I know works…I am harder to convince.

Cammer was the most intriguing of all interviewees. She would not participate in the survey because she "often reads between the lines and perceive(s) a particular attitude toward the respondent or a particular point of view to be proven." Cammer had much to say about innovation and change. First she said that she thinks innovation is positive and change can be positive or negative. She believed that educators should be teaching students to be more discerning about change. According to her, people should be

'resistant to change' who do not follow 'lock step' but play 'devil's advocate. I

believe this role is not negative, on the contrary , it represents high order thinking

skills: analyzing a proposition, synthesizing the proposition into the status quo

and evaluating the 'fit'. …The weighing of shades of gray rather than black and

white in issues may necessitate a moderate, measured approach to 'innovation.'…

Cammer also communicated in an email about the change process and gave her

perspective about teachers' relationship to change.

One more thing about dialogue and change... If the change is really on the agenda,

then listening to a teacher's view, especially if it differs from the agenda, doesn't

seem useful to me. Ultimately, it feels like a dismissal of teachers' experience,

education, and thoughtful considerations. (Sometimes they have more experience

or education than the change makers). If there is another rationale for the change

(besides the formal discussions) that trumps all other rationale, then the reason for

change must be explained since teachers' views are moot points.

Summary

The case study of the three secondary schools was presented with interview,

observation, document, and survey data. Triangulation provided multiple routes to

interpret all the data. Descriptive statistical analysis of survey data was helpful to make

inferences about staff willingness to change. In the next chapter, I will present findings

and reach conclusions about my research questions within the Diffusion of Innovations

Theory framework.

CHAPTER V

FINDINGS AND CONCLUSIONS

The previous chapter detailed data collection, interviews, the survey, and observations within one school district. This chapter includes my analysis of the three secondary schools, my findings and conclusions about my research questions, and reflections regarding my dissertation experience.

Throughout the case study, I was concerned about researcher bias. Because I was researching in my own district, I was vulnerable to integrating preconceived notions into my analysis. I was also at risk of inadvertently exercising power over my interviewees. As I begin Chapter V, it is imperative that I address these concerns. In order to counteract integrating perceived notions, I continually addressed the issue throughout analysis. I often reflected on whether my analysis was based on reality or on my own judgments. I talked to peers about the case study, and I constantly revisited the data to cross check my findings and conclusions.

After much reflection, I must admit that I was not concerned about coercion. All but one of my years in the district were spent serving in capacities other than classroom teacher. Throughout the years, I worked tenaciously to develop good relationships with staff as a technology coach then as a district administrator. I did not have any obvious enemies and seldom heard complaints about my leadership. Since I only evaluated the

principals, I did not have direct influence over the job status of teachers which buffered their potential sense of coercion and resentment toward me. My frequent approach to change was to avoid imposing it and to provide ample opportunity to participate in the process of communication and implementation. I commonly used faculty meeting presentations and paid study groups as venues for discussion prior to adoption of innovations. My practice was based on a philosophy of participatory change.

Throughout the interview process, teachers appeared to be open, and I did not perceive that they were uncomfortable. I made every effort to show genuine interest in their responses and to express appreciation for their contribution to the case study. I tried to communicate that I appreciated their help and insights.

While I made a conscious effort to ward off researcher bias and coercion, I cannot state that bias and coercion were not in play. It would be naïve to think that an element of power was not in play since I was a district administrator. Therefore, the survey data became valuable. Teachers did not have to complete the anonymous survey. They could complete the survey independent of my interaction with them and without identification of their responses. The survey data gave an unfiltered, unbiased look at innovativeness and was helpful as I made inferences about staff willingness to change.

Washington Middle School

Washington Middle School is on the west end of the community's main street. The building is vanilla in color, has little landscaping, and the main entrance is a good walk from the street. Patron parking is not accessible or plentiful. The Main Office sits away from the entrance, and people can slip into the building without being seen or welcomed. The cafeteria is to the left of the entrance and is decorated with fake fish tanks

and an interesting assortment of hanging musical instruments. Just beyond the cafeteria is the auditorium which has had no renovations or multimedia improvements since the school opened in 1961. During events, a tiny projector sits on the stage floor with projection delivered on a portable screen and an old fashioned public announcement system. The auditorium roof leaks, the chairs squeak, but student laughter during assemblies, talent shows, and programs is common. Teachers are grouped in teams on two floors with old fashioned hallways lined with lockers. The gym, orchestra, and fine arts classrooms are on the north end of the building. The Library is spacious, pleasant and centrally located. Washington's general use computer labs are close to the Library while the career technology classroom is in an obscure location in the south Washington corner of the building. In general, halls are typically decorated with student council signs, motivational posters, team signs, and teachers' paraphernalia. Frankly, Washington looks much like it did when it was built.

Technology Integration into Instruction

Washington has the most technical resources of the three secondary schools. 88% of the teachers have electronic whiteboards. Several mobile carts extend availability of classroom access to computer labs. Teachers also have classroom performance (CPS) systems, known as clickers, which provide immediate assessment results to inform teachers and students about skills mastery. New tools include iTouch carts, portable document cameras, and Neo2 mini computers. Of all the District's principals, Connie Boyd has the most visionary and clearly articulated plan for developing a Twenty-first Century school. Under her leadership, staff members generally feel comfortable with technology and aggressively seek to integrate technology into their lessons. Boyd has

methodically provided technology resources and professional development to bring her vision to fruition.

Technology Coach Rock Stenson is well regarded in the District and supports Washington staff with great creativity. For example, Stenson's office was moved to an unused, outdated home economics room. Stenson was not fazed by this change and created his "techno kitchen" which quickly became a great meeting place for technology training, individual support, and frequent homemade lunches or snacks. Stenson also models technology use by providing many multimedia videos, sound bites, and visual aids for faculty meetings, district events, and professional development. All of his work is infused with humor to increase attention and effectiveness. Most importantly, Stenson relates well with staff, makes them feel comfortable, and graciously guides them to increase technology integration into the classroom.   Stenson is not an educator by trade, but he is an invaluable technology coach with an innate understanding of education and human nature.

Twenty-First Century Instruction

Based on observation, document review, and interviews, Washington is a District leader in technology integration. Boyd is respected by her peers and Washington is frequently cited as the most technically rich school in the District. During my research, Boyd and her team were asked to demonstrate iTouches and Neos during the State Legislature's Educational Technology Day. The team also presented their technology program at a statewide educational technology conference.

Nevertheless, Washington classrooms still appear very traditional. Students sit in rows with teacher podiums predictably stationed at the front of the class. Teachers are

using technology to teach in ways similar to those used during the Twentieth Century. For example, electronic white boards are often used like old fashioned overhead projectors. Teacher web sites are primarily used for announcements and seldom include Web 2.0 tools. Slowly, students are beginning to have more opportunity to use technology. Introduction of the Apple iTouch is increasing student use and teachers are increasingly using the iTouches for review and instruction. Students are also using Renaissance Learning's Neo mini computers to take assessments and type papers. Few glimpses of Twenty-first century learning can be seen at Washington. Classrooms are primarily teacher-centered, not student-centered. Learning is somewhat differentiated and collaborative, but it is not particularly student-led and seldom project-based. Differentiation does occur in reading courses and students are grouped into math strands according to ability. High achieving math students learn seventh grade standards in the sixth grade in preparation for pre-algebra following year. In most courses, differentiation is up to the classroom teacher.

Students are frequently assessed, and teachers increasingly use formative assessments that afford them with data to drive instruction. Teachers provide students with real time feedback about their own learning, but students are not routinely setting academic goals, tracking their progress, or communicating their success as they take ownership in their education. Teachers and administrators work together in leadership teams and PLCs to set and achieve specific learning goals (SMART goals). The school uses data to drive site improvement, and Boyd directs her staff through a state recommended model to analyze state test results. I observed staff engagement in the

process resulting in beneficial instructional changes focused on increasing student achievement.

Washington's best example of differentiated, technology rich programs is the reading program. Test data and teacher recommendation from elementary schools are used to place students in different reading courses based on reading level. Frequent assessments monitor student progress and a variety of software is used to improve reading skills. One example of technology integrated well with student learning is found in Washington's reading program. The Visograph (see Figure 13) records eye movement, and its software system evaluates reading skill. Other examples are Renaissance Learning, Star Reading, and Accelerated Reader which are used to keep students focused on reading, but Washington's point system does not necessarily motivate students or result in kids learning to love to read. Unfortunately, other software tends to be simplistic and "drill and kill." Nevertheless, Washington reading teachers are passionate about their program and are constantly revising their program to increase student achievement.

Figure 13. The Visograph Goggles Used to Measure Eye Movement

Another good example of a Twenty-first Century Learning is Washington's use of a value added assessment used to track student growth. Washington piloted the Measures of Academic Performance, MAP, in 2007 and has become the District leader in this adaptive assessment. MAP is an assessment developed by the Northwestern Evaluation

Association, a non-profit organization created to develop and deliver a formative assessment which could provide statistically valid and reliable data about student learning. MAP dynamically adapts to students' online assessment responses in order to determine academic knowledge along a continuum of learning. Students' resulting scaled scores provide detailed information to teachers and administrators about the students' individual learning needs and communicate what the students know, what they are ready to learn, and what they are not academically prepared to learn. Washington uses this data to set SMART goals, to place students in math and reading programs, to develop individual educational plans for all students, and to monitor student progress. Teachers, parents, and teams integrate this data into the Pyramid of Success framework to increase student success.

A weak spot is Washington teachers' use of classroom web sites to integrate technology and 21st Century skills into the learning experience. My sampling of web sites indicates that only 6% of Washington teachers have up to date sites and none of the teachers use their sites for instructional purposes. I write this with personal bias. When I re-entered education in 1999, I was immediately drawn to technology and how it could facilitate student learning. I acquired a projector, used PowerPoint to teach math concepts, reserved the computer lab without scheduling conflicts because no one else was using it, and developed my website as a resource and instructional hub. Students used my web site to get help from resource sites whenever needed and to complete assignments from my online lesson plans. Just as one cannot imagine life without the Internet in today's professional and personal environments, I cannot help thinking that a teacher who does not see the value of a well developed web site has not tapped in to the power of the

Web and Web 2.0 tools and technology in general. Of the observed Washington web sites, 33% of the teachers had classroom web sites, 6% were up to date, and none of the teacher sites were for instructional purposes.

