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ARE TECHNOLOGY COORDINATORS TEACHING TEACHERS TO TEACH WITH TECH? A SEQUENTIAL EXPLANATORY MIXED-METHODS STUDY

by

Paula McGraw

A Dissertation

Submitted to the
Department of Educational Services and Leadership
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At
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Dissertation Advisor: John Robinson, Ed.D.

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My graduate committee; Dr. James Coaxum, III, Dr. Jonathan Ponds and Dr. John H. Robinson, my advisor, all of whom have given me their direction and support. To Mr. Alex Menard who sponsored me in joining the New Jersey School Technology Coordinators and all the members who responded to my survey.

The only person who is educated is the one who has learned how to learn and change.

Carl Rogers

Abstract

Paula McGraw
ARE TECHNOLOGY COORDINATORS TEACHING TEACHERS TO TEACH WITH TECH? A SEQUENTIAL EXPLANATORY MIXED-METHODS STUDY
2018-2019
John H. Robinson, Ed.D.
Doctor of Education

The purpose of this study was to define instructional leadership methods used among New Jersey School Technology Coordinators across the state. The study seeks to examine two parameters of leadership among these technology professionals. First, it seeks to define the instructional role of the educational technology leader in New Jersey public school districts and, second, to provide common leadership parameters among these technology professionals serving in the New Jersey public schools. This study will examine the meaning of the leadership role to NJ public school technology administrators and ascertains their experiences of school technology leadership as they implement educational technology in their respective New Jersey public school districts. The members the New Jersey School Technology Coordinators on line community were queried in survey following parameters advanced in the PIMRS (Principal Instructional Management Rating Scale) which has served to assess the level of instructional leadership utilized by school principals first developed during the early 1980s as the first validated instrument for measuring instructional leadership along with one-on-one interviews.

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Chapter 1

Introduction

Every facet of our modern lives is controlled by computer technology be it banking, local or distance travel, work product, or entertainment. In order to truly educate the citizens of the 21st century, our New Jersey public schools must provide purposeful educational technology to the students they serve. Accordingly, in our state, the bulk of public school districts now employ technology coordinators who are responsible for educational technology in district. The New Jersey Department of Education (2002) indicated the percentage of districts with technology coordinators is 91% while the percentage of each school in district with a technology specialist on staff is 57.8%. Thus, more than half of schools in New Jersey have a local technology expert on staff. Further, the state of New Jersey, with its existing extensive diversity and population can act as a microcosm for the nation at large, suggesting an ongoing model for such positons in the United States.

Beginning with the 20th century, a university degree became, according to Langenberg & Spicer (2001), the requirement for entry into the administrative or professional workforce as well as the basis of informed American citizenship. But, in the 21st century, it is perceived that without computer skills, public school students will not be prepared for participation in the predominant information economy we all universally share. In today's society, technological literacy symbolizes access to the high-tech job market, participation in the global economy, and success in the new information age. Cuban, Kirkpatrick, & Peck (2001) also acknowledge "the importance of an information-based economy that requires knowledgeable and technically skilled workers has been promoted in the media and by legislation." Technology is tapped in school systems because it confers mobility and ubiquitous communication, interconnectedness, instant digital learning prospects, research and collaboration opportunities, library media center connection, computerized submission and finishing of assignments as well as ease and availability of administrative functions. This means that material can be transferred, stored, retrieved or processed across school milieu. Technology should, then, serve as an extension to amplify our mental capacity, enabling us to perform more productively.

Today's public school students will experience extensive changes in global politics, economics, technology and sweeping multi-cultural changes. Educators have the responsibility to plan student education and insure that they have the best chance of success in life by providing a quality educational experience and enabling them to develop abilities and skills critical to successful employment. Educational technology is a skill set that must be present to impart employability to our students. Public school educators must work together as a team to build the best possible system of educational experiences and to give public school students every opportunity for their present and future success as they enter the 21st century workplace.

New Jersey Educational Technology Implementation

Educational technology is ubiquitous in New Jersey's public schools at this writing. In the classroom it can be used to offer or collect educational material, inspire and give incentives to students, establish and suggest learning, generate drills and practice, and personalize instruction to enhance learning. Romano (2003) described the need for standardized curricula as key to the implementation of the technology enabled curriculum which New Jersey has adopted (one of 46 states and the District of Columbia) through the Common Core Standards. The Common Core Standards have been acknowledged to support technology usage in the classroom (Marcoux, (2012); Saine, (2013); Tucker, (2012); Yim, Warschauer, Zheng, & Lawrence, (2014)).

Further, the Individuals with Disabilities Education Act (IDEA) requires states to provide a free appropriate public education for all children with disabilities between the ages of three and twenty-one since even before the enactment of federal laws relating to special education, New Jersey had laws requiring school districts to provide educational services to children with disabilities. Educational technology in the classroom increases accessibility to accommodations for these students with appropriate multimedia, evaluating each student on a case-by-case basis, enabling collaboration, providing for individualized instruction, allowing students to formulate multimedia assignments, to gather information, to communicate and use technology research resources as well as provide for ease of use with input devices--mouse, keyboard, remote control and output of product--monitor, printer, electronic transmission (New Jersey Department of Education Offices of Special Education, 2014). The ideal scenario, then, is that new technologies would eventually transform teacher-centered practices into student-centered ones (Cetron & Gayle, 1996; International Society for Technology in Education, 1999; Papert, 1993).

New Jersey educational leaders must embrace the aforementioned vision and work strategically to implement its directives. It is also incumbent upon public school leaders in the state to produce an employable pool of students to meet the demands of the

21st century global economy. However, Rein (1976) advances that policy comes about as a result of compromise and negotiation reflecting values, assumptions and beliefs. Research points out that numerous and conflicting policy causes school reform to be carried out in defective ways in the actual classroom setting (Ahern, 2000; Banks, 1994; Noble & Smith, 1994).

Problem Statement

Governor Thomas Kean, in 1983, urged that we must "give students a boost in obtaining the skills necessary to function in an increasingly high technology society." Subsequent to this speech, Senator, Trinity, & Roper (1984) point out that New Jersey believes public schools in the state must be responsive to recent changes in skill sets needed for work and for college achievement. Further, and perhaps more important, parents want their children exposed to technology, forcing public school teachers to learn computer skills in order to respond to student inquiry needs.

Carter (1966) prophesized four main uses of technology in schools:

1. research and computation in universities
2. logistics and accounting in the public school setting
3. scheduling and advisement
4. as a widespread instructional tool, including teacher liberation from clerical duties, record keeping and presentation of information to students

Harold Howe II (1966), who served as commissioner of education during the administration of Lyndon Johnson, viewed technology as a route to insuring educational efficiency. The 1983 report "A Nation at Risk: The Imperative for Educational Reform," urged:

> The teaching of computer science in high school should equip graduates to: (a) understand the computer as an information, computation and communication device, (b) use the computer in the study of the other basics ("Five Basics": English, mathematics, science, social studies, and computer science) and for personal and work-related purposes, and (c) understand the world of computers, electronics and related technologies.

Compaine (Harvard Information Resources Policy Program) reinforces the view that: "Literacy may soon mean being able to access, manipulate and store information on a computer." Glennan & Melmed (1996) further define the federal responsibility in fostering educational technology in school systems including advocacy along with emphasis on student performance improvement, supply of information on effective classroom use of technology, providing organizations to help schools implement technology effectively and maintain research and development with respect to educational technology. Finally, H.R. 1804 Goals 2000, 1994, is federal legislation where section 317 defines state planning for technology expects "each State to plan effectively for improved student learning in all schools through the use of technology as an integral part of the State improvement plan".

The Council on New Jersey Affairs (1984) acknowledged educational technology develops rapidly, requires extensive teacher training (advising local districts provide in-service training to teachers) and requires clear educational purpose for classroom integration. New Jersey was an early adopter of classroom computing along with California, Florida, Minnesota and New York and all of these states designated full time staff to monitor technology development and facilitate adoption.

New Jersey required computer literacy as a part of curriculum offerings emphasizing programming. Classroom use was designated to include drill and practice (use of computers for recording rote student response), simulations, and word processing. Hentrel & Harper (1985) define computer literacy as "that collection of skills, knowledge, understanding, values and relationships that allows a person to function comfortably as a productive citizen of a computer oriented society."   Skill sets needed to attain computer literacy include computer programming, as well as debugging and modifying a computer; selection and use of software, avoidance of computer misuse, and the ability to apply concepts learned through computers to other learning through new problem solving techniques (recognizing patterns, formulating generalizations, making predictions, and experimenting to confirm hypothesis) and new communication methods. The idea that technology is, in and of itself, an educational endeavor obscures the fact that educational technology is a powerful tool only. It can support student learning by providing individual learning platforms, group learning opportunities, instructional integration, communication and school administration functions.   Education technology can serve to help students understand concepts, solve problems and perform independent learning but they are not subject matter of their own accord. Or, as Cuban (2015) told me: "It is about learning, not technology."

Further, with differing levels of computer use in schools, what constitutes computer literacy does not have one salient definition; implementation difficulties arise because the right type of training is needed for classroom teachers. According to Senator, Trinity, & Roper, (1984), “finding a staff member to coordinate the school system’s use of computers and training classroom teachers in ways to use computers.” is a necessity, in addition, these authors point out, “Local school districts should provide in-service training for teachers in the educational use of computers.”

Consistency is still a concern with respect to educational technology implementation in the New Jersey public schools. This concern, as advanced in 1984, still remains, “No statewide coordination exists among the local efforts to use computers in New Jersey schools.” (Senator, Trinity, & Roper, 1984). Senator, et. al. (1984) further indicate:

> New Jersey schools lag behind those in states that have been identified as leaders in the use of computers in the classroom. We believe this has come about primarily because New Jersey’s local school districts have developed their programs in a sporadic and uncoordinated fashion…New Jersey has contributed little in a systematic way to its local districts.

Lack of expert consistency. This technology expert position is a relatively new addition to central administration. Unlike most educational professional positions, educational preparation for these positions varies; NJ DOE certifications are not a requirement. In a recent survey conducted among New Jersey School Technology coordinators regarding Google/Microsoft Certification/Trainer it was noted that 47% of respondents do not hold any such certificates (T. Ragavas, personal communication, April 3, 2017).

Work performed by Technology Coordinators across New Jersey differs from district to district. Coordinators may be responsible for simple implementation of technology infrastructure, both the hardware and software so that the on-site school technology is, at the very least, operable for students and staff. As experts in the technology field these individuals must become the instructional leaders to help teachers to teach with technology through establishing vision, defining goals, teaching technology usage to staff and then coaching and reinforcing staff learning so that it may be used in the classroom. As members of upper level public school administration these professionals should answer to a higher standard because they are employed by the New Jersey public schools where the primary directive is student learning by the provision of high quality and effective teaching. Thus, as educational leaders, public school technology coordinators should also help teaching staff maximize use of the technology in their classrooms to teach their students, fostering staff and students via educational technology leadership, nurturing technology change, and developing and leading collaboration so that they constantly strive for educational technology improvement. That being said, these professionals are responsible not only for integration of effective public school educational technology, but also championing and nurturing its use among staff and students.

The educational preparation for Technology Coordinator administrative position varies and specific NJ DOE certifications are not a requirement. Expected work product provided by these professionals also differs from district to district; coordinators may be responsible for implementation of infrastructure, hardware and software so that the technology is, at the very least, operable. This may simply mean that these individuals must order computers and other devices, network them, protect data with firewalls and load software onto the computers. In some districts, devices could include chromebooks, ipads or BYOD (bring your own devices) where enrollment and configuration of devices and capacity of wireless routers meeting user traffic must be insured. For many Coordinators, as long as the network is accessible and maintenance is completed to keep it running, their work has met district requirements.

As experts in the field, these leaders must also help teachers to teach with technology through establishing vision, defining goals, teaching technology usage to staff and then coaching and reinforcing staff learning so that it can be fully used in the classroom. As New Jersey public school employees Technology Coordinators are held to a higher standard of employment where the primary directive of their jobs is student learning by the provision of high quality and effective teaching. They should be educational leaders helping teaching staff maximize use of the existing technology in their classrooms to teach their students, fostering staff and students by educational technology leadership, nurturing technology change, and developing and leading collaboration while constantly striving for educational technology improvement. In other words, integration of effective public school educational technology must also be championed by its use among staff and students.

A clear understanding of successful leadership techniques will provide valuable information to other districts and technology leaders so that educational technology can be enhanced consistently in all districts and students may benefit from robust educational technology use in their classrooms. This dissertation will show that by adopting a different leadership style a technology coordinator will implement technology and motivate usage more effectively. Since technology coordinators' primary duties should involve learning and teaching they must serve to implement technological productivity and support educational professional practice. In addition, in some district coordinators must also address management and operations including network support, hardware operation, software selection and software use. True leadership will enable schools to avoid what Tomei (2002) refers to as a "technology façade" where it appears that technology is conspicuous and being used extensively but in reality is not being used to its full potential.

Leadership requirements. Since technology coordinators' primary duties should involve learning and teaching they must serve to implement technological productivity and support educational professional practice. In addition, some district coordinators must also address management and operations including network support, hardware operation and software selection and use. True instructional leadership will enable schools to avoid what Tomei (2002) refers to as a "technology façade" where it appears that technology is conspicuous and being used extensively but in reality is not being used to its fullest potential.

Purpose of the Study

Educational technology is ubiquitous in New Jersey's public schools at this writing. In the classroom it can be used to organize the classroom syllabus and assignments, quiz and test, inspire and give incentives to students, establish and suggest learning, generate drills and practice, extension activities and personalize instruction to enhance learning. Romano (2003) described the need for standardized curricula as key to the implementation of the technology enabled curriculum which New Jersey has adopted (one of 46 states and the District of Columbia) through the Common Core Standards. The Common Core Standards have been acknowledged to support technology usage in the classroom (Marcoux, (2012); Saine, (2013); Tucker, (2012); Yim, Warschauer, Zheng, & Lawrence, (2014)).

Further, the Individuals with Disabilities Education Act (IDEA) requires all states to provide a free appropriate public education for all children with disabilities between the ages of three and twenty-one. In addition to federal requirements, New Jersey also has laws requiring school districts to provide educational services to children with disabilities (N.J.S.A., 2000). New Jersey Department of Education. (2017) has an Assistive Technology Center and an Adaptive Technology Center to provide support to students requiring special education in the state. New Jersey acknowledges that educational technology in the classroom increases accessibility to accommodations for these students with appropriate multimedia, evaluating each student on a case-by-case basis, enabling collaboration, providing for individualized instruction, allowing students to formulate multimedia assignments, to gather information, to communicate and use technology research resources as well as provide for ease of use with input devices--mouse, keyboard, remote control and output of product--monitor, printer, electronic transmission (New Jersey Department of Education Offices of Special Education, 2014). The ideal scenario, then, is that new technologies would eventually transform teacher-centered practices into student-centered ones (Cetron & Gayle, 1996; International Society for Technology in Education, 1999; Papert, 1993).

New Jersey educational leaders must embrace the aforementioned vision and work strategically to implement its directives. It is also incumbent upon public school leaders in the state to produce an employable pool of students to meet the demands of the 21st century global economy. However, Rein (1976) advances that policy comes about as a result of compromise and negotiation reflecting values, assumptions and beliefs. Research points out that numerous and conflicting policy causes school reform to be carried out in defective ways in the actual classroom setting (Ahern, 2000; Banks, 1994; Noble & Smith, 1994).

The main goal of this dissertation will be to define the meaning of the leadership role public school technology leaders (i.e. public school technology coordinators/technology specialists/educational technologists) hold and to establish individual leadership values for these professionals. The purpose of this dissertation is two pronged. First, to define the instructional role of the educational technology leader in New Jersey public school districts and, second, to provide common leadership parameters that may be standardized for success. This study will examine the meaning of the leadership role to NJ public school technology administrators and examine their experiences of school technology leadership as they implement educational technology in their respective New Jersey public school districts. Linking leadership style and successful technology usage will enable adoption of effectual instructional leadership style to benefit teaching staff statewide. Such leadership must underwrite proper technology implementation to insure optimal educational opportunities for our New Jersey public school students.

Methodological and Theoretical Considerations

In order to understand instructional leadership methods among technology coordinators in New Jersey, one central research question along with three research subquestions have been defined:

Central Question:

What is the meaning of the leadership role to NJ public school technology administrators? (i.e. what is their experience of school technology leadership?)

Subquestions:

What leadership values are held by these administrators?

What is their leadership vision?

How do they foster change in district?

These questions are relevant to achieving an understanding of the leadership methods of New Jersey technology professionals in self-examination because they are loosely based upon the Principal Instructional Management Rating Scale (PIMRS) which has served to assess the level of instructional leadership utilized by school principals. The PIMRS was first developed during the early 1980s as the first validated instrument for measuring instructional leadership. The PIMRS is the most widely used survey instrument designed for assessing instructional leadership for research and practice (It has been used in more than 250 studies in more than 30 countries around the world). Hallinger & Murphy (1985) present the theory behind the instrument stemming from an attempt to provide a clear definition of instructional leadership and is divided into 10 instructional leadership functions, some of which may not apply to school technology coordinators.

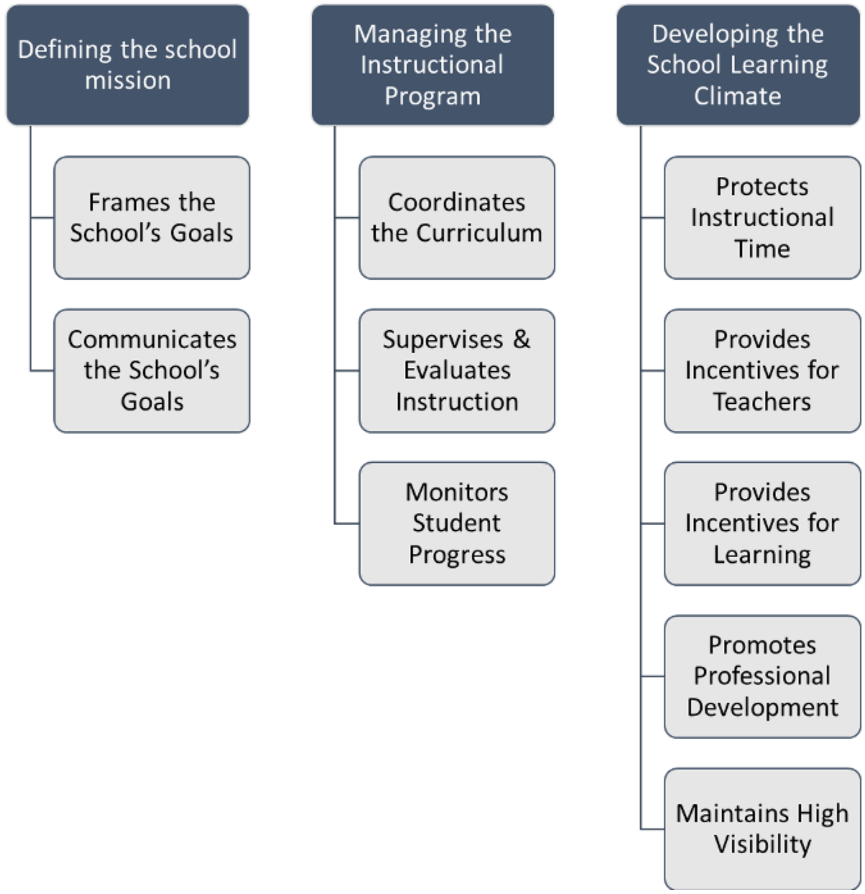

Figure 1. PIMRS conceptual framework (from Hallinger & Wang 2015 p. 28)

Hallinger (2011) reviewed 130 doctoral dissertations completed over the past three decades that used the Principal Instructional Management Rating Scale (PIMRS) and he clearly states the PIMRS has proven a reliable and valid data collection tool. However, these previous studies differ in three ways from the one at hand. First, the PIMRS is not a self-assessment, second, this study advanced here does not examine the role of school principals, rather, it examines technology professionals and, third, questions in the survey are crafted to determine professional duties and opinions and do not request information from teaching staff.

Heretofore instructional leadership was assumed to be the purview of school administrators probably because technology professionals are new to school administrative offices and, as such, do not have specifically defined job duties across all districts. This initial study will try to find the leadership role provided by the NJ public school technology administrators as they have experienced in their current roles. We must analyze the leadership values, vision and change leadership carried out by these professionals to begin to understand if instructional technology methods are now being employed by technology professionals.

First, to gauge if NJ public school technology administrators employ instructional leadership to any extent, a survey based upon parameters presented in the PIMRS will be distributed to technology coordinators across the state of New Jersey electronically, via email. To address the subquestions, a set of interview questions have been formulated based upon the instruments conceptual framework to be administered selected New Jersey Technology Coordinators:

Framing school goals
What is your vision of technology in education?
Describe how you have created a plan to integrate education technology into the district's strategic and operational goals.

Communicating school goals
Discuss how you present the school technology goals with teachers.

Supervise instruction
Describe how you have ensured that school staff stays current about the latest trends and technologies emerging in the education field.

Coordinate with the curriculum
How do you work closely with curriculum and instruction departments and how do you develop these relationships?
How have you insured that teaching staff use educational technology to teach your school curriculum? (For example Social Studies, Language Arts and Science)

Promote professional development
Describe how you have ensured that school staff stays current about the latest trends and technologies emerging in the education field.
What is your philosophy on managing or collaborating with cross-functional teams?
How do you lead the way for teachers to embrace and use technology?

Evaluate instruction
Are you available in classrooms/involved in informal observations?

Maintain high visibility
What is the role of a technology director in an educational environment?
How do you insure that staff know your expertise and willingness to help them?

The essential first step in the statistical process is the specification of the population prior to sample selection in the defining the setting of the statistical survey. Because this is the first look at these parameters among NJ technology professionals, a survey will provide quantitative data to clearly define what members of the NJ School Technology Coordinators community (an on-line community with 521 members across the state of New Jersey) self-assess regarding instructional leadership roles in their positions. E-mail of a Google Form link was chosen as sampling strategy. Dillman (2000) found that e-mail survey had the advantage of prompter returns and lower nonresponse. Guba (1963) stresses that issues in sampling should not happen when the group of interest is the actual group approached, as is the case when the administration of the aforementioned survey to the NJ School Technology Coordinators directly online.

Creswell (2013) notes that qualitative research methods typically aid in researching topics where little is known about a phenomenon as in this initial examination of educational leadership among technology coordinators (there have been no such studies done, to date), survey method was chosen to provide initial information. Survey research designs are “procedures in quantitative research in which investigators administer a survey to a sample from an entire population of people in order to describe the attitudes, opinions, behaviors or characteristics of the population” (Creswell, 2005)

Educational Theory and Methodology

Self -assessment was chosen as the method for the survey of this study in order to advance the ideas of instructional leadership to technology professionals in New Jersey. Further, researchers point out that if an individual is unable to lead themselves, then the individual cannot expect to be able to lead others. Indeed, such researchers have advanced that leadership requires individuals to take responsibility for as well as regulate their personal acts (Neck and Manz, 2010, Goleman, 1998 a, b 2000; Norris, 2008) where self-knowledge results from one’s efforts to assess one’s capabilities. Bandura (1982) postulates that self-awareness attained from self-assessment processes serves to produce the motivation and conduct of the individual. He indicates that self-awareness of one’s individual proficiencies influences the types of aspired performance (goal choices), procurement of competences needed and individual ability to achieve goals. Giving survey subjects examples of good instructional leadership activities, i.e. advancing possible leadership opportunities; could make technology leaders want to incorporate leadership actions into their job duties going forward, and hopefully have them set up their own instructional leadership goals, as well as for others. Those that already use some instructional leadership techniques could also be positively reinforced by such questioning, yielding affirmative self-insights and encouraging the individual to select more ambitious goals, where these goals are indicative of rising personal standards (Bandura, 1977a, b) since the leader feels more positive about their capability to achieve more ambitious goals. In contrast, self-doubt leads to a deleterious view of the individual regarding personal capability and precipitates lower personal achievement standards. Accordingly, lowered ambitions result due to the selection of less challenging or no goals being set. As a consequence, self-leadership development then deteriorates or terminates altogether.

