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Implementation of the New Jersey Core Curricular Content Standards for Technology in New Jersey Public Middle Schools

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Implementation of the New Jersey Core Curricular Content Standards for Technology in New Jersey Public Middle Schools

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Abstract

This study focused on the degree to which New Jersey public middle school principals perceived that New Jersey public middle school teachers are implementing the New Jersey Core Curricular Content Standard for Technology (Standard 8.1 Computer and Information Literacy), mandated by the New Jersey Department of Education (NJDOE) into their teaching practices. Also explored was the degree to which teachers are integrating technology into their teaching practice, how teachers are assessing students regarding Standard 8.1, and the importance teachers place on implementing Standard 8.1.

A mixed-method design was employed with quantitative data collected via questionnaires distributed to principals (n=6) and teachers (n=63). Qualitative data were collected via teacher interviews (n=8). Questionnaire response data were analyzed for differences and similarities between principals' perception if implementation of Standard 8.1 and teachers' actual implantation of Standard 8.1. Teacher interview responses provided in depth understanding of teachers' implementation of Standard 8.1 and related assessment practices.

Key findings of the study include the following: (a) Responding principals perceived that responding teachers are implementing Standard 8.1 to a greater degree than what responding teachers indicate as actual practice, (b) The majority of responding teachers did not refer to Standard 8.1 or the assessment criteria established by the NJDOE to inform their implementation of Standard 8.1, (c) The majority of responding teachers require students to perform low-level task with computer and information technology, as
opposed to high-level task mandated by NJDOE standards and recommended in best practice literature; (d) Teachers' reported lack of awareness regarding the specifics of Standard 8.1 and the NJTAP-IN general assessment rubric indicates that Standard 8.1 is not being implemented formally or at a high degree.

This study contributes to the body of research concerning the integration of technology into teaching and learning. Also, insights gleaned from this study can be used (a) to help principals and teachers better align their efforts regarding the integration of technology into teaching and learning, and (b) to help New Jersey principals and teachers align curriculum and assessment practice with Standard 8.1 and the NJTAP-IN general assessment rubric.
Dedication

This work is dedicated to my wife Maudjah and my two sons Luc and William. They have been my source of strength and inspiration throughout this process. Maudjah, I could not have completed this dissertation without your love, patience, understanding and encouragement. Thank you, and I love you!

This work is also dedicated to my parents, Norman Francis, Sr. and Edna Gloria Francis. Due to their love and sacrifice, I had the opportunity to dream and reach for my goals. Mom and Dad, I love both of you dearly.
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Chapter I

Introduction

The purpose of education standards is to define the minimum competencies students should acquire as the result of participation in a program of planned learning experiences. The information contained in standards documents is also used to construct evaluation tools for measuring student development, teacher proficiency, and program effectiveness. Standards are the words and measures that should guide the form and the force of accountability, which in turn drives the delivery of an equitable and appropriate educational experience for all students.

Education standards are a reflection of contemporary and evolving societal values, corporate interests, demographic realities, economic trends, environmental forces, and other factors that influence the determination of "critical knowledge." Standards denote the abilities, aptitudes, and dispositions a society deems necessary for a person to succeed in school and find success in life. The 21st century presents the world citizenry with dynamics and forces that require new skills and aptitudes. For the individual who fails to acquire these new skills and aptitudes, both a productive response to 21st-century demands and a fulfilling existence will be elusive. Education leaders, policy makers, and other education stakeholders recognize these 21st-century demands and the requisite skills. In particular, these entities have noted the need for computer-technology literacy and information literacy to be seen as student outcomes of paramount importance. Their efforts toward addressing this concern resulted in the creation of, and/or refashioning of education standards nationwide. In fact, school districts have adopted education
technology standards that are aligned with standards put forth by the International Society for Technology in Education (ISTE). ISTE is the initiating body and driver of the National Educational Technology Standards (NETS) project. This project works to define standards for integrating technology into curriculum, for assessments, and for the evaluation of technology use. ISTE reports that “forty-nine of the 50 U.S. states have adopted, adapted, or referenced ISTE’s NETS in state department of education documents” (ISTE, 2010).

Problem Statement

In 2004, the New Jersey Department of Education, in response to the ever-increasing demand to develop a computer–technology- and information-literate populace, adopted the New Jersey Core Curriculum Content Standards for Technological Literacy. This document is aligned with ISTE’s NETS. Focusing on the specific concern of computer and information literacy, Standard 8.1—Computer and Information Literacy was developed and adopted. As noted on the New Jersey Technology Assessment for Proficiency and Integration (NJTAP-IN) website, the Standard 8.1 provides standardized indicators across the state that inform school districts of the criteria for technological literacy (NJDOE, 2006). It is also notes that Standard 8.1 supports No Child Left Behind (NCLB) Title II D, a primary goal of which is “to improve student achievement through the use of technology in elementary and secondary schools (ED.Gov, 2009). On the United States Department of Education website’s page dedicated to information for the Enhancing Education through Technology State Program, it is stated that additional goals for Title II D “include helping all students become technologically literate by the end of
the eighth grade and, through the integration of technology with both teacher training and curriculum development, establishing research-based instructional methods that can be widely implemented" (ED.Gov, 2009).

Historically, technology has been highlighted as an important component of education in New Jersey Core Curriculum Content Standards (NJCCCS). However, the demands of the age of 21st century technology and federal government mandates have required technological literacy to be indicated with greater prominence and specificity.

In conjunction with the adoption of technological literacy standards, the New Jersey Department of Education established the New Jersey Technology Assessment for Proficiency and Integration (NJTAP-IN). NJTAP-IN is a technology standards implementation and assessment plan. Although the implementation of Standard 8.1 is mandated, the use of the NJTAP-IN framework for implementation is only a recommendation from the NJDOE. The assessment component of NJTAP-IN is a recommendation in part. While the NJTAP-IN program recommends specific assessments, the NJDOE mandates that alternate assessments chosen by local education agencies (LEAs) be aligned with the NJTAP-IN General Assessment Rubric (Appendix M). Thus, an assessment standard is provided.

Between December 2006 and May 2007, the NJDOE conducted the NJTAP-IN Pilot Program. Twenty-seven (27) school districts volunteered to use the NJTAP-IN resources to implement Standard 8.1—Computer and Information Literacy. Resources provided to these districts included sample lessons that integrated technology, the assessment rubric based on Standard 8.1, sample assessments, and references to international standards to which New Jersey’s technological literacy standards are
aligned. Feedback from these districts was used to enhance the supports and resources that the NJDOE provides for educators implementing Standard 8.1.

The New Jersey Department of Education has provided New Jersey public schools with mandated technology standards, mandated technological literacy assessment criteria and a website rich with support and guidance for the implementation of Standard 8.1. In New Jersey, the instructional-computer-to-student ratio and the high-speed-Internet-connected-computer-to-student ratio are 3:9 and 3:6 respectively (Education Week, 2008). The most recent New Jersey Technology Questionnaire results posted on the NJDOE website indicate that 91.9% of the districts have the support of a designated technology coordinator, 84.5% of all districts have equipped all instructional and administrative rooms with one or more computers that have internet access, and 49.9% of teachers have intermediate skills for using technology instruction, with 27.1% of teachers having advanced skills in this area (NJDOE, 2006). It would seem that New Jersey public schools are poised for maximum school compliance regarding the implementation of Standard 8.1.

Research on the implementation of education technological standards and the parallel necessity of integrating computer technology into instructional practice show that even under ideal conditions, implementation efforts often fall short (Mancieri, 2008, Leonard, 2006; Cuban, Kirkpatrick & Peck, 2001; Rother, 2004; Kleiman, 2004).

Research has also shown that teachers who identify themselves as “technology users” often fail to integrate technology into their instructional practice. Becker (2001) in a national survey of teachers and their teaching practices concerning computer use found the following:
Although computers in schools by now number over 10 million, frequent student experiences with school computers occur primarily in four contexts—separate courses in computer education, pre-occupational preparation in business and vocational education, various exploratory uses in elementary school classes, and the use of word processing software for students to present work to their teachers. The one area where one might imagine learning to be most impacted by technology—students acquiring information, analyzing ideas, and demonstrating and communicating content understanding in secondary school science, social studies, mathematics, and other academic work—involves computers significantly in only a small minority of secondary school academic classes (p. 2).

In addition research shows that student use of the Internet occurs mostly outside of school time and is unrelated to teachers’ directives (Levin and Arafeh, 2002).

Ertmer (2005) cites a U.S. DOE summary titled *Funding for Educational Technology and How It Is Used in the Classroom*, which indicates that “the computer-related activities in which teachers reported most often engaging their students were as follows: expressing themselves in writing, improving their computer skills, doing research using the Internet, using computers as a free-time or reward activity, and doing practice drills” (p.26).

Kleiman (2004) in his comments regarding the positive gains in K–12 technology between the years of 1999 and 2004 noted tremendous improvement in infrastructure, teacher training/professional development and integration of technology into curriculum standards (p. 248). However, he made the following critical observations:

1. A great deal of technology lies unused in schools. The computers and wires may be there, but the plans to put them to good educational use, the preparation necessary for the teachers to use them well, and the support needed to ensure that they will work when needed are lacking (p. 248).

2. We continue to see computers used in ways that are peripheral, rather than central, to the curriculum and important learning goals. And we continue to see
technology plans and programs developed separate from school improvement, curriculum reform, professional development, and special education plans (p. 248).

Mueller, Wood, Willoughby, Ross, and Specht (2008) in their review of the literature, cited several studies conducted in North America (Abrami, 2001; Ertl & Plante, 2004; Muir-Herzig, 2004; Sutherland et al., 2004), and international studies (Conlon & Simpson, 2003; Demetriadis et al., 2003; Hayes, 2007; Pelgrum, 2001; Wilson, Notar, & Yunker, 2003; Wooley, 1998) that “suggests that computers are underused in many schools and the potential of computer technology is not being realized” (p. 1524).

Ertmer (2005) notes “while instructional computer use appears to be increasing (at least as measured by self-report data), the most common and frequent uses have resulted in only incremental, or first-order, changes in teaching style and remain far removed from the best practices advocated in the literature (Becker, 1994; Berg, Benz, Lasley, & Raisch, 1998; Dede, 1998; Dexter, Anderson, & Becker, 1999)” (p.26).

Are things different in New Jersey public schools? Are New Jersey teachers integrating technology into instructional practices? Are technology standards being implemented according to NJDOE curriculum mandates? Recent comments by current Secretary of Education Arne Duncan indicate that the question whether technology is being integrated into education practice is still relevant:

“Most young people can’t remember a time without the Internet, but right now many students’ learning experiences in school don’t match the reality outside of school. We need to bridge this gap. We need to make school relevant and engaging. We must make the on-demand, personalized tech applications that are part of students’ daily lives, a more strategic part of their academic lives” (ED.gov, 2010)
Research Questions

The goal of this study is to determine (1) the degree to which public-middle-school principals perceive that teachers are integrating Standard 8.1 into curriculum and instruction, and (2) to what degree public-middle-school teachers are integrating Standard 8.1 into curriculum and instruction.

The following subquestions will also be investigated:

1. How are public middle schools in New Jersey assessing students based on Standard 8.1?
2. To what degree do public middle school teachers perceive difficulty in implementing Standard 8.1?
3. What are public middle school teachers perceptions regarding the importance of integrating Standard 8.1?

Background and Purpose of Study

Mancieri (2008) investigated “the degree of implementation of the National Education Technology Standards for Students (NETS-S) in Rhode Island’s public high schools based on the perceptions of Rhode Island high-school principals and teachers” (p. viii). Her study also did the following:

1. Examined how Rhode Island high schools are assessing student performance on the NETS-S
2. Identified teacher perceptions of the importance of integrating the NETS-S
3. Examined teacher perceptions of the difficulties they faced in implementing the NETS-S in curriculum and instruction (p. viii),

Mancieri’s findings indicated, “teachers are not implementing the NETS-S into their curriculum and instruction in a formal process [as recommended by NETS-S and mandated by the Rhode Island Department of Education (RIDE)]. However, teachers are informally integrating technology at all levels of the continuum” (p.104). She also found that “80% of student use of computers was for productivity activities and not activities recommended by NETS-S” (p.viii).

Mancieri’s study highlights research that points to the critical importance of principal leadership for technology integration (Andersen & Dexter, 2005; Gurr, 2001; Macneil & Delafield, 1998; Byrom, 1998). She also highlights research that points to organizational conditions (Ertmer, 1999) and teacher characteristics such as capacity (Breaden, 2008), beliefs (Park & Ertmer, 2007), pedagogical style (Becker & Ravitz, 2001), and perceptions of technology in education (Cope & Ward, 2002) that impact technology integration.

Mancieri’s ultimate purpose was to provide a research-based assessment of RIDE public high schools' adherence to NETS-S and provide research-based recommendations for moving the district’s technology integration practices toward alignment with NETS-S.

The purpose of this study, which is modeled after Mancieri, is to investigate the degree to which the implementation of New Jersey Core Curriculum Content Standard: Standard 8.1—Computer and Information Literacy is occurring in New Jersey public middle schools.
In general, middle schools are composed of students enrolled in grades 6 through grade 8. For the purpose of this study, principals and teachers working with students enrolled in grades 6 through 8 but are not in a school identified as a "middle school" by their district were invited to participate.

Core curriculum content standards are mandated by the NJDOE with the expectations that (1) local school curricula will be aligned with the state mandate and (2) instructional practices will be aligned with State and local mandates in terms of content delivered and teaching practices. Furthermore, it is expected that students will emerge from properly aligned programs with no less than satisfactory acquisition of competencies, understandings and skills noted in the standards. Is this occurring in New Jersey public middle schools in relationship to Standard 8.1? The individuals who can answer this question are the principals and teachers who are responsible for ensuring that standards are implemented at the building and classroom level.

The intent of the researcher was to examine the differences and similarities between the perceptions of principals and teachers. Different perceptions that are noted will highlight areas where alignment of understanding of professional practice regarding the implementation of Standard 8.1 needs to occur. The results of this study contribute to the body of knowledge concerning effective implementation of Standard 8.1 and the integration of technology into instructional practices.

The researcher also explored whether actual and perceived barriers to technology integration, identified in the research and literature, persist in the experience of teachers in spite of the many supports provided by the NJDOE via the New Jersey Technology
Assessment for Proficiency and Integration (NJTAP-IN) plan, and the significant improvements in infrastructure and technology supports in New Jersey public schools.

Limitations and Delimitations

The limitations of this research project are discussed below.

This study relies on self-reported data from principals and teachers in New Jersey public schools that service middle-grade students. Leedy and Ormrod (2005) note the following limitations concerning self-reported data solicited via questionnaires:

When using survey research "...we are relying on self-reported data: People are telling us what they believe to be true or, perhaps, what they think we want to hear.... Furthermore, people’s descriptions of their attitudes and opinions are often constructed on the spot—oftentimes, they haven’t really thought about certain issues until a researcher poses a question about them — and so may be colored by recent events or the current context (Schwarz, 1999).” An additional problem is that some people may intentionally misrepresent the facts (at least, the “facts” as they know them) in order to present a favorable impression to the researcher (p. 184).

The study examined the perceptions of principals and teachers from six different schools in northern New Jersey that service middle-grade students. Excluded from the research is an examination of the perceptions of principals and teachers in schools that service high-school and elementary-school students.

Participation was solicited only from districts that are active members of the New Jersey Educational Computing Cooperative, Inc. (NJECC), and from teachers assigned core-curricular-content courses as identified by the New Jersey Department of Education.

The number of literature sources consulted to establish the criteria for ideal integration of technology also limits this study. All sources are identified in the literature review section of this document.
In addition, the age of subjects was not considered. Comparisons and conclusions among participants cannot be made regarding this factor.

A methodological weakness of this investigation is that the researcher was the sole analyzer of transcribed responses from teacher interviews. Data analysis techniques that help buttress the accuracy and validity of results, such as member checking (Swenson, 1996, p. 190, as cited in Manceri, 2008), and peer briefing (Lincoln & Guba, 1985, as cited in Manceri, 2008) were not employed.

Definition of Terms

1. Computer literacy: Understanding computers and related systems. It includes a working vocabulary of computer and information system components, the fundamental principles of computer processing, and a perspective for how nontechnical people interact with technical people. The term’s origin has been attributed to Andrew Molnar in the early 1970s. He was director of the Office of Computing Activities at the National Science Foundation. (Answers.com, 2009)

2. Computer literate person: “a confident user of computer systems and software...able to utilize the computer and its software to meet one’s needs either at home or work, have a grasp of the current and future impact of computers on the world and its peoples...able to make reasonable and intelligent decisions about the selection and purchase of computer hardware and software...able to talk intelligently about computers (Creighton, Kilcoyne, Traver, Wright, 2006, p.16)

3. First Order Barriers: “refer to those obstacles that are extrinsic to teachers. Typically, these barriers are described in terms of types of resources (e.g.,
equipment, time training, support) that are either missing or inadequately provided in teacher implementation environments” (Means & Olson, 1997, as cited by Ertmer, 1999, p.50).

4. Implementation: “…consists of the process of putting into practice an idea, program, or set of activities new to the people attempting or expected to change” (Fullan, 1982, p. 54)

5. Information literacy: a thematic synthesis of the skills that individuals will need to live in the information age (Doyle, 1992)

6. Information literate person. One who:
   a. Recognizes that accurate and complete information is the basis of intelligent decision making
   b. Recognizes the need for information
   c. Formulates questions based on information needs
   d. Identifies potential sources of information
   e. Develops successful search strategies
   f. Accesses sources of information including computer-based and other technologies
   g. Evaluates information
   h. Organizes information for practical application
   i. Integrates new information into an existing body of knowledge
   j. Uses information in critical thinking and problem solving (Doyle, 1994)

7. International Society for Technology Education (ISTE): “A nonprofit membership organization, ISTE provides leadership and service to improve
teaching, learning, and school leadership by advancing the effective use of technology in K–12 and teacher education. Home of the National Educational Technology Standards (NETS), the Center for Applied Research in Educational Technology (CARET), and the National Educational Computing Conference (NECC), ISTE represents more than 85,000 professionals worldwide.” (ISTE, 2009, website)

8. Middle School: “Most of these schools are for grades 6–8, although some may have grades 5–8, 5–7 or even 7–8.” (USDOE, 2003 http://www.ed.gov/parents/academic/help/adolescence/partx1.html) For the purposes of this study, the grade levels that will be considered are grades 6, 7, and 8.

9. Mindtools: computer-based tools and learning environments that have been adapted or developed to function as intellectual partners with the learner in order to engage and facilitate critical thinking and higher-order learning (Jonassen, 2002)

10. National Educational Technology Standards for Students - NETS-S (See Appendix F for the standards and the six strands)

11. NJTAP-IN General Assessment Rubric: defines technological proficiency as it relates to the 8.1 Computer and Information Literacy Standard. Any assessment used by LEAs in relationship to Standard 8.1 must be aligned with the rubric (Appendix M).

12. NJTAP-IN (Technology Assessment for Proficiency and Integration): an implementation and assessment plan for Standard 8.1 Computer and Information
Literacy, developed by the Educational Technology Curriculum Committee (ETCC), under the auspices of the New Jersey Department of Education

13. Second Order Barriers: "barries that interfere with or impede fundamental change...these barriers are typically rooted in teachers' underlying beliefs about teaching and learning and may not be immediately apparent to others or even to the teachers themselves" (Kerr, 1996, as cited by Ertmer, 1999 p.51)

14. Standard 8.1—Computer and Information Literacy: all students will use computer applications to gather and organize information and to solve problems (Appendix E).
Chapter II

Literature Review

The Impetus for Technology Standards in Education

Advances in technology have always created ripples that affect or change the function of major institutions in a society. Many have deemed the advent of the Internet as one of the greatest technological shifts in recent history. It has changed the ways in which we communicate, the way our economy functions, the way consumers purchase, and the way citizens participate in civic affairs. On-demand access to information is available to virtually any person with a networked computer. According to Miniwatts Marketing Group (2011), nearly 77.4% of the North American population and 28.7% of the world population has been penetrated by the Internet.

Thomas Friedman (2005) in *The World Is Flat* describes a virtual demographic shift fueled and facilitated by the exponential development of computer information technology that has rocked the foundation of the old-world economy. It is characterized as a virtual shift because foreign workers, remaining in their homeland, have migrated via broadband cable and via satellite to America. American employers are now selecting from a global pool of workers. Comparable foreign talent is competing for American-based jobs remotely offering identical skill sets for less.

*Zhao* (2009) in *Catching Up or Leading the Way* talks about how corporations are increasingly exploiting the global job pool by bringing jobs to cheap labor.
"Outsourcing," "offshoring," and the "fragmentation of production" processes have become critical elements of many corporations’ organizational schemes. Zhao explains the following regarding technological advances:

[They] enable business to distribute their production processes globally. Thanks to the decreased cost of transportation and the increased efficiency of communication, a company can locate its designers, manufactures, marketers, and managers anywhere in the world and still have them all work together on the same product seamlessly, as if they were located in the same place (pp. 101–102).

Zhao notes that corporations will place the fragments of their production line in whatever location that will minimize cost.

Offering additional insight regarding the technology-induced/-fueled changes in organizational structures and workplace environments, November (2011) states the following:

The real revolution that technology brings to society extends well beyond how to use computers, or in school terms, computer literacy. It is more complex than integrating computers across the curriculum or learning about multimedia or even using the Internet. The profound impact is that information-communications technology is completely reorganizing how, where, when, with whom, and even why people work. The concept of the very structure of the way that many people work today, the job, is finished (p.1).

These occurrences as described by Friedman, Zhao and November have tremendous implications as to how schools must prepare students to function in the “flat world.” It is imperative that American schools equip students with the computer literacy and information literacy necessary to compete globally, collaborate globally, and survive.

Cuban (1993) in his discussion concerning technology and school reform, states that there are three national impulses that converge to push for schools to be reformed via electronic technologies. He describes one impulse below:

[It’s] the drive to bring schools technologically in step with the work place because of the fear that students will be unprepared both to compete in the job
market and to adjust to the changing marketplace where...electronic devices prevail. The computerized work place and the ubiquity of telecommunications in daily routines outside the home have convinced advocates of modernizing schools that students must become familiar with electronic technologies (p. 4).

The remaining two impulses are (1) the "neo-progressive" (p. 4) impulse to use interactive computers and telecommunications to facilitate more student-centered learning, real-world problem solving, and collaborative educational experiences in schools, and (2) the impulse to use computer technology to positively impact school productivity and efficiency —"teaching more in less time for less cost" (p. 5). Cuban states that these impulses are not isolated and are usually present in the advocacy for computer technology's importance in education to varying degrees. However, the impulse related to workplace readiness echoes the observations of Friedman and Zhao and is the most prominent impulse of the 21st century.

In 2002, a public-private coalition known as the Partnership for 21st Century Skills put forth a vision of how schools can best prepare students to succeed in the 21st century. Their goal is to address what they see as a "profound gap between the knowledge and skills most students learn in school and the knowledge and skills they need in typical 21st-century communities and work places" (p. 3). Reflecting the impulses described by Cuban, the Partnership states, "In a digital world, students need to learn to use the tools that are essential to everyday life and workplace productivity (p. 4). They advocate the following:

Skilled 21st century citizens should be proficient in ICT (information and communication technologies) literacy, defined by Programme for International Student Assessment (PISA) as "the interest, attitude and ability of individuals to appropriately use digital technology and communication tools to access, manage, integrate and evaluate information, construct new knowledge, and communicate with others in order to participate effectively in society" (p. 4).
Concerns over America’s status on the world stage, emanating from the realization that the rapid diffusion of computer-information technology is sparking a shift in the power and economic dynamics among countries, nations, states, and communities are not new. Questions regarding whether America’s schools can prepare students to function and thrive in emergent technological environments are more than two decades old. The alarm was sounded in “A Nation at Risk” (National Commission on Educational Excellence, 1983)

In 1991, the Secretary’s Commission on Achieving Necessary Skills (SCANS) was established with the purpose of (1) determining requisite workplace skills for the 21st century and (2) evaluating American schools’ effectiveness at equipping students with these skills. The commission concluded that schools, although making a sincere effort to educate America’s students, lacked clear and consistent guidance, reflective of needs of contemporary businesses and organizations. Schools were operating under a paradigm that was no longer relevant.

Since the SCANS findings, government agencies, corporate leaders, and various education stakeholders have worked to establish the new paradigm for which schools are to operate. Entities that have had significant influence on how the New Jersey Department of Education has proceeded in this endeavor are the United States Department of Education with No Child Left Behind (NCLB) Part D, the International Society for Technology in Education (ISTE), the International Technology Education Association (ITEA), and the Partnership for 21st Century Skills. These entities have set forth mandates, espoused philosophies, and constructed standards regarding technology
integration into education. Documents created by each entity are referenced in the New Jersey Core Curriculum Technology Standards for Technology and related documents.

The New Jersey Core Curriculum Content Standards, originally adopted by New Jersey State Board of Education in 1996, describe what should constitute a “Thorough and Efficient Education” as guaranteed in 1875 by the New Jersey Constitution. Since the initial adoption, the standards have been reviewed and revised every five years to reflect the changing times. In 2004, the New Jersey State Board of Education adopted technological literacy standards. Technology was highlighted as an important component of education in the original standards. However, the demands of the 21st-century technology age required technological literacy to be indicated more explicitly. In 2009, The NJDOE released a revised version of New Jersey Core Curriculum Content Standards (NJ CCCS). The introduction for the NJ CCCS states that the “intent and spirit of the technology standards” provides that:


This statement denotes a clear mandate that all teachers integrate technology standards and related technology (Internet, computer hardware, software, etc.) into their instructional practice.
Computer and Information Literacy

What is computer and information literacy? Creighton, Kilcoyne, Tarver, and Wright (2006) reviewed literature and traced the evolution of the concept of computer literacy. They also explained how the concept of “information literacy” spawned from this process. They cite Higdon (1995) who explained that the 1970s’ definition of computer literacy, which was “knowing what a computer was and how it operated,” evolved to the 1990s and new millennium’s definition, which includes: communicating with a computer, programming a computer, utilizing computer applications software, using e-mail, navigating the World Wide Web, and related activities.

Creighton et al. (2006) cite Ehrmann (2004) who comments on how computer technology combined with the Internet has provided people with access to enormous amounts of information, creating a need for information literacy—skills needed to retrieve, organize, critically analyze, and effectively utilize information. Today, computer literacy and information literacy continue to grow in importance as computer and information technologies continue to evolve and become ever more pervasive in peoples’ lives.

The ISTE Standards, which serve as the touchstones for many of the states’ technology standards, list the following competencies as indicators of computer and information literacy:

1. Basic operations and concepts
2. Social, ethical, and human issues
3. Technology productivity tools
4. Technology communication tools

5. Technology research tools

6. Technology problem-solving and decision-making tools (as cited in Barron, Kemker, Harmes & Kalaydjian, 2003)

The descriptive statement Standard S.1—Computer and Information Literacy states the following:

The goal is to promote student use of “computer applications and technology tools [to] conduct research, solve problems, improve learning, achieve goals, and produce products and presentations in conjunction with standards in all content areas, including career education and consumer family, and life skills” (NJDOE, 2006) Also, students will be able to “develop, locate, summarize, organize, synthesize, and evaluate information for lifelong learning” (NJDOE, 2004).

The definitions of computer and information literacy cited above, in conjunction with the descriptive statement of Standard S.1, place a set of demands on contemporary educators quite different from the demands placed on educators in the 20th century. The impetus for this change has been the rapid expansion of digital technology/computer and information technology, and the extent to which it has penetrated and established eminence in all areas of life (Prensky, 2001). Computer/technology literacy no longer constitutes simply the ability to use computers as “productivity tools; mediums for helping the user accomplish a specific task or repeat a rudimentary function with precision” (Cirasella, 2008, p. 11).

21st Century Skills

The Partnership for 21st Century Skills, on the “Information, Media and Technology Skills” page of their website, makes the following statement:
People in the 21st century live in a technology and media-suffused environment, marked by various characteristics, including 1) access to an abundance of information, 2) rapid changes in technology tools, and 3) the ability to collaborate and make individual contributions on an unprecedented scale. To be effective in the 21st century, citizens and workers must be able to exhibit a range of functional and critical thinking skills related to information, media and technology” (The Partnership, 2004).

Influential thinkers, policy makers and academics that have taken a critical look at what has become known as the “21st Century Skills Movement” note critics’ assertion that the skills advocated by the movement are not new skills at all (Rotherham & Willingham, 2009; Silva, 2009). It has always been a goal of our educational system to teach critical thinking, problem solving and collaboration. Rotherham et al. point out that the context in which the United States education system must deliver instruction regarding these skills is new:

What’s actually new is the extent to which changes in our economy and the world mean that collective and individual success depends on having such skills. Many U.S. students are taught these skills—those who are fortunate enough to attend highly effective schools or at least encounter great teachers—but it’s a matter of chance rather than the deliberate design of our school system. Today we cannot afford a system in which receiving a high-quality education is akin to a game of bingo. If we are to have a more equitable and effective public education system, skills that have been the province of the few must become universal (p. 16).

The New Jersey Core Curriculum Content Standards (NJCCCS) for Technology acknowledges the skills students need, the global context students must face, and the evolving computer technology they must learn to wield. Below are the mission and vision statements found in the introduction section of the NJCCCS for Technology:

Mission: Technology enables students to solve real-world problems, enhance life, and extend human capability as they meet the challenges of a dynamic global society.
Vision: The systematic integration of technology across the curriculum and in the teaching and learning process fosters a population that leverages 21st-century resources to:

1. Apply information-literacy skills to access, manage, and communicate information using a range of emerging technological tools.
2. Think critically and creatively to solve problems, synthesize and create new knowledge, and make informed decisions that affect individuals, the world community, and the environment.
3. Gain enhanced understanding of global interdependencies as well as multiple cultural perspectives, differing points of view, and diverse values.
4. Employ a systemic approach to understand the design process, the designed world, and the interrelationship and impact of technologies.
5. Model digital citizenship (NJDOE Website, 2006)

Technology Integration

In the 1980s, researchers began to investigate the process of technology integration in terms of how teachers actually use technology in instructional practices (Barron, Kemker, Harmes & Kalaydjian, 2003). Barron et al. (2003) highlight the Apple Classroom of Tomorrow (ACOT) project and the Level of Technology Integration (LoTi) scale as the two critical elements that serve as foundational pieces to this line of research.

The ACOT research “focused on both the process of technology integration and the phases of adoption at the classroom level” (Coley, Cradler, & Engel, 1997, as cited in Barron et al. 2003). The key findings of the ACOT study were that technology:

1. Encourages fundamentally different forms of interactions among students and between students and teachers
2. Engages students systematically in high-order cognitive tasks
3. Prompts teachers to question old assumptions about instruction and learning (Dwyer, 1994 as cited in Barron et al., 2003. p. 492)
In addition, the ACOT study spawned an adoption model for the use of technology in classrooms. The model, known as the Stages of Instructional Evolution, states that teachers evolve through the following five (5) stages when integrating technology into instructional practice:

1. Entry—Learning the basics of using technology
2. Adoption—Using new technology to support traditional instruction
3. Adaptation—Integrating new technology into traditional classroom practice
4. Appropriation—Focusing on cooperative, project-based, and interdisciplinary work, incorporating the technology as needed and as one of many tools

The Levels of Technology Integration (LoTi) scale was developed by Dr. Christopher Moersch in 1995. The purpose of the scale is to facilitate the assessment of a teaching staff’s capacity to work with technology and provide a “snapshot” of the current level of computer use for instruction. Each teacher is asked to respond to a 50-item questionnaire designed to yield a teacher profile indication across three domains: (1) level of technology integration (LoTi), (2) personal computer use (PCU), and (3) current instructional practice (CIP). A teacher’s overall rating, which is a combination of the LoTi, PCU and CIP ratings, corresponds to one of the ratings on the LoTi scale:

1. Level 0—Nonuse
2. Level 1—Awareness
3. Level 2—Exploration
4. Level 3—Infusion
5. Level 4a—Integration (mechanical)
6. Level 4b—Integration (routine)

7. Level 5—Expansion

8. Level 6—Refinement

The level ascribed to a teacher indicates the degree to which a teacher is “integrating technology and moving from teacher-centered activities towards learner-centered activities (Barron et al., 2003, p. 493). The information gleaned from the use of the LoTi instrument facilitates “data-driven” staff-development planning (Moersch, 1999, as cited in Barron et al., 2003, p. 493).

The teacher must be a primary consideration for technology-integration efforts. Detailed and accurate information regarding a teacher’s capacity to use technology and levels of technology use is critical to initiation and sustainability. Also important is a focus on the “affective and behavioral dimensions of change in relation to a teacher’s adoption and integration of technology into instructional practice” (Anderson, 1997).

The Concerns Based Adoption Model (CBAM), a multifaceted framework designed to mitigate teachers’ concerns regarding adoption of innovative practices, addresses these areas. CBAM assumes the following in relationship to change:

(1) Change is a process, not an event; (2) change is accomplished by individuals; (3) change is a highly personal experience; (4) change involves developmental growth in feelings and skills; and (5) change can be facilitated by interventions directed toward the individuals, innovations, and contexts involved (Anderson, 1987).