Staff Willingness to Change

Analysis of Washington staff's willingness to change includes a look at the school's leadership and culture. Boyd is a transformational leader and has taken her staff where they would not have independently gone. Using Leithwood's eight dimensions of transformational leadership, a summary of Boyd's leadership follows:

- Building school vision- Staff are focused on students. Over the years, Boyd developed a school wide reading program, a strong teaming model, and a "Pyramid of Success" intervention program focused on the "won't kids" who chose not to work and not to achieve satisfactory levels of learning.

- Establishing school goals- Boyd has a history of influencing staff in order to reach a common goal. Under her leadership, the staff has developed a strong PLC environment focused on the academic and behavioral needs of students. Boyd and her leadership team develop annual SMART goals elaborated in extensive site improvement plans.

- Providing intellectual stimulation- During Boyd's interview, she frequently talked about her belief that staff should be lifelong learners. Staff reiterated Boyd's belief.

- Offering individualized support- Staff surveys and interviews confirmed that Boyd supports staff in professional and personal ways.

- Modeling best practices and important organizational values- Boyd was constantly researching quality professional development and conferences for herself and staff. Once Boyd decided a new strategy was research based and best practice, she was quick to implement that strategy in her building. Pyramid of Success is a good example. Her site leaders attended a summer conference and implemented that fall. During year three, the year of this study, data showed that the program has improved student achievement and behavioral indicators.

- Demonstrating high performance expectations- Boyd is a no nonsense leader with heart. She has a counseling background and has the ability to push people to achieve high levels of performance while making them feel supported and cared for.

- Developing structures to foster participation in school decisions- Boyd has a well defined leadership team with an academic teaming structure that provided a framework for collaboration and decision making. Of particular note is Boyd's strategy of carefully selecting late majority staff to serve in leadership roles in order to sway their positions on current changes or innovations.

- Creating a productive school culture- Building a relationship of trust is a key component of Boyd's leadership style. This translates to a school culture of respect in which teachers believe Boyd would only introduce changes or innovations which were "good for kids" while providing the support and training needed to implement the innovations.

DOI and Adopter Distribution

Out of all the Washington staff I emailed, 48% of the staff submitted an online survey response. The combined frequency analysis (See Table 10) had Means of 2.60 and a Standard Deviation of .29. As measured by the Practitioner's Innovation Survey, Washington does not have any laggards or innovators. The number of leaders or early adopters is less than normal. With mean of 2.6, the distribution is slightly skewed toward innovation and the standard deviation indicates that respondent categories tend toward the mean. In fact, Washington has a high number of early majority adopters. Figure 14 provides graphic representation of Washington's adopter distribution.

Table 10

Washington Middle School Frequency Table

Total_Innovation_6th_7th_Center

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.9	2	7.4	7.4	7.4
	2.2	1	3.7	3.7	11.1
	2.3	1	3.7	3.7	14.8
	2.4	1	3.7	3.7	18.5
	2.5	1	3.7	3.7	22.2
	2.6	12	44.4	44.4	66.7
	2.7	2	7.4	7.4	74.1
	2.8	3	11.1	11.1	85.2
	2.9	1	3.7	3.7	88.9
	3	2	7.4	7.4	96.3

	3.2	1	3.7	3.7	100.0
	Total	27	100.0	100. 0	

Statistics

Total_Innovation_6th_7th_Center

N	Valid	27
	Missing	0
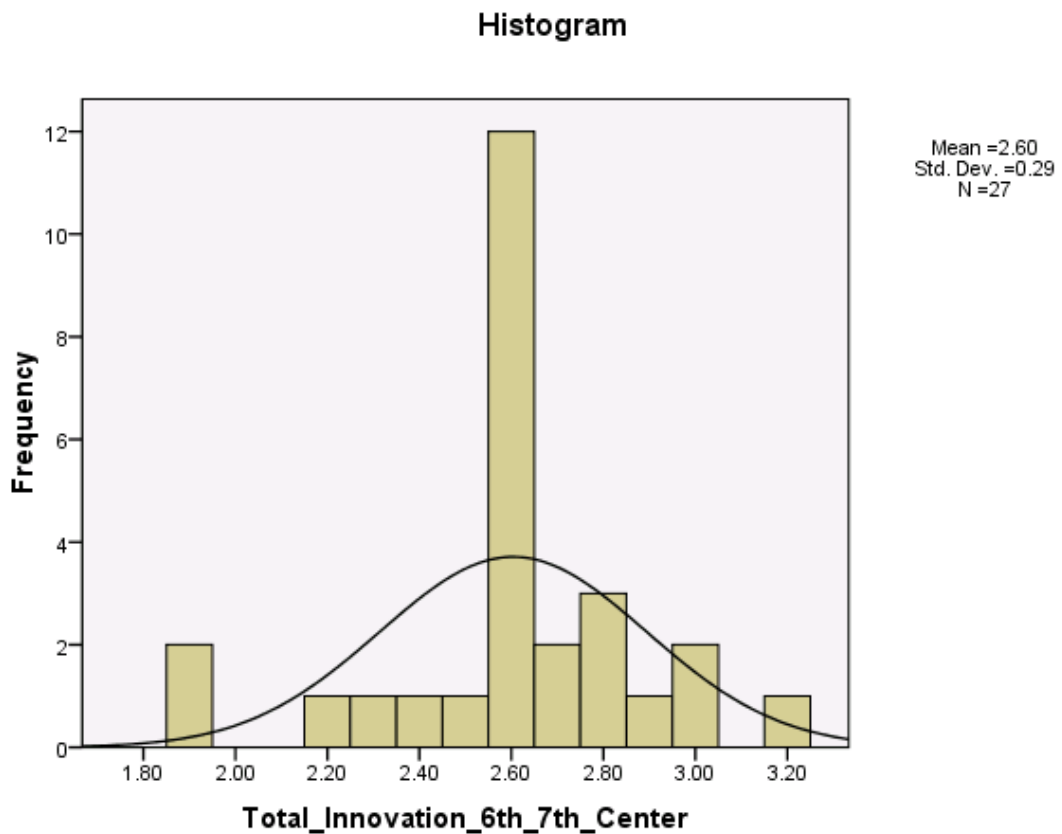
Figure 14. Washington Middle School Adopter Distribution

Inferences of School Readiness for Twenty-First Century Instruction

Washington has a tight, positive culture with staff who are willing to change, but lack innovators and teacher leaders. Interviews confirmed that staff members see the

"Math Department" as the leading force for change rather than identifying specific teachers who are innovators and early adopters. Because of Boyd's abilities as a transformational leader, she has been successful at collectively guiding her followers through innovation and change. She has strategically organized teams to move through the innovation process, but she does not have a normal distribution of adopters. In reality, Boyd is the innovator who must carefully till her garden to cultivate change. The good news is that she has a moldable staff who are willing to change, but she does not have innovators who are on the cutting edge or leaders who will move the adoption process as quickly and efficiently as possible. This may explain why Washington has the most technology without tangible evidence of innovative instructional practice aligned to characteristics of Twenty-first Century Learning. Therefore, because of Boyd's leadership, the school is ready for Twenty-first Century Instruction, but the implementation will require attention to change theory and will depend on Boyd continuing to serve as principal. If Boyd leaves the District, her replacement may be able to innovate and lead, but may not be ready to get the garden to produce without careful planting, watering and time.

Eaton 8th Grade Center

The Campus

Eaton 8th Grade Center is on the opposite end of Main Street. The building sits close to the street and is close to from the community Library, across from City Hall, and near the Fire Station. Oddly enough, the main entrance is not on Main Street. Parking is a challenge for patrons with a few options on Main Street, availability behind the Library, or nearby church lots when available. The main entrance was renovated during the time

my study and a large awning has made entry easier during inclement weather. A security

kiosk greets visitors who must go through clearance checks prior to making contact with

office secretaries who have the ultimate say in who can enter the building. Once visitors

are in the building, the atmosphere is warm and welcoming. The building is small with

two floors and an "h" shaped set of halls. "Learning is the Only Option" signs line the

halls, and teachers' full length photos greet students when they enter classrooms. A

minimal amount of student work is posted, but display cases hold posters, awards, and

trophies. The gym and auditorium are across from each other on the ground floor.

The gym is a hotbed of activity with daily activities before students head to class.

Weekly assemblies allow teachers precious time for PLCs. Like Washington, the

auditorium is old, the chairs are squeaky, and the sound system poor. In Eaton's case, the

projector sits on a moving cart in the middle of the center row. Cords are taped down to

prevent tripping. The lack of multimedia resources does not deter fledgling musicians or

singers. Eaton administrators aggressively bring guest speakers, performers, and

programs into the old auditorium with teachers closely monitoring student behavior. The

small cafeteria is at the far end of the building.

<center>**Technology Integration into Instruction**</center>

Eaton has one 50 station computer lab that is not easy to use, especially when two

classes share the room. Whiteboards are not available and a small projector precariously

balanced on a room divider is not viewable by more than a handful of students, so

teachers post instructions on post it paper. Climate control is unpredictable with

challenging swings between way too hot and way too cold. Two additional computer labs

are available for keyboarding and electives. As for actual hardware, the majority of the

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eighth grade classrooms are equipped with LCD projectors, but only one-fourth have electronic white boards. The school has one mobile computer cart with 30 wireless laptops. The Eighth grade center also has two iTouch carts. Every team has at least one CPS system, but teachers do not often use the systems.

Classrooms are traditional. Most have student desks in typical lines with the teacher desk and a podium at the front. A few classrooms, especially science rooms, have tables. Only a handful of the 31 teachers use electronic whiteboards, and technology use in the classroom is seldom. Teachers take students to computer labs, but the primary purpose is for online assessment. On the bright side, the new iTouch carts and mobile cart were increasingly used throughout the school year.

In the last year, Sylvia Dressler has increased her focus on technology integration, but her experience and knowledge base has made visioning the future challenging. In order to become more knowledgeable, Dressler attended national technology conferences and met with Technology Coach Rock Stenson on a weekly basis. Her assistant principal is technically adept and encourages staff to integrate, but no formal school technology goals have been in place. At the beginning of the school year, the school's first site based Technology Coach Dana Chiwa was hired, but her working relationship with Dressler was very poor. Chiwa was able to increase use of the iTouch cart and encourage a few teachers, but her overall effectiveness was minimal, and she did not notably impact the rate of technology integration or change instructional practice. Consequently, Chiwa was moved to Central Office to assist with assessments and to serve as District web master.