Thus an understanding and knowledge of the function and properties of personal leadership development empowers individuals to engage in action that improves personal leadership development. Roberts, Dutton, Spreitezer, Heaphy & Quinn (2005) point out that learnings regarding leadership behavior can achieve the goal of a leadership development process which enables an individual to learn how to become a self-leader. Further, Bennis and Nanus (1985) suggest that leader actions are behaviors that individuals display correlating with those considered leaders. Researchers point out that individuals as well as organizations can empower development of self-leadership ability (Ashford and Tsui, 1991; Hambrick, 2007).

Kolb, Kolb, Passarelli, & Sharma (2014) suggest that reflection is also necessary to grasp the deeper meaning of creative work ideas and develop skill sets to apply them. It is hoped that self-evaluation would present the basic tenants of instructional leadership to technology coordinators participating in this survey. Kolb et al. (2014) describes Experiential Learning Theory and suggests that a self-assessment instrument can help educators understand their approach to education, analogously; a self-assessment can be applied to educational technology professionals to help them understand their own educational leadership methods. Kolb et al. (2014) goes on to define four roles that educators take on in order to become a part of the aforementioned learning cycle including facilitator, subject expert, standard-setter/evaluator, and coach. He indicates that a self-assessment instrument helps educators understand their uses of various teaching roles and can aid in the planning and implementation of their own educational experiences where the learner must attend to subject matter but also apply reflection to complete the educational process so that they may attain a deeper meaning of their learning and apply the ideas understood. With practice, both learners and educators can develop the flexibility to use all educator roles, through self-evaluation making use of all learning styles to create a more powerful and effective process of teaching and learning.

Deci, Nezlek, & Sheinman (1981), refers to a self-leadership model which is based upon a group of triggers that are a network acting to manage choice of leadership behavior. Bandura (1978) discusses self-influence which range on a scale from high to low. His salient influences are self-esteem and self-concept. These two parameters serve to initiate the leader's rational functions. In his work, Social Learning Theory, Bandura (1977b) provides support for his theory of the import of social interface on self-esteem and self-concept, both of which are the basis for individual leadership value systems. Such value systems define the principles by which leaders create functioning goals both in and out of working situations. Bandura (1982) indicates that self-perception serves to define how one may address and meet their goals as well as impact motivation and overall behavior leading to higher confidence levels (Carmeli et al., 2006 and Stewart, 1995). Therefore, individuals with positive self-perception have high self-confidence and feel empowered to choose more difficult goals and to achieve these goals (Neck and Houghton, 2006). Bandura's (1978) cycle provides the basis for self-mediated behavior and also lends itself to a juxtaposition of the experiential educator roles discussed heretofore.

Ross (2014) describes a conceptual model that provides a comprehensive overview of self-leadership that extends Neck and Manz's (2010) conceptual model and is illustrated in figure 2. Ross indicates: "If an individual is unable to lead his or herself, then the individual cannot expect to be able to lead others. Leadership involves the individual exercising responsibility and control over his or her personal actions" It does so by identifying all the critical super ordinate mediators referred to by Deci, Nezlek, & Sheinman (1981) as internal states (referred to in this study as "dimensions"). These "dimensions" are then organized into a singular system for each individual which leads to specific types of behavior (see figure below). Through elucidating the important mediators an understanding how behavior, an individual's internal processes and external forces influence each other (in what Manz, 1986; Bandura, 1978 refer to as reciprocal determinism), we can begin to understand how to design more effective leadership development programs. Finally, Ashford and Tsui (1991) also suggest that active feedback impacts self-regulation leading to successful integration of skill sets.

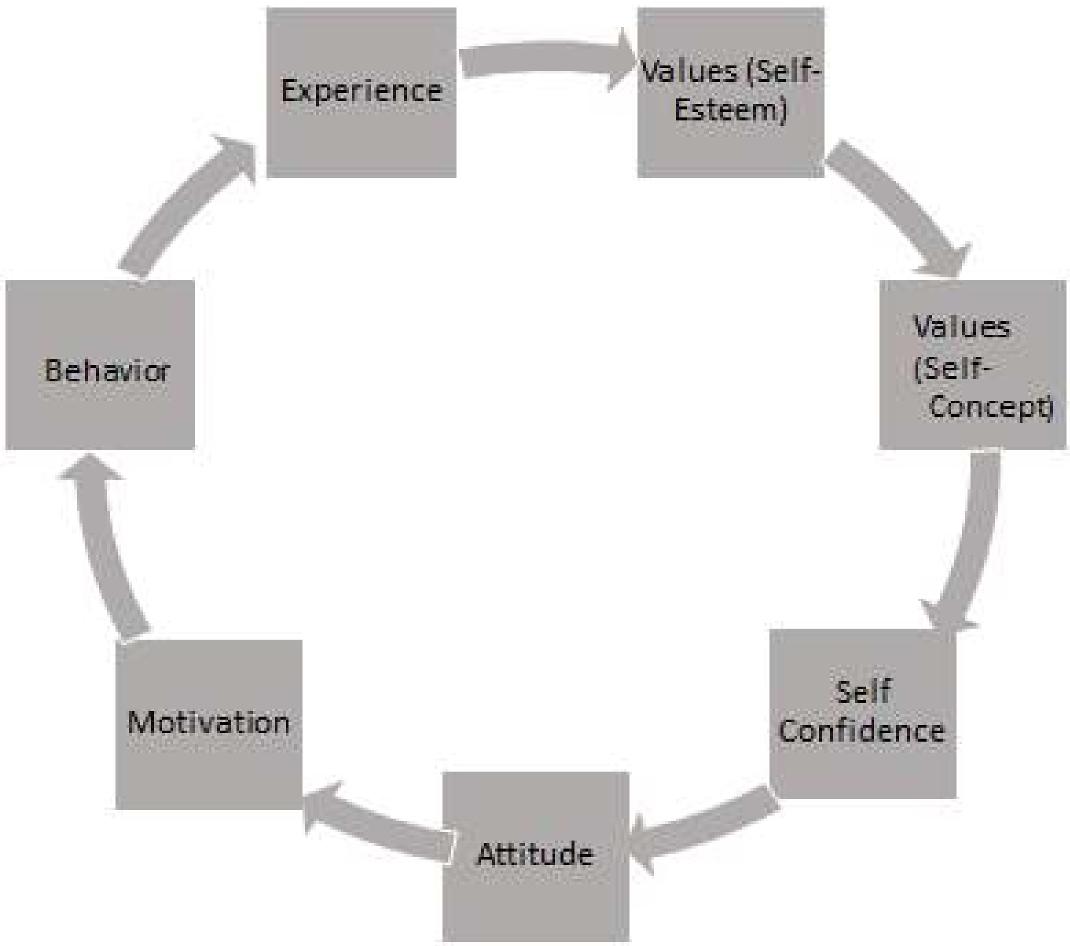

Figure 2. The Leadership Development Model. Elements advanced by Ross (2014).

Significance of the Study

Public school central office administration has increased in complexity in conjunction with increasing demands placed upon public schools in today's educational environment administering 21st Century skills. Hallinger (1992) has examined the role of school principals in this environment of evolving complexity of school administration taking place since the 1960s in U.S. schools. Establishment of instructional technology, as required by 21st Century skill sets, has become a mainstay in classrooms and requires establishment of hardware, software and networking capacity additionally also required are leaders who can teach instructors how to use technology to its maximum level and impart this understanding to students in the classroom. Hallinger (2003) has discussed the leadership necessary for principals of changing schools. In the past two decades two models come to the fore—transformational leadership and instructional leadership, both of which also adapt themselves to reform efforts. Hallinger (2003), an expert in instructional leadership defines it as a leadership situation where learning and teaching are supported by an organization built on interactive relationships. Hallinger theorizes that when other types of leadership such as transformational leadership were examined they created frustration with the instructional leadership model, which remained focused on the school principal at the heart of the research. Though it cannot be contested that principals make a large difference in the values and creed of a school, it is also important that leaders at every level of the organization be developed in their leadership skills. This is especially true of technology coordinators who must move from their role as subject matter experts and change leaders in an inherently complex field, to instructional leaders helping implement technology effectively in the classroom.

Cuban suggests that the superintendent should mandate the planning process for each school. With completion of such planning, staff then creates schoolwide and individual classroom goals targeted upon student outcomes and aligned with the district goals. Between the staff and the school board office's defined goals, lies instructional leadership which includes professional development, monitoring curriculum and instruction, supervising instruction, providing feedback, communication, and reinforcement of set goals. As he points out:

> Principals themselves report that they give such managerial activities less time because the nature of the job forces them to concentrate on noninstructional tasks, such as maintaining school stability and coping with the often competing interests of the central office, school faculty, parents, and others.

Cuban (1984) states, "Instructional leadership, for some, resides in the role of principal; for others, in the teaching staff; and for others, it is beyond definition." He also acknowledges that principalship defines the current research surrounding this leadership model. Hallinger (2003) also points to the fact that solely the principalship is the focus of educational technology instructional leadership research, rather than technology coordinators. It cannot be refuted that principals make a weighty difference in the value and creed of a school but, it is also necessary that leaders at every level of the organization be developed in leadership skills as they move from being subject matter experts to strong instructional leaders, especially in the case of New Jersey technology coordinators, where the area and focus they maintain is ever changing as well as inherently complex.

Further, Marzano & Sims (2013) suggest that classroom coaches, ideally, should not have management responsibilities for the coached staff member, suggesting that the principal should not be the primary technology coach for teaching staff as previous research on instructional leadership would suggest.

This leaves the task of instructional leadership, beyond providing technology itself in public schools, seem rather undefined. This presents an issue because, among staff in public schools there are still a substantial number of teachers in New Jersey public schools who are digital immigrants requiring coaching concerning educational technology that will best serve their classrooms (Prensky, 2001). Even teachers proficient with technology cannot take time out of meeting their curriculum standards as they teach day to day to learn the new technology applications that arise constantly.

Implications of the Study

Beach, (2013) points out that a widening technology skills gap threatens America's future and will impact our economy, workforce employability and national security. Workforce technology needs are indicated as pervasive throughout the fields by the author. In fact, Jang (2016) explores important skills, knowledge, and work activities using the standardized occupation information database managed by the Department of Labor. Citing Katz and Kahn (1978) he lists categories to represent skills and knowledge required in technology-based workplaces and relevant to working in an organization. Jang points out that work activities involved in working with technology (in light of the analysis performed regarding the department of Labor) include interacting with computers, processing information, inspecting equipment and documenting/recording information. The US Department of Education, defined a framework for 21st century learning and suggests four important skill categories: core subjects and 21st century skills; learning and innovation skills; information, media, and technology skills; and, life and career skills per the Partnership for 21st century learning. The framework explains work as “a process of transforming raw materials into useful products through the use of technology and labor. McCannon, & O'Neal (2003), for example, indicate the necessity of technology knowledge in the field of nursing such as using e-mail effectively, operating basic Windows applications, and searching databases where the most critical information technology skill was knowing nursing-specific software, which could be extrapolated from technology training obtained in earlier education, such as bedside charting and computer-activated medication dispensing.

Luft, Bonello, & Zirzow (2009) outline specific job growth predictions that included the following job titles: network systems and data communications analysts + 53.4% computer software engineers for applications + 44.6% computer systems analysts + 29.0% computer software engineers for systems software + 28.2%. These data seem to indicate that strong technology skills are fueling increasingly essential professions which will be key to obtaining and maintaining employment in the ongoing 21st century workforce. None of these professions will be available for public school educated students without initial grounding in educational technology usage.

From an education perspective, the need for individuals that can design, maintain and properly use the tools of technology is evident. Technology continues to become increasingly sophisticated and pervasive both in education and the world of work. The universal use of technology in the world today has enabled unprecedented access to information so that it is also most important that students are taught the processes for finding, using and evaluating information. Technology must be infused into the curriculum where students will be enabled to boost their achievement and critical thinking skills while preparing themselves for the world of work. It is necessary that teachers become proactive in seeking out and infusing technology research into their work supporting and enhancing the essential learnings presented in the public school curriculum. Allowing students to demonstrate their competency by using technology to present project-based work, reports, multimedia presentations, web pages, video presentations and other like products prepares them for job performance. The tools of technology enable cooperation, communication, independence, and the chance to gather, organize, manipulate and evaluate date as well as access multiple resources.

Skills that can be taught in tandem with technology enriched educational environments including problem solving, critical thinking, creativity, and inquiry which are all essential to the future educational and work success for students. Technology skills learned in school are the foundation upon which successful careers and lifelong learning are built.

Chopra (1994) cautions that without a plan for use, the introduction of technology into schools basically accomplishes little. He singles out the use of computers only for word processing, math drill and practice, and computer literacy where computer literacy seemed to be the area educators could target and call on to justify support for requesting commitment of large budgets rather than integrating technology into the curriculum. Teachers, already struggling with extensive documentation and growing/changing curriculum, are given devices often without appropriate pedagogic training. Upper level administrators (principals and superintendents) perform generalized administrative duties, the impetus being on the school technology coordinators who are subject matter experts and must instruct teachers to teach with technology acting as instructional leaders in NJ public schools. This subject matter expert/instructional leadership relationship will be examined in this study.

Chapter 2

Literature Review

Policy Implementation

Rein (1976) advances that policy comes about as a result of compromise and negotiation reflecting values, assumptions and beliefs. However, research points out that numerous and conflicting policy causes school reform to be carried out in defective ways in the actual classroom setting (Ahern, 2000; Banks, 1994; Noble & Smith, 1994).

Federal Directives

Historically, the United States has defined public policy serving to link public educational opportunities with employability. One such type of legislation effecting this change was the First Morrill Act ("Land Grant Act") of 1862 which provided public lands to states to be sold in order to provide:

> endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.

Carter (1966) prophesized four main uses of technology in schools as research and computation in universities, logistics and accounting in the public school setting, scheduling and advisement and as a widespread instructional tool, including teacher liberation from clerical duties, record keeping and presentation of information to students. Harold Howe II (1966), who served as commissioner of education during the administration of Lyndon Johnson, viewed technology as a route to insuring educational efficiency. The 1983 report “A Nation at Risk: The Imperative for Educational Reform,” urged:

> The teaching of computer science in high school should equip graduates to: (a) understand the computer as an information, computation and communication device, (b) use the computer in the study of the other basics (“Five Basics”: English, mathematics, science, social studies, and computer science) and for personal and work-related purposes, and (c) understand the world of computers, electronics and related technologies.

Compaine (Harvard Information Resources Policy Program) reinforces the view that: “Literacy may soon mean being able to access, manipulate and store information on a computer.” Glennan & Melmed (1996) further define the federal responsibility in fostering educational technology in school systems including advocacy along with emphasis on student performance improvement, supply of information on effective classroom use of technology, providing organizations to help schools implement technology effectively and maintain research and development with respect to educational technology. Finally, H.R. 1804 Goals 2000, 1994, is federal legislation where section 317 defines state planning for technology expects “each State to plan effectively for improved student learning in all schools through the use of technology as an integral part of the State improvement plan”.

New Jersey Directives

New Jersey, in fact, hosts the oldest school holding land-grant status; Rutgers University, which was founded in 1766 and designated the land-grant college of New Jersey in 1864. In keeping with its history of linking education to employability, one of New Jersey's most current initiatives at the public school level is helping to shape the state's directive of occupational education by the implementation of educational technology in state public schools. Pursuant to this goal, in 2007, New Jersey defined a vision statement for the NJ Educational Technology Plan Butcher, Aponte, Dietz, Eckert-Casha, Fulton, Hernandez, Hyndman, LaGarde, Lepore, Napoleon-Smith, Parker, Corzine & Davy (2007):

> All students will be prepared to meet the challenge of a dynamic global society in which they participate, contribute, achieve, and flourish through universal access to people, information and ideas.

Governor Thomas Kean, in 1983, urged that we must "give students a boost in obtaining the skills necessary to function in an increasingly high technology society." Subsequent to this speech, Senator, Trinity, & Roper (1984) point out that New Jersey believes public schools in the state must be responsive to recent changes in skill sets needed for work and for college achievement. Further, and perhaps more important, parents want their children exposed to technology, forcing public school teachers to learn computer skills in order to respond to student inquiry needs.

The Council on New Jersey Affairs (1984) acknowledged educational technology develops rapidly, requires extensive teacher training (advising local districts provide inservice training to teachers) and requires clear educational purpose for classroom integration. New Jersey was an early adopter of classroom computing along with California, Florida, Minnesota and New York and all of these states designated full time staff to monitor technology development and facilitate adoption.

New Jersey required computer literacy as a part of curriculum offerings emphasizing programming in the classroom for drill and practice (use of computers to record rote student response), simulations, and word processing. Hentrel & Harper (1985) define computer literacy as "that collection of skills, knowledge, understanding, values and relationships that allows a person to function comfortably as a productive citizen of a computer oriented society." Skill sets needed to attain computer literacy include computer programming, as well as debugging and modifying computer selection, use of software, avoidance of computer misuse, and the ability to apply concepts learned through computers to other learning through new problem solving techniques (recognizing patterns, formulating generalizations, making predictions, and experimenting to confirm hypothesis) and new communication methods. The idea that technology is, in and of itself, an educational endeavor obscures the fact that educational technology is a powerful tool only, supporting student learning by providing individual learning platforms, group learning opportunities, instructional integration, communication and school administration functions. Education technology can serve to help students understand concepts solve problems and perform independent learning but they are not subject matter of their own accord. Or, as Cuban (2015) states: "It is about learning, not technology."

Further, with differing levels of computer use in schools, what constitutes "computer literacy" does not have a salient definition; implementation difficulties arise since the "right type" of training is necessary for classroom teachers: "finding a staff member to coordinate the school system's use of computers and training classroom teachers in ways to use computers." (Senator, Trinity, & Roper, 1984). In addition the authors point out: "Local school districts should provide in-service training for teachers in the educational use of computers."

Consistency is still a concern with respect to educational technology implementation in the New Jersey public schools. This concern, as advanced in 1984, still remains, "No statewide coordination exists among the local efforts to use computers in New Jersey schools." (Senator, Trinity & Roper, 1984). Senator, et al. (1984) further indicates:

> New Jersey schools lag behind those in states that have been identified as leaders in the use of computers in the classroom. We believe this has come about primarily because New Jersey's local school districts have developed their programs in a sporadic and uncoordinated fashion…New Jersey has contributed little in a systematic way to its local districts.

Public School Technology Implementation

McNulty (2010) acknowledges: "technology integration can create an enormous challenge for school administrators, who must manage the gamut of expectations from tech-confident Millennial students to tech-resistant Baby Boomers." Whereas, CEO Forum (1997) an advocacy group supported by 20 leading U.S. corporations states:

> The gap between technology presence in schools and its effective use is still too wide. We continue to believe the quality of public education depends upon our collective ability to close the gap between technology presence and its effective use in the pursuit of school improvement.

U. S. Congress Office (1995) points out that public school teachers and administrators still need a clear cut vision of how technology can best be deployed in the public schools. Ringstaff, Yocam, & Marsh, (1996) in conjunction with the Apple Classroom of Tomorrow Project acknowledge that given extensive government reform efforts, the role of educational technology still remains unclear in the public school setting. Apple, Inc., (2008) stresses that a clear focus on desired goals is a necessity. Schacter, (1999) points out that though educational technology developments are constantly occurring, effective use of educational technology is not clearly defined. Romano, (2003) indicates that educational leaders lack the understanding of how technology can make teaching and learning effective and efficient so that their impact on promoting the use of technology has not been realized hence there is no clear vision of educational technology by these leaders, there are only unrealized expectations. Hanover Research, (2014) espouses the need for leaders who are well connected and attuned to the organization, have excellent communications skills along with the ability to build relationships, and act as team leaders; technology must be pervasive within the vision, mission, and curriculum of schools and teachers must receive extensive professional development on using technology to support learning and they need access to ongoing assistance during the school year.

In-House Teacher Training Requirements

Beginning July 1, 2013 New Jersey teachers must earn at least 20 hours of professional development each year, (in accordance with N.J.A.C. 6A:9C-3.4). Teachers often complain about the requirement to participate in cookie-cutter one-day professional development sessions. The state of New Jersey does not regulate the type of professional development districts receive. Hord, Roussin & Sommers (2010) indicate that keys to teacher learning include vital social interaction, emotional components, relevance of the learning and learner ownership (such as goal direction and motivation). These goals can be folded into on site ongoing learning with proper school leadership exhibited by upper level managers as well as the technology coordinators working directly with staff.

U.S. Department of Education (2010) recently surveying educational technology professional development indicated that teachers felt that the activities preparing them to use educational technology for instruction were 61 % professional development activities, 61 % training provided by school staff responsible for technology support and/or integration, and 78 % independent learning. The teachers reported average number of hours in professional development activities was from 1 to 8 hours. The report provided no hours for ongoing educational technology development and coaching subsequent to professional development for reinforcement of skill sets. Duffey & Fox, (2012) discuss the need for technology coach/mentor support for teachers as a means of modeling and utilizing the potential of technology to improve teaching and learning "Instructional technology coaches or mentors in schools provide critical opportunities for collaborative planning and co-teaching to help teachers utilize new and best practices, and research–based resources." They indicate that such coaches should exhibit content knowledge along with visionary leadership.

Leadership Parameters

Leadership needed to improve organizational effectiveness. Leithwood & Riehl (2003) discuss the merits of successful school leadership, "Leadership has significant effects on student learning, second only to the effects of the quality of the curriculum and teachers' instruction". But, unlike leadership that focuses on production of company product, school leadership must focus on learning and teaching. Sustainable leadership also imparts social justice since it should not simply serve to maintain enterprises in just one school, but responsibility to all students that, in turn, affect environs for all citizens. In other words, it does not just impact one student and one school.

Hallinger (2003) has discussed the leadership necessary for principals of changing schools. In the past two decades two models come to the fore—transformational leadership and instructional leadership both of which also adapt themselves to reform efforts. He indicates that the type of leadership employed by building administrators varies depending on district context and external local environment. Both types of leadership are used with the purpose of improving educational outcomes (e.g. Leithwood & Jantzi, 1999; Southworth, 2002) and, as such, they are the main leadership styles of interest in this study since they are directed specifically towards educational leadership.

Transformational leadership. Classically, leadership was discussed by Douglas McGregor in terms of theories x and y (McGregor, 1960; Northouse, 2012). In this context, McGregor suggests two fundamental approaches to managing people; theory x where employees are viewed as unmotivated with an aversion to work, suggesting an authoritarian style of management and theory y where employees are happy to work, self-motivated and creative, and enjoy working with greater responsibility, suggesting a de-centralized management style.