As espoused by the tenets of the CBAM, there are “stages of concern” through which teachers progress that a change facilitator must be sensitive to in order to successfully orchestrate adoption of an innovation. Anderson (1997) describes stages of
concern “...as a framework that describes the feelings and motivations a teacher might have about a change in curriculum and/or instructional practices at different points of its implementation” (p. 334). The stages are presented in Table 2.1
Table 2.1

**CBAM Stages of Concern**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>Teachers have little concern or involvement with the innovation.</td>
</tr>
<tr>
<td>Informational</td>
<td>Teachers have a general interest in the innovation and would like to know more about it.</td>
</tr>
<tr>
<td>Personal</td>
<td>Teachers want to learn about the personal ramifications of the innovation. They question how the innovation will affect them.</td>
</tr>
<tr>
<td>Management</td>
<td>Teachers learn the processes and tasks of the innovation. They focus on information and resources.</td>
</tr>
<tr>
<td>Consequence</td>
<td>Teachers focus on the innovation’s impact on students.</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Teachers cooperate with other teachers in implementing the innovation.</td>
</tr>
<tr>
<td>Refocusing</td>
<td>Teachers consider the benefits of the innovation and think of additional alternatives that might work even better.</td>
</tr>
</tbody>
</table>

Hall & Loucks (1979)
Along with the “Stages of Concern” concept there are two other concepts embedded in CBAM: “Levels of Use” and “Innovation Configuration.” The Levels of Use framework, similar to the LoTi scale discussed above, “focuses on general patterns of teacher behavior as they prepare to use, begin to use, and gain experience implementing a classroom change” (Anderson, 1997, p. 335). Innovation Configuration (ICs) focuses on the variations that exist in the ways teachers implement an innovation. The goal was to separate valid and invalid implementation practices and identify practices essential to implementation.

The facilitators of any change effort, involving technology integration or not, must take care to identify teachers’ concerns and respond with appropriate information, nurturing, and support. The concepts and tools described above have been used by researchers to ascertain accurate pictures of the level of technology implementation in educational organizations: LOTI (Malcolm-Bell, 2010; Cottle, 2010; Truett, 2006; McAdoo, 2005); CBAM (Curtis, 2010; Al-Rawaijfi, Fong, Syed Idros, 2010; McArthur, 2008). School leaders should use these tools to gather meaningful and accurate feedback from teachers.

New Jersey Department of Education Mandate for the Implementation of Technology Standards

In order for standards to be implemented, appropriate assessments must accompany the process. The New Jersey Technological Assessment for Proficiency and Integration (NJTAP-IN) is an implementation plan for the New Jersey Core Curriculum
Content Standards (NJ CCCS) for technology. The New Jersey Department of Education (NJDOE) and the Educational Technology Curriculum Committee (ETCC) of the NJDOE developed this plan. The resources and assistance provided by the ETCC are designed to support school districts in their technology-implementation efforts, as they work to meet the federal government's mandate that every student be technologically literate by the end of grade eight. The committee targeted the implementation plan to the K–8 population of students (NJDOE, 2006).

Although the implementation of the technology standards is a mandate, the NJTAP-IN framework is a recommendation for the most part. The mandated portion states that any assessment a local education agency (LEA) decides to use must meet the criteria of the NJTAP-IN General Assessment Rubric. The purpose of the rubric is to provide a standardized guide for LEAs to assess computer and information literacy appropriately and to ensure that integration of technology is actually occurring (NJDOE, 2006).

**Conditions Necessary for Successful Technology Integration**

Donald P. Ely, in his research into the implementation of instructional innovations, identified eight (8) conditions that facilitate such utilization. Several researchers have used the framework derived from Ely’s identified conditions to study the implementation process as it relates to innovative educational technology (Bauder, 1993; Hajar Mohd. Nor., 2004; Nawawi, 2005; Ravitz, 1999; Ensminger, Surry, Porter & Wright, 2004). Ely’s eight (8) conditions are:
1. Dissatisfaction with the status quo: An emotional discomfort that results from perceiving the current method as inefficient or ineffective. This condition does not have as much influence as the other seven (Ely 1990, 1999).

2. Knowledge and skills: An [accurate] assessment of the current level of skills and knowledge of the product users. Ely reports that this condition consistently ranks as one of the most influential conditions among the eight (Ely 1990, 1999).

3. Adequate resources: The amount of resources currently available to successfully implement the innovation. Resources include finances, hardware, software, and personnel (Ely 1990, 1999).

4. Time: Adequate time and compensated time for users to become educated and skilled in how to use the innovation. This condition refers not only to the organization’s willingness to provide time but also the users’ willingness to devote learning time for implementation (Ely 1990, 1999).

5. Rewards or incentives: The existence of incentives that motivate users to employ the innovation or rewards provided by the organization for those who do use the innovation (Ely 1990, 1999).

6. Participation: The involvement of key stakeholders in decisions that relate to the planning and design of the innovation. The condition refers to all stakeholders but emphasizes the participation of product users (Ely 1990, 1999).

7. Commitment: The perception by users that the power brokers of the organization (i.e., presidents, CEO, vice presidents) actively support the implementation of the innovation (Ely 1990, 1999).

8. Leadership: An active involvement by immediate supervisors in assisting the users in implementing the innovation (Ely 1990, 1999). This includes providing support and encouragement to users, as well as role-modeling use of the innovation. (Ely, 1990 as cited in Ensminger, Surry, Porter & Wright, 2004)

Although the conditions have distinct names, they are not separate and distinct occurrences in reality. The conditions are interrelated, and each influences the other negatively or positively. Ely maintains that if all conditions are present, it will be highly probable that the innovative practice is implemented and sustained. Deficient levels of either of the conditions would cripple implementation and sustainability efforts.
In their document *The Conditions to Effectively Leverage Technology for Learning*, the International Society for Technology in Education (ISTE) identified the following factors:

1. Shared vision: Proactive leadership in developing a shared vision for educational technology among all education stakeholders including teachers and support staff, school and district administrators, teacher educators, students, parents, and the community

2. Empowered leaders: Stakeholders at every level empowered to be leaders in effecting change

3. Implementation planning: A systematic plan aligned with a shared vision for school effectiveness and student learning through the infusion of information and communication technologies (ICT) and digital learning resources

4. Consistent and adequate funding: Ongoing funding to support technology infrastructure, personnel, digital resources, and staff development

5. Equitable access: Robust and reliable access to current and emerging technologies and digital resources, with connectivity for all students, teachers, staff, and school leaders

6. Skilled personnel: Educators, support staff, and other leaders skilled in the selection and effective use of appropriate ICT resources

7. Ongoing professional learning: Technology-related professional learning plans and opportunities with dedicated time to practice and share ideas

8. Technical support: Consistent and reliable assistance for maintaining, renewing, and using ICT and digital learning resources

9. Curriculum Framework: Content standards and related digital curriculum resources that are aligned with and support digital-age learning and work

10. Student-centered learning: Planning, teaching, and assessment centered around the needs and abilities of students

11. Assessment and evaluation: Continuous assessment of teaching, learning, and leadership, and evaluation of the use of ICT and digital resources

12. Engaged communities: Partnerships and collaboration within communities to support and fund the use of ICT and digital resources
13. Support policies: Policies, financial plans, accountability measures, and incentive structures to support the use of ICT and digital-learning resources for learning and in district school operations

14. Supportive external context: Policies and initiatives at the national, regional, and local levels to support schools and teacher-preparation programs in effective implementation of technology for achieving curriculum and learning technology (ICT) standards (ISTE, 2011)

Principal Leadership & Technology Integration

There must be a semblance of alignment between what principals and teachers see as the effective integration of technology standards. It is important that there is a shared vision, common understandings of implementation evaluation criteria and predetermined goals. If these elements are not present, efforts will be problematic.

Principals play a central role in technology integration. Their perceptions and understandings of what effective integration entails will be a major determinant of the overall success. Anderson and Dexter (2005) note, “all of the literature on leadership and technology acknowledges either explicitly or implicitly that school leaders should provide administrative oversight for educational technology” (p.51). Anderson et al. (2005) analyzed data from the 1998 Teaching, Learning and Computing survey. This was a nationwide poll that encompassed responses from more than 800 schools. The findings of this study confirmed that effective principal leadership is of paramount importance to technology integration.

Principals must support, model, facilitate, and guide the way to the desired change. A school’s leadership must actively foster Ely’s (1990, 1999) eight conditions that he posits are necessary for the successful implementation of technology by engaging in vision building, planning, assessing organizational needs, building consensus with key
stakeholders, allocating resources (money, time, etc.), providing motivation and support for organizational members, and evaluating progress.

As the instructional leaders of the building, principals must be knowledgeable about the instructional benefits of technology in order to effectively support school faculty (Yu & Durrington, 2006; Brooks-Young, 2002). Brockmeier, Sermon, and Hope (2005) concluded that in order for a principal to serve effectively as an instructional leader regarding technology she must do the following:

(a) become familiar with the capabilities of various technology devices; (b) be able to use an array of technologies; (c) understand how technology can be applied to teaching and learning; and (d) become an enabler, one who promotes technology use as a user, collaborator, and facilitator (p. 55).

Brooks-Young (2002) concluded that it is the administrator's function to actively create an environment that is supportive of risk-taking. This type of environment will support teachers as they incorporate innovative practice and technology into their teaching. Constructing this type of environment requires building administrators to incorporate the following principles:

1. An administrator's primary concern is student achievement.

2. It is imperative to have administrative support through modeling technology use; active participation in planning, implementation, and evaluation; and the ability to locate human and financial resources.

3. Program planning must be predicated upon the analysis of appropriate data.

4. Program planning must be inclusive and dynamic.

5. Staff members must have access to regular, ongoing professional-development opportunities in a variety of formats both on and off site.

6. Staff members and students must have ready access to up-to-date equipment that is reliable and well maintained.
7. Staff members must have ready access to support personnel for both technical problems and curriculum delivery issues.

8. Administrators must understand and address concerns about equal access; social, legal, and ethical issues; and system security and use.

9. Regular monitoring and evaluation of programs are necessary to continue to move forward. (Brooks-Young, 2002, p.178, as cited in Thomas, 2010 pp 21–22)

The International Society for Technology in Education (ISTE) created a set of standards that identified the competencies, technical skills and knowledge school administrators must possess to execute their role as instructional technology leader:

1. Visionary leadership. Educational administrators inspire and lead development and implementation of a shared vision for comprehensive integration of technology to promote excellence and support transformation throughout the organization.

2. Digital-age learning culture. Educational administrators create, promote, and sustain a dynamic digital-age learning culture that provides a rigorous, relevant, and engaging education for all students.

3. Excellence in professional practice. Educational administrators promote an environment of professional learning and innovation that empowers educators to enhance student learning through the infusion of contemporary technologies and digital resources.

4. Systemic improvement. Educational administrators provide digital-age leadership and management to continuously improve the organization through the effective use of information and technology resources.


Leadership behavior is a critical factor in the introduction of any innovative technology, idea, or practice to an organization. For an innovation to become fully integrated, there are understandings and dispositions a leader must possess to appropriately engage change. Also, there are purposeful actions a leader must take to move the change. Fullan (2001) provides a theory that denotes leadership capacities
requisite for the successful management of complex or adaptive change: (1) moral purpose, (2) understanding of the change process, (3) relationship building, (4) Knowledge creation and sharing, (5) Coherence Making, (6) Energy/enthusiasm/optimism. Each capacity is summarized below:

1. Moral purpose—acting with the intention of making a positive difference in the lives of employees, customers, and society as a whole (p.3)

2. Understand the change process—Fullan offers six points that should guide a leader’s thoughts about the change process:
   a. The goal is not to innovate the most.
   b. It’s not enough to have the best ideas.
   c. Appreciate the early difficulties of trying something new...the implementation dip.
   d. Redefine resistance as a potential positive force.
   e. Reculturing is the name of the game.
   f. Never a checklist, always complexity

3. Relationship building—"the single factor common to every successful change initiative is that relationships improve (p. 5). Leaders must be consummate relationship builders with diverse people and groups. Effective leaders constantly foster purposeful interaction and problem solving and are wary of easy consensus.

4. Knowledge creation and sharing—Leaders must work to foster an environment in which workers feel that the change process is one that encourages and “favors exchange” between coworkers and stakeholders. The amount and quality of exchange is a function of a leader’s ability to engender moral purpose in others, approach change with the appropriate mind frame, and build trusting collegial relationships.
5. Coherence making—This is the practice of extracting “valuable patterns [of behavior that emerge from a changing organization] worth retaining” from the messiness of the change process. This also involves the leader keeping organizational activity and thought focused on the purpose and objectives of the organization. Fullan states “the process embedded in pursuing moral purpose, the change process, new relationships, and knowledge sharing…produce greater and deeper coherence as they unfold” (p.115).

6. Energy/enthusiasm/hopefulness—these personal characteristics are the hallmark of a leader who effectively manages complex change. By exhibiting these qualities and honoring the first five aspects of leadership “effective leaders make people feel that even the most difficult problems can be tackled productively” (p.7).

*Teacher Pedagogical Beliefs and Technology Integration*

Becker (1998) noted that the research on technology-using teachers yields distinct characterizations of technology-using teachers. He stated “data from the literature [e.g., Becker, 1994; Hadley & Sheingold, 1993; Honey & Moeller, 1990; Means & Olson, 1995; Wiske et al., 1998] show that technology-using teachers range along a continuum of instructional styles from instruction to construction” (p. 221). He explains that instruction refers to a traditional teacher-centered style of delivery with technology serving as a complement. Construction practices are characterized as student-centered, with technology used to support active learning leading to student construction of knowledge. Becker (2000) buttressed the existing research. The study concluded that
given appropriate training, convenient access to computers, and sufficient skill level, teachers who subscribe to constructivist pedagogy used computers more frequently than teachers who subscribed to a more traditional pedagogy. Becker and Ravits (1999) in their study of the impact information technology and computers have on teacher pedagogy cite the President’s Committee of Advisors on Science and Technology (PCAST), which posits a move toward a student-centered, constructivist paradigm offers “the most fertile ground for the application of technology to education” (p. 357).

Stressing the importance of pedagogical beliefs and their impact on a teacher’s practice, Kagan (1992) states that “empirical studies have yielded quite consistent findings: A teacher’s beliefs tend to be associated with a congruent style of teaching that is often evident across different classes and grade levels” (as cited in Ertmer, 2005, p. 28). Where teachers’ behavior deviates from their beliefs, “contextual constraints” are the cause of the discrepancy. Kagan’s findings regarding disparity between teacher beliefs and practice are supported by Chen (2008). Chen identified three categories for influences that contribute to such inconsistencies: (a) the influence of external factors, (b) teachers’ limited or improper theoretical understanding, and (c) teachers’ other conflicting beliefs.

Additional research continued to support Kagan’s findings that teachers’ beliefs are critical variables in the integration of innovative teaching practices (Donnelly, McGarr, & O’Reilly, 2011; Stols & Kreik, 2011; Mueller, Wood, Willoughby, Ross & Specht, 2008); Hermans, Tondeur, Van Braak & Valke, 2008; Ertmer & Park, 2009; Levin & Wadmany, 2006; Zhao, Pugh, Sheldon & Byers, 2002; Dexter, Anderson & Becker, 1999; Sugar, Crawley & Fine, 2004).
The State of Educational Technology in New Jersey

The Milken Exchange on Education Technology and Education Week collaborate on annual reports on the state of education in American schools. One of their reports titled Technology Counts, published in 2009, rated schools nationally regarding use of educational technology. A scale of zero to 100 was used to rank technology leadership and uses of learning technologies in all states in the following areas: access to technology, use of technology, and capacity to use technology. These rankings are compiled to provide an overall score with a corresponding letter grade. New Jersey's rankings for 2009 are illustrated in Table 2.2:
Table 2.2

State Technology Report Card Compared to National Average Grade

<table>
<thead>
<tr>
<th>Category</th>
<th>New Jersey</th>
<th>Average Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to Technology</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Use of Technology</td>
<td>B-</td>
<td>B-</td>
</tr>
<tr>
<td>Capacity to Use Technology</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Overall Score</td>
<td>C</td>
<td>C+</td>
</tr>
</tbody>
</table>
The information in Table 2.2 indicates that the infrastructure for implanting technology-literacy standards in New Jersey public schools exist at an average level. The Technology Counts grading breakdown indicated that 90% of eighth graders in New Jersey have access to computers, that the instructional-computer-to-student ratio is 3:9, and that the high-speed-Internet-connected-computer-to-student ratio is 3:6 (Editorial Projects in Education Research Center, 2008). However, research has shown that high access to networked computers and instructional/educational software does not necessarily equate to high use (Govender & Maharaj, 2006; Bauer & Kenton, 2005; DeYoung, Mueller, Wood, Willoughby, & Specht, 2005, Cuban, Kilpatrick, & Peck, 2001; Ravitz, 1999). Maharaj et al. (2006) stated “regardless of the amount of technology and its sophistication, technology will not be used unless educators have the skills, knowledge and attitudes necessary to infuse it into the curriculum” (p. iv).

Although the majority of New Jersey public schools are equipped with networked and wired computers readily available for use by students and teachers, it is not safe to assume that regular, effective use will follow (Wooley, 1998, Cuban et al., 2000; Pelgrum, 2001; Conlon & Simpson, 2003). There exist a host of environmental factors and teacher characteristics that must be addressed (Wood et al., 2005). Cuban et al. (2001) found in their study of two well-equipped public high schools located in Silicon Valley, that access to equipment and software failed to perpetuate widespread teacher and student use. Several studies have found that the potential benefit of readily available technology lies dormant in many schools due to underuse (Muir-Herzig, 2004; Sutherland et al., 2004).

Kleiman (2004) lamented, “Although progress has been made in equity of access
to technology in schools, serious inequities remain in terms of the ways those computers are used in classrooms and the level of preparation for teachers to use them effectively. Unfortunately, in much of the country little progress has been made toward fulfilling the educational potential of information and communications technologies” (p. 2).

**Barriers to Teachers’ Technology Integration**

Ertmer (1999) explores contextual factors (work environment, policy environment, culture, etc.) and internal factors (beliefs, fears, values, habits, etc.) that tend to emerge as barriers to teachers’ successful integration of technology into their teaching and learning practice. She differentiates these factors into two categories: “first-order barriers” and “second-order barriers.”

Ertmer describes first-order barriers to technology integration as “being extrinsic to teachers and including lack of access to computers and software, insufficient time to plan instruction, and inadequate technical and administrative support” (p.48). Ely’s conditions of Time, Rewards and Incentives, Adequate Resources, and Leadership all speak to first-order barriers as defined by Ertmer. These factors are identified by several researchers (Mueller, 2008; Martin, 2000; Dias, 1999; Wang & Chan, 1995; Dawson & Heinecke, 2004; Manternach-Wigans, 1999; Moseley & Higgins, 1999).

Second-order barriers to technology integration are described as “intrinsic to teachers and include beliefs about teaching, beliefs about computers, established classroom practices, and unwillingness to change” (p.48). Ely’s conditions of Dissatisfaction with the Status Quo, Knowledge and Skills, and Commitment (teacher perception of the commitment of leadership), combined with Ertmer’s definition of
second-order barriers, facilitate a more comprehensive discussion of second-order barriers. For a teacher to implement an innovative practice and be willing to change, the teacher must be able to acknowledge the futility of current practice or see the innovation as a valuable or meaningful enhancement to, or replacement of, current practice. Also necessary are the requisite knowledge and skills to implement the innovative practice. A teacher's capacity to implement the innovation will impact their belief regarding the usefulness of an innovative practice and whether or not the teacher will be willing to deviate from established practice. Finally, a teacher must perceive that organizational leaders are committed to the innovative practice as indicated in the leaders' words and deeds. Organization leaders must set the vision for the innovative practice, insist that the innovation is implemented, model implementation, and provide the necessary supports. These "commitment" actions will positively impact teachers' willingness to change, influence established practice, influence teachers' beliefs about the innovation, and influence teachers' beliefs about teaching.

Major strides have been made toward mitigating the impact of first-order barriers. Student and teacher access to the computers, the Internet, and related technologies has grown significantly. Teacher preservice and in-service training have improved and are better aligned with best-practice research. Policies at local state and federal levels of government are emerging that create a favorable environment for technology use in K–12 teaching and learning (U.S. DOE, 1996, 2001, 2003 as cited in Ertmer 2005). Given the factors mentioned above, Ertmer (2005) states "although many teachers are using technology for numerous low-level tasks (word processing, Internet research), higher-level uses are still very much in the minority" (p.26). Ertmer posits that second-order
barriers that emanate from internally held teacher beliefs and ingrained pedagogical practices are impeding full integration of technology. Citing the work of Becker, Ertmer (2005) makes the following statement:

According to Becker (2000) computers serve as a “valuable and well-functioning instructional tool” (p. 29) in schools and classrooms in which teachers (a) have convenient access, (b) are adequately prepared, (c) have some freedom in the curriculum, and (d) hold personal beliefs aligned with a constructivist pedagogy” (p. 25).

Ertmer notes that significant gains have been made regarding items “a,” “b,” and “c” as documented by several studies (Barron, Kemker, Harmes, & Kalaydjian, 2003), yet item “d” is a second-order barrier that “confronts teachers’ fundamental beliefs and, thus, requires new ways of both seeing and doing things” (p. 26). It is not a technical or structural change; it is an adaptive change (Heiftz & Linkisky, 2002) that poses an adaptive challenge for teachers. Heiftz et al. stated that adaptive challenges, in contrast to technical challenges, occur when members of an organization face change that significantly challenges values, beliefs, status, security etc. It is change that requires paradigm shifts, foundational realignments and loss (p. 13).

Mueler (2008) states “although environmental barriers remain important considerations, it is the individual differences in beliefs, attitudes, and skills among teachers that is the key area of interest for researchers today” (p. 1524). Research focused on schools deemed as “high access” in terms of availability and accessibility to technology (Mueller, Willoughby, Specht & DeYoung, 2005; Cuban et al. 2001;
Windschitl & Sahl, 2002; Conlon et al. 2003) identify teacher characteristics as the key factor in successful implementation efforts. This focus falls in the realm of “second-order barriers” (Ertmer, 2002).

Cuban (1993) spoke to what Ertmer identified as first-order and second-order barriers to change in his commentary on the impact technology failed to have on public schools. Commenting on the time period from the early ’80s to the early ’90s, he opined that technology had failed to revolutionize teaching and learning due to fundamental aspects of the institution of school.

Cuban (1993) argued “there are fundamental reasons within schools as institutions that make them substantially different from businesses, industries, and other organizations,” (p. 1) which appear to adopt and implement computer innovations more readily. He provides two reasons:

1. First, certain cultural beliefs about what teaching is, how learning occurs, what knowledge is proper in schools, and the teacher-student (not student-machine) relationship dominate popular views of proper schooling (p. 1).

2. Second, the age-graded school, an organizational invention of the late nineteenth century, has profoundly shaped what teachers do and do not do in classrooms, including the persistent adaptation of innovations to fit the contours of these age-graded settings (p.2).

Cuban notes these two factors are resilient in the face of improved technologies, increased access, and better teacher training/preparation. Also resilient is the resulting “snail-like” pace of the growth of revolutionary technology use by teachers. Item number one above relates to first-order barriers, and item number two relates to second-order barriers.
First-Order Barrier Research

Cuban, in an interview with Salpeter (2000), argues that existing school structures and competing demands on teachers account for more of the reasons for low levels of technology use by teachers than teacher-derived factors. Cuban elaborates on his thoughts explaining that the typical course load, minimal preparation time, and administrative demands make incorporating computer technology difficult. Other demands include NCLB mandates, standardized testing, and a packed local curriculum. Glitches that occur in technology use further diminish the efforts of time-strapped teachers (Salpeter, 2000). To facilitate the teacher integration of computers, Cuban suggests that workplace conditions be improved for teachers by lowering class size to 20, decreasing daily class load to four, and increasing the class duration to 100 minutes (Salpeter).

Cuban (2001) and his colleagues found that computer technology had failed to revolutionize teacher instructional practice, stating that it may be due to “deeply entrenched structures of the self-contained classroom, departments, time schedules, and teachers disciplinary training…” (p.83).

Current research continues to identify first-order barriers as critical stumbling blocks or nagging recurrences to technology integration in education.

Lack of sufficient time continues to emerge as a barrier in the research (Zuniga, 2010; Wisniewski, 2010; Guajardo, 2010; Hew & Brush, 2007, Becta, 2004, Schoepp, 2005; Sicilia; 2005). Teachers and principals report that time is lacking for teachers to receive appropriate training and to have opportunities to practice using relevant technologies (Wisniewski, 2010). In situations where technology recourses must be
reserved for use, time constraints coupled with limited resources make it difficult to for teachers to plan significant use of technology (Becta, 2004; Schoepp, 2005; Sicilia, 2005). Teachers also report that there is insufficient time to plan lessons that incorporate technology (Sicilia, 2005).

Access to sufficient and/or high quality computer equipment and infrastructure continue to be identified as impediment to integration (Malcolm-Bell, 2010; Wisniewski, 2010; Sicilia, 2005; Gomes, 2005; Toprakci, 2006; Becta, 2004). Teachers note that access is often restricted due to limited computers and technology resources (Sicilia, 2005). Other factors identified as hindrances to accessibility are “poor organization of available technology resources, poor quality hardware, inappropriate software, or lack of personal access for teachers (Becta, 2004 as cited in Bingimlas, 2009).

The absence of technical and/or instructional support is noted as a common barrier (Korte & Husing, 2007; Gomes, 2005; Sicilia, 2005; Almohaissin, 2006; Sandhotz & Reilly, 2004; Becta, 2004; Lewis, 2003). Technical problems that impede or discourage teachers’ use manifest in many forms. Examples noted in the research are slow moving or unreliable Internet connections, websites that take inordinate amounts of time to open, printer malfunctions, nearly obsolete hardware (Sicilia, 2005). Lack of on-demand technical support when technical issues arrive exacerbates the disruption to instruction caused by the initial issue. Korte and Husing (2007) argue that schools must make provisions to establish dedicated technicians to mitigate technology issues. This will prevent the loss of instructional time and promote integration efforts. Becta (2004) notes that the lack of dedicated technical support will result in lapses in general maintenance, frequent technological malfunctions, and discouraged users.
Lack of effective professional development and appropriate training has also been identified in the literature as a barrier to teacher integration of technology (Ozden, 2007; Balanskat et al., 2006; Toprakci, 2006; Gomes, 2005; Schoepp, 2005; Sicilia, 2005; Koeler & Mishra, 2005; Glazer, Hannifin, & Song, 2005; Becta, 2004). Becta (2004) noted that training regarding technology integration is a complex issue with several factors that must be considered, including: sufficient time from training, technology-skills training, pedagogical training, and preservice technical and pedagogical training for teachers. Gomes (2005) noted that “lack of pedagogic and didactic training in how to use ICT (information and communication technologies) in the classroom, and lack of training concerning the use of technologies in [content] specific areas were obstacles to using new technologies in classroom practice. Balanskat et al. (2006) found that “inappropriate teacher training is not helping teachers to use ICT in their classrooms and in preparing lessons. They assert that this is because training programmes do not focus on teacher’s pedagogical practices in relation to ICT but on the development of ICT skills” (as cited in Bingimlas, 2009). Balanskat et al. (2006) argue, “Inadequate or inappropriate training leads to teachers being neither sufficiently prepared nor sufficiently confident to carry out full integration of ICT in the classroom” (as cited in Bingimlas, 2009). Other critical factors to proper training are allotting the time and resources needed to provide appropriate ongoing training for teachers (Newhouse, 2002), providing differentiated training to meet the specific needs of teachers (Balanskat et al. 2006), and lack of sufficient training of preservice teachers (Becta, 2004).

In a school striving to implement technology standards and integrate technology, principal leadership is critical. Current research substantiates the level of importance a

Second-Order Barrier Research

Ertmer (2005) posits that achieving second-order change is the critical step that must be taken for full integration to occur. Ertmer defines second-order change as “change that confronts teachers’ fundamental beliefs and, thus, requires new ways of both seeing and doing things…. As such, these types of changes are riskier for teachers, as well as more difficult to achieve” (p. 26). Ertmer and Ottenbreit-Leftwich (2010) posit that teachers must undergo a complete change in their mind-set, coming to the understanding that effective teaching in the 21st century is no longer possible without technology integration.

Many types of second-order barriers are discussed in the literature. The most common second-order barriers identified in the literature are negative attitudes, resistance to change, lack of confidence, teacher capacity and competence, teacher values, and pedagogical beliefs.

Teachers’ attitudes toward the use of technology are critical factors in their decisions to integrate technology (Rahimi & Yadollah, 2011; Hennessy & Mama, 2010; Gibbone & Rukavina, 2010; Baloglu & Celvik, 2009; Teo, 2008; Cavanaugh, 2009; Gong & Cuper, 2008). Research has shown that negative attitudes toward technology are significant barriers to integration (Gomes, 2005; Schoepp, 2005; Earle, 2002; Becta,
2004; Schoepp, 2005). Becta (2004) maintains that helping teachers understand the
usefulness of a technology and the benefits specific technologies have on their students’
learning experiences will mitigate negative attitudes. Negative attitudes also stem from
the teachers’ perceptions that they are not receiving support, guidance or reward for their
integration efforts (Schoepp, 2005).

Lack of confidence in one’s ability to effectively integrate technology is another
hindering factor (Becta, 2004). Teacher uncertainty has been connected to fear of failure
(Beggs, 2000 as cited in Bingimlas, 2009), limited ICT knowledge (Balanskat et al.,
2006, Becta, 2004), and lack of capacity and competence (Balanskat et al., 2006;
Pelgrum; 2001).

Regarding fear of failure, Teo (2008) showed that there is a positive correlation
between teacher attitudes toward computer use and teachers’ levels of experience with
computers. Teo maintains that as teachers become more familiar with computers through
use, anxieties and fears decrease while confidence levels increased. Computer anxiety has
been identified as a major factor in teacher resistance (Baloglu & Celvik, 2009).
Adequate computer literacy will also help mitigate negative teacher attitudes and fear of
failure. The requisite skills must be developed (Chen, 2008; Jung, 2005; Lockyer &
Patterson, 2007; Mojgan Afshani, Kamariah, Wong, Bahaman & Foo, 2009; (Mohd,
Chong, Aris, Mohamed, Kamarudin, & Zainuddin ,2007).

The problems of (1) teachers having high access to computer and information
technology (hardware, software, the Internet) yet insufficient training on how to use it
effectively and/or (2) the scant presence of high-level use, has been well noted in the
literature (Parks & Pisapia, 1994; Ertmer, 1999; Cuban et al., 2001).
Judge, Puckett and Cubuk (2004) stated the following:

Due to the relative newness of computer technology, many teachers have not received adequate training to select appropriate technologies and lack support to use them. It appears that the rapidly accelerating investments in computer hardware and software have not always been matched with the support and training needed by teachers expected to improve the education experiences of young children. Thus the mere presence of computers alone does not ensure appropriate or effective use (pp. 386–387).

The National Educational Technology Plan (2004b) from the U.S. Department of Education notes that the reason technology is not where it could be is not necessarily budget restraints and inadequate access. Yet a major reason is “lack of adequate training and lack of understanding of how computers can be used to enrich the learning experience” (USDOE, p. 22, as cited in Manceiri, 2008).

Ertmer (2005) observed that nationwide, teacher access to technology, appropriate training opportunities, and other critical factors to their integration of technology were beginning to emerge and reconcile the disparities noted by Judge et al. and many others. She cited a 2003 United States Department of Education (USDOE) survey of American teachers to which 85% of teachers reported feeling “somewhat well-prepared” to use technology for classroom instruction (p.25). Also, 80% of teachers surveyed expressed an interest in learning how to integrate computer technology into curricular areas (p.25). She compares the USDOE’s study findings to those of the National Center for Education Statistics (NCES) study, conducted in 2000, in which 53% of the American teachers surveyed reported feeling somewhat prepared (p.25). She concludes that these findings are significant signs that the majority of American teachers have technology skills at or above minimum competency and that the majority of American teachers are willing to integrate technology into curriculum and instruction, though she concedes that these
conclusions are conjectures based on self-reported data. Ertmer also observed that increased teachers’ capacity is being realized due to a more favorable policy environment at the local, state and federal levels.

Understanding teacher values as they pertain to the use of technology in education is critical to implementation efforts and professional-development decisions (Ertmer, Glazewski, Newby, & Ottenbreit-Leftwich, 2010). Ertmer et al. found that teacher integration decisions were based on whether the teacher perceived that the technology aligned with his or her value of promoting student learning.

Teachers’ pedagogical beliefs are also found to have a significant impact on the degree to which teachers integrate technology (Mueller, Wood, Willoughby, Ross & Specht, 2008; Hermans, Tondeur, Van Braak & Valke, 2008; Ertmer & Park, 2009).

Exemplary Use of Educational Technology

The New Jersey Department of Education describes the ideal use of educational technology the following way:

> using technology in conjunction with specific teaching strategies within an instructional setting to support students and teachers in a learning process that leads to academic success for each student, [enables] students to develop the knowledge and skills necessary to be productive, informed citizens, and self-directed lifelong learners, [and supports] higher-order thinking skills in a learner centered environment across all curriculum areas (NJ DOE – ED-TECH, 2006).

A document prepared by the USDOE, Office of Educational Research and Improvement (2003) states that “Patterns of student use (percent of students using computer-based technologies on a variety of instructional and instruction-related task)” (p 86) are appropriate indicators. The following list of instructional-related tasks is
Gathering information from a variety of sources; organizing and storing information; performing measurements and collecting data in investigation or laboratory experiments; manipulating/analyzing/interpreting information or data to discover relationships, generate questions, and/or reach conclusions; communicating/reporting information, conclusions, or results of investigations; creating visual displays of data/information; communicating/interacting with others in the classroom/school/outside of school; planning, refining, and producing audio/visual presentations; planning, drafting, proofreading, revising, publishing written text; creating graphics or visuals; generating original pieces of visual art and/or musical composition; publishing student projects or materials at remote locations on the Internet; performing calculations; and developing a more complete understanding of complex material or abstract concepts (p. 86).

Combinations of the tasks listed above would be required of students in a classroom where technology is truly integrated and a teacher has integrated technology into her instructional practice.