Twenty-First Century Learning

Almost non-existent! If a casual observer who attended Eaton 8th Grade Center in the Twentieth Century walked through the school and looked in the classrooms, she would feel like she was in a time warp. Except for clothing styles, renovated halls, an updated cafeteria, and a few new gadgets, the school would not look much different than when she went to school at Eaton.

While school administrators and teachers strive to make learning enjoyable, technology is not consistently infused in lessons, students do not routinely have access to Web 2.0 tools, or experience computer based lessons. Teachers have projectors and use electronic materials provided in textbook resources, but do not use electronic whiteboards, CPS systems, or multimedia equipment. Of the observed Eaton web sites, 50% of the teachers had classroom web sites. Of those, 33% were up to date. One teacher had an instructional web site with Web 2.0 tools including a wiki, a blog, and question and answer page.

Because of the intense spotlight on state testing, Eaton is focused on consistent curriculum heavily laced with assessment, intervention and remediation. While teachers do teach interdisciplinary lessons, the majority of instruction is teacher centered. Lessons are not particularly differentiated, collaborative, or project-based. One exception is the World War II Project which involves the entire school and all courses. Students become involved in a reenactment of prisoner of war camps and learn what it is like to be condemned to death because of race.

One bright spot is the use of iTouch applications for review and practice. Also, the site uses online assessments to provide teachers with data to drive

instruction. Students also receive feedback about their own learning, but do not routinely work with teachers to set personal learning goals (SMART goals), track their progress, or communicate their success in order to take ownership in their education.

School Willingness to Change

While staff may not be attentive to technology integration and Twenty-first Century Learning, they are focused on student achievement. Six years ago, Dressler introduced the school's motto, "Learning is the Only Option," and it has become the rally cry of teachers, support staff, and students. The motto is visibly displayed throughout the building, and presented in all communications with patrons and community.

The emphasis on student learning has developed a school culture where staff members are willing to change and is the result of Dressler's transformational leadership. Using Leithwood's eight dimensions of transformational leadership, a summary of Dressler' leadership follows:

- Building school vision- When Dressler became principal, she focused on developing a strong learning environment. Once Dressler created the "Learning is the Only Option" motto, her plan to embed the motto into the staff's psyche was classic. Dressler left no stone unturned in pursuit of her vision. It was obvious in interviews, observations, document reviews that Dressler had a vision for the school, that all the staff knew what it was, and almost all were onboard with the vision.

- Establishing school goals- Dressler was very data driven. As an example, the District introduced a procedural model to break down data, analyze the data, hypothesis about why the data did not meet school goals, and

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determine solutions to increase student learning. Dressler did not immediately embrace the model because she had already developed her own process.

- Providing intellectual stimulation- Observations at faculty meetings indicated that Dressler was an instructional leader. When she attended workshops, she immediately shared resources and new strategies with her staff. She was very good at revisiting summer professional development during the school year. For example, Dressler had a focus strategy of the month learned during summer professional development, reviewed the strategy during faculty meetings, and looked for the strategy during classroom walkthroughs and evaluations. She understood the value of job embedded professional development.

- Offering individualized support- while Dressler was a task master when it came to student learning, she knew how to "love on" her staff. Every early morning faculty meeting included breakfast. Water, soft drinks, and snacks were available during other meetings and events. Offices and meeting rooms were beautifully decorated. Frankly, Dressler had a knack for old fashioned southern hospitality and often pulled out the good china for staff, parents, patrons, and guests.

- Modeling best practices and important organizational values- In terms of PLCs, Dressler was ahead of her peers. She had functional DAGs (Department Academic Groups) several years before the District and the rest of schools embraced the PLC model. The other seven dimensions of

transformational leadership demonstrate that Dressler modeled best

practices and understood the importance of organizational values.

- A demonstrating high performance expectations- Dressler' expectation of

  staff performance was very high. If teachers' students were not learning as

  measured by state test scores or if teacher evaluations were poor, Dressler

  methodically worked to remove or transfer the teacher. In fact, it was not

  uncommon to hear Dressler state that someone or something contradicting

  Dressler' expectations was not going to happen in her school.

- Creating a productive school culture, observations, interviews, and

  document analysis confirmed that "Learning is the Only Option"

  described the norms, values, belief systems, and traditions of Eaton

  Middle School.

- Developing structures to foster participation in school decisions- Dressler

  had a strong "Principal's Leadership Team" which assisted her in the

  establishment of annual school goals and improvement plan. Interviews

  confirmed that Dressler included staff in decision-making, was attentive to

  teacher buy in, and listened to her staff unless, of course, they were not

  attentive to student learning or were mediocre teachers.

DOI and Adopter Distribution

Out of 33 Eaton staff, 15 or 45 % of the faculty answered the survey. The

combined frequency analysis (See Table 11) had mean of 2.85 and a Standard Deviation

of .304. The mean indicates that the distribution is significantly skewed toward

innovation and the standard deviation communicates that respondent categories tend

toward the mean. As measured by the Innovation Survey, Eaton does not have a normal

distribution of adopter categories (See Figure 15). In fact, Eaton not only does not have

any laggards or late majority, but also has a noteworthy number (73%) of early majority.

Based on survey results, Eaton has at least several early adopters and one innovator.

Table 11

Eaton 8th Grade Center Frequency Table

Total_Innovation_8[th]_Grade_Center

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.5	1	6.7	6.7	6.7
	2.6	4	26.7	26.7	33.3
	2.7	2	13.3	13.3	46.7
	2.9	4	26.7	26.7	73.3
	3	1	6.7	6.7	80.0
	3.1	2	13.3	13.3	93.3
	3.7	1	6.7	6.7	100.0
	Total	15	100.0	100. 0	

Statistics

Total_Innovation_8th_Center

N	Valid	15
	Missing	0

Histogram

Mean =2.85
Std. Dev. =0.304
N =15
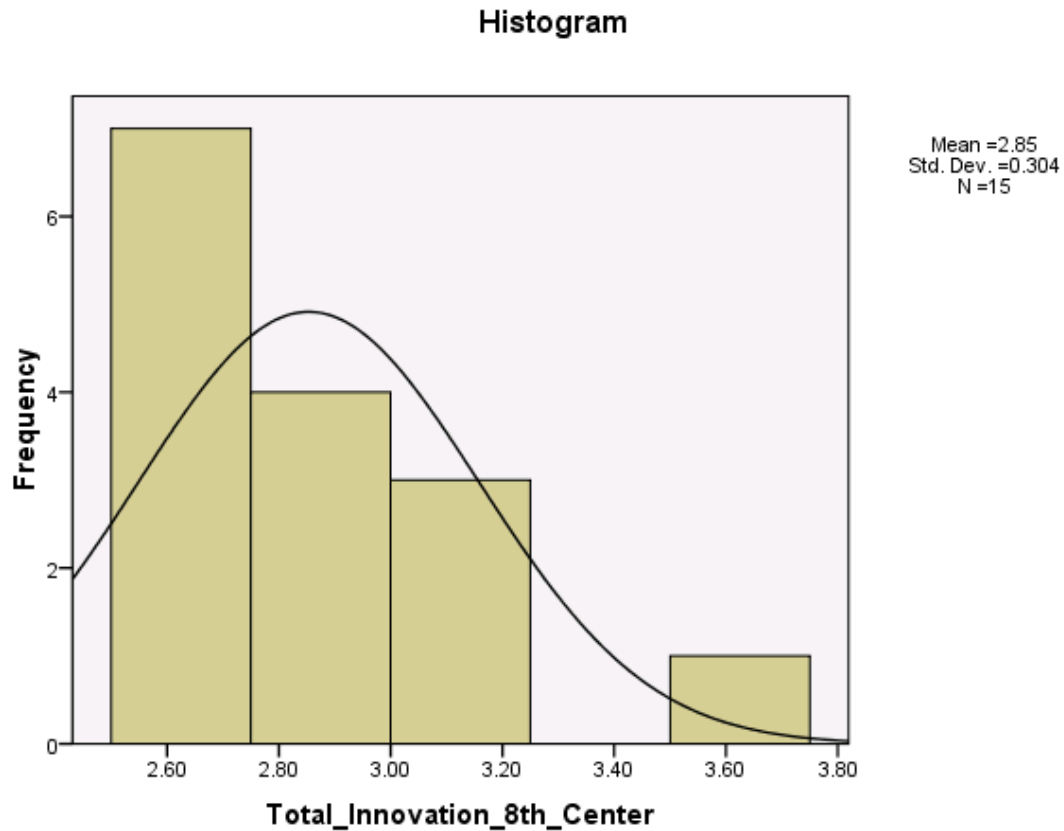
Figure 15. Eaton 8th Grade Center Adopter Distribution

Inferences of School Readiness for Twenty-First Century Instruction

Because Eaton Middle School does not have a normal distribution of DOI adopter

categories, it is a unique site. Dressler, a transformational leader, created a vision for her

staff, set goals to reach her vision, and developed a school culture focused on learning.

Staff routinely expressed that the way the school functions is to meet the needs of

students no matter what the issues. Interviews, observations of new programs, site

professional development, and functional PLCs confirm that staff members believe

"Learning is the Only Option." In this kind of environment, it comes as no surprise that

staff members in general are innovative and willing to change. While technology

integration has not been a priority until recently, Eaton Middle School is poised to tackle

the innovations needed to become a Twenty-first Century learning environment. If Dressler can retool her vision for the school, her staff is willing to change, and implementation should exceed the normal rate of infusion.

Sonland High School

The Campus

Sonland High School (SHS) is a large, multi-building complex that sits on 26 acres in the center of the community, and educates approximately 1400 students. Ten years ago, the three story main building doubled in size with the addition of a math, science wing decked out with new labs, computer classrooms, offices, library, and other modernized facilities. The older section still includes original classroom fireplaces, beautiful crown molding, and strong wooden staircases. Architects creatively designed a commons area between the main building and an older, outdated, and moldy wing that houses ninth grade teachers. The commons area is used for lunch and school activities. With multimedia equipment and flexible seating, a multipurpose assembly center is used for a myriad of school and community events. Gyms, locker rooms, and additional classrooms extend beyond the main building, but are not readily accessible or obvious to patrons. The football, baseball, track and basketball facilities are on the distant side of the student parking lot with the basketball gym undergoing renovation for the first time since construction 40 years ago. To casual observers and visitors, the complex is well maintained and clean. Visitors frequently remark that students are well behaved and the high school is a pleasant learning environment.