But, transformational leadership means that management goes beyond completing work and maintaining good relationships with employees. Bass & Avolio (1994) point out that transformational leaders present as role models, they work to encourage and stimulate followers by raising the bar and imparting meaning to their employment, they encourage creativity and do not penalize mistakes or views other than their own, and they readily act as coaches and mentors. Davies, (2010) says such leaders stir strong emotions so that followers identify with them, they model correct practice, they give support to each employee's efforts encouraging them to advance, and they motivate them to think about their work in new ways and instilling in them a sense of mission. The product of such actions is to engage employees and develop them to higher levels of productivity, motivating these followers to put group interests above their own, and involve them in the organizational mission or vision. As such, transformational leadership expands upon theory y management. Such leaders concern themselves with values, ethics and long-term goals and, as such, formulate goals which encompass an expansive perspective. Finally, these leaders do not require rewards to but rather raise awareness of organization members to support organizational growth and accomplishment, developing followers to eventually take on leadership roles within the organization and to perform above expectations.

Davies emphasizes that transformational leadership emphasizes feelings and ethics, where the main goal is insuring follower commitment to leadership targets so that greater productivity results, in tune with the leadership agenda. Basically in appealing to individual goals of followers, the leaders transform these individual aspirations to collective targets. This type of leadership best suits the superintendent whose direct leadership is limited to a small number of followers which include principals, curriculum directors, business managers and technology coordinators where the leader works directly with followers, communicating directly with them, using the techniques of individual attention, intellectual stimulation, encouragement in motivation and focus on vision, especially necessary in the non-routine, novel, changing scenarios that most public schools now face. Bass & Ryterbrand (1979), in fact, suggest that optimum team size should be 5 to 6, supporting the structure of central office direct reports in most school districts in New Jersey. Superintendents, in this way, can expand their leadership through management line reports enabling indirect management where organizational culture is maintained, allowing for communication of vision, and delegation leading to employee empowerment. Once the transformational leader has set change in motion all leaders in the organization must work to have followers support that vision and provide an environment conducive to incorporating change into ongoing organizational operations. This leadership style, though applicable to higher level management duties, requires handoff of direction to subject matter experts for proper implementation.

Instructional leadership. Instructional leadership models present with effective leadership focused on curriculum and instruction. Also, such methods are the gold standard for most training of principals seeking to improve leadership practice and speak to educational underperformance in their schools (Hallinger, 1992). This is because the model has proven effective especially in at risk districts at the elementary level (Edmonds, 1979; Leithwood & Montgomery, 1982). But, Hallinger theorizes that when other types of leadership such as transformational leadership were examined they created frustration with the instructional leadership model, which remained focused on the school principal at the heart of the research. Both instructional leadership (e.g. Glasman, 1984; Heck, Marcolouides & Larsen, 1990) and transformational leadership (e.g., Leithwood & Jantzi, 2000; Silins, 1994) have been extensively examined as methods to improve student outcome.

Cuban (1984) states, "Instructional leadership, for some, resides in the role of principal; for others, in the teaching staff; and for others, it is beyond definition." He also acknowledges that principalship defines the current research surrounding this leadership model. Hallinger also points to the fact that solely the principalship is the focus of educational technology instructional leadership research, rather than technology coordinators. It cannot be refuted that principals make a weighty difference in the value and creed of a school. But, it is also necessary that leaders at every level of the organization be developed in leadership skills as they move from being strong instructional leaders in some cases to technology coordinators, where the area and focus they maintain is ever changing as well as inherently complex.

Cuban suggests that the superintendent should mandate the planning process for each school. With completion of such planning, staff then creates schoolwide and individual classroom goals targeted upon student outcomes and aligned with the district goals. Between the staff and the school board office's defined goals, lies instructional leadership which includes professional development, monitoring curriculum and instruction, supervising instruction, providing feedback, communication, and reinforcement of set goals.

Cuban points out:

> Principals themselves report that they give such managerial activities less time because the nature of the job forces them to concentrate on noninstructional tasks, such as maintaining school stability and coping with the often competing interests of the central office, school faculty, parents, and others.

Further, Marzano & Sims (2012) suggest that classroom coaches, ideally, should not have management responsibilities for the coached staff member, suggesting that the principal should not be the primary technology coach for teaching staff as previous research on instructional leadership would suggest.

The foregoing, then, leaves the task of instructional leadership, at least in the realm of technology; in the public schools seem rather undefined. This presents as an issue because, among staff in public schools there exist digital natives, but there are still a substantial number of teachers in New Jersey public schools who are digital immigrants who require coaching regarding the educational technology that will best serve their classrooms (Prensky, 2001). Further, all staff members would benefit from a single point of contact, a subject matter expert, who can continually define the best educational technology applications, in keeping with the district curriculum, which best suit classroom use since some districts, my own as an example, may use educational technology as a staff evaluation parameter. It makes sense that the individuals who put the technology in place would be the ones to take on the role of instructional leadership in public school districts. Moreira, Rivero & Sosa Alonso (2018) point to international studies that have shown that educational leadership is a relevant factor in the process of instructional integration of digital technologies in classrooms. They argue these leaders must have ICT (information and communications technology) skills of various kinds that are more complex than simply instrumental mastery of technology and must be linked to support the innovative use of ICT in teaching and learning by teachers. They conclude that policies are required to train and support this should properly train and support these change agents. Christensen, Eichhorn, Prestridge, Petko, Sligte, Baker, Alayyar, & Knezek (2018) advance many leaders who are charged with the task of technology integration have not received professional development to support a leadership role and that school administrators may not have the skills to make decisions for technology integration for learning. Effective technology leaders can create a shared vision, focus on best practices, and support on-going professional development. Pettersson (2018) recently reviewed ten years of research on digital competence in education has increased but relationships to infrastructure and strategic leadership are minimal. The aforementioned suggests educational technology leadership is not clearly defined or administered.

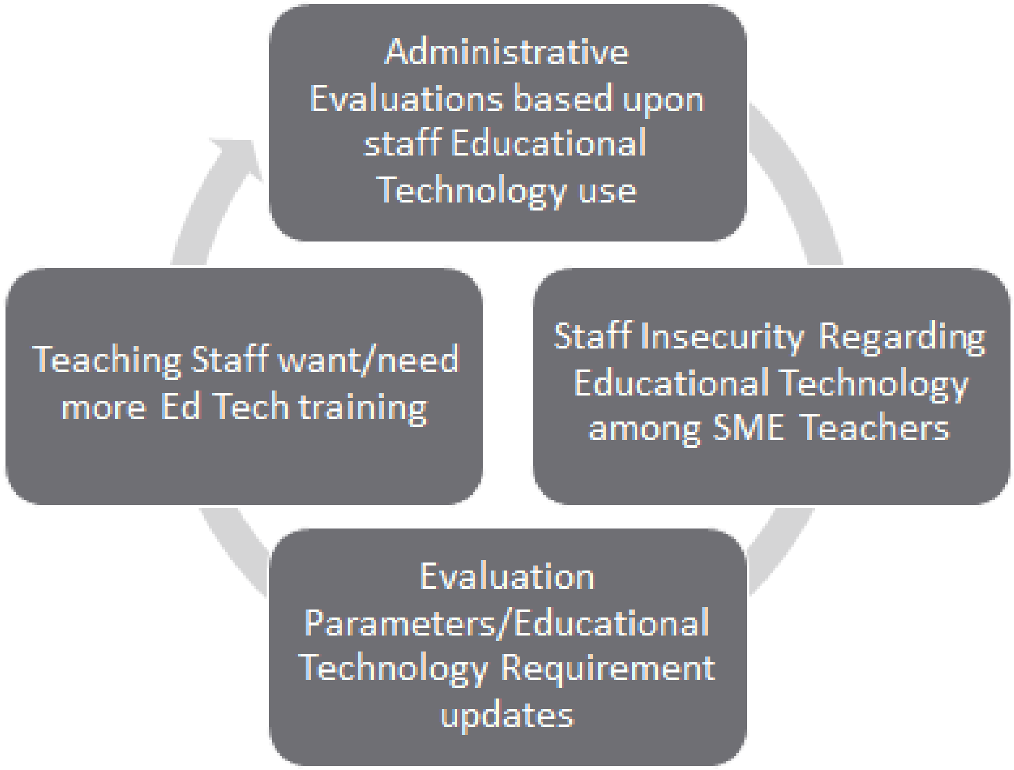

Figure 3. Staff views regarding classroom technology usage and attendant needs.

Integration of leadership. The public school environment is a complex one and requires different types of leadership at different times. Ideally, the superintendent and upper level management should make use of a transformational leadership platform in order to facilitate the goals they set for the district. For the most part, technology coordinators should act as technology instructional leaders in district. Therefore, technology coordinators should position themselves to be strong instructional leaders in district. Razik, & Swanson (2001) say these instructional leaders need to be adroit at defining educational problems including assimilation of technology into lesson planning, aiding teachers, developing integrated curriculum, staff development, and evaluation and remediation of classroom work in a coaching capacity.

Bases of power. Burns (1978) believed that:

> power over other persons is exercised when potential power wielders, motivated to achieve certain goals of their own, marshal in their power base resources that enable them to influence the behavior of respondents by activating motives of respondents relevant to those resources and to those goals.

Rost (1991) supports the idea of mutual purpose as necessary to effect real organizational change and not simply enforcement of top-down management directives.

Different bases of power delineate different leadership styles. Few leaders use the same leadership style consistently; however, origins of power determine how power can best be used. French & Raven (1959) advanced that, in order to understand the different effects of power, we must understand the types of power imparted to leaders. The five types of power include reward power, which is based upon rewards received and could be the purview of the superintendent since he/she generally has the final say, along with the school board, in salary, promotion and the like. The opposite of reward power is coercive power, where punishment is delineated for various infractions, again the preserve of the superintendent and the school board. Legitimate power is that derived from formal position or office, thus the superintendent has power invested to him/her by the school board allowing for decision making, reward/punishment specific to the role as the chief school administrator supported by traditional school district's structure and cultural values. Referent power, or that of the influence the leader has over the follower due to the follower's respect, loyalty and desire to curry favor may or may not be power the superintendent wields within the district, given his/her prestigious position, though in many instances, followers may seek favor in order to obtain rewards, so that reward power may be the correct term. Finally, expert power based upon experience or special skills and talents and could be invested in the superintendent's office but most certainly may be applied to technology coordinators.

Because technology coordinators should seek to insure achievement and mastery of educational technology among students as well as insure its robust application in the classroom, they must impart their knowledge, expertise and attendant information effectively to public school staff, so that it is used properly and extensively in the classroom. Raven (1992) points out that positive experts guide followers to perform as instructed by the expert based on the perception of the expert's accepted knowledge. Raven also suggests that negative experts can exert power in a deleterious way if the follower perceives that the expert motivation is personal gain. Nonetheless, technology coordinators can make use of expert power to insure usage of educational technology in their public school setting.

Team leadership. Instructional leaders must still act as team leaders. They act as role models who encourage followers to emulate them, instill trust and respect among team members, provide follow-up, feedback and reinforcement insuring the team's goals meet individual member needs. In terms of technology coordinators as team leaders, though they cannot directly dispense rewards as instructional leaders, given the power base they employ, they may make recommendations about rewards to upper level management. However, hurdles exist with respect to team functioning, Miller & Catt

(1989), for example, point out that poor communication, disagreements regarding tasks, methods directing the team, personality conflict, unfair reward allocation, disagreement over rules, ability to deal with change, incorrect leadership style, reward allocation, and competition among team members are all possible issues within the team structure. A good team leader understands that conflict is an important part of change and uses that conflict to facilitate creativity as well as guarantee intellectual stimulation as a corollary. Effective team leaders establish trust, and in such a climate, can empower team members to perform to the best of their abilities. Technology Coordinators acting as instructional leaders must act as agents for change built upon team trust, helping the public school redirect itself to meet the demands of technological change.

Leadership for school improvement. Jones (2009) says that the role of the school leader is important in advancing instructional leadership to insure school improvement where learning is the primary directive of public schooling and where an understanding of the learning process exists for students and staff as well as execution of learning in all school settings. Purkey & Smith (1985) indicate that research supports the fact that student academic performance is affected by school culture (including values and norms) championed and perpetuated by school leadership, where the culture conducts teaching and learning. Schein (1985) defines culture as evolving over time through shared beliefs, values and norms that serve to connect the people that make up the school community. Sergiovanni (2005) affirms: “Culture is generally thought of as the normative glue that holds a particular school together”. Research supports the fact that leadership impacts school success (Hargreaves & Fink, 2004; Tyack & Cuban, 1997; Senge, 1990; Fullan 2004, 2007, 2008; Elmore, 2004; Sergiovanni, 1996; Johnson &

Uline, 2005). More important, academics agree that leadership effectiveness impacts student achievement, school culture and school improvement (Fullan, 2004; Elmore, 2000; Leithwood, Seashore, Anderson & Wahlstrom, 2004; Murphy & Datnow, 2003; Steiner-Khamsi & Harris-Van Keuren, 2009; Darling-Hammond, 2010). Fullan (2002) points out that a skilled superintendent realizes that no detail of school operations is too infinitesimal to contribute to the school climate, which ideally provides a safe, supportive environment that cultivates group emotional, moral and scholastic skills.

The fact that leadership impacts school success means that school leaders must not only be capable of instructional leadership but also must maintain a public school climate and culture reflective of community needs impinging on educational efforts by incorporating curriculum, assessment and preparation to serve every student. In other words, learning is the primary directive of the public school, insuring ongoing learning while in school and lifelong learning afterwards. In addition, such leaders guarantee academic and social development of all students through optimum performance and ownership of staff by creating shared responsibility for student success. Northouse (2012) could be inferred to suggest that school leaders must focus on task and relationships. Superintendents cannot be the sole instructional leaders of the district, principals cannot be the sole instructional leaders of their schools; both roles serve to define the school culture and interface with the community (parents, teachers and students) which are extensive and consuming responsibilities. Northouse also emphasizes that leadership is situational in that there is no one best leadership style, rather, leaders should be flexible and adapt to the situation at hand using available sources to prepare members of the school to take ownership and absorb culpability.

School Leadership and Change

New Jersey public schools in the current decade operate in an environment of extreme volatility impacting administrators, teachers and students as controlled by the changes in curriculum (adoption of the Common Core curriculum in 2010; New Jersey revised Common Core Standards 2017), human resources (AchieveNJ changing NJ teacher tenure law, August 6, 2012) and high stakes testing (adoption of PARCC testing, 2015). Such changes affect the goals, needs, performance, views, and work product of all stakeholders in the New Jersey public schools.

There is a need for new instructional methods to raise the bar and insure the raising of student performance standards. Eisenhardt & Brown (1998) point out that in such environments, the organization drives the strategy, rather than vice versa, with change occurring frequently so that there is a need for effectual leadership that uses new leadership tactics on an ongoing basis. Banathy (2001) acknowledges that new systems of educational implementation are required in our schools given the new realities of the information age, as opposed to those employed during the industrial era. Senge (2006) further supports the fact that*, "* today's problems come from yesterday's solutions", he advocates a systemic approach where organizational members are continually learning and the realization that issues must be defined, owned, and solved by the organization regardless of the government, the community, or other external factors.

Argyris, (1990) points to the need for leaders in such changing environments to insure communication at all levels, embrace realism, personal commitment, decisiveness and instill trust in situations where Argyris & Schön, (1974) acknowledge incongruity in theory-in-use can prevent learning. If such incongruity can be overcome, however, Calvert, Mobley, & Marshall (1994) point to the fact that organizational change through innovative learning can support adaption to both the changing internal and external environment as is currently seen in the New Jersey public schools with respect to educational technology.

Technology, in particular, requires accelerated rate of change given ongoing developments in the field. Langenberg & Spicer point out that the standard lifetime for information technology changes is a period of between three to five years, citing Moore's Law which estimates that computing power tends to double every two years. Such change must alter values and attitudes continually so that users are always ready to embrace new applications by adaptations of behavior forcing followers to innately transform themselves, since change itself is an ongoing process. Devlin (1999) affirms, "When a person internalizes information to the degree that he or she can make use of it, we call it knowledge."

Gibson, Ivancevich, & Donnelly (1991) point to the fact that there exist stages in change intervention so that initial change is begun by upper level management and supported by change agents. In the case of technology implementation, technology coordinators are the logical agents since they must act as key points of contact in the change process and should be the point of contact to aid followers in increasing their competence with technology through training. Hayes, Emmons, Ben-Avie & Gebreyesus (1996) support that positive and meaningful change is not created by chance but due to careful planning and consistency of staff effort led by the superintendent. With respect to the subject matter of technology, education, training, retraining and motivation are necessary and must be supported by the superintendent yet, logically, implemented by the technology coordinator.

Management sustains ongoing commitment to change and, next, followers are accessed to ascertain how best to implement the change, employees should be accessed as well with an explanation of the connection of change to the overall organizational mission.   But, Stace & Dunphy (1988) point out radical transformational strategy is needed when the organization is not a fit to external environment or if the change must be executed quickly for organizational survival, but, incremental change is sufficient if time is not of the essence.

Waters (2003) identifies two distinct kinds of change – first and second order. He suggests that first order changes are focused, problem-oriented, solution-oriented and implemented by experts, whereas second order changes require new skills and is implemented by stakeholders but cautions: “Different perceptions about the implications of change can lead to one person’s solution becoming someone else’s problem” with respect to educational technology.

Murray (2006) suggests a “slow revolution” occurs where the possibilities with respect to change are clearly palpable, but in which users are prevented from achievement by issues not of technology or vision, but of organizational entropy. This being the case, a single point of contact and focus must be designated to power the change. That individual can overcome entropy by sustained persistence in district and reliance on the power base of subject matter expertise, insuring individual classroom educational technology, then, is best implemented by technology coordinators, not by superintendents or building principals who have other duties aside from sole technology concerns.

Professional Learning Communities

Schools must generate their own learning environments for staff, schools establish a context for professional development, learning, intellectual growth and innovation. In addition, schools must establish an internal environment to manage change as well as establish sustained school improvement. National College for School Leadership (2002) indicates PLCs are ideal models because they include the personal, interpersonal and organizational parameters of each unique school and include development of leadership capacity which embraces significant purpose, collective standards, social solidity and trust. Putnam, Gunnings-Moton, & Sharp (2012) emphasize the safety of in-house shared professional practice as well as establishing higher morale and lasting change. In complex, information and knowledge based organizations such as public schools, everyone's professional skill sets are needed to help the school respond to the demands precipitated by the United States and New Jersey State Departments of Education.

Finally, PLCs provide leadership opportunities to Technology Coordinators whose membership is based upon their subject matter expert status regarding educational technology. Otherwise, technology coordinators would only concern themselves with purchase of hardware, execution of software and network implementation and maintenance. Membership in PLCs, allow technology coordinators to develop professionally and take advantage of the leadership opportunities membership in such teams afford.

Student Improvement

Computer-Assisted Instruction (CAI) occurs when student interact with computers, its effect on student improvement is mixed with respect to the literature. Kulik & Fletcher (2015; 2016) found that CAI raised student test scores 0.66 standard deviations; from the 50th to the 75th percentile. Liao (2007) found that CAI is more effective than traditional instruction. Kulik, Kulik, & Bangert-Drowns (1985) found increases in pupil achievement scores of 0.47 standard deviations, or from the 50th to the 68th percentile at the elementary level. Kulik, Bangert & Williams (1983) also found that students who were taught on computers developed positive attitudes toward the computer and toward the courses they were taking. However, Dacanay, & Cohen (1992) indicate overall magnitude of effect, was small to moderate with instructor-paced versions of individualized instruction producing larger achievement gains than student-paced versions, yet, acknowledging more research is needed in this area, with respect to dental education. Cohen, & Dacanay (1994) note in nursing studies that overall achievement effect size for 26 studies that quantified outcomes was 0.45, or a medium-sized effect.

The largest gains in the use of CAI have been in primary grade children's mathematics, especially when used as additional practice (Ragosta et al., 1981, Lavin and Sanders, 1983; Niemiec,, Blackwell, & Walberg, 1986). In contrast, Räsänen, et al. (2009) say that computer-assisted learning has not met its expectations. Carter, Greenberg & Walker (2016) at the United States Military Academy found average final exam scores from students in classrooms that allowed computers were 18 % of a standard deviation lower than exam scores of students in classrooms that barred computers.

Conversely, Weng, Maeda, & Bouck (2014) found results supporting the continued and increased use of CAI in educational settings with computer-assisted instruction for students with disabilities.

Personal computers and other electronic devices are a common feature of children's lives and, as more and more computer applications continue to be developed to entertain and assist learning, educational research should keep up with this rapid change addressing how children interact with information, making an on-site expert in district necessary.

In-House Teacher Training

Beginning July 1, 2013 New Jersey teachers must earn at least 20 hours of professional development each year, (in accordance with N.J.A.C. 6A:9C-3.4). Teachers often complain about the requirement to participate in cookie-cutter one-day professional development sessions. The state of New Jersey does not regulate the type of professional development districts receive. Hord, Roussin & Sommers (2010) indicate that keys to teacher learning include vital social interaction, emotional components, relevance of the learning and learner ownership (such as goal direction and motivation). These goals can be folded into on site ongoing learning with proper school leadership exhibited by upper level managers as well as the technology coordinators working directly with staff.

U.S. Department of Education (2010) recently surveying educational technology professional development indicated that teachers felt that the activities preparing them to use educational technology for instruction were 61 % professional development activities, 61 % training provided by school staff responsible for technology support and/or integration, and 78 % independent learning. The teachers reported average number of hours in professional development activities was from 1 to 8 hours. Of interest is the fact that the report provided no hours for ongoing educational technology development and coaching subsequent to professional development for reinforcement of skill sets. Duffey & Fox (2012) discuss the need for technology coach/mentor support for teachers as a means of modeling and utilizing the potential of technology to improve teaching and learning "Instructional technology coaches or mentors in schools provide critical opportunities for collaborative planning and co-teaching to help teachers utilize new and best practices, and research–based resources." They indicate that such coaches should exhibit content knowledge along with visionary leadership.

Leadership for School Improvement

Jones (2009) says that the role of the school leader is important in advancing instructional leadership to insure school improvement where learning is the primary directive of public schooling and where an understanding of the learning process exists for students and staff as well as execution of learning in all school settings. Purkey & Smith (1985) indicate that research supports the fact that student academic performance is affected by school culture (including values and norms) championed and perpetuated by school leadership, where the culture conducts teaching and learning. Schein (1985) defines culture as evolving over time through shared beliefs, values and norms that serve to connect the people that make up the school community. Sergiovanni (2005) affirms: "Culture is generally thought of as the normative glue that holds a particular school together".

Research supports the fact that leadership impacts school success (Hargreaves & Fink, 2004; Tyack & Cuban, 1997; Senge, 1990; Fullan 2004, 2007, 2008; Elmore, 2004; Sergiovanni, 1996; Johnson & Uline, 2005). More important, academicians agree that leadership effectiveness impacts student achievement, school culture and school improvement (Fullan, 2004; Elmore, 2000; Leithwood, Seashore, Anderson & Wahlstrom, 2004; Murphy & Datnow, 2003; Steiner-Khamsi & Harris-Van Keuren, 2009; Darling-Hammond, 2010). Fullan (2002) points out that a skilled superintendent realizes that no detail of school operations is too infinitesimal to contribute to the school climate, which ideally provides a safe, supportive environment that cultivates group emotional, moral and scholastic skills.