Research has shown that teachers who manage to effectively integrate technology into their instructional practice and leverage the power of technology to facilitate the development of higher-order thinking skills in their students subscribe to constructivist pedagogy (Jonassen, Peck & Wilson, 1999). Constructivist pedagogy is a learner-centered approach. Constructivist theory posits that students make sense of the world by synthesizing new experiences with understandings derived from previous experiences. Through reflection on their interaction with new objects and ideas, students form new mental constructs. When they encounter information or the expression of a mental construct that does not make sense to them, they either adjust their mental construct to absorb the new information or they interpret the new information in a way that conforms with their current mental construct (Brooks and Brooks, 1992, Sprague and Dede, 1999). Dede and Sprague (1999) point out that constructivist theory is essentially a theory of learning that if subscribed to by a teacher requires that teacher to “emulate certain
behaviors if they wish to be true to the constructivist paradigm” (p. 2). These behaviors include:

1. Organizing information around conceptual clusters of problems and questions as opposed to facts in isolation
2. Facilitating authentic activities/tasks that are relevant or of emerging relevance to students
3. Facilitating problem-based activities rather than drill and practice, which foster deeper understanding of concepts, as opposed to acquiring knowledge without deep understandings of context, relationships, nuances, and enduring relevancy
4. Encouraging student inquiry by asking thoughtful, open-ended questions
5. Allowing student inquiry and contributions to drive lessons and augment content
6. Being flexible with instructional strategies, changing and/or synthesizing strategies when necessary
7. Facilitating a collaborative environment in the classroom (Sprague and Dede, 1999).

Means, Blando, Olson, and Middleton (1993) state that constructivist learning strategies call for “teaching basic skills within authentic contexts...for modeling expert thought processes, and for providing for collaboration and external supports to permit students to achieve intellectual accomplishments they could not do on their own (1993, p.2).”
Regarding how the constructivist paradigm relates to technology integration, technology is to be presented as a tool to help students engage in authentic, problem-based, student-centered activities. Jonassen (2000) refers to technologies used in this fashion as “mindtools.” Jonassen describes mindtools in the following way:

[C]omputer-based tools and learning environments that have been adapted or developed to function as intellectual partners with the learner in order to engage and facilitate critical thinking and higher order learning. These tools include (but are not necessarily limited to) databases, semantic networks [concept maps], spreadsheets, expert systems, systems modeling tools, microworlds, intentional information search engines, visualization tools, multimedia publishing tools, live conversation environments, and computer conferences (p. 9)

Jonassen maintains that mindtools are ideal for constructivist pedagogy.

Helping students develop their technology literacy is not something that should happen in isolation. Technology literacy and other curricular knowledge domains should be addressed simultaneously. The required literacy for a particular technology must be taught to students along with the problem that it can be used to solve. Sprague and Dede (1999) state “assimilating [technology content and other subject content] should occur at the time the students need to master the material, and only as much [technology] instruction as they need to complete their project should be provided” (p2). The technology tool must be relevant to the task at hand in order for a meaningful connection to be made. Technology instruction should be embedded throughout other curricula.

Supporting the work of Dede and Sprague (1999), Jonassen (2000), and others Ringstaff and Kelly (2002) in their review of findings from research concerning the use of technology in education noted that “many researchers...found that technology is most powerful when used as a tool for problem solving, conceptual development, and critical
thinking" (Culp, Hawkins & Honey, 1999; Sandholtz, Ringstaff & Dwyer, 1997).

Ringstaff and Kelly identify this aggregation of findings as “Learning with Technology.”
Salomon, Perkins, and Globerson (1991) highlight a critical distinction between learning
with technology and learning from technology. Salomon et al. use the terms “the effects
OF technology versus the effects WITH computer technology” stating that “[t]he former
refers to the effects of computers on the learner, as if the learner has no input into the
process. Learning WITH computers refers to learners entering into intellectual
partnerships with the computer” (Salomon et. al, 1991). The result is a learning
experience that exceeds the possibilities of either the learner or the computer working
apart from the other (Joanssen, 1994).

In regard to the teacher’s role in the constructivist paradigm and technology
integration, Sprague and Dede (1999) note that teachers who effectively integrated
technology and students’ learning experiences into their curriculum and teaching yield to
the requisite change in the teacher-student dynamic. Teachers become facilitators of
learning experiences, giving students an opportunity to explore content and construct
meaning, as opposed to “presentational instruction.” (p.2) In their research review,
Ringstaff and Kelly (2002) note that a prevalent finding is that the more advanced uses of
technology support the constructivist view of learning in which the teacher is a facilitator
of learning rather than the classroom’s only source of knowledge (Trilling & Hood, 1999;
Silverstein et al., 2000; Statham & Torell, 1999). As stated by the President’s Panel on
Educational Technology (PPET, 1997) constructivist teachers place “the locus of
initiative and control largely within the student, who typically undertakes substantial,
authentic tasks, presented in a realistic context, that require the self-directed application of various sorts of knowledge and skills for their successful execution” (p. 34).

As noted earlier in this document, the literature indicates that technology-using teachers range along a continuum of instructional styles from instruction to construction (Becker). Table 2.3 compares traditional teaching practices (instruction) to constructivist instructional practices (construction):
<table>
<thead>
<tr>
<th>Item</th>
<th>Instruction</th>
<th>Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom activity</td>
<td>Teacher-centered</td>
<td>Learner-centered</td>
</tr>
<tr>
<td></td>
<td>Didactic</td>
<td>Interactive</td>
</tr>
<tr>
<td>Teacher role</td>
<td>Fact teller</td>
<td>Collaborative</td>
</tr>
<tr>
<td></td>
<td>Always expert</td>
<td>Sometimes learner</td>
</tr>
<tr>
<td>Student role</td>
<td>Listener</td>
<td>Collaborator</td>
</tr>
<tr>
<td></td>
<td>Always learner</td>
<td>Sometimes expert</td>
</tr>
<tr>
<td>Instructional emphasis</td>
<td>Facts</td>
<td>Relationships</td>
</tr>
<tr>
<td></td>
<td>Memorization</td>
<td>Inquiry and investigation</td>
</tr>
<tr>
<td>Concept of knowledge</td>
<td>Accumulation of</td>
<td>Transformation of facts</td>
</tr>
<tr>
<td></td>
<td>facts</td>
<td></td>
</tr>
<tr>
<td>Demonstration of success</td>
<td>Quantity</td>
<td>Quality of understanding</td>
</tr>
<tr>
<td>Assessment</td>
<td>Norm-referenced</td>
<td>Criterion-referenced</td>
</tr>
<tr>
<td></td>
<td>Portfolios and</td>
<td>Performances</td>
</tr>
<tr>
<td></td>
<td>performances</td>
<td></td>
</tr>
<tr>
<td>Technology use</td>
<td>Drill and practice</td>
<td>Communication, collaboration, information access, expression</td>
</tr>
</tbody>
</table>

Adopted from Sandholtz, Ringstaff, and Dwyer (1997)
Ertmer, Gopalakrishnan and Ross (2001) cited studies by Becker (1994), Dede, (1998), Dexter et al. (1999), and the President's Panel on Educational Technology (1997) to support the following statement:

Although we can find examples of technology-using teachers who fall at every point along this instruction-construction continuum, the literature on exemplary technology use suggest that expert technology-using teachers (do or should) reside on the constructivist side of the continuum (p. 2).

From the work of Grabe & Grabe (1996), Hooper & Rieber (1995), and Jonassen, Peck, & Wilson (1999), Ertmer et al. derived the table below to illustrate the difference between technology-integrated classroom environments and traditional classroom environments. They note, “The literature on technology-using teachers describes exemplary use as that which supports the type of activities and approaches noted o the right side of the table” (p.2). Though similar to Table 2.3, above., Table 2.4 provides additional insights.
Table 2.4

Attributes of Traditional and Integrated Classroom Environments

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Traditional Setting</th>
<th>Integrated Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom focus</td>
<td>Teacher centered (didactic)</td>
<td>Learner centered (interactive)</td>
</tr>
<tr>
<td>Teacher role</td>
<td>Present information Manage classroom</td>
<td>Guide discovery Model active learning Collaborator (sometimes learner)</td>
</tr>
<tr>
<td>Student role</td>
<td>Store information</td>
<td>Create knowledge Collaborator (sometimes expert)</td>
</tr>
<tr>
<td>Curricular characteristics</td>
<td>[Focused on] breadth Fact retention Fragmented knowledge and disciplinary separation</td>
<td>[Focused on] depth Application of knowledge Integrated multidisciplinary themes</td>
</tr>
<tr>
<td>Assessment practices</td>
<td>Fact retention Product oriented Traditional test Norm referenced</td>
<td>Applied knowledge Process oriented Alternative measures Criterion referenced</td>
</tr>
<tr>
<td>Role for technology</td>
<td>Drill and practice Programming</td>
<td>Communication (collaboration, information access, expression)</td>
</tr>
<tr>
<td>Technology content</td>
<td>Basic computer literacy with higher-level skills building on lower-level skills</td>
<td>Emphasis on thinking skills and application</td>
</tr>
</tbody>
</table>
Current research continues to indicate constructivist style pedagogy as a significant predictor of teacher integration of technology into teaching practice (Stols & Kriek, 2011; Donnelly, McGarr, & O’Reilly, 2011; Overbay, Patterson, Ashley, Vasu, & Grable, 2010).
Chapter III. Methodology

Introduction

This study was aimed at investigating the degree to which New Jersey public-middle-school teachers are integrating state mandated technology standards into curriculum and instruction. Principal’s perception of teachers’ integrations of the standards is also an area of examination. Standard 8.1—Computer and Information Literacy is the specific standard of focus for this investigation. The investigation also sought to understand how the teachers in targeted schools are assessing student performance in regard to Standard 8.1, the difficulties teachers perceive in their efforts to satisfy this mandate, and the level of importance teachers assign to implementing Standard 8.1.

The method (mixed-method) and design of this study are adapted from research conducted by Mancieri (2008). To obtain quantitative data, a descriptive survey was employed. In survey research, “the researcher poses a series of questions to willing participants; summarizes their responses with percentages, frequency counts, or more sophisticated statistical indexes; and then draws inferences about a particular population from the responses of the sample (Leedy & Ormrod, 2005, p. 184).

A phenomenological approach was employed to examine qualitative data gathered from principals and teachers. In phenomenological study, a researcher “attempts to understand people’s perceptions, perspectives, and understandings of a particular situation” (Leedy & Ormrod, 2005, pg. 139). In this study, the situation of interest is the level of integration that has occurred regarding Standard 8.1—Computer
and Information Literacy in public middle schools. The perceptions and perspectives sought are those of principals and teachers.

This study was driven by a two-part research question:

1. To what degree do New Jersey public-middle-school principals perceive that teachers are integrating Standard 8.1 into curriculum and instruction?

2. To what degree are New Jersey public-middle-school teachers integrating Standard 8.1 into curriculum and instruction?

Three research subquestions were also addressed in this study:

1. How are public middle schools in New Jersey assessing students based on Standard 8.1?

2. To what degree do public-middle-school teachers perceive difficulty in implementing Standard 8.1?

3. What are public-middle-school teachers' perceptions regarding the importance of integrating Standard 8.1?

Research Design

The researcher employed a mixed-methods approach to this study, combining quantitative and qualitative methods. As stated by Gay, Mills and Airasian (2009) “The purpose of mixed-methods research is to build on the synergy and strength that exist between quantitative and qualitative research methods to understand a phenomenon more fully than is possible using either quantitative or qualitative methods alone” (p.462). It was the goal of the researcher to collect and analyze quantitative data by way of
questionnaires, and then use qualitative data to further clarify the quantitative data. The qualitative data was collected by way of open-ended prompts and interviews.

Subjects

The researcher used purposive sampling in selecting the subjects for this study. Purposive sampling “is the process of selecting a sample that is believed to be representative of a given population” (Gay, Mills and Airasian, 2009, p.134). The districts from which the subjects for this study were selected are active members of the New Jersey Educational Computing Cooperative, Inc. (NJECC). The NJECC is recognized by the NJDOE as a legitimate and reputable organization that provides advocacy and support for districts committed to integrating technology into learning, instructional practices and professional development. The districts selected, based on their affiliation with the NJECC, are believed to be a sample of education organizations committed to the effective use and integration of technology into curriculum and teaching.

The following is a description of the two subject groups that ultimately participated in this study.

1. School Principals

The principals in 12 districts, from one county in northern New Jersey, N=13, were invited to participate in this study. A total of six (6) principals (n=6) participated. The schools that participated belong to the top three district-factor-group (DFG)
categories established by the New Jersey Department of Education: three (3) schools were from GH; two (2) schools were from J; one (1) school was from I. All participating schools are located in suburban areas of the county. Each school services a population of 500 students or more, with the exception of one school, which serviced fewer than 500 students.
Table 3.1

*Principal Questionnaire: Demographics*

<table>
<thead>
<tr>
<th>Items</th>
<th>( f )</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>7a. What is the population of students you serve in your school?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 500</td>
<td>1</td>
<td>16.7</td>
</tr>
<tr>
<td>500–1,000</td>
<td>5</td>
<td>83.3</td>
</tr>
<tr>
<td>1,0001,500</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>More than 2,000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7b. Your school is in what type of geographical setting?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Suburban</td>
<td>6</td>
<td>100</td>
</tr>
<tr>
<td>Rural</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7c. How many years total have you been a principal?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 5yrs</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>5 to 10 yrs</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>10–20 yrs</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>More than 20 yrs</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
2. Teachers

Teachers from each school supervised by a participating principal were invited to participate in the study. Only teachers who taught one of the ten content areas identified in the New Jersey Core Curricular Content Standards (NJCCCS) were solicited. A total of 353 questionnaires were distributed to teachers, and 63 questionnaires were completed and returned.

Teachers that received a questionnaire were invited to participate in follow-up interviews. A total of eight (8) teachers agreed to be interviewed. Of the eight interviewees, four (4) taught social studies, two (2) taught language arts literacy, one (1) taught science, and one (1) taught technology. Table 3.1 illustrates teacher participation by school.
Table 3.2

*Teacher Participation by School*

<table>
<thead>
<tr>
<th>School Number</th>
<th>Questionnaire</th>
<th>Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>School 1</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>School 2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>School 3</td>
<td>21</td>
<td>2</td>
</tr>
<tr>
<td>School 4</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>School 5</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>School 6</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>63</strong></td>
<td><strong>8</strong></td>
</tr>
</tbody>
</table>
Table 3.3

*Teacher Questionnaire: Demographics*

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>f</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>9a. What is the population of students you serve in your school?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 500</td>
<td>13</td>
<td>20.6</td>
</tr>
<tr>
<td>500–1,000</td>
<td>48</td>
<td>76.2</td>
</tr>
<tr>
<td>1,000–1,500</td>
<td>2</td>
<td>3.2</td>
</tr>
<tr>
<td>More than 2,000</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td>9b. Your school is in what type of geographical setting?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td>Suburban</td>
<td>55</td>
<td>87.3</td>
</tr>
<tr>
<td>Rural</td>
<td>6</td>
<td>9.5</td>
</tr>
<tr>
<td>9c. How many years total have you been a teacher?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 5 yrs</td>
<td>16</td>
<td>25.4</td>
</tr>
<tr>
<td>5–10 yrs</td>
<td>24</td>
<td>38.1</td>
</tr>
<tr>
<td>10–20 yrs</td>
<td>15</td>
<td>23.8</td>
</tr>
<tr>
<td>More than 20 yrs</td>
<td>8</td>
<td>12.7</td>
</tr>
</tbody>
</table>

Note: Total of n=1 respondents did not respond to question 9b.
Procedure

The superintendents of the twelve (12) public school districts located in northern New Jersey and the principals of the thirteen (13) public middle schools (one district has two middle schools) were sent a letter of solicitation via e-mail. A total of six (6) superintendents granted the researcher permission to conduct the study in their respective districts. A total of seven (7) schools were sent principal and teacher research packets. One principal declined to participate in the study, leaving a total of six (6) participating schools.

The researcher initiated the study in early November of 2010 by mailing research packets to principals and delivering questionnaires and questionnaire drop-boxes to the schools participating principals. All principal questionnaires were returned to the researcher via regular mail. The drop boxes containing completed teacher questionnaires were collected by the researcher. Questionnaire collection was completed by December 1, 2010. Teacher interviews were conducted between December 9, 2010 and January 11, 2011.

Each participating principal completed an anonymous, paper-based questionnaire distributed to him or her via regular mail (Appendix G.). Each principal was also provided with a cover letter explaining the research project and a postage-paid envelope to return completed surveys. Consent to participate in the study was indicated by participating principals completing and returning the questionnaire.

The data collected from the questionnaire addressed these research questions:
1. To what degree do public-middle-school-principals in New Jersey perceive that their teachers are integrating Standard 8.1—Computer and Information Literacy into their curriculum and instruction?

2. How are public middle schools in New Jersey assessing students based on Standard 8.1?

The teachers in the schools supervised by participating principals received a paper-based questionnaire (Appendix H) delivered to their individual school mailboxes. Included with the questionnaire were a cover letter, informed-consent document (Appendix C) explaining the research project, and an interview solicitation form. Consent to participate in the questionnaire portion of the study was indicated by participating teachers completing and returning the questionnaire. Teachers were asked to complete the questionnaire and interview solicitation form (Appendix I) and return them to a secure drop box located in the main office of their respective schools. Teachers were explicitly directed to submit the interview solicitation form and the completed questionnaire separately to maintain the anonymity of the questionnaire submission. The teacher questionnaire solicited information addressing these research questions:

1. To what degree do public-middle-school teachers in New Jersey integrate Standard 8.1—Computer and Information Literacy into their curriculum and instruction?

2. To what degree do teachers perceive difficulty in implementing Standard 8.1?

3. What are teacher perceptions regarding the importance of integrating Standard 8.1?
All teachers that indicated on an interview solicitation form that they were willing to participate in an interview were contacted by the researcher to arrange an interview date. A total of eight (8) teachers were interviewed. The researcher conducted and recorded all interviews. Three (3) interviews were conducted in person. Five (5) interviews were conducted over the phone. Interview data collected addressed the following research questions:

1. To what degree do teachers perceive difficulty in implementing Standard 8.1?
2. What are teachers’ perceptions about the importance of integrating Standard 8.1?
3. How are public middle schools in New Jersey assessing student performance regarding Standard 8.1?

Instrumentation

The instrumentation employed in this study is a modified version of the questionnaire and semistructured interview guide developed by Mancieri (2008). While Mancieri’s instruments focused on the implementation of National Educational Technology Standards for Students (NETS-S), the researcher modified the questionnaire to focus on the implementation of New Jersey Technology Literacy Standard (8.1), which is aligned with NETS-S. Permission for the use of the instrument was obtained from Mancieri via e-mail communication (Appendix L). Regarding the validity of the instrument, Mancieri stated the following in her dissertation:

The two instruments were created using the NETS-S as the content. Content validity of the NETS-S was supported by the many expert stakeholders participating in the drafts and the years of research required in creating the standards (Thomas, 2000 as cited by Manceri, 2008)
Questionnaires

Part 1, sections 1 through 6 of the teachers’ and the principals’ questionnaires, are identical. Principals and teachers were asked the same questions regarding Standard 8.1 to facilitate a compare/contrast analysis of the perceptions of the two groups. The relationship between the questions in the noted sections of the principals’ and teachers’ questionnaire and the NJCCCS 8.1—Computer and Information Literacy is illustrated in Table 3.4 below:
Table 3.4

*Relationship Between Questionnaire Sections and Standard 8.1 Strands*

<table>
<thead>
<tr>
<th>Questionnaire Section</th>
<th>Strand(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Basic operations and concepts</td>
<td>A. Technology Operations and Concepts</td>
</tr>
<tr>
<td>2. Social, ethical, and human issues</td>
<td>D. Digital Citizenship</td>
</tr>
<tr>
<td>3. Technology productivity tools</td>
<td>A. Technology Operations and Concepts</td>
</tr>
<tr>
<td>4. Technology communications tools</td>
<td>B. Creativity and Innovation</td>
</tr>
<tr>
<td></td>
<td>C. Communication and Collaboration</td>
</tr>
<tr>
<td>5. Technology research tools</td>
<td>E. Research and Information Literacy</td>
</tr>
<tr>
<td>6. Technology problem-solving and decision-</td>
<td>F. Critical Thinking, Problem Solving, and Decision-Making</td>
</tr>
<tr>
<td>making tools</td>
<td></td>
</tr>
</tbody>
</table>
Part 2 and Part 3 of the teachers' questionnaire contained prompts that solicited responses regarding the levels and types of support teachers receive in implementing technology into curriculum and teaching by way of Standard 8.1, and the barriers to this objective that they encounter in their professional practice.

The questionnaires were composed of forced-answer items and one open-ended question. The forced-answer items were in the form of a five-point Likert Scale prompting participants to select a response indicator that best represents their answer to the statement. The response choices will be SA=Strongly agree; A=Agree, D=Disagree; SD=Strongly disagree; NA=Not able to rate. The open-ended item prompted participants to describe how student proficiency, in relation to Standard 8.1, is assessed.

Interviews

The researcher conducted semistructured interviews with teachers. A list of interview prompts (Appendix J) adapted from Manceri (2008) were used to guide the interviews. Solicitation of interview participants was executed via a solicitation form included with the teacher survey. The solicitation form requested contact information (name, phone number, school, e-mail). Eight (8) willing teachers completed this form. A formal consent statement was signed and returned by interview participants. Interviewees were presented with a copy of their signed consent form at the time of the interview, or a copy was mailed to the interviewee if the interview was conducted over the phone. All interviews were recorded using a digital audio recorder. The researcher conducted all interviews. The researcher transcribed and analyzed each recording (Appendix K).
Data Analysis

The researcher’s data-analysis procedures were guided and informed by the procedures used by Mancieri (2008). Forced-answer questionnaire responses of both the teachers’ and principals’ questionnaire were analyzed using SPSS software version PASW Statistics version 18.0 (2010). The goal of the analysis was to derive “a descriptive analysis of the data of all variables, dependent and independent, including the mean, standard deviation, frequencies, and percents (Gall, Gall, & Borg, 2007 as cited by Manceiri, 2008, p. 60). The descriptive variables analyzed for this study were frequencies and percents. Results of the analysis are expressed in tables. Frequency tables were created with results displayed to highlight the number and percentages of respondents and non-respondents for both the public-middle-school principals and the public-middle-school teachers (Manceri, 2008).

Similarities and differences between principal questionnaire responses and teacher questionnaire responses are analyzed and compared to trends in the literature on technology integration and K–12 education.

Data gathered from semistructured open-ended interview recordings was transcribed and examined using a phenomenological approach. The researcher employed the following steps for data analysis:

1. Identify statements that relate to the topic
2. Group statements into “meaning units”
3. Seek divergent perspectives
The researcher looked for recurring words and phrases using content analysis. 

"Content analysis is a detailed and systematic examination of the contents of a particular body of material for the purpose of identifying patterns, themes or biases" (Leedy & Ormrod, 2001 as cited in Coopeland, 2003; Patton, 1990). Items were coded and categorized according to emergent categories or themes. In the discussion section of this document, emergent themes are discussed in relation to the questionnaire findings, related research, related literature, and relevant theories. The qualitative data gathered in this study was used to provide greater depth to quantitative data collected.

The researcher hopes that the analysis will yield useful information that helps practitioners better align the efforts of principals and teachers regarding the integration of technology into instruction and the implementation of Standard 8.1.
Chapter IV
Presentation of Findings

Introduction

The study’s findings are presented in this chapter according to the research questions that guided the study. The research questions are:

1. To what degree do New Jersey public-middle-school principals perceive that teachers are integrating Standard 8.1 into curriculum and instruction?

2. To what degree are New Jersey public-middle-school teachers integrating Standard 8.1 into curriculum and instruction?

Three research subquestions were also addressed by this study:

1. How are public middle schools in New Jersey assessing students based on Standard 8.1?

2. To what degree do public-middle-school teachers perceive difficulty in implementing Standard 8.1?

3. What are public-middle-school teachers perceptions regarding the importance of integrating Standard 8.1?

A mixed-method research design was employed for this study. Quantitative data was collected via questionnaires and qualitative data was collected via an open-ended prompt included in the questionnaires. Qualitative data was also collected via semistructured interviews.
The researcher received six (n=6) completed questionnaires from middle-school principals, and sixty-three (n=63) completed questionnaires from middle-school teachers. The researcher also interviewed eight (n=8) middle-school teachers.

**Research Question One and Two**

1. **To what degree do New Jersey public-middle-school principals perceive that teachers are integrating Standard 8.1 into curriculum and instruction?**

2. **To what degree are New Jersey public-middle-school teachers integrating Standard 8.1 into curriculum and instruction?**

The research questions above were addressed by principals and teachers in their respective questionnaires. Also, teacher responses during interviews provided insight regarding teacher implementation practices.

In Table 4.1 principals' and teachers' responses were placed side by side for comparison. The data is compiled from section 1 through 6 of both the principal and teacher questionnaire. The point of comparison is the percentage of disparity. This number indicates the difference between the percentage of principals that indicate agreement and the percentage of teachers that indicate agreement with a questionnaire prompt. For the purposes of this analysis, percentage disparity that is 50% or higher indicates nonsimilar responses between principals and teachers. Percentage disparity below 50% indicates similar response between principals and teachers.
### Table 4.1

**Principal/Teacher Comparison: Frequencies (f) and Percents (P) of Responses of "Strongly Agree" and "Agree" for Perceived Use Versus Actual Use of the Standard 8.1 in Curriculum and Instruction.**

<table>
<thead>
<tr>
<th>Items</th>
<th>Principals n=6</th>
<th>Teachers n=63</th>
<th>Percentage disparity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>P</td>
<td>f</td>
</tr>
<tr>
<td><strong>Section 1. Basic Operations and Concepts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1a. Students demonstrate a sound understanding of the nature and operation of technology systems</td>
<td>6</td>
<td>100</td>
<td>52</td>
</tr>
<tr>
<td>1b. Students are proficient in the use of technology</td>
<td>6</td>
<td>100</td>
<td>53</td>
</tr>
<tr>
<td><strong>Section 2. Social, ethical, and human issues</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2a. Students understand the ethical, cultural and societal issues related to technology</td>
<td>3</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>2b. Students practice responsible use of technology systems, information, and software</td>
<td>5</td>
<td>83.3</td>
<td>30</td>
</tr>
<tr>
<td>2c. Students develop positive attitudes toward technology use that supports lifelong learning, collaboration, personal pursuits, and productivity</td>
<td>5</td>
<td>83.3</td>
<td>47</td>
</tr>
<tr>
<td><strong>Section 3. Technology productivity tools</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3a. Students use technology tools to enhance learning, increase productivity, and promote creativity</td>
<td>6</td>
<td>100</td>
<td>54</td>
</tr>
<tr>
<td>3b. Students use productivity tools to</td>
<td>6</td>
<td>100</td>
<td>55</td>
</tr>
</tbody>
</table>
collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works

Section 4. Technology communication tools

4a. Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences

4b. Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences

Section 5. Technology research tools

5a. Students use technology to locate, evaluate, and collect information from a variety of sources

5b. Students use technology tools to process data and report results

5c. Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks

Section 6. Technology problem-solving and decision-making tools

6a. Students use technology resources for solving problems and making informed decisions

6b. Students employ technology in the development of strategies for solving problems in the real world
Six out of Six Principals Agree

In analyzing table 4.3 above, looking at the items for which 100% of the participating principals indicated agreement (1a, 1b, 3a, 3b, 4a, 4b, 5a), it is interesting to examine the disparity between the percentage of teachers that indicated agreement with these same items. For all except one of these items the percentage point disparity falls between a range of 12.7 points and 26.9 percentage points, showing similarity in the perceptions of all principals as a group and all teachers as a group. For the item of exception, statement 4b, the range of disparity is 87.3 percentage points. This particular group of principals perceives that students are using a “variety of media and formats to communicate information and ideas effectively to multiple audiences” while the overwhelming majority of this particular group of teachers feel that their students are not demonstrating proficiency to the same degree. This item relates to Standard 8.1, Strand C (Communication and Collaboration).

Five out of Six Principals Agree

In looking at the items for which five out of the six principals indicated agreement (2b, 2c, 6a, 6b) the range of disparity is from 30.9% to 35.7% for 2b, 6a, and 6b. For item 2c, the range of disparity is only 8.7 percentage points. For this item, the perceptions of the principals and the majority of the teachers are similar.

It is important to note the disparity in agreement on item 2b and 6b.

For item 2b (students practice responsible use of technology systems, information, and software), the range of disparity is 35.7 percentage points. While 5 out of 6 principals
indicate agreement with the statement, less than half of the responding teachers (47.6)
agree. This item relates to Standard 8.1, Strand D (Digital Citizenship). Principal
perception and teacher practice are not aligned in this area.

For item 6a (Students use technology resources for solving problems and making
informed decisions), a little over half of responding teachers (52.3%) indicated agreement
with the statement, while five out of six principals indicate agreement. Regarding item
6a, principal perception is not aligned with teacher practice.

For item 6b (Students employ technology in the development of strategies for
solving problems in the real world), the range of disparity is 37.3 percentage points.
While five out of six principals indicate agreement with the statement, less than half of
the responding teachers (46.0%) indicate a perception similar to the group of responding
principals. Responding teachers’ practices are not aligned with responding principals’
perceptions.

Items 6a and 6b relate to Standard 8.1, Strand F (Critical Thinking, Problem
Solving, and Decision-Making).

Four out of Six Principals Agree

Item 5c (Students evaluate and select new information resources and
technological innovations based on the appropriateness for specific tasks) is the only item
for which four out of six principals indicated agreement with the statement. One third of
responding teachers (33.3%) indicated agreement, while two thirds (66.7%) of
responding principals indicated agreement. This item relates to Standard 8.1, Strand A
(Technology Operations and Concepts).
Three out of Six Principals Agree

The two questionnaire items for which three out of six principals indicated agreement are 2a and 5b.

For item 2a (Students understand the ethical, cultural and societal issues related to technology), less than half the teachers (47.6%) indicated agreement with the statement. The disparity of agreement is minimal at 10.1 percentage points. This indicates that the perceptions of responding principals and that of the teachers are relatively similar in this area. Item 2a relates to Standard 8.1, Strand D (Digital Citizenship).

For item 5b (Students use technology tools to process data and report results), agreement with the statement is similar among the principals and teachers. The range of disparity is minimal at 13.4 percentage points. The perceptions of responding principals and the practice of responding teachers are relatively similar. Questionnaire item 5b relates to Standard 8.1, Strand A (Technology Operations and Concepts).

Principals’ perceptions of the degree of implementation of Standard 8.1 and teacher’s perception of their actual implementation of Standard 8.1 were similar for most items on the questionnaire (13 out of 14). The questionnaire prompts were arranged in sections that represent particular skill sets and competencies identifies in the NETS-S, which are aligned with the NJCCCS for Technology. In one (1) of the sections, principals’ perceptions and teachers practice emerge as contradictory for specific items. Table 4.2, illustrates the alignments and contradictions between principal’s perceptions and teacher reported practice.
Table 4.2

Alignment and Nonalignment of Teacher Practice and Principal Perception

<table>
<thead>
<tr>
<th>Questionnaire Section</th>
<th>Aligned</th>
<th>Not Aligned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic operations and concepts</td>
<td>1a, 1b</td>
<td></td>
</tr>
<tr>
<td>Social, ethical, and human issues</td>
<td>2a, 2b, 2c</td>
<td></td>
</tr>
<tr>
<td>Technology productivity tools</td>
<td>3a, 3b</td>
<td></td>
</tr>
<tr>
<td>Technology communications tools</td>
<td>4a</td>
<td>4b</td>
</tr>
<tr>
<td>Technology research tools</td>
<td>5a, 5b, 5c</td>
<td></td>
</tr>
<tr>
<td>Technology problem-solving and decision-making tools</td>
<td>6a, 6b</td>
<td></td>
</tr>
</tbody>
</table>
The information in Table 4.2 appears to indicate that alignment is nearly perfect. However, examining the percent disparity for the questionnaire items provides information that reveals areas of significant disparities. For the following items, the majority of principals (four or more) indicate agreement with the statement, while less than half of the teachers indicate agreement:

1) 2b. Students practice responsible use of technology systems, information and software (principals perceived a greater degree than teachers—35.7 percentage disparity)

2) 4b. Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences (principals perceived a greater degree than teachers—87.3 percentage disparity)

3) 5c. Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks (principals perceived a greater degree than teachers—33.3 percentage disparity)

4) 6b. Students employ technology in the development of strategies for solving real-world problems (principals perceived a greater degree than teachers—37.7 percentage disparity)

Although principals perceive that integration of Standard 8.1 is taking place, and
teachers are implementing Standard 8.1, there are both similar and divergent understandings of the details. The existence of discrepancies between principals and teachers, evidenced by the examination of the percent disparity on specific questionnaire items (2b, 4b, 5c, 6b), highlights a critical issue.

Analysis of Questionnaire Findings by School

Above, questionnaire responses were considered as an aggregated group for principals and teachers respectively. The data collected also allows for further analysis of responses by individual school. This provides further insight into, and a more focused understanding of, the differences and similarities in the perceptions of principal respondents and the teacher respondents they supervise directly.
**School 1**

Table 4.3

*Single-School Principal/Teacher Comparison: Frequencies (f) and Percentages (P) of “Strongly Agree” and “Agree” Responses for Perceived Use Versus Actual Use of the Standard 8.1 in Curriculum and Instruction – School 1*

<table>
<thead>
<tr>
<th>Section 1. Basic operations and concepts</th>
<th>Principal f</th>
<th>Teachers n=11 f</th>
<th>Teachers P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a. Students demonstrate a sound understanding of the nature and operation of technology systems</td>
<td>1</td>
<td>9</td>
<td>81.8</td>
</tr>
<tr>
<td>1b. Students are proficient in the use of technology.</td>
<td>1</td>
<td>8</td>
<td>72.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section 2. Social, ethical, and human issues</th>
<th>Principal f</th>
<th>Teachers n=11 f</th>
<th>Teachers P</th>
</tr>
</thead>
<tbody>
<tr>
<td>2a. Students understand the ethical, cultural and societal issues related to technology</td>
<td>1</td>
<td>4</td>
<td>36.4</td>
</tr>
<tr>
<td>2b. Students practice responsible use of technology systems, information, and software</td>
<td>1</td>
<td>5</td>
<td>45.5</td>
</tr>
<tr>
<td>2c. Students develop positive attitudes toward technology use that supports lifelong learning, collaboration, personal pursuits, and productivity</td>
<td>1</td>
<td>8</td>
<td>72.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section 3. Technology productivity tools</th>
<th>Principal f</th>
<th>Teachers n=11 f</th>
<th>Teachers P</th>
</tr>
</thead>
<tbody>
<tr>
<td>3a. Students use technology tools to enhance learning, increase productivity, and promote creativity</td>
<td>1</td>
<td>10</td>
<td>90.9</td>
</tr>
</tbody>
</table>
3b. Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.