Traditionally, Sonland High School students score better than their peers on state national tests. Students also generally have above average college readiness indicators

and have a higher retention rates during the first year of college. The rigorous college prep curriculum is complimented with a wide range of AP courses, a variety of elective programs, special needs support, and nationally recognized extracurricular activities. Concurrent enrollment at the local junior college and opportunities to attend the area vocational school provide additional opportunities for students to exit Sonland High School ready for post secondary schooling or the workplace.

Technology Integration into Instruction

Sonland High School has four general purpose computer labs available for classroom use on a first come first serve basis. Each lab has 25 stations and a projector. The site also has two mobile carts each with 30 laptops which must be charged every three hours. Business teachers have well equipped labs with electronic whiteboards, digital cameras, document cameras, and other multimedia equipment. Their labs are available for general use during teacher planning periods. The six labs and a few extra slots during business teachers' planning periods are shared amongst approximately 95 teachers which greatly reduces the likelihood of technology integration. Math teachers tend to consume available time with required web based programs to increase state test scores and credit acquisition. English teachers scoop up remaining slots to give students time to type papers. Consequently, science, social studies, and elective teachers seldom develop technology rich lesson plans requiring lab access. Only a few teachers have classroom electronic whiteboards, projectors, computer response systems, or other technology tools.

Twenty-First Century Learning

Sonland High School is a traditional high school. Classroom instruction looks just like it did 50 years ago and has not shifted from being teacher-centered to being student-centered. Instruction is primarily delivered in a lecture format with typical homework assignments and occasional projects rather than an integrated, differentiated, student-led, collaborative delivery model. Differentiation occurs by tracking students into special education, basic, accelerated, or AP tracks. Students in state tested courses take diagnostic and formative assessments that provide teachers with timely data to drive instruction and they receive timely feedback about their own learning. Nevertheless, students do not track their progress or work with teachers to set and achieve specific learning goals (SMART goals) in order to communicate success or take ownership in their education.

Because of the restriction of readily available computers and multimedia equipment, teachers seldom create technically rich lessons or maintain up to date web sites. While analysis did not include all teacher web sites, observation of math, science, social studies, language arts and business education web sites revealed only 15% of the teaching staff had a classroom web site. Of the 6% teachers who had up to date sites, most provided information like supply lists, calendars, assignments, or syllabi. Only 1 of the 52 sites observed was used for academic and instructional purposes. Because of the lack of resources, teachers are unresponsive to requests to create lessons infused with technology or Twenty-first Century skills.

School Willingness to Change

Sonland staff are like most high school staff. Teachers tend to be content specialists focused on creating responsible teenagers who complete homework on time and pay attention in class. Because of the demographic changes of the student body and the increased number of poor, special education, and at risk students, teachers are nonetheless being forced to rethink instructional strategies, philosophy, and classroom management techniques. Teachers are slow to change, but they recognize that the "way we do things around here" is no longer working and they must adapt to meet the challenging needs of the students. Consequently, there is increasing willingness to change.

Evidence of staff willingness to change is seen in the adoption of the PLC model. After four years, teachers are meeting on a regular basis to use data to drive instruction, to compare instructional strategies, and to embrace research based practices. As one teacher commented, she believes "change should start with a perceived need for change at the classroom level. The PLCs are a perfect avenue for this discussion …." Leadership at Sonland High is undergoing change as well. Ben Simpson has only served one year as principal and does not have his transformational skills nailed down. He is intentionally building a school vision of a collaborative learning community focused on preparing students to live and work in the Twenty-first Century, but he expresses concerns that staff members are not ready for much change. He believes that he must move slowly to reach his goals and likens his strategies to chess moves. Simpson focuses on best practices and is intent on creating a positive school culture, but he is reducing the number of teachers involved in site decision making. He is excellent at providing

individualized and department support, but he has commented that he may intentionally overlook the needs of mediocre staff.

DOI and Adopter Distribution

Out of 104 high school staff, 31 respondents or 30% of the faculty answered the survey. The combined frequency analysis (See Table 12) had mean of 2.63 and a standard deviation of .197. The mean indicates that the distribution is significantly skewed toward innovation and the standard deviation communicates that respondent categories tend toward the mean. As measured by the Innovation Survey, Sonland High School has a normal distribution of adopter categories. In fact, SHS does not have any laggards or innovators, has a similar percentage of late majority and early adopters, and a noteworthy number (74%) of early majority adopters. One out of 10 SHS staff are early adopters and can lead change. Figure 16 illustrates Sonland High School's adopter distribution.

Table 12

Sonland High School Frequency Table

Total Innovation_Sonland_High_School

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.2	1	3.2	3.2	3.2
	2.4	4	12.9	12.9	16.1
	2.5	3	9.7	9.7	25.8
	2.6	14	45.2	45.2	71.0
	2.7	3	9.7	9.7	80.6
	2.8	3	9.7	9.7	90.3
	3	2	6.5	6.5	96.8

	3.2	1		3.2	3.2	100.0
	Total	31		100.0	100. 0	

Statistics

Total_Innovation_High_School

N	Valid	31
	Missing	0
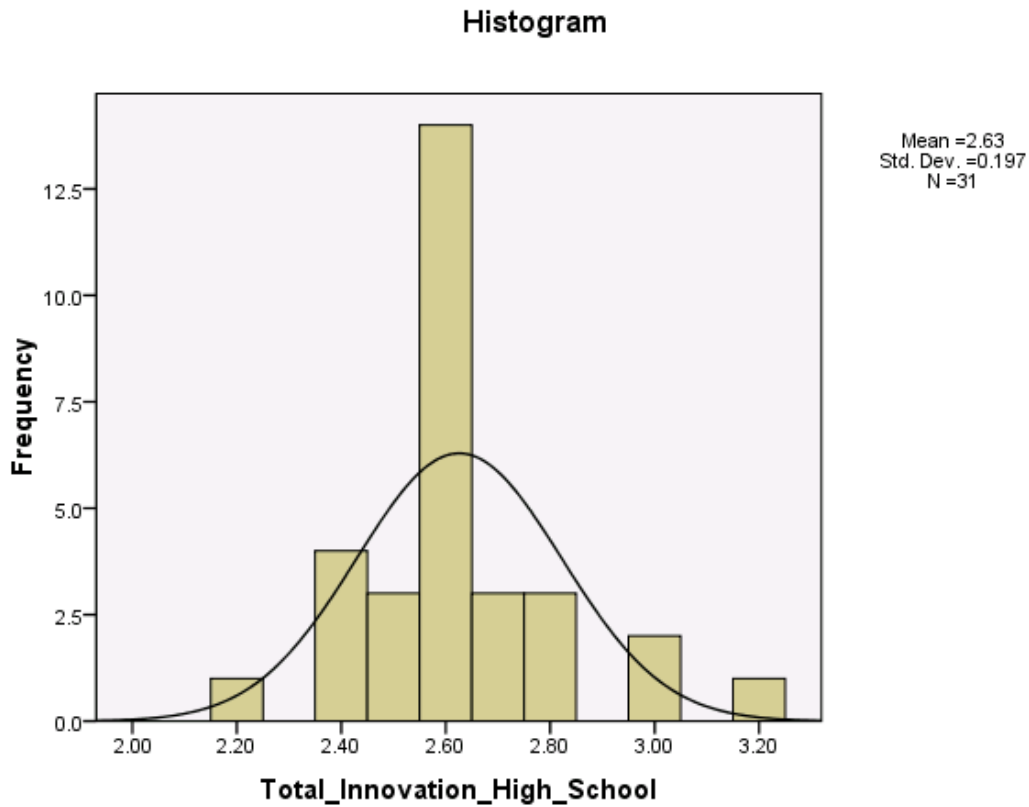
Figure 16. Sonland High School Adopter Distribution

Inferences of School Readiness for Twenty-First Century Instruction

While the survey indicates that Sonland High School does not have laggards or

innovators, interviews and observations indicate there are staff at opposite ends of the

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DOI adopter categories. Collected data leads to an inference that Sonland High School is

close to having a normal distribution of DOI adopters. Department groups do not stand

out as innovative, but individual staff were identified in each category. With 100

certified staff, SHS can be classified as an educational organization with a typical cross

section of innovators, early adopters, early majority, late adopters, and laggards. This

means that over time, the high school will adopt innovations, change instructional

strategies, and move toward becoming a Twenty-first Century learning environment, but

Ben Simpson must clearly articulate his vision, provide much needed resources, and

intentionally move staff toward change. He must nurture innovators, guide early adopters

as they lead peers through the innovation adoption process, and listen to late adopters and

laggards. Communication and buy in is critical in a high school setting, and SHS is no

exception. To avoid allowing resistant staff to sabotage the innovation adoption process,

careful planning and attention to detail will be important. Simpson's analogy fits his

situation. His leadership strategies should resemble a chess game with carefully planned

steps toward the goal. Also, because high school staff are often content driven and some

people are unwilling to change, humor would be a helpful tool to interact with staff as

Simpson guides them toward becoming a Twenty-first Century School. Figure 17

provides a chuckle on the complications of innovation, change, and thinking outside the

box.
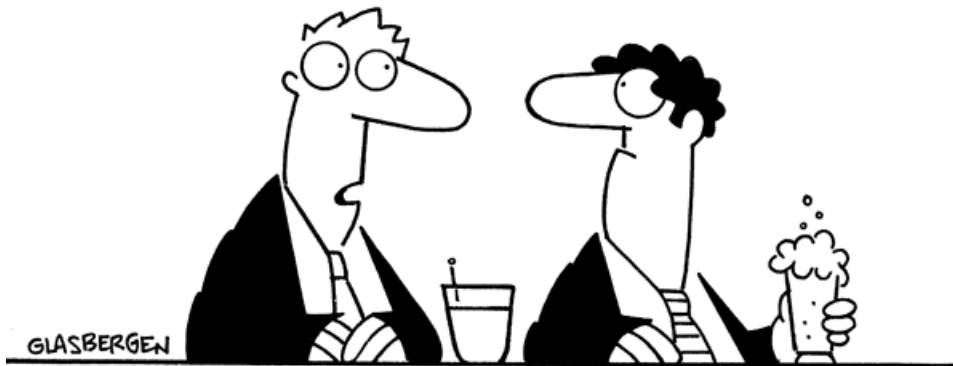
"While I was thinking outside of the box, someone changed the password and now I can't get back in!"