This means that school leaders must not only be capable of instructional leadership but also must maintain a public school climate and culture reflective of community needs impinging on educational efforts by incorporating curriculum, assessment and preparation to serve every student. In other words, learning is the primary directive of the public school, insuring ongoing learning while in school and lifelong learning afterwards. In addition, such leaders guarantee academic and social development of all students through optimum performance and ownership of staff by creating shared responsibility for student success. Northouse (2012) could be inferred to suggest that school leaders must focus on task and relationships. Superintendents cannot be the sole instructional leaders of the district, principals cannot be the sole instructional leaders of their schools; both roles serve to define the school culture and interface with the community (parents, teachers and students) which are extensive and consuming responsibilities. Northouse also emphasizes that leadership is situational in that there is no one best leadership style, rather, leaders should be flexible and adapt to the situation at hand using available sources to prepare members of the school to take ownership and absorb culpability.

Professional Learning Community Requirements

Schools must generate their own learning environments for staff, schools establish a context for professional development, learning, intellectual growth and innovation. In addition, schools must establish an internal environment to manage change as well as establish sustained school improvement. National College for School Leadership (2002) indicates PLCs are ideal models because they include the personal, interpersonal and organizational parameters of each unique school and include development of leadership capacity which embraces significant purpose, collective standards, social solidity and trust. Putnam, Gunnings-Moton, & Sharp (2012) emphasize the safety of in-house shared professional practice as well as establishing higher morale and lasting change. In complex, information and knowledge based organizations such as public schools, everyone's professional skill sets are needed to help the school respond to the demands precipitated by the United States and New Jersey State Departments of Education.

Finally, PLCs provide leadership opportunities to Technology Coordinators whose membership is based upon their subject matter expert status regarding educational technology. Otherwise, technology coordinators would only concern themselves with purchase of hardware, execution of software and network implementation and maintenance. Membership in PLCs, allow technology coordinators to develop professionally and take advantage of the leadership opportunities membership in such teams afford.

Technology Leadership

Ginsberg and McCormick (1998) studied 1,163 teachers in 38 schools in one southeastern state and found few variations in how all schools used computers as well as recording rare cases of very sophisticated use of technology. Teachers reported just using computers for word processing or drill and practice, but "rarely were they fully integrated into the learning activities". The authors indicate that teachers know little about incorporating technology into their instruction efforts. They recommended that districts make time and expertise available to teachers and they also support teachers themselves taking the initiative to explore technology applications in the classroom. Teachers have to advocate for themselves in obtaining improved training and professional development in educational technology. Cuban, et al. (2001) further indicates that legislators, corporations, practitioners, and parents believe that undertaking the expensive route of wiring schools, buying hardware and software, and distributing equipment throughout will lead to improved teaching and learning in classrooms. He indicates that when teachers adopt technological innovations, these changes maintain rather than alter existing classroom practices (Mehan, 1989; National Educational Assessment Program, 1996; Schofield, 1995). Further, despite greater access to computer equipment and software, the gap between technology presence and use in high schools is wide – the presence of technology alone seldom leads to widespread teacher and student use (Cuban et. al., 2001). While there are positive examples of technology being used to support student learning and to foster positive changes in schools, predictions that computers would revolutionize public education have not materialized. Merely installing computers and networks in schools is insufficient for educational reform.

van Broekhuizen (2016) performed observations inside U.S. and international classrooms completing 140,000 observations during a three-year period. Findings included the fact that half of all classrooms were not using any tech to "gather, evaluate and/or use information for learning," and even fewer classrooms were seen using technology for problem solving or collaboration. About half of observed classrooms were using tech for gathering and evaluating information is acknowledged as "the most superficial use of technology, most easily implemented and least time consuming." Using technology to communicate and collaborate effectively is considered the benchmark for classroom technology use but, "in 92,190 classrooms (64.6 %), observers did not see students engaging in this use of technology at all" — which the report said could be partly attributed to students simply never being directed to use their devices in this way. Similarly, observers noted that the use of technology for research and problem solving was "regular classroom practice" in only about 25 % of classrooms. van Broekhuizen speculates that the results might be due to "to a broad range of factors related to teacher preparation and training".

Educational leadership seems to view technology leadership as an afterthought (McLeod, Bathon, & Richardson, 2011; Schrum,, Galizio, & Ledesma, 2011). As technology marches on and, per Moore's law, reinvents itself every two to three years, educational leadership progress in this area is inching along at best. McLeod et al. state:

> …that scholars, researchers and practitioners in the field of educational leadership are rarely exposed to issues of school technology leadership. Thus, the question begs to be answered: how are school leaders becoming technology leaders if the field of the educational leadership has yet to embrace this change…?

Richardson, Bathon, Flora, & Lewis (2012) in an extensive literature review analyzed articles published from 1997 through 2010 housed in the Education Resource Information Center (ERIC) database on the topic of school technology leadership. Using NESTA standards as a guide they found that only 37 articles focused on technology leadership as defined by the NETSA, all indicators of the standards were covered to some degree, but there was a definite lack of in-depth research regarding this subject in conjunction with school leadership. In fact, nearly 68% of the articles were merely descriptive in nature.

U.S. Department of Education (2010) indicates "Studies have found that educators are more likely to incorporate technology into their instruction when they have access to this kind of coaching and mentoring. School technology coordinators… may play this important role." Technology Coordinators/Specialists would be the logical professionals serving to aid staff in making robust use of educational technology in their classrooms. In fact, the literature advanced regarding implementation of educational technology among staff examined school principals (who should not provide coaching to the teachers they evaluate) but not technology coordinators, who have the best knowledge base to address staff technology needs. This study will examine the duties of the public school technology coordinators in the New Jersey public schools and suggest levels of leadership they could maintain in order to execute vigorous educational technology in public school classrooms.

Existing technology leadership models. Despite the dearth of research on topic there exist a few models of educational leadership as applied to technology leadership (Anderson & Dexter, 2011; Davies, 2010; Flanagan & Jacobsen, 2003; ISTE, 2016; Yee, 1998, 2000, 2001). Of interest is the acknowledged need for a model and, though none of the aforementioned models address public school technology leadership needs fully, each will be examined in turn.

Anderson & Dexter's (2011) findings verify that, though technology infrastructure is important, technology leadership is more important for effective utilization of technology in schools. Their model makes use of the National Educational Technology Standards for Administrators (ISTE) and applied these to technology leadership. This model, then, incorporates the following parameters:

- Leadership and Vision
- Learning and Teaching
- Productivity and Professional Practice
- Support, Management, and Operations
- Assessment and Evaluation
- Social, Legal, and Ethical Issues

One of the deficits of this model is its application to the school principal's duties. Thomas & Knezek (1991) argue that technology leaders should understand how educational technology can support classroom learning by working to apply technology that enhances student learning. Further Anderson and Dexter assert principals must learn how to operate technology and use it in their own work as well as create a vision for the role of educational technology in schools.

Designating the principal as the single point of contact for implementation of educational technology school wide is not feasible since school principals are not school subject matter experts in educational technology to begin with. Technology Coordinators, with their knowledge of hardware, software and applications would be the logical choice to know which aspects of technology support learning and, as a corollary; they could insure teacher classroom productivity (including student assessment applications) as well as their typical duties of technology operations, thus, addressing four of the six aforementioned duties suggested by the ISTE advanced in this model.

Davis (2010) creates a model showing how schools can organize technology leadership so that teaching and learning is the primary directive and where technology leadership serves to reorganize teaching rather than altering the teaching process itself. Davis defines school technology leaders and leadership from an international perspective, examines their role in educational change, and addresses why schools are now changing as a result of 21st century advancements in technology. She states, “A conceptualization of technology leadership must involve understanding the kinds of interaction between members within an institution that are necessary for generating systems for the use of ICT (information and communications technology) in schools.” Ely (2008) defines ‘educational technology’ as all uses of technology applied to education and an ‘educational technologist’ as one who is a subject matter expert in the field. Davis, citing Kowch’s (2005) objectives for educational technologists in schools queries who they are, what makes up their training and experience, what their duties entail and what makes up their knowledge base. As Kowch (2005) states, “Too little research on the educational technologist as leader exists. To manage change in education today, we must have knowledge and speak the language of leadership to create sustainable organization change plans.” Davis suggests that more studies on the official and practiced roles of educational technologists would provide useful information vital to understanding their involvement as technology leaders in schools, one of the basic goals of this dissertation.

Flanagan & Jacobsen (2003) suggest that school principals can undertake new leadership responsibilities regarding educational technology. The authors outline successes in the area of technology integration provided to inform regarding current technology leadership practices. The leadership goals, competencies and responsibilities needed in order to achieve this preferred future are described. The authors present a five-part leadership model currently in use by a large urban school district to interpret multiple dimensions of technology leadership for principals. As aforementioned, the deficit in such models puts the onus on already burdened principals as the primary technology leaders in schools, rather than as a shared responsibility between technology coordinators and upper level management.

Barriers to this technology usage include pedagogical issues, deficient professional development, and lack of knowledgeable leadership. Kearsley (1998) suggests educators “develop a new conceptual basis for applying technology” such that educational technology increases learning resources available for inquiry learning and research, enables project based learning, allows for blended learning classrooms, and gives opportunities for personalized learning as well as opportunities for collaboration and direct instructor communication. Key here is providing technology leadership to support teachers as they investigate the varied ways to integrate technology in their classrooms. Further, deficiency in professional development does not allow teachers to properly perform classroom technology integration. This is because most in-service professional development sessions provide an introduction to a few isolated computer skills which are then integrated into teaching lessons or are suggested as facets of lesson planning. The key to excellence in technology leadership is providing technology coaching where the technology leader interfaces with teaching staff to assess classroom technology needs, provides a presence in the classroom, perhaps even team teaches, and then to revisits, reinforces and reflects with teachers. Lack of knowledgeable leadership is evident in the fact that most technology coordinator duties are to provide hardware, software and network maintenance without considering school vision, culture or mission and not addressing the goal of improved student performance. Upper level school management is also at fault in not providing the needed organizational changes required to support appropriate technology use, let alone the extensive financial investment where, for example more than half of the worldwide institutional spending on mobile devices in 2013— upwards of $4 billion—was seen in the United States, driven primarily by Apple iPad expenditure. Glennan & Melmed, (1996) reinforce, that technology use is limited to games, word processing and student drills in the classroom.

Yee (1998, 2000, 2001) examined educational leadership by examining experiences of principals in ten schools located in Canada, the US and New Zealand, respectively, and suggests that the principal must be the educational leader for the school. But, in trying to implement technology to enhance student learning, there are numerous challenges they face, and they must use their leadership skills to address these roadblocks. Finally, Yee also places the impetus on the principal to carry out all leadership with respect to educational technology, rather than shared responsibility with the educational technologists employed by the district.

The ISTE (International Society for Technology in Education) endeavors to provide administrative standards based upon the parameters of visionary leadership, digital age learning culture and excellence in professional practice. Through provision of a transformational vision, provision of a learning culture and professional learning opportunities, the technology administrator creates a robust environment for the establishment of strong classroom usage. Though such standards are applicable to public school administrators, they do not directly apply to didactic instructional technology skill sets imparted to faculty for use in their classrooms.

Implications

U.S. Department of Education (2010) indicates "Studies have found that educators are more likely to incorporate technology into their instruction when they have access to this kind of coaching and mentoring. School technology coordinators… may play this important role." Technology Coordinators/Specialists would be the logical professionals serving to aid staff in making robust use of educational technology in their classrooms. In fact, the literature advanced regarding implementation of educational technology among staff examined school principals (who should not provide coaching to the teachers they evaluate) but not technology coordinators, who have the best knowledge base to address staff technology needs. This study will look at the leadership duties of public school technology coordinators in the New Jersey public schools and suggest levels of leadership they could maintain in order to execute vigorous educational technology in public school classrooms. Consistency of leadership will lead to consistency of implementation and consistency in the classroom educational technology experience.

Chapter 3

Methodology

Niess (2005) indicates educational methods must use electronic technologies by creating classroom learning for students using these technologies under the auspices of the standard public school curriculum. However, how teachers learn to teach is not necessarily the way their students will need to be taught going forward into the 21st century. Ertmer & Ottenbreit-Leftwich (2010) say despite increases in computer availability, technology sophistication and technology training, technology is not being used to bolster the classroom instruction believed to be the most effective in the 21st century. Cuban (2001) points out that teachers of the 21st century use roughly the same tools as teachers used prior to the advent of technology. And when technology is implemented, it typically is not used to support the kinds of instruction (e.g., student-centered constructivist practice) believed to be best for student learning (Cuban, Kirkpatrick, & Peck; 2001; International Society for Technology in Education [ISTE], 2008; Partnership for 21st Century Learning, 2007).

Ertmer & Ottenbreit-Leftwich (2010) point out that knowing just how to use technology (both hardware and software) is not adequate for effective use in teaching; providing only a basis upon which lesson planning and presentation can occur. The authors indicate that technology for teachers must be identified, defined and selected for classroom use and that teachers must feel a confidence level at using technology to enable student learning. Bauer and Kenton (2005), in fact, found a correlation where technology-using teachers rated themselves as being highly confident. Windschitl & Sahl (2002) found teacher opinions impacted technology use, but the context (i.e. school culture—norms, values and shared beliefs) of schools created these principles. Naturally, as part of public school education and of concern, is the fact that technology facility is expected in almost every profession in our 21st century society. Brodie (2004) described this phenomenon as “culture pressure” using the concept of a meme or a product of a culture that gets conveyed by repetition. Finally, public education must provide a foundation for lifelong learning especially as technology tools and resources are constantly changing.

Flanagan & Jacobsen (2003) present a technology leadership framework for proper implementation. The plan is suggested for school principals; however, as previously pointed out, school principals are not subject matter experts on technology, (in fact the authors indicate that lack of informed leadership is seminal in prevention of proper technology implementation). Further, principals evaluate teaching staff and, as such, should not be designated as school instructional leaders. Finally, principals have a myriad of school duties, designating them as technology implementation chiefs is adding to their already extensive workload. The authors acknowledge that more research is needed to understand the developing role of technology leadership as well as support of teaching practice.

Research Questions

The purpose of this phenomenological research study is to understand the leadership methods used by public school technology administrators as they implement educational technology in their New Jersey school districts. The main focus of the study will be technology (administrators, coordinators, supervisors) in New Jersey, K-12, public schools who are statewide members of the NJ School Technology Coordinators on-line community.

Technology leadership methods will be generally defined as multiple constructed realities evolving through human action and interaction in the New Jersey public school environment and defined with quantative research (survey technique). An established instructional leadership instrument is the PIMRS (Principal Instructional Management Rating Scale), which is the first authenticated instrument for measuring instructional leadership, used for determining instructional leadership methods used by school principals, this instrument will be modified to define instructional leadership of NJ school technology coordinators.

Creswell (2013) points to the fact that survey design provides a quantitative delineation of opinions of a population by studying a sample of that population. Since the purpose of the research is to generalize from a sample to a population, it enables the researcher to draw conclusions with respect to the overall population of public school Technology Coordinators. Literature survey has indicated that the subject matter experts holding these positions in the New Jersey public schools have not been assessed regarding their instructional leadership duties, and they should be because they are the only public school professionals who truly understand these educational tools.

A clear understanding of successful leadership techniques will provide valuable information to other districts and technology leaders so that educational technology can be enhanced consistently in all districts and students may benefit from robust educational technology use in their classrooms. It is possible that this study may show, that by adopting a different leadership style, a technology coordinator will implement technology and motivate its usage more effectively. Since technology coordinators primary duties should involve learning and teaching they must serve to implement technological productivity and support educational professional practice. In addition, in some district coordinators must also address management and operations including network support, hardware operation and software selection and use. True leadership will enable schools to avoid what Tomei (2002) refers to as a technology façade where it appears that technology is the appearance that technology is conspicuous and being used when extensively but really is not being used to its full potential.

The purpose of this study is two pronged. First, to define the role of the educational technology leader in New Jersey public school districts and, second, to provide common leadership parameters that may be standardized for success. Linking leadership style and successful technology usage will enable adoption of effectual leadership style to benefit teaching staff statewide. Such leadership must insure proper technology implementation to insure optimal educational opportunities for our public school students.

Central Question:

What is the meaning of the leadership role to NJ public school technology administrators? (i.e. what is their experience of school technology leadership?)

Subquestions:

What leadership values are held by these administrators?

What is their leadership vision?

How do they foster change in district?

Methods

In this study we plan to approach members of an internet discussion community existing across the State of New Jersey and request that they complete a google form presented in the forum (restricted by membership to NJ Technology Coordinators) which is based upon Hallinger's PIMRS, however as a self-assessment, regarding instructional leadership in the work place serving to define the job duties of these educational technology administrators. Responses will not be anonymous, since responding email address will be evident the recruiting missive and survey instrument as attached to this application. Data will be analyzed through google forms via Google add ons and standard statistical analysis using Microsoft Office Excel for data analysis. Data will be stored via cloud computing in Google Drive and is password protected, accessible only by restricted password. Confidentiality is upheld to protect the privacy of all subjects, to build trust and rapport with study participants, and to maintain ethical standards and the integrity of the research process (Baez, 2002).

A survey was chosen per Creswell (2013) where it was suggested that initial foray into research modes not previously examined are best defined by survey as the chosen method, such research provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population. A 5 point Likert scale was selected since this scaling method Hallinger (1983) used in the *Principal Instructional Management Rating Scale*, as that would be the most valid (and reliable) method, used to test the psychometric properties of the original instrument. The study begins with a broad survey in order to generalize results that may be applied to a population and survey design provides a quantitative or numeric model for that population. New Jersey, because of its diverse and dense population may serve as a microcosm for the United States as a whole. United States Census Bureau, (2016) included Hispanic and Latino Americans amount to 17.8%, African American estimated as 12.7% of the population, median age is 38.1 years and children under the age of 18 is 24%. New Jersey Department of Health (2010) lists 18% Hispanic or Latino and 13% Black or African American, median age is 39.0 years Children under 18 years of age made up 23% of the population. Data for U.S. overall as well as New Jersey are quite similar with regards to demographics.

Because instructional leadership has not been examined in depth for the profession of public school Technology Coordinators, it is first necessary to define the level of this type of leadership among these experts. Survey method will serve to provide a general description of the attributes of the overall population accessed in the study. Braithwaite, Emery, de Lusignan & Sutton (2003) indicates that internet based surveys provides a valid alternative to traditional survey methods which focus on external validity, sample representativeness, and decreased response bias. The survey instrument will be created in a google form and disseminated by email invitation to the NJ School Technology Coordinators community which includes 521 members across the state of New Jersey, hopefully insuring a robust sample size of respondents and guaranteeing effectual data gathering regardless of the location of the participants. Braithwaite et. al. (2003) points to the fact that the major obstacle to such survey is external validity, in specific, how to obtain a representative sample and an adequate response rate. Due to the high representation suggested by the survey method, it should be a more straightforward way to obtain statistically significant results due to larger sample sizes. In addition, a number of variables may be accessed and analyzed effectively using survey method. Survey provides all participants with a standard research instrument and should provide high reliability since the researcher's own bias should be eliminated. In addition, because of the anonymity afforded by internet delivery of survey, it is possible that subjects will be more candid than they would with other vehicles of delivery.

Before the availability of internet, survey costs were a concern. Hansen (1953) encouraged researchers to make design decisions to maximize data quality. Making use of survey method based upon design decisions that insure data quality is espoused by many (Dillman, 1978, Fowler, 1988; Groves, 1989; Lavrakas, 1993) and is referred to in the literature as "total survey error" assessment and leading to study of samples which best reflect the general population and provide a framework to conduct surveys of value. Visser, Krosnick, & Lavrakas (2000) believe that survey research truly explores process versus individual difference interactions since well-chosen samples can fully reflect the general population and allows the researcher to draw important inferences about that population.

Survey is not a perfect vehicle for research, but knowing its limitations aids the researcher in addressing the method. Second, potential controversial issues may not be revealed given the objective format of the instrument, however this issue is somewhat alleviated by the Likert scale employed in this study. Finally, appropriateness of questions could be at issue, hence the use of an accepted instrument the PIMRS in general, the questions must be general enough to accommodate the general population, this issue is alleviated somewhat since it is objective nature, not focusing on affective variables that evoke emotions.

Survey Design

Leedy & Ormrod (2001) state: "Quantitative researchers seek explanations and predictions that will generate to other persons and places. The intent is to establish, confirm, or validate relationships and to develop generalizations that contribute to theory". In the case of this study, an initial determination is to be gleaned of leadership practices among public school technology professionals. Given the problem statement, and with completion of the literature survey and quantitative data analysis, this issue should become better defined. As Creswell (2013) states, quantitative research should "employ strategies of inquiry…surveys, and collect data on predetermined instruments that yield statistical data".

Williams (2007) directs that one chooses to distribute a survey that contains closed-ended questions to collect numerical, or quantitative, data. Closed-ended questions limit the answers of the respondents to response options provided on the questionnaire. Given the study will access over 500 respondents, this survey is time-efficient allowing for responses are easy to code and interpret making it ideal for a quantitative research approach. Closed-ended questions in this survey mimic the PMI, making use of a common rating scale (the Likert scale i.e. a five-point scale).

Norman (2010) defines a number of ways data obtained can be examined--ordinal data including bar charts and dot plots (but not histograms since the data is not continuous), central tendency as summarized by median and mode (but not mean), variability summarized by range and inter-quartile range (not standard deviation), analysis using non-parametric tests (differences between medians); using the Mann-Whitney U test, Wilcoxon signed-rank test, or the Kruskal-Wallis test. Likert question responses which can be considered together to provide interval data where the items measure a single latent variable may be examined using parametric tests such as analysis of variance (ANOVA). The data can be reduced to nominal levels of agree/disagree and can be measured by the Chi-square test, the Cochran Q test or the McNemar test. Once the quantative data has been collected in this study a determination will take place on best fit of testing methods. Microsoft Excel will be used for statistical analysis (XLSTAT statistical software and data analysis add-on for Excel used to produce descriptive statistics).

Strengths/Weaknesses of Likert Scale Surveys

The Likert scale is a good method for question construction in survey because it is simple to construct, likely to produce a highly reliable scale, easy to read and complete for participants. But, Likert scale also has some shortcomings such as avoidance of extreme response categories, bias towards agreement, participants choose answers that place themselves in a more favorable light, validity difficult to delineate and a lack of reproducibility. Examination of best fit testing should help to delineate results and diminish overall shortcomings. Clason & Dormody (1994) state: " Statistical procedures that meaningfully answer the research questions, maintain the richness of the data, and are not subject to scaling debates should be the methods of choice in analyzing Likert-type items."

Worldview

Guba (1990) defined worldview as "a basic set of beliefs that guide action". Weltanschauug, or worldview is a philosophical concept such that an individual can have an underlying view point that yields a way to understand how individuals and the world function and interrelate. It is our framework lens or filter through which we see the world.