Section 4. Technology communications tools

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>72.7</td>
</tr>
</tbody>
</table>

4a. Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
<td>63.6</td>
</tr>
</tbody>
</table>

4b. Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences

Section 5. Technology research tools

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</thead>
<tbody>
<tr>
<td>1</td>
<td>9</td>
<td>81.8</td>
</tr>
</tbody>
</table>

5a. Students use technology to locate, evaluate, and collect information from a variety of sources

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>36.4</td>
</tr>
</tbody>
</table>

5b. Students use technology tools to process data and report results

<p>| | | |</p>
<table>
<thead>
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<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>54.5</td>
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</tbody>
</table>

5c. Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks

Section 6. Technology problem-solving and decision-making tools

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<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>54.5</td>
</tr>
</tbody>
</table>

6a. Students use technology resources for solving problems and making informed decisions

<p>| | | |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>54.5</td>
</tr>
</tbody>
</table>

6b. Students employ technology in the development of strategies for solving problems in the real world
For School 1, sixty-four (64) teachers received a questionnaire. Eleven (11) teachers completed and returned the questionnaire, for a 17.18% response rate. For thirteen (13) out of fourteen (14) questionnaire items, more than half of the teachers that responded indicated agreement similar to that of the principal. Item 5b (Students use technology tools to process data and report results) is the item of exception with only four teachers out of eleven (36.33%) indicating agreement. Item 5b relates to Standard 8.1, Strand A (Technology Operations and Concepts).

For all other items, the principals’ and teachers’ responses indicating agreement were similar with six or more teachers (54% or higher) indicating agreement for a particular item. Agreement was most similar on items 3a and 3b. Item 3a had 100% agreement between principal and teachers. For item 3b, ten out of eleven teachers indicated agreement. Items 3a and 3b refer to students’ use of productivity tools. These items relate to Standard 8.1, Strand A (Technology Operations and Concepts).

The perception of the principal in School 1, regarding the implementation of Standard 8.1, is similar to that of the responding teachers.
School 2

Table 4.4

*Single-School, Principal/Teacher Comparison: Frequencies (f) and Percentages (P) of “Strongly Agree” and “Agree” Responses for Perceived Use Versus Actual Use of the Standard 8.1 in Curriculum and Instruction – School 2*

<table>
<thead>
<tr>
<th>Questionnaire Section</th>
<th>Teachers Principal n=1</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 1. Basic operations and concepts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1a. Students demonstrate a sound understanding of the nature and operation of technology systems.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1b. Students are proficient in the use of technology.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Section 2. Social, ethical, and human issues</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2a. Students understand the ethical, cultural and societal issues related to technology</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>2b. Students practice responsible use of technology systems, information, and software</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2c. Students develop positive attitudes toward technology use that supports lifelong learning, collaboration, personal pursuits, and productivity</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Section 3. Technology productivity tools</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3a. Students use technology tools to enhance learning, increase productivity, and promote creativity.</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
3b. Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.

Section 4. Technology communications tools

4a. Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.

4b. Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences

Section 5. Technology research tools

5a. Students use technology to locate, evaluate, and collect information from a variety of sources.

5b. Students use technology tools to process data and report results

5c. Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks

Section 6. Technology problem-solving and decision-making tools

6a. Students use technology resources for solving problems and making informed decisions

6b. Students employ technology in the development of strategies for solving problems in the real world
For School 2, eleven (11) teachers taught students considered middle-grade students. Each teacher solicited taught sixth grade. Of the eleven teachers who received the questionnaire, only one (1) responded. The one respondent was in agreement with the principal on all items with the exception of the following items:

1. 5b. Students use technology tools to process data and report results.
2. 5c. Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.
3. 6a. Students use technology resources for solving problems and making informed decisions.
4. 6b. Students employ technology in the development of strategies for solving problems in the real world.

These items referred to technology research tools and technology-problems solving and decision-making tools. These items are aligned with Standard 8.1, Strand A (Technology Operation and Concepts), as well as Strand C (Communication and Collaboration).

Since only one teacher of 11 responded, an inference cannot be drawn regarding the experience of the solicited group of teachers. However, it can be said that the perception of the principal is closely aligned with that of the responding teacher.
**School 3**

Table 4.5

Single-School, Principal/Teacher Comparison: Frequencies ($f$) and Percents ($P$) of “Strongly Agree” and “Agree” Responses for Perceived Use Versus Actual Use of the Standard 8.1 in Curriculum and Instruction – School 3

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>Principal $f$</th>
<th>Teachers $n=21$ $f$</th>
<th>Teachers $P$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 1. Basic operations and concepts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1a. Students demonstrate a sound understanding of the nature and operation of technology systems</td>
<td>1</td>
<td>19</td>
<td>90.5</td>
</tr>
<tr>
<td>1b. Students are proficient in the use of technology</td>
<td>1</td>
<td>18</td>
<td>85.7</td>
</tr>
<tr>
<td><strong>Section 2. Social, ethical, and human issues</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2a. Students understand the ethical, cultural and societal issues related to technology</td>
<td>12</td>
<td></td>
<td>57.1</td>
</tr>
<tr>
<td>2b. Students practice responsible use of technology systems, information, and software.</td>
<td>1</td>
<td>10</td>
<td>47.6</td>
</tr>
<tr>
<td>2c. Students develop positive attitudes toward technology use that supports lifelong learning, collaboration, personal pursuits, and productivity</td>
<td>1</td>
<td>15</td>
<td>71.4</td>
</tr>
<tr>
<td><strong>Section 3. Technology productivity tools</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3a. Students use technology tools to enhance learning, increase productivity, and promote creativity.</td>
<td>1</td>
<td>19</td>
<td>90.5</td>
</tr>
<tr>
<td>3b. Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.</td>
<td>1</td>
<td>19</td>
<td>90.5</td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>Section 4. Technology communications tools</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4a. Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.</td>
<td>1</td>
<td>16</td>
<td>76.2</td>
</tr>
<tr>
<td>4b. Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences</td>
<td>1</td>
<td>19</td>
<td>90.5</td>
</tr>
<tr>
<td>Section 5. Technology research tools</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a. Students use technology to locate, evaluate, and collect information from a variety of sources</td>
<td>1</td>
<td>16</td>
<td>76.2</td>
</tr>
<tr>
<td>5b. Students use technology tools to process data and report results</td>
<td>1</td>
<td>15</td>
<td>71.4</td>
</tr>
<tr>
<td>5c. Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.</td>
<td>5</td>
<td>23.8</td>
<td></td>
</tr>
<tr>
<td>Section 6. Technology Problem-solving and decision-making tools</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6a. Students use technology resources for solving problems and making informed decisions</td>
<td>14</td>
<td>66.7</td>
<td></td>
</tr>
<tr>
<td>6b. Students employ technology in the development of strategies for solving problems in the real world</td>
<td>11</td>
<td>52.4</td>
<td></td>
</tr>
</tbody>
</table>
For School 3, seventy-four (74) teachers received the questionnaire. A total of twenty-one (21) teachers returned the questionnaire for a response rate of 28.37%.

The majority of the teachers that responded shared a similar perception to the principals on most questionnaire items. The items of exception are:

1. 2a. Students understand the ethical, cultural and societal issues related to technology.

2. 2b. Students practice responsible use of technology systems, information, and software.

3. 6a. Students use technology resources for solving problems and making informed decisions.

4. 6b. Students employ technology in the development of strategies for solving problems in the real world.

These items are related to Standard 8.1, Strand A (Technology Operations and Concepts), and Strand D (Digital Citizenship).

For item 2a, nine (9) out of twenty-one (21) teachers (42.85%) indicated a similar perception to that of the principal.

For item 2b, ten (10) out of twenty-one (21) teachers (47.62%) indicated a similar perception to that of the principal.

For item 6a, seven (7) out of twenty-one (21) teachers (33.33%) indicate practice that is similar to the perception of the principal.

For item 6b, ten (10) out of twenty-one (21) teachers (47.62%) share the similar perception with the principal.
The analysis of the data for School 3 reveals that the principal’s perception and teacher practice regarding the implementation of Standard 8.1 are aligned for the majority of the standard strands, and thus similar.
Table 4.6

Single-School, Principal/Teacher Comparison: Frequencies (f) and Percents (P) of “Strongly Agree” and “Agree” Responses for Perceived Use Versus Actual Use of the Standard 8.1 in Curriculum and Instruction – School 4

<table>
<thead>
<tr>
<th>Items</th>
<th>Principal n=5</th>
<th>Teachers</th>
<th>f</th>
<th>f</th>
<th>P</th>
</tr>
</thead>
</table>

Section 1. Basic operations and concepts

1a. Students demonstrate a sound understanding of the nature and operation of technology systems

1b. Students are proficient in the use of technology

Section 2. Social, ethical, and human issues

2a. Students understand the ethical, cultural and societal issues related to technology

2b. Students practice responsible use of technology systems, information, and software

2c. Students develop positive attitudes toward technology use that supports lifelong learning, collaboration, personal pursuits, and productivity

Section 3. Technology productivity tools

3a. Students use technology tools to enhance learning, increase productivity, and promote creativity
3b. Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works

Section 4. Technology communications tools

4a. Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences

4b. Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences

Section 5. Technology research tools

5a. Students use technology to locate, evaluate, and collect information from a variety of sources

5b. Students use technology tools to process data and report results

5c. Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.

Section 6. Technology problem-solving and decision-making tools

6a. Students use technology resources for solving problems and making informed decisions

6b. Students employ technology in the development of strategies for solving problems in the real world

* Principal indicated disagreement with the statement
A total of ninety-one (91) questionnaires were distributed to teachers in School 4. Five (5) questionnaires were returned, for a response rate of 5.49%.

For nine (9) out of fourteen (14) of the questionnaire items, the majority of the teacher respondents indicated that their teaching practice regarding Standard 8.1 was similar to the perception of the principal. The items for which the majority of teachers indicated disagreement with the principal are:

1. 2a. Students understand the ethical, cultural and societal issues related to technology.
2. 2b. Students practice responsible use of technology systems, information, and software.
3. 5b. Students use technology tools to process data and report results; 5c. Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.
4. 6b. Students employ technology in the development of strategies for solving problems in the real-world.

For item 2a, none of the responding teachers indicated that their practice was similar to the perception of the principal.

For item 2b, three (3) out of the five (5) teacher respondents indicated agreement with the statement, which is contrary to the principal’s perception.

Items 2a and 2b are related to Standard 8.1, Strand D. Digital Citizenship. It is interesting to note that although items 2a and 2b are under the same section (Section 2.
Social, ethical, and human issues), the principal and the responding teachers are on the opposite sides. The principal perceives that students understand the issues, but do not practice responsibly. The majority of the teacher respondents perceive that the students do not understand the issues, but practice responsibility.

For item 5b, three (3) out of five (5) teachers indicate agreement with the statement. The principal indicated disagreement. This item relates to Standard 8.1, Strand E (Research and Information Literacy).

For item 5c, the principal indicates agreement with the statement. Three (3) out of five (5) teacher respondents disagree with the principal’s perception.

Items 5b and 5c are related to Standard 8.1, Strand E (Research and Information Literacy).

For item 6b, the principal’s indicates agreement with the statement. Four (4) out of the five (5) teacher respondents indicated disagreement with the statement. Item 6b is related to Standard 8.1, Strand E (Research and Information Literacy), and Strand F (Critical Thinking, Problem solving and Decision Making).

The questionnaire data for School 4 indicates that the principal and teachers’ perceptions are similar overall. However, critical differences do exist.
**School 5**

Table 4.7

*Single-School, Principal/Teacher Comparison: Frequencies (f) and Percents (P) of “Strongly Agree” and “Agree” Responses for Perceived Use Versus Actual Use of the Standard 8.1 in Curriculum and Instruction – School 5*

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>Principal f</th>
<th>Teachers n=12 f</th>
<th>Teachers P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1. Basic operations and concepts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1a. Students demonstrate a sound understanding of the nature and operation of technology systems</td>
<td>1</td>
<td>10</td>
<td>83.3</td>
</tr>
<tr>
<td>1b. Students are proficient in the use of technology</td>
<td>1</td>
<td>11</td>
<td>91.6</td>
</tr>
<tr>
<td>Section 2. Social, ethical, and human issues</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2a. Students understand the ethical, cultural and societal issues related to technology</td>
<td>1</td>
<td>2</td>
<td>16.6</td>
</tr>
<tr>
<td>2b. Students practice responsible use of technology systems, information, and software</td>
<td>1</td>
<td>5</td>
<td>41.6</td>
</tr>
<tr>
<td>2c. Students develop positive attitudes toward technology use that supports lifelong learning, collaboration, personal pursuits, and productivity</td>
<td>1</td>
<td>9</td>
<td>75</td>
</tr>
<tr>
<td>Section 3. Technology productivity tools</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3a. Students use technology tools to enhance learning, increase productivity, and promote creativity</td>
<td>1</td>
<td>9</td>
<td>75</td>
</tr>
<tr>
<td>3b. Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works</td>
<td>1</td>
<td>11</td>
<td>91.6</td>
</tr>
</tbody>
</table>
Section 4. Technology communications tools

4a. Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences  

| 1 | 11 | 91.6 |

4b. Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences

| 1 | 11 | 91.6 |

Section 5. Technology research tools

5a. Students use technology to locate, evaluate, and collect information from a variety of sources.

| 1 | 9  | 75  |

5b. Students use technology tools to process data and report results

| 1 | 8  | 66.6 |

5c. Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.

| 1 | 4  | 33.3 |

Section 6. Technology problem-solving and decision-making tools

6a. Students use technology resources for solving problems and making informed decisions

| 1 | 5  | 41.6 |

6b. Students employ technology in the development of strategies for solving problems in the real world

| 1 | 4  | 33.3 |
A total of seventy-five (75) questionnaires were distributed to teachers in School 5. A total of twelve (12) teachers returned a questionnaire, for a response rate of 16.22%.

For most of the questionnaire items (9 out of 14) the principal and responding teachers indicated similar perceptions. The items on which the majority of the responding teachers indicated disagreement with the principal are:

1. 2a. Students understand the ethical, cultural and societal issues related to technology.
2. 2b. Students practice responsible use of technology systems, information, and software.
3. 5c. Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.
4. 6a. Students use technology resources for solving problems and making informed decisions.
5. 6b. Students employ technology in the development of strategies for solving problems in the real world.

For item 2a, ten (10) out of twelve (12) teacher respondents (83.33%) indicated disagreement with the statement, while the principal indicated agreement.

For item 2b, seven (7) out of twelve (12) teacher respondents (58.33%) indicated disagreement with the principal’s perception regarding the statement.

Item 2a and 2b are related to Standard 8.1, Strand D (Digital Citizenship).

For item 5c, eight (8) out of twelve (12) teacher respondents (66.67%) disagreed with the principal's perception. This item is related to Standard 8.1, Strand A
(Technology Operation and Concepts), and Strand E (Research and Information Literacy).

For items 6a and 6b, the principal indicated agreement with each statement. A total of seven (7) out of twelve (12) teachers (58.33%) indicated disagreement with item 6a. A total of eight (8) out of twelve (12) teachers (66.67%) indicated disagreement with item 6b. Both items are related to Standard 8.1, Strand E (Research and Information Literacy).

The implementation practices of the responding teachers in School 5 are similar to the perceptions of the principal. Critical discrepancies do exist.
### Table 4.8

**Single-School Principal/Teacher Comparison: Frequencies (f) and Percents (P) of “Strongly Agree” and “Agree” Responses for Perceived Use Versus Actual Use of the Standard 8.1 in Curriculum and Instruction – School 6**

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>Principal</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>n=13</td>
</tr>
<tr>
<td><strong>Section 1. Basic operations and concepts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1a. Students demonstrate a sound understanding of the nature and operation of technology systems</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>1b. Students are proficient in the use of technology</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td><strong>Section 2. Social, ethical, and human issues</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2a. Students understand the ethical, cultural and societal issues related to technology</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>2b. Students practice responsible use of technology systems, information, and software</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2c. Students develop positive attitudes toward technology use that supports lifelong learning, collaboration, personal pursuits, and productivity</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td><strong>Section 3. Technology productivity tools</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3a. Students use technology tools to enhance learning, increase productivity, and promote creativity</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>3b. Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works</td>
<td>1</td>
<td>8</td>
</tr>
</tbody>
</table>
**Section 4. Technology communications tools**

4a. Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>53.8</th>
</tr>
</thead>
</table>

4b. Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>46.1</th>
</tr>
</thead>
</table>

**Section 5. Technology research tools**

5a. Students use technology to locate, evaluate, and collect information from a variety of sources

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>69.2</th>
</tr>
</thead>
</table>

5b. Students use technology tools to process data and report results

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>69.2</th>
</tr>
</thead>
</table>

5c. Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>23.1</th>
</tr>
</thead>
</table>

**Section 6. Technology Problem-solving and decision-making tools**

6a. Students use technology resources for solving problems and making informed decisions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>38.5</th>
</tr>
</thead>
</table>

6b. Students employ technology in the development of strategies for solving problems in the real world.

<table>
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<tr>
<th></th>
<th></th>
<th>53.8</th>
</tr>
</thead>
</table>
A total of thirty-six (36) questionnaires were distributed to teachers at School 6. Thirteen (13) teachers returned completed questionnaires, for a response rate of 36.11%.

For ten (10) out of fourteen (14) items in Part 1 of the teacher’s questionnaire, the majority of teacher responses were similar to the responses of the principal. The items for which the majority of teachers indicated teaching practices contrary to the principal’s perception are:

1. 2b. Students practice responsible use of technology systems, information, and software.
2. 4b. Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.
3. 5c. Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.
4. 6a. Students use technology resources for solving problems and making informed decisions.

For item 2b, four (4) out of thirteen (13) teachers (30.78%) indicated that their practice reflected the perception of the principal. Item 2b is related to Standard 8.1, Strand D (Digital Citizenship 0.

For item 4b, six (6) out of thirteen (13) teachers (46.15%) indicated that their practice reflected the perception of the principal. Item 4b is related to Standard 8.1, Strand A (Technology Operations and Concepts), and Strand C (Communication and Collaboration).

For item 5c, three (3) out of thirteen (13) teachers (23.08%) indicated that their
practice reflected the perception of the principal. This item relates to Standard 8.1, Strand A (Technology Operations and Concepts).

For item 6a) Students use technology resources for solving problems and making informed decisions, five out of thirteen responding teachers (38.46%) indicated agreement, aligned with the principal’s perception. Item 6a is related to Standard 8.1, Strand F. Critical Thinking, Problem Solving, and Decision-making.

The questionnaire data for School 6 indicate that principal perception and teacher practice are similar. The critical differences are noted above.

**Interview Responses**

Prompt 8: Can you provide an example of in-depth use of technology in the classroom?

Interviewees were given the opportunity to provide examples of in-depth use of technology. The responses were indicative of what each teacher considers technology integration. The responses also provided insights into the degree to which responding teachers were implementing Standard 8.1. There were varying levels of technology sophistication in the examples provided. The literature indicates that this is to be expected. A document prepared by the USDOE, Office of Educational Research and Improvement (2003) contains the following statement:

Integrating technology is what comes next after making the technology available and accessible. It is a goal-in-process, not an end state. The goal of perfect technology integration is inherently unreachable: technologies change and develop, students and teachers come and go—things change. It is the process by which people and their institutional setting adapt to the technology that matters most. The process of technology integration is one of continuous change, learning, and (hopefully) improvement (p.75).

Interviewee responses to the question “Can you provide an example of in-depth
use of technology in the classroom?” are below:

Interviewee #1

Yes. I designed...a social networking site but it’s, it’s protected and it’s, it’s actually through the Ning network, and I designed it as History Facebook....the whole concept was if Facebook and technology existed when the Constitutional Convention was happening, how would things have turned out differently? How would communication have been different in real time, and...forming new friends? [T]he kids had to research their people first and then the regions that they would have been from and who they might have been in agreement with, and who they would have not been in agreement with. Then once they got on this site, they designed their page and did everything like fun stuff like they would have but then, the blogging was actually—they had to respond as if they were there and I feel that not only taught them not only what was going on at the convention but it also taught them how to use the technology appropriately, like how to social network for the appropriate purposes not to just, you know, change your profile picture when you ever feel like it.

Interviewee #2

There is a website...Cagle.com, and it is a repository of political cartoons from newspapers and news outlets from all over the nation and actually from all over the world. [W]hen I taught history, prior to the Internet [and] smart boards, [students would] have to cut out an article or to print out an article and bring it in to talk about it. Now I have them...go up to the smart board and navigate through Cagle[.com] and take us to a cartoon and analyze it and interpret it for us...[At] the beginning of the year the students....struggle with it. They do not have an easy time. By the middle or the end of the year almost all of them can really do it well, can analyze them well, can read between the lines, can identify that particular cartoon or that particular artist for that particular cartoon as right of center or left of center or what have you.

Interviewee #3

...My [eighth grade] are going to...enter a video-game-design contest, and they’re going to use software to actually create a playable version of their game. So, it’s that idea.... I used to do this kind of thing where they would imagine it and they would write about it, but they never had to do it.... I feel like it’s forcing them...like they’re thinking critically but then they are also looking at this...they’re looking at other games critically. And everything is posted on this website. The other thing I think....kind of a good use of it is that to open their community.... make it a wider audience using that same project, kids that have posted video games already, there are reviews and comments...and before it would just be, Okay, well, what do these
eight kids, ten kids...think, and now they are...getting opinions from kids that are not in this building. [A]nytime that I can get them out of this little community [it] is a good thing.

Interviewee #4

[A] Web quest, obviously it’s student based and at their own pace. I mean, without the Internet, obviously Web quest cannot exist.

Interviewee #5

[We]...did some projects where we started out writing a book, drawing pictures, and then with the same thing moved it into taking photos of it and creating a book through technology and then voicing over that book and having a disc made from it. from a whole story. So you start on paper and continue through technology.

Interviewee #6

An in-depth use is any Web 2.0 tool where students are actually creating content online—whether it’s a blog or a podcast. Anything like that. Any interacting in the virtual world or experience or a wiki or something like that.

Interviewee #7

When the student creates an original product, whether it is through a program like Photo Story. Or they may use something like voice thread if they create a podcast. Or if they create a video...you know maybe something to that effect. Or something online through an online program where you can only view something through Smart School if they’ve made something with smart boards.

Interviewee #8

There was a great website last year that allowed you to collect polling data from students anonymously and it actually used...their cell phone numbers. [You] would send out a poll via e-mail and...they could respond to this poll using their cell phones. And you could even do that in class if you wanted to. [It] would tabulate all results right away in real time. So that was a great use of technology on the fly. Kids are very savvy with their phones so it made perfect sense to use.

It is evident in interviewees’ responses that technology integration is seen as
student use of technology tools, or mind tools (Jonassen, 2000), to learn by participating in task that are similar to the instructional activities noted by the USDOE, Office of Educational Research and Improvement. The examples provided also meet the criteria of exemplary practices, as defined by the literature.

Prompt 12: Are you familiar with the details of Standard 8.1?

Interview prompt number 12 asked participants if they were familiar with the specifics of Standard 8.1. Six (6) teachers responded yes, and two (2) teachers responded no. Given that the majority of the interview respondents indicated familiarity with Standard 8.1, their technology-integration practice may be influenced and guided by the tenets of Standard 8.1.

Research Sub-question One

How are public middle schools in New Jersey assessing students based on Standard 8.1?

Research subquestion one was addressed by principals’ and teachers’ responses to their respective questionnaires. Teachers interviewed also provided responses that addressed this question.

Principals’ Questionnaire Responses

Question 8, on the principals’ questionnaire asked respondents to describe how their respective schools assess student performance in relationship to Standard 8.1. All six (6) principals answered question 8. Their responses are noted in Table 4.9.
Table 4.9

Principals' Responses to Question 8. How does your school assess student performance in relationship to Standard 8.1?

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Responses</th>
</tr>
</thead>
</table>
| Principal 1 | 1. Computer applications course that is aligned to the technology standards. Successful completing of the course and assigned projects indicate proficiency.  
2. We have also included tech standards in the subject area curriculums. Students complete projects that assess their knowledge of the standards. |
| Principal 2 | 1. Technology use in cross-curricular projects  
2. Assessments in technology class  
3. Technology-enrichment projects and competitions with neighboring districts |
| Principal 3 | Our school uses the learning.com tech literacy assessment. |
| Principal 4 | We have a rubric designed by the computer supervisor that includes levels of performance. Teachers use the rubric along with formative assessments. |
| Principal 5 | Through teacher assessment and student surveys |
| Principal 6 | Through integration of subject areas. Implemented on a daily basis is expectation of all teachers. |
To summarize principals' responses to question 8, four statements were made indicating that technology was assessed across the curriculum by the successful completion of projects. Two statements were made indicating student proficiency was assessed via the completion of a dedicated technology course. One statement indicated the use of a rubric to assess students' proficiency. One statement indicated that a dedicated technology course (or several technology courses) was used to assess proficiency. One statement indicated that a Web-based literacy exam was administered.

The reported methods and modes of assessment regarding Standard 8.1 varied, yet all implied that assessment practices were aligned with Standard 8.1. All examples provided by principals are assessment models that meet assessment criteria found on the New Jersey Department of Education Website.

Teachers' Questionnaire Responses

Question 10 on the teachers' questionnaire asked respondents to describe how their respective school assesses student performance in relationship to Standard 8.1. A total of forty-two (42) of the sixty-three (63) teachers (66.7%) provided a response for this question.

Analysis of the teacher responses yielded four reoccurring thoughts regarding assessment practices as they pertain to assessing student proficiency related to Standard 8.1. The researcher formalized these thoughts into the categories noted in the Table 4.10.
Table 4.10

*School Assessment Practices as Described by Teachers*

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated course</td>
<td>There is a dedicated course that teaches and assesses students regarding Standard 8.1</td>
</tr>
<tr>
<td>Embedded in curricula/teacher decision</td>
<td>Each teacher decides how to assess proficiency regarding Standard 8.1 in their curriculum</td>
</tr>
<tr>
<td>Not done</td>
<td>Assessment for Standard 8.1 is not done in the school.</td>
</tr>
<tr>
<td>Not aware</td>
<td>Not aware of how Standard 8.1 is assessed</td>
</tr>
</tbody>
</table>
The following tables reflect the number of times each category appeared in the responses of teachers from each school. For each responding teacher, the category was counted only once. Following each school’s chart is an analysis of how each school’s respective principal’s response compares to that of the responding teachers. No teacher from School 2 responded to this question. Consequently, School 2 is excluded from this analysis.

School 1

A total of four (4) teachers from School 1 responded to question 10.
Table 4.11

*Teacher Responses to Question 10, Categorized — School*

<table>
<thead>
<tr>
<th>Category</th>
<th>Tallies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated course(s)</td>
<td>2</td>
</tr>
<tr>
<td>Embedded in curricula/teacher decision</td>
<td>2</td>
</tr>
<tr>
<td>Not done</td>
<td>0</td>
</tr>
<tr>
<td>Not aware</td>
<td>0</td>
</tr>
</tbody>
</table>
For School 1, the response of the principal to question 8 on the questionnaire reflects the responses provided by the teachers of School 1. Both the principal and the teachers identified dedicated course assessments and assessments embedded in various curricula as modes of evaluating Standard 8.1.

The types of assessments identified by teachers are:

1. Completion of course on computer applications
2. Projects that require the use of technology

The data indicate that the principal and the teachers share a similar view regarding the modes of assessment employed in their school.
School 3

A total of fifteen (15) teachers from School 3 responded to question 10.
Table 4.12

*Teacher Responses to Question 10, Categorized — School 3*

<table>
<thead>
<tr>
<th>Category</th>
<th>Tallies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated course(s)</td>
<td>6</td>
</tr>
<tr>
<td>Embedded in curricula/teacher decision</td>
<td>13</td>
</tr>
<tr>
<td>Not done</td>
<td>0</td>
</tr>
<tr>
<td>Not aware</td>
<td>2</td>
</tr>
</tbody>
</table>
The principal of School 3 stated in his response to question 8 that his school uses the learning.com technology literacy assessment. The principal did not provide a description of this assessment. No teachers made mention of a Web-based assessment for student proficiency, regarding Standard 8.1. What emerged most from teacher responses is that computer and information literacy assessment is an embedded process and that teachers make individual decisions on how to assess students.

While both the principal and responding teachers from School 3 indicate that Standard 8.1 is assessed, there appears to be a different view of the primary mode of assessment.

The types of assessments identified by responding teachers are:

1. Completion of technology courses
2. Projects that require the use of PowerPoint and word processing
3. Evaluating research skills and use of appropriate use of information
School 4

A total of four (4) teachers from School 4 responded to question 10.
Table 4.13

*Teacher Responses to Question 10, Categorized School 4*

<table>
<thead>
<tr>
<th>Category</th>
<th>Tallies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated course</td>
<td>1</td>
</tr>
<tr>
<td>Embedded in curricula/teacher decision</td>
<td>1</td>
</tr>
<tr>
<td>Not done</td>
<td>0</td>
</tr>
<tr>
<td>Not aware</td>
<td>2</td>
</tr>
</tbody>
</table>
The principal of School 4 indicated that teachers develop formative assessments of students' proficiency regarding Standard 8.1 using a rubric, which indicates levels of performance. Two of the responding teachers indicated that assessment of Standard 8.1 is occurring. However, no mention of a rubric is made.

The remaining responders are not aware of assessment practices regarding Standard 8.1. Teacher 3 stated, "I don't think specific standards are 'spelled out' and not sure if all staff is aware of technology standards." Teacher 4 stated, "...I'm unsure of how students are assessed in this area."

A comparison of the responding teachers' view of assessment practices regarding Standard 8.1, with the principal's response to question 8 on the principals' questionnaire, reveals a disparity. The responding teachers are not aware of the rubric.

The types of assessments identified by responding teachers are:

1. Evaluating student ability to use heart-rate monitor to assess their intensity of activity

2. Projects and reports that require the use of technology
School 5

A total of nine (9) teachers from School 5 responded to question 10.
Table 4.14

*Teacher Responses to Question 10, Categorized—School 5*

<table>
<thead>
<tr>
<th>Category</th>
<th>Tallies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated course(s)</td>
<td>0</td>
</tr>
<tr>
<td>Embedded in curricula/teacher decision</td>
<td>7</td>
</tr>
<tr>
<td>Not done</td>
<td>2</td>
</tr>
<tr>
<td>Not aware</td>
<td>1</td>
</tr>
</tbody>
</table>
The principal of School 5 indicated that student proficiency regarding Standard 8.1 is assessed via teacher-designed assessments and student surveys. Reflecting the principal’s response, the category of “Embedded in curricula/teacher decision” was heavily represented amongst the responding teachers statements. However, no mention was made of student surveys.

Teachers that mentioned that Standard 8.1 was not formally addressed, and/or they were not aware of how it was assessed, noted that individual teachers assessed technology/computer proficiency somehow.

Teacher 5 stated, “I don’t think the school assesses student performance in relationship to 8.1. Each teacher who creates an assignment involving technology assesses it in his/her own way.”

Teacher 10 stated, “We do not formally assess it at all. I, as an English teacher, will assess their formatting and word-processing skills; sometimes their PowerPoint-presentation skills... that is really the extent of assessment in terms of computers and technology.”

Teacher 9 stated, “I am not aware of how it is assessed. Teachers are encouraged to use technology, but I think it’s up to teachers to actually integrate it into lessons.”

The types of assessments identified by responding teachers are:

1. Portfolios and projects
2. Word-processing skills and PowerPoint-presentation skills
3. Evaluation of written reports for accurate sources and research methods

The data indicate that there are varying views of both how and if Standard 8.1 is
assessed in School 5.
School 6

A total of ten (10) teachers from School 6 responded to question 10.
Table 4.15

*Teacher Responses to Question 10, Categorized — School 6*

<table>
<thead>
<tr>
<th>Category</th>
<th>Tallies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated course(s)</td>
<td>4</td>
</tr>
<tr>
<td>Embedded in curricula/teacher decision</td>
<td>4</td>
</tr>
<tr>
<td>Not done</td>
<td>1</td>
</tr>
<tr>
<td>Not aware</td>
<td>2</td>
</tr>
</tbody>
</table>
The principal of School 6 indicated that students are assessed in relationship to Standard 8.1 “through integration of subject areas.” The category “Embedded in curricula/teacher decision” reflects the principal’s response and was mentioned with high frequency amongst the statements of the responding teachers.

The principal’s response, and the statements of teachers, which indicated that assessment regarding Standard 8.1 is occurring, describe similar practices.

The types of assessments identified by responding teachers are:

1. Projects and research papers
2. Web-literacy assessment in computer class

Interview Responses

Eight (8) teachers were interviewed for this study. Teacher responses during interviews provided insight regarding their assessment practices and how their assessment practices align with the New Jersey State Department of Education (NJDOE) assessment mandate. Specifically, the NJDOE requires that all local education agencies (LEAs) use the NJTAP-IN General Assessment Rubric, or an alternate assessment that is aligned with the NJTAP-IN General Assessment Rubric.

Interview prompt number 15 asked participants if they were familiar with the NJTAP-IN assessment rubric. Seven (7) teachers responded no, with only one (1) teacher responding yes.

Interview prompt number 12 asked participants if they were familiar with the specifics of Standard 8.1. Six (6) teachers responded yes, and two (2) teachers responded
The data gathered from principals' responses to question 8, teachers' responded to question 10, and teacher interviews indicate that assessment of student performance in relationship to Standard 8.1 is occurring. This assessment is occurring either in a dedicated technology course and/or via evaluation of various curricular projects that require the demonstration of skills and understanding identified in Standard 8.1. The data also indicates that there exist both similarities and disparities between principals' perceptions of assessment practices and the actual assessment practices of reporting teachers.

**Research Sub-question Two**

*To what degree do public-middle-school teachers perceive difficulty in implementing Standard 8.1?*

Part 3 of the teachers' questionnaire prompted participants to indicate the difficulties or challenges that they perceive when attempting to integrate Standard 8.1. Table 4.16 shows the frequency and percentage of responses of teachers as a group that indicated agreement with the corresponding questionnaire statements.
Table 4.16

*Teacher Responses: Frequencies (f) and Percents (P) of Strongly Agree and Agree Responses for Part 3, Section 8 Barriers to Integrating Standard 8.1

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>f</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Prior to participating in this research project I did not know the specifics of Computer and Information Literacy Standard 8.1.</td>
<td>23</td>
<td>36.5</td>
</tr>
<tr>
<td>b. Integrating technology into my curriculum is a top priority of mine while planning lessons.</td>
<td>40</td>
<td>63.5</td>
</tr>
<tr>
<td>c. I find it difficult to create ways to integrate technology into my subject area.</td>
<td>13</td>
<td>20.6</td>
</tr>
<tr>
<td>d. I do not have time to change my lessons.</td>
<td>7</td>
<td>11.1</td>
</tr>
<tr>
<td>e. I am comfortable using technology for personal use.</td>
<td>62</td>
<td>98.4</td>
</tr>
<tr>
<td>f. I am comfortable using technology in my teaching and learning practice.</td>
<td>60</td>
<td>92.2</td>
</tr>
<tr>
<td>g. I think I need (more) training before I would integrate technology into my lessons.</td>
<td>22</td>
<td>34.9</td>
</tr>
</tbody>
</table>
As a group, the responding teachers report minimal difficulty with integrating technology into their curriculum and teaching by way of Standard 8.1. Awareness of Standard 8.1 is high amongst this group of teachers as indicated by twenty-three (23) out of sixty-three (63) teachers (36.51%) noting agreement with statement a (Prior to participating in this research project I did not know the specifics of computer and Information Literacy Standard 8.1).

It also appears to be a priority amongst the majority of the responding teachers with forty (40) out of sixty-three (63) teachers (63.50%) agreeing with statement b (Integrating technology into my curriculum is a top priority of mine while planning lessons.). A total of thirteen (13) teachers (20.63%) indicated agreement with statement c (I find it difficult to create ways to integrate technology into my subject area.).

Also, the majority of responding teachers indicated that time is not an issue with regard to altering lessons to incorporate Standard 8.1. Only seven (7) out of sixty-three (63) teachers (11.11%) indicated agreement with statement d (I do not have time to change my lessons.).

Looking at statement e (I am comfortable using technology for personal use.), and statement f (I am comfortable using technology in my teaching and learning practice.), the majority of the responding teachers are comfortable using technology personally and in their profession. 98.42% indicated agreement with e, and 92.24% indicated agreement with f.

Amount of training was not indicated as a barrier for the majority of responding teachers. A total of twenty-two (22) out of sixty-three (63) teachers (34.92%) indicated
agreement with statement g (I think I need [more] training before I would integrate technology into my lessons).

Analysis of Part 3 of Teacher Questionnaire with Interview Responses

The following tables present the frequencies and percentages of the responses, by school, to the prompts in Part 3, section 8 of the teachers' questionnaire. Also, relevant teacher-interview responses are analyzed. Interview data is only available for School 3, School 4, School 5, and School 6.
### School 1

#### Table 4.17

**Teachers' Questionnaire: Frequencies and Percentages of the Responses ("Agree" and "Strongly Agree" combined), by school, to Part 3, Section 8. Barriers—School 1**

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>(n=11)</th>
<th>f</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Prior to participating in this research project I did not know the specifics of Computer and Information Literacy Standard 8.1.</td>
<td></td>
<td>5</td>
<td>45.5</td>
</tr>
<tr>
<td>b. Integrating technology into my curriculum is a top priority of mine while planning lessons.</td>
<td></td>
<td>8</td>
<td>72.7</td>
</tr>
<tr>
<td>c. I find it difficult to create ways to integrate technology into my subject area.</td>
<td></td>
<td>3</td>
<td>27.3</td>
</tr>
<tr>
<td>d. I do not have time to change my lessons.</td>
<td></td>
<td>5</td>
<td>45.5</td>
</tr>
<tr>
<td>e. I am comfortable using technology for personal use.</td>
<td></td>
<td>11</td>
<td>100</td>
</tr>
<tr>
<td>f. I am comfortable using technology in my teaching and learning practice.</td>
<td></td>
<td>10</td>
<td>90.9</td>
</tr>
<tr>
<td>g. I think I need (more) training before I would integrate technology into my lessons.</td>
<td></td>
<td>7</td>
<td>63.7</td>
</tr>
<tr>
<td>h. My principal uses technology on a daily basis.</td>
<td></td>
<td>6</td>
<td>54.5</td>
</tr>
</tbody>
</table>
In analyzing the responses of teachers from School 1, five (5) of the eleven (11) responding teachers were not aware of Standard 8.1. Without knowledge of the standard, it is difficult for implementation to take place at a high degree. However, with the majority of teachers indicating that they had prior knowledge of Standard 8.1, that technology integration is a top priority, and that they are comfortable with using technology personally and professionally, it is likely that elements of Standard 8.1 are being addressed formally. The majority of the responding teachers indicated that time is not a barrier, and that they have received sufficient training to integrate technology. The majority also indicated that the principal uses technology daily.
**School 2**

Table 4.18

*Teachers' Questionnaire: Frequencies and Percentages of the Responses (“Agree” and “Strongly Agree” combined), by school, to Part 3, Section 8. Barriers—School 2*

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>(n=1)</th>
<th>f</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Prior to participating in this research project I did not know the specifics of Computer and Information Literacy Standard 8.1.</td>
<td></td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>b. Integrating technology into my curriculum is a top priority of mine while planning lessons.</td>
<td></td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>c. I find it difficult to create ways to integrate technology into my subject area.</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>d. I do not have time to change my lessons.</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>e. I am comfortable using technology for personal use.</td>
<td></td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>f. I am comfortable using technology in my teaching and learning practice.</td>
<td></td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>g. I think I need (more) training before I would integrate technology into my lessons.</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>h. My principal uses technology on a daily basis.</td>
<td></td>
<td>1</td>
<td>100</td>
</tr>
</tbody>
</table>
For School 2, the responding teacher indicated that no prior knowledge regarding Standard 8.1 was possessed before participating in this study. Also, the potential barriers of insufficient time and training are not factors for this teacher. The teacher is comfortable using technology personally and professionally, and sees technology integration as a priority. Based on the teacher's response, informal implementation of Standard 8.1 is likely occurring. Without having specific knowledge of the standard, it is not likely that it is occurring at a high degree. The teacher also indicated that the principal uses technology on a daily basis.
### School 3

Table 4.19

**Teachers’ Questionnaire: Frequencies and Percentages of the Responses (“Agree” and “Strongly Agree” combined), by school. to Part 3, Section 8. Barriers—School 3**

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>(n=21)</th>
<th>f</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Prior to participating in this research project I did not know the specifics of Computer and Information Literacy Standard 8.1.</td>
<td></td>
<td>4</td>
<td>19.0</td>
</tr>
<tr>
<td>b. Integrating technology into my curriculum is a top priority of mine while planning lessons.</td>
<td></td>
<td>14</td>
<td>66.7</td>
</tr>
<tr>
<td>c. I find it difficult to create ways to integrate technology into my subject area.</td>
<td></td>
<td>5</td>
<td>23.8</td>
</tr>
<tr>
<td>d. I do not have time to change my lessons.</td>
<td></td>
<td>1</td>
<td>4.8</td>
</tr>
<tr>
<td>e. I am comfortable using technology for personal use.</td>
<td></td>
<td>21</td>
<td>23.8</td>
</tr>
<tr>
<td>f. I am comfortable using technology in my teaching and learning practice.</td>
<td></td>
<td>16</td>
<td>76.2</td>
</tr>
<tr>
<td>g. I think I need (more) training before I would integrate technology into my lessons.</td>
<td></td>
<td>7</td>
<td>33.3</td>
</tr>
<tr>
<td>h. My principal uses technology on a daily basis.</td>
<td></td>
<td>15</td>
<td>71.4</td>
</tr>
</tbody>
</table>
For School 3, seventeen (17) out of twenty-one (21) responding teachers indicated that they had knowledge of Standard 8.1 prior to participation in this study. Regarding technology being a priority, fourteen (14) of the twenty-one (21) responding teachers indicated that it is. The majority of the responders also indicated that time and training are not factors that prohibit their integration of technology and Standard 8.1. The majority of responding teachers are also comfortable using technology for personal and professional use. Also, integration of technology into respective subject areas is not perceived as difficult to accomplish for most of the responders. The majority of respondents also indicated that the principal uses technology on a daily basis.

Two (2) teachers from School 3 participated in an interview. Their statements regarding barriers to implementation of Standard 8.1 highlighted the following areas:

1. Infrastructure
   a. It just seems as if the technology is there but the infrastructure to support the technology is not there... I think that makes teachers hesitant to use technology because you say, “Well I planned this great lesson,” and then it was for nothing because the technology wasn’t there. (Interview 4)

2. Time
   a. I think the one thing that teachers would like is more time. And having enough time to be able to develop all those lessons. So you might say...there are some interesting video clips and you can make a slide show and embed them in the video. But to have the time to do that...no one has time...as much time as they want I’m sure. As soon as you come up with this idea, you think to yourself, “Oh my gosh, I have all these lab reports to grade” or “I have all these projects to score.” Or even something as mundane as running photocopies. (Interview 4)

3. Change
a. I think that with anything new, one of the barriers, "Oh I already have a way to teach that." So it forces you to change the way you would normally do the instruction. (Int. 4)

4. Training

a. I think sometimes it's just not having the appropriate training. When I first started at my old school, I had the smart board. I wanted to use it, but I did not know how to use it. (Int. 4)

5. Maintenance/technical support

a. Just the equipment. I think that is the major barrier. Just having enough equipment that is running all the time. In my classroom some of the computers are not working. The printer doesn't work, so I think it's more mechanical problems that are blocking me. (Interview 5)
Table 4.20

Teachers' Questionnaire: Frequencies and Percentages of the Responses ("Agree" and "Strongly Agree" Combined), by school, to Part 3, Section 8. Barriers—School 4

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>(n=5)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Prior to participating in this research project I did not know the specifics of</td>
<td>1</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Computer and Information Literacy Standard 8.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Integrating technology into my curriculum is a top priority of mine while planning</td>
<td>3</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>lessons.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. I find it difficult to create ways to integrate technology into my subject area.</td>
<td>1</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>d. I do not have time to change my lessons.</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>e. I am comfortable using technology for personal use.</td>
<td>5</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>f. I am comfortable using technology in my teaching and learning practice.</td>
<td>5</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>g. I think I need (more) training before I would integrate technology into my lessons.</td>
<td>2</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>h. My principal uses technology on a daily basis.</td>
<td>2</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>
For School 4, only one (1) of the five (5) responding teachers was aware of Standard 8.1 prior to this study. It is unlikely that formal implementation is occurring amongst this group of respondents. Responding teachers indicated comfort with using technology professionally and personally, and perceived no difficulty with integrating technology. Three (3) out of the five (5) teachers indicated that technology integration was a top priority. Time and training are not perceived as barriers for this group. Two (2) of the five (5) responding teachers reported that their principal uses technology on a daily basis.

One teacher participated in an interview from School 4. The teacher's responses indicated the following barriers to integration of Standard 8.1:

1. Infrastructure
   a. In my own personal school district...access to the Internet is an issue. Our school is wireless now, but it’s kind of haphazard. You never know when it’s going to work or when it’s going to be fast enough. You like to stream some websites, but anything that is not a simple Web page tends to not want to load, especially over the wireless network. (Interview 8)

2. Maintenance/technical support
   a. Things break. You are talking about stuff that students use and teachers use...expensive equipment, and we don’t really have the support staff to be able to take care of it all. Generally speaking when something breaks down, it’s never really repaired. (Interview 8)

3. Training
   a. I don’t know about other districts, but I know our district has the propensity to buy the newest technology but not to train you properly in it. Case in point, our district just installed hundreds of these interactive whiteboards. They’re fantastic, and nobody taught us how to use any of it. (Interview 8)
School 5

Table 4.21

*Teachers’ Questionnaire: Frequencies and Percentages of the Responses (“Agree” and “Strongly Agree” combined), by school, to Part 3, Section 8. Barriers—School 5*

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>(n=12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Prior to participating in this research project I did not know the specifics</td>
<td>5</td>
</tr>
<tr>
<td>of Computer and Information Literacy Standard 8.1.</td>
<td>41.7</td>
</tr>
<tr>
<td>b. Integrating technology into my curriculum is a top priority of mine while</td>
<td>9</td>
</tr>
<tr>
<td>planning lessons.</td>
<td>75</td>
</tr>
<tr>
<td>c. I find it difficult to create ways to integrate technology into my subject area.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>8.3</td>
</tr>
<tr>
<td>d. I do not have time to change my lessons.</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>e. I am comfortable using technology for personal use.</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>91.7</td>
</tr>
<tr>
<td>f. I am comfortable using technology in my teaching and learning practice.</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>91.7</td>
</tr>
<tr>
<td>g. I think I need (more) training before I would integrate technology into my</td>
<td>3</td>
</tr>
<tr>
<td>lessons.</td>
<td>25</td>
</tr>
<tr>
<td>h. My principal uses technology on a daily basis.</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>91.7</td>
</tr>
</tbody>
</table>
The majority of the responders from School 5 were aware of Standard 8.1 prior to this study and indicated technology integration as a top priority. Only one (1) out of the twelve (12) teachers indicated difficulty when attempting to integrate technology into their subject area. The majority of responding teachers indicated that they are comfortable using technology for personal and professional use. Also, time and training are not perceived as barriers for the majority of the responding teachers. Leadership behavior on the part of the principal is not seen as a barrier.

Three (3) teachers from School 5 participated in the interview portion of this study. Their responses highlighted the following barriers:

1. Infrastructure
   a. It is sometimes unreliable. Sometimes the server goes down. Sometimes websites that you’ve bookmarked are not there, or they change.... We have different carts of laptops...sometimes twelve sometimes twenty-four and they are very hard to book for times. And they’re unreliable. Sometimes they work and sometimes they don’t. Sometimes the batteries are charged. Whenever I plan on something, I like to make sure it is going to be there for me. I get real uneasy if I think I have to have plan B constantly. (Interview 2)

   b. Sometimes the system is down, and that can put a wrench into what you have planned for the day, unless you have a solid backup plan that doesn’t require the technology to be used. And also sometimes the systems are slow...you know there are things that you want to do...you want to try to show a video on YouTube and it freezes it up or you know...it’s not reliable 100%, meaning if I am using a computer or smart board for things like that... (Interview 7)

2. Maintenance/technical support
   a. [A]s many people who know what the heck they are doing on site as possible. Who, you know, can not only, you know, help instruct us but
basically be fix-it people. I mean, you know, I know how to drive a car, but I don't know how to fix one. The same thing with a computer: I know how to use one, but when I have something, you know, when it's troubleshooting, I have no idea how to fix it. (Interview 2)

b. Well, we used to have in our building a technology teacher, and we don't have that anymore. We just have tech support, where if there's an issue you send...there is this thing called the school wire. You send a ticket in and they fill the ticket request by coming in and, like, taking care of whatever is wrong in your room. I prefer to have a technology teacher in the building like we used to. Or staff, I guess you could say. (Interview 7)

c. It's not that I mind [students] working on laptops, I just can't always be sure. Typically at any point, computers will die and while you would say, "Just plug them in"...well, all of the plugs are here, so they don't have enough extension cords. And no one in the building is in charge of that equipment because we do not have a tech. The tech teacher used to monitor and make sure all the equipment was updated...or even clean it...I mean they would occasionally wipe it down. So I would say a barrier. (Interview 3)

3. Access

a. I think barriers are...kind of what we have...it's really the access. Like when it becomes for me, like...when it starts interfering with their learning because the laptops weren't charged and they are not available and it takes me...like, I have to spend 15 minutes before the class getting laptops and 15 minutes returning them....That prevents me from...like, I have to weigh the value. So, I kind of am really conscious of that. I really need to see that there is something more there than they can get without it. (Interview 3)
School 6

Table 4.22

Teachers' Questionnaire: Frequencies and Percentages of the Responses ("Agree" and "Strongly Agree" Combined), by school, to Part 3, Section 8. Barriers—School 6

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>n=13</th>
<th>f</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Prior to participating in this research project I did not know the specifics of Computer and Information Literacy Standard 8.1.</td>
<td></td>
<td>7</td>
<td>53.8</td>
</tr>
<tr>
<td>b. Integrating technology into my curriculum is a top priority of mine while planning lessons.</td>
<td></td>
<td>5</td>
<td>38.5</td>
</tr>
<tr>
<td>c. I find it difficult to create ways to integrate technology into my subject area.</td>
<td></td>
<td>3</td>
<td>23.1</td>
</tr>
<tr>
<td>d. I do not have time to change my lessons.</td>
<td></td>
<td>1</td>
<td>7.7</td>
</tr>
<tr>
<td>e. I am comfortable using technology for personal use.</td>
<td></td>
<td>13</td>
<td>100</td>
</tr>
<tr>
<td>f. I am comfortable using technology in my teaching and learning practice.</td>
<td></td>
<td>13</td>
<td>100</td>
</tr>
<tr>
<td>g. I think I need (more) training before I would integrate technology into my lessons.</td>
<td></td>
<td>3</td>
<td>23.1</td>
</tr>
<tr>
<td>h. My principal uses technology on a daily basis.</td>
<td></td>
<td>12</td>
<td>63.2</td>
</tr>
</tbody>
</table>
For School 6, the majority of the teachers indicated an awareness of Standard 8.1 prior to participation in this study. The teachers who indicated that technology integration is a top priority were in the minority—five (5) out of eleven (11). However, only three (3) out of thirteen (13) teachers indicated that they found it difficult to integrate technology into their respective subject areas. All responding teachers indicated that they are comfortable using technology personally and professionally. Time and training are not indicated as barriers for the majority of the responding teachers. Of the responding teachers, 63.2% indicated that school leadership models the use of technology in daily practice and that technology integration by way of Standard 8.1 is a priority by agreeing with statement h (My principal uses technology on a daily basis.). Leadership behavior in this sense is not perceived as a barrier.

Two teachers from School 6 participated in the interview portion of this study. Their responses highlighted the following barriers:

1. Maintenance/technical support
   a. The barriers are definitely the maintenance and the upkeep of them. When you have 15 computers open in your classroom, you end up troubleshooting computer issues and you get away from the content and the curriculum because you are spending so much time fixing things. (Interview 1)

2. Access
   a. “Student’s availability at home. The participation gap of students having computer use at home” (Interview 6)

Interview prompt number 16 asked, “What could/should your district do to
support the use of Standard 8.1 in your classroom?” The numbered items below were noted in interviewee responses. In parentheses are the items from Part 3, section 8 of the teacher questionnaire that relate to the interview responses.

1. Proper training (item a)
2. More technical support (item b)
3. Instructional support (items b and c)
4. More time (item c)

Regarding proper training, Interviewee #8 responded:

...I don't know about other districts, but I know our district has the propensity to buy the newest technology but not to train you properly in it. Case in point, our district just installed hundreds of these interactive whiteboards....They're fantastic, and nobody taught us how to use any of it....So, that's where I think you really need more resources and support, is in the training end. If you can get teachers a $10,000 computer, but if they don't know how to use it how are they [going to] benefit students?

Two teachers responded indicating a need for greater instructional support.

Interviewee #1 stated:

I think it would be good to have a push-in program. We have a technology department here. We have a technology teacher who sees kids three times, once in sixth, seventh and eighth grades for sixteen days in a cycle. That's it. I think it would be much better suited if maybe for sixth, seventh, and eighth grades - if that teacher pushed in to classrooms, almost like an in-class support. So that if I am doing a project that requires technology...he can be working with that and I can be working with the actual content... (Interview 1)

Interviewee #3 stated:

I think having a tech coach in each [building] would be [helpful]. I mean, we don't have that here. We used to have one person who was K to 6 and he was spread very thin, and they eliminated the position. We also used to have tech teachers in every building, so when you would do something, that would kind of be the person you knew could help you. So, I think having someone in the building who is very knowledgeable and who's job it is, not somebody who just helps you on the side because they are tech savvy. (Interview 3)
Two teachers responded indicating a need for greater technical support.

Regarding technical support, interviewee #2 stated:

[W]e don’t have on-site people. We have to do a request through something called school wires...this central tech office, which happens to be just like across the parking lot, but these guys service all the schools in our district. I would say that’s it really, on site a tech lab, as many tech labs as possible and as many people who know what the heck they are doing on site as possible. Who, you know, can not only, you know, help us instruct but basically be fix-it people. I mean, you know, I know how to drive a car, but I don’t know how to fix one. The same thing with a computer—I know how to use one but when...it’s troubleshooting, I have no idea how to fix it. It’s worked okay having to put a request and these guys are there, in most cases if it’s an emergency they’re there in 20 or 30 minutes. It used to be somebody was there within a minute. So you don’t lose any instructional time. (Interview 2)

Interviewee #7 reflected the same sentiment regarding technical support as Interviewee #2 did:

Well, we used to have in our building a technology teacher, and we don’t have that anymore. We just have tech support, where if there’s an issue, you send...there is this thing called the school wire. You send a ticket in and they fill the ticket request by coming in and, like, taking care of whatever is wrong in your room. I prefer to have a technology teacher in the building like we used to. Or staff, I guess you could say. (Interview 7)

Regarding time, Interviewee #4 stated:

...I think the one thing that teachers would like is more time. And having enough time to be able to develop all those lessons. So you might say ...there are some interesting video clips and you can make a slide show and embed them in the video...But to have the time to do that...no one has time...as much time as they want I’m sure. As soon as you come up with this idea, you think to yourself, “Oh my gosh, I have all these lab reports to grade or I have all these projects to score. Or even something as mundane as running photocopies. It all just takes time...sometimes it just gets pushed back.

For all schools with the exception of one, teachers said the principal used technology on a daily basis. Modeling the integration of technology is a form of support.
Principals and district leadership, in addition to modeling support for the implementation of Standard 8.1 and technology integration, play a vital role in the active mitigation of barriers. In fact, removal of barriers was identified as a critical element of support in teacher interview responses. Interview prompt number 16 asked “What could/should your district do to support the use of Standard 8.1 in your classroom?” The numbered items below were noted in interviewee responses. In parentheses are the items from Part 3, Section 8 of the teacher questionnaire that relate to the interview responses.

1. Proper training (item a)
2. More technical support (item b)
3. Instructional support (items b and c)
4. More time (item c)

When interviewees were asked specifically “What could/should your district do to support the use of the Standard 8.1 in your classroom?” the items above were reverberated.

The critique provide by teacher interviewees serves as valuable insight that indicate the need for districts and building-level administrators, having achieved moderate to high levels of technology integration in their schools, to continue evaluating and meeting the needs of practitioners as they relate to professional development, technical support, instructional support, and time. This is critical for sustainability and growth to be realized. For teachers to continue to see technology integration and Standard 8.1 as important, the leadership must lead the way. Interviewee #5 had the following to say:

I have to say, our district is pretty good. We are very supportive. We’re always going one step further. We just introduced interactive boards in almost every
classroom and soon they will be in every one. Teachers are being trained. They're excited about it. And I think it has a lot to do with our administration. The way they roll it out to make it feel exciting and something people want to try. So I think they are doing a good job.

Research Sub-question Three

What are public-middle-school teachers' perceptions regarding the importance of integrating Standard 8.1?

Data collected from both the teachers' questionnaire and the teachers' interviews address this question.

For Part 3, section 8 of the teachers' questionnaire, forty (40) out of sixty-three (63) teachers (63.6%) indicated agreement with item b (Integrating technology into my curriculum is a top priority of mine while planning lessons.) (see Table 4.24).

With item c (I find it difficult to create ways to integrate technology into my subject area.), thirteen (13) out of sixty-three (63) teachers (20.6%) indicated agreement.

The responses to these two items indicate that, amongst the responding teachers, integration of technology, into curriculum and teaching by way of Standard 8.1 is important and a task that is within their capacity to complete.

Part 2, section 7 of the teachers' questionnaire prompted teachers to respond to questions regarding support.
Table 4.23

*Teachers' Questionnaire: Frequencies and Percentages of “Strongly Agree” and “Agree” Responses for Part 2, Section 7—Support*

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>f</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. There are professional-development opportunities in my district to learn how to integrate technology into my lessons.</td>
<td>59</td>
<td>93.7</td>
</tr>
<tr>
<td>b. My school/district provides technical support throughout the school year to aid me in creating integrated lessons if I choose to use it.</td>
<td>54</td>
<td>85.7</td>
</tr>
<tr>
<td>c. Teachers are given time through common planning time, embedded professional development, or other creative scheduling to share their best practices with integrating technology.</td>
<td>40</td>
<td>63.5</td>
</tr>
<tr>
<td>d. The principal has technology integration as a priority.</td>
<td>50</td>
<td>79.4</td>
</tr>
<tr>
<td>e. The principal creates time in his/her schedule for visiting classrooms.</td>
<td>41</td>
<td>65.1</td>
</tr>
</tbody>
</table>
The majority of the responding teachers (93.65%) indicated agreement with statement a (There are professional development opportunities in my district to learn how to integrate technology into my lessons.).

The majority of responding teachers (85.71%) indicated agreement with statement b (My school/district provides technical support throughout the school year to aid me in creating integrated lessons if I choose to use it.).

A total of forty (40) out of sixty-three (63) teachers (63.5%) indicated agreement with statement c (Teachers are given time through common planning time, embedded professional development, or other creative scheduling strategies to share their best practices with integrating technology.).

A total of fifty (50) out of sixty-three (63) teachers (79.4%) indicated agreement that the principal has technology as a priority.

A total of forty-one (41) out of sixty-three (63) teachers (65.08%) indicated agreement with statement e (The principal creates time in his/her schedule for visiting classrooms.).

In summary, the majority of the responding teachers indicated that they feel supported by their district in regards to implementing technology by way of Standard 8.1. Technical support, Professional development (ongoing/embedded), and common planning times are provided at a level they find meaningful. The majority also indicated that leadership has set technology integration by way of Standard 8.1 as a priority, evidenced by provisions of systematic support and Principal observation/evaluation practices.
The question regarding the importance of Standard 8.1 was also addressed in
interviews. Teachers expressed philosophical reasons for implementing technology.
Interviewee #1 explained that he is obligated to make sure students understand
appropriate and ethical use of technological resources. The interviewee stated the
following:

I am a social studies teacher so I think for my purposes, teaching them how to
research accurately online is definitely one of my priorities and also teaching them
how to use technology appropriately and not abuse it. (Interview 1)

Three teachers based their priorities on the obligation they feel to prepare students
for the world they live in:

I think because the way the world operates...technology is so infused that if we
don't integrate it into our teaching, we're really not teaching them how to operate in
the world....(Interview 3)

Well, I just think the world today, they really have to...keep up with what's going on
today. Especially with Mark Zuckerberg being named Man of the Year.... We have
a global connection now. And that has [been] done through technology. So
[students] have to be really proficient in it. (Interview 5)

...In society now, we function with technology. You go to the store and everything
is on a computer when they ring you up for purchasing. You go...and you order food
at a drive-in, it is all pumped into a computer. So in that respect, technology is
everywhere. So, to keep up with the times. (Interview 7)

Two teachers based their priority on the type of learner they see in students they
teach:

Well, the kids are different. I think that...your lessons are driven by the
students...not to sound like a political answer, but the kids really respond to
technology. (Interview 4)

We are talking about a generation of audio-visual learners. Kids are very used to that
sort of technology.... This is really the first set of kids that were born with a cell
phone in their hands. While I don't always agree with its use, it is certainly
important to integrate it into the classroom. (Interview 8)
Summary

This chapter presented a description of the quantitative and qualitative findings. Chapter V will present the conclusions drawn from the findings, and discuss their relationship to the theory and literature noted in Chapter II. Chapter V will conclude with a discussion regarding implications for policy and practice. Also, recommendations for future research will be provided.
Chapter V.

Conclusions, Recommendations, and Summary

The New Jersey Department of Education has invested a tremendous amount of time and money in establishing a technology-rich environment in its public schools. A comparable effort has been dedicated to establishing technology standards that provide educators with guidance regarding curriculum development, desired student competencies, evaluation criteria, and appropriate instructional resources. The push has been to provide students with an educational experience that reflects 21st-century living and provides students with the necessary skills.

In 2004 the New Jersey Department of Education (NJDOE) established the New Jersey Core Curriculum Content Standards for Technological Literacy. This standard document was segmented into two major components. One of the major components is Standard 8.1—Computer and Information Literacy.

The implementation of this standard is mandatory. All local education agencies (LEAs) should be using these documents to inform curriculum design and guide instructional decisions.

Focusing on the federal government's goal stated in Title II-D: Enhancing Education Through Technology (E2T2) of the No Child Left Behind Act (NCLB), that all students be computer literate by the end of eighth grade, the NJDOE developed an implementation plan called the New Jersey Technological Assessment for Proficiency and Integration (NJTAP-IN). This plan focused on technology integration amongst the
K–8 population. The strategies and resources provided in this plan are recommendations with the exception of the assessment rubric component. LEAs are mandated to use the assessment rubric as provided, or develop an assessment that is aligned with the general assessment rubric.

This study was driven by two (2) main research questions and three (3) subresearch questions. This chapter will present the principal findings from the analysis of quantitative and qualitative data collected by the researcher. The findings are discussed in relationship to the theory and literature discussed in Chapters I and II of this document. In conclusion, implications regarding technology-integration practices and recommendations for future research are provided.

Conclusions—Research Question One and Two

1. To what degree do New Jersey public-middle-school principals perceive that teachers are integrating Standard 8.1 into curriculum and instruction?

2. To what degree are New Jersey public-middle-school teachers integrating Standard 8.1 into curriculum and instruction?

Questionnaires

Analysis of the questionnaire data for teachers and principals reveals similarities between how principals (as a group) perceive teachers are implementing Standard 8.1, and the degree to which teachers (as a group) report actual integration of standard 8.1. However, there were several critical points where the principals’ perception of teachers’ practice and the actual practice of teachers diverged. The questionnaire items of note are:
1. 2b. Students practice responsible use of technology systems, information and software. (Principals perceived a greater degree than teachers—a 35.7 percentage disparity.)

2. 4b. Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences. (Principals perceived a greater degree than teachers—a 87.3 percentage disparity.)

3. 5c. Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks. (Principals perceived a greater degree than teachers—a 33.3 percentage disparity.)

4. 6b. Students employ technology in the development of strategies for solving real-world problems. (Principals perceived a greater degree than teachers—37.3 percentage disparity.)

Table 5.1 illustrates the questionnaire item discrepancies by school.
Table 5.1
Questionnaire items for which less than 50% of teachers indicated agreement with their principal, by school

<table>
<thead>
<tr>
<th>School</th>
<th>Questionnaire Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2a, 5b</td>
</tr>
<tr>
<td>2</td>
<td>2a, 5b, 5c</td>
</tr>
<tr>
<td>3</td>
<td>2b, 6a</td>
</tr>
<tr>
<td>4</td>
<td>2a, 5c, 6b</td>
</tr>
<tr>
<td>5</td>
<td>2a, 2b, 5c, 6a, 6b</td>
</tr>
<tr>
<td>6</td>
<td>2a, 4b, 5c, 6a</td>
</tr>
</tbody>
</table>
Analyzing the questionnaire data from each school, as it relates to the strands of Standard 8.1, shows that there are several gaps between the perception of responding principals and the reality of teacher practices.

Table 5.2 highlights the gaps as they relate to Standard 8.1 strands, by school. Standard 8.1, Strand D (Digital Citizenship) and Strand E (Research and Information Literacy) emerge as the areas where the disparity was most frequent between the principals’ perceptions and teacher-reported practice.
Table 5.2

Gaps in Teacher Practice and Principal Perception by School

<table>
<thead>
<tr>
<th>School</th>
<th>Standard 8.1, Strands where gaps exist</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D, E</td>
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On all points identified above, the principals’ view of conditions is more optimistic than the teachers’. The literature speaks to the importance of a principal’s leadership behavior in mitigating such discrepancies (Fullan, 2001; Anderson & Dexter, 2005). The principal must make a conscious effort to engage with teachers regarding the implementation of Standard 8.1, and employ evaluation tools that will present them with an accurate assessment of the progress being made, and the capacity of teachers to carry out the implementation process.

The Levels of Technology Integration (LoTi) Scale can be employed to accurately assess the depth to which technology integration is being integrated related to Standard 8.1. Also, the Stages of Instructional Evolution, a derivative of the ACOT research (Dwyer, Ringstaff, Haymore, Sandholtz, Apple Computer, Inc., 1990), can be employed as a decision-making tool. Proceeding with an understanding of the progressive nature of integration, principals can make appropriate decisions regarding the amount and type of support to provide teachers as they move from simple uses of technology to more complex integration. Understanding the change process is critical to successful integration (Fullan, 2001).

In addition, several of Ely’s (1900, 1999) eight conditions for successful integration of innovative practices apply to this portion of the discussion. The leader of an organization must be actively involved in the integration process (condition 8), be able to garner an accurate assessment of the capacity and practices of organization members (condition 2), and be able to make an accurate account of requisite resources (condition 3). With these conditions in place, a difference in the perception of principals and the
actual practice of teachers will narrow or cease to exist. Also, innovative practices that support the implementation of Standard 8.1 will receive adequate support.

*Interviews*

Teachers that participated in the interview portion of this study were presented with prompts that allowed them to describe in-depth uses of technology in their teaching practice. Their responses provide insights into the degree to which teachers were implementing Standard 8.1. The majority of the teachers interviewed (five out of eight) indicated familiarity with Standard 8.1. Each teacher was also able to provide an example of in-depth use of technology in his or her teaching practice. Each example addressed one or more strands of Standard 8.1, requiring students to use computer applications and technology tools in accordance with the NJDOE standards.

**Conclusions—Research Sub-question One**

*How are public middle schools assessing student performance in relationship to Standard 8.1?*

As mandated by the New Jersey Department of Education, all local education agencies (LEAs) have two choices regarding how to assess student performance in relationship to Standard 8.1—Computer and Information Literacy. Choice one is to use the state-developed NJ-TAP-IN general-assessment rubric (Appendix M). The alternate choice is to develop an assessment(s) that is aligned with the NJTAP-IN General Assessment Rubric. Teachers’ interview data showed that seven (7) out of the eight (8) teachers interviewed were not familiar with the NJTAP-IN General Assessment Rubric.
Principals and teachers were prompted on their respective questionnaires to describe how their school assesses student performance in relationship to Standard 8.1. Neither teachers nor principals made reference to the NJTAP-IN General Assessment Rubric in their responses.

**Questionnaires**

Principals' and teachers' responses, in general, indicated that Standard 8.1 was assessed via projects and assignments developed by teachers in the various disciplines. It was also reported that technology assessment is embedded in the curriculum. Another mode of assessment reported by principals was students' successful completion of technology courses. One principal mentioned the use of a Web-based assessment, hosted on Learning.com, which is aligned with ISTE’s, NETS-Standards. As noted earlier in this document, Standard 8.1 is aligned with NETS. Some examples of ideal assessment practices, as indicated by the literature, were provided in the questionnaire responses.

Teachers that indicated that Standard 8.1 was not assessed in their school or that they were unaware of how Standard 8.1 was assessed, were in the minority. However, it is important not to dismiss this finding as insignificant. All principals reported that Standard 8.1 was indeed assessed in their respective schools. The principal must address this gap between her perception of reality and the actual assessment practices of her teachers’ teacher. As noted by Anderson and Dexter (2005), administrative oversight is absolutely necessary for innovative practices involving educational technology to be implemented. Principals must be aware of what is actually going on and hold teachers accountable.
Computer skills assessed amongst the participating schools are students’ research skills, word-processing skills, and presentation skills. Teachers reported that assessment of skills related to Standard 8.1 occurred in dedicated computer courses or that Standard 8.1 was embedded in the curriculum of other content areas. Where embedded, students are required to demonstrate content knowledge using computer-related technology as a tool. The modes of assessment reported varied.

The examples provided by responding teachers reflect what is stated in the literature. Mostly lower-level tasks are demanded of students when the use of computer technology is required (Ertmer, 2005; Kleiman, 2004). As indicated by the New Jersey Department of Education, ideal use of educational technology involves “…using technology in conjunction with specific teaching strategies [that support] higher-order thinking skills in a learner-centered environment across all curriculum areas (NJ DOE—ED-TECH, 2006).

Interviews

As evidenced by teacher-interview responses, students are being required to engage in higher-level tasks, using technology tools, to some degree.

The literature also states that constructivist pedagogy is the hallmark of teachers who have effectively integrated technology into curriculum and instruction (Dexter et al., 1999; Peck et al., 1999; Sprague et al., 1999). Neither teachers nor principals explicitly identified the use of constructivist practices. However, constructivist principles were evident in the examples of in-depth technology use found in teacher interview data.
Summary

The schools that participated in this study are from technology-rich districts operating under the mandate of the New Jersey Department of Education (NJDOE) to implement New Jersey Core Curricular Content Standard 8.1—Computer and Information Literacy. United States Department of Education and NJDOE documents mandate that all students must be computer literate by the end of eighth grade. The NJDOE has provided districts with resources and guidance that reflect best practices—literature regarding technology integration into curriculum and instruction. The NJDOE has also provided a state mandate for assessment, requiring LEAs to use the NJTAP-IN general-assessment rubric or design assessments aligned with the rubric. It is interesting to note that the majority of the teachers who participated in this study were unaware of the NJTAP-IN general-assessment rubric. It is also interesting to see that the majority of the teachers that participated in the study presented examples of assessment practices that are considered in the literature to be low-level uses (Ertmer, 2005) of technology. The literature on ideal/exemplar technology integration suggests that teachers who are most successfully integrating technology into instruction, requiring high-level use on the part of students, employ constructivist pedagogy (Ertmer, et al., 2001). Neither questionnaire nor interview respondents made mention of constructivist practices explicitly. Some examples of practice provided by teachers during interviews implied constructivist pedagogy and higher-level uses of technology.
Conclusion - Research Sub-question Two

To what degree do public-middle-school teachers perceive difficulty in implementing Standard 8.1?

The majority of the teachers who responded to the questionnaire indicated that they did not perceive the implementation of Standard 8.1 as difficult.

The questionnaire data revealed that at each school, with the exception of School 2 (n=1), there were responding teachers who were not aware of the specifics of Standard 8.1. Without knowledge of the standard, implementation will be difficult. The interview data revealed that five (5) out of the eight (8) teachers interviewed were not familiar with the Specifics of Standard 8.1. In spite of this finding, the implementation of the standard was occurring informally and the technology is being integrated into teaching practices.

During the interviews, teachers mentioned “first-order barriers” (Ertmer, 2002) or “environmental barriers” (Wood et al., 2005) that present reoccurring challenges to their personal practice, and the practice of their colleagues. As noted above, issues relating to time (for planning), insufficient support, insufficient training, insufficient infrastructure, and maintenance were mentioned. Although first-order barriers were mentioned as a concern, it appears that these barriers are mitigated to a degree that allows for reporting teachers to proceed with implementation efforts and meet with success. The literature notes that it is necessary for these issues to be addressed initially and as they arise in order for innovative practices to be sustained and evolve (Ely, 1999; Ertmer, 1999, ISTE, 2011).

Teachers indicated in their questionnaire responses that their principals used technology on a daily basis. Principals’ use of technology to a high degree is a critical
signal of support of teachers' efforts to integrate technology. The literature highlights the importance of leadership behavior to successful organization change (Fullan, 2001) and the implementation of innovative practice (Ely, 1999). In order for there to be congruency between the perceptions of principals and the actual practice of teachers, a principal must diligently work at "coherence making" (Fullan), which is "keeping organizational activity and thought focused on the purpose and objective of the organization..." (p.115). Ely posits, as condition number eight of his theory, that leadership must be actively involved with the implementation process, "providing support and encouragement to users, as well as role-modeling the use of the innovation." Without this level of involvement from the leader, organizational members will lose focus, or perceive that leadership does not truly value the innovative practice. With this perception the organization member will not see it as sensible to dedicate time and energy to the practice.

Teachers' responses in interviews also reflected ongoing concern regarding barriers or challenges to their implementation of Standard 8.1 and technology. Items mentioned in interviews included: proper training, more technical support, instructional support, and more time. Again, the need for these items to be addressed is mentioned in the literature (Ely, 1999; Ertmer, 1999; ISTE, 2011). Second-order barriers (Ertmer) were not noted as prevalent in the experience of the teachers interviewed or in the experience of teachers that provided questionnaire responses.

As noted in the literature, second-order barriers such as a teacher's beliefs and entrenched pedagogical practices, can be major barriers to overcome (Ertmer, 1999). Teachers' responses to items b, c, and d in Part 3, section 8 of the teachers' questionnaire
indicate that the majority of the responding teachers are amenable to the integration of Standard 8.1, to the integration of technology, and to the changes in practices that may be required.

Interview responses also provided indications that teachers feel that the implementation of Standard 8.1 is important. Teachers expressed various philosophical stances, and pedagogical beliefs that underpin their reasons for seeing Standard 8.1 and the integration of technology as important. Research has shown that when a teacher sees value in the use of technology, in terms of its usefulness for teaching and instruction, and in terms of seeing it as critical to a student’s education, the teacher will more likely make use of the technology in his or her teaching practice (Donnelly, McGarr, & O’Reilly, 2011; Stols & Kreik, 2011; Mueller, Wood, Willoughby, Ross & Specht, 2008); Hermans, Tondeur, Van Braak & Valke, 2008; Ertmer & Park, 2009; Levin & Wadmany, 2006; Zhao, Pugh, Sheldon & Byers, 2002; Sugar, Crawley & Fine, 2004).

Conclusions—Research Sub-question Three:

What are public-middle-school teachers perceptions regarding the importance of integrating Standard 8.1?

As mentioned above, the teachers’ questionnaire data indicated that the majority of the responding teachers consider implementation of Standard 8.1 to be a priority.

The literature indicates that leadership behavior is a critical factor in the implementation and sustainability of innovative teaching practices (Ely, 1999; Ertmer, 1999; ISTE, 2010; Fullan, 2001, Anderson & Dexter, 2005; Gurr, 2001; Macneil &
Delafield, 1998; Byrom, 1998). The data collected with the teachers’ questionnaire indicates that the majority of the responding teachers feel their district and building leadership have made the implementation of Standard 8.1 a priority. This is evidenced by the leaders’ actions. The majority of the responding teachers feel that the professional-development opportunities, ongoing technical and instructional support, and time provisions for planning and sharing of best practices with colleagues are provided by leadership to a degree that substantiates the priority status of Standard 8.1. The data also indicate that the majority of the responding teachers agree that their principal’s professional use of technology and observation practices indicate that Standard 8.1 and technology integration are priorities.

**Recommendations for Policy**

In New Jersey there exists a clear mandate from the New Jersey Department of Education (NJDOE) for local LEAs to implement Standard 8.1—Computer and Information literacy into curriculum and instruction. The NJDOE, through various resources found on its website, provides educators with instructional guidance and explicit assessment criteria regarding Standard 8.1. The data and findings from this study provide evidence that Standard 8.1 is being implemented in the schools solicited at varying levels. The findings also highlight a gap between the perceptions held by principals and the actual practice of teachers. In an effort to close this gap, policy makers may want to require principals to place a greater focus on teacher implementation of Standard 8.1 in the teacher observation and evaluation process. Without such a
requirement and the necessary accountability measures, the attention given to Standard 8.1 will continue to be less than ideal.

**Recommendations for Practice**

The findings of this study illuminate the apparent gap between responding principals’ perceptions of the degree to which teachers are integrating Standard 8.1 and the actual degree to which implementation is occurring amongst responding teachers. It is interesting to note that principals perceive that teachers are implementing Standard 8.1 to a higher degree than what teachers are reporting. It is the conjecture of the researcher that this occurrence may be due to principals’ desire to avoid descriptions of their schools’ practices that may be unflattering, or it may be due to a genuine misperception. In any event, the researcher recommends that a greater effort on the part of principals be made to ascertain the true implementation picture in their building. Principals must be familiar with the specifics of Standard 8.1, state assessment criteria (NJTAP-IN General Assessment Rubric), and the best practice resources provided on the NJDOE website. Principals must also make sure that teachers are familiar with the same. Furthermore, principals must use this information to inform observations, evaluations, and professional-development decisions. Without these actions on the part of the principal, implementation will be fragmented and fail to manifest in exemplary form buildingwide.

The tools for aligning principals’ perceptions and teachers’ practice have been provided:

1. Standard 8.1—Computer and Information Literacy
2. NJTAP-IN General Assessment Rubric
3. NJTAP-IN Website and Resources

These tools must be employed in earnest to ensure that best practices are occurring regarding technology integration and teacher instructional practice. Ultimately, students will derive greater benefits from what has been, and continues to be, a monumental investment of educational resources.

**Recommendation for Further Research**

Below are recommendations that may be considered for future research:

1. This study can be replicated at the high-school level to see if implementation efforts on the part of teachers reflect the perceptions of principals.

2. This study can be expanded to include districts from varying district factor groupings to see if SES plays a role in the focus principals and teachers place on implementing Standard 8.1.

3. A future study can identify participants by subjects taught and examine the similarities and/or differences in implementation levels that may exist between curricular departments.
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Appendix A

Research Communication for Superintendents

Dear Superintendents,

I am a doctoral candidate at Seton Hall University. I am conducting research on the degree to which implementation of the New Jersey Core Curriculum Content Standard: Standard 8.1 – Computer and Information Literacy is occurring in public middle schools. I have directed my inquiry toward public school districts in Morris County that maintain active memberships with the New Jersey Educational Computing Cooperative, Inc. (NJECC). The NJECC is recognized by the NJDOE as a legitimate and reputable organization that provides advocacy and support for districts committed to integrating technology into learning, instructional practices and professional development.

Public middle school principals in your districts will be contacted and invited to participate in this research project by completing an anonymous, paper-based questionnaire. A separate anonymous, paper-based questionnaire will be sent to middle school teachers. Teachers will also be invited to participate in interviews following survey completion. All information collected will be held in strictest confidence. There will be no mention of participant, district or school names in the research results.

I am requesting permission to conduct research in your district. If you agree with the above please respond in writing via e-mail. Respond to: norman.francis@student.shu.edu. Upon receipt of your approval, the middle school principals and teachers in your district will be sent letters explaining the research project and inviting them to participate.

If you have questions regarding the study, you may contact the Dissertation Chair of my committee, Dr. Mary Ruzicka at Seton Hall University, Executive Ed. D. Program, 400 S. Orange Avenue, South Orange, NJ 07079, 973-275-2723, Mary.ruzicka@shu.edu

Sincerely,

Norman Francis, Jr.
Assistant Principal
Jonathan Dayton High School
Appendix B

Principal Contact Letter

Dear Principal,

My name is Norman Francis, Jr., and I am a doctoral student at Seton Hall University in the College of Education and Human Services, department of Education Leadership, Management and Policy. My dissertation involves researching the degree to which New Jersey Core Curricular Content Standard: Standard 8.1 Computer and Information Literacy is being implemented by teachers in New Jersey public middle schools.

I am requesting that you participate in my research study by completing the enclosed anonymous, paper-based questionnaire. The questionnaire will require 12 to 15 minutes of your time to complete.

If you are able and willing to participate in this study please complete the enclosed survey and return it by using the enclosed return, postage-paid envelope.

I sincerely thank you for you time.

Regards,

Norman Francis, Jr.
Doctoral Student
Seton Hall University

Seton Hall University
Institutional Review Board

OCT 27 2010
Approval Date

Expiration Date
OCT 27 2011.
The researcher, Norman Francis, Jr., is a doctoral candidate in the Executive Ed. D. Program at Seton Hall University. The Executive Ed. D. Program is housed in the College of Education and Human Services, Department of Education Leadership, Management and Policy.

**Purpose**

This study focuses on the degree to which New Jersey public school teachers are integrating New Jersey Core Curricular Content Standard for Technology - Standard 8.1: Computer and Information Literacy into their curriculum and instruction. The New Jersey Department of Education adopted Standard 8.1 in 2004. The NCLB act requires that all students be computer literate by the end of grade 8. The purpose of this study is to investigate current efforts towards this goal and ultimately provide recommendations to educators on how to refine and better support this effort.

**Interview Procedure**

The researcher will conduct all interviews. All interviews will be recorded via digital recorder. The anticipated duration of the interview is 45 minutes to one hour. Participants will be allowed to review their audio recordings. A participant’s recording may be destroyed at their request.

**Instrumentation**

The teacher interview will be semi-structured. The researcher will use a list of open-ended questions to conduct the interview. The researcher may pose questions seeking clarification of statements made by participants.

Sample Prompts:
- When and how did you first use technology in your curriculum and teaching?
- What do you feel is the major reason for you to adopt and implement technology in your curriculum? What are the barriers if any?
- Can you provide an example of in-depth use of technology in the classroom?
- Is technology use causing positive change in your classroom? Please describe.
Voluntary Participation
A participant's decision to take part in this research study is voluntary. If at anytime a participant wishes to drop out of the project they can do so.

Anonymity
During interviews, participants will not be addressed by their real name. A code-name will be provided to participants at the start of the interviews. Participant responses will be coded to facilitate organization of information and analysis.

Confidentiality
The researcher will ensure that information related to an individual subject's participation in an interview is protected and maintained in a confidential manner. Information will not be accessible beyond the scope of the researcher, the IRB, and actual participants. Pseudonyms will be used to protect subject identity.

Security
Data will be stored electronically on a USB memory key. The memory key will be locked in a safe for three years following the completion of the study. After three years the data will be destroyed. The only individual that will have access to raw research data is the researcher.

Benefits of the Study
Although there may be no direct benefits to you as a result of taking part in this study, the findings will be used to make recommendations to the New Jersey Department of Education and to school districts on how the implementation of the Standard 8.1 may be expanded and enhanced in New Jersey public schools. Participants will not be compensated for their involvement.

Researcher's Contact Information
The principal investigator/researcher, Norman Francis, Jr., may be contacted for further information at norman.francis@student.shu.edu. The researcher's dissertation advisor, Dr. Mary Ruziczka can be reached at Seton Hall University, Executive Ed. D. Program, 400 S. Orange Avenue, South Orange, NJ 07079, 973-275-2723, Mary.ruziczka@shu.edu. If participants have questions regarding their rights as human subjects they may contact the Seton Hall University Institutional Review Board at (973) 313-6314 or irb@shu.edu.
All interview participants will receive a copy of the signed and dated Informed Consent Form.

Your signature below indicates that you have read and understand the information provided above. This signed form will represent your written consent for the use of digital audio recording devices by the researcher as indicated above. All digital recordings will be destroyed three years following the completion of this study.

Participant Signature ___________________________ Date ____________

Seton Hall University
Institutional Review Board

OCT 27 2010 Expiration Date
Approval Date OCT 27 2011
Appendix D

Teacher Cover Letter

Dear Teacher,

My name is Norman Francis, Jr., and I am a doctoral student at Seton Hall University in the College of Education and Human Services. My studies are in the Department of Leadership, Management and Policy.

My dissertation involves researching the degree to which New Jersey Core Curricular Content Standard: Standard 8.1 Computer and Information Literacy is being implemented in New Jersey public schools. My focus is on grades 6 to 8.

I would like to ask you to participate in this study by completing the enclosed anonymous questionnaire. The questionnaire will require 12 to 15 minutes to complete. Please complete the questionnaire and place it in the locked drop box in the main office of your school.

Your participation in this research project is voluntary. Your consent to participate in the questionnaire portion of the project will be indicated by your completion and submission of the questionnaire. All questionnaire submissions are completely anonymous.

Also, if you are willing to participate in an interview regarding the implementation of technology standards, please complete the attached interview solicitation form and submit it detached from your completed Questionnaire to preserve the anonymity of you questionnaire. Place the form in the locked drop box located in the main office of your school. Using the contact information you provide, I will contact you to arrange an interview. Interviews will be approximately 45 minutes in duration.

I offer my sincerest thanks for your participation.

Regards,

Norman Francis, Jr.
Doctoral Student
Seton Hall University

Seton Hall University
Institutional Review Board

OCT 27 2010
Approval Date

OCT 27 2011
Expiration Date
Appendix E

Standard 8.1 Computer and information Literacy:

All students will use computer applications to gather and organize information and to solve problems.

Descriptive Statement:

Using computer applications and technology tools students will conduct research, solve problems, improve learning, achieve goals, and produce products and presentations in conjunction with standards in all content areas, including career education and consumer family, and life skills. They will also develop, locate, summarize, organize, synthesize, and evaluate information for lifelong learning.

Strands and Cumulative Progress Indicators

By the end of Grade 4, students will:

8.1.4 A. Basic Computer Skills and Tools
1. Use basic technology vocabulary.
2. Use basic features of an operating system (e.g., accessing programs, identifying and selecting a printer, finding help).
3. Input and access text and data, using appropriate keyboarding techniques or other input devices.
4. Produce a simple finished document using word processing software.
5. Produce and interpret a simple graph or chart by entering and editing data on a prepared spreadsheet template.
6. Create and present a multimedia presentation using appropriate software.
7. Create and maintain files and folders.
8. Use a graphic organizer.
9. Use basic computer icons.

8.1.4 B. Application of Productivity Tools

Social Aspects
1. Discuss the common uses of computer applications and identify their advantages and disadvantages.
2. Recognize and practice responsible social and ethical behaviors when using technology, and understand the consequences of inappropriate use including: Internet access.
Copyrighted materials
On-line library resources
Personal security and safety issues
3. Practice appropriate Internet etiquette.
4. Recognize the ethical and legal implications of plagiarism of copyrighted materials.

Information Access and Research
5. Recognize the need for accessing and using information.
6. Identify and use web browsers, search engines, and directories to obtain information to solve real world problems.
7. Locate specific information by searching a database.
8. Recognize accuracy and/or bias of information.

Problem Solving and Decision Making
9. Solve problems individually and/or collaboratively using computer applications.
10. Identify basic hardware problems and solve simple problems.

Building upon knowledge and skills gained in preceding grades, by the end of Grade 8, students will:

8.1.8 A. Basic Computer Skills and Tools
1. Use appropriate technology vocabulary.
2. Use common features of an operating system (e.g., creating and organizing files and folders).
3. Demonstrate effective input of text and data, using touch keyboarding with proper technique.
4. Input and access data and text efficiently and accurately through proficient use of other input devices, such as the mouse.
5. Create documents with advanced text-formatting and graphics using word processing.
6. Create a file containing customized information by merging documents.
7. Construct a simple spreadsheet, enter data, and interpret the information.
8. Design and produce a basic multimedia project.
9. Plan and create a simple database, define fields, input data, and produce a report using sort and query.
10. Use network resources for storing and retrieving data.
11. Choose appropriate electronic graphic organizers to create, construct, or design a document.
12. Create, organize and manipulate shortcuts.

8.1.8 B. Application of Productivity Tools

Social Aspects
1. Demonstrate an understanding of how changes in technology impact the workplace and society.
2. Exhibit legal and ethical behaviors when using information and technology, and discuss consequences of misuse.
3. Explain the purpose of an Acceptable Use Policy and the consequences of
inappropriate use of technology.
4. Describe and practice safe Internet usage.
5. Describe and practice “etiquette” when using the Internet and electronic mail.

Information Access and Research
6. Choose appropriate tools and information resources to support research and solve real world problems, including but not limited to:
   . On-line resources and databases
   . Search engines and subject directories
7. Evaluate the accuracy, relevance, and appropriateness of print and non-print electronic information sources.

Problem Solving and Decision Making
8. Use computer applications to modify information independently and/or collaboratively to solve problems.
9. Identify basic hardware problems and demonstrate the ability to solve common problems.
10. Determine when technology tools are appropriate to solve a problem and make a decision
Appendix F

NETS for Students 2007

1. Creativity and Innovation
Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students:

a. apply existing knowledge to generate new ideas, products, or processes.
b. create original works as a means of personal or group expression.
c. use models and simulations to explore complex systems and issues.
d. identify trends and forecast possibilities.

2. Communication and Collaboration
Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students:

a. interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media.
b. communicate information and ideas effectively to multiple audiences using a variety of media and formats.
c. develop cultural understanding and global awareness by engaging with learners of other cultures.
d. contribute to project teams to produce original works or solve problems.

3. Research and Information Fluency
Students apply digital tools to gather, evaluate, and use information. Students:

a. plan strategies to guide inquiry.
b. locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
c. evaluate and select information sources and digital tools based on the appropriateness to specific tasks.
d. process data and report results.
4. Critical Thinking, Problem Solving, and Decision Making
Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. Students:

a. identify and define authentic problems and significant questions for investigation.
b. plan and manage activities to develop a solution or complete a project.
c. collect and analyze data to identify solutions and/or make informed decisions.
d. use multiple processes and diverse perspectives to explore alternative solutions.

5. Digital Citizenship
Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. Students:

a. advocate and practice safe, legal, and responsible use of information and technology.
b. exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.
c. demonstrate personal responsibility for lifelong learning.
d. exhibit leadership for digital citizenship.

6. Technology Operations and Concepts
Students demonstrate a sound understanding of technology concepts, systems, and operations. Students:

a. understand and use technology systems.
b. select and use applications effectively and productively.
c. troubleshoot systems and applications.
d. transfer current knowledge to learning of new technologies.
Principal Questionnaire

Please note:
1. Responses to this questionnaire will be confidential.
2. Please answer all questions based on the degree to which YOU perceive the teachers in your school (GRADES 6–8) are implementing New Jersey Core Curricular Content Standard 8.1—Computer and Information Literacy in their curriculum and instruction.
3. Return the questionnaire as requested.

THANK YOU FOR YOUR PARTICIPATION.

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a. Students demonstrate a sound understanding of the nature and operation of technology systems.

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b. Students are proficient in the use of technology.

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a. Students understand the ethical, cultural, and societal issues related to technology.

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b. Students practice responsible use of technology systems, information, and software.

c. Students develop positive attitudes toward technology use that supports lifelong learning, collaboration, personal pursuits, and productivity.

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a. Students use technology tools to enhance learning, increase productivity, and promote creativity.

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b. Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.

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a. Students use Web-based communication tools and/or telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.

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b. Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.
a. Students use technology to locate, evaluate, and collect information from a variety of sources.

b. Students use technology tools to process data and report results.

c. Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.

| a. Students use technology resources for solving problems and making informed decisions. |
| b. Students employ technology in the development of strategies for solving real-world problems. |

| a. What is the population of students you serve in your school? |
| (less than 500) | (500–1,000) | (1,000–1,500) | (1,500–2,000) | (more than 2,000) |

| b. Your school is in what type of geographical setting? |
| Circle one of the following: Urban Suburban Rural |

| c. How many years total have you been a principal, including at this school? |
| (less than 5 yrs) | (5 to 10 yrs) | (10 to 20 yrs) | (more than 20 yrs) |

Appendix H

Teacher Questionnaire

Please note:

1. Responses to this questionnaire will be confidential.
2. Please answer all questions based on the degree to which you implement the New Jersey Core Curricular Content Standard 8.1—Computer and Information Literacy in your curriculum and instruction (Grades 6–8)
3. Return the questionnaire as requested.

THANK YOU FOR YOU PARTICIPATION.

<table>
<thead>
<tr>
<th>Part 1: New Jersey CCCS Technology Standard 8.1—Computer and Information Literacy</th>
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<tbody>
<tr>
<td>a. Students demonstrate a sound understanding of the nature and operation of technology systems.</td>
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<td>b. Students are proficient in the use of technology.</td>
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<td>a. Students understand the ethical, cultural, and societal issues related to technology.</td>
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<td>b. Students practice responsible use of technology systems, information, and software.</td>
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<td>c. Students develop positive attitudes toward technology use that supports lifelong learning, collaboration, personal pursuits, and productivity.</td>
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<td>a. Students use technology tools to enhance learning, increase productivity, and promote creativity.</td>
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<td>b. Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.</td>
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<tr>
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### Part 1

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<tr>
<td>a.</td>
<td>Students use technology to locate, evaluate, and collect information from a variety of sources.</td>
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<td>b.</td>
<td>Students use technology tools to process data and report results.</td>
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<td>c.</td>
<td>Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.</td>
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<td>a.</td>
<td>Prior to participating in this research project I did not know the specifics of Standard 8.1—Computer and Information Literacy</td>
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<td>b.</td>
<td>Integrating technology into my curriculum is a top priority of mine while planning lessons.</td>
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<td>c.</td>
<td>I find it difficult to create ways to integrate technology into my subject area.</td>
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<td>d.</td>
<td>I do not have the time to change my lessons.</td>
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<td>e.</td>
<td>I am comfortable using technology for personal use.</td>
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<td>I am comfortable using technology in my teaching and learning practice.</td>
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<td>g.</td>
<td>I think I need (more) training before I would integrate technology into my lessons.</td>
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h. My principal uses technology on a daily basis

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a. What is the population of students you serve in your school? Circle one of the following:
(less than 500) (500–1,000) (1,000–1,500) (1,500–2,000) (more than 2,000)

b. Your school is in what type of geographical setting? Circle one of the following:
Urban Suburban Rural

Please fill in the following:

c. How many years total have you been a teacher? Circle one of the following:
(Less than 5 yrs) (5 to 10 yrs) (10 to 20 yrs) (more than 20 yrs)

INTERVIEW SOLICITATION FORM

If you are willing to participate in an interview regarding the implementation of technology standards, please complete this form and place it in the locked drop box in your main office marked “Questionnaire Return.” Make sure that this form is detached from your completed questionnaire.

Name: ____________________________

Phone: ____________________________

e-mail: ____________________________

Best time to contact you by phone: ____________________________
Appendix J

Simi-Structured Interview Prompts

1. When did you first begin using technology on a personal level? (E-mail, shopping online, etc.)

2. Do you use technology in your curriculum and teaching at school? If yes, go to 3 and continue, if no, go to 5 and continue.

3. When and how did you first use technology in your curriculum and teaching?

4. What do you feel is the major reason for you to adopt and implement technology into your curriculum?

5. What do you feel is the major reason for you not to adopt and implement technology in your curriculum? What are the barriers, if any?

6. What support would you like to have to allow you to continue your use of technology in your curriculum and instruction?

7. Can you provide an example of superficial use of technology in the classroom?

8. Can you provide an example of in-depth use of technology in the classroom?

9. What is your school doing as a whole to integrate technology? Are there any examples you can provide? Is it affecting students/teachers in a positive way?

10. Do you rely on our tech department for professional development? Y or N; Do you prefer learning from colleagues? Y or N; Are you motivated to play around on the computer and teach yourself? Y or N? (Please circle/Bold Y or N for each)

11. Are resources for technology in your district more likely to be a barrier or a motivation for your use of technology in your classroom? Why?

12. Are you familiar with the details of Standard 8.1?
13. If no, in question 12, do you still feel like you incorporate technology into your lessons even without knowing the exact contents of Standard 8.1?

14. If yes, in question 12, how often do you incorporate the standards when creating your lessons?

15. Are you familiar with the NJ-TAP IN General Assessment Rubric?

16. What could/should your districts do to support the use of the use of Standard 8.1 in your classroom?

17. Is technology use causing positive change in your classroom? Please describe.
Appendix K

Interview Transcriptions

Interview 1

Q1
Yeah, um, my freshman year in college actually was the first time, that was my first e-mail account, actually was the first time, umm. That was my first e-mail account. Seton Hall gave me my first e-mail account. And our professors started communicating with us through e-mail, and I think I was only required to take one technology class, which was like Word Perfect with the blue screen.

Q2
Yes. Almost daily.

Q3
I guess it started from the beginning. I have been teaching for twelve years, so probably started out with just basic word processing, and then the district got involved with the IDE program and every classroom got at least you know six or seven laptops. I got a grant for five desktops, so then I was able to start kind of doing a little bit more with it.

Q4
I think the major, well I am a social studies teacher, so I think for my purposes, teaching them how to research accurately online is definitely one of my priorities and also teaching them how to use technology appropriately and not abuse it.

Q5
The barriers are definitely the maintenance and the upkeep of them. When you do have 15 computers open in your classroom, you end up troubleshooting computer issues and you get away from the content and the curriculum because you are spending so much time fixing things.

I also would say that sometimes...and this again is a history thing, not necessarily but I think that kids get away from reading. Like I found as a history teacher, I actually with my eighth graders, at the end of the year they have one project where they can only use print material. Because they are so used to Googling something that they...they don’t know how to actually find any information.

Q6
I think it would be good to have a push-in program. We have a technology department here. We have a technology teacher who sees kids three times, once in sixth, seventh, and eighth grade for sixteen days in a cycle. That’s it. I think it would be much better suited if
maybe for sixth, seventh, and eighth grade if that teacher pushed in to classrooms, almost like an in-class support. So that if I am doing a project that requires technology...you know...if I'm analyzing data through Excel, he can be working with that, and I can be working with the actual content. You know, almost like a special-education situation, but for technology purposes. That would be helpful.

That would probably be my number-one choice.

Q7
An example of superficial use of technology...like, I don't know what you are looking for here.

A superficial use probably would be kind of like random searching. I feel like for kids that is almost detrimental. Like, to send them out and say, like, here you are going to research George Washington. Go! I feel like that is almost detrimental to what you are trying to do. I guess that would be sort of superficial.

Q8
Yeah. Um, actually I designed last year a....It's a social-networking site, but it's, it's protected and it's, it's actually through the Ning network, and I designed it as History Facebook, but the kids had to research...it was based on the Constitution and the whole concept was if Facebook and technology existed when the Constitutional Convention was happening, how would things have turned out differently? How would communication have been different in real time, and, you know, and so on, forming new friends and all that, and, umm, it actually worked out well because the kids had to research their people first and then the regions that they would have been from and who they might have been in agreement with and who they would have not been in agreement with, and then once they got on this site, they designed their page and did everything like fun stuff like they would have but then the blogging was actually, they actually had to respond as if they were there, and I feel that not only taught them not only what was going on at the convention but it also taught them how to use the technology appropriately like how to social network for the appropriate purposes, not to just, you know, change your profile picture when you ever feel like it. I think that was kind of...probably the most beneficial thing I have seen so far.

Q9
Well, I think it was about six...probably about six years ago we implemented the IDE program so almost every teacher at this point has been trained in problem-based learning, and every classroom has been equipped with the smart board and the projector and the computer that go along with it. But a lot of our workshops are designed for technology or the district has a web site that all the teachers are expected to keep up, and you know you are posting homework and you are posting all kinds of assignments you know if kids are absent they can go on. It really I think it's like college, I really do. To be in middle school and to be downloading your notes from class for that day and using it as a study guide at
home. I think that’s like a huge step. So the teachers have been trained to kind of do all that stuff too. It’s pretty helpful.

Q10
Yes and no. I think it’s it’s positive in that you know it helps especially with kids with IEPs, and you have all these things you have to follow, and now I just feel like it’s all there like you can’t possibly say you couldn’t get the notes or you weren’t in class or she couldn’t write it down because she wasn’t paying attention—it’s everything is there. However, now I feel like everything is given to them and they absolutely have zero responsibility of their own. If I like write the homework on the board it’s like it’s not enough anymore. I have to post it two days in advance so that the mother can see it, so I can... It’s taking the onus off of the students.

No

Yes, I prefer learning from colleagues. I prefer learning on my own. Actually, that word perfect class...I actually am one of the biggest users of technology in the building, and I haven’t taken any other computer classes...except for what the district has made me take. I just play with it until I figure it out.

Yes

Q11
I think that they are a motivation.

Um, I think we do have a lot available to us, and I feel like if we want to approach something or want to try something new, the district is pretty open to, to allowing us to do that and kind of encouraging us to do that. And we also have ETTC, are you familiar with that? The Educational Technology Classes? So we’re part of the group also so we can take, any teacher can take any class there for free, and if they ever have something coming up that they think we might be interested in or if it’s something that we can utilize, they really do encourage it to happen, so... I don’t necessarily go, but a lot of people do.

Q12
Um hum

Q13 – (Skipped)

Q14
Actually, I actually just start incorporating them every week. So, they are in there every week.

Q15
No. Should I be?

Q16
Again, I think the push-in program would be helpful. I also think that once you put the computers in here and once you put the technology in here, it has to be maintained. That department, our tech department has never been expanded, so we have a whole lot more technology in the buildings in the district and we still have the same size tech department. So, it is very, they are strapped, they are absolutely strapped. So, it gets to the point where most teachers if you want to get something done you have to figure out how to do it yourself. Which is somewhat of a barrier.

Q17
Yes. I would say that it is as long as everything is working. When things...and honestly, the kids are so used to using technology if they come to school and their stuff isn’t working, they’d rather just shut it down go home and do it at home cause they know it’s going to take them ten minutes to do whatever they are trying to do here, at home. It has kind of gotten to that point where if we can’t maintain that level of functioning technology, there’s really no point in keeping it. That’s kind of my take on it.

I would say that they’re learning how to use it in the right way. So, for example, when they are giving presentations, they love PowerPoint. They love to make PowerPoint presentations. They don’t love necessarily getting up and actually presenting them. So it’s like, okay, you have to teach them that you can get up there and enjoy what you are doing, but you need to know that there is content that goes into it and that when you present something, you have to present it the right way. So that is a positive. Teaching them how to take what they already know how to do...like the bells and whistles that they already know...turning it into something that actually is a good, solid presentation. That’s definitely something for the positive.

And honestly I think that social networking is something we need to work on, because they are...middle school is just a mess when it comes to Facebook and texting and all...anything that has to do with communication at all. But I think that’s important to teach it. It’s dangerous to teach it, but I think that it’s important that we do. I haven’t really grasped how we are going to do it yet....It’s hard...It is a challenge because you want to be out there doing it, but you don’t want to.... Someone is always going to abuse it, so...it’s kind of like a fine line. The history Facebook thing worked. It worked. It was a lot of prep though. A lot of prep.

I created my own e-mail accounts for each of the kids. I accepted them all into the program first. So they had no idea how to invite...they were incapable of inviting anyone else in. It was a totally locked site. It worked well.
Interview 2

Q1
Um, on a personal level actually in graduate school...when I was in grad school working on my masters’ in secondary education down in Arkansas. I guess that would be, um, 1996–97 is when I first started using the Internet, computers and, um you know, I guess what we all lump together as technology.

Q2
Yeah, actually almost every day, umm, being a civics teacher it’s great. We really, we don’t have a textbook per se, umm, so I am constantly drawing on current events by way of CNN or, you know, I’m illustrating the political spectrum going to Fox News or Wall Street Journal on the right or NYTimes.com or MSNBC on the left. You know polling sites like polireport.com or umm...political-cartoon sites like kagel.com. So I wouldn’t say every but, umm, I would say probably three or four days a week at least part of my lesson is referencing something online.

Q3
Um, actually that coincided with when we got our smart boards. It all, each classroom got a smart board at a different time. It was prioritized in terms of subject matter. I think, you know, English may have been first and then science or I can’t remember, but, you know, social studies, we were somewhat in the middle of the pack if not the end. I’m trying to remember, gosh, it was probably...you know...boy, I’m sorry I should have looked at that prompt. I could have gone and looked it up, but umm...I, you know what, I can get back to you if you need an exact year.

Yeah, umm, this is my fourth year teaching civics, and I would say probably, I mean we are in 2010 now so 2006 was probably when it was full-time integrated and it really became vital to my curriculum, and I pretty much ditched the television and the VCR and DVD players and it was all computers. So, you know the first few years...this is my thirteenth year teaching in middle school and the first nine years I taught American history and the last four it’s been eighth grade civics American government. So, at least for the past four years it has been all technology and I have not used an overhead, I haven’t used a television, I haven’t used any of that old-school technology. So, I’d say at least four years, really, I was only able to do it once I had the smart board hooked up to the desktop.

It was no more than between four or six years anyway.

Q4
Because the civics course we teach in eighth grade is not like...I don’t know how old of a guy you are. I’m 38 and the government courses, American government course that I took and our parents took were pretty traditional conservative. There was a lot of rote
memorization—you know how a bill becomes a law and memorizing the Constitution and stuff like that. And this particular course we teach in eighth grade is very current. You know it's absolutely making reference to current events. So, you know, like I said, we don't have a set textbook, but you know, I use Jon Stewart's *America Democracy in Action* reference Jon Stewart, Stephen Colbert, Glenn Beck, Bill O'Reilly, Keith Olbermann, so I guess the question was why, because that's what we're teaching. You know it's obviously kids are going to remember things better and they are going to pay better attention when it's relevant to what they are seeing every day. So if you can bring in what's going on not just nationally but internationally... that's—the technology is great for that. The days are gone when I have to, you know—when I first started teaching, I'd say that there was this great commercial when Ronald Regan was running for re-election... and now I just go on the YouTube, type it up, and it's there within seconds, but primarily it is for current-events perspectives.

Q5
I think the major one more than anything is it's sometimes unreliable. Sometimes the server goes down. Sometimes websites that you've bookmarked are not there, or they change. Or you have pop-ups... not pop-ups, but banner ads that are inappropriate for school. So in terms of me presenting one thing to all students those are the major problems. In terms of using technology with all of the students but individualizing is... we don't have a tech lab anymore. We used to have two computer labs where you could sign up and get time and each student would have his or her own computer and it could be very individualized in that way. We are down to no tech labs in the building now. So, we have technology on a cart. We have different carts of laptops... sometimes twelve sometimes twenty-four and they are very hard to book for times. And they're unreliable. Sometimes they work and sometimes they don't. Sometimes the batteries are not charged. Whenever I plan on something I like to make sure it is going to be there for me. I get real uneasy and ancy if I think I have to have plan B constantly. The technology just when it is me presenting one thing in a uniform way, it is very reliable actually. What's not reliable is when you try to individualize it and have each student have a laptop. Obviously we are not at the point yet where each kid has his personal or her personal laptop but that'll really make things great whenever that happens, if ever it happens.

Q6
Two things more than any one is that it would be great in our building to have at least one tech lab. Like I said, when we first implemented technology... when we first implemented it as a goal, we had two and it was wonderful. We had two tech labs staffed with tech-lab people and you could get time in there. So, what I would like to see is to at least have one tech lab back. And the other thing is to have a person on site, because right now we don't have on-site people. We have to do a request through something called school wires, and I don't know if that is over where you are teaching as well. But we have to put in a request to this central tech office, which happens to be just like across the parking lot, but these guys service all the schools in our district. I would say that's it really, on site—a tech lab, as many tech labs as possible and as many people who know what the heck they are doing on site as possible. Who, you know, can not only, you know, help instruct us but basically be fix-it people. I mean, you know, I know how to drive a car, but I don't
know how to fix one. The same thing with a computer—I know how to use one, but when I have something, you know, when it’s troubleshooting, I have no idea how to fix it. And we need those people on site. It’s worked okay having to put a request, and these guys are there, in most cases if it’s an emergency, they’re there in 20 or 30 minutes. It used to be somebody was there within a minute. So you don’t lose any instructional time. Like I said, you don’t have to have a plan B or plan C or whatever.

Q7
Yeah. In terms of what I practice. I try not to do it too much, but of course if there is something that, umm I’m big on cultural literacy and these kids are not watching the news the beginning of the year I hope that during the course of the year I get them interested enough that they will pay attention and they will actually watch the news. And sometimes if there is just a crazy story—There was just one the other day where some guy went in and it was caught on camera…on security camera, a fella went in to rob a pizza store…and the guy behind the counter had a gigantic metal spatula and beat him back out the door. So, you know, superficial? Yeah, I think so in the sense that it didn’t really…there was no goal or the student would have a goal in mind, but I just like to crack them up to lighten the mood to get them interested in the news and give them something to talk about when they walk in the door and they go home and mom says, “Hi, how was school?” and they say, “fine,” and she says, “What did you learn today?” and, you know, “Nothing.” Hopefully they have something that they can share to prove that we are doing something. Yeah, I use stuff superficially every now and then, but the vast majority of the time I do certainly have a purpose and it is tied to my curriculum somehow someway.

Q8
Every, I do it about every other Friday. There is a website run by, I believe he is a college professor by the name of Derrick Cagle C-A-G-L-E and he his website is Cagle.com and it is a repository of political cartoons from newspapers and news outlets from all over the nation and actually from all over the world. So what I used to do is when I taught history, prior to the Internet, smart boards, they’d have to cut out an article or to print out an article and bring it in to talk about it. Now I have them, you know, individually go up to the smart board and navigate through Cagle and take us to a cartoon and analyze it and interpret it for us. And we would give our own interpretation and talk about our opinion and sometimes it touches off a debate. That’s about as in-depth as you can get using technology just because like I said you have these things…these political cartoons at your fingertips. You know, the beginning of the year the students are…they struggle with it. They do not have an easy time. By the middle or the end of the year almost all of them can really do it well can analyze them well, can read between the lines, can identify that particular cartoon or that particular artist for that particular cartoon as right of center or left of center or what have you. So my favorite use of it is Cagle on a regular basis.

Q9
Well I mean, our grade books now are entirely online. You know, the parents don’t have access to it yet, but I foresee it happening in the near future at least for a limited time there will be a window of time where parents can use a password and get in and view
only their own students'...their own son's or daughter's grades. So, you know, we had our hand forced, although I went along willingly and there haven't been any problems, knock on wood. So our grade books are entirely digital. Our attendance digital.... So much of the communication when I first started, and that was in 1998 it was by paper and it was just stacks and stacks of paper. And now whether it is job posting or faculty meeting minutes or any messages have been put on First Class, which is our internal system for e-mail. Also we just started this year using Google Apps, which has some problems of its own translating from school to home and back just because of different filters and computer configurations, which I don't know enough to talk about. I just know we are having some problems. The district definitely has stepped it up and forced us to do things that we really don't have a choice. For the most part it has been good and I am not too old. I am young enough and I can go along with it, but I know the older staff members have not, some of them, have not been enthusiastic about the situation. By getting rid of the tech labs, the idea I think with the upper administration was you know to have teachers become more well versed in fixing problem on their own. I think there was even the belief that we were good enough or tech savvy enough to fix these things on our own. But like I said I'm not and most people I know aren't. Most of us feel that we need a help desk of some sort to troubleshoot when things go wrong. We do have some very good people who are teachers in the building who are tech savvy. There are some younger ones. But frankly if I have any technology questions, I go to my students I mean 12-, 13-, 14-year-old kids and they know everything. They’re the only ones who if they sabotage a computer can figure out how to fix it.

I think, you know, it, technology is, like, well it’s like, I mean, technology throughout history has been a double-edged sword. There is good along with bad. I think the students certainly—we used to have morning announcements over the loudspeaker and the intercom and nobody would listen as the homeroom teacher tried to keep the people quiet just so they did the pledge so it would be orderly. But we recently started doing CMS in the AM where it is a broadcast...it’s a taped broadcast of homeroom, you know, we bring it up on the smart board, and we project it and play it and it has got the students in wrapped attention—it’s excellent. So I think that from that perspective it’s good. There are other elements of technology that I think, you know, the students... Are you talking specifically technology that the school has forced us to use, or technology in general in terms of how it has affected students?

For the most part I think it has been positive for students. The only time I think we had an issue was a few years ago where they introduced the outgoing eighth graders to the First Class system, the e-mail system they would be using at the high school and within hours one of the kids started flaming everybody in a really bad way. So they had to shut that down.

The technology that these kids are used to using outside of school or as soon as the bell rings to end school just within their hands outstrips anything we use in school. So I think from their perspective what we force upon them or ask them to do is pretty rudimentary and they are comfortable and they’re good at it. As I see it, the technology issue has been
less contentious or less a problem or less... I guess it has been more smooth for the students than it has for the staff members.

Q10
No
No
No

Q11
Honestly, both. Like I said, with just my own computer and my own smart board projecting to everybody kind of shooting to the middle more I'm happy to do that, But the technology on the cart really makes me really uneasy because it is unreliable. But when it is reliable, absolutely, I love to use it and I'm happy to use it. It makes teaching that much better and that much more relevant. But when it is unreliable I am really hesitant to rely that much on it.

Q12
Not really. No.

Q13
Yes. And basically my feeling about technology regarding these students is that there is nothing I can really teach them about technology. It's just another tool to relay the content. I really...these kids are just so far ahead of any of us that I know of in the district...any of us who are teachers...I mean we have tech-savvy people but the kids are always one step ahead. So, no, I don’t think that it’s not like certainly teaching and looking at social-studies standards...when we rewrote the curriculum, we are always looking to the standards and those standards are important to know because that’s part of the content. But do I feel that technology is part of the content? No. It is a vehicle to relay the content. So, no, I think... you know, I feel comfortable, I look at technology as a tool, not necessarily content to be known. Unless I was a tech teacher, which I am not.

Q14
(Skipped)
Q15
No

Q16
More tech labs...we don’t have any. What we have now is our library they have put computers in...of course, there are books there now too, but they call it the media center as opposed to a library. So I think they kind of would say: “We have a tech lab. It’s the media center.” But, no, it’s the library. In any event, just more computers and more people on site to help us with the use of those and fixing them and that sort of thing.

Q17
Yes. Definitely in my classroom I would say it’s positive change. I view my job primarily as a civics teacher...social studies teacher. Just getting these kids interested. I mean, when I look back or try to think back to seventh grade or eighth grade, and I ask anybody the same thing —think back as an adult to that time what do you remember? Most of us do not remember anything. So I am less hung up on the details. Of course there are certain things that kids ought to know by the time they leave my classroom. What does it mean to be right-wing versus left-wing. You know, the basic political spectrum and how to critique various arguments they’re hearing and that sort of thing...if the question was whether I use technology for a net good or a benefit basically...

Yeah I think it is definitely causing a positive change because it gives me the ability to make these kids aware of things it gets them interested and interested in the world and interested in current events. I’ll bring in an appropriate SNL clip, you know, they always seem to open with something political —fits in what we’re doing, but, umm, definitely I certainly If I didn’t feel it was doing something positive I wouldn’t use it. So, I believe it is.
Interview 3

Q1
I think e-mail in my first few years of teaching, which would have been ’94 to ’96 there was no e-mail at that point. In fact, I remember I was still physically cutting out pictures and taping them on to documents as a way...and umm I was still...I had computer files at that point but I wouldn’t say...it was, I mean, we had Internet at that point, but not...e-mail really was not as widely used. So, I would say...maybe it was like ’97, ’98.

Q2
I would say yes.

Q3
I think it really just started first as like word processing, a way to help kids with writing like be able to revise more easily so they would type their first draft and then we’d conference, and they would conference with other kids. And when they would go back in to make changes they’d had already saved a draft. So I would say that was my first. When I started...Maybe 2000...I think it would probably be in 2000.

Q4
I think because the way the world operates...technology is so infused that if we don’t integrate it into our teaching we’re really not teaching them how to operate in the world. Just today we were talking about Dictionary.com and what were the features that they could get on Dictionary.com that they could not get with a paper dictionary. And they really didn’t know, because they really haven’t used paper dictionaries. So, it was very interesting, even that conversation...like, to them it is just natural to use it. I didn’t have to sell it.

Q5
I think barriers are...kind of what we have...it’s really the access. Like when it becomes for me like...when it starts interfering with their learning because the laptops weren’t charged and they are not available and it takes me... Like I have to spend 15 minutes before the class getting laptops and 15 minutes returning them...That prevents me from...like I have to weigh the value. So, I kind of am really conscious of that. I really need to see that there is something more there than they can get without it.

Q6
I think having a tech coach in each would be... I mean, we don’t have that here. We used to have one person who was K to 6, and he was spread very thin, and they eliminated the position. We also used to have tech teachers in every building, so when you would do something, that would kind of be the person you know could help you. So, I think having someone in the building who is very knowledgeable and whose job it is not somebody who just helps you on the side because they are tech savvy. There have been times when I have posted questions to the whole faculty like, okay, I can’t figure out this feature, and I get, like, no response. So, I really feel like it’s up to me to figure this out. So, it would be really nice to have a person in the building.

Q7

I think when...if kids wrote something and all they’re doing is typing it, and there’s no, to me they are just making it look pretty, I don’t see that as a way of extending their learning. My measure is, is it someway doing something for them that we weren’t doing by hand? Like there are some things I do that are so very simple like these Post-It notes on the side of the filing cabinet, a vocabulary thing...I don’t see how technology, or I just don’t know it yet, can help us with that. And I see that sometimes where teachers will have kids, they require them to type something, but there is no reason except to make it more readable.

Q8

Right now we just started...we will see how it turns out...my students are going to...eighth-graders...enter a video-game-design contest, and they’re going to use software to actually create a playable version of their game. So, it’s that idea...I used to do this kind of thing where they would imagine it and they would write about it, but they never had to do it. It’s actually a new competition, so I am not even totally sure if the software can do as much as they want it to do. I feel like it’s forcing them...like they’re thinking critically but then they are also looking at this...they’re looking at other games critically. And everything is posted on this website, so... The other thing I think...kind of a good use of it is that to open their community ... make it a wider audience using that same project, kids that have posted video games already, there are reviews and comments... and before it would just be, okay, well, what do these eight kids, ten kids, I work with small groups, think, and now they are seeing, they’re getting opinions from kids that are not in this building and not...so, anytime that I can get them out of this little community is a good thing.

Q9

I think they are investing a lot in the hardware. Like today we just found out that we are getting four new carts with twenty-four netbooks on each cart, in addition to the eight we already have. So, I think they are making financial commitment to the materials. As a building we...last year and this year we have been focusing on Google Apps for
education. So, with providing additional teacher training to encourage that. We started with a small group...there were ten of us who decided to be like a pilot group and we provided the teacher training on a PD day. But, it still is just...I think the people who were not in the pilot group are not really using Google Apps. They’re still not clear, but those of us who had the pilot, we did three full days of PD spread out last spring. And we’re much more comfortable with the features. So, I think it is money, they are putting more money into buying the stuff and they’re doing some teacher training.

They’re not like—no one is asking us to even put into our lesson plans or integrate it...it’s not like every so often or every week we should see... no they’re not requiring anything like that. So there are some teachers...there is no accountability, I kind of don’t have to do it if I don’t want...I guess, technically.

I do think that it is. I don’t think it is a systematic approach. I am not sure where if they are learning anything about critical reading. I teach struggling readers. So, I talk to them about that, but I don’t know if anybody is talking to them about just maybe ethical use of the Internet. Like, I don’t know where that is being taught because the standards that ultimately my supervisor wants to see are really the English standards. And until I did your survey I didn’t even realize there were standards that addressed technology.

Q10

-I would say no. I think the teachers here tend to do the PD. I think our tech department is more the IT...They fix stuff. They don’t tell us how to teach it or use it.

It doesn’t matter. I mean, I think as long as there is professional development provided, I think it’s great to have it come from colleagues, but in our district those are teachers who are...they are already doing it. It isn’t their primary focus...It doesn’t matter to me, it just...It just always seems a little bit haphazard like, “so and so is going to do this workshop because she did an interesting...her kids are doing blogs.” But there’s really nobody in the district that is overseeing that professional development.

-Yes.

Q11

I would say a barrier because everything is on a cart. We dismantled the lab last year and I don’t know if other schools are doing that but in this district it happened. They started with just getting rid of the tech teacher and they left the lab. You could still sign up and go somewhere. You can see how small my room is. When I bring the cart in we actually have to move the furniture around, and they’re not always charged. It’s not that I mind them working on laptops, I just can’t always be sure. Typically at any point computers will die and while you would say just plug them in...well all of the plugs are here so they don’t have enough extension cords. And no one in the building is in charge of that
equipment because we do not have a tech. The tech teacher used to monitor and make sure all the equipment was updated...or even clean it...I mean they would occasionally wipe it down. So I would say a barrier.

Q12

No, no not at all.

Q13

I do but I think it is interesting. I’m sure that the standards would be more comprehensive. I’m kind of making it...some of my decision are based on student’s interest. Like this video-game competition is like I have my agenda that I want them doing reading and critical thinking. And I thought, well, this is an added component. It’s not really because I think there are skills that they are learning form the technology standards. I’m not even thinking about that. I’m kind of saying they’ll be very motivated. So that’s...I’m not sure. I am not sure if I am teaching them the skills they need to be technologically literate.

Q14

(skipped)

Q15

No

Q16

I think if every teacher had...It doesn’t mean that we need one computer per student, but if there were computers that were kind of...that I only had to share with the person across the hall, and I didn’t have to sign up...I think the access is a big part of it, and I think having a person, somebody who is a resource. Like, I’m trying to figure out this particular software that the kids are going to use. I don’t have anybody I can ask. I just have to do it, and today I really did it with...I have one very small class of three, and I said to them, “I want to see you explore this website a little bit, because I’ve tried it but I’m not quite sure. And so together, but really I had to use a class period, which I don’t think is a good use of my time with them, but...they did say after they checked it out a little bit, we think you have to play these games (which it doesn’t say anywhere), you actually have to play these games in order to be able to create a game. It’s like you have to earn power or whatever. I said, well, it doesn’t say it. It just seemed like I should be able to go in and create a game, and I was not able to do that. And I think it was good to help the...they helped me problem-solve, but a resource would be good. A person...
I would say yes because it is definitely more motivating for them. I work with students who are in the regular education program, but they are struggling academically for various reasons. So, they have an English class and they have me. So I try to do things that are more interesting for them to get them...to hook them a little bit more. So, what I found is like we did a project and the culmination was that we use flip cameras to record themselves and we critiqued the videos. So they got the chance to film somebody as well as be filmed and they were so excited about that. But, again I don’t know if it at all addresses any of the standards, but it worked into what I was doing as far as the English. And I said it’s not that much of a time commitment. So, I think, Yes, I would say positive. They’re engaged and they’re excited. But...I’m not sure with the skill...
Interview 4

Q1
When I was in college, I was using e-mail to communicate with my friends from high school. And, like, instant messenger was big then. ICQ when I was in high school. I remember having e-mail and ICQ wars with my friends. Definitely, probably as early as high school—which is probably when it became commonplace with dial-up Internet. Like ’95, probably ’96.

Q2
Yeah, I mean I try to use technology...you're always trying to use different modes of getting the information to the students. So, since I teach science, I try to use a lot of hands-on activities, but I try to use the computer if we are...earth science is kind of abstract to think about the whole world so trying to show them more pictures than what they see in their textbook. Or to summarize something you've read, something and then the next day you have a PowerPoint slide show just to like hit on the main points. Or sixth-grade students, which is what I teach, they think that a picture means that they have to read less. So a lot of using the technology to remind them to interpret the diagram or show them different pictures or what do you see here.

Q3
The first school, I started teaching in another district, and when I got to this school, I had a smart board and so I went, what do I do...I mean I had some understanding of computers but I had never...I didn’t even know what a smart board was because I had gone to college and then I did something else for a couple of years and then I came back to teaching. So in that window of opportunity I guess they developed the smart board and I was like what is this thing. So I had a smart board in the room and slowly I learned how to use it. I contacted...every time they had an in-service for smart boards I went to it. I would fiddle around with it on my own. They brought in somebody from the Smart company...to show the teachers and for us to ask questions. That was like the first thing I did. But now we are getting interactive projectors in this district, so that will be interesting to see how they have changed in those three years.

Q4
Well, the kids are different. I think that you’re always what you teach, your lessons are driven by the students...not to sound like a political answer, but the kids really respond to technology. We have an online textbook, which I just recently learned about. Even just saying to the kids, “Read the textbook,” in class they would open up the textbook and look around the room. But if you say we are using laptops to read our textbooks today,
they would be like, “Oh my gosh,” and you can like literally walk in here and see them. Are you really like integrating... is it integrated technology? No. But you have sort of hooked them by the fact that...it’s a different way of reading the textbook. Now we can see...the textbook can have some animations or there’s little check point questions that again are normally printed on the side of the textbook. Would they normally read them? Probably not. I would like to think that they would. But if it says...now they’re scrolling along Web pages and it says, Click here to see if you really understand what you are learning; “click, click, click,” they’re clicking and that is getting them the information.

As far as like...when we do a lesson, should we use technology. It is something that the kids are interested in. And it is something that they are more familiar with than I was when I was in middle school. So it’s almost expected. And it is something that the district is pushing to incorporate technology. Plus it’s nice to, with science, to be able to show them pictures that they can’t see here; in this part of New Jersey we don’t have volcanoes, but could we pull up a picture of a volcano that they might have heard about...if there is a volcano erupting. Last year when we did volcanoes one of the volcanoes in Washington State started to erupt. So like pulling that in and showing them real-time stuff that is happening in another part of the world is good timing.

Q5
I think that with anything new one of the barriers is—oh I already have a way to teach that. So it forces you to change the way you would normally do the instruction. So, we have a lab for that or something rather than like doing virtual lab you might want the kids to do a hands-on lab, which I see the benefits of that too.

I think sometimes it ’ just not having the appropriate training. When I first started at my old school I had the smart board. I wanted to use it but I did not know how to use it. By the time it came to having some sort of in district training, you’d get there and there would be some sort of computer issues and now we’re supposed to be learning about the smart board, but we’re calling computer techs to fix it. It just seems as if the technology is there but the infrastructure to support the technology is not there.

So we have wireless laptop carts here, but we got the laptop carts and some parts of the school building weren’t wireless. So that part of the school couldn’t use the laptop carts. If you taught down in the seventh grade wing, you could have signed out the laptop carts but now all of a sudden you can’t implement them in your lesson that you might have planned. And I think that makes teachers hesitant to use technology because you say, “Well, I planned this great lesson and then it was for nothing because the technology wasn’t there. Or, I had ten kids on the laptop and two kids who couldn’t make any progress because their computers would not let them log on. As a teacher that can be frustrating; you feel like I didn’t get anything done ’cause sometimes you only see the negative. Those other ten kids were probably having a great lesson and learning a lot, and once you iron out those wrinkles it would be great.
Q6

I think that this district does a really nice job supporting teachers and using technology for the curriculum. I think the one thing that teachers would like is more time, and having enough time to be able to develop all those lessons. So you might say you can make...there are some interesting video clips and you can make a slide show and embed them in the video. Those are things I am learning because I am in a grad program too. But to have the time to do that...no one has time...as much time as they want I'm sure. As soon as you come up with this idea you think to yourself, oh my gosh, I have all these lab reports to grade or I have all these projects to score. Or even something as mundane as running photocopies. It all just takes time and to set your priorities and say, okay I really need to try this new activity, sometimes it just gets pushed back.

Q7

We do...a do-now when you get to the classroom...which, you know, is the prompt on the board for the students to get to right away. And I've seen teachers say, “Oh, I am being observed and I am going to use technology,” and they’ll type up the do-now and put it on the board, which is nice because it’s there, but by the time they are booting up the computer getting the projector set you could have had it written out. And to me that is like, why? Is it really integral to the lesson? Or do you just want to show that you know how to use a computer. So to me that would be like superficial.

Q8

I got called out on this once in a job interview...and they were like, what does it really mean to integrate technology. And I was like, umm...and finally the guy was like, it is when your lesson cannot exist without the technology. So, if there was something, for example, if you want to just show them, maybe we were doing a lesson where we are talking about volcanoes around the world and in our textbook four pictures and you want to show them different things or get them to draw their own definition of the three types of volcanic land forms or volcanic mountains by seeing the pictures instead of just saying, okay, cinder-cone volcanoes, here is what they look like. So, sometimes getting them to see those extra visuals so they can come up with their own definitions. Or, if you had a lesson like a Web quest, obviously it’s student based and at their own pace. I mean, without the Internet, obviously Web quest cannot exist.

Even when I have done lessons like this is a Web quest, I feel like I am always trying to build that safety net for it. Like I was mentioning before...what is holding people back? Because you say, what if the computers are not working that day so you are running around getting textbooks and books from the library so you have a backup. But then are you putting all your energy into how great the lesson could be on the Internet if you were just focused on that?
I think one of the big things that we are working on in this district is MOODLE. I can’t ever remember what MOODLE stands for. It’s really an extension of your class that the kids can work on at home or they can work on in school. Little units that you can post. For example, we’re doing rocks right now, so I could post a topic of rocks and then put links that would either support or reinforce what we are learning in class for students to review on their own. I could post a quiz for kids to test their own rocks knowledge before the actual test. Note sheets that we might have completed in class in case they lose a copy or if they were absent needed to keep up. So that is something the district is really behind...the MOODLE. That’s their biggest initiative. And I know that in sixth grade this year we are getting new textbooks so we are reviewing textbooks looking at what kind of online components they have for students to use at home or for teachers to use in the classroom, so you know you are buying more than paper that’s bound together. So I know that was something we looked at and we went with an interactive textbook. It actually comes with its own...as a teacher you’ll design a website for your interactive class and it’s sort of like MOODLE...so unlike where now in MOODLE it’s a blank topic and I put in rocks and I pull in all these things, they have it set up, or based on what I saw in the presentation...it seems like you can set up your own website and then they’d say what topics you are covering and you can just drag in rocks and it’s already there like preloaded and it almost takes one of the steps out. And they give you links to websites that have already been reviewed by another person. So instead of me going out and searching for it I can just check that link and see that I like it. And that is something the district is interested in when they’re reviewing textbooks. They are always seeing what more is there besides what the kid is using in the classroom.

I think so. The students really...the MOODLE. I hear them talk about going on to MOODLE. I have even gotten MOODLE messages...from students saying thanks for putting this up on the site. The site is really helping me. Unprompted, so maybe they are just sucking up to the teacher. But more than one student...on the last test we give out study guides to support and their studying, especially in sixth grade, and I posted an answer key...I didn’t say I posted an answer key. I just posted it. So and I said...I made an announcement to the class if you are reviewing and you want to test your own skill there’s a lot of sites, links on the MOODLE site that’ll help you to review. Some interactive rock cycle things or something because we are doing rocks right now and we just finished our rocks unit. And kids were like, “Ohh, I saw there was an answer key posted.” And the next day I collected from them their study guide so they can see their test and their study guide and correlate...did just not know this or did I have it wrong in the study guide and ask questions. They’re working on a whole study initiative. A bunch of students had the answer key that had been posted with them and their study guide and they told me how they had been reviewing and on their reflection sheet...we use a self reflection —how did I study and how effective was my studying. Several students wrote that they had been to the MOODLE site and how it had been helpful. I think it is helping them.
As I mentioned, the interactive textbook. I think they will really like it. But that’s just a guess not because we do not have it.

I think its adding stress to teachers. I have heard more than one teacher say Moodle, which is what our district is really behind, Moodle isn’t helpful, it’s not a good tool. But I just don’t think that they understand how to use it. The more I learned about Moodle, the more I thought to myself when I started...like I said, I am in grad school and we are using Moodle there. So I took a class, not a whole class on Moodle, but part of a class they broke down into Excel and Moodle. And in that first class about Moodle I learned more than I had learned in my years... I had only been at that point here one year working with Moodle. I think it can be frustrating to teachers who just don’t have enough training. And I know that probably in a lot of school districts the plan is to train these ten teachers and then they will go teach everyone else. Sometimes I wonder who is training those ten teachers. When I came back from my grad school, I said, “Oh, did you see this?” And one of the teachers who was a trainer was like, “Oh, show me how to do that.” I know it’s nice to show each other, but maybe there should be an authority. Not an authority but a Moodle expert teaching it. But at the same time, it can be...I don’t know, anything new can be stressful. But I am finding that the more I do it, the more I am organized. And that the kids...seeing the kids respond, you think to yourself...okay then it is worth all that I am doing because it is helping the students and that’s why you are doing the hard work. That’s what I like to think anyway, that I am doing it to help them.

Q10

To an extent. I mean, when they do like the in-service here or curricular days, I always do look through them to see what is being offered. But I do look since I am in grad school now it’s definitely one of the things I look at to see what kinds of things are there that would keep me in the know.

It would be...I guess organized by the tech department. Sometimes the courses are taught by teachers. So, if that’s how they do it. I don’t know if that is how they do it in every district...they’ll say, “Do you have something that you are very good at that you would like to share with others?” Sometimes it is run by the tech department. Like when we first got these...I have a tablet PC...and that was rolled out by the tech department and it was all the teachers getting their tablets and the head of the technology department was there instructing us. When we got laptop carts here, he came in and actually did a lesson with my students on how to use the laptops then we turnkeyed it to the rest of our classes. He was there for the first two classes and then the other three we were like, okay, here is how you use the computers. I guess it’s a mix.

Yes and no...It’s nice because sometimes it’s not as intimidating and you feel you can ask any questions. And you feel more like it’s sharing than, okay, here is me lecturing or here is someone from the technology department where you feel like saying as they are presenting sometimes you are there on your own computer fiddling around and you might
find something that you think is an easier way. Instead of if it was someone from the
technology department instead of maybe teachers feeling like they can say, “Oh, couldn’t
you just do this?” If it was someone from in the building who maybe was doing the
lesson, you could say, “Oh, you know what I learned. And they would probably say, Oh,
okay, I didn’t know that—everyone listen, another way to do this that may be easier. So I
see the benefits of both.

Sometimes. The main thing that would prevent it is having enough time. And making the
time. I’s not like, okay, I mean there’s 24 hours in a day. Could you find time to do that?
You could. The grad-school program that I am in now actually I like because they give
you time to do that. They, like, show you something like they show us like here are some
things on Moodle. Now spend the next hour. And that really when I would say I learned
the most. But would I normally be doing that on a Friday night? But when I am in this
grad program I am doing that. So I guess I’m not always motivated to. Sometimes in the
summer but during the year it’s just so hectic it’s hard to find time.

Q11

Definitely a motivation. I would say especially since we got, in this particular wing, when
we got that laptop cart, we all started to say, “Well, how could we use them? What can
we do to use them? Because, I hate to think of something not being used.” Even when we
have the projectors to show on the screen, we just think, what can I do to incorporate this
in my lesson? because I don’t like to think of things going unused. I think teachers are a
little competitive like that also. Thinking, well if there is some sort of technology and
I’m not using it and some other teacher is gonna be using those laptop carts and then
when I want to use them I won’t be able to. So you think, well, let me use them as often
as possible so that, you know, you have to sort of get your first dibs on the carts and plan
out your lessons...what am I going to do to use these so that I can use them.

Q12

I am more familiar with it after I was reading your survey. So, yes.

Q13

(Skipped)

Q14

I don’t know how to answer that.

Q15

No

Q16

I think they are doing a lot to encourage teachers to use technology. I think that they are
doing a good job of that. Is 8.1 where it is like, how is the student being assessed on
technology use? I think that since I teach science, you know our curriculum is all based on science learning, and there is really never anything that says what I think...especially when people are going towards more using rubrics for scoring. If it’s a science project, how would a science supervisor, or even a building administrator feel if part of that rubric was use of technology and how did they use the technology? Whereas they might think if it’s a project about rocks...like what we are doing right now our pet rock project...They would think or maybe this is just my thought that they would think that the rubric should all be based on supporting their understanding of the goal of the project, which is do they understand the rock cycle and can they explain the processes of the rock cycle. So, I guess if they...I know there are some districts that have things such as, you know, in sixth-graders’ science, they have to have a project that assesses their technology use. Because I know I’ve heard other teachers talk about, “Oh, we have to do that project...that’s our tech project. Do we do it here in sixth grade here? I think we do. I just don’t know that it is something that we could say, “I know how well Norman uses technology because on his project here is what he showed me.” So I don’t know that we have any sort of written proof of that. Do I know what students in my class know how to use technology? Some of them. Some of them, no, because they are not typing their reports or showing me. On this project, some kids are bringing in pictures that they made on Paint as their illustration instead of hand drawing them. Or they are taking pictures with a digital camera and printing them out as part of their report, which were all options that were given to them, but it wasn’t mandated. Because... I don’t mandate that because I don’t know that everyone in this district has those capabilities at home. So then that would be something you would have to offer time in school for. But there is never enough time.

Q17
Yes. I think so. I think it makes kids excited about a project if they are using technology. Even just something...I don’t think always of a PowerPoint slide show as being technology, I’m like, oh, I’m just showing them notes. But at the same time if there is a video in there...even if it is extra pictures it’s like something they wouldn’t...sometimes I pull up a picture and I’m like, “This is a picture of a volcano, but you can actually hear them saying, “Oh, cool.” And you think this is effective. It’s something as simple as showing a picture, but it is effective and it is affecting the students in a positive way. Even giving students the option...as I was mentioning in this project...where they could incorporate pictures that they had taken with a camera or drawn on Paint. That even just mentioning in class, some kids say, “Oh, Paint. I have that program. I am going to try to make my pictures on Paint. So they’re going home and you know what you were mentioning before about teachers spending their own time trying to learn something...they’re spending their own time because they know it’s a project. Is it required to do the picture on paint? No, but they’ll futz around on the computer and figure something out that maybe they wouldn’t have before. Because now they have a reason to be doing it. So I think it’s definitely having a good impact on them.
Interview 5

Q1

When I was in college just starting to go on the computer, that’s how I started. I’m a little bit older so...when I went to college the first time, everything was on the typewriter so then... I guess ten years ago maybe. Maybe that was ten years ago, let’s say that.

Q2

I do. I am actually a computer teacher. For right now I teach sixth-grade computers one. So the main tools I use are just basic Microsoft programs such as Word and Excel. I teach them how to use Gmail, which we have in district. I teach them...about chatting safely and things like that. I will be teaching them PowerPoint, and we use Inspiration...moviemaking. So all of those programs.

Q3 N/A

Q4

Well, I just think the world today, they really have to be...keep up with what’s going on today. Especially with Mark Zuckerberg being named Man of the Year. We talked about it in class because that’s all technology based. You know...his...what he has done...everyone is connected. We have a global connection now. And that has to all be done through technology. So they have to be really proficient in it.

Q5

Just the equipment. I think that is the major barrier. Just having enough equipment that is running all the time. In my classroom some of the computers are not working. The printer doesn’t work, so I think it’s more mechanical problems that are blocking me. That’s about it.

Q6

I have to say our district is pretty good. We are very supportive. We’re always going one step further. We just introduced interactive boards in almost every classroom and soon they will be in every one. Teachers are being trained. They’re excited about it. And I think it has a lot to do with our administration. The way they roll it out to make it feel exciting and something people want to try. So I think they are doing a good job.

Q7
Yeah. Superficial would just be putting a video on or some kind of movie on for no reason. Just passing time. I think that's superficial use of it.

I guess just.... Superficial use would be just typing a project on the computer...that kids weren't being taught any new tools. You know, type a document on the computer for no reason. Just so it looks good or something. To me, that is superficial and not needed.

Q8

Yeah. I....My first year teaching computers I taught second grade. And I tried to incorporate it everyday but at that level also. And we, you know, did some projects where we started out writing a book, drawing pictures, and then with the same thing moved it into taking photos of it and creating a book through technology and then voicing over that book and having a disc made from it... you know from a whole story. So you start on paper and continue through technology. You know there are so many things we can do.

Q9

Yeah. One of the big pushes right now is to get teacher to share what they are doing with each other. We're isolated in our classroom and one of the things we are trying to do is pull teachers together. So have more grade-level meetings. And then at that time we have a new site that we are using called Share Point. And there you can go on to your grade level or subject area and share some of the lessons you are doing or some of the activities you are doing with your colleagues across the district. It's a great use of technology, and I think it will be really helpful. Especially for new teachers coming in.

Absolutely, because every time a teacher learns something new, it's passed on to the student. I was piloting the smart board a couple of years ago and it just engages every student when we use interactive white boards or smart boards. And I think it really brings up the student's interest level and therefore their learning at the same time.

Definitely. I have a good friend of mine who is afraid of technology and really didn't want anything to do with it. She now has an interactive board and she was doing a regular lesson, and all of a sudden said, “Oh, I wonder if I could use Google Earth to find a map of that and show it to my students.” And that's what she did. And she was excited to be able to do that. It's definitely a positive in our district.

Q10

Yes. They offer us every fall and spring semester many classes that I take full advantage of.
Yes. I think that’s the best way to learn because they know where I am, what I’m doing. And to give me really good information. I think it’s best to learn from someone who does the same thing.

Yes. I actually, pretty much taught myself how to use the smart board because no one else in the district had it at that time. But because of that I’m really involved in teaching...facilitating classes for the teachers for the interactive board. So yeah, I do it a lot on my own, still.

Q11

I think they’re overwhelming when they give you all this technology and they expect so much. But I think once you get used to it, it motivates you to try something new. And to go one step further. And it also motivates you to talk to your colleagues and what are you doing, and I think it’s really good.

Q12

Yes

Q13

(Skipped)

Q14

All the time. Right now since I’m teaching computers I really refer to them a lot. To make sure I am hitting all the points that the sixth graders will be competent by the time they are in eighth grade.

Q15

I was not familiar with it. I must have received, maybe that first e-mail...I saw that question and I did look it up. But until that time I was not familiar with it.

Q16

I think maybe curriculum revision might be in order. I think with technology, the curriculum has to be updated pretty often. Because these kids are coming up with so much more. So the curriculum for sixth grade is a little bit lacking. Because they can already do so much, so you almost have to like push it further. And I think that’s where the district can work on ...is moving the curriculum forward a little bit faster.
Absolutely. Yes. Like I said, I use it all the time. I’m lucky enough... I have a projector... if something is happening in the world that I think is important, I’ll turn it on and we’ll live stream ... either coal miners being brought up from the bottom of the earth, or astronauts lifting off into space. Even though that is not my subject area, I think it’s important for all of us to see what’s going on in the world, and technology is where we can do that.
Interview 6

Q1

Q2
Yes, almost every day. I use smart boards, smart-response systems, Many Web 2.0 tools... I use assistive technology like an FM system I wear every day. We use a lot of computers.

Q3
When I first started here. I have a master’s degree in educational technology, and I teach social studies. So pretty much right off the bat.

Q4
I use it as a tool. I don’t use it so much... I mean I do sometimes use it as a research tool but I mainly use it as a tool for student learning. I use it to create student sets of projects, publish online, or they will make podcast, or they will make movie trailers, videos, video editing anything like that.

Q5
Student’s availability at home. The participation gap of students having computer use at home.

Q6
I would like less websites to be blocked for gaming. Video gaming. For instance, the movie Saving Private Ryan is a fictional movie... it is fictional, but it takes place during a historical event. It’s a violent R-rated movie, but pieces of that can be shown in the classroom to show what World War II was like. But if a child is playing with other students and collaborating on problem-solving in a World War II–set video game like Call to Duty, it’s not considered acceptable. I don’t really see the difference... I’ve played the game and I’ve seen the movie. They’re both historical fiction.

Q7
Sure. Superficial use would be using a computer for a research tool or something basic like that.

Q8

An in-depth use is any Web 2.0 tool where students are actually creating content online. Whether it's a blog or a podcast. Anything like that. Any interacting in the virtual world or experience or a wiki or something like that.

Q9

We're pretty aggressive. We have strong broadband connections here with WiFi everywhere. We have a lot of computers. We have a 60% computer-to-student ratio. And ...most sites are not blocked, which is helpful. We have access to YouTube. Facebook isn't blocked. Twitter isn't blocked. There is a lot of accessibility. Only really games are blocked. And a lot of flash games, which are useful, even simple games. Some of those are blocked too.

Yes

Yes

Q10

No. There is a lot of confusion what an Ed Tech is, which is what my degree is, and what the IT department is. People ask me to fix their smart board and I don't know how to do that. I can teach them how to put stuff on YouTube. I'm usually the go-to guy for professional development. I usually run one of the classes.

Yes

Almost all the time. Including during dinner.

Q11

Motivation. It's very available. It's encouraged by our superintendent and our principal. And even professional development is offered through ETTC. And I also teach at ETTC.

Q12

Yes

Q13
Q14

Almost daily. The only time I do not use technology would be classes that involve guided reading. I would say every day, but guided reading is stations around the room with cryptic documents. That sort of thing.

Although I do use technology with online lesson planning and online gradebook.

Q15

Yes

Q16


Q17

It is it increases student engagement. And sometimes students will do multiple versions of an assignment just because they like the technology.
Interview 7

Q1

A long time ago, I would say. Probably in the '90s, I would say.

Q2

Yes

Q3

This is my twelfth year teaching. So, when I first started teaching I was in a Catholic school and I mainly used technology...we had a tech center in the school, so one-on-one by the PC so we would probably do word processing...the really like lowest level that I started at.

Q4

Because, in reality...in society now we function with technology. You go to the store and everything is on a computer when they ring you up for purchasing. You go...and you order food at a drive-in, it is all pumped into a computer. So in that respect, technology is everywhere. So to keep up with the times.

Q5

Sometimes the system is down and that can put a wrench into what you have planned for the day, unless you have a solid backup plan that doesn't require the technology to be used. And also sometimes the systems are slow...you know there are things that you want to do...you want to try to show a video on YouTube and it freezes it up or you know...it's not reliable 100%, meaning, if I am using a computer or smart board for things like that.

Q6

Well we used to have in our building a technology teacher, and we don't have that anymore. We just have tech support where if there's an issue you send...there is this thing called the school wire. You send a ticket in and they fill the ticket request by coming in and like taking care of whatever is wrong in your room. I prefer to have a technology teacher in the building like we used to. Or staff, I guess you could say.

Q7
Well...let's see.... I have a smart board in my classroom. And I know at least for in my content area for English I use the smart board as glorified overhead. So for showing film, I mean, it’s great because it’s a big screen, but really. I always show the film on TV. It’s not doing other than making it on a bigger screen and for more people to see easily.

Q8

When the student creates an original product, whether it is through a program like Photo Story. Or they may use something like Voice Thread if they create a podcast. Or if they create a video...you know maybe something to that effect. Or something online through an online program where you can only view something through Smart School if they’ve made something with smart boards.

Q9

Almost every classroom has a smart board now and that’s been something that they have been working on for the past few years. They started like with one subject area, maybe social studies I think might have been the first and then they move into math...every so often depending on the grant money...they added more smart boards to the classrooms. And we have more laptops that are on carts now. A lot of it has to do with computers. Although we do have some video cameras and we get scanners and things like that to supplement. But the crux of it has to deal with computers in my opinion.

Yes and no. Do you want to know why? One example is that...this year we implemented the use of Google Apps. Where every student in the middle school has a Google App account. And this is supposed to then be able to bridge the gap between home and school. So if they work on a document at home they can easily access it from school. There’s a lot of questions...the kids...I find that some of them are better at using it that others. Some of them are more patient that others. Some of them know how to convert things better than others. And the ones who don’t get easily frustrated and then decide not to use it whatsoever. So it kind of defeats the purpose.

Affecting the teachers is this...we’re always getting a new program that they want us to use. For example First Class we use for e-mail. Then they want us to go to Google Apps and download passes for guidance from Google Apps. They want us to show this video in the morning on the smart board. They want us to take attendance online. So every time they add a new program, we have to learn that program. By the time you get the full grasp of that program, they introduce to you another program that they want you to use. So it’s a lot to juggle...

Q10

No

Yes
Yes

Q11

For me, personally... a motivation because I'm curious whenever they introduce something.

Yes and no

Q12

Yes

Q13

(Skipped)

Q14

I don't usually... when I write my state standards I usually write all my English state standards only. I don't usually write it as a cross-curricular. Because in the English state standards there are standards that involve technology.

Q15

No

Q16

Maybe have workshops that specifically have lesson plans that revolve around those standards and bridge the gap by saying this fits this standard.

Q17

Oh, yes. Definitely. I have a smart board in my classroom, and I have three computers in my class. And there is a laptop cart that we rotate throughout the building. I've done podcast with my students, I've done blogs with my students... The most positive thing that comes out of technology, believe it or not, is that there are many times where... the students will... I'll show them something they don't know. But they'll show me something that I don't know. There is more teaching being done in that respect as opposed to even sometimes with the final project. I showed them how to use Google Book the other day from the smart board and... some of them did but a lot of them never even knew what is was and I showed them how they could preview books and find post and... . I thought that was great. And sometimes a student would show me how to cut and paste and bring something from Google Docs to a Word doc where it is successful through our providers. So I think that there is a good relationship... I have a good relationship with the students with technology because we are kind of in it together.
Interview 8

Q1
I would say I was in seventh grade when my family first got the Internet...so I was 12, 13, and shopping online I didn’t start doing until later in high school when it really became available.

Q2
Yes. Very much so.

Q3
I would say that my very first year, which was 2007, I started by doing persuasive speeches with the kids very early in the year and I recorded it to a laptop. And then what I did was I converted the files into MP3 and I emailed parents to ask them if they wanted to hear their kid’s persuasive speech. And then if they emailed me yes I would send them the MP3 file of their son or daughter giving the speech. So that was probably the very first time I used...I didn’t have any sort of projectors that first year. I just had your standard overhead and stuff like that. Outside of that realm I was pretty limited in terms of technology.

Q4
First of all, it’s ever-changing. A textbook once printed is going to stay exactly the same. It can’t adapt or modify itself to the needs of students, but technology it can. Even if you’re talking about something as simple as the Internet, every day you can go on and find some sort of new resource or website that is current and modern and certainly fits the needs of whatever I’m teaching. And second, here we are talking about a generation of audio-visual learners. Kids are very used to that sort of technology...this is really the first set of kids that were born with a cell phone in their hands. While I don’t always agree with its use, it is certainly important to integrate it into the classroom. And it is useful and helpful too.

Q5
Couple of barriers. Personally, I believe it can be overused. Kids can be overstimulated and kids can come to expect certain things. Like for instance when I was going through middle school ...you saw your assignments in class, you wrote it down, you brought it in the next day...you were responsible about it. Between when you left school and you came in the next day...if you had questions there was nothing you could do. You could
call a friend, but that was about it. Now it’s...we’ve come to a level where the homework is posted online. They can access it online so if they forget it at school they always have it available to them. I like that it a great resource. Kids also become less responsible at the same time. Saying to themselves, well, if I forget at school that’s okay. It’s online. And if I have a question after school, I can always e-mail a teacher. So, sometimes I think it gives them a false sense of protection...maybe I don’t have to listen in class because I can always ask the question later. So I think it can be overused and kids might take advantage of it too much.

In my own personal school district...access to the Internet is an issue. Our school is wireless but it’s kind of haphazard...you never know when it’s going to work or when it’s going to be fast enough. You like to stream some websites, but anything that is not a simple Webpage tends to not want to load, especially over the wireless network.

Things break. You are talking about stuff that students use and teachers use...expensive equipment, and we don’t really have the support staff to be able to take care of it all. Generally speaking, when something breaks down, it’s never really repaired.

Q6

Honestly, I think a lot of training coming from the administrators, coming from our technology department would be great. I don’t know about other districts, but I know our district has the propensity to buy the newest technology but not to train you properly in int. Case in point, our district just installed hundreds of these interactive whiteboards. They’re like smart boards, but they’re made by Epson and they’re wonderful. They’re fantastic and nobody taught us how to use any of it. So, not to be age biased here, but as a younger staff member I can teach myself pretty easily how to use it all and I did but our older staff members that have this technology thrust upon them, they are in the dark. These are people...half of them don’t have computers to hook up to their smart boards...and they show up to their classroom and there it is. Nobody tells them anything about it. So, that’s where I think you really need more resources and support is in the training end. You can get teachers a $10,000 computer, but if they don’t know how to use it, how are they gonna benefit students?

Q7

That’s going to come probably with these new interactive projectors. We also two or three years ago received Toshiba tablet computers. Of course, they are interactive. And they were touted as being great for the kids, and everything would be interactive and stuff like that. What you saw a lot of was teachers playing these interactive games. And games are good every once in a while, but they certainly shouldn’t be the focus of a lesson. I think you saw a lot of that. And with most teachers being given a computer at their disposal, you saw a lot more of these creamy PowerPoint presentations and stuff like that. I think that’s a real shame because it creates a disconnect between teacher and student. And just turns it into a prefabricated lesson. I think on the surface that’s a huge problem. That just makes technology for show. That’s not really applying it. You can show a
presentation with an overhead, a slide projector, shadow puppets...I don’t care what you do it with. You are paying $3,000 for a projector, not training a teacher, and then they’re putting up a PowerPoint and we’re calling that progress. I think that’s a big problem.

Q8

Absolutely. Last year I piloted a couple of programs. One was using...well, actually it would have been two years ago, Using an online grading system where I could send out all the kids’ work online. They could see all their grades online. This year, myself and another teacher are piloting Google Documents. Where kids, we are trying to go paperless...kids are submitting all of their work online. We’re revising it and sending it right back to them online. And they can also send, share and receive with their peers to do the exact same thing—even when school is, obviously, out of session.

There was a great website last year that allowed you to collect polling data from students anonymously and it actually used cell phone...their cell phone numbers. So what happened was you would send out a poll via e-mail and...I don’t know. maybe something about the first amendment or something like that...it doesn’t matter. And they could respond to this poll using their cell phones. And you could even do that in class if you wanted to. And it was great because you didn’t see who was answering the question and how...and it would tabulate it all results right away in real time. So that was a great use of technology on the fly. Kids are very savvy with their phones, so it made perfect sense to use.

One...another couple of examples...the other stuff. interactively using things like Google Earth. Showcasing an interactive timeline. Showcasing an online timeline. Interactive pie charts, analyzing data and stuff like that...

Q9

Me signing up to being an instructor for these interactive smart boards. Like I said...they’ll provide us with the technology, but they won’t provide us with the training. Like I said, a couple of years ago they bought the tablet computers and now we have the interactive whiteboards and stuff like that. They trying to give us access to the technology, but they’re not teaching anyone really how to use it properly. We have a curriculum day this Friday, so I signed up to teach a lesson that’s just on social studies and these new interactive whiteboards and in hope that I can enlighten other people. I hate to see all these things go to waste.

Some of it. Absolutely. Gone are the days where a teacher had to sign out or almost rent the video cart and it inhibited access to certain media and things like that. So, now if I go off on a tangent in class and a kid wants to know about the senate, I can pull up the website on the interactive board, Google it, we can watch the senate in session, we can do all this sort of interactive stuff. I can actually put notes on the board and then send it out
immediately via e-mail to students who missed the work—all without touching my
computer. You know they were out sick, or whatever. So, the ability is there to impact
these kids in a great way.

No. Not overall. No. I think that districts are changing around the technology far too
quickly. It’s kind of like this...we want the newest toy on the market. We want to be able
to say that we have it. I mean, how many districts right now are buying iPads for their
kids and stuff like that. I think that it’s just for them to be able to say...you mentioned
superficial before...that’s as superficial as it gets. I mean what are you going to use these
things for? And then two years later something new will be on the market and they’ll just
want to go and buy that. Teachers, especially classically trained ones, are just...they can’t
use this stuff. And I don’t hold anything against them for that. They’re not receiving
training and they’re just having stuff thrown at them and they’re expected to use it. And
the ones that do, I don’t think are using it in the correct way. Like I said, PowerPoint
presentations...being able to type notes...I mean, why are we spending $3,000 so a
teacher can type notes on the board instead of using a piece of chalk?

Q10

No

No. I feel that my colleagues are going to be the ones...I know the group of people that
are going to want to go out and explore the uses and programs available to us through the
technology that we have been provided. And because of that we’ll have the latest stuff.
We’ll know the best websites...and...an example that was last month...we had a
curriculum day and it was supposed to be all about these new interactive whiteboards,
which 90% of the teachers attending didn’t have yet. But they were going to run the
training session, which was fine. The training session had nothing to do with the
interactive whiteboard because our supervisor didn’t know how to use it himself. He was
running it, but he had no idea how to use it. So, after he left, he said we’re supposed to go
on and use this other program called SharePoint. And we’re just left there for two hours
by ourselves. Myself and three other colleagues all got up, started using the interactive
projector, teaching ourselves. And then we started showing each other websites. And it
was great because I learned five or 6 new things that I could use in class. And they
learned a ton from me. I found that I was much more productive doing that than listening
to any supervisor in my content area or from the tech department.

Yes

Q11

A motivation for me because I like being able to say I can do it and use it. If I’m given
something I want to be the first to turn it into a lesson. I want to be the first to hold a
course on it...to be able to show it to everyone else. You know some of that is pride. But I
just want to be ahead of the curve. I don’t want to be that person that five years from now
everybody is using something and I have no idea what’s going on. I want to...my district
is even looking at new districtwide grading programs that would be online, and I wanted
to be on that evaluation committee...I wanted to be involved in every facet of it and....I know a lot of people that feel the exact same way.

Q12
Yes.

Q13
Skipped

Q14
It's a phenomenal question because some...when I did my student teaching you were required to list every single standard as you applied it in your lesson plan. So, if you use U.S. Geography, you throw in standard 6.4. whatever it may be. [This District] doesn't have that. We don't need to put down our standards. But the use of technology as it relates to the standards...We're talking at least 50% of the week we'll have some sort of technology integrated into it.

Actually, just to expand upon a question I answered before about...you said what could be some drawbacks to technology in the classroom...If there is a day where I don't use my interactive whiteboard. Or I don't show a video clip, or I don't do whatever, and I'm writing on the chalkboard, the kids ask why. And it's interesting because they expect...it's absolutely what we worry about. They expect you to use it.

Q15
No.

Q16
They should certainly try to invite more cross-curricular lesson plans and things like that. It would be difficult certainly because of scheduling and whatnot. But there is no reason that especially technology, which can be used in every single discipline, we should be able to have a team-meeting day with computer teachers and our technology-lab teachers, and supervisors, and stuff like that where it would make the integration of those standards much easier into the classroom. I mean they have a plethora of information at their fingertips, but in order for them to disseminate it to us it is nearly impossible.

Q17
I'd say yes. And obviously I wouldn't continue using it if I didn’t think that was the case. Yeah, it makes everything much more accessible. I can’t tell you how many times where...because I teach U.S. History up until the Civil War, and I could be talking about Andrew Jackson and somehow we start talking about politics and then kids want to know generally more about the war in Afghanistan. And that's fine. Days like that will happen. With this sort of technology at my disposal I can easily pull up so much information. I can show them right away up on this beautiful digital image of what Afghanistan looks like and Iraq looks like, and things like that, and I think have the access to it and using in that sort of scenario just makes a world of difference. Teaching the electoral college used to be the hardest thing in the world until they made interactive maps about it and stuff.
like that. Then the kids actually get really, really excited to see it. And granted, there is a bit of an entertainment factor involved. Teaching needs a lot of entertainment. You gotta keep these kids' attention, and I think technology definitely helps us in that aspect.
Appendix L

Approval for Use of Data Collection Instruments

Hi Norman,

I apologize for not getting back to you the first time. I see I have two emails. I was on vacation and I just have not been on the computer, believe or not! Anyway, you may absolutely use my instrument. Anything I can do to help someone in your position I am happy to do.

Keep in touch and let me know how your dissertation comes along. I would love to know if your teachers are better prepared than mine were. Thanks for the citation.

Take care and I wish you the best,

Denise

From: Norman Francis [mailto:norman.francis@student.shu.edu]
Sent: Tue 7/28/2009 7:28 AM
To: Mancieri, Denise
Subject: USE OF SURVEY INSTRUMENT

Dear Mrs. Mancieri.

I am currently a doctoral student at Seton Hall University in New Jersey. I am writing to request authorization to use the survey instruments (teacher survey & principal survey) you used to collect data as part of your 2008 dissertation. I am investigating the implementation of State technology standards in New Jersey public schools. The only modification to the instruments would be to change the focus to New Jersey Technology Literacy Standards as opposed to NETS-S.

Permission to use your instrument would be greatly appreciated. Working in conjunction with my dissertation advisor at Seton Hall University, I will make sure that you are properly credited and cited in my completed dissertation.

I look forward to your response.

Regards,

Norman Francis, Jr.
Doctoral Student
Seton Hall University
## Appendix M

NJATAP-IN General Assessment Rubric

### Strand A: Basic Computer Skills and Tools

<table>
<thead>
<tr>
<th>Task</th>
<th>Performance/Outcome</th>
<th>Vocabulary Development/Integration</th>
<th>Use of Technology/Internet/Networks/Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A.1.1.2:</strong> Use common features of an operating system, e.g., creating and negotiating files and folders.</td>
<td>Independently use common features of an operating system, e.g., creating and negotiating files and folders.</td>
<td>With assistance, use common features of an operating system, e.g., creating and negotiating files and folders.</td>
<td>Unable to perform task with satisfaction. (Evidence must be available upon request.)</td>
</tr>
<tr>
<td><strong>A.1.1.3:</strong> Choose, organize, and manipulate objects.</td>
<td>Use proper techniques to effectively and accurately input text and data using touch keyboarding.</td>
<td>With assistance, input text and data using touch keyboarding.</td>
<td>Unable to perform task with satisfaction. (Evidence must be available upon request.)</td>
</tr>
<tr>
<td><strong>A.1.2.1:</strong> Create documents with advanced text formatting and graphics using word processing software.</td>
<td>Create word processing documents independently that include advanced text formatting and graphics.</td>
<td>With assistance, create documents with advanced text formatting and graphics using word processing software.</td>
<td>Unable to perform task with satisfaction. (Evidence must be available upon request.)</td>
</tr>
<tr>
<td><strong>A.1.2.2:</strong> Create a file containing embedded information by merging documents.</td>
<td>Independently save two or more documents as a single merged document in a specific core curriculum context area.</td>
<td>With assistance, create a file containing embedded information by merging documents.</td>
<td>Unable to perform task with satisfaction. (Evidence must be available upon request.)</td>
</tr>
<tr>
<td><strong>A.1.3.1:</strong> Construct a simple spreadsheet, enter data, use mathematical or logical functions to manipulate and present data, generate charts and graphs, and interpret results in a specific core curriculum context area.</td>
<td>Independently construct a spreadsheet by entering data and interpreting information.</td>
<td>With assistance, construct a simple spreadsheet, enter data, and interpret the information.</td>
<td>Unable to perform task with satisfaction. (Evidence must be available upon request.)</td>
</tr>
<tr>
<td><strong>A.1.3.2:</strong> Design and produce a basic multimedia project.</td>
<td>Independently design and produce a basic multimedia project using text, graphics, moving images and sound in a specific core curriculum context area.</td>
<td>With assistance, design and produce a basic multimedia project using text, graphics, moving images and sound.</td>
<td>Unable to perform task with satisfaction. (Evidence must be available upon request.)</td>
</tr>
<tr>
<td>Standard</td>
<td>Advanced</td>
<td>Proficient</td>
<td>Partially Proficient</td>
</tr>
<tr>
<td>----------</td>
<td>----------</td>
<td>------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>S.I.B.9.8.9</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Choose the appropriate electronic graphics organizer to create, construct, or design a document</td>
<td>Independently uses network resources to store and retrieve data</td>
<td>With assistance, uses network resources for storing and retrieving data</td>
<td>Unable to perform task with assistance</td>
</tr>
<tr>
<td>S.I.B.9.8.10</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Use network resources for storing and retrieving data</td>
<td>Independently use network resources to store and retrieve data</td>
<td>With assistance, use network resources for storing and retrieving data</td>
<td>Unable to perform task with assistance</td>
</tr>
<tr>
<td>S.I.B.9.8.11</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Choose the appropriate electronic graphics organizer to create, construct, or design a document</td>
<td>Independently creates and produces a report by sorting and querying a database file</td>
<td>With assistance, plan and create a simple database, define fields, input data, and produce a report using sort and query</td>
<td>Unable to perform task with assistance</td>
</tr>
</tbody>
</table>

### STRAND B: APPLICATION OF PRODUCTIVITY TOOLS

<table>
<thead>
<tr>
<th>Standard</th>
<th>Advanced</th>
<th>Proficient</th>
<th>Partially Proficient</th>
<th>Novice</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.I.B.9.8.3</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Define legal and ethical behavior when using information and technology in an independent task as a specific core curriculum content area</td>
<td>Exhibits an understanding of the district’s Acceptable Use Policy (AUP) and the consequences of inappropriate use of technology when completing school work</td>
<td>Independently chooses and uses appropriate tools and information resources to support research and solve real-world problems (online resources and databases, search engines and subject directories)</td>
<td>Unable to perform task with assistance</td>
<td>(Evidence must be available upon request)</td>
</tr>
<tr>
<td>S.I.B.9.8.4</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Define legal and ethical behavior when using information and technology as evidenced by using copyright for one’s own use as part of an assignment in a specific core curriculum content area</td>
<td>Independently creates and produces a report by sorting and querying a database file</td>
<td>With assistance, plan and create a simple database, define fields, input data, and produce a report using sort and query</td>
<td>Unable to perform task with assistance</td>
<td>(Evidence must be available upon request)</td>
</tr>
<tr>
<td>S.I.B.9.8.5</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Define and practice &quot;ethical&quot; when using the Internet and electronic mail</td>
<td>Independently uses network resources to store and retrieve data</td>
<td>With assistance, uses network resources for storing and retrieving data</td>
<td>Unable to perform task with assistance</td>
<td>(Evidence must be available upon request)</td>
</tr>
<tr>
<td>S.I.B.9.8.6</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Choose the appropriate electronic graphics organizer to create, construct, or design a document</td>
<td>Independently uses network resources to store and retrieve data</td>
<td>With assistance, uses network resources for storing and retrieving data</td>
<td>Unable to perform task with assistance</td>
<td>(Evidence must be available upon request)</td>
</tr>
<tr>
<td>Standard: B.1. - End of Grade 8</td>
<td>Advanced Proficient (5)</td>
<td>Proficient (2)</td>
<td>Partially Proficient (1)</td>
<td>Novice (0)</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------------------</td>
<td>----------------</td>
<td>-------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>A.1.A.R.1: Evaluate the accuracy, relevance, and appropriateness of print and non-print electronic information sources</td>
<td>Able to cite and support information sources using credible (accurate, relevant and appropriate) print and non-print electronic information sources</td>
<td>Independently evaluate information sources for credibility of print and non-print electronic information sources based on predetermined criteria list</td>
<td>With assistance, evaluate the accuracy, relevance, and appropriateness of print and non-print electronic information sources</td>
<td>Unable to perform task with assistance (Evidence must be available upon request)</td>
</tr>
<tr>
<td>A.1.A.R.2: Use computer applications to modify information independently and/or collaboratively to solve problems</td>
<td>Consistently demonstrates the ability to create and manipulate information independently and/or collaboratively to solve problems and design and develop products in a specific area of interest</td>
<td>Independently and collaboratively use computer applications to modify information to solve problems</td>
<td>With direct instruction use computer applications to modify, gather and present information independently and/or collaboratively to solve problems</td>
<td>Unable to perform task with assistance (Evidence must be available upon request)</td>
</tr>
<tr>
<td>A.1.A.R.3: Identify basic hardware problems and demonstrate the ability to solve common problems</td>
<td>Identify, diagnose and suggest solutions for non-functioning technology systems</td>
<td>Identify basic hardware problems and demonstrate the ability to solve common problems without assistance</td>
<td>Given basic hardware problems, demonstrates the ability to solve common problems with assistance</td>
<td>Unable to perform task with assistance (Evidence must be available upon request)</td>
</tr>
<tr>
<td>A.1.A.R.4: Determine when technology tools are appropriate to solve a problem and make a decision</td>
<td>Identify a problem in a context area and formulate a strategy to solve the problem using the appropriate technology tool(s), if applicable</td>
<td>Determine when technology tools are appropriate to solve a problem and make a decision</td>
<td>Given a problem, select the appropriate technology tool, if applicable, to solve the problem from a given set of solutions</td>
<td>Unable to perform task with assistance (Evidence must be available upon request)</td>
</tr>
</tbody>
</table>

**LEGEND:**
Greater than 31 = Student Proficient

Revised 2/1/2010