Figure 17. Thinking Outside of the Box. *Daily Carton by Randy Glasbergen*, by Randy

Glasbergen, 2005, Retrieved from

http://www.glasbergen.com/?s=Thinking+outside+of+the+box. Copyright 2005 by

Randy Glasbergen. Reprinted with Permission.

DOI as a Theoretical Framework

As anticipated, DOI provided a framework to understand the process of adopting

innovations and interpreting staff willingness to change. Without the DOI lens, there

would not have been a reference point to begin the study, research questions would not

have been as easy to answer, and findings may not have contributed to the literature about

school reform and staff willingness to change. Research and data collection confirmed

that there is a process of communication between staff. Rogers (1995), in his seminal

work, *The Diffusion of Innovations,* defined diffusion as the "process by which an

innovation is communicated through certain channels over time among the members of a

social system" (Rogers & Singhal, 1996). Findings confirm that certain staff seek out

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innovations, others watch, listen, then lead or simply adopt innovations, and some hold out until they are convinced or forced to accept change. Communication channels were most obvious at Washington Middle School where a specific team of math teachers seemed to enthusiastically lead by example when embracing new ideas. Eaton 8th Grade Center had individuals rather than groups leading the process and was the only school with an innovator as measured by the survey. SHS was very "vanilla" with no laggards or innovators identified in the survey and a vast majority of middle of the roaders. Interviews and observations confirm the perception that high school staff require time, support, communication, and buy in before innovations are adopted.

One contradiction to the framework was repeatedly observed in interviews, but not correlated with survey data. Interviewees repeatedly struggled with distinguishing between innovators and early adopters. When it was explained that innovators are experimenters or "gatekeepers" of new ideas, but they may not lead teachers through the implementation process, interviewees understood the difference and expressed some agreement, but probing questions did not provide answers as to which staff were innovators and which were early adopters. Interviewees tended to group people into three categories: innovators, laggards, and everyone else. While survey data did not always triangulate with interview data, I pursued multiple avenues of analysis which led me to a richer understanding of school reform and staff willingness to change.

A second weakness of the DOI framework was that it does not capitalize on the importance of the laggard or give the laggard voice in the communication process. Rogers (1995) does not even discuss the laggard in his work, *Diffusion of Innovations.* While practitioners may state that laggards resist change, tend to be more isolationist, and

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take longer to make a decision to adopt innovations, DOI does not prompt strategists to value laggards' insights or opinions. In an educational setting where teacher buy in is critical, leaders should not overlook 16% of the staff, but should wisely give voice to their concerns when introducing innovations and moving through the adoption process.

Although DOI was essential to provide a lens to understand adopter categories and the process of diffusion, the framework did not provide a mechanism to analyze innovativeness or staff willingness to change. The Practitioners' Survey used in the case study can be an invaluable instrument to measure the distribution of adopter categories. This information can provide much needed insight into the makeup of the staff which can assist a principal and district leadership in choosing where to allocate precious resources to begin district innovations. Also, any instrument which provides data about a school staff can help instructional leaders with the development and implementation of new programs and school reforms.

Summary

Comparisons of the three schools' survey data indicate that Eaton 8th Grade Center is the most innovative, but Washington and SHS have staffs that are generally ready for change (See Table 13). Eaton has a transformational leader who has developed a collaborative culture focused on student learning as well as staff members that are overwhelmingly ready and willing to change. Washington has the leadership needed to embrace innovation and introduce a Twenty-first Century learning environment, but has a number of late adopters. Sonland High School has an adopter distribution that also leans toward innovation, but also has late adopters. Because of school culture and change in

leadership, it may take longer to diffuse innovation at Sonland High School than Washington.

Table 13

Survey Summary for the Three Sonland Secondary Schools

Category	Washington	Eaton		SHS	
Laggard	0%	0	0%	0	0%
Late Majority	19%	0	0%	5	16%
Early Majority	70%	11	73%	23	74%
Early Adopters	11%	3	20%	3	10%
Innovators	0%	1	7%	0	0%

Based on survey results, interviews, and observations, Eaton would be a good choice to allocate precious district resources to introduce a Twenty-first Century learning environment. With District support for Dressler, Eaton could become more focused on technology integration in preparation for becoming a Twenty-first Century School. Because of the percent of staff who are early adopters, Eaton staff could lead innovation and influence change in the District. While Washington has been considered a model of technology integration, staff do not stand out as leaders. Boyd is the driving force behind technology integration in her school. Possibly her influence across the District could be increased to expedite change across the District.

The study did not seek to investigate the innovativeness of the district, but it is worthwhile to make inferences not only about the three schools, but also about Sonland School Public Schools' secondary program. 38% of Sonland Public Schools' middle and high school certified staff faculty answered the survey. The combined frequency analysis

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(See Table 14) had 2.67 mean and a standard deviation of .267. The mean indicates that

the distribution is skewed toward innovation (see Figure 18).

Table 14

Sonland Public Schools Frequency Table

Total_Innovation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.9	2	2.6	2.6	2.6
	2.2	2	2.6	2.6	5.3
	2.3	1	1.3	1.3	6.6
	2.4	5	6.6	6.6	13.2
	2.5	5	6.6	6.6	19.7
	2.6	31	40.8	40.8	60.5
	2.7	8	10.5	10.5	71.1
	2.8	7	9.2	9.2	80.3
	2.9	5	6.6	6.6	86.0
	3	5	6.6	6.6	93.4
	3.1	2	2.6	2.6	96.1
	3.2	2	2.6	2.6	98.7
	3.7	1	1.3	1.3	100.0
	Total	76	100.0	100. 0	

Statistics

Total_Innovation

N	Valid	76

Histogram
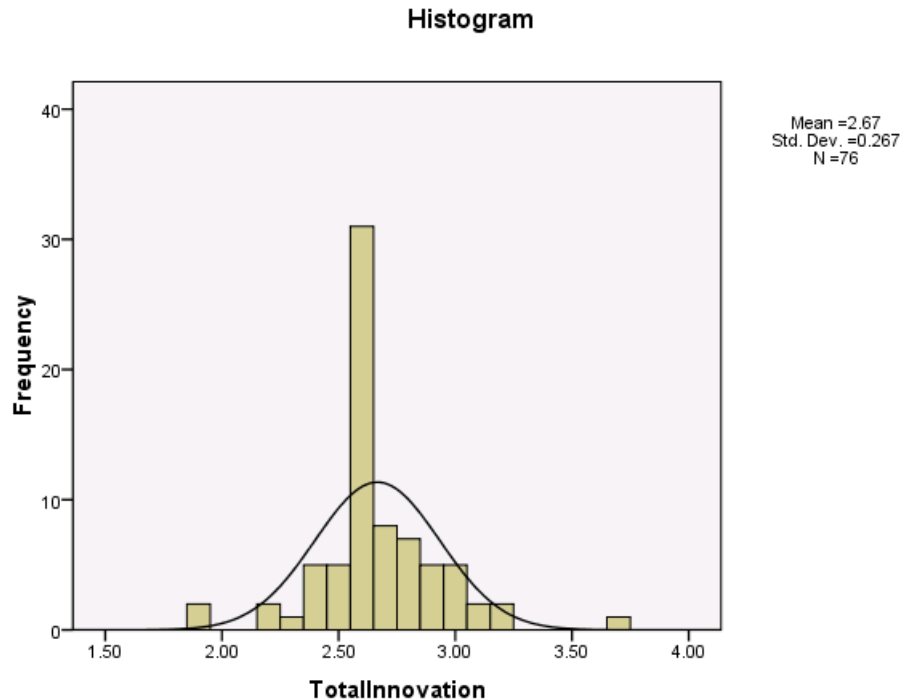
Figure 18. Sonland Public Schools Adopter Distribution

As measured by the Practitioners' Survey, Sonland Public Schools does not have

a normal distribution of adopter categories, does not have any laggards, has a noteworthy

number (13%) of staff who will lead adoption of innovations, and most importantly, 87%

of the staff rather than the normal 50% lean toward innovation and are willing to change.

It is assumed that if all staff completed the survey, the distribution might become more

normal, but because this survey was voluntary, it is acceptable to infer that the results

secondary staff are willing to change and are ready to transition from traditional

instructional practice to Twenty-first Century learning. Not only is Dennison visionary

and aggressively introducing educational innovation and change, his staff appears to be

poised and ready to become a Twenty-first Century District.

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Conclusions

A number of conclusions can be drawn from this study. First, Diffusion of Innovation as a theoretical framework not only clarifies the "process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers & Singhal, 1996), it also explains the adoption of new ideas in educational settings. DOI provides a good lens to examine teacher innovativeness, but also a useful resource for district administrators and principals needing to understand the complexity of organizational change, to analyze staff willingness to change, and to determine readiness for school reform.

Similarly, the Practitioners' Survey is a practical instrument for determining the distribution of DOI adopter categories. Analysis of the distribution of adopters, especially innovators, early adopters and laggards, is helpful not only for evaluation of staff willingness to change, but also whether schools have enough teacher leaders to implement new ideas, to communicate with peers about such ideas, and to guide the adoption process. Additionally, the comparison of the distribution of adopters among multiple schools can help district leaders allocate scarce resources to the most innovative schools.

However, one weakness of the DOI framework is that it does not facilitate contribution from laggards or give them an opportunity to participate in the communication process. Ginger Cammer, a Sonland High School laggard, highlighted this issue when she described her experience in a summer workshop.

Some parts of the survey reminded me of our staff development about coaching this summer [rather than technology]. It was an interesting summer seminar, but I

did note the numerous times when "resistant-to-change" teachers were mocked by jokes--almost with derision and condescension. As a teacher rather than administrator, I was aware of this.

I inferred that Crammer felt rejected, insignificant, and unappreciated. Up to 16% of the staff may feel just like her.