Postpositivism is the epistemological doctrine where social reality is constructed and is constructed differently by different individuals. That being said, then, instructional leadership is a concept that would have different meanings for different individuals. In this quantitative research project the research is directed by a worldview of postpositivism. Creswell (2013) points out that postpositivism accompanied by knowledge claims includes various facets: determinism (the inevitability of causation), reductionism (the practice of analyzing and describing a complex phenomenon in terms of occurrences that are held to represent a simpler or more fundamental level, especially when these incidents come together to provide a sufficient explanation.), empirical observation (Research based on experimentation or observation, i.e. evidence. Such research is carried out to answer a specific question or to test a hypothesis) along with the use of measurement and, finally, theory verification (where a proposition is meaningful if it can be found to be either true or false). Quantitative research, then, basically observes and measures information numerically; allowing for suppositions to be delineated by mathematical and statistical means. After statistical analysis of the results, a comprehensive answer is reached, and the results can be legitimately presented. Quantitative experiments also filter out external factors, if properly designed, so the results can be real and unbiased. Creswell indicates that an identification of factors that influence an outcome is best studied using a quantitative approach. He goes on to say that a survey can act to provide a quantitative description of trends of a given population.

Quantitative research works to test objective questions by examining the associations among variables. Variables can be evaluated so that the arithmetical data can be analyzed using statistical procedures. Patton (1975) indicates that the quantitative approach is linked to connection of theory and data through deduction; the relationship to the research process is one of objectivity and the inferences drawn from the data obtained by the research process. Quantitative Research emphasizes a deductive–objective–generalizing approach. The research questions are arranged in order to provide a deductive pattern where the deductive approach itself is concerned with developing a hypothesis based on existing theory and then designing a research strategy to test the hypothesis. The deductive approach draws conclusions from preexisting principles and is focused on testing theory, not generating new theory upon examination of data.

"Postpositivism," itself, challenges the traditional notion of the absolute truth of knowledge and recognizes that we cannot be "positive" about our claims of knowledge when studying the behavior and actions of individuals. Developing numeric measures of observations is also necessary under this philosophy. Though postpositivism acknowledges that knowledge is speculative and perfect truths cannot be defined, the researcher does not prove a defined hypothesis. The ongoing research itself makes claims but may vacate some suppositions, embracing claims that are more strongly supported along the course of the research. Data and rational thought serve to shape understanding under this philosophy, the research conducted ripens into true statements pertaining to the subject explored. Finally, objectivity is necessary during research inquiry, methods and conclusions must be scrutinized for bias.

In this research study, instructional leadership is examined as it impacts technology specialists in the New Jersey public schools. Are these technology professionals employing leadership in the context of their positions in the New Jersey public schools and, if so, given the specialization of their subject matter knowledge, do they impart this knowledge using instructional leadership parameters to those they work with? This objective research lends itself well to postpositivism since a predetermined instrument; survey will be used providing a questionnaire for data collection. The data obtained will then be analyzed with statistical analysis. Phillips & Burbules (2000) view post-positivism as valuable research method for modern investigations and they indicate that, unlike positivism, post-positivism presents an orientation not a defined school of thought. They further go on to support the idea that educational research can be scientific allowing that the positivist research milieu can and should be replaced by "a more up-to-date postpositivistic" approach. Educational research does not follow the model of the natural sciences; providing a clear, unambiguous road to the causes of certain educational phenomena. Agar (1986) points out the post-positivist social researcher assumes a learning role rather than a testing one. Hammersley (2000) suggests post-positivism research can have an exploratory character which may serve to define the issue, and not solve the problem at hand because discovering the right way to formulate a problem is often as important to incorporate knowledge of the issue.

As indicated in the literature, this is a preliminary investigation into the technology leadership strategies of technology professionals, a question that has heretofore not been examined in depth in existing research studies. Within this population, defining the leadership trends best lends itself to a survey, as suggested by Creswell. Once the parameters of instructional leadership among technology professionals are identified, ongoing educational technology efforts could be enhanced across the New Jersey public schools, providing better leadership parameters and imparting best practices using technology for public school students.

The worldview used in this study is a post positivistic worldview where the research is theory driven—tested, supported or refuted standards of validity and reliability is compatible with the quantitative research impacting this research study. Post-positivism strives to maintain distance and impartiality while the researcher objectively collects data. Hence, post positive research strives to obtain reliability and validity as related to survey instruments and results of research. As defined previously, post-positivism embraces deductive reasoning where the researchers test an a priori theory, in this case defining if technology coordinators in New Jersey Public schools make use of instructional leadership. Post-positivist research principles emphasize meaning and the creation of new knowledge. That being said, research is viewed as being broad rather than specialized. Schratz and Walker (1995) point out the researcher's motivations for and commitment to research are central and crucial to the enterprise. They also refute the idea that research is concerned only with correct techniques for collecting and categorizing information under the postitivist approach.

Finally, grounded theory involves deriving constructs and laws directly from the immediate data collected through direct research that has been collected rather than from research done previously. These suppositions are then "grounded" in the particular set of data collected. The usefulness of rules established in initial research can be tested in subsequent research studies.

Setting

This study will take place across the state of New Jersey, where the socio-demographic characteristics of the state make it unique. This is because New Jersey is the most densely populated of the 50 United States. It is also one of the most ethnically and religiously diverse states in the country. Examining one parameter of culture; Wormald (2015), for example, points out that 67% of New Jersey's population are Christian; 14% are non-Christian religions. In the United States overall 70.6% are Christian and 5.9% are non-Christian and while not a perfect correlation, to national figures, New Jersey does reflect this cultural parameter to some extent. As aforementioned, United States Census Bureau, (2016) and New Jersey Department of Health (2010) lists age and race data for U.S. overall as well as New Jersey similar, allowing for extrapolation of results. Guba (1963) suggests that from a well-defined population, generalizations regarding population's whole may be permissible.

Sampling and Participants

Sample selection can have a serious impact on the quality of research obtained. Kitson, Sussman, Williams, Zeehandelaar, Shickmanter & Steinberger (1982) points out that inadequate sample selection can affect replication of the study as well. Onwuegbuzie & Collins (2007) indicate that criterion sampling schemes employ choosing groups of individuals because they represent one or more criteria, as is the case here, where all individuals in the selected sample are employed as public school technology professionals. They also state that large samples are associated with quantitative studies. The main reason the samples are employed is to streamline the research effort where sampling provides results that may be as accurate as those of the full consensus of the population. Quantitative researchers tend to make “statistical” generalizations, which involve generalizing findings and inferences from the statistical sample to the population from which the sample was drawn, in this case, given demographics, data obtained from New Jersey public school technology professionals might be applied to the United States as a whole.

Another major impact to statistical study is sample size. Gorard (2001) states that the sample must be large enough to carry out the analysis, since small samples can lead to the loss of valuable results accordingly, it is best to have as large a sample size as possible. In addition, the larger the sample size, the more accurate the results will be to estimate the population at large and the smaller the confidence interval will be such that, when we take a sample, we can never be truly sure that what is learned is representative of a population but we can define how confident we are regarding the outcome.

The research setting can be seen as the physical, social, and cultural site in which the researcher conducts the study. The environment within which studies are run has important consequences for experimental design, the type of data that can be collected, and the interpretation of results. This study will not occur in an experimental laboratory under controlled conditions. The sample will be drawn from members of the NJ School Technology Coordinators community only, which includes 521 members across the state of New Jersey. Participants belong to a preferred group membership online and are vetted individuals holding technology department memberships as scrutinized individuals who have permission to access the forum. All members will be invited to participate by email posting on the forum and may elect to participate or decline. The survey will be administered as a google form residing on the researcher's Rowan google drive account which will require a password for access.

This survey was created as a self-assessment where individuals in the profession describe their job duties. The survey was created to define instructional leadership skill sets and actions. However, the survey may also help to define career development methods.

Educators may also glean the individual and team performance skills employed by Technology Coordinators and Coordinators and define educational training and development opportunities for those in the profession.

All participants in this class are above 18 years of age. Survey invitations will include both males and females who hold this job title and do not require gender response. The survey on its face is neutral and does not query race, religion, income, age or marital status. Participation in the survey is voluntary. Subjects will be solicited via the Internet by email (Appendix A) posted on the forum with the survey google form as an attachment. No incentive will be offered for participation.

Procedure and Data Collection

The survey will be administered electronically to the NJ School technology Coordinators forum members. An email solicitation will be sent to all members of the forum with a Google Form attachment (presented in Google "quiz" mode) consisting of 21 Likert scaled questions. As the Google Forms are completed they will be populated onto Google Sheets for initial analysis. The only identifier for each form response will be the email address of each participant and responses will be numbered automatically on the sheet, which could allow for deletion of emails of all respondents. The results will be sent directly into the Rowan Google Drive which is password protected. The Google sheets response is also password protected on the Rowan Google Drive. Data will be stored on Google using cloud computing and restricted access will be imparted only through shared dissemination of the form link through Google. Hence, access of data responses is only available through password from the Google cloud. The researcher will retain the data for 6 years subsequent to dissertation completion. As addressed heretofore, data analysis will examine descriptive statistics seeking to summarize the sample and provide a numerical basis for survey outcome.

Schmidt (1997) points out The World-Wide Web presents survey researchers with an unprecedented tool for the collection of data. The costs in terms of both time and money for publishing a survey on the Web are low compared with costs associated with conventional surveying methods.

Data Management

Data expected during the course of this research project will include survey results obtained from responses to the Google Form creating Google Sheets responses, and transcribed to Excel Spreadsheets. The data will present as scores from a 5 point Likert score for each response. It is expected that up to 100 responses should be obtained from the Internet delivered Google Form. The data will be collected over the course of seven months, and the researcher will manage the data via cloud computing on the Internet, once the study is completed, the data will be imported to Excel and stored on computer hard drive as well as USB flash drive. The researcher will insure the data plan is completed.

Documentation will include spreadsheets and graphics to make the data understandable and accessible. Metadata, which describes raw findings and descriptors of the statistics will be managed and stored on personal computer and USB flash drive using Excel.

File formats will be:

- Non-proprietary
- Open, documented standard
- Common usage by research community
- Standard representation in Excel
- Unencrypted
- Uncompressed

Local storage, again, will be on a personal computer, backup data storage will be on a USB flash drive. Rights to the data will include the investigator as well as thesis committee, who are faculty of Rowan University and per IRB requirements external collaborators and others as appropriate. Data will be shared upon completion of the study via electronic file and privacy will not be breached since data will be anonymized. Copyright of data will be help by the researcher.

Data will be archived on USB flash drive and stored on the C drive of researcher's personal computer for long term use. Excel software is necessary to access data as aforementioned. The principal investigator is the primary individual responsible for fulfilling the retention and access of the data. Data from study to be retained for 6 years, after which time it will be archived as Excel spreadsheets held by the author.

Mixed-Method Data Collection

For a more complete research experience, members of the research committee supporting this dissertation suggested creating a sequential explanatory mixed-methods study where, subsequent to survey, selected interviews based upon the Principal Instructional Management Rating Scale. A combination of quantitative and qualitative methods allow for a stronger analysis, benefiting from the strengths of each research method and allowing for more in-depth detailed answers to research questions. Ivankova, Creswell, & Stick (2006) state that mixed-methods sequential explanatory design, is well used in research and is carried out by collecting and analyzing first quantitative (survey) and then qualitative (interview) data in consecutive phases within one study. Creswell (2013) defines the procedural steps for conducting a mixed-methods sequential explanatory study as consisting of performing survey first then interviews. Key here is building the qualitative data upon the quantative results so that the qualitative results define the plan for the qualitative inquiry.

With regards to the interview, a thematic analysis of the text data with initial coding and then assignment of themes manually, without the use of software will be carried out. In the sequential explanatory design, priority, typically, is given to the quantitative approach because the quantitative data collection comes first in the sequence and often represents the main part of the mixed-methods data collection process making the goal of the qualitative phase exploration and interpretation of the statistical results obtained in the first phase. Implementation then occurs where the quantitative and qualitative data collection and analysis come in sequence, one following another. In this study, first the quantitative data using a Web-based survey to allow for definitively selecting informants for the second phase of the based on their numeric scores. Developing the interview questions for the qualitative data collection was not based on the results of the quantitative, phase, rather, open-ended questions were formulated from the parameters of the Principal Instructional Management Rating Scale and demographic selection was not at issue since the survey was only administered to members of NJ technology coordinators forum. Eight questions in the interview protocol explored more intensely seven parameters of the PIMRS.

Survey and interview. Creswell (2013) defines the purpose of a survey is to provide a quantitative description of trends, attitudes, or opinions of a population. Fink (2013) states: "Surveys are information collection methods used to describe…knowledge, feelings, values, preferences, and behavior." Fink indicates that one of the principle reasons survey is selected as a research method is to guide analysis and inquiry. Sapsford (2007) simply states: "A survey describes a population; it counts and describes 'what is out there' ". The population of members of the NJ School Technology Coordinators forum will all receive an email requesting participation in the survey from the forum. The survey is 21 questions long, and presented as a Google Form (in quiz mode) (Appendix A), each question is on a five point Likert Scale (Likert, 1932). The survey itself is a self-evaluation based upon the PIMRS (Hallinger, 1983). The Likert Scale will be modified to be verbal rather than numeric. Philip Hallinger has granted permission for use of the instrument (Appendix C). This survey has been carefully designed in a straightforward way in order for the respondents to self-administer it.

This survey is administered electronically allowing for swift return of data so that Excel statistical analysis can begin as soon as results are received. The survey participants can be designated as anonymous by the use of number in lieu of email addresses. Though it is possible that not all of the sample may be able to use the electronic form due to accessibility issues, software compatibility, server load or internet access, it may not provide a complete representation of the target population but the delivery method (gmail and google forms) is a standard for many districts in New Jersey and should be accessible for most users. Further, electronic access is the best way to contact the sample size (521 individuals) addressed in this study.

Schmidt (1997) points out although the potential for missing data, unacceptable responses, duplicate submissions, and Web abuse exist, so that careful selection of survey software will serve to minimize the frequency and negative consequences of such incidents. The benefits of such a method include increased population contact, low cost and rapid turnover of data and the fact that interactive easily accessed surveys increase the motivation of respondents towards completion.

After survey results are compiled, respondents for interviews are selected who had high scores on all survey parameters defining educational technology in their schools, i.e. those who define school mission, manage the instructional program and develop the school learning climate. These participants were exposed to in-depth semi structured telephone interviews. Ivankova et al. (2006) say that the basis for this approach is that the quantitative data and subsequent analysis serves to provide a general understanding of the research problem. But, the qualitative data and analysis refine and explain those statistical results by exploring participants' views in a more profound way. The inclusion of the interview process provides straightforwardness and gives an opportunity for the exploration of the quantitative results in more detail.

Data Analysis

Quantitative data. Guba (1963) defines research as an inquiry process meeting two conditions—control which serves to insure relevancy (internal validity) and proper sampling allowing for generalization of findings (external validity). He stresses that as long research is not attempting to define cause and effect relationships, the survey approach to research is appropriate, since it is a good when attempting to obtain normative or descriptive information about a sample group. Surveys, then, according to Guba, venture to answer questions regarding "what is" rather than "why it is so" serving to define the presence, if any, of an existing relationship.

Data will be compiled directly into Google Sheets from the Google Forms submitted by the participants. Descriptive statistical analysis will strive to define the basic features of the data in the study, to summarize the study. The descriptive statistics will be broken down into measures of central tendency (such as mean, median and mode) and measures of variability or spread. The statistical analysis will serve to summarize the data in a meaningful way where patterns may become evident from the information obtained in the study. Analysis will describe how the data values are distributed across the range of values in the sample. Upon completion of data analysis, a clearer understanding of technology coordinators' instructional leadership will be revealed.

Qualitative Data. Subsequent to Google Form responses, interviewees will be selected and assessed with the following interview questions based upon the PIMRS:

What are the (educational/leadership credentials needed for your position?

Framing school goals:

Describe how you have created a plan to integrate educational technology into the district's strategic and operational goals.

Communicating school goals:

Discuss how you present/ally the school technology goals with teachers.

Supervise instruction:

Describe how you have ensured that school staff stays current about the latest trends and technologies emerging in the education field and uses them in the classroom.

Coordinate with the curriculum:

How do you insure that teaching staff use educational technology to teach your school curriculum?

Promote professional development:

How do you lead the way for teachers to embrace and use technology?

Evaluate instruction:

Are you available in classrooms and involved in informal "walk through" observations?

Maintain high visibility:

How do you insure that staff know your expertise and willingness to help them?

Internal and External Validity (Generalizability), Reliability, and Objectivity of Data Analysis

For quantitative researchers, the methods used to establish trustworthiness include internal validity, external validity, reliability, and objectivity. Quantitative methods require the researcher to use a pre-constructed standardized instrument or pre-determined answer categories where the participants' experiences are expected to fit for their responses. Surveys must include randomly selected large representative so that researchers can generalize their findings from the research sample to other populations. The major advantage of quantitative survey is that it allows researchers to assess large numbers of participants with limited focused questions, facilitating comparison and aggregation of data. The results of such closed-ended questionnaires allow researchers to define a pattern of participants' reactions to their working experiences in the public school domain.

Quantitative methods allow the researchers to obtain a generalizable set of findings and present them succinctly with reliance on descriptive statistics. In essence, such research consists of a first-hand examination into a social experience, measured with numbers and analyzed with statistics, in order to determine if the theory explains a phenomena of interest (Creswell, 1994; Gay & Airasian, 2000). This provides generalizations, predictions and possibly, causal explanations. Quantitative research embraces deduction, detachment and impartiality using the survey along with systematic numerical measurement. It naturally lends itself to examining large numbers of subjects and can lead to clear description of patterns seen in these samples (Patton, 2002).

Reliability in quantitative research in general refers to the consistency with which a research instrument measures factors consistently. It is important to note that reliability applies to data not to measurement instruments. Where external validity reflects the degree to which one can generalize research results beyond the present conditions of testing; that is, other persons, places, or times. Internal consistency reliability indicates whether measuring instruments possess internal consistency or the results of the instrument administered to a group of subjects correlate very positively (Huck, 2000; Keppel, 1991;Trochim, 2005). There should be consistency across the parts of a measuring instrument or subsets of questions. To judge that the full instrument possesses high internal consistency reliability, the researcher determines the extent to which parts of a test make sense and measure the same thing. Validity refers to the accuracy of research data. A researcher's data can be said to be valid if the results of the study measurement process are accurate. That is, a measurement instrument is valid to the degree that it measures what it is supposed to measure. External validity reflects the degree to which one can generalize research results beyond the present conditions of the survey; to other, persons, places, times, or approaches.

Threats to Internal and External Validity (Generalizability), Reliability, and Objectivity of Data Analysis

Initially, before launching a survey the instrument must be precisely designed to respond to an issue of interest not already explored by existing literature on topic. Survey questions are then written to provide information that can then be used in further research. In this study, the survey instrument should be relevant, given that it is modeled on an instrument consistently used to gauge instructional leadership.

The second major problem in survey research regards external validity, where the results of the survey cannot be generalized beyond the group of individuals who answer the survey. Respondents are almost always self-selected so that not all who receive a survey are likely to answer it regardless of reminders or incentives. This means that those who choose to respond may differ in some pivotal way from those who do not, so that the results may not reflect the opinions or behaviors of the entire population under study. In this study, presentation to a large pre-selected group, possible because the survey is sent on the internet, will serve to increase the sample size, decreasing this threat to external validity.

Sample bias will be addressed by forwarding the survey to the large selected representative sample of the population as described heretofore. Reminders will be used to obtain a high response rate (> 60%), this will minimize the chance that only those with a particular point of view will answer the survey Also, descriptive statistical analysis of the internal structure of the survey will address the treat to internal validity. By choosing the best fit of data analysis tools the internal structure of the survey including the relationships between responses to different survey items will be examined.

Validity of the survey concerns accuracy. In order to insure that the survey is as accurate as possible, the survey will be pretested on technology professionals in my district and will then be discussed with the survey pretest participants to identify ambiguous answers or unintelligible questions.

A benchmarking survey such as the one at hand is used provide data on the characteristics of a specific population of individuals. The intention is not to add to the knowledgebase but instead to provide numerical information that others can use for that purpose. The data in these surveys are used by others both for practical purposes and for research. As an example, the NJ DOE and other policy makers can use this data to understand instructional leadership trends of these professionals in New Jersey.

To be useful, a benchmarking study must be structured so that the data can be used by researchers to identify a peer group for comparative purposes. Benchmarking surveys need to be large and use a professionally constructed survey instrument to explore the situation researched. Even so the surveys remain suggestive rather than conclusive. To “develop or contribute to generalizable knowledge,” a survey needs to be created to answer a question that is important to others and use a well-designed unambiguous set of questions. The research question comes first; if the answer is already in the literature, as seen from the review of literature, then no further research is required. Developing a sampling methodology comes next, with examination of various methods and reviewing literature regarding the same.

Because these surveys require a deductive approach and predetermined sets of standardized responses based on theory, they do not delve into respondent’s feelings, thoughts, frames of reference, and experiences with their own words. Quantitative researchers are concerned with outcomes, generalization, prediction, and cause-effect relationships through deductive reasoning.

Schmidt (1997) points out that online surveys have the potential for missing data, unacceptable responses, duplicate submissions, and Web abuse researchers can take measures when selecting the survey software to minimize the frequency and negative consequences of such incidents.

Ethical Considerations

Because no intimate/personal questions will be included in the survey, the Rowan IRB has been presented and accepted a waiver request making informed consent unnecessary from the survey participants. All data obtained from the survey will be kept confidential and cannot be accessed without a password for the Rowan student Google Drive account of the researcher. Google sheets will contain email addresses of respondents but these addresses will be expunged when data is published, relying upon the innate numbering of responses available in the Google Sheets formatting. Members of the forum who do not complete the Google form are those who choose not to participate in the study. No others (*e.g.,* family members) will become secondary subjects as a result of the information provided by the primary subjects. No one under age 18 will be accessed for survey completion.

All professional standards will be observed for managing and conducting research at all stages of the study. This includes strict compliance with 45 C.F.R. § 46 governing Human Subjects (Protection of Human, 2016). Further, Shapiro & Stefkovich (2011) point out that ethics is a core competency for school leaders so that professional codes of ethics serve as guideposts for the profession. It would then seem apparent that such ethical behavior should extend to educational research in the field of leadership as well.

Limitations

The limitations of the study are those characteristics of design that influence the interpretation of the findings from the research. There are the constraints on generalizability; where utility of findings that are the result of the ways in which design of the study occurred and the methods used to establish internal and external validity, each of which will be examined in turn. Generalizability; the study at hand is meant look at the specific use of instructional leadership in public school technology in New Jersey, hence, a certain population. It is possible that the study will only apply to this population and cannot be extrapolated to concern other such professionals in other venues. Internal validity; is only relevant in studies that try to establish a causal relationship. Hence, it is not relevant for the most part in this observational study since no intervention upon the population is taking place. External validity; concerns the approximate truth of conclusions concerning generalizations and the degree to which the conclusions from the study would hold for other subjects in other places and at other times. It is possible that conclusions from this benchmark survey would not impact any other population of public school technology specialists.