Teacher Voice

The evolution of leadership in the Twenty-first Century points to an increasing expectation of followers that they will not be pushed. They want to influence organizational decisions. Today's employees want collaborative leadership and they want a voice in the change process (Heathfield, 2005, p. 3). Rost (1991) define leadership as a relationship of influence among leaders and followers who seek real changes that reflect their mutual purposes. Just as DOI provides a theoretical framework to understand the diffusion of innovation process, Leader-Member Exchange Theory (LMX) conceptualizes the collaborative approach to leadership. LMX draws attention away from the characteristics and qualities of the leader and focuses on relationships and interactions within the leadership process (Northouse, 2007, p. 151). As a result of the early studies of this theory, the LMX model examined the working relationship between the follower and the leader. The model suggested that as the follower and the leader found common beliefs and interests, the relationship deepened. With time, responsibilities assigned to the follower increased which solidified trust, respect, and inter-dependence. The end result was the development of an in-group of trusted followers within the inner circle of the leader. Other subordinates had a more formal, distant relationship with the leader and were considered in the out-group. Graen and Uhl-Bein (1995) conducted later studies and

focused on organizational effectiveness based on the LMX Theory. Their research

concluded that when leaders and followers have quality exchanges, the organization is

healthier. Employees are happier, production improves, and turnover is reduced. Graen

and Uhl-Bein (1995) recognized that grouping is likely within organizations, but

conclusions were drawn about what quality relationships looked like. When leaders

nurture quality relationships and seek ways to reach out to all employees, the

organization is better off.

The LMX Theory is not only about leader-follower relationships, it is also about

the follower's opportunity to influence the leader. In this regard, the value of teacher

voice cannot be underestimated. "Teachers will do well to insist that any program of

educational reform shall start with them" (Waller, 1932, p. 457). Research tells us that

policy makers commit huge mistakes when teachers are ignored during the reform

process and do not feel buy-in for the changes required of them (Fullan, 1991, Astuto,

Clark, Read, McGree, and Fernandez, 1993). Additionally, the roles of individual as well

as collective efficacy must be understood, promoted, and protected by today's

educational leaders. Theorists state that collective efficacy is strongly correlated to

student achievement (Goddard, Hoy, & Hoy, 2000). In this researcher's opinion, voice

and efficacy are difficult to separate. If teachers do not have voice in their school

environment, how can they feel like they can make a difference in today's high stakes,

test driven educational system? When teachers have a say in school decisions, they tend

to believe that the staff has strong beliefs, collective capability, and the ability to effect

change (Hargreaves, 1996, p. 12). Administrators will benefit greatly if they recognize

the role that teacher voice plays in leading change. Innovation will become common

practice when teachers are involved in a participatory rather than imposed change process.

Limitations

Several limitations were manifested during the study. First, survey responses were acceptable, but incomplete. Washington had a 48% response rate, Eaton had a 45% response, and SHS only had a 30% response to the survey. Obviously, if more staff had responded, results would have increased the confidence of school inferences. Since this was a voluntary survey, the research was at the mercy of staffs' motivation to help with the study. If the survey was used by a district or school to guide leaders in strategic planning or program implementation, leaders could require full participation and, consequently, get better results as well as make more reliable inferences about staff readiness for change.

Second, more initial discussion and follow up would have provided additional insights and data to answer research questions. In particular, it would have been very beneficial to read original transcripts, schedule additional time to continue discussion, and delve deeper into the case study. Unfortunately, staff struggled to find time to meet for the first interview. Data collection occurred prior to statewide testing and near the end of the school year. Teachers were very busy, administrators were multitasking to prepare for testing, wrap up the school year, and begin planning for the following year. As a result, available time to interview, observe, and review documents was adequate for the case study, but additional time would have increased the level of detail, improved thick description, and increased the depth of data analysis and findings.

Recommendations

Benefits

Theory

Because of increasing expectations of school reform by state and federal agencies,

educational administrators not only must be good managers, but also must become

instructional leaders who know how to develop strategic plans, introduce innovations,

and understand the change process. When administrators rely on only their own

experiences and practice, they do not tap into the invaluable information gleaned from

theory. Most importantly, they do not have researched explanations about educational

phenomena.

Diffusion of Innovation as a conceptual and theoretical framework for

understanding the process and adoption of innovations has been used in many

organizational settings including education. DOI provides a lens for leaders to

understand different types of adopters, how adopters influence and communicate with

each other, and how innovations diffuse over time. In this study, DOI was beneficial not

only to frame the study, it also provided a structure to examine data and reach

conclusions about innovation and staff willingness to change. The DOI theoretical

framework was also the right theory to fit the "manner consistent with its use" (Creswell,

2003). Placement of the framework at the beginning the study was the correct placement

because it shaped interviews, guided observations, and increased the trustworthiness of

the findings especially through data triangulation. DOI broadened my perception of the

phenomena being studied, improved data analysis, and prompted the secondary theme of

the importance of the laggard's voice in the communication process. Without DOI as a

theoretical framework, I do not believe my research would have resulted in meaningful conclusions.

In preparation for this study, extensive investigation revealed few instruments to measure the distribution of adopters in organizations. In fact, only one instrument was located that met the needs of the study. The survey instrument was invaluable to make inferences about the distribution of DOI adopter categories among school staff. Without the instrument, qualitative data might not have led to worthwhile inferences about staff willingness to change. Because of the application of DOI to a Twenty-first Century educational issue and because of the benefit of using The Practitioner's Survey, this study not only contributes to the Literature about innovation, change, and DOI, but also provides a good mile marker for future research.

Practice

In 2009, President Obama signed legislation which created the historic American Recovery and Reinvestment Act (ARRA). ARRA provided $4.35 billion for the a competitive grant program know as the Race to the Top Fund. The Fund is designed to encourage state conditions for education innovation and reform (U.S. Department of Education, 2009). The goal of the Race to the Top fund is to achieve significant student academic outcomes, to close achievement gaps, to improve high school graduation rates, and to ensure student readiness for college and the world of work. The competitive grant sends a clear message from the Federal level that school reform is imperative. President Obama (2009) stated, "It's time to stop just talking about education reform and start actually doing it. It's time to make education America's national mission." Because of Obama's directive, state policy makers, superintendents, and school administrators, must

intentionally seek innovative programs to meet the needs of Twenty-first Century students. Educational leaders must re-evaluate traditional practices and envision new instructional models.

Knowledge of DOI will increase leaders' understanding of the diffusion of innovations over time, and the survey will add to leaders' knowledge of the characteristics of school staff as measured by DOI's adopter categories. Using the DOI Theoretical Framework and The Practitioners' Survey, educational leaders can research staff innovativeness and reach conclusions about staff willingness to change. Armed with key data gleaned from the survey, educational leaders can improve strategic planning and maximize financial resources by targeting specific schools to tactically initiate reforms within districts.

Administrators who read this case study will increase their understanding of Twenty-first Century learning, school reform, school culture, and educational leadership. Presentation of DOI adopter categories and the process of diffusing innovation will broaden knowledge about staff willingness to change. Administrators who use The Practitioners' Survey will learn more about staff innovativeness and will have an instrument to analyze the distribution of adopter categories across their organization and/or schools. At the very least, administrators will glean helpful theoretical perspective that will benefit their practice.

Further Research

Staff willingness to change is not the only factor to consider when introducing innovations, initiating change, or implementing a Twenty-first Century learning environment. Educational leaders would benefit from the availability of a number of

tools to guide the reform process and develop strategic plans to adopt innovations.
Future research is needed to

- Create a model/matrix to assist district and school administrators when developing strategic plans involving innovation and change.

- Develop instruments to analyze leadership and school culture

- Construct tools to interpret results and apply DOI principles

In particular, it would be helpful to develop a set of survey instruments and decision making tools that not only analyze staff innovativeness and willingness to change, but also look at the critical factors of leadership style and school culture. Table 15 illustrates a possible prototype of a two dimensional instrument to evaluate school readiness for change based on leadership style and staff innovativeness.

Table 15

Tentative Reform Matrix to Analyze School Readiness for Twenty-first Century Learning

Leadership	Staff Innovativeness	School Readiness
Transformational Leadership Questionnaire	**Diffusion of Innovations Practitioners' Survey**	
Transformational	Adequate number of Innovators, Early Adopters, and Early Majority	**Introduce Innovation**
Transactional	Adequate number of Innovators, Early Adopters, and Early Majority	**Address leadership style then introduce innovation**
Transformational	Inadequate number of Innovators, Early Adopters, and Early Majority	**Change staff then introduce Innovation**
Transactional	**Inadequate number of Innovators, Early Adopters and Early Majority**	**Chose different school**

A three dimensional matrix would be a better instrument and would include three variables: staff innovativeness, leadership style, and school culture. The School Culture Triage Survey (Phillips, 1996; Phillips & Wagner, 2003; Wagner & Masden-Copas, 2002; Wagner, 2006) is a possible candidate to measure school culture. The survey measures the extent to which three cultural behaviors are seen in a school or school district. These behaviors include:

- Professional collaboration:

  Do teachers and staff members meet and work together to solve professional issues—that is, instructional, organizational, or curricular issues?

- Affiliative and collegial relationships:

  Do people enjoy working together, support one another, and feel valued and included?

- Efficacy or self-determination:

  Are people in the school because they want to be? Do they work to improve their skills as true professionals or do they simply see themselves as helpless victims of a large and uncaring bureaucracy?

These three culture behaviors or markers provide insight into the overall culture of the learning community and, specifically, to the culture within the school walls. In the vast majority of schools that use the School Culture Triage Survey, the health or toxicity of the school's culture positively correlated with student achievement (Wagner, 2006).

This study validated DOI as a theoretical framework to understand the diffusion of innovations in an educational organization. The Practitioners' Survey provided an

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instrument to analyze the distribution of adopters in schools. A subsequent conclusion reminds leaders of the importance of teacher voice for all adopters, even the often overlooked laggards. Further research could result in the development of an effective set of decision making and strategic planning tools to assist educational leaders in their mission to reform schools and, ultimately, create a Twenty-first Century learning environment that converges traditional best practice with multimedia and web resources where students have more ownership in and engagement with their learning.

Researcher Reflection

Throughout my doctoral program, I have been fortunate to experience firsthand application of theory to educational practice.   While I was taking courses, I also served as a central office administrator in an innovative school district. My superintendent was a visionary who charged me with high school reform, a lofty and challenging assignment. Consequently, whenever I could, I merged doctoral course assignments with district reform projects.   Examples include parent outreach programs using the Joyce Epstein Model, strategic plans to implement online learning, and a number of projects that impacted district instructional technology planning.

While I was working on my dissertation, the District was simultaneously introducing an new idea across the secondary program. I was guided a district change that was innovative, threatening, and required a significant paradigm shift for teachers. We asked teachers to consider changing something near and dear to them, their grading practice. Our goal was standards-based grading (SBG). Marzano (2009) defined standards-based grading as "feedback to the learner on the degree to which he/she has the knowledge in standards his (benchmarks, indicators, learning goals…etc) at a particular

point in time." With the participation and approval of our middle and high school administrators, I devised a three year plan to infuse the SBG innovation into our secondary program. We carefully planned professional development, slowly introduced the change through faculty meetings and PLCs, paid teachers to attend book studies, and provided ample opportunity for staff to experiment and share. The first book studies were scheduled during year one, our preparation year. We held studies at the 8th Grade Center and Sonland High School before our nationally recognized presenter came to speak to secondary teachers as year two started. After he presented for two days, additional book studies were carefully scheduled and teachers were intentionally asked to participate. During year two, we encouraged key teachers who were willing to experiment and were school leaders to try standards-based grading in their classrooms. They participated in book study during the fall of year two and collaborated on successes, failures, and unresolved issues. After they were on board and had worked out kinks in their grading strategies, we asked teacher leaders from the first study to facilitate an additional group of teachers who were grouped by content area. We sought out new participants who were not ready to adopt, but were willing to consider change and to share with peers in their book study group and in their schools. My dissertation research was complete at the end of year two just before the same speaker was to return to the District and before I moved to another state. As I finished my dissertation, I learned that SBG was moving forward and high school staff members generally were on board with the change.

As I interviewed teachers for this case study, I was intrigued to hear repeated references to the SBG implementation. Over half of the teachers interviewed brought up SBG. In fact, all of Eaton teachers mentioned SBG during their interviews and one of the

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participants was not only an SBG innovator, she was also leading one of the SBG study groups. Comments were fascinating and made me realize that the SBG implementation mirrored the DOI process.

1. A laggard who told me he does not change unless he is convinced that the new idea is better than his own approach said, "Math has done a lot of standards-based grading. My discipline, standards-based grading is going to be impossible."

2. A reading teacher who is an innovator and early adopter said, "…and like those book studies, sometimes those people will sign up for those book studies because they want to be a kink in the wheel. But then when you're in there and you start talking, they are going, oh, and they start thinking about it. And even though they're not ready to try it, they're not saying anymore, 'this is stupid.'"

3. An early majority adopter said, "It's taken me a little bit to get on the standards-based grading. That's a new change that I can relate to… at first it was stressful to me because I'm thinking, oh, gosh, you're changing something I've done for the last 10 years. That was, you know, changing an old way is difficult, but once I did change I like it."

4. A technology coach said, "We've got quite a few teachers that are very excited about some of the changes we're making in curriculum on standards-based grading… and the neat thing is 8 to 10 teachers that are really pushing and that are helping the others along…"

I was very gratified to see that my plans to lead change not only were intuitive, but my strategies also were improved because of my doctoral training, my attention to theoretical research, and to my academic experiences. I was encouraged because I could see the

connection between my professional and scholarly pursuits. My learning experience was more significant during the dissertation process because DOI was relevant to my practice.

Another timely event added relevance to my study. At the same time I was working on my dissertation, I coordinated efforts to complete an American Recovery and Reinvestment Act (ARRA) grant for Eaton 8th Grade Center. The grant would provide $967,000 to begin an innovative one-to-one student laptop program to transform classroom instruction and to introduce a Twenty-first Century learning environment. Eaton won the grant! Not only were Eaton staff leading the SBG innovation, research data and inferences suggested Eaton staff were the most innovative, the most willing to change, and the most ready to change. The infusion of grant cash, grant accountability requirements, and instructional support implies that staff are beginning a journey toward implementing a Twenty-first Century school. The research implies and my observations confirm that Sonland School District is collectively on the journey to becoming a Twenty-first Century District.

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Publications.

APPENDICES

Appendix A

Re: Thesis--reply - Windows Internet Explorer

Reply | Reply to all | Forward | Help

You replied on 1/2/2010 12:05 PM.

From: Carol Savery [csavery@kent.edu]　　　　　　　　　　　　Sent: Fri 1/1/2010 8:16 PM
To: Susan Powell
Cc:
Subject: Re: Thesis--reply
Attachments:

Susan Powell:

Yes you are more than welcome to use the survey, as long as you cite it in your dissertation. The thesis survey was a pilot test without reliabilities. I would be interested in what your reliability tests are for the motivation focus incorporating your changes. I missed meeting Dr. Rogers because he passed away in 2005 while I was working on my thesis. I believe that DOL has a great many applications to innovations and motivation is a good channel to explore. I am now a doctoral student at Kent State. Good luck with your dissertation. I am writing my comprehensive exams in April 2010. Keep in touch!

I had interest in my thesis by several European public relations researchers. My thesis was published in Germany in 2008, so you can use that as the publication information:

Savery, C.A. (2008). *Communication innovators or laggards? Diffusion of innovations by U.S. public relations practitioners.* Berlin, Germany: VDM Verlag Dr. Müller Aktiengesellschaft & Co.

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Carol A. Savery, M.A.
Doctoral Student & Instructor
Kent State
Communication Studies
Taylor Hall 127
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On Fri, Jan 1, 2010 at 2:20 PM, Susan Powell <POWELS@pcps.us> wrote:
Ms. Savery,

I am a doctoral student at Oklahoma State University. My dissertation topic is "School Readiness for Twenty-first Century Learning." One aspect of school readiness is teacher motivation to change. I am using DOL as my theoretical framework. I came across your thesis and would like to use your Practicioner's Survey with a few modifications. Would you give permission for me to use it? I've looked far and wide for a good survey and yours fits well with my research goals.

Your response will be appreciated.
Susan C. Powell
Ponca City Public Schools
Secondary Curriculum and Assessment Coordinator

Web Site Design : Teacher Website Rubric

Teacher
Name: _____

CATEGORY	4	3	2	1
Links (content)	All links point to high quality, up-to-date, credible sites.	Almost all links point to high quality, up-to-date, credible sites.	Most links point to high quality, up-to-date, credible sites.	Less than 3/4 of the links point to high quality, up-to-date, credible sites.
Content	The site has a well-stated clear purpose and theme that is carried out throughout the site.	The site has a clearly stated purpose and theme, but may have one or two elements that do not seem to be related to it.	The purpose and theme of the site is somewhat muddy or vague.	The site lacks a purpose and theme.
Contact Information	Every Web page contains a statement of authorship, school name, and date of publication/date last edited.	Almost all Web pages contain a statement of authorship, school name, and date of publication/date last edited.	Most (75-80%) Web pages contain a statement of authorship, school name, and date of publication/date last edited.	Several Web pages do not contain a statement of authorship, school name, and/or date of publication/date last edited.
Interest	The author has made an exceptional attempt to make the content of this Web site interesting to the people for	The author has tried to make the content of this Web site interesting to the people for whom it is	The author has put lots of information in the Web site but there is little evidence that the person tried	The author has provided only the minimum amount of information and has not transformed the information to

	whom it is intended.	intended.	to present the information in an interesting way.	make it more interesting to the audience (e.g., has only provided a list of links to the content of others).
Layout	The Web site has an exceptionally attractive and usable layout. It is easy to locate all important elements. White space, graphic elements and/or alignment are used effectively to organize material.	The Web pages have an attractive and usable layout. It is easy to locate all important elements.	The Web pages have a usable layout, but may appear busy or boring. It is easy to locate most of the important elements.	The Web pages are cluttered looking or confusing. It is often difficult to locate important elements.
Learning of Material	The student has an exceptional understanding of the material included in the site and where to find additional information. Can easily answer questions about the content and procedures used to make the web site.	The student has a good understanding of the material included in the site. Can easily answer questions about the content and procedures used to make the web site.	The student has a fair understanding of the material included in the site. Can easily answer most questions about the content and procedures used to make the web site.	Student did not appear to learn much from this project. Cannot answer most questions about the content and the procedures used to make the web site.
NET.T Standards	The teacher constantly incorporates NET.T Standards	The teacher constantly incorporates NET.T Standards	The teacher occasionally incorporates NET.T Standards	The teacher never incorporates NET.T Standards
Communication	The teacher offers excellent communication tools including wikis and Twitter	The teacher offers good communication tools including e-mail and blogs	The teacher offers e-mail only	The teacher offers no communication tools

Observation Guide

Observer: Susan Powell   Role: Participant

Date:

Starting Time: Ending Time:

Place:

Participants:

Setting:

Meeting Purpose:

Observations:

Reflection:

Appendix D

Principal Interview Questions

1. Explain your vision for your school.

2. What will your school look like in 2, 5 and 10 years?

3. What is an innovation?

4. What is the relationship between an innovation and change?

5. What does change mean to you?

6. Explain how you handle changes in your district.

7. Describe how staff influences each other when undergoing change.

8. What is the status of technology integration in your school?

9. What do you think about the term "Twenty-first Century Learning"?

10. Without identifying anyone, describe staff willingness to change example-from a traditional instructional practice to a "Twenty-first Century Learning" environment?

11. Based on your understanding of "Twenty-first Century Learning", explain your staff's readiness to change.

Appendix E

Teacher Interview Questions

1. Explain your principal's vision for your school.

2. What will your school look like in 2, 5 and 10 years?

3. What is an innovation?

4. What is the relationship between an innovation and change?

5. What does change mean to you?

6. Explain how you handle changes at your school.

7. Describe how staff influences each other when undergoing change.

8. What is the status of technology integration in your school?

9. What do you think about the term "Twenty-first Century Learning"?

10. Without identifying anyone, describe staff willingness to change example-from a traditional instructional practice to a "Twenty-first Century Learning" environment?

11. Based on your understanding of "Twenty-first Century Learning", explain your staff's readiness to change.

Appendix F

Technology Coach Interview Questions

1. Explain your principal's vision for your school.

2. What will your school look like in 2, 5 and 10 years?

3. What is an innovation?

4. What is the relationship between an innovation and change?

5. What does change mean to you?

6. Explain how you handle changes at your school.

7. Describe how staff influences each other when undergoing change.

8. What is the status of technology integration in your school?

9. What do you think about the term "Twenty-first Century Learning"?

10. Without identifying anyone, describe staff willingness to change example-from a traditional instructional practice to a "Twenty-first Century Learning" environment?