Alternative Explanations

Patton (2001) encourages the researcher to employ a systematic search for alternative themes, divergent patterns, and differing explanations that can be accomplished by looking for other ways to organize data and thinking about other possible ways of seeing the data. The aim here is to look for data that support other explanations or ways of seeing and understanding the survey. Descriptive statistics will be used to describe the basic features of the data in this study. They will provide summaries about the sample and together with graphic analysis they will form the basis of the quantitative analysis of the data. Thus descriptive statistics tries to summarize the sample responses and is applied to the data for complete understanding of findings. Finally, by employing a general elimination methodology statistically which involves identifying alternative explanations and then systematically investigating each to see if they are viable will serve to define the data and results.

Summary

Educational technology has become an essential part of learning in New Jersey's public schools. Perhaps the major issue surrounding effective classroom usage of educational technology is teachers' lack of using the equipment to full effect. Schrum (1995) points out that teachers need time to investigate, absorb, and tryout technology as well as time to maintain their learned skills. Also planning, collaboration, preparation, and technology use in the classroom requires additional time during the school day (Loehr, 1996; Shelton & Jones, 1996; Schrum, 1995; Sudzina, 1993). Finally opportunities during and outside of the school day are required so that teachers can attend technology training activities (Shelton & Jones, 1996; Sudzina, 1993). Technology training for teachers must be hands-on, meaningful, systematic, developmental, and on-going (Ritchie, 1996; Shelton & Jones, 1996; Topp et al., 1995; Sudzina, 1993). Zagami, Bocconi, Starkey, Wilson, Gibson, Downie, Mayln-Smith, & Elliott (2018) ICT is necessary to an information based society, school systems must prepare students to compete in this arena, hence efforts and changes in national policies regarding this directive are ongoing, and they point to four challenges in particular: (1) creating future ready policy, (2) advancing the views of stakeholders, (3) insuring commitment to the policies (4) insuring support of the policies. In summary, adequate staff development, training, and technical support are all necessities for proper technology implementation (Ritchie, 1996; Schrum, 1995). Figure 4 indicates that administrators are cognizant that digital learning is a priority.

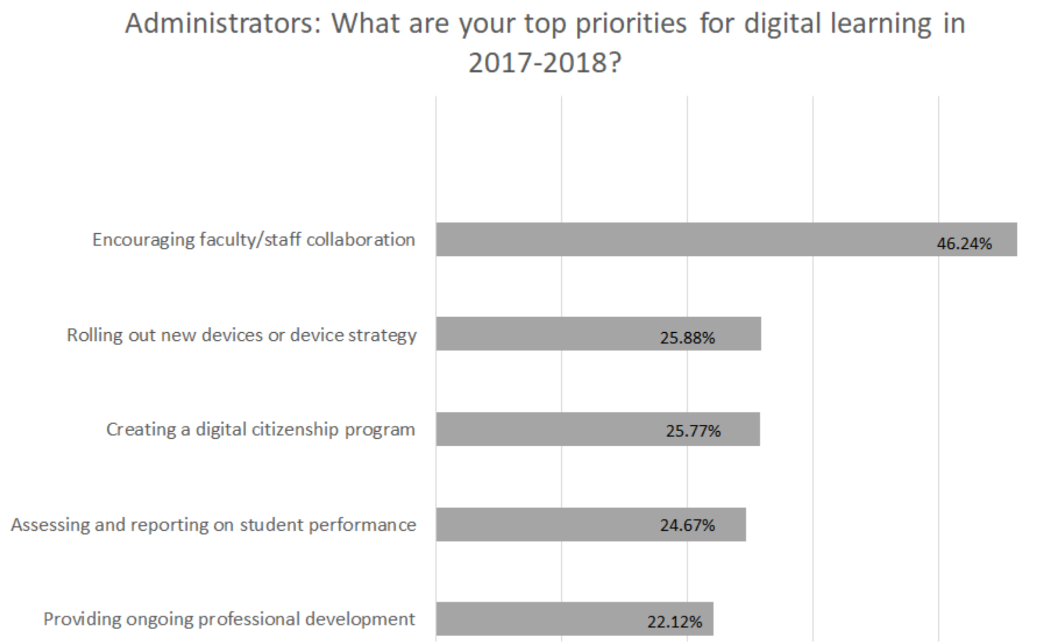

Figure 4. Current K-12 administrative priorities for digital learning (Schoolology, 2017, p. [Page 15]).

However all authors agree that administrative leadership and support is of ultimate importance to the adoption, implementation, and integration of technology in the classroom (Ritchie, 1996; Shelton & Jones, 1996; Schrum, 1995; Toppet al., 1995; Sudzina, 1993). Ritchie (1996) advocates the articulation of a vision for the implementation of educational technology, defining a plan for the implementation, and provision of a role model of adoption and utilization of the technology. Topp et al. (1995) suggests that administrative leadership must set high expectations and provide encouragement for teachers as they progress toward new or increased technology implementation in their classroom. Ritchie (1996) argues that administrative support may be the most critical factor since it can have a direct influence on all of the other critical factors.   Personnel who are sufficiently competent and knowledgeable in hardware, software, and equipment maintenance, and who are also available to work directly with teachers are necessary (Ritchie, 1996; Shelton & Jones, 1996; Topp et al., 1995). Shelton and Jones (1996) cite that each building should have its own onsite technical support person. Technical support also includes the identification and utilization of appropriate strategies, methods, and materials related to technology integration (Shelton & Jones, 1996; Topp et al., 1995).

According to Schrum,"Perhaps it is time that we stop expecting teachers to make the improvements on their own, and instead expect school districts...to provide ongoing and collaborative assistance." It is unfortunate that in spite of all the research and the repeated recognition that these critical factors still affect public school educational technology implementation, so that successful implementation of technology in the classroom remains an uphill battle for teachers as we approach the twenty-first century. The purpose of this study is to determine the instructional leadership capabilities and methods of the most succinct subject matter experts in public school educational technology. The survey will act to provide a baseline measurement of instructional leadership in New Jersey public schools and provide a base for additional research as well as provide suggestions for proper public school educational technology and potential policy change going forward.

Chapter 4

Findings

Data/Procedure & Methods

Electronic submission of the Google Form to the New Jersey Technology Coordinators forum yielded eighty eight responses, so that about 1/5 of the members responding to the survey. Data was imported from Google Sheets to Excel spreadsheet where the Analysis Toolpack (add –in) was used to generate descriptive statistics and provide summary statistics. Hallinger & Wang (2015) define a numerical Likert scale from initial verbal response as shown in Table 1. This was the scoring convention used for the data generated from this survey.

Table 1

Numerical Scoring Key

Verbal Response	Numerical Score
Strongly disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly agree	5

Hallinger & Wang (2015) point out the scores delineate how often the queried behaviors occur. They advise that each item should be averaged to obtain a mean score for every behavior. Each section of the instrument defines broad topics making up instructional leadership behavior as previously indicated (*Figure 1*).

As aforementioned, the instrument used for this study was modified from the PIMRS created by Dr. Philip Hallinger as presented in Table2 into self-evaluation mode. Questions posed in the survey correspond to the original instrument framework.

Table 2

Survey Questions/PIMRS Framework

PIMRS Framework	Technology Survey Statement
Defining the School Mission	
Frames the School's Goals	As Technology Expert I define the school-wide technology goals.
	In order to frame our school technology goals I create needs assessments or other formal and informal methods to obtain staff input on goal development welcoming feedback.
Communicate the School Goals	I am responsible in communicating the technology mission effectively to all members of the school community.
	One of my primary duties is to ensure that the classroom priorities of teachers are consistent with defined technology goals and direction of technology usage within the school .

Table 2 (continued)

PIMRS Framework	Technology Survey Statement
Managing the Instructional Program	
Supervise and Evaluate Instruction	One of my major duties is to conduct informal observations in classrooms on a regular basis (informal observations are unscheduled, last at least 5 minutes, and may or may not involve written feedback or a formal conference).
	I routinely act to point out specific strengths/weaknesses in teacher educational technology practices.
	One of my jobs is to encourage teachers to use instructional time for teaching and practicing new educational technology skills and concepts.
	I often take time to talk informally with teachers during breaks regarding instructional technology encouraging innovation and experimentation.
	I make time to visit classrooms to aid in technology issues with teachers.
Supervise and Evaluate Instruction	I provide regular feedback to teaching staff on the effectiveness of their classroom educational technology.
PIMRS Framework	Technology Survey Statement
Developing the School Learning Climate	

Table 2 (continued)

PIMRS Framework	Technology Survey Statement
Provides Incentives for Teachers	I am sure to reinforce superior educational technology performance by teachers in staff meetings, newsletters, or memos and other school communications.
	I routinely set aside time to compliment teachers one on one regarding their use of educational technology.
	I reward special efforts in technology by teachers with opportunities for professional recognition (such as presentations at professional development meetings).
Promotes Professional Development	I create professional technology growth opportunities for teachers who excel in classroom technology use (such as sponsoring funding for Google Certification).
	I plan and adopt strategies that guarantee ongoing professional development regarding educational technology for teaching staff.
	I ensure that inservice activities attended by staff are consistent with the school technology goals.
	I actively support classroom use of educational technology skills acquired during inservice training.
	I obtain the participation of the whole staff in important technology inservice activities.
Maintains High Visibility	I lead or attend teacher inservice activities concerned with educational technology instruction.
	I request time at faculty meetings for teachers to share ideas or information from technology inservice activities or ask clarification questions regarding technology use.

The responses to the survey reflect respondents' views on how they act to define the school's technology mission, management of the technology instructional program and developing the school technology learning environment.

Descriptive statistics for each main parameter and every question was calculated and histograms were created for each questions delineating the number of responses for each translated response giving each a score of 1 – 5 and them deterring frequency of responses for each score category.

Defining School Technology Mission

The raw data provided from eighty eight responses is show in the frequency histogram shown in figure 5. Descriptive statistics verifying the mean are shown in Tables 3 – 5.

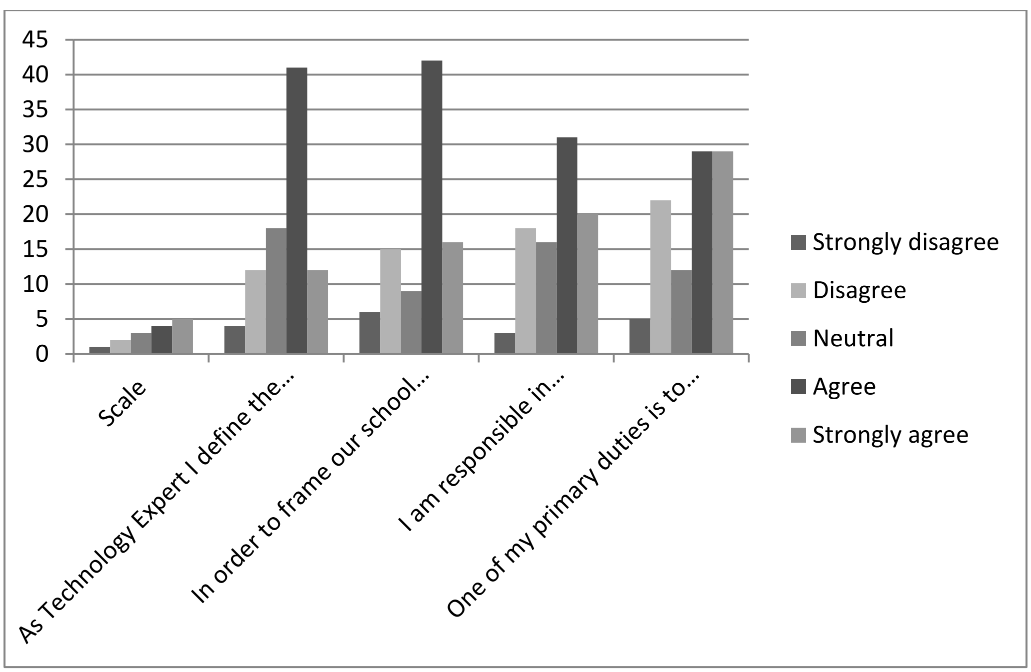

Figure 5. Histogram defining responses regarding defining school technology mission.

Descriptive statistical analysis of this parameter includes the mean. The mean gives a valid final score for each of the responses since there is little variation around the mean. To reinforce this supposition, the coefficient of variation (CV=standard deviation / mean) was also calculated. This measure of variation of mean scores indicates consistency in responses (CV >= 1 indicates a relatively high variation, while a CV < 1 can be considered low). All coefficients of variation for all answers in the survey were less than 1 means that a CV lower than 1 so that responses exhibit low variance. This validates the mean as the measurement value for the answered questions in the survey.

The standard error of the mean is a measure of the dispersion of sample means around the population mean. This value also is relatively low which indicates there is less spread in the sampling distributions. This value also serves to indicate the likely accuracy of the sample mean for each sample.

This is further reinforced by the fact that the kurtosis (a measure of tailedness for areas under the curve for each response). Kurtosis of a normal distribution equals 3. If the kurtosis is greater than 3, then the dataset has heavier tails than a normal distribution. The highest measure for the value is 1, therefore the data set does not present a normal distribution with a number of outlying scores. Kurtosis in the case of these values indicates that there is a tendency to have small tails, therefore a lack of outliers.

Skewness is a measure of the symmetry in a distribution. It actually measures the lack of symmetry in the data set. A symmetric data set looks the same to the left and to the right of a data point.

The frequency histograms of data show the lack of symmetry in the data sets visually such that the most common response for almost all survey. The histograms for each parameter queried in the survey indicate the frequency of scores. The frequency distributions show how often each different value in a set of data occurs. The responses to the survey were used to plot the frequency of score occurrences in the continuous data sets and to indicate the means. Finally, the data obtained validates the mean as the focus for research analysis.

Table 3

Descriptive Statistics Regarding Defining School Technology Mission

As Technology Expert I define the school-wide technology goals.		*In order to frame our school technology goals I create needs assessments or other formal and informal methods to obtain staff input on goal development welcoming feedback.*		*I am responsible in communicating the technology mission effectively to all members of the school community*		*One of my primary duties is to ensure that the classroom priorities of teachers are consistent with defined technology goals and direction of technology usage within school*	
Mean	3.517241	Mean	3.534091	Mean	3.534091	Mean	3.42045455
Standard Error	0.111922	Standard Error	0.125142	Standard Error	0.123037	Standard Error	0.13300795
Median	4	Median	4	Median	4	Median	4
Mode	4	Mode	4	Mode	4	Mode	4
Standard Deviation	1.043942	Standard Deviation	1.17394	Standard Deviation	1.154191	Standard Deviation	1.2477252
Sample Variance	1.089816	Sample Variance	1.378135	Sample Variance	1.332158	Sample Variance	1.55681818
Coefficient of Variation	0.296807	Coefficient of Variation	0.332176	Coefficient of Variation	0.326588	Coefficient of Variation	0.364783
Kurtosis	-0.10816	Kurtosis	-0.46661	Kurtosis	-0.89591	Kurtosis	-1.1280916
Skewness	-0.67445	Skewness	-0.7162	Skewness	-0.38329	Skewness	-0.3050711
Range	4	Range	4	Range	4	Range	4
Minimum	1	Minimum	1	Minimum	1	Minimum	1
Maximum	5	Maximum	5	Maximum	5	Maximum	5
Sum	306	Sum	311	Sum	311	Sum	301
Count	87	Count	88	Count	88	Count	88

Management of the Technology Instructional Program/Teaching Teachers Technology

Figure 6 gives a visual representation of means regarding instructional technology programs.

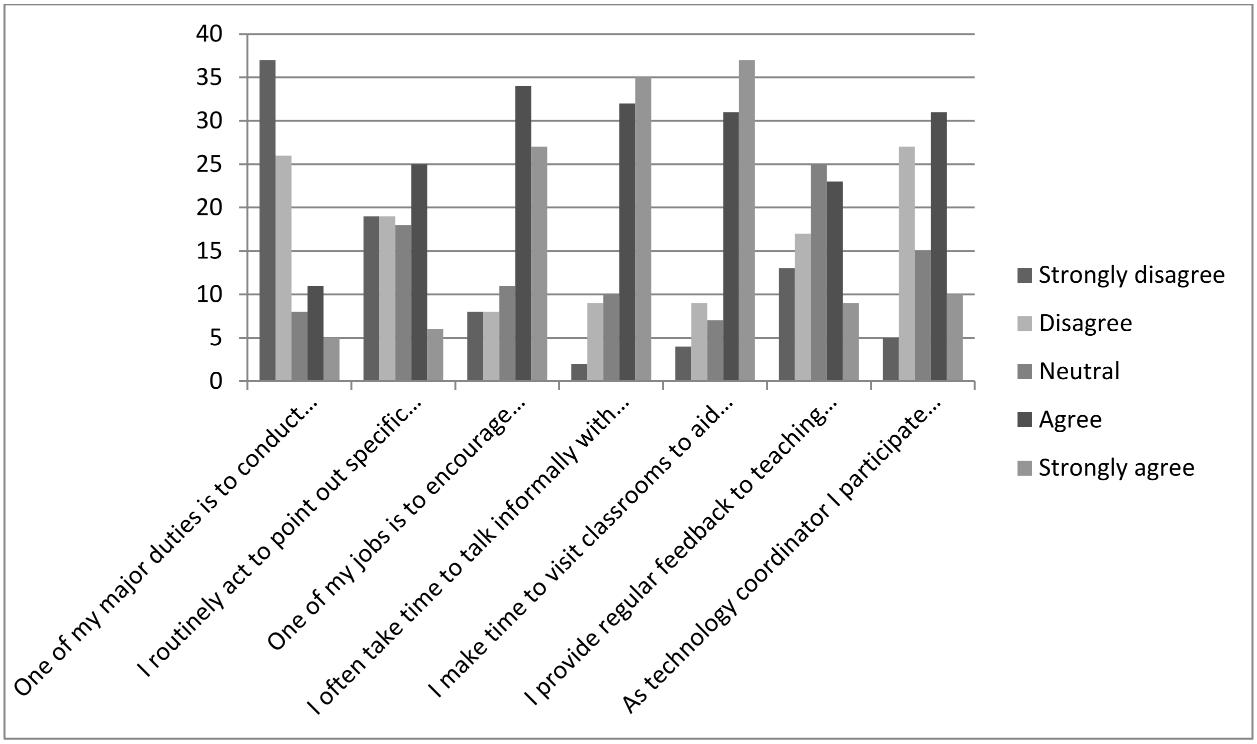

Figure 6 . Histogram defining responses regarding management of technology instructional programs.

Table 4

Descriptive Statistics Regarding Management of Technology Instructional Programs

One of my major duties is to conduct informal observations in classrooms on a regular basis (informal observations are unscheduled, last at least 5 minutes, and may or may not involve written feedback or a formal conference).		*I routinely act to point out specific strengths/weaknesses in teacher educational technology practices.*		*One of my jobs is to encourage teachers to use instructional time for teaching and practicing new educational technology skills and concepts.*		*I often take time to talk informally with teachers during breaks regarding instructional technology encouraging innovation and experimentation.*	
Mean	2.091954	Mean	2.770115	Mean	3.727273	Mean	4.011364
Standard Error	0.133459	Standard Error	0.136498	Standard Error	0.133014	Standard Error	0.113708
Median	2	Median	3	Median	4	Median	4
Mode	1	Mode	4	Mode	4	Mode	5
Standard Deviation	1.244824	Standard Deviation	1.273168	Standard Deviation	1.247778	Standard Deviation	1.066677
Sample Variance	1.549586	Sample Variance	1.620957	Sample Variance	1.556949	Sample Variance	1.1378
Coefficient of Variation	0.595053	Coefficient of Variation	0.459608	Coefficient of Variation	0.334770	Coefficient of Variation	0.265913
Kurtosis	-0.19239	Kurtosis	-1.21507	Kurtosis	-0.11954	Kurtosis	0.277067
Skewness	0.969723	Skewness	-0.00463	Skewness	-0.91653	Skewness	-1.01149
Range	4	Range	4	Range	4	Range	4
Minimum	1	Minimum	1	Minimum	1	Minimum	1
Maximum	5	Maximum	5	Maximum	5	Maximum	5
Sum	182	Sum	241	Sum	328	Sum	353
Count	87	Count	87	Count	88	Count	88

Table 4 (continued)

I make time to visit classrooms to aid in technology issues with teachers.		*I provide regular feedback to teaching staff on the effectiveness of their classroom educational technology.*		*As technology coordinator I participate actively in the review of curricular materials in order to advance educational technology practices.*	
Mean	4	Mean	2.977011	Mean	3.159091
Standard Error	0.123091	Standard Error	0.130773	Standard Error	0.122971
Median	4	Median	3	Median	3
Mode	5	Mode	3	Mode	4
Standard Deviation	1.154701	Standard Deviation	1.219769	Standard Deviation	1.153569
Sample Variance	1.333333	Sample Variance	1.487837	Sample Variance	1.330721
Coefficient of Variation	0.288675	Coefficient of Variation	0.409729	Coefficient of Variation	0.365159
Kurtosis	0.440441	Kurtosis	-0.91084	Kurtosis	-1.10515
Skewness	-1.1459	Skewness	-0.11263	Skewness	-0.08895
Range	4	Range	4	Range	4
Minimum	1	Minimum	1	Minimum	1
Maximum	5	Maximum	5	Maximum	5
Sum	352	Sum	259	Sum	278
Count	88	Count	87	Count	88

Developing the School Technology Learning Climate/Teaching Methods

Frequency histogram Figure 7 visually represents responses regarding the school technology learning climate.

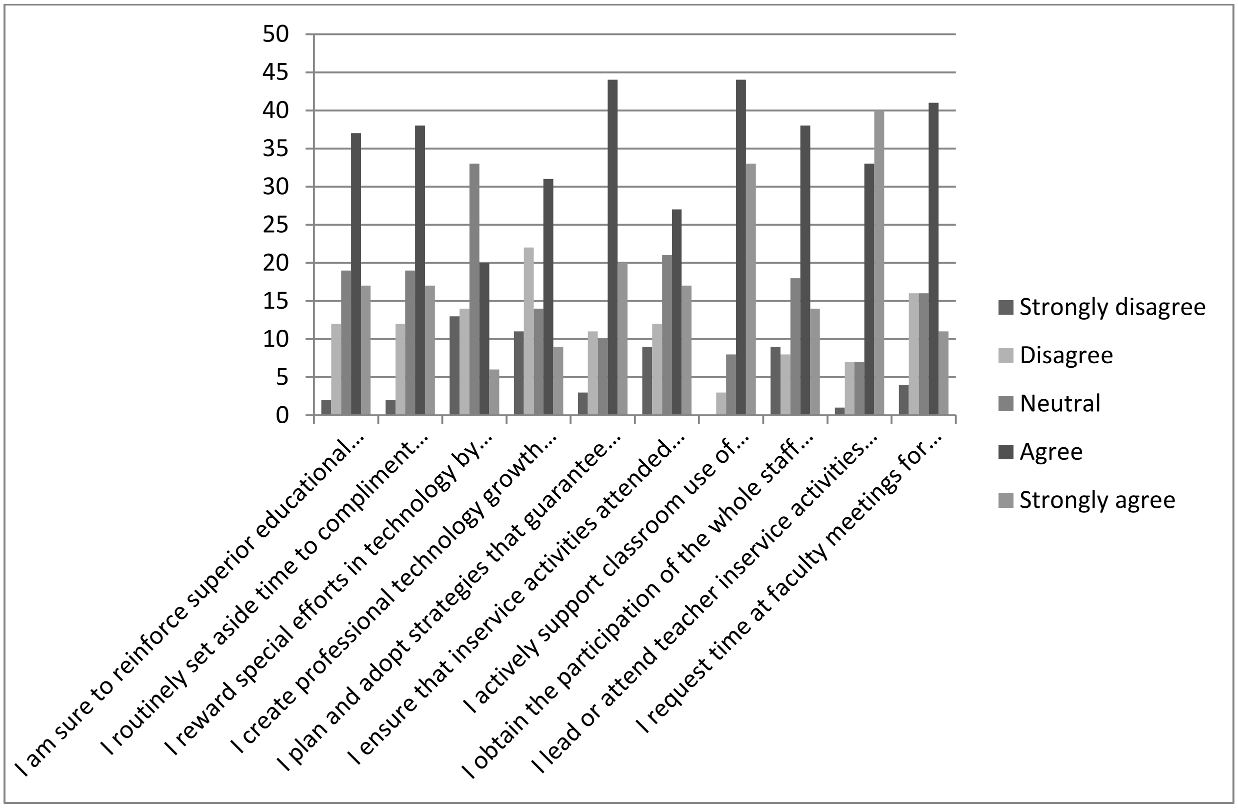

Figure 7. Histogram defining responses regarding development of the school technology learning climate.