11. Based on your understanding of "Twenty-first Century Learning", explain your staff's readiness to change.

PRACTITIONERS' SURVEY

1. I am venturesome and eager to be the first to try new innovations.
                Strongly Disagree
                Disagree
                Agree
                Strongly Agree
2. I adopt innovations and influence others to do so.
                Strongly Disagree
                Disagree
                Agree
                Strongly Agree
3. I am willing to follow the lead of others in adopting innovations.
                Strongly Disagree
                Disagree
                Agree
                Strongly Agree
4. I need to be convinced of the advantage of innovations by peers.
                Strongly Disagree
                Disagree
                Agree
                Strongly Agree
5. I am suspicious of innovations.
                Strongly Disagree
                Disagree
                Agree
                Strongly Agree
6. I am always looking for innovations.
                Strongly Disagree
                Disagree
                Agree
                Strongly Agree
7. My opinion about innovations is respected by peers.
                Strongly Disagree
                Disagree
                Agree
                Strongly Agree
8. I will adopt innovations but do not attempt to influence others to do so.
                Strongly Disagree
                Disagree
                Agree
                Strongly Agree

9. I go along with innovations out of necessity.

                        Strongly Disagree
                        Disagree
                        Agree
                        Strongly Agree

10. I am resistant to change.

                        Strongly Disagree
                        Disagree
                        Agree
                        Strongly Agree

11. Indicate the innovations you have adopted into your work as a teacher. (Please select all that apply.)

                        E-mail
                        PowerPoint
                        CPS Systems
                        Promethean Boards
                        Web Sites
                        Wikis.
                        Blogs
                        Twitter
                        Other:

Please specify:

12. Indicate the obstacles or challenges to your adoption of new innovations. (Please select all that apply.)

                        Need for technical support.
                        Training requirements.
                        Keeping up with new versions.
                        Students' technology limitations.
                        Students' technology limitations.
                        Added stress for me.
                        Other:

Please specify:

13. Indicate the influences to your adoption of new innovations (Please select all that apply.)

                        Principals' expectations.
                        Competition by other teachers.
                        Speed of transmitting information.
                        Teacher leadership opportunities.
                        School credibility.
                        Personal credibility.
                        Enhancement of my career.
                        Efficiency.
                        Other:

Please specify:

14. Indicate what organizations influence your adoption of innovations. (Please select all that apply.)

                        Your school
                        The District
                        Your professional organization
                        ACT
                        Other:

Please specify:

15. Indicate the individuals who influence your adoption of innovations. (Please select all that apply.)

                        My principal.
                        Central Office.
                        Technology champions in my district.
                        Parents.
                        Other teachers.
                        Community leaders.
                        Other:

Please specify:

16. Innovations I use have a relative advantage and are better than what I used before.

                        Strongly Disagree
                        Disagree
                        Agree
                        Strongly Agree

17. Innovations I use are consistent with my existing values and needs.

                        Strongly Disagree
                        Disagree
                        Agree
                        Strongly Agree

18. Innovations are difficult and complex to learn.

                        Strongly Disagree
                        Disagree
                        Agree
                        Strongly Agree

19. I need more time to experiment with innovations before they are implemented.

                        Strongly Disagree
                        Disagree
                        Agree
                        Strongly Agree

20. The results of using innovations are visible to others in my school.

                        Strongly Disagree
                        Disagree
                        Agree
                        Strongly Agree

21. The results of using innovations are visible to others outside of my school.

                        Strongly Disagree
                        Disagree

Agree

Strongly Agree

22. Using innovations has enhanced my image or status at work.

Strongly Disagree

Disagree

Agree

Strongly Agree

23. I use individual communication innovations (such as e-mail) to communicate with other teachers inside or outside my district. (Please select one.)

Strongly Disagree

Disagree

Agree

Strongly Agree

24. I use individual communication innovations (such as wikis, blogs, or tweets conferences) to communicate with a variety of individuals outside of my district (Please select one.)

Strongly Disagree

Disagree

Agree

Strongly Agree

25. I use interpersonal communication innovations (such as video conference calls involving face-to-face exchanges) to communicate with others. (Please select one.)

Strongly Disagree

Disagree

Agree

Strongly Agree

26. I am comfortable completing surveys online.

Strongly Disagree

Disagree

Agree

Strongly Agree

27. I would prefer completing surveys in a paper-based format.

Strongly Disagree

Disagree

Agree

Strongly Agree

Adopter Categories (Questions 1-10)

Innovators (Questions 1 & 6)

Early Adopters (Questions 2 & 7)

Early Majority (Questions 3 & 8)

Late Majority (Questions 4 & 9)

Laggards (Questions 5 & 10)

Innovations adopted (Question 11)

Obstacles to adoption (Question 12)

Influences to adoption (Question 13)

Organizations that influence (Question 14)
Individuals who influence (Question 15)
Perceptions about innovations (Questions 16-27)

APPENDIX H

E-mail Script

School Staff,

I am conducting a research project for my dissertation on change using the Diffusion of Innovation Theory. A link is provided below to an online survey with 32 questions about your perceptions and experiences with innovations.

Your participation is voluntary and will be very helpful to this study. Your responses will be confidential and anonymous. The survey does not record any information traceable to you. The data will not be used in any way to evaluate you or your school.

This research project has been approved by the Oklahoma State University Institutional Review Board. Your submission of the survey serves as your consent to participate. If you have any questions about this project, you can contact me directly at susan.powell@okstate.edu or contact the OSU Instructional Review Board at 405-744-3377.

Survey link: http://www.quia.com/sv/379826.html

Thank you for your time and assistance!

Susan C. Powell
Doctoral Student
Oklahoma State University
College of Education

Initial Presentation of Survey Results

Washington Middle School

Question	Strongly Agree		Agree		Disagree		Strongly Disagree	
1	5	18%	15	54%	6	21%	2	7%
2	0	0%	18	64%	10	36%	1	4%
3	6	21%	20	71%	2	7%	0	0%
4	3	11%	12	43%	11	39%	2	7%
5	1	4%	6	21%	15	54%	6	21%
6	2	7%	19	68%	6	21%	1	4%
7	1	4%	24	86%	4	14%	0	0%
8	2	7%	9	32%	17	61%	0	0%
9	2	7%	7	25%	17	61%	2	7%
10	0	0%	4	14%	15	54%	9	32%

Eaton 8th Grade Center

Question	Strongly Agree		Agree		Disagree		Strongly Disagree	
1	6	38%	9	56%	1	6%	0	0%
2	2	13%	13	81%	0	0%	1	6%
3	5	28%	13	72%	0	0%	0	0%
4	0	0%	7	44%	7	44%	2	13%

Question	Strongly Agree		Agree		Disagree		Strongly Disagree	
5	0	0%	2	13%	10	63%	4	25%
6	6	38%	9	56%	1	6%	0	0%
7	2	13%	14	88%	0	0%	0	0%
8	0	0%	2	13%	13	81%	1	6%
9	0	0%	3	19%	12	75%	1	6%
10	0	0%	1	6%	5	31%	10	63%

Sonland High School								
Question	Strongly Agree		Agree		Disagree		Strongly Disagree	
1	4	13%	19	61%	6	19%	2	6%
2	4	13%	24	77%	2	6%	1	3%
3	6	19%	22	71%	2	6%	1	3%
4	5	16%	11	35%	12	39%	1	3%
5	1	3%	5	16%	24	77%	1	3%
6	4	13%	17	55%	10	32%	0	0%
7	1	3%	29	94%	1	3%	0	0%
8	0	0%	1	3%	28	90%	2	6%
9	0	0%	13	42%	17	55%	1	3%
10	1	3%	2	6%	21	68%	7	23%

VITA

Susan Claire Powell

Candidate for the Degree of

Doctor of Education

Dissertation: TRADITION VS. INNOVATION: TWENTY-FIRST CENTURY
                LEARNING AND SCHOOL READINESS FOR CHANGE

Major Field: Educational Leadership

Biographical:

   Personal Data: Born in Madison, Wisconsin on August 29, 19560, daughter of
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         in 1974; received Bachelor of Arts degree in Mathematics Education
         from Florida State University, Tallahassee, Florida in June, 1974.
         Received Master of Education in School Administration at Oklahoma
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         Doctor of Education in Educational Leadership at Oklahoma State
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         Development Department, Pioneer Technology Center, Ponca City,
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         mathematics, technology coach, district assessment coordinator then
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   Professional Memberships: Phi Kappa Phi, Association for Supervision and
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         Learning

Name: Susan Claire Powell   Date of Degree: December, 2010

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Title of Study: TRADITION VS. INNOVATION: TWENTY-FIRST CENTURY

LEARNING AND SCHOOL READINESS FOR CHANGE

Pages in Study: 146   Candidate for the Degree of Doctor of Education

Major Field: Educational Leadership

Scope and Method of Study: The purpose of this case study was to analyze the willingness of staff within one district's three secondary schools to change, and to determine the schools' readiness to transition from traditional instructional practice to Twenty-first Century learning. Because of the complexity of organizational change, *Diffusion of Innovations Theory* was the theoretical framework to analyze staff willingness to change. Based on research findings, inferences were made about the three schools' readiness for Twenty-first Century learning.

Findings and Conclusions:

A number of conclusions can be drawn from this study. First, Diffusion of Innovations as a theoretical framework not only clarifies the "process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers & Sinhal, 1996), it also explains the adoption of new ideas in educational settings. DOI is a useful resource for district administrators and principals needing to understand the complexity of organizational change, to analyze staff willingness to change, and to determine readiness for school reform.

Similarly, the Practitioners' Survey is a practical instrument for determining the distribution of DOI adopter categories. Analysis of the distribution of adopters, especially innovators, early adopters and laggards, is helpful not only for evaluation of staff willingness to change, but also whether schools have enough teacher leaders to implement new ideas, to communicate with peers about such ideas, and to guide the adoption process. In addition, the comparison of the distribution of adopters among multiple schools can help district leaders allocate scarce resources to the most innovative schools.

However, one weakness of the DOI framework is that it does not facilitate contribution from laggards or give them an opportunity to participate in the communication process. The evolution of leadership in the Twenty-first Century points to an increasing expectation of followers that they will not be pushed. They want to influence organizational decisions. Today's employees want collaborative leadership and they want a voice in the change process. If teachers do not have voice in their school environment, how can they feel like they can make a difference in today's high stakes, test driven educational system? When teachers have a say in school decisions, they tend to believe that the staff has strong beliefs, collective capability, and the ability to effect change. Administrators will benefit greatly if they recognize the role that teacher voice plays in leading change.

Advisor's Approval: Dr. Bernita Krumm