Table 5

Descriptive Statistics Regarding Development of the School technology Learning Climate.

I am sure to reinforce superior educational technology performance by teachers in staff meetings, newsletters, or memos and other school communications.		*I routinely set aside time to compliment teachers one on one regarding their use of educational technology.*		*I reward special efforts in technology by teachers with opportunities for professional recognition (such as presentations at professional development meetings).*		*I create professional technology growth opportunities for teachers who excel in classroom technology use (such as sponsoring funding for Google Certification).*	
Mean	3.632183908	Mean	3.636364	Mean	2.906977	Mean	3.057471
Standard Error	0.109816184	Standard Error	0.108642	Standard Error	0.122254	Standard Error	0.133183
Median	4	Median	4	Median	3	Median	3
Mode	4	Mode	4	Mode	3	Mode	4
Standard Deviation	1.024297179	Standard Deviation	1.019148	Standard Deviation	1.133738	Standard Deviation	1.242244
Sample Variance	1.04918471	Sample Variance	1.038662	Sample Variance	1.285363	Sample Variance	1.54317
Coefficient of Variation	0.282006	Coefficient of Variation	0.280266	Coefficient of Variation	0.390006	Coefficient of Variation	0.406298
Kurtosis	-0.339473312	Kurtosis	-0.30705	Kurtosis	-0.62464	Kurtosis	-1.13242
Skewness	-0.532757994	Skewness	-0.54655	Skewness	-0.16069	Skewness	-0.18562
Range	4	Range	4	Range	4	Range	4
Minimum	1	Minimum	1	Minimum	1	Minimum	1
Maximum	5	Maximum	5	Maximum	5	Maximum	5
Sum	316	Sum	320	Sum	250	Sum	266
Count	87	Count	88	Count	86	Count	87

Table 5 (continued)

I plan and adopt strategies that guarantee ongoing professional development regarding educational technology for teaching staff.		*I ensure that inservice activities attended by staff are consistent with the school technology goals.*		*I actively support classroom use of educational technology skills acquired during inservice training.*		*I obtain the participation of the whole staff in important technology inservice activities.*	
Mean	3.761364	Mean	3.360465	Mean	4.215909	Mean	3.45977
Standard Error	0.111972	Standard Error	0.134289	Standard Error	0.079918	Standard Error	0.126437
Median	4	Median	4	Median	4	Median	4
Mode	4	Mode	4	Mode	4	Mode	4
Standard Deviation	1.050389	Standard Deviation	1.245347	Standard Deviation	0.749695	Standard Deviation	1.179324
Sample Variance	1.103318	Sample Variance	1.550889	Sample Variance	0.562043	Sample Variance	1.390805
Coefficient of Variation	0.279257	Coefficient of Variation	0.370588	Coefficient of Variation	0.177825	Coefficient of Variation	0.340868
Kurtosis	0.241102	Kurtosis	-0.75613	Kurtosis	0.885253	Kurtosis	-0.2158
Skewness	-0.9041	Skewness	-0.42147	Skewness	-0.88089	Skewness	-0.75052
Range	4	Range	4	Range	3	Range	4
Minimum	1	Minimum	1	Minimum	2	Minimum	1
Maximum	5	Maximum	5	Maximum	5	Maximum	5
Sum	331	Sum	289	Sum	371	Sum	301
Count	88	Count	86	Count	88	Count	87

Table 5 (continued)

I lead or attend teacher inservice activities concerned with educational technology instruction.		*I request time at faculty meetings for teachers to share ideas or information from technology inservice activities or ask clarification questions regarding technology use.*	
Mean	4.181818	Mean	3.443182
Standard Error	0.102917	Standard Error	0.114125
Median	4	Median	4
Mode	5	Mode	4
Standard Deviation	0.965443	Standard Deviation	1.070589
Sample Variance	0.932079	Sample Variance	1.14616
Coefficient of Variation	0.230867	Coefficient of Variation	0.310930
Kurtosis	1.043312	Kurtosis	-0.47109
Skewness	-1.23855	Skewness	-0.56779
Range	4	Range	4
Minimum	1	Minimum	1
Maximum	5	Maximum	5
Sum	368	Sum	303
Count	88	Count	88

Interpreting the Scores

Hallinger & Wang (2015) clearly state, “Mean scores of 4 and above should, therefore, be treated as indicators of ‘high engagement’”. As Table 6 defines this convention will be employed examining data obtained in this survey. Interpretation based upon this guideline indicates high engagement only in the following instances; taking time to talk informally with teachers during breaks regarding instructional technology encouraging innovation and experimentation, making time to visit classrooms to aid in technology issues with teachers, actively supporting classroom use of educational technology skills acquired during inservice training, leading or attending teacher inservice activities concerned with educational technology instruction. Most of these interactions appear to be only in informal settings or during special occasions such as inservice events. Further a calculation of the mean of means overall does not indicate high engagement.

Table 6

Survey Questions/PIMRS Framework/Mean Responses.

PIMRS Framework	Survey Statement	Mean
Defining the School Mission		
Frames the School’s Goals	As Technology Expert I define the school-wide technology goals.	3.517241

Table 6 (continued)

PIMRS Framework	Survey Statement	Mean
	In order to frame our school technology goals I create needs assessments or other formal and informal methods to obtain staff input on goal development welcoming feedback.	
Communicate the School Goals	I am responsible in communicating the technology mission effectively to all members of the school community.	3.534091
	One of my primary duties is to ensure that the classroom priorities of teachers are consistent with defined technology goals and direction of technology usage within the school .	3.42045455
Managing the Instructional Program		
Supervise and Evaluate Instruction	One of my major duties is to conduct informal observations in classrooms on a regular basis (informal observations are unscheduled, last at least 5 minutes, and may or may not involve written feedback or a formal conference).	2.091954
Supervise and Evaluate Instruction	I routinely act to point out specific strengths/weaknesses in teacher educational technology practices.	2.770115

Table 6 (continued)

PIMRS Framework	Survey Statement	Mean
	One of my jobs is to encourage teachers to use instructional time for teaching and practicing new educational technology skills and concepts.	3.727273
	I often take time to talk informally with teachers during breaks regarding instructional technology encouraging innovation and experimentation.	4.011364
	I make time to visit classrooms to aid in technology issues with teachers.	4
	I provide regular feedback to teaching staff on the effectiveness of their classroom educational technology.	2.977011
Coordinates the Curriculum	As technology coordinator I participate actively in the review of curricular materials in order to advance educational technology practices.	3.159091
Developing the School Learning Climate		
Provides Incentives for Teachers	I am sure to reinforce superior educational technology performance by teachers in staff meetings, newsletters, or memos and other school communications.	3.632183908

Table 6 (continued)

PIMRS Framework	Survey Statement	Mean
	I routinely set aside time to compliment teachers one on one regarding their use of educational technology.	3.636364
	I reward special efforts in technology by teachers with opportunities for professional recognition (such as presentations at professional development meetings).	2.906977
	I plan and adopt strategies that guarantee ongoing professional development regarding educational technology for teaching staff.	3.761364
	I ensure that inservice activities attended by staff are consistent with the school technology goals.	3.360465
	I actively support classroom use of educational technology skills acquired during inservice training.	4.215909
	I obtain the participation of the whole staff in important technology inservice activities.	3.45977

Table 6 (continued)

PIMRS Framework	Survey Statement	Mean
Maintains High Visibility	I lead or attend teacher inservice activities concerned with educational technology instruction.	4.181818
	I request time at faculty meetings for teachers to share ideas or information from technology inservice activities or ask clarification questions regarding technology use.	3.4431182
Mean of Means		3.6482872

Accordingly, from these results we can assume, overall that most technology coordinators are not highly engaged in all parameters of instructional technology leadership. We can also surmise this from the mean of all means.

Carey (2011) another Rowan doctoral candidate notes in her dissertation, “Most of the participants verbalized their reliance on the Technology Coordinator to spearhead all technology integration efforts. (page 208). However, from survey results we can surmise this may not be completely the case.

Defining School Technology Mission

Coordinators, though not highly engaged per parameters aforementioned by Hallinger, do have some input into defining technology mission. For the most part, their responses were somewhat above a neutral response. The top down organization of most school district leadership where the superintendent performs transformational leadership as postulated in literature search.

Managing Technology Instructional Program

Coordinators do not spearhead the technology instructional program but spend their time behind the scenes speaking informally to teachers, encouraging them to make use of classroom educational technology, and taking time to visit classrooms in a help desk capacity.

But, informal walkthroughs, which can help to determine educational technology needs in the classrooms and reinforcement after rollouts is not in evidence. In keeping with that, coordinators are not pointing out strengths and weaknesses of educational technology implementation.

Feedback (figure 8) is not espoused by the technology coordinators as well. All of these actions integrate into an overall lack of involvement with the subject matter expert and teaching staff missing valuable teachable educational technology moments which could be necessary for complex concepts surrounding new classroom technologies.

Figure 8. Feedback loop illustrating technology learning.

Developing School Technology Climate

Rewarding special efforts is not evident in the survey responses, however reinforcement and compliments are above a neutral level, providing some incentives for teachers. Professional growth opportunities are at only a neutral level. Strategies for professional development, inservice activities, and participation in professional development are above neutral level.

High visibility in terms of leading or attending inservice shows high engagement. But, technology is not showcased at high engagement levels at faculty meetings which could be used as a forum for discussion.

Interview Results

Interviews commenced immediately after IRB approval in June of 2018. There were a number of potential interviewees who refused to complete the interview because educational technology in their districts is held out as proprietary and cannot be shared outside of the district. Other technology coordinators told me they previewed the questions but could not answer them because their role does not include instructional technology, or, that the district does not have an instructional technology supervisor, per se, these responses were significant since it was evident that the technology coordinators did not view that their role included instructional leadership for educational technology. Interviews were conducted in 30 minutes due to time constraints imposed by job duties impacting the interviewees, over the telephone, during lunch hours and after school. Interviewees were selected subsequent to completion of all survey forms. The interviews used the following questions as prompts and the questions were created in keeping with the PIMRS framework advanced by Hallinger & Wang (2015):

1. What are the (educational/leadership) credentials needed for your position?
2. (Framing school goals)

Describe how you have created a plan to integrate education technology into the district's strategic and operational goals.

3. (Communicating school goals)
   Discuss how you present/ally the school technology goals with teachers.

4. (Supervise instruction)
   Describe how you have ensured that school staff stays current about the latest trends and technologies emerging in the education field and uses them in the classroom.

5. (Coordinate with the curriculum)
   How do you insure that teaching staff use educational technology to teach your school curriculum?

6. (Promote professional development)
   How do you lead the way for teachers to embrace and use technology?

7. (Evaluate instruction)
   Are you available in classrooms and involved in informal "walk through" observations?

8. (Maintain high visibility)
   How do you insure that staff know your expertise and willingness to help them?

These interviews were transcribed and coded to uncover emerging themes and analyzed for additional reflective data in keeping with Bogdan & Biklen (2003).

Table 7

Interview Questions/Themes.

Interview Questions	Codes	Theme
Credentials needed for your position?	Licensure	Often the job is a reward for years of service.
Describe how you have created a plan to integrate education technology into the district's strategic and operational goals.	Committees Structured Frameworks	Participant not leader/Share not lead

Table 7 (continued)

Interview Questions	Codes	Theme
Discuss how you present/ally the school technology goals with teachers.	Sharing "word of mouth"	Participant not leader/Share not lead
Describe how you have ensured that school staff stays current about the latest trends and technologies emerging in the education field and use them in the classroom.	Peripheral "Lead by example" "Encourage"	Does not come forward to assist but uses technology and expects staff to follow
How do you insure that teaching staff use educational technology to teach your school curriculum?	Peripheral ("Lead by example"; "Sign up and Learn")	Does not come forward to assist but uses technology and expects staff to follow
How do you lead the way for teachers to embrace and use technology? Promote professional development/Developing the School Learning Climate	Peripheral ("Lead by example"; "Sign up and Learn")	Peripheral but somewhat accessible, help desk capacity
Are you available in classrooms and involved in informal "walk through" observations?	Peripheral	Peripheral but somewhat accessible, help desk capacity
How do you insure that staff know your expertise and willingness to help them Maintain high visibility/Developing the School Learning Climate	Accessible	Peripheral but somewhat accessible, help desk capacity

The predominant themes that were evident from the interviews were strategic and operational goals, skillsets, meetings, technology pedagogy, “walkthoroughs”, and communication.

Credentials

There is no one set of credentials seen among technology coordinators interviewed. As one interviewee indicated,

> The credentials needed for my position is a bachelor’s degree and a teaching certificate. However, since I am also a technology coach, the credentials that made me a more favored candidate is a dual masters in biology and computer science-information systems. I also have a masters in educational leadership.

Another stressed the need for a teaching certificate

> I attended New Jersey City University with a media specialist in the classroom, however Cisco certificates are needed to understand network infrastructure as I have a one man department.

Seniority can also allow for an opportunity to obtain these positions, since salary levels are triple that of a classroom teacher as one interviewee shared,

> I have 26 years in District and I am a certified teacher in “technology” but I taught wood shop for a number of years. I also attended Teacher’s College/Columbia for the Ed.D. Program, but three years in I dropped out of the Ed.D. Program there.

Another respondent indicated

> I have over 20 years in our district. I have been the technology teacher before I took on this job. I will tell you that, if they asked me to scrub the floors in the halls here I would do that too.

One interviewee did receive an Ed.D. in Educational Leadership in 2018.

Framing Goals and Mission

Committees are tapped to define schoolwide goals.   One respondent said

> I act as the coach of the district committee which has included from 12 to 20 members over the years. However, our new Superintendent has made it clear, in no uncertain terms, that she does not want to see integration of technology. In fact, she is championing a reduction of computing and its role in emerging technology, so that I feel I must completely fly under the radar.

One way to address district technology goal setting is by implementing directives suggested by Future Ready Schools. One interviewee specified,

> I chair the Future Ready Schools Certification Committee.

Other districts do not have plans to embrace Future Ready Schools,

> We looked into the program but we felt it was too restrictive and that many of the requirements were things we were doing already on our own as a district which supports 1:1 ipads for all of our students, in fact, we rolled out 1:1 before even the Los Angeles Unified School District and we have had them successfully for almost a decade. The district technology plan is written every 3 years and submitted to the NJDOE, outlines our strategic and operational goals and I am the principal writer of the plan.

There is a preference for structured frameworks to provide direction,

> The New Jersey Department of Education (NJDOE) established NJTRAx to gauge the technology readiness of New Jersey schools and districts for online testing as well as provide a digital learning tool.

Often, tech is tied to evaluation,

> We have a 1:1 device environment and every student must use google classroom. Folded into the PDP (professional development plan) for all teachers is the necessity to use tech and teacher evaluations are based on observations so that, I believe, that we, in our district have a natural evolution towards tech and educational technology use.

Communicating Goals

One of the subjects who definitely experiences successful technology integration through their own instructional leadership stated,

> Having open and ongoing communication with subject areas department heads about technology integration and future projects during regular schedule monthly meetings allows me to share information on what members of the technology and information services department are experts in. Willingness to help all staff with technology tasks is the expectation of our department members.

In another successful district the respondent pointed out,

> As far as professional development goes, we rely heavily on PLCs but we also expect teachers to generate tech use by sharing and word of mouth. Teachers are expected to share "tech tips" at our regular faculty meetings. Our tech coaches are very active throughout their schools and are there to help our teachers daily. Tech use, to me, is competency based where those individuals help others and cultivate growth and learning and sharing.

Key is communication to teachers by teachers,

> I provide service, support, and trainings that align with the district initiatives to integrate technology into the curriculum and make sure it aligns with best practice. Where ever possible, I have passively passed on information by means of word of mouth as well as targeted email correspondence with those would be considered as "early adopters".

Another coordinator who completed the survey verbalized,

> I speak at staff meetings as well as at board meetings to explain the processes and make sure everyone has buy in, I also insure that technology changes are meaningful to everyone involved.

Supervision and Management

One coordinator noted that instructional staff has been removed as direct reports,

> I used to supervise 8 computer teachers, now my duties are just operational. But, aside from that I have tried to reach out to staff with technology education, for example I have made sure our overall staff have Google 1 and 2 certificates, there are 35 total certificate holders in district.

Another indicates he relinquishes responsibility for educational technology,

> We do not have an instructional technology supervisor. I would if I could.

Other districts are more "hands on",

> In our district the principals of each school are expected to enforce tech in the curriculum. In addition, each teacher has a PCP (Performance Development Plan)

> which includes a heavy tech component; we also have tech coaches in every school. Our program with respect to tech is really what I would call "grass roots" on an as need basis not via top down management.

One interviewee articulated,

> We hold monthly meetings with are department members, who are strategically placed in STEM and the Media Centers as Media Specialists. During these meetings we discuss latest trends and technologies. In addition, I encourage members of the department to attend yearly conferences, workshops and seminars where they are encouraged, by offering PD, to bring back the information and skill sets to the schools which they serve.

Another offered,

> We perform surveys to determine digital readiness and we have tech committees which include all stakeholders ever our students. This is because we truly embrace student centered learning. I am a leader in district and I present to and engage the staff. I try to practice what I preach, we call it "eating your own dog food"

Evaluate Instruction

One coordinator at a top performing school pronounced

> I perform 84 walk throughs over the course of the school year guaranteeing that teachers are constantly accessing tech and using tech to teach in our district.

this was the exception regarding walk through observation since most recipients indicated,

> Although I do not serve the district in an administrative role, I am available to the teaching staff every day. I do not conduct "walk throughs"

Coordinate with Curriculum

For the most part most interviewees would agree,

> I participate in all areas of professional development in grades pre-K to 12 for teaching staff. In order to ensure that technology skills and resources are integrated into curricula of all subject areas. I also work very closely with members of our department so that they are able to turnkey new skills and new technology resources.

Promote Professional Development

One process used for professional development was advanced by one coordinator

> I provide "sign up and learn" modules for all teachers so that they can drop by as their schedule allows to learn the skill sets they need for the classroom.

another stated,

> My job is to stay current with emerging technologies and technology pedagogy and to constantly encourage teachers to improve their own skill sets for the purpose of meeting the needs of all students in all areas of technology.

Another individual surveyed pointed out

> I prefer to lead by example by using the technology myself.

One coordinator declared,

> I support and train a group of "teachers who train in tech" and those individuals change every two years. I have 14 teacher trainers in the district with 7 in our high school and all teachers have a PDP that includes a personal technology plan and which is tied to our district tech initiatives.

on a final note, one coordinator exclaimed,

> As far as professional development goes, we rely heavily on PLCs but we also expect teachers to generate tech use by sharing and word of mouth. Furthermore, teachers are expected to share "tech tips" at our regular faculty meetings. Tech use, to me, is competency based where those individuals help others and cultivate growth and learning and sharing.

Visibility

One respondent believes,

> Though I do no walk throughs I feel I maintain high visibility by providing teacher classes on in service days. I also maintain a robust help desk so that teachers know where to go quickly and efficiently for technology support. We also have Clever Badges to allow easy access on site to all tools rather than have log ins that students and teachers cannot remember.

Another says,

> I am approachable and leave my problems outside the door. Teachers know I truly have an "open door" policy and that I provide valuable customer service to them. I view them and our students as my customers and I strive to perform above expectations every single day.

Another individual agreed,

> Since I am constantly providing support, trainings, and service, the district staff is aware of my abilities and my willingness to assist them wherever and whenever I can.

> A final point,

>> Having open and ongoing communication with subject area department heads about technology integration and future projects during regular scheduled monthly meetings allows me to share information on what members of the technology and information services department are expert in. Willingness to help all staff with technology tasks is the expectation of all department members.

Chapter 5

Conclusions and Implications

This study was an initial examination of the instructional leadership parameters shown by New Jersey Technology Coordinators. Technology Coordinators are uniquely qualified to drive technology acquisition, but, because they have deep understanding of the technology they implement, they also are incomparably qualified to share the utility of such technologies with teaching staff as instructional leaders, insuring technology usage in the classroom.

In revisiting the research questions it is noted that New Jersey Technology Coordinators are not taking a leadership stance in addressing educational technology:

What leadership values are held by these administrators?

Addressed in the survey by:

Managing the Instructional Program

One of my major duties is to conduct informal observations in classrooms on a regular basis (informal observations are unscheduled, last at least 5 minutes, and may or may not involve written feedback or a formal conference). (2.0)

I routinely act to point out specific strengths/weaknesses in teacher educational technology practices. (2.7)

One of my jobs is to encourage teachers to use instructional time for teaching and practicing new educational technology skills and concepts. (3.7)

I often take time to talk informally with teachers during breaks regarding instructional technology encouraging innovation and experimentation. (4)

I make time to visit classrooms to aid in technology issues with teachers. (4)

I provide regular feedback to teaching staff on the effectiveness of their classroom educational technology. (2.9)

As technology coordinator I participate actively in the review of curricular materials in order to advance educational technology practices. (3.1)

Conclusion: Not formally engaged, but has informal contact on occasion.

Addressed by the interview:

Supervise instruction

Describe how you have ensured that school staff stays current about the latest trends and technologies emerging in the education field and use them in the classroom. (Peripheral)

Coordinate with the curriculum

How do you insure that teaching staff use educational technology to teach your school curriculum? (Peripheral)

Conclusion: Does not come forward to assist but uses technology and expects staff to follow

What is their leadership vision?

Addressed in the survey by:

As Technology Expert I define the school-wide technology goals. (3.5)

In order to frame our school technology goals I create needs assessments or other formal and informal methods to obtain staff input on goal development welcoming feedback. (3.5)

I am responsible in communicating the technology mission effectively to all members of the school community. (3.5)

One of my primary duties is to ensure that the classroom priorities of teachers are consistent with defined technology goals and direction of technology usage within the school. (3.4)

Conclusion: Not imbibed with leadership vision

Addressed by the interview questions:

Framing school goals

Describe how you have created a plan to integrate education technology into the district's strategic and operational goals. (Committees/Structured Frameworks)

Communicating school goals

Discuss how you present/ally the school technology goals with teachers. (Sharing, "word of mouth")

Conclusion: Participant not leader/Share not lead

How do they foster change in district?

Addressed in the survey by:

I am sure to reinforce superior educational technology performance by teachers in staff meetings, newsletters, or memos and other school communications. (3.6)

I routinely set aside time to compliment teachers one on one regarding their use of educational technology. (3.6)

I reward special efforts in technology by teachers with opportunities for professional recognition (such as presentations at professional development meetings). (2.9)

I plan and adopt strategies that guarantee ongoing professional development regarding educational technology for teaching staff. (3.7)

I ensure that inservice activities attended by staff are consistent with the school technology goals. (3.3)

I actively support classroom use of educational technology skills acquired during

activities.

I lead or attend teacher inservice activities concerned with educational technology instruction. (4.1)

I request time at faculty meetings for teachers to share ideas or information from technology inservice activities or ask clarification questions regarding technology use. (3.4)

Conclusion: Involved only with inservice events

Addressed in the interview:

Promote professional development

How do you lead the way for teachers to embrace and use technology? (Peripheral)

Evaluate instruction

Are you available in classrooms and involved in informal "walk through" observations? (Peripheral)

Maintain high visibility

How do you insure that staff know your expertise and willingness to help them? (Accessible)

Conclusion: Peripheral but somewhat accessible

It is evident that the state of New Jersey is aware of the importance of educational technology given the Future Ready Schools New Jersey school certification program which strives to best prepare New Jersey students for success in the digital age. In addition to this certification, a rigorous set of standards was implemented in 2014 by the NJDOE; NJTAP (The New Jersey Technology Assessment of Proficiency) was put in place to assure that the No Child Left Behind – Title II, D requirement that all students are technologically literate by the end of grade eight. New Jersey has also created a model curriculum framework along with Professional Development suggestions and technology resources. It is evident that the state is invested in educational technology but the question remains as to who shoulders the responsibility for instructional technology sponsorship in public school districts and who is the ultimate classroom mentor for instructional technology (i.e. improving the efficacy of learning using developing media technology)?

Two types of educational leadership seem to predominate in school districts. Hallinger (2003) delineates them as transformational leadership and instructional leadership. It is natural that transformational leadership was discussed in depth during the Rowan Ed.D. Program since, as I have discussed, transformational leadership is integral to upper level management and strategic planning carried out by school superintendents. Leithwood (1994) points out that transformational leadership strives to establish school vision but does not focus on the skill sets imparted in standard classroom structures and processes.

Instructional leadership speaks to the more tactical goals of instructional management and support of the school learning climate. Hallinger & Heck (1996) indicate that instructional leadership's purview is curriculum and instruction where synchronization, direction and control are key; serving to supervise advancement to preferred instructional results. Leithwood, Aitken & Jantzi (2006) point out that instructional leadership has the soundest substantiated bearing on student learning outcomes.

Instructional leaders are often described as leading from an amalgamation of proficiency and persuasion. Cuban (1984) acknowledges these are 'hands-on' leaders, 'hip-deep' in curriculum and instruction. Yet, he concedes that instructional leadership methodology seems to have 'run aground' since school principals' administrative duties have clashed with leadership duties limiting expected instruction results and restraining student learning outcomes.

Bell (1982) reported that the status of United States education was declining in quality and the country was facing becoming a "nation at risk", this commentary laid the groundwork for additional education legislation. Following this report, policy entrenched in the No Child Left Behind and Race to the Top still buttressed by the Every Student Succeeds Act (ESSA) have made school principals responsible for school results. In so doing, then, principals are now postured as instructional leaders with respect to instructional technology directives. As mentioned previously, principals cannot act as mentors to teaching staff if they evaluate teachers as well, and in many districts, as is true in mine, technology usage is part of teacher evaluation. In addition, principals' expertise does not lie in understanding new developments in technology or implementing technology so it is not rational to make these administrators instructional leaders for educational technology. School principals are overworked; it is not rational to expect them to be subject matter experts, administrators and also specialists in classroom educational technology. Further, how can teachers be subject matter experts in their fields and know all the technology strategies necessary to teach students in 21st century classrooms. A point of contact must come forward take the responsibility assuring that educational technology will reach all students in the New Jersey public schools enabling them to meet the job requirements presented by a global high-tech economy.

Technology coordinators do have the responsibility of interfacing with outside vendors to provide device capacity in district. However, since these professionals are also compensated as school administrators and experts in their field, instructional duties could be included and expected from staff as illustrated in figure 9. Findings in this study indicated that some informal discourse occurs between coordinators and staff regarding instructional technology as well as a presence during inservice events.

Instructional intervention provided by technology coordinators must be as organized and focused as any educational undertaking. It must provide focus and, most important, instructional feedback and reinforcement.

Such leadership has not been examined among technology subject matter experts—technology coordinators--suggesting that they might "carry the ball" in fronting educational technology goals into the classroom. Going forward, subsequent to this initial examination, more research needs to be carried out examining New Jersey public school technology coordinators and their role in implementing these state and federal objectives and to address student needs for state of the art contemporary learning.

Policy Implications

One contribution from this study is its delineation of how NJ state education policy could have an effect on the delivery of educational technology in the public schools. The major issue is that there are no standards of performance articulated by state agencies with regards to technology coordinators, specifically, a requirement for educational certification.

There is a divide between education policy and practice. Policymakers can be out of touch with best classroom practice and often propose educational reforms that can fail schools, teachers, and students by not speaking to the primary purpose of public education which is student achievement.

Plaut & Sharkey (2003) clearly state:

> The decisions that a school makes regarding established policies and practices affect students enormously. Teachers' instructional decisions influence students' feelings about (and success with) the curriculum, but the policies and practices in both classrooms and in the entire school provide the context for teacher-student interactions around instruction. The policies and practices affecting students are those aspects of a school's operation that organize students' experiences within the institution.

In the case of New Jersey educational technology there is a lack of policy consistently impacting personnel regarding state teaching certifications, since school technology coordinators and other educational technology professionals are not required to hold standard certifications issued by the NJDOE, this being irrespective of the NJDOE statement:

> New Jersey certification is required for any professional staff member employed in New Jersey public schools or in any institution under the supervision of the New Jersey Department of Education.

Further, perpetuating this disconnect is the fact that NJ students are mandated by the NJ DOE to:

> Understand and use technology systems.
>
> Select and use applications effectively and productively.

Since NJ Technology professionals are not certified or accountable, they may take on a passive or routine approach to their teaching practice.

Some themes suggested by this completed study include:

- The necessity of state directives and the influence of this external policy making on the initial design of educational technology implementation and staffing patterns in public school districts.

-The problems associated with a lack of consistency in staffing and the eventual usage of educational technology in the classroom.

- The capacity of district technology coordinators to support levels of excellence in services above and beyond the minimum standards set by state policy.

Contributions the state could make from the learnings provided by this study should include how state policies should interact in conjunction with local district components to influence educational technology delivery for the better. Themes which impact this directive include:

- The power to have a positive influence on the design of core services and staffing patterns in districts.

- The problems associated with the present practice of district staffing--access to programs, and failing support of high levels of quality in district services.

- The capacity of local superintendents to promote levels of excellence above and beyond the minimum standards set in state policy for student achievement.

Uniform implementation of the principles for developmentally appropriate practice is needed for the effective use of educational technology in the classroom for all New Jersey districts especially those facing technology achievement gaps--consistent state policy can make that happen. Such technology practitioners must feel that they belong to a statewide community of professionals which stands behind a concrete, comprehensive image of effective educational technology practice as set by the state. This would also require clear markers set as state benchmarks which allow for quick assessment of the qualities of instructional strategies used to implement NJ DOE student standards.

Recommendations for Future Research

- A qualitative in-depth study to query why technology coordinators are not imparting educational technology requirements to classroom staff
- A qualitative study regarding upper level management's direction to these professionals with respect to job duties, satisfaction and educational leadership.
- A mixed methods study to determine how to select candidates who will carry out educational technology implementation in classrooms going forward and possibly affect a policy change in certifications for such individuals for New Jersey.

Instructional Recommendations

Brand (1997) suggests that a lack of teacher training prevents using technology with school curriculum. Harvey & Purnell (1995) indicate that not only training but practice is also necessary. They say that variability and alteration which include workshops, collaboration and group sessions should be scheduled. This implies that someone must take ownership, have focus and organize these meetings, and especially insure reinforcement and coaching. The literature says that the best way to align staff development with district/school goals is to employ someone with experience in both

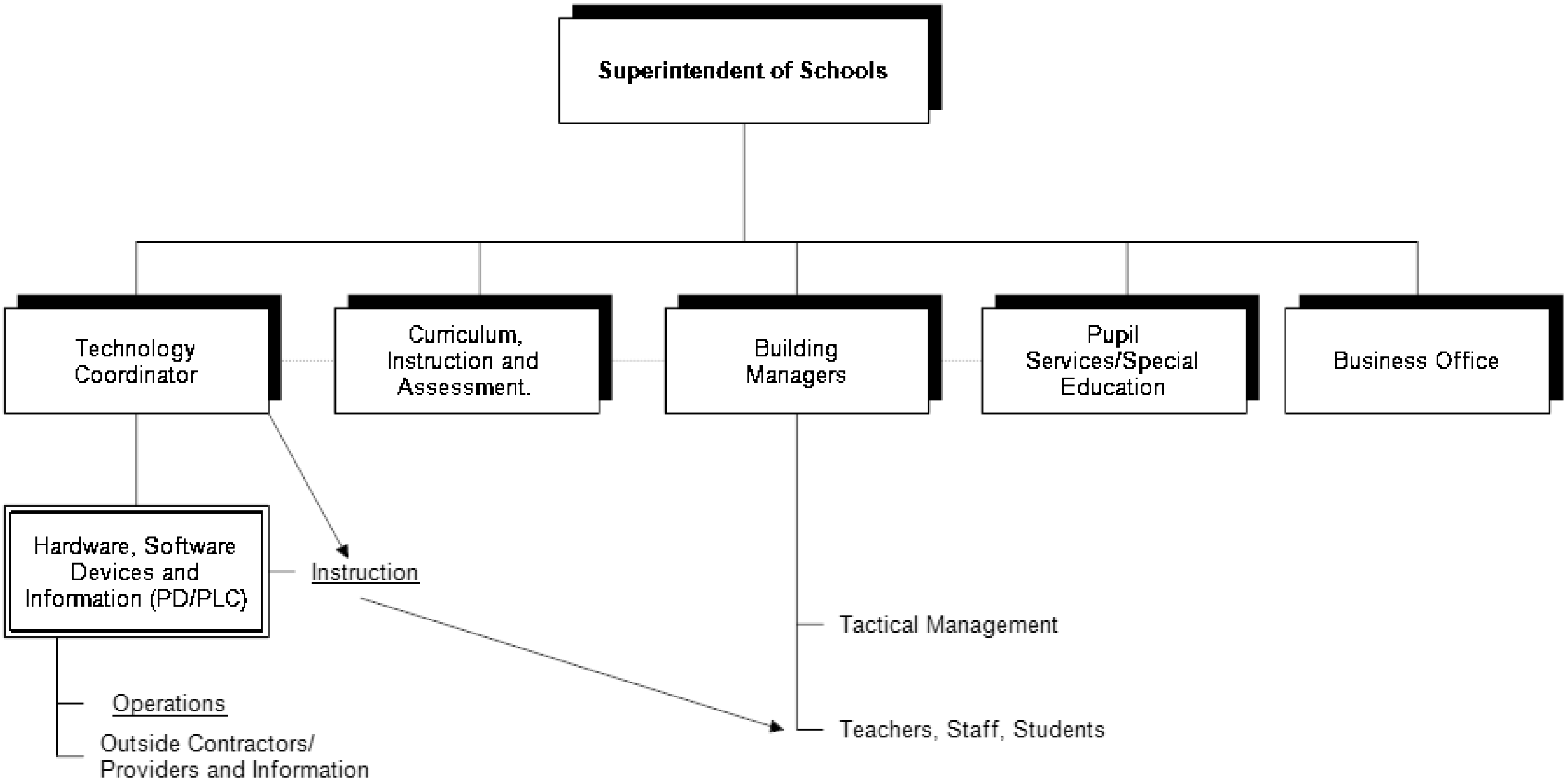

Figure 9. Technology Coordinator instructional duties.

(Kinnaman , 1990; Shelton and Jones, 1996; Guhlin, 1996; Stager, 1995; Pearson, 1994; Kinnaman , 1990; and Persky , 1990). It is also acknowledged that hesitant classroom staff need sensitive and responsive support (Pearson, 1994; Persky, 1990). Persky (1990) indicates peer coaching and modeling are best for transitioning workshop knowledge to classroom application and best practice. Browne & Ritchie (1991) acknowledge that peer coaching, in individual sessions, is the best way to address individual teacher technology needs. As in standard teaching practice in the classroom, modeling can be used provided a teacher gives the instruction and provides benchmarks for learning in keeping with best practice. Persky (1990) says that joint problem solving with learning also has to be a part of technology learning for teachers. Most important, coaching is successful in applying workshop learning to classroom work. Harvey & Purnell (1995) advance that in training teachers it should not be a given that all attending intensive workshops will have the ability to transfer flawlessly into their classrooms. Moursund (1992) cautions that such training fails if sustained support is not available pointing to the need for coaching, reinforcement and feedback. This means that one time high intensity workshops are not enough, constant support is key (Hawkins & MacMillan, 1993; Kinnaman, 1990; Shelton & Jones, 1996). Kinnaman (1990) says recognition is key in the process of teacher achievement and training must be sustained not sporadically limited to a few workshops.

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Appendix A

Technology Coordinator Instructional Leadership Self-Evaluation Google Form

Technology Coordinator Instructional Leadership Self-Evaluation

Self-assessment survey

Please complete the questions below, be sure to submit your answers when you have completed the survey.

As Technology Expert I define the school-wide technology goals.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

In order to frame our school technology goals I create needs assessments or other formal and informal methods to obtain staff input on goal development welcoming feedback.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

Appendix A (continued)

I am responsible in communicating the technology mission effectively to all members of the school community .

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

One of my primary duties is to ensure that the classroom priorities of teachers are consistent with defined technology goals and direction of technology usage within school .

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Appendix A (continued)

One of my major duties is to conduct informal observations in classrooms on a regular basis (informal observations are unscheduled, last at least 5 minutes, and may or may not involve written feedback or a formal conference).

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I routinely act to point out specific strengths/weaknesses in teacher educational technology practices.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

As technology coordinator I participate actively in the review of curricular materials in order to advance educational technology practices.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

One of my jobs is to encourage teachers to use instructional time for teaching and practicing new educational technology skills and concepts.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Appendix A (continued)

I plan and adopt strategies that guarantee ongoing professional development regarding educational technology for teaching staff.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I often take time to talk informally with teachers during breaks regarding instructional technology encouraging innovation and experimentation.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I make time to visit classrooms to aid in technology issues with teachers.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I am sure to reinforce superior educational technology performance by teachers in staff meetings, newsletters, or memos and other school communications.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Appendix A (continued)

I routinely set aside time to compliment teachers one on one regarding their use of educational technology.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I provide regular feedback to teaching staff on the effectiveness of their classroom educational technology.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I reward special efforts in technology by teachers with opportunities for professional recognition (such as presentations at professional development meetings).

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I create professional technology growth opportunities for teachers who excel in classroom technology use (such as sponsoring funding for Google Certification).

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Appendix A (continued)

I ensure that inservice activities attended by staff are consistent with the school technology goals.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I actively support classroom use of educational technology skills acquired during inservice training.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I obtain the participation of the whole staff in important technology inservice activities.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I lead or attend teacher inservice activities concerned with educational technology instruction.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Appendix A (continued)

I lead or attend teacher inservice activities concerned with educational technology instruction.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

I request time at faculty meetings for teachers to share ideas or information from technology inservice activities or ask clarification questions regarding technology use.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Appendix B

PIMRS Assessment of Instructional Management of Principals

To what extent does your principal . . . ?

	ALMOST NEVER				ALMOST ALWAYS
I. FRAME THE SCHOOL GOALS					
1. Develop a focused set of annual school-wide goals	1	2	3	4	5
2. Frame the school's goals in terms of staff responsibilities for meeting them	1	2	3	4	5
3. Use needs assessment or other formal and informal methods to secure staff input on goal development	1	2	3	4	5
4. Use data on student performance when developing the school's academic goals	1	2	3	4	5
5. Develop goals that are easily understood and used by teachers in the school	1	2	3	4	5
II. COMMUNICATE THE SCHOOL GOALS					
6. Communicate the school's mission effectively to members of the school community	1	2	3	4	5
7. Discuss the school's academic goals with teachers at faculty meetings	1	2	3	4	5
8. Refer to the school's academic goals when making curricular decisions with teachers	1	2	3	4	5

Appendix B (continued)

at faculty meetings

8. Refer to the school's academic goals when making curricular decisions with teachers	1	2	3	4	5
9. Ensure that the school's academic goals are reflected in highly visible displays in the school (e.g., posters or bulletin boards emphasizing academic progress)	1	2	3	4	5
10. Refer to the school's goals or mission in forums with students (e.g., in assemblies or discussions)	1	2	3	4	5

III. SUPERVISE & EVALUATE INSTRUCTION

11. Ensure that the classroom priorities of teachers are consistent with the goals and direction of the school	1	2	3	4	5
12. Review student work products when evaluating classroom instruction	1	2	3	4	5

	ALMOST NEVER				ALMOST ALWAYS
13. Conduct informal observations in classrooms on a regular basis (informal observations are unscheduled, last at least 5 minutes, and may or may not involve written feedback or a formal conference)	1	2	3	4	5
14. Point out specific strengths in teacher's instructional practices in post-observation feedback (e.g., in conferences or written evaluations)	1	2	3	4	5
15. Point out specific weaknesses in teacher instructional practices in post-observation feedback (e.g., in conferences or written evaluations)	1	2	3	4	5

IV. COORDINATE THE CURRICULUM

16. Make clear who is responsible for coordinating the curriculum across grade levels (e.g., the principal, vice principal, or teacher-leaders)	1	2	3	4	5
17. Draw upon the results of school-wide testing when making curricular decisions	1	2	3	4	5
18. Monitor the classroom curriculum to see that it covers the school's curricular objectives	1	2	3	4	5
19. Assess the overlap between the school's curricular objectives and the school's achievement tests	1	2	3	4	5

Appendix B (continued)

20. Participate actively in the review of curricular materials	1	2	3	4	5

V. MONITOR STUDENT PROGRESS

21. Meet individually with teachers to discuss student progress	1	2	3	4	5
22. Discuss academic performance results with the faculty to identify curricular strengths and weaknesses	1	2	3	4	5
23. Use tests and other performance measure to assess progress toward school goals	1	2	3	4	5

	ALMOST NEVER				ALMOST ALWAYS
24. Inform teachers of the school's performance results in written form (e.g., in a memo or newsletter)	1	2	3	4	5
25. Inform students of school's academic progress	1	2	3	4	5

VI. PROTECT INSTRUCTIONAL TIME

26. Limit interruptions of instructional time by public address announcements	1	2	3	4	5
27. Ensure that students are not called to the office during instructional time	1	2	3	4	5
28. Ensure that tardy and truant students suffer specific consequences for missing instructional time	1	2	3	4	5
29. Encourage teachers to use instructional time for teaching and practicing new skills and concepts	1	2	3	4	5
30. Limit the intrusion of extra- and co-curricular activities on instructional time	1	2	3	4	5

Appendix B (continued)

VII. MAINTAIN HIGH VISIBILITY

31. Take time to talk informally with students and teachers during recess and breaks	1	2	3	4	5
32. Visit classrooms to discuss school issues with teachers and students	1	2	3	4	5
33. Attend/participate in extra- and co-curricular activities	1	2	3	4	5
34. Cover classes for teachers until a late or substitute teacher arrives	1	2	3	4	5
35. Tutor students or provide direct instruction to classes	1	2	3	4	5

VIII. PROVIDE INCENTIVES FOR TEACHERS

36. Reinforce superior performance by teachers in staff meetings, newsletters, and/or memos	1	2	3	4	5
37. Compliment teachers privately for their efforts or performance	1	2	3	4	5

Appendix B (continued)

	ALMOST NEVER				ALMOST ALWAYS
38. Acknowledge teachers' exceptional performance by writing memos for their personnel files	1	2	3	4	5
39. Reward special efforts by teachers with opportunities for professional recognition	1	2	3	4	5
40. Create professional growth opportunities for teachers as a reward for special contributions to the school	1	2	3	4	5
IX. PROMOTE PROFESSIONAL DEVELOPMENT					
41. Ensure that inservice activities attended by staff are consistent with the school's goals	1	2	3	4	5
42. Actively support the use in the classroom of skills acquired during inservice training	1	2	3	4	5
43. Obtain the participation of the whole staff in important inservice activities	1	2	3	4	5
44. Lead or attend teacher inservice activities concerned with instruction	1	2	3	4	5
45. Set aside time at faculty meetings for teachers to share ideas or information from inservice activities	1	2	3	4	5

Appendix B (continued)

X. PROVIDE INCENTIVES FOR LEARNING

46. Recognize students who do superior work with formal rewards such as an honor roll or mention in the principal's newsletter	1	2	3	4	5
47. Use assemblies to honor students for academic accomplishments or for behavior or citizenship	1	2	3	4	5
48. Recognize superior student achievement or improvement by seeing in the office the students with their work	1	2	3	4	5
49. Contact parents to communicate improved or exemplary student performance or contributions	1	2	3	4	5
50. Support teachers actively in their recognition and/or reward of student contributions to and accomplishments in class	1	2	3	4	5

Appendix C

Permission for Copyrighted Material Use

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November 23, 2016

Paula McGraw

As copyright holder and publisher, you have my permission as publisher to use the *Principal Instructional Management Rating Scale* (*PIMRS*) in your research study. In using the scale, you may make unlimited copies of any of the three forms of the PIMRS.

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Sincerely,

Professor Philip Hallinger

Appendix D

Email Solicitation for Survey

The purpose of this study is to understand instructional leadership as employed by you, the School Technology Coordinators across the state of New Jersey. Your participation in the survey will help educational researchers better understand the role of School Technology Coordinators in our New Jersey public schools. It will take about 15 minutes of your time to complete the questionnaire. You are free to contact the investigator (Paula McGraw, a doctoral candidate at Rowan University at mcgrap3@rowan.edu) or by phone (908.604.4202) to discuss the survey.

Risks to participants are considered minimal. There will be no costs for participating, nor will you benefit from participating.

Identification numbers associated with email addresses will be kept during the data collection phase in order to track responses. A limited number of research team members will have access to the raw data during data collection. Any email addresses will be stripped from the final dataset used for dissertation presentation.

We have taken all reasonable measures to protect your identity and responses. The questions in this survey do not ask you to reveal any personally identifying information, the data are SSL encrypted and stored in a password protected database, and IP addresses are not collected. However, email and the internet are not 100% secure, so it is also suggested that you clear the computer's cache and browser history to protect your privacy after completing the survey.

Your participation in this survey is completely voluntary. You may decline to answer any question and you have the right to withdraw from participation at any time without penalty electronically by sending an email to mcgrawp3@rowan.edu..

If you have any questions please call Paula McGraw at 908-604-4202 or send an email to mcgrawp3@rowan.edu You may also request an electronic copy of overall anonymous survey results from the contact information above.To complete the survey, click on the link for the google form below: