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The Impact a Technology Leader and Their Leadership Style Makes in K-12 Classroom Teacher's Implementation of Technology

Molly S. Smith

THE IMPACT A TECHNOLOGY LEADER AND THEIR LEADERSHIP STYLE MAKES IN K-12 CLASSROOM TEACHER'S IMPLEMENTATION OF TECHNOLOGY

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Presented by:

Molly S. Smith

M.S. Ed. Instructional Technology, Duquesne University, 2002
B.S. Elementary and Special Education, Clarion University, 2000

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Approved by

_____, Chair
David D. Carbonara, Ed.D.
Director, Instructional Technology Program
Assistant Professor, Instructional Technology
Duquesne University

_____, Member
Joseph C. Kush, Ph.D.
Director, Doctoral Program in Instructional Technology
Associate Professor, Instructional Technology
Duquesne University

_____, Member
Connie M. Moss, Ed.D
Associate Professor, Department of Foundations and Leadership
Duquesne University

ABSTRACT

THE IMPACT A TECHNOLOGY LEADER AND THEIR LEADERSHIP STYLE MAKES IN K-12 CLASSROOM TEACHER'S IMPLEMENTATION OF TECHNOLOGY

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Dissertation Supervised by: Dr. David D. Carbonara

The purpose of the study was to examine how public school technology leaders' leadership styles in Pennsylvania schools impact K-12 classroom teachers' integration of technology. The study collected data using two online surveys, the MLQ and LoTi, which measured leadership styles and levels of technology integration. Despite the large sample size of 500 school districts, a low response rate of 5.6% resulted. While demographic data and descriptive statistics could be analyzed, it was not possible to run meaningful analytical statistics to show if correlations existed between technology leaders' leadership style sand classroom technology integration. A number of limitations were identified and insightful comments from participating classroom teachers and technology leaders provide future researchers with many points to consider.

ACKNOWLEDGEMENTS

I dedicate this to my children Alex, Adam, Aaron, and Anthony who have sometimes noticed my disappearances when I have been working on this paper. Being so young, I hope that they don't remember my absences. I do hope that they remember the graduation ceremony and set the bar high as I have always done.

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CHAPTER 1

INTRODUCTION

"Woe to the school leader unable to show patrons and visitors rooms full of machines A 'good' school has become, by definition, a technologically equipped one." (Cuban, 2001a, p. 159)

Without realizing it, many of our schools that meet the technologically equipped definition do so with the mere presence of technology. The façade that many schools portray is a sign that schools are lacking well equipped leaders who can facilitate change to integrate technology. "The Technology Façade presents a false sense of activity and substance with respect to the uses of technology in the school. Shiny computer labs, ill-prepared and overworked technology coordinators, and last minute budget re-adjustments run counter to a technology-based curriculum that deserves to be grounded in proven pedagogy, a viable support infrastructure, and sound fiscal propriety" (Tomei, n.d., p. 1). Technology may not be the answer to all problems faced in education, but the way in which it is used can revolutionize teaching and learning.

Background

The students we see in K-12 classrooms today were born into a digital world surrounded by technology devices and therefore, "access, absorb, interpret, process, and use information fundamentally differently than previous generations" (DeGennaro, 2008, p. 1). Our students have been inundated with technology and have become multi-taskers. They have learned to work and collaborate with others while working with many kinds of technology devices and programs. This has been done through self exploration and no formal instruction (DeGennaro, 2008). As students enter school with their technology

devices and knowledge, they are encountering curriculums and textbooks that were written and developed before technology came onto the scene. Students are being taught by teachers that have not necessarily experienced with the same technological learning environments as their students (Ben-David Kolikant, 2009).

The way students are constructing their knowledge through the use of technology is reflected in today's classrooms. This makes it necessary to step back and look at our current curriculums and consider the use of technological devices to make learning more effective (DeGennaro, 2008). Teachers who are from the book generation are familiar with linear and hierarchical thinking and perceive books as more reliable resources. This is a completely different school of thought. New generations do not think in the same linear fashion and routinely access information they need from a variety of resources at their fingertips. It is imperative that teachers recognize this change and adapt to meet the learning styles and needs of their students regardless of the initial sense of awkwardness that may impact the teacher who is accustomed to another way of learning and thinking (Ben-David Kolikant, 2009; Kozloski, 2006).

To help teachers make the needed changes in their teaching styles and curriculum, technology leaders have been placed within school districts. Technology leaders must be strong instructional leaders who are able to effectively demonstrate how technology will enhance their curriculum and help their students learn. "As leaders of learning, we need to know the big ideas on which each discipline is based, be able to recognize those big ideas when we see them being used in classrooms, know what questions to ask if we do not see them, and know where to find appropriate resources for ourselves and the teaching staff" (Rutherford, 2006, p. 2).

Statement of the Problem

As technology is placed at educators' fingertips, technology leaders are asked to perform a multitude of tasks to ensure the technology is consistently utilized. The roles these leaders play within their districts as leaders are crucial to how teachers will embrace and implement the technology within their classrooms. Presently, technology leaders within Pennsylvania's public school systems have varied job titles, different job descriptions, and face numerous barriers. This keeps them from helping teachers integrate technology into their classrooms and curriculums, which is essentially one of the most important aspects of having the technology in place.

Importance of the Study

This study examined the leadership styles of the technology leaders within Pennsylvania's public schools along with their knowledge of technology in relationship to how teachers within their districts integrate technology into their classrooms. This was accomplished through two online surveys. Despite all the differences that are seen in technology leader job roles, this researcher hoped to find a connection between leadership styles and its impact on technology integration. If this connection could be made, technology leaders may be able to cross more barriers within their own districts by adopting a different leadership style to better assist their teaching staff. While similar studies have been completed with school principals, no such study has been completed with technology leaders.

Delimitations

This study asked technology leaders to rate themselves as to what kind of leader they perceived themselves to be. The researcher asked for self perceived information

which could be skewed depending on how honestly participants answered questions and rated themselves. It is important to recognize that some districts had more than one technology leader. While this is addressed in the initial email that was sent out to technology leaders, it is possible that the leader who deals with teacher training or instructional support may not have been the leader who took the surveys. Lastly, technology leaders were asked to select ten K-12 classroom teachers within their district to possibly participate in this study. Technology leaders may have selected teachers who they may know better which may have lead to a more accurate picture of the leadership style of the individual. This may not have presented an accurate picture of how staff perceptions may have been district wide.

Research Purpose and Hypotheses

Purpose Statement

The overall purpose of this research was to examine Pennsylvania's public school technology leaders' leadership styles in relationship to how teachers are implementing technology within their classrooms.

Research Question One: Is there a difference in the leadership styles of technology leaders identified by the Multifactor Leadership Questionnaire (MLQ) in comparison with K-12 classroom teacher technology integration scores identified by the Level of Technology Implementation Questionnaire (LoTi)?

> *Hypotheses One:* Technology leaders with a transformational leadership score on the MLQ have a significant impact on K-12 classroom teachers within their district scores on the LoTi.

Hypotheses Two: Technology leaders with transactional or passive/avoidant scores on the MLQ do not significantly impact K-12 classroom teacher's LoTi scores.

Hypotheses Three: Technology leaders with a high inspirational motivation (IM) score on the MLQ [i.e. vision] have teachers within their district with a significantly higher LoTi Level and current instructional practices (CIP) scores.

Research Question Two: Do technology leaders who face "barriers" identified by the literature (Hofer, Chamberlin, & Scot, 2004; Lai, Trewern, & Pratt, 2002; Snelbecker & Miller, 2003; So, 2002; Strudler, Falba, & Hearrington, 2001; Wagner, 2004) have teachers within their districts with significantly lower LoTi scores in comparison to leaders who may not face the same barriers?

Hypotheses One: The academic degree possessed by technology leaders has no significant difference on K-12 classroom teacher's LoTi scores.

Hypotheses Two: The number of years a technology leader has been with their district does not significantly affect teacher's LoTi scores.

Hypotheses Three: technology leaders who are able to provide instructional support and training have teachers whom have higher LoTi scores.

Hypotheses Four: Districts that have a higher number of technology support staff members have teachers with higher LoTi scores.

Hypotheses Five: Districts that have sufficient to abundant technology budgets have teachers with higher LoTi scores.

Hypotheses Six: Technology leaders with the time to attend and participate in professional development opportunities have teachers with higher LoTi scores.

Hypotheses Seven: Technology leaders who have had increased responsibility since the time they were hired have teachers with lower LoTi scores.

Hypotheses Eight: Technology leaders who receive support from their district superintendent and/or building principals have teachers with higher LoTi scores.

Research Question Three: Is there a difference in LoTi scores among classroom teachers in identified Blue Ribbon School Districts within Pennsylvania in comparison with non Blue Ribbon School Districts?

Hypotheses One: Exemplary schools identified by the state of Pennsylvania as Blue Ribbon Schools have teachers with higher LoTi scores.

Definition of terms

Authentic learning experience: real to life experiences created within the classroom to allow students to solve and interact in situations that may be encountered in their own lives

Barriers (First and Second Order): Becta and Ertmer (as cited in Brinkerhoff, 2006) define barriers as any factor preventing or restricting teachers use of technology in the classroom" (p.2). First order barriers deal with extrinsic obstacles such as lack of training and second order barriers deal with intrinsic obstacles such as teachers unwillingness to change (Ertmer, 1999).

Blogs: a web page that acts as a journal where someone can post thoughts or information to for others to view

Change agent: a person who works as a catalyst to make changes in any given environment

Constructivist approach: a teaching approach where teachers allow students to construct their own knowledge and understanding

Correlates: a connection or relationship

Digital storytelling: a form of storytelling using text, pictures, audio etc. to convey a message to an audience using available technologies and software

Enablers: factors that help teachers integrate technology. Enablers are things such as access to computers, quality software, planning time, etc. that give teachers opportunities to use technology (Ertmer, Ottenbreit-Leftwich, & York, 2006-07).

Extrinsic barriers: barriers that are "outside" the limits of ones control such as number of computers one has access to, amount of training received, etc.

Instructional support: support that addresses technology integration to classroom curriculums

Intrinsic barriers: barriers that lie within oneself such as beliefs and attitudes towards technology

International Society for Technology Education (ISTE) standards: developed to act as a guide to what 21st century students should know about technology

Mindtools: Computer based tools and learning environments are referred to as "mindtools" by David Jonassen (2006) and are the key to his theory of conceptual change. With mindtools students are given the opportunity to construct a model of what they know using technology tools.

Multimedia projects: projects that could include text, audio, digital graphics, video, etc. with the aid of technology tools

NETS: In National Educational Technology Standards is referred to as (NETS) published by ISTE in 1998

Ongoing support: instructional and technical support provided on an ongoing basis

Pedagogical support: support provided to teachers on how technology fits into teaching methods and instructional practices effectively

Pedagogy: instructional methods used by teachers

Podcast: an audio or video broadcast that is converted into an mp3 format and can be viewed on mp3 players or on computers

Productivity paradox: Despite computers being present in the classroom, in many cases there use is not improving student learning to warrant the cost or use of them in the classroom.

Stakeholders: people who have an investment in our children's education such as parents, teachers, community members etc.

Synchronous chat: a real-time chat that takes between two or more people where one person can type a message and send it instantly for others to see and to reply to

Technology façade: the appearance that technology is prominent and being used when it is not being used to its full potential

Technical support: support that addresses hardware and software issues

TPACK (PCK – TPCK – PTCK): Pedagogical technological content knowledge (PTCK) Since its introduction the acronym PTCK has transformed into TPCK and now into TPACK (AACTE Committee, 2008; Koehler & Mishra, n.d.). It is the teacher's understanding of the relationship between technical knowledge, pedagogical knowledge, and content knowledge that sound technology integration takes place within the classroom (Koehler & Mishra, n.d.).

Transformational leader: leadership style known to involve charismatic and visionary leadership styles to "transform" their followers (Northouse, 2004)

CHAPTER II

LITERATURE REVIEW

Technology Training

Teachers not using technology effectively results from the lack of instructional support they receive from technology leaders in both curriculum development and in professional development (Brinkerhoff, 2006; Hofer, Chamberlain, & Scot, 2004; Li, 2007; Mishra & Koehler, 2006; Ringstaff & Kelley, 2002; Wagner, 2004). According to Jazzar & Friedman, "educational leaders' roles as instructional leaders have gained importance, while their managerial role has diminished" (2007, p. 1). Technology leaders need to provide quality training and professional development opportunities to allow teachers to comfortably integrate technology within their own content areas and grade levels. Training must be practical and not simply a how-to session (Brinkerhoff, 2006; Cuban, Kirkpatrick, & Peck, 2001; Glazer, Hannafin, & Song, 2005; Salpeter & Bray, 2003). "It is important that teachers gain technical skills as well as pedagogical knowledge of effective instructional practices that incorporate meaningful uses of technology" (Ertmer, 1999, p. 2). In the 2000 CEO Forum report on assessment of technology training, Swain and Pearson (2002) points out, "To achieve sustained technology use, teachers need hands-on learning, time to experiment, easy access to equipment, and ready access to support personnel who can help them understand how to use technology well in their teaching practices" (Teacher Training Section, p. 4). It is with the support of technology leaders providing quality professional development sessions that teachers will be able to more effectively implement technology to enhance learning for students. Leslie Conery (as cited in Stephenson, 2004), deputy CEO of

ISTE, states, ". . . the question is no longer whether students will use technology, but whether educators want to have any impact on how students use it" (p. 27).

Ongoing Technology Support

Technology training should be shifting to answering these questions, "How do you use technology to improve student achievement? What does it look like to teach a standards-based lesson infused with technology?" (Salpeter & Bray, 2003, p. 2) If teachers can visualize the impact technology can have on their teaching and students' learning, they may be more apt to integrate the technology with less resistance to change. They may buy-in to the new way of teaching with technology if they could appreciate the impact on student learning (Salpeter & Bray, 2003). With the need to integrate standards within curriculum content due to No Child Left Behind, a great deal of pressure is being placed on the classroom teacher. In fact all money distributed for professional development through No Child Left Behind comes with the stipulation that the money cannot be used for short-term learning but must be on-going (Salpeter & Bray, 2003). Along with on-going support from technology leaders, it is imperative that on-site support is present to help if something does go unexpectedly awry. In fact it is essential that teachers receive this support. "Training and professional development are the keys to successful technology into the schools. On-going support is critical to the success of incorporating technology innovations into educational practice" (Wagner, 2004, Chapter II p. 45). On-going support is cited in the literature as being one of the main components for helping teachers overcome the barriers they face in the classroom regarding technology integration (Glazer, Hannafin, & Song, 2005; Mayo, Jazzar & Friedman,

2007; Kajs, Tanguma, 2005; Salpeter & Bray, 2003; Sherry & Gibson, 2002; Snelbecker & Miller, 2003; Swain & Pearson, 2002; Wagner, 2004; Wells, 2007).

Funding for professional development is a contributing barrier to technology integration. Expenditures reported in two Market Data retrieval surveys found that between 1999 and 2000 spending for professional development only increased 3%, 14% to 17%, with the rest of the money being allocated to hardware and software (Sherry & Gibson, 2002). Hofer, Chamberlain, & Scot (2004) support the fact that most money within the technology budget goes towards hardware and software, "Therefore, computers remain on the periphery of the classroom experience – not used to their full potential and offering little impact on learning" (p. 2). This should not be too alarming given the fact that most technology leaders do not have a great deal of time to spend on instructional support (Brinkerhoff, 2006; Hofer, Chamberlain, & Scot, 2004; Li, 2007; Wagner, 2004). Strudler (1995-96) found that, "without the implementation support that the coordinators provide[;] it is unlikely that technology will fulfill its potential to impact teaching and learning in school programs in the coming years" (p.16). In Strudler's (1995-96) study, three technology coordinators attempt to work themselves out of a job in three elementary schools by teaching teachers enough that their presence would no longer be needed. It was determined that due to the rapid changes in technology and the need for leadership, technology leaders remain an integral part of technology integration and their job roles could not be eliminated (Strudler, 2995-96; Wagenr, 2004).

Pedagogical Support

Integrating technology into instruction is a daunting task for most teachers. Cradwell (as cited in Kozlaoski, 2006) states, "For educators, technology signifies change and change

is disruptive. . . . Even when change is welcomed, it is anxiety provoking and it creates conditions of uncertainty" (p. 4). It is not easy to change teaching practices and beliefs that many teachers have been accustomed to for years before the infusion of educational technologies (Levin & Wadmany, 2006-07). Teachers rely on technology leaders and expect them to offer and provide support. "Teachers need both technical and pedagogical support to effectively use technology. This pedagogical support is typically offered by existing technology coordinators" (Hofer, Chamberlin, & Scot, 2004, p. 2). If teachers are expected to integrate technology successfully they must be provided with the ongoing support that technology leaders offer (Wagner, 2004).

Barriers K-12 Teachers Face

Why are teachers struggling to integrate technology into the classroom? Teachers face many barriers, highlighted in Table 1, when it comes to integrating technology into their curriculum and classrooms; all of which are cited heavily in many research studies.

Becta and Ertmer (as cited in Brinkerhoff, 2006) point out the following:

> There is a general agreement among leaders in the field of educational technology that, due to a variety of barriers, teachers often fail to capitalize on the educational potential offered by technology resources. Barriers are defined as any factor preventing or restricting teachers use of technology in the classroom (p. 2).

Table 1

Barriers Faced By Classroom Teachers

Barriers	As Cited in
lack of technical support	Brinkerhoff, 2006; Hofer, Chamberlain, & Scot, 2004; Li, 2007; Lim & Khine, 2006; Mehlinger & Powers, 2002; Moses, 2006; Sandholz & Reilly, 2004
lack of instructional support	Brinkerhoff, 2006; Hofer, Chamberlain, & Scot, 2004; Jazzar & Friedman, 2007; Li, 2007; Mishra & Koehler, 2006; Ringstaff & Kelley, 2002; Wagner, 2004
lack of planning time	Brinkerhoff, 2006; Lai, Trewern, & Pratt, 2002; Mishra & Koehler, 2006; Mehlinger & Powers, 2002; Ringstaff & Kelley, 2002; Sherry & Gibson, 2002; Strudler, 1995-96; Strudler, Falba, & Hearrington, 2001;
cultural and social beliefs	Hew, 2007; Lai, Trewern, & Pratt, 2002; Levin & Wadmany, 2006-07; Lim & Khine, 2006; Moses, 2006; Strudler, 1995-96
school organizational structures	Cullen, Brush, Frey, Hinshaw, & Warren, 2006; Lai, Trewern, & Pratt, 2002
inadequate resources and/or access to technology	Brinkerhoff, 2006; Forgasz, 2006; Franklin, 2007; Hew, 2007; Jazzar & Friedman, 2007; Li, 2007; Lim & Khine, 2006; Mehlinger & Powers, 2002; Roblyer, 2000; Strudler, 1995-96; Strudler, Falba, & Hearrington, 2001; Whitney, 2000
training	Brinkerhoff, 2006; Forgasz, 2006; Franklin, 2007; Lim & Khine, 2006; Mehlinger & Powers, 2002; Moses, 2006; Roblyer, 2000; Sandholz & Reilly, 2004; Strudler, 1995-96; Strudler, Falba, & Hearrington, 2001; Wagner, 2004; Whitney, 2000

(Table 1 continues)

(Table 1 continued)

Barriers	As Cited in
the rapid changes in technology	Strudler, 1995-96
lack of time to evaluate software	Cuban, Kirkpatrick, & Peck, 2001; Franklin, 2007; Moses, 2006
resistance to change	Levin & Wadmany, 2006-07; Lim & Khine, 2006; Whitney, 2000
teacher attitudes towards technology	Cullen, Brush, Frey, Hinshaw, & Warren, 2006; Levin & Wadmany, 2006-07; Whitney, 2000
fear and anxiety	Mayo, Kajs, & Tanguma, 2005; Mishra & Koehler, 2006; Rovai & Childress, 2003
low confidence in abilities	Mayo, Kajs, & Tanguma, 2005; Rovai & Childress, 2003
lack of leadership	Franklin, 2007
lack of incentives	Mehlinger & Powers, 2002
lack of vision	Li, 2007; Lim & Khine, 2006; Mehlinger & Powers, 2002
too much curriculum to cover	Franklin, 2007
standardized testing	Jazzar & Friedman, 2007
lack of pre-service training within education programs	Franklin, 2007; Ringstaff & Kelley, 2002

Ertmer (1999) points out that the literature suggests while teachers may not face all of these barriers, it only takes one to disrupt technology implementation in the classroom. If teachers become more aware of the barriers and the challenges they face, it will be more likely that they can overcome these barriers (Ertmer, 1999).

Cuban (2001a) agrees that barriers exist, and he finds many of these barriers to be no more than assumptions and excuses that are not firmly supported. Some barriers that Cuban (2001a) would consider assumptions include, "lack of training, insufficient time to learn, too many older teachers, technophobia, etc" (p. 1). Cuban (2001b) believes that for teachers to make changes in the way they teach and how they integrate technology steps need to be taken to hire more technical support that would be on-site, establish state and federal standards for hardware and software vendors making them do research on their products effectiveness, create opportunities for peer teaching, reduce class sizes, and decrease teaching workloads. Sherry and Gibson (2002) support Cuban's (2001) view and also cite others who agree that the barriers to technology integration are due to a combination of issues not just lack of access and individual perceptions. Strudler (1995-96) interviews a building principal which comments that teachers will find time to incorporate anything if it is made priority.

Even with Strudler's (1995-96) study being done, the following still remains true 12 years later:

> we are still in an awkward transition period in which the benefits of teaching and learning with technology do not necessarily outweigh the costs. While teachers are increasingly citing the benefits that students derive from computer use, they must weigh the costs in terms of their time

> . . . Meanwhile, the support provided by an effective coordinator serves to 'tip the scales' for teachers weighing the costs and benefits of technology use. (Discussion and Implications Section, p. 13)

Categories of Barriers

With so many barriers, many authors have attempted to create categories. Hew (2007) found 123 barriers in his investigations and created six categories, which include resources, knowledge and skills, institution, attitudes and beliefs, conducting professional development, and reconsidering assessments. Brinkerhoff (2006) breaks barriers into four categories including resources, institutional and administrative support, training and experience, and attitudinal or personality factors. Lastly, Ertmer (1999) created two levels of barriers being first order barriers which include extrinsic obstacles such as lack of training and second order barriers which include intrinsic factors such as teachers unwillingness to change. While technology training in the past has focused on addressing first order barriers which look at obtaining skills to operate a computer, today training focuses more on second order barriers that are more difficult to overcome. Training requires a focus on pedagogical models and how teachers need to integrate technology into the classroom (Ertmer, 1999).

Enablers

Barriers hold teachers back from using technology; however, enablers are factors that help teachers integrate technology. Ertmer, Ottenbreit-Leftwich, and York (2006-07) have been an integral part of defining the opposing force to barriers known as enablers. Enablers are supports such as access to computers, quality software, planning time, etc. that give teachers opportunities to use technology. Barriers and enablers are inversely

related. Technically if enablers increase, barriers should decrease for a teacher. Enablers, like barriers, are also defined as intrinsic or extrinsic. Extrinsic enablers would be items such as hardware, software, and access. Intrinsic would be attitudes like personal beliefs and confidence. A study done by Ertmer, Ottenbreit-Leftwich, and York (2006-07), found that intrinsic factors were more likely to affect the teacher's ability to use technology than extrinsic factors.

Despite these barriers or lack of enablers, teachers are responsible for meeting the standards in the most effective way they can, and technology leaders must help them overcome these challenges while hurdling their own barriers. With the No Child Left Behind Act, high expectations are being set which includes a "learning return on all technology investments" along with "smart, integrated uses of technology" (SETDA, 2005, p. 1). As Sandholz and Reilly (2004) state, "To help teachers become more productive in their use of technology, we need to help them focus more on instruction and learning, and less on bits, bytes, and backups" (p. 510). The pressure on classroom teachers to integrate technology effectively will be high. It will be the role of the technology leader to help teachers integrate technology into all classroom curriculums showing the need for a strong understanding in technology and pedagogy.

Effective Technology Integration

Technology is not being used to its full potential, rather as word processors or electric blackboards. Even though computers are available to teachers, it does not necessitate that computers are being used effectively to meet existing goals and standards (Wagner, 2004). Teachers must integrate the technology within their curriculums to support learning. Dockstader (as cited in Ausband, 2006) states, "True integration comes

when students learn through computers, not about" (p. 15). Teachers must change the way they teach by making technology a partner in the learning processes vs. the technology as a teacher. Jonassen, Howland, Moore, and Marra (2003) support the fact that, "Students do not learn from technology, they learn from thinking. Technologies can engage and support thinking when students learn with technology" (Chapter 1, p. 11).

With large amounts of money being spent on technology, there should be evidence to support that students are benefiting from this investment (E-Rate Central, 2007; Tomei, 2002). Ertmer (2005) points out that even though it appears that teachers are equipped to integrate technology; high levels of technology use are still not seen in the classroom. When high levels of technology are seen, it is being done by a minority of teachers.

What constitutes high levels of technology use? The Level of Technology Implementation Questionnaire (LoTi) instrument measures levels of technology use using a six point scale ranging from nonuse to refinement (Moersch, 2001). At level 1, awareness, teachers use technology for classroom or classroom management tools such as email, grade books, lesson plans, and PowerPoint presentations. At level 2, exploration, technology is used as extension activities or enrichment activities. Learning is more at a knowledge/comprehension level for students. Level 3, infusion, teachers develop multimedia projects and students use thinking skills, problem solving skills, decision making skills, reflection, and scientific inquiry using tools such as databases, spreadsheets, graphs, and PowerPoint. Level 4, integration, is broken into two categories, mechanical and routine. At the mechanical level, teachers use technology tools to provide understanding of classroom concepts. The teachers rely heavily on pre-packaged

and outside resources. At the routine level, teachers design and implement authentic learning experiences with little to no outside resources. Level 5, expansion, teachers access networks beyond their classroom walls by connecting with other schools, businesses, government, and research institutes. Lastly, Level 6, refinement, shifts to a solely learner based environment where students are given a real world problem to solve and the technology tools to complete the task (Moersch, 2001). A large group of classroom teachers were surveyed using the LoTi instrument by Moersch (2001). In 1999-2000, 24, 598 classroom teachers were surveyed and in the 2000-2001 school year, 16, 723 classroom teachers were surveyed. Results showed that 69% of teachers were using technology at a Level 1 and 2. Only 14% were using technology at a Level 4A and above. With the use of the LoTi, classroom technology use can be measured and provide districts with comprehensive information about how technology is being used in the classroom. More information on technology use is being demanded to provide accountability for the time and funds being spent on technology. Stakeholders want to, " know about classroom results such as the effect technology is having on student academic achievement and how technology funding for professional development has changed teaching practices" (Moersch, 2001, p. 23).

Cuban (2001a) claims that computers have been oversold and underused in the educational realm. Cuban, Kirkpatrick, and Peck (2001) did a study in two Silicon Valley High Schools. They spent seven months examining whether these schools were transforming education with their technology integration. Of the 21 teachers interviewed, only 13 said technology changed the way they taught. Of these 13 teachers, only 4 said they modified their classroom in significant ways and in essence became more of a coach

vs. lecturer. The questions Cuban, Kirkpatrick, and Peck (2001) pose include, "With outstanding access to computers, why do most teachers use the technology in classrooms infrequently and in limited ways? Why do the teachers who do use computers for instruction typically use the technology to sustain common teaching practices?" (p. 825) Pflaum (as cited in Wagner, 2004) supports Cuban's (2001a) theory of computers being underused, and the idea of that instead of technology enhancing instruction, teachers are trying to integrate technology while using their same outdated teaching practices rather than using that technology to enhance instruction. Sandholz and Reilly (2004) also found that despite the push for incorporating technology, there has been an insignificant influence on what has transpired in the classroom. Despite the idea that technology has the potential to enhance teaching and learning, we are still not seeing it embraced. This lack of embrace could be due to the lack of technical and pedagogical support.

Sandholz and Reilly (2004) state that:

> Technology offers richer, more varied, and more engaging learning opportunities for students, but these practices tend to be the exception rather than the norm. Simply increasing the number of computers available for instructional use is not likely to lead to significant changes in instructional methods. (p. 487)

Cuban (as cited by Ertmer, 2005) believes that it is not a problem with access to technology rather, "a struggle over core values" (para. 10). Peslak (2005) found the expenditures on technology significantly increased from 1991-1992 to 2003-2004 by a difference of 4 billion dollars. The assumption was that the more money being spent on technology the better the educational outcome and test scores. In Peslak's (2005) study

of 2,500 schools there was no correlations between the access or variety of technology in classrooms and schools to standardized testing scores in Pennsylvania "There appears to be a productivity paradox in education" (p. 111). It is imperative that school districts overcome this productivity paradox to ensure that money being spent on technology for our childrens' educations is being used effectively and efficiently.

Technology Leader Roles

School Districts hire technology leaders to run technology operations; however, many leaders do not have educational backgrounds or they face barriers that would keep them from helping teachers integrate the technology available to them. (Lai, Trewern, & Pratt, 2002; Snelbecker & Miller, 2003; So, 2002; Wagner, 2004). Technology leaders are the key to success in technology integration today! (Gopalakrishnan, 2006; Sugar & Holloman, 2009). This role of "technology leader" did not always exist within school districts. Before computers and technology emerged in the education realm, there was simply no need for someone to coordinate their use. With the evolution of computers in the K-12 classroom in the 1980's, the role of instructional coordinators emerged on the scene (Strudler, Falba, & Hearrington, 2001). It was not until 1986 that the role of a technology coordinator was being viewed as an important and separate role (Wagner, 2004). Even with literature showing those teachers, who receive quality technical and instructional support, use technology more and in more ways, the staffing of full time technology coordinators was not happening. In 2000, Strudler, Falba, and Hearrington (2001), found that 87% of districts had technology coordinators; however, only 19% were considered to be full time with high schools receiving most of the technical support.

Wagner (2004) quotes one technology coordinator, who was a participant in his 2004 study:

> I think that as districts move ahead, they're going to find that full-time tech. coordinators are going to be vital to the operation, just the basic operation of the district. I think they're going to find that they just can't do without. It's going to be like having a building principal. (Chapter IV, p. 17)

Role Defined

With this being a relatively new position in education, the role of technology leaders remains diverse and poorly defined (So, 2002; Wagner, 2004). The CoSN K-12 Council (2005) identifies nine essential skills for a school's chief technology officer. These skills include leadership and vision, planning and budgeting, team building and staffing, systems management, information management, business leadership, education and training, ethics and policies, and communication systems (2005). The literature supports the fact that the role of a technology coordinator is not an easy job for any one person to fill; "The Technology Coordinator position requires a person with a unique blend of skills and abilities that enables the person to work with both equipment and people" (Lesisko, 2005, p. 14-15).

The CoSN K-12 CTO Council (2004) created the following want ad to demonstrate the great deal of skill one person needs to fill the shoes of a technology leader position,

> Wanted: Chief technology officer for a medium-sized school district. Advanced degree and background in education, finance, business and

> technology required. Must have strong organizational and interpersonal skills and be an expert on strategic planning, budgeting, IT staffing, computer networking, data management, security issues and standards, computer operating systems, hardware maintenance and repair, and all aspects of running an IT business. Must require no more than two hours of sleep per night. (p. 1)

Other skills coordinators are expected to have include but are not limited to, assembling and installing equipment, maintaining equipment, managing computer lab activities, preventive maintenance, policy making, curriculum integration, staff development, writing grants, researching new technologies, keeping an inventory of hardware and software, managing budgets, providing on-going support on a technical and instructional level, participating on technology committees, and possessing leadership qualities (Ausband, 2006; Davidson, 2003; So, 2002; Tomei, 2002; Wagner, 2004). So (2002) even concludes that the technology coordinators within schools are as "almighty as 'Superman'" (Abstract p. 75). Essentially the technology leader within the school environment, "performs several tasks. . . and plays multiple roles that influence teaching and learning each day" (Sugar and Holloman, 2009, p. 66).

Categories of Technology Leadership Roles

Many articles suggest the need to split the many roles technology leaders have into categories to allow for specialists in each role to be hired and carry out responsibilities that districts expect one person to fulfill. While splitting the role into technical and instructional categories is most prevalent in the literature (Beattie, 2000; Hofer, Chamberlain, & Scot, 2004; Lai, 2002; Lesisko, 2005; Snelbecker & Miller, 2003;

Wagner, 2004). Marcovitz and Reilly (as cited in So, 2002) both suggest splitting the role into an administrative role, technical role, and instructional role.

Even if districts are lucky enough to find an individual who is skilled in both technical and instructional support, most are seeking a higher salary that districts cannot offer (So, 2002). School districts and taxpayers must be willing to recognize the importance of technology leaders and their need within the school system to ensure money spent on technology is not wasted (Lai, Trewern, & Pratt, 2002; Snelbecker & Miller, 2003; Strudler, 1995-96; Wagner, 2004). Districts must also commit to technology budgets and take long-term ownership in technology making solid commitments to purchases as well as technical and instructional support (Beattie, 2000). In districts with monetary constraints it is often the case that technology leaders are forced to fight for their jobs (Wagner, 2004). Many districts do have technology leaders that overlook technical operations; although many do not have technology leaders who focus on technology integration. It is important that we recognize the need for this type of support for teachers and student achievement (Glazer, Hannafin, & Song, 2005; Hofer, Chamberlin, & Scot, 2004; Lesisko, 2005; Sandholz & Reilly, 2004; Snelbecker & Miller, 2003; Strudler, 1995-96; Strudler, Falba, & Hearrington, 2001; Wagner, 2004).

Job Titles of Technology Leaders

The job titles of a technology coordinator are as diverse as the job roles described above. Lesisko (2005) conducted a study in Eastern Pennsylvania which focused on who the technology coordinators were in the districts found within this region. Lesisko (2005) found that of the 87 technology coordinators in these districts, there were 45 different job titles. Specifically the literature has identified the following titles: chief technology

officer, microcomputer coordinator, technology facilitator, technology coordinator, computer coordinator, instructional technology coordinator, computing coordinator, technology resource teacher/contact, network administrator, technology coordinator specialist, director of technology, educational computer coordinator, coordinator of computer services, director of information systems, director of instructional technology and library media, technology integration specialist, technology support specialist, technology mentor teachers, curriculum technology partners, educational technologists, coaches, expert trainers, technology support coordinators, and site-based technology facilitators (CoSN K-12 CTO Council, 2006; Hofer, Chamberlain, & Scot, 2004; Wagner, 2004) For the purpose of consistency the term technology leader will be used from this point on to encompass the many titles and roles that exist within this field.

Barriers Technology Leaders Face

Along with juggling the many roles expected of them, many barriers exist that prevent technology leaders from focusing solely on helping teachers integrate technology into the curriculum and classroom. These barriers include but are not limited to more time being spent on technical issues vs. instructional issues (Snelbecker & Miller, 2003; Strudler, Falba, & Hearrington, 2001), feelings of isolation and jealousy (So, 2002; Wagner, 2004), limited budgets (So, 2002; Wagner, 2004), keeping up with the changes and advancements in technology (So, 2002), workload issues (Lai, Trewern, & Pratt, 2002; Wagner, 2004), and increases in responsibilities as technology becomes more prevalent (Hofer, Chamberlin, & Scot, 2004). Wagner (2004) conducted a study to identify what makes technology coordinators successful. He found that 95% of technology leaders felt their main responsibility is to facilitate the integration of

technology into the schools they support. Solving technical issues distracts technology leaders from focusing on the bigger picture and from helping teachers focus on curriculum integration. Many technology leaders accept the fact that solving technical issues is a part of their job and must be completed for curriculum integration to occur (Wagner, 2004). Despite the fact that technology leaders feel this is their most important role, other studies support the fact that the majority of the technology leader's time is spent troubleshooting technical issues (Dexter, Anderson, & Ronnkvist, 2002; Hofer, Chamberlin, & Scot, 2004; Lai, Trewern, & Pratt, 2002; Snelbecker & Miller, 2003; So, 2002; Strudler, Falba, & Hearrington, 2001; Wagner, 2004). As schools obtain more and more technology, the responsibility of maintaining this technology also increases.

Hofer, Chamberlin, and Scot (2004) point out:

> The technology coordinator can easily get caught up in the hardware part of his or her job, rather than showing teachers how to use the equipment and how to incorporate it into their instruction. These diverse responsibilities make it difficult, if not impossible, for the technology coordinators to offer direct instruction to teachers and staff. (p. 2)

Despite the expectation that has been placed on technology leaders, districts should recognize the need to hire technical staff to focus on the nuts and bolts and a separate technology leader that can focus on curriculum integration as well as support and training of the teachers.

Quality Technology Support

In spite of the different roles technology leaders play, they must still provide quality technology support. Dexter, Anderson, and Ronnkvist (2002) conducted a study

looking at the quality of technology support and its effect on technology use in the classroom. The 1999 CEO Forum, a group of business men and school leaders, created a guide for defining quality technical support. These surveys were given to 1,215 principals, teachers, and technology leaders who were randomly sampled nationwide. The study concluded that teachers who had higher quality technology support did use technology more within the classroom and on a personal level. It also concluded that the frequency, variety, and progressive use of technology occurred more with teachers who received quality technical support.

Dexter, Anderson, and Ronnkvist (2002) state that:

> When technology support is designed with the instructional needs of teachers in mind . . . the effects on teachers' uses are pronounced. Quality technology support is associated with teachers' increased uses of technology, correlating with greater frequency and variety of use as well as increased use over time. (p. 12)

Pedagogy and PTCK

Technology leaders are responsible for more than just technology itself just as teachers are responsible for more than just pedagogy (AACTE Committee 2008; Mishra & Koehler, 2006). To better equip teachers to face the challenges of a 21st century classroom we must look at the concept of pedagogical content knowledge (PCK) and how it has evolved into technological pedagogical content knowledge (TPACK) to fit the needs of our technologically advanced classrooms. PCK was developed by Shulman (as cited in Mishra & Koehler, 2006) in 1987 and exists at the point in which content knowledge and pedagogy intersect. Teachers must be grounded in both domains to successfully deliver content to students. "teachers must understand how technology

connects with both pedagogy and the content of the curriculum; a change in the instructional use of computers is dependent upon understanding the instructional practices needed to use technology while teaching the curriculum" (Matzen & Edmunds, 2007, p. 1). It is important to understand that teachers do more than just write curriculum. They must implement the curriculum, and it is at their discretion what is taught and what is not (AACTE Committee, 2008, p. 21).

With the introduction of new digital technologies, educators must embrace a new methodology of teaching, as technology is not going away. Margaret Niess (as cited in AACTE Committee, 2008) states, "Tomorrow's teacher must be prepared to rethink, unlearn and relearn, change, revise, and adapt" (p. 225). Due to this fact, pedagogical technological content knowledge (PTCK) has been created to incorporate the skills educators need to operate particular technologies. Since its introduction the acronym PTCK has transformed into technological pedagogical content knowledge (TPCK) and now into TPACK (AACTE Committee, 2008; Koehler & Mishra, n.d.). Even though the acronym has changed, the meaning of the concept remains the same. "PTCK is the basis of good teaching with technology" (Mishra & Koehler, 2006, p. 1029). It is the teacher's understanding of the relationship between technical knowledge, pedagogical knowledge, and content knowledge that sound technology integration takes place within the classroom (Koehler & Mishra, 2006). It is believed that [TPCK] is critical if effective teaching with technology is to take place (AACTE Committee, 2008, p. 3).

[TPCK] makes teachers and technology leaders realize that the roles and knowledge they were responsible for has now shifted. Teachers are now responsible for more than just pedagogy and technology leaders are responsible for more than just

technology (AACTE Committee, 2008, p. 9). If teachers are expected to be efficient at PTCK, where should our technology leaders be? The level of expected knowledge in PTCK for technology leaders should be set high. These are the leaders that are guiding and teaching our teachers. If technology leaders do not have a sound base in PTCK, how will they be able to help teachers reach the level of PTCK they need to implement technology well in the classroom?

The standard approach and one that is still used readily in our schools suggests that teachers need to be trained in technology with the assumption that knowing specific technologies will lead to "good" teaching with technology. This approach is flawed for a number of reasons which include: rapid rates of technology evolution use of software that is designed for businesses and not education, one fit approaches that don't allow for teaching styles to emerge, and the focus of "what" verses "how" technology is being used (Mishra & Koehler, 2006). It is imperative that our school leaders recognize the need for change to accommodate technology tools that are at our educators' fingertips and, "must recognize the new tools and strategies for teaching, learning, and assessment and value them as effective models for facilitating improved student learning and significant pedagogical reform" (Thomas & Knezek, 2002, p. 15). The approach Mishra and Koehler (2006) suggests is much more complex. Their solution involves learning by design which makes educators become involved in an authentic learning experience which involves technology but also their content areas and their teaching pedagogy. The emphasis in this training is "learning by doing" (p. 1035). The AACTE Committee on Innovation and Technology (2008) believes that a focus on developing [TPCK] will help educators move away from the mindset that technology is a separate subject area but a

tool that can be applied to all subject areas. Leaders in education need to begin to focus less on technology purchases and on the technology façade they wish to portray and more on, "creating environments that are conducive to continued growth in pedagogy as well as in technology use" (Pierson, 2001, Conclusion).

"TPCK in K-6 literacy education It's not that elementary!" is the title Denise Schmidt and Marina Gurbo (as cited in AACTE Committee, 2008) gave their chapter in the *Handbook of Technological Pedagogical Content Knowledge (TPCK) for Educators* (p. 61). Incorporating technology within any content area well is not an easy task. Teachers are expected to develop PTCK within their content areas but are not always provided with examples on how other teachers are integrating technology to enhance learning. How technology will be used is greatly based on, "the teacher's own perceptions of the value that technology will have on instructional practice, classroom context, and the students' learning" (AACTE Committee, 2008, p. 71). *The Handbook of Technological Pedagogical Content Knowledge (TPCK) for Educators* attempts to provide teachers with examples of how technology is being used for several specific content areas. Mishra and Koehler (as cited in AACTE Committee, 2008) stress that, "there is no single technological solution that applies for every teacher, every course, or every view of teaching" (p. 117). While content areas are identified and addressed separately, many of the ideas could be applied across the curriculum and be adapted to fit other subject areas. Beginning with K-6 literacy, students are accessing information online and are being faced with a completely different form of text to decipher. Reading strategies must change when looking at web sites and navigating through pages of hyperlinks. Learning with audio books, podcasts, graphic representations developed by

software packages such as Inspiration and Kidspiration (Inspiration Software, Inc.), organizing thoughts in KidPix and PowerPoint, digital storytelling, and blogs are just a few technology tools being used to enhance literacy instruction and place students in a whole new learning arena (AACTE Committee, 2008). World Language teachers are able to provide authentic learning experiences for their students using online tools such as synchronous chat to write, read, and develop conversational skills with other students around the world. They can also use tools such as current video clips, podcasting, blogging, and multimedia software to enhance their curriculums. The content area of Social Studies is greatly expanded when the use of technology is utilized. Web based resources provide authentic learning experiences through podcasting, file sharing, cross cultural communications, email, video conferencing, and digital storytelling. Art students can study dance through digital movies, tour virtual museums from another country, share and discuss their own works of art through digital images, web cams, and chats (AACTE Committee, 2008). While these are just some ways technology is being used, the possibilities for technology integration for learning is providing unique and authentic learning experiences for students regardless of where they live in the world.

Mindtools

David Jonassen (2006) developed a model for teachers on how to teach with technology. Computer based tools and learning environments are referred to as "mindtools" by Jonassen (2006) and are the key to his theory of conceptual change. With mindtools students are given the opportunity to construct a model of what they know using technology tools. Technology can help students think critically by taking the memorization and information retrieval tasks away from students and allowing them to

analyze, manipulate, and reflect on the information at hand. Using mindtools students are able to construct their own knowledge (Jonassen, 2006; Ringstaff & Kelley, 2002). Mindtools represents a constructivist approach to using technology. "The process of articulating what we know in order to construct a knowledge base forces learners to reflect on what they are studying in new and meaningful ways" (Jonassen, Carr, & Yueh, 1998, p. 6). Literature suggests constructivist practices are more conducive for effective technology integration (Albion & Ertmer, 2002; Cuban, 2001a; Ertmer, 2005; Matzen & Edmunds, 2007; Pierson, 2001; Ringstaff & Kelley, 2002). Jonassen (2006) specifically looks at databases, spreadsheets, concept maps, expert systems, hypermedia, and more to show how these concepts and technology tools can act as "mindtools" within the classroom and content areas. Ringstaff and Kelley (2002) have found that, ". . . technology is most powerful when used as a tool for problem solving, conceptual development, and critical thinking" (p. 5). Focusing on how teachers are using technology and the tools available to them in the classroom is crucial if technology is to be seen as enhancing instruction and not just a replacement to traditional tools such as paper and pencil.

Exemplary Technology Use

While many great strategies exist for how to integrate technology within the classroom, what makes a teacher exemplary in their use of technology? Exemplary technology-using teachers have been defined as, ". . . those who employ technology in learner-centered, constructivist environments as opposed to traditional teacher –directed environments" (Ertmer, Ottenbreit-Leftwich, & York, 2006-07, p.1). Classrooms where good technology integration occurs incorporate technology as a tool to engage learners

and to promote higher levels of thinking. Tasks are authentic, collaborative, and allow students to process the information and make it their own (Ertmer, Ottenbreit-Leftwich, & York, 2006-07). Teachers who use technology well realize the potential and the learning power behind the tools they use. Their visions of technology use are focused on the learning outcome and not the technology itself. While exemplary technology using teachers face the same barriers as their colleagues, they face these barriers with a care free approach of finding ways around those barriers. This is due to the fact that these teachers perceive technology to increase student motivation, increase student achievement levels, and provide students a chance to 'own' their learning (Ertmer, Ross, & Gopalakrishnan, 2000).

Constructivist Approach

Ertmer, Gopalakrishnan, and Ross (2001) conducted an exploratory study examining pedagogical beliefs and classroom practices of 17 teachers that are considered exemplary technology using teachers to see how their classroom practices connected with what is described in the literature. The literature supports that exemplary technology using teachers have a constructivist approach to teaching, which is student centered and student directed. The following practices are thought to be best practices in constructivist teaching: designing activities around student interest, collaborative group projects, assessing student understanding of complex ideas, and teaching students how to reflect on their learning. Seventeen teachers from all grade levels were interviewed as a part of this exploratory study. The findings highlight that exemplary uses of technology in the classroom in the real world differs from descriptions often highlighted in the literature.

This is based on a number of variables and factors such as grade levels, visions teachers embrace, available resources, and many others (Ertmer, Gopalakrishnan, & Ross, 2001).

International Society for Technology Education Standards

To help guide teachers with technology integration a set of technology standards were developed to act as a guide to what 21st century students should know about technology. "Incorporating standards of any type frequently requires teachers to reevaluate their curriculum. Technology standards can provide teachers at all levels with suggestions for effectively integrating technology into the daily learning environment" (Swain & Pearson, 2002, Technology Integration and Standards Section, p. 4). In 1998 the International Society for Technology in Education (ISTE) published the National Educational Technology Standards referred to as (NETS). ISTE is considered to be the largest technology organization in education in the world, which gives the NETS standards a great deal of credibility and backing. The project of developing the standards was initiated by ISTE and funded by NASA with consultation of key organizations and stakeholders such as the U.S. Department of Education, the Milken Exchange on Education Technology, and Apple Computer (Roblyer, 2000). At the time of their development ISTE focused on what students needed to know about technology and what students needed to be able to do with technology (ISTE, 2007). They did not intend technology to be a focus of instructional content or as the only means of instructional delivery modes. They are meant to supplement instruction and enhance the curriculum content already in place (Caverly & MacDonald, 2004). The NETS standards were thought to, "facilitate school improvement in the United States" (Swain & Pearson, 2002, p. 1). Swain and Pearson (2002) believe that the implementation of ISTE NETS

standards and a standards based curriculum has the ability to level the playing field for students in the classroom and will aid in bridging the digital divide we see in our schools.

In 2007 "the next generation of NETS for Students" (ISTE, 2007, p. 1) was unveiled at the annual NECC conference hosted by ISTE. ISTE (2007) reports that the newly designed standards, "focus more on skills and expertise and less on tools. Specifically, they address: creativity and innovation, communication and collaboration, research and information fluency, critical thinking, problem-solving, and decision-making, digital citizenship, and lastly technology operations and concepts" (p. 1). The current CEO of ISTE, Don Knezek, (as cited in ISTE, 2007) feels the newly designed NETS will help students, "learn effectively and live productively in a rapidly changing digital world." (ISTE, 2007, NETS p. 1). The ISTE organization reports that their standards are in some way being used and adopted in every state within the United States along with other countries.

National Educational Technology Standards

The technology leader has a number of roles to juggle, but whom or what is guiding the technology leader? The classroom teacher uses National Educational Technology Standards referred to as (NETS) as a guide for incorporating technology within their classroom curriculums. It is the NETS standards that aid in the change process because it makes teachers reevaluate their curriculum (Swain & Pearson, 2002). Schools hold teachers accountable when it comes to implementing standards, technology leaders also need to be held accountable for the role they play in helping teachers integrate and implement the NETS. Most educational leaders agree that standards provide clear guidelines and a way to measure performance within content levels, grade

levels, and even the quality of job performance in regards to teachers, administrators, and even technology leaders (Roblyer, 2000). To help guide our school leaders ISTE has developed NETS for Teachers and Administrators which will be revised soon to match the newly designed NETS for students. These standards will hold teachers and administrators accountable for integrating technology.

Technology leaders must also be held accountable, and ISTE has created a set of standards to do just that. The vague job description of technology leader combined with the expectations of the position force the creation of standards to guide technology leaders. So (2002) has suggested a technology leader must be as "almighty as 'Superman'" (Abstract p. 75) to meet all the expectations expected of them. In a study of eastern Pennsylvania technology leaders, Lesisko (2005) finds 45 different job titles for the technology leader position in 87 districts. With a number of barriers from workload issues (Lai, Trewern, & Pratt, 2002; Wagenr, 2004), time spent dealing with technical issues vs. instructional issues (Strudler, Falba, & Hearrington, 2001; Snelbecker & Miller, 2003), and steady increases in responsibilities (Hofer, Chamberlin, & Scot, 2004), technology leaders are forced to overcome these barriers to help teachers overcome their own set of barriers. To help teachers overcome the "productivity paradox"(Peslak, 2005, p.111), technology leaders must take on the role of transformational leader, visionary, change agent, presenter, and instructional specialist. With PTCK as the basis of good teaching with technology (Mishra & Koehler, 2006), Jonassens' (2006) mindtools as a model, and the ISTE NETS standards for teachers and for technology leaders, technology leaders now have a guide they can follow to better meet their responsibilities and to help their teachers integrate technology and impact our children's education.

Technology Leader International Society Technology Education Standards

The program standards that ISTE (2007) has created to support and guide the stakeholders of our children's education in technology will, "prepare candidates to keep abreast of changes in the educational computing and technology and their impact on education." (p.1) ISTE and National Council for Accreditation of Teacher Education (NCATE) have developed a set of standards for technology leaders referred to as technology leadership (TL). The Technology Leader International Society Technology Education (TL ISTE) standards were geared toward technology directors or coordinators at district, regional, and/or state levels. The standards were developed to help schools and organizations in, "understanding and evaluating the educational preparation needed for specialization within the field" ((ISTE, 2007, p. 1). While these standards exist, it is reported by Snelbecker and Miller (2003) that few teachers and administrators are aware of the ISTE/NCATE standards created for technology leaders, and they suggest that not all technology leaders share awareness of the existence of TL standards. While the TL standards offer clear guidelines on what roles the technology leaders should play, it also gives school districts an evaluation tool to use on the technology leader's performance. Technology leaders can also use this as a self-assessment and even as a checklist for what needs to be done. Lastly, the program standards were designed to help stakeholders see the educational needs for filling such a specialized position (ISTE, 2007).

Categories of Technology Leader International Society for Technology Education Standards

The Technology Leader standards developed by ISTE/NCATE have been broken down into eight standard categories which include: I. Technology Operations and

Concepts, II. Planning and Designing Learning Environments and Experiences, III. Teaching, Learning, and the Curriculum, IV. Assessment and Evaluation, V. Productivity and Professional Practice, VI. Social, Ethical, Legal, and Human Issues, VII. Procedures, Policies, Planning, and Budgeting for Technology Environments, and VIII. Leadership and Vision. Within each standard, subcategories exist with very specific expectations being listed (ISTE NETS, 2007, Technology Leadership Advanced Program Section). From these standards, leadership rubrics were created by ISTE with three possible performance indicators being defined as approaches standard, meets standard, and exceeds standard. The ISTE rubrics were constructed to help faculty members preparing future technology leaders to meet the standards and to help guide their programs to fully educate their students. "The standards and rubrics should help faculty to identify the kinds of experiences they provide in their courses and whether or not those experiences generate candidate performance that approaches, meets, or exceeds the standards" (ISTE NETS, 2007, p. 1). It is important to note that providing day to day technical support is not a responsibility of a technology leader. They are to use their skills to prioritize, manage, evaluate, and develop plans to ensure that technology is being maintained and used to its fullest. It could be viewed as a violation of the standards that a technology leader with a high level of pedagogical knowledge is taking time and attention away from key job priorities in order to fix small technical issues.

A technology leader with high levels of PTCK and the time to utilize their knowledge will be more likely to make an impact on how teachers use technology. As Cuban, Kirkpatrick, and Peck (2001) have found teachers are using technology to sustain traditional forms of teaching rather than transforming their teaching practices to

maximize the impact of technology integrated instruction. The shift in teaching practices will be in a large part due to the leadership role the technology leader plays within the change process in their schools (Lai, Trewern, & Pratt, 2002).

Leadership Role

If teachers are to shift their teaching practices and their values and beliefs regarding how learning takes place, a strong and effective technology leader needs to be present (Lai, Trewern, & Pratt, 2002). "A technology coordinator is expected to be a school leader" (Sugar & Holloman, 2009, p.67). The term technology leader stresses the importance of the leadership role that must be carried out within the schools they support. Elmore, Gronn, Spillane, Halverson, and Diamond (as cited in Davidson, 2003) agree, "In this sense, the ET (educational technologist) points the way to a new kind of educator role, one that integrates leadership and instruction and exists interdependently with school colleagues, much in the way that the new paradigm for leadership indicates will be critical for school improvement" (p. 747). Leadership is imperative to the success of any initiative being embarked upon, including technology integration. The technology leader must be a true leader in every sense of the word. "The leadership role has to be clearly recognized when technology is to be implemented in schools. What makes a school technologically successful depends a lot on the kind of leadership in the process" (Lai, Trewern, & Pratt, 2002, p. 542).

Leadership Defined

Leaders in the field of education have been attempting to classify and define the dimensions of leadership for the past 50 years and have created up to 65 different classification systems to do this (Northouse, 2004). With so many classification systems

in existence, it is difficult to have one solid definition of what a leader is or does because it varies greatly from person to person and from setting to setting. The following can be considered "central to the phenomenon of leadership" according to Peter Northouse (2004), "(a)leadership is a process, (b) leadership involves influence, (c) leadership occurs within a group context, and (d) leadership involves goal attainment" (2004, p. 3). By looking at leadership as a process it becomes more than just a trait one individual has. It instead becomes an event that happens between a leader and his or her followers. This makes leadership attainable for any individual who strives to lead (Northouse, 2004). Leadership has been identified as the key to success when it comes to implementing technology, and it is when leadership is missing that implementation of technology suffers (Costello, 1997; Moses, 2006).

Transformational Leadership

A "New Leadership" paradigm that has been closely looked at since the 1980's is Transformational Leadership. Northouse (2004) identifies individuals that posses the transformational leadership style to be charismatic and a visionary allowing them to transform their followers. James McGregor Burns (as cited by Liontos, 1992) developed this leadership style in 1978 and it was later expanded upon by Bernard Bass (as cited by Liontos, 1992). Both Burns and Bass (as cited by Liontos, 1992) studied this leadership style within businesses, political roles, and military roles, but not in school settings. Later research does support that there are similarities between school settings and the other settings previously studied. (Liontos, 1992). Leithwood and Jantzi (2005) define transformational leadership as being, "an extremely popular image of ideal practice in

schools at the present time" (p. 178) in their study that evaluated transformational school leadership research from 1996 to 2005.

There is no universal definition of transformational leadership. Burns (as cited by Moses, 2006) defines transformational leadership in 1978 as, "one or more persons engage with others in such a way that leaders and followers raise one another to higher levels of motivation and morality" (p. 30). Northouse (2004) defines transformational leadership as, "an exceptional form of influence that moves followers to accomplish more than what is usually expected of them" (p. 169).

Hall, Johnson, Wysocki, and Kepner (2002) describe the qualities that a transformational leader would posses as follows:

> empowers followers to do what is best for the organization; is a strong role model with high values; listens to all viewpoints to develop a spirit of cooperation; creates a vision, using people in the organization; acts as a change agent within the organization by setting an example of how to initiate and implement change; helps the organization by helping others contribute to the organization. (p. 4)

There is a respect that the transformational leader instills in their followers. Transformational leaders challenge their followers, allow experimentation and creative thinking, and treat each follower as an individual (Koh, 1995).

Transformational leadership has many strengths that Northouse (2004) has gathered from the literature. First, this leadership style has been widely researched. Second, this leadership style fits how most people perceive a leader, which is someone leading and advocating change. Third, this model is looked at as a process involving

leader and followers with the follower's role being just as important and integral as the leader's role. Fourth, transformational leadership looks at the big picture and focuses on the role of the follower and what needs to be accomplished. Fifth, it focuses on the morals, values, and needs of the followers. Lastly, transformational leadership has been deemed an effective form of leadership (Northouse, 2004).

The impact that a transformational leader has on their follower has been documented to be beneficial and has led to desired changes within educational settings. Leithwood (as cited by Liontos, 1992) finds that transformational leadership has improved teacher collaboration, changed attitudes towards school improvements, and has changed instructional practices. Yukl (as cited by Lunenburg, 2003) demonstrates that transformational leaders influence major changes and build commitments for the goal at hand . It is important to note that charisma has been identified as a quality that transformational leaders possess which may or may not impact their followers depending on the setting (Hall, Johnson, Wysocki & Kepner, 2002; Lunenburg, 2003).

Many studies have looked at the leaderships styles of the school principal in regards to technology integration and implementation of technology policies (Hadjithoma-Garstka, 2011; Kozloski, 2006; Moses, 2006). Moses (2006) conducted a dissertation study that investigated leadership styles of school principals and their relation to teachers' implementation of technology in the classroom. This study was conducted in three different suburban Texas Schools. While the study did not focus on any one type of leadership style, it did conclude that different leadership styles are needed based on the given situation. Moses (2006) felt that multiple variables effected the use of technology in the classroom and was not solely linked to the principal's leadership style alone. A

British study found that the principal's leadership style were related to school climate and the presence of, "school-wide communities of implementation" (Hadjithoma-Garstka, 2011, p. 324). While many see the leadership role as one of the principals, Sugar and Holloman (2009) "assert that the technology coordinator's role embodies critical leadership capacity that is vital to the school's overall mission" (p. 69).

Transformational Leader as Visionary

One of the key characteristics of a transformational leader is one of a visionary. "The vision emerges from the collective interests of various individuals and units with an organization. The vision is a focal point for transformational leadership. It gives the leader and the organization a conceptual map for where the organization is headed" (Northouse, 2004, p.183). The vision of a technology leader not only gives a view of the bigger picture so they can plan, but it also allows teachers to see the big picture as well. Beattie (2000) cautions on working without a vision in schools and states that, "a lack of vision regarding the philosophy and application of technology can quickly become a significant liability to the evolution of an institution of learning" (p. 1). Costello (1997) agrees that without a mutual vision, "it will be difficult to set priorities, to know where we are headed, and to know whether we have achieved what we are trying to accomplish" (p. 58). Teachers must understand why integrating technology is so important and what benefits can ensue from its use (Lai, Trewern, & Pratt, 2002). Albion and Ertmer (2002) find that, "teachers are not motivated to tackle the challenges of integrating technology unless they have a vision for how it will improve teaching and learning" (p. 1). Creating a shared vision with teachers will eliminate the top-down approach that we often see with technology integration. Teachers unaware of why technology integration is implemented

or why it is vital to learning will resist change, while others with a shared vision of technology integration will embrace it. The likelihood of teachers accepting technology as a new teaching tool is more likely to happen if the teacher believes in the vision (CoSN K-12 CTO Council, 2004; Levin & Wadmany, 2006-07; Salpeter, 2000; Wagner, 2004). As Polonoli (2001) states, "What is needed is a shift in thinking so teachers will come to view technology as an effective tool to use throughout the course of planning instruction, not something that must be used to meet a government-mandated technology standard" (p. 2). Schraeder, Swamidass, and Morrison (2006) support this theory and indicate that teachers who are allowed to participate in the decision making processes will be more likely to support and comply with the changes being made. As shared vision implies, teachers will be more likely to make changes and accept new goals if they themselves are apart of the planning and the goal setting stages (Moses, 2006).

Transformational Leader as Change Agent

Another key characteristic of a transformational leadership is one of a change agent. "Transformational leaders also act as change agents who initiate and implement new directions within organizations" (Northouse, 2004, p. 183). It is important to remember that leadership through the change process is pertinent for a successful outcome. "Change does not manage itself" (Mehlinger & Powers, 2002, p.282). Michael Fullan (2001) states, "if people don't find meaning in reform it can never have an impact" (p. 269). Fullan, Cuttress, and Kilcher (2005) stress the need for all parties to accept ownership of the change process, "Making change work requires the energy, ideas, commitment, and ownership of all those implementing improvements. . . . . The change process is about establishing the condition for continuous improvement in order to persist

and overcome inevitable barriers to reform" (p. 2). Technology leaders must teach teachers that the teachers themselves are leading the change, rather than being passive recipients of change (Wagner, 2004). A great deal of literature assigns technology leaders the title of change agent suggesting that they are the catalyst to help teachers overcome the barriers they face when integrating technology (CoSN K-12 CTO Council, 2004; Hofer, Chamberlain, & Scot, 2004; Lai, Trewern, & Pratt, 2002; Mehlinger & Powers, 2002; So, 2002; Strudler, 1995-96; Wagner; 2004). As Wagner (2004) states one of the most noted traits a successful technology leader has is to become a change agent. Change agent is yet another role that the technology leader is expected to fulfill. It is the technology leader who needs to facilitate and drive the technology revolution within the classrooms.

To assess any leader it is important to look at the challenges they may be facing within their districts. A leader who is working at what may be labeled an effective school may not encounter as many barriers as a leader who may be working in a noneffective school. Both leaders may be exemplary; however, the results of their work must be judged differently taking into account the barriers they may face.

Effective Schools Research

Effective Schools Research looks at schools that are successful despite the demographics of the school. Ronald Edmonds (as cited in Association for Effective Schools, Inc., 1996) from Harvard University started his research by looking at children from low income families who were highly successful in school. His research was sparked by James Coleman (as cited in Association for Effective Schools, Inc., 1996) who reported that despite what schools do, family backgrounds were the primary reason

for success or failure within schools. Edmond's findings disputed Coleman's claims (as cited in Association for Effective Schools, Inc., 1996), and he claimed that public schools can make a difference. Children from low poverty levels can be successful, and successful schools have common processes and characteristics (Association for Effective Schools, Inc., 1996). Edmonds (as cited in Association for Effective Schools, Inc., 1996) found that successful schools had strong administrative leadership, an emphasis on basic skill acquisition, high expectations for student achievement, a safe and orderly atmosphere conducive to learning, and frequent monitoring of student progress. It was these five correlates that became the focus of school reform in the nineteen seventies and eighties (Marzano, 2003).

As researchers continue to search for the perfect set of correlates, the only consensus that most researchers can make is that there is no single factor or list of correlates that will produce an effective school everywhere it is tried (Sammons, Hillman, & Mortimore, 1995). The number of correlates along with the selection of factors varies among researchers. Edmonds (as cited in Marzano, 2003) started the wave of research with five correlates which is the fewest number of correlates in the reviewed literature and twenty-nine correlates being the highest. As displayed in Table 2, the following researchers contribute to the field (as cited in Association for Effective Schools, Inc., 1996; Jansen, 1995; Johnstone, 1989; Lipka & Gailey, 1989; Marzano, 2003) Individual researchers such as Edmonds refined their lists over the years as they continued to do research (Jansen, 1995; Johnstone, 1989; Marzano, 2003).

Table 2

Number of Correlates created by Researchers in the Field

Number of Correlates	Researcher(s)
5	Edmonds
7	Association for Effective Schools
7	Levine & Lezotte
7	Lezotte & Bancroft
8	Marzano
8	Scheerens & Bosker
8	Weber
9	Steadman
10	Brookover & Lawrence
11	Sammons, Hillman, & Mortimore
29	Austin

The question remains as to what makes a school successful. While no consensus can be made on what makes schools successful, there are key correlates that researchers can agree upon and that are consistent among researchers' lists with some differences in wording. Two specific correlates included in almost every list provided by researchers. These two correlates included leadership and a safe environment in which to learn (Association for Effective Schools, Inc., 1996; Jansen, 1995; Johnstone, 1989; Lipka & Gailey, 1989; Marzano, 2003). Successful leadership is one of the key correlates that bring together so many variables that are often uncontrollable (Day & Harris, n.d.; Fullan, 2002). Other correlates that were present in many of the lists included high expectations for student achievement, home-school partnerships, and shared vision and goals (Association for Effective Schools, Inc., 1996; Jansen, 1995; Johnstone, 1989; Lipka & Gailey, 1989; Marzano, 2003). How each school interprets the many characteristics and how they implement changes based on these becomes a complicated formula not always resulting in success (Johnstone, 1989).

Exemplary Schools

Determining which schools and districts are exemplary or effective would be challenging when evaluating a large number of districts. The U.S. Department of Education has been striving to reward districts that are showing success in relation to state standardized testing brought about by No Child Left Behind. The U.S. Department of Education has developed a Blue Ribbon Schools Program which rewards public and private schools including elementary, middle school, and high schools. These schools act as model schools because they have been academically superior, are in the top 10% in their state assessments, or have demonstrated a superior gain in achievement (U.S.

Department of Education, 2009). In the Commonwealth of Pennsylvania, the Pennsylvania System of School Assessment (PSSA) is the assessment used to measure student achievement and a school's ability to help students achieve proficiency. Using the blue ribbon schools of Pennsylvania as examples of exemplary schools, this study attempted to look at the technology leaders within these districts to see if technology integration is higher within these districts opposed to districts that do not have the blue ribbon schools title.

In conclusion, it is difficult for teachers to integrate technology and all the necessary technology standards within their curriculum. Technology leaders are needed to educate teachers on the ISTE NETS standards, and they need to help teachers integrate these standards within their classroom curriculums. To do this, it is imperative that technology leaders have high levels of PTCK and are aware of and are being held accountable for the standards set for technology leaders. This will ensure that they are providing quality technology support to teachers who are teaching our future leaders of America who need to be fluent in technology to survive in the workforce (Li, 2007). "Quality technology support is associated with teachers' increased uses of technology, correlating with greater frequency and variety of use as well as increased use over time" (Dexter, Anderson, & Ronnkvist, 2002, p. 12).

CHAPTER III

METHODOLOGY

Participants

There are 500 public school districts in the Commonwealth of Pennsylvania. This study attempted to survey technology leaders from each of these school districts along with 10 K-12 classroom teachers within each district that work with these technology leaders. Each technology leader who agreed to participate had to select 10 K-12 classroom teachers to rate their leadership styles.

Instrumentation

Level of Technology Implementation Questionnaire

To measure the levels of technology implementation in the classroom, the Level of Technology Implementation Questionnaire (LoTi) instrument was selected to gather data from classroom teachers and technology leaders. The LoTi questionnaire is now also referred to as the Determining Educational Technology and Instructional Literacy Skillsets (DETAILS) for the 21st Century Questionnaire due to its alignment with the 21st Century Skills (National Business Education Alliance, 2006). The LoTi was conceptualized in 1995 and was developed by Dr. Christopher Moersch (2002). The framework for the questionnaire measures the stages of technology implementation using the following categories: non use, awareness, exploration, infusion, integration, expansion, and refinement. With the adoption of each stage, a change in the teacher's instructional curriculum is observed (Moersch, 1995). "The challenge is not merely to use technology to achieve isolated tasks (e.g., word processing a research paper, creating a multimedia slide show, browsing the Internet), but rather to integrate technology in an

exemplary manner that supports purposeful problem-solving, performance-based assessment practices, and experiential learning—all vital characteristics of the Target Technology level established by the CEO Forum on Education and Technology" (National Business Education Alliance, 2006, LoTi Framework para. 1). Eighty percent of the LoTi instrument focuses on the integration of technology within the classroom, 10% focuses on personal computer use, and the final 10% focuses on instructional practices (Moersch, 2002). The framework does strive to focus on technology being used as a technology tool, student based instruction, and higher order thinking (National Business Education Alliance, 2006).

There are six versions of the DETAILS for the 21st Century Questionnaire which are based on the LoTi. The versions were created for pre-service teachers, in-service teachers, instructional specialists, media specialists, administrators, and higher education faculty. For this study the in-service teacher version would be administered to the K-12 classroom teachers, and the media specialist questionnaire would be administered to the technology leaders. (National Business Education Alliance, 2006) The LoTi Details Questionnaire for in-service teachers consists of 37 questions in which teachers rate statements on a Likert scale of 0 to 7 (N/A to Very true of me now). The LoTi media specialist questionnaire for media specialist consists of 50 questions in which technology leaders will rate statements on a Likert scale of 0 to 7 (N/A to Very true of me now).

Many benefits have been identified to suggest that this is a "leader in online technology assessments" (National Business Education Alliance, 2006, p.1). Each domain of the survey is nationally validated. These domains include LoTi Levels, Personal Computer Use, and Current Instructional Practices all of which are statistically

reliable and valid. The reported reliability does vary among the studies viewed. Middleton and Murray (1999) report the Cronbach Alpha Test of Reliability to be .870. Rakes, Fields, and Cox (2006) report the Cronbach Alpha Reliability by domain with the LoTi Levels having a reliability measure of .74, Personal Computer Use at .81, and Current Instructional Practices at .73. Lastly, Stoltzfus (2005) found the Cronbach's Alpha Test of Reliability of the New DETAILS questionnaire to range from .66 to .93 when broken down into five factors such as using technology for complex student projects, teacher proficiency with using technology, student influences, dependence on resources, and challenges to teachers' computer use. Stoltzfus (2005) also determined that the survey clearly proves to be a valid measure of teachers' levels of technology integration.

The DETAILS for the 21st Century Questionnaire is currently available at no charge to public and private educators online through the LoTi Lounge link at the following website http://www.loticonnection.com For dissertation research there was a $750 fee per study which covers a set-up charge for the standard 50-item LoTi Questionnaire, access to the online reporting system, creation of custom demographic questions, and access to the raw data collection. An additional approval must be granted through an online form to ensure that no other candidate is using the instrument for similar research. Once approval was granted, the researcher provided the survey company with a Comma Separated Value or CSV file which is an Excel Spreadsheet. This spreadsheet consisted of one column listing the names of 500 public school district's names from the Commonwealth of Pennsylvania. This allowed the survey company to

place district names in a drop down menu on the survey instrument so participants could select their district and data could be organized based on this selection.

Participants accessed the LoTi website and created a unique login to the survey site. Participants were told that they did not need to enter their names at any time even though an optional name field was present. Once participants were granted access to the site, they selected their school district from a drop down menu and selected whether they were a technology leader or a classroom teacher. Given the choice of technology leader or classroom teacher, participants were given questions relevant to their job title. Technology leaders began with 17 demographic questions created by the researcher (Appendix C) and classroom teachers began with 7 demographic questions created by the researcher (Appendix D). Demographic data included factors such as gender, age, number of years teaching or in a leadership position, educational degree or certifications, grade levels and content areas taught, number of teachers that leaders support, technology budgets, types of technology resources, access to technology resources, barriers leaders face, and more. At the completion of the demographic questions the LoTi survey questions for technology leaders and classroom teachers appeared. The LoTi survey itself took approximately 20 minutes to complete and the option of stopping and saving partially completed surveys at any given time was an option.

The website and server the survey was hosted on was checked daily for known security vulnerabilities. The server used Mac OSX which is not vulnerable to UNIX or Windows attacks and was updated with the latest security options. Data was replicated live and was backed up nightly, weekly, monthly, and yearly. Reports and Data could be accessed at any time by the researcher using an administrative login.

Multifactor Leadership Questionnaire

To best measure technology leaders' leadership styles, the Multifactor Leadership Questionnaire (MLQ) will be used. The MLQ is the most widely used instrument to measure transformational leadership qualities (Northouse, 2004). The MLQ (5x Short) contains 45 items and contains statements that must be rated on a Likert 0 to 4 scale (Avolio & Bass, 2004). Four main categories were developed to measure transformational leadership in the MLQ, which were developed by Bass (as cited in Lumenburg, 2003) and his associates. These four factors are known as the four I's and include, "idealized influence, inspirational motivation, intellectual stimulation, and individual consideration" (Hall, Johnson, Wysocki, & Kepner, 2002, p.2; Lunenburg, 2003, p.3). The MLQ was taken by the leader and "followers" of the leader. Followers took the MLQ to measure their perceptions as to how they perceived their leader's behaviors (Northouse, 2004). There was no required minimum number of followers that should take the survey; however, it was strongly suggested that no fewer than three take the survey (Avolio & Bass, 2004).

The following are the categories that leaders fell into after completing the survey.

- Transformational Leadership
  - II (A) Idealized Attributes
  - II (B) Idealized Behaviors
  - (IM) Inspirational Motivation
  - (IS) Intellectual Stimulation
  - (IC) Individual Consideration

- Transactional Leadership
  - (CR) Contingent Reward
  - (MBEA) Management-by-Exception: Active

- Passive/Avoidant Behavior
  - (MBEP) Management-by-Exception: Passive
  - (LF) Laissez-Faire

- Outcomes of Leadership
  - (EE) Extra Effort
  - (EFF) Effectiveness
  - (SAT) Satisfaction with the Leadership

Despite the fact that the MLQ is widely used, there are criticisms of the instrument. Northouse (2004) identifies a number of these criticisms which include the validity not being proven, the four I's correlate highly with one another which does not make it unique to the transformational model, and the treatment of the leadership style as more of a personality trait vs. a learned behavior. Their have been others that have also questioned the validity of the MLQ such as Lunenburg (2003) who sites multiple authors with this viewpoint.

Since it was first designed the MLQ has undergone many revisions and updates to improve its reliability and validity. To combat the criticisms of the MLQ, Bass and Avolio (2004) have scrutinized their instrument and have revised the items along with having scholars in the field make recommendations prior to re-testing for reliability and validity again. Despite all the revisions the instrument underwent, the MLQ holds true to being reliable with the scale ranging from .74 to .94 which exceeds the standard cut-offs for internal consistency. Validity studies were also conducted using 14 samples that were used to validate and cross-validate the MLQ 5X (Avolio & Bass, 2004). The cost to use this survey was $4.00 per technology leader using Mind Garden's web based version at www.mindgarden.com . An unlimited number of leader "raters" were included for this fee.

The survey required approximately 20 minutes to complete and the option of stopping and saving responses was given. The MLQ was on the Mind Garden Inc.'s secure website due to it not being an http site. Access was granted through invitations to the survey that were sent out by Mind Garden or by a specific link sent only to technology leaders through the researcher's email. Once surveys were completed the link was deactivated.

The researcher's administrative access gave the researcher a place to enter survey deadlines, an option to enter a personal message to the scripted email sent by Mind Garden (Appendix I), a page to enter technology leader names and email addresses, and an option to download the data when surveys are completed. The administrative view allowed the researcher to see if the technology leader completed their MLQ survey, how many raters where entered, how many raters completed their survey, and the option to resend the survey link to technology leaders. Technology leader's pages allowed them to enter their 10 K-12 classroom teachers along with teacher email addresses. Technology leaders could see which of their raters completed their surveys, and they had the option to resend invitations to their raters.

Mind Garden Inc. provided the researcher with the raw and scored data for each rating in an Excel CSV file. Data was not aggregated across raters for any specific leaders. K-12 teacher names could only be seen if the technology leader's page was opened with the administrative access. To keep names anonymous to the researcher, the researcher did not access any technology leader pages. Technology leaders did not receive scores or results from their rater responses.

Methodology

Data Collection Procedures

Technology leader names were obtained via school district websites, intermediate units, email requests, and by phone. (Appendix D) Each district superintendent received a courtesy email explaining the study and that professionals within their district would be contacted unless they chose otherwise. (Appendix E) Superintendent emails were obtained via school district websites, email requests, and by phone.

Technology leaders received information about the study and a link via their school email address to the first online survey, the LoTi. An introduction asked the technology leader receiving the email if they were the leader in charge of providing instructional support to teachers. They were asked to ensure the correct person within their technology department (if there were more than one technology leader within their district) was receiving this email. If the technology leader receiving the email felt another technology leader within their district would be better suited to answer the questions for this study, they were asked to forward the email to that technology leader and asked to add the researcher's email in the carbon copy section of the email. This allowed the researcher to change the contact information within that specific district for future communication. It was also explained in the initial email to the technology leader that a second email containing an invitation to take the MLQ survey would be received from the company Mind Garden. A consent form was included within the initial email and an additional consent question was included in the LoTi demographic survey. (Appendix B)

Technology leaders were asked to select 10 K-12 classroom teachers within their district as possible study participants by emailing each of the selected teachers an email created by the researcher that was directed towards classroom teachers. Technology leaders also gave these same 10 names of K-12 classroom teachers within their district along with the classroom teacher's email addresses to the Mind Garden company so the K-12 classroom teacher would receive the second survey, MLQ, with the name of the technology leader they would be rating. The technology leader selected the participating classroom teachers. They selected teachers who would be able to rate their leadership style more effectively than a new teacher from the district that may have been selected by the researcher. Technology leaders sent this initial email from the researcher and provided names and emails of classroom teachers directly to the Mind Garden company, eliminating the need for the researcher to hold the names and emails of the classroom teachers as participants. This kept teacher names confidential and eliminated the need for their information to exchange more hands than necessary.

The K-12 classroom teachers' initial email included the study's information along with a link to the first online survey, LoTi. It was explained to K-12 teachers that a second email invitation from the company Mind Garden would be sent to them for access to the MLQ survey (Appendix H). A consent form was also included within their initial email and an additional consent question was included in the LoTi demographic survey.

If no response was made two weeks after the initial email had been sent, a follow-up email was sent to technology leaders and/or classroom teachers (Appendix J). All technology leaders and K-12 teachers who participated and completed their surveys by the posted deadline were entered into a drawing to win 1 of 10 2nd Generation 1G iPod

Shuffles if they consented to providing the researcher their name and contact information for the purposes of a drawing.

The consent to participate in a research study form (Appendix B) was included in the initial email technology leaders received. Because both surveys were conducted online, participants granted their consent to participate by clicking on the survey links at the bottom of the email. An additional consent question was included in the demographic section of the LoTi, the first survey participants completed. The consent form did indicate that participants could withdraw from this study at any time. The form also stated that participants' names or district names would never appear on any forms, tables, or reports.

Data Analyses

Once the proposed deadline had passed, the data were downloaded from the LoTi Profiler and Mind Garden Inc. To ensure all classroom teacher names were kept anonymous to the researcher, a graduate assistant at Duquesne University downloaded data from the LoTi Profiler. The graduate assistant deleted three columns from an Excel spreadsheet that may have shown first name, last name, and email address if the classroom teacher had opted to put their names and email addresses into the online form.

Data was analyzed and reports were run within the LoTi Profiler and through a Statistical Package for Social Sciences (SPSS). The study's research questions and hypotheses were analyzed using descriptive and inferential statistics.

Some data was analyzed within groups based on participants from each district to show relationships between the technology leader and the teachers they work with. At no

time were district names or participant names published or posted for anyone but the researcher to see.

To match technology leaders to the teachers they supported within their district, markers were present in surveys they completed. When participants completed the LoTi survey, they had to select their district name and job title which allowed the researcher to match the leader to the classroom teacher for data analysis purposes. When participants completed the MLQ survey, the technology leader and classroom teachers were automatically grouped within the Mind Garden system. For this reason, the company had to directly email the survey invitation out, and the researcher could not simply provide a link to the MLQ survey. The researcher was able to link the LoTi and MLQ results using the district names and titles from the LoTi survey to the technology leader name provided in the MLQ reports.

Institutional Review Board

The National Institutes of Health (NIH) training was completed on February 13, 2008. All documentation for the Duquesne Institutional Review Board (IRB) was completed before any participants were contacted or before any distribution of surveys took place. IRB approval was received on September 29, 2009. An amendment on November 24, 2009 was also approved to ensure that the researcher could not see K-12 classroom teacher names in data collected. IRB approval was granted as an expedited study due to minimal risks to subjects being present and the non-use of vulnerable groups of people. The submitted IRB packet included a cover page, a transmittal form, abstract, a copies of both survey instruments, sample emails, consent form, and a NIH training certificate.

Limitations

One limitation of the proposed methodology was each participant involved received multiple emails with survey links. A link to the LoTi survey was present in the email sent by the researcher, and a link to the MLQ survey was sent via Mind Garden Inc. This barrier was due to Mind Garden Inc. only allowing their survey to be sent via one of their links. This may have made things more complicated for participants who had to locate separate emails to take their surveys.

Research Purpose and Hypotheses

Purpose Statement

The purpose of this study was to examine how technology leaders' leadership styles and knowledge of technology impact how classroom teachers use technology within their classrooms.

Research Questions

Research Question One: Is there a difference in the leadership styles of technology leaders identified by the Multifactor Leadership Questionnaire (MLQ) in comparison with K-12 classroom teacher technology integration scores identified by the Level of Technology Implementation Questionnaire (LoTi)?

Hypotheses One: Technology leaders with a transformational leadership score on the MLQ have a significant impact on K-12 classroom teachers within their district scores on the LoTi.

Hypotheses Two: Technology leaders with transactional or passive/avoidant scores on the MLQ do not significantly impact K-12 classroom teacher's LoTi scores.

Hypotheses Three: Technology leaders with a high inspirational motivation (IM) score on the MLQ [i.e. vision] have teachers within their district with a significantly higher LoTi Level and current instructional practices (CIP) scores.

Research Question Two: Do technology leaders who face "barriers" identified by the literature (Hofer, Chamberlin, & Scot, 2004; Lai, Trewern, & Pratt, 2002; Snelbecker & Miller, 2003; So, 2002; Strudler, Falba, & Hearrington, 2001; Wagner, 2004) have teachers within their districts with significantly lower LoTi scores in comparison to leaders who may not face the same barriers?

Hypotheses One: The academic degree possessed by technology leaders has no significant difference on K-12 classroom teacher's LoTi scores.

Hypotheses Two: The number of years a technology leader has been with their district does not significantly affect teacher's LoTi scores.

Hypotheses Three: technology leaders who are able to provide instructional support and training have teachers whom have higher LoTi scores.

Hypotheses Four: Districts that have a higher number of technology support staff members have teachers with higher LoTi scores.

Hypotheses Five: Districts that have sufficient to abundant technology budgets have teachers with higher LoTi scores.

Hypotheses Six: Technology leaders with the time to attend and participate in professional development opportunities have teachers with higher LoTi scores.

Hypotheses Seven: Technology leaders who have had increased responsibility since the time they were hired have teachers with lower LoTi scores.

Hypotheses Eight: Technology leaders who receive support from their district superintendent and/or building principals have teachers with higher LoTi scores.

Research Question Three: Is there a difference in LoTi scores among classroom teachers in identified Blue Ribbon School Districts within Pennsylvania in comparison with non Blue Ribbon School Districts?

Hypotheses One: Exemplary schools identified by the state of Pennsylvania as Blue Ribbon Schools have teachers with higher LoTi scores.

CHAPTER IV

RESULTS

Introduction

This chapter presents the results of this study examining how technology leaders' leadership styles and knowledge of technology impact how classroom teachers use technology within their classrooms. This chapter will review survey deployment and response rates, technology leader and teacher demographics, research questions and hypotheses, and an analysis of the data for each research hypotheses.

Survey Deployment

School email addresses for school superintendents and technology leaders had to be obtained before survey deployment could occur. After corresponding with people via email from the PA Department of Education and with directors of intermediate units, it was apparent that no up-to-date central database of this information existed. If it did exist, it was not to be distributed without permission from everyone on the list. The researcher therefore visited the website of each intermediate unit across the Commonwealth of Pennsylvania to obtain a list of public school names and links to their district sites. Each district's website was visited to find the email addresses of school superintendents and technology leaders. The majority of school district websites had this information present on them; however, there were 124 school districts out of 500 that did not post email addresses for the district superintendent and/or technology leader. The researcher then called each of these districts using the phone numbers found on their district websites to obtain the necessary information. The call script used can be found in (Appendix E).

After collecting all the necessary email addresses, eleven districts were eliminated immediately for a number of reasons. There were three districts that did not have technology directors at the time of the study. Two districts contracted out technology services. Six districts did not respond to voicemails that were left, or they simply stated that they would not share email addresses.

The first email sent out was a courtesy email to district superintendents informing them of the research study and that their technology leader would be contacted with more information about the study (Appendix F). Superintendents had the option to say their district did not wish to participate. They also had the option of requesting the results of the study once it was complete, which would include information from all participating districts. On December 1st and 2nd, 2009 emails were sent out to district Superintendents. After troubleshooting a number of delivery failures, there were approximately eleven email addresses that could not be delivered even after verifying addresses.

Emails were sent using a hotmail account created by the researcher, msmithresearch@hotmail.com. Due to the large number of surveys being sent out, it was discovered that hotmail had a built-in spam protection filter that only allowed one account to mail out 100 emails in a given 24 hour period. For this reason, superintendent emails were sent on two consecutive days. This hotmail account was later upgraded to hotmail plus to allow for more emails to be sent in a given 24 hour period.

There were 20 districts that declined to participate with most declines coming from district superintendents but also several from technology leaders. There were a number of reasons for this decision. Eleven districts stated that they were not interested in participating. Two districts said they were committed to their maximum number of

research study involvement at this time. Other reasons cited included internal labor issues, obligation of staff time, district priorities being too time consuming, schools were in transition, medical emergency of the technology leader, research studies were reserved for district doctoral students, and the technology department was being bombarded by countless surveys and could not accept them all.

The first survey deployment date for surveys being sent to technology leaders was December 4, 2009. Technology leaders and teachers had approximately two and a half weeks to complete two surveys. Each technology leader received three emails. The first email from the researcher titled, Research Study – Chance to win 1 of 10 2nd Generation 1G iPod shuffles, contained an introduction letter, consent to participate form, a link to the first survey, and a checklist of what needed to be completed to be entered into the iPod shuffle drawing. (Appendix G). The second email sent to technology leaders titled, Forward to 10 K-12 Classroom Teachers - Research Study – Chance to win 1 of 10 2nd Generation 1G iPod shuffles, was for the technology leaders to forward to 10 teachers of their choice within their district. This email contained an introduction letter, consent to participate form, a link to the first survey for K-12 classroom teachers, and a checklist of what needed to be done to be entered into the iPod shuffle drawing. (Appendix H). The third email sent to Technology Leaders was sent via the Mind Garden company as an invitation to take the second survey. A total of 54 emails came back non-deliverable. After troubleshooting and verifying these email addresses this total decreased to 16 emails. At the end of the first survey deployment, 34 LoTi surveys had been completed and 18 MLQ surveys had been completed by both technology leaders and classroom teachers from a total of 18 school districts. This response rate was considered to be quite

low but could be contributed to two points that were noted during the first deployment time period. First, it came to the researcher's attention after receiving an email from a participating classroom teacher that they did not receive an invitation to complete the second survey. After email communications with their technology director, it was determined that their district's spam filters were blocking the email being sent out by Mind Garden Inc. Second, an email was received by the researcher from another classroom teacher who had received the introduction email from their technology leader. Their message was to another teacher within the district asking if the they had gotten this email and if it was "legit?" Most classroom teachers do not receive emails with a chance to win something, so as a result they may have been disregarded by some classroom teachers as spam.

The second survey deployment date for surveys sent to technology leaders was January 12, 2010. Participants had until January 29, 2010 to complete the two surveys. Attached to the email subject heading of the original email were the words "Deadline Extension" and the following text was added to the beginning of the introduction to the technology leader email, "I have extended the deadline for responses for my research study to January 29th and would be very grateful for your time. I have been able to include links to both surveys at the bottom of this email in the event you did not receive the second survey email previously." In an attempt to eliminate problems of the Mind Garden survey invitation being filtered out by spam blockers, the company was contacted and it was determined that a direct survey link for technology leaders within the initial introduction email could be included eliminating the need for the third email they would receive from the Mind Garden company. This feature was not allowed previously by the

company, but due to upgrades in their system it was permitted. While this made things much more convenient for technology leaders, the classroom teacher still had to obtain their second survey link from the Mind Garden Company. Although technology leaders had direct access to the second survey, there was still potential for classroom teachers' invitations to be blocked by the spam software within their district. For the districts that may have had technology leaders that completed one of the two surveys in the first round of survey deployments, individual emails were sent out thanking them for what they had completed and asked if they could complete the other survey or resend reminders to their classroom teachers. Another interesting point to note is after sending out the second round of emails, there were 20 undeliverable emails from districts that went through in the previous survey deployment. After the second survey deadline had passed, a total of 57 LoTi surveys and 49 MLQ surveys had been completed by both technology leaders and classroom teachers from a total of 23 districts.

Even after two survey deployments the response rate remained low, so a third deployment was decided on in an attempt to improve the numbers. The third survey deployment date for surveys being sent to technology leaders was February 18, 2010. Participants had until March 5, 2010 to complete the two surveys. Attached to the original email subject heading were the words "Final Call" and the following text was added to the beginning of the introduction to the technology leader email, "I am still in need of technology leaders to participate to in my research study to make my study valid. Please consider participating for a chance to win 1 of 10 2nd Generation 1G iPod Shuffles. Please complete both surveys by March 5th to be included in this study. Thank you so much for your time!" More personalized emails were sent out to districts that had

already started to participate in previous survey deployments. After the third deadline had passed a total of 62 LoTi surveys and 49 MLQ surveys had been completed by both technology leaders and classroom teachers from a total of 26 districts.

Response Rate

The participants for this study were technology leaders from all public schools in the Commonwealth of Pennsylvania and the classroom teachers who work with them. Of 500 public school districts in Pennsylvania, 47 districts were eliminated due to not having technology leaders, superintendents and technology leaders declining to participate, and emails being non-deliverable. This yielded a starting point of 462 possible technology leaders and a possible 4,620 classroom teachers assuming that each technology leader had all 10 teachers from their district participate. By the end of the third survey deployment only 26 districts had responded giving a 5.6% response rate among participating districts. There has been research done on response rates that demonstrate rather low response rates. Cook, Heath, and Thompson (2000) conducted a study that looked at 68 web based surveys it was reported that in 49 of these studies the mean response rate was 39.6% with a standard deviation of 19.6%. Baruch (1999) looked at response rates in academic studies and found response rates to decline from 55.6% to 48.4% over the years with a standard deviation of 20.1%. Baruch and Holtom (2008) warn that researchers seeking participation from top managers often achieve even lower response rates. Studies involving top management were lower at 36.1% with a standard deviation of 13.3% (Baruch, 1999). Many studies that have had low response rates may not have been included in this research due to the fact typically these studies are not submitted for publication or will be declined due to the low response rates (Cook, Heath,

& Thompson, 2000). While this particular study's response rate still remains lower than the percentages reported in the above studies, it is important to consider this research study's limitations. Technology leaders would be considered top management in business terms.

Demographics

A series of demographic questions were asked to both Technology Leaders (Appendix C) and Classroom Teachers (Appendix D) at the start of the LoTi survey instrument. Classroom teachers were asked seven questions regarding information dealing with grade levels taught, level of education, how many years they have taught, how many computers they have in the classroom, access to computer labs, if they knew their technology leaders, and if they would feel comfortable contacting their technology leader with instructional questions. A total of 39 classroom teachers responded to these questions and the breakdown of their responses can be found in Table 3. The Technology Leader sent emails out selecting the K-12 classroom teachers, the demographic data shows that all grade levels were evenly represented, which was a concern of the researcher prior to beginning this study. While most teachers responded that they knew their technology leader and would feel comfortable talking with them about instructional questions; it was surprising that six teachers did say they did not know their technology leader well. Two teachers also responded "no" to feeling comfortable asking the technology leader about instructional questions. These responses help to highlight some of the barriers and limitations that exist. It also reveals that not all teachers selected to receive the invitation to participate in this study were necessarily "friends" of the technology leader which could have been a possible limitation in the methodology.

Table 3

Demographic Characteristics of Classroom Teachers (N = 39)

Characteristic	n	%
Grade levels taught		
K-5	15	41
7-9	10	27
10-12	12	32
No response	2	
Level of education		
Bachelors	9	23
Masters	30	77
Doctorate	0	0
Years teaching (years)		
0-5	8	22
6-10	11	30
11-15	5	14
16-24	10	27
25+	3	8
No response	2	
Computers in classroom		
1	17	47
2-5	7	19
6-10	3	8
11-20	4	11
20+	5	14
No Response	3	

(Table 3 continues)

(Table 3 continued)

Characteristic	n	%
Access to labs		
1	12	33
2	8	22
3	5	14
4	6	17
5+	5	14
No Response	3	
Know your technology leader		
Yes	31	84
No	6	16
No Response	2	
Comfortable with contacting leader with instructional questions		
Yes	35	95
No	2	5
No Response	2	

Technology leaders also had demographic questions that were presented prior to the LoTi survey instrument. They were asked 16 demographic questions which was considerably more than the classroom teachers were asked to answer. The majority of the questions asked were linked to the six literature-based barriers that challenge technology leaders and are linked to the second research question in this study. These barriers include time spent on technical issues vs. instructional issues (Snelbecker & Miller, 2003; Strudler, Falba, & Hearrington, 2001), feelings of isolation and jealousy i.e. isolation - no one to bounce ideas off of due to limited number of staff with the same technical knowledge jealousy – teachers often resent the technology leader due to a disconnect in facing or understanding the barriers teachers face within the classroom (So, 2002; Wagner, 2004), limited budgets (So, 2002; Wagner, 2004), keeping up with the changes and advancements in technology (So, 2002), workload issues (Lai, Trewern, & Pratt, 2002; Wagner, 2004), and increase in responsibilities as technology becomes more prevalent (Hofer, Chamberlin, & Scot, 2004). Technology leader responses to these questions are represented in Table 4. Most of these will be investigated in further detail in alignment with research question number two and the hypotheses outlined based on the barriers described above. It is interesting to note that all 20 technology leaders' response to the question, "Would most K-12 teachers within your district know who you are? [yes; no]" was Yes which did not align with the classroom teachers response of six classroom teachers saying they did not know their technology leader well.

Table 4

Demographic Characteristics of Technology Leaders (N = 20)

Characteristic	n	%
Level of education		
Associates	0	0
Bachelors	4	20
Masters	14	70
Doctorate	2	10
Degree focus		
Computer related skills	3	15
Instruction & curriculum	4	20
Both computer & instruction related fields	10	50
Other	3	15
Years working for current school district		
0-5	9	45
6-15	9	45
16-25+	2	10
Increase in responsibilities since hired		
Yes	15	75
Somewhat	4	20
No	0	0
No Response	1	
School buildings within district		
1-3	5	25
4-6	12	60
7-9	1	5
10+	2	10

(Table 4 continues)

(Table 4 continued)

Characteristic	n	%
Professionals providing computer support district wide		
1-3	8	40
4-6	7	35
7-9	3	15
10+	1	5
No Response	1	
Day spent provided technical support (%)		
None	1	5
10-30	14	70
30-60	4	20
60-90	1	5
100	0	0
Day spent providing instructional support (%)		
None	3	15
10-30	12	60
30-60	3	15
60-90	1	5
100	0	0
No Response	1	
Teacher training provided online or face to face		
Daily	3	15
Weekly	3	15
Monthly	7	35
A couple times a year	7	35
None	0	0

(Table 4 continues)

(Table 4 continued)

Characteristic	n	%
Provided with time to train your self		
Yes	15	75
No	5	25
Superintendent supports technology integration		
Yes	12	60
Somewhat	8	40
No	0	0
Principals supports technology integration		
Yes	11	55
Most	6	30
Some	3	15
None	0	0
Technology budget		
Abundant	0	0
Sufficient	9	45
Limited	11	55
Money was received from classrooms of the future grant		
Yes	19	95
No	1	5
Would most teachers know who you are?		
Yes	20	100
No	0	0

Descriptive Statistics

Two survey instruments, MLQ and LoTi, were used by two separate groups of participants, classroom teachers and technology leaders. The MLQ determines leadership styles which is where data analysis began. Based on the technology leaders' responses and the classroom teachers who work with this leader, a leadership style was determined. Thirteen technology leaders took the MLQ survey and 36 classroom teachers took the MLQ to rate their technology leaders. There is no required minimum number of followers that should take the survey; however, it is strongly suggested that no fewer than three participate (Avolio & Bass, 2004). Six of the 13 technology leaders did have three or more raters, but due to the low response rate, results from all 13 technology leaders were used. The MLQ was scored by the researcher using a key which dissected each leadership type down via two to four specific questions in the survey. The scores obtained on these two to four questions were added and divided by the number of questions finding the average, This score determined leaders' leadership styles. Table 5 shows the leadership styles of the 13 Technology Leaders. Some technology leaders did have high scores in two areas with one leader having a high score in both the transformational category and the transactional category.

Table 5

MLQ Leadership Styles (N=13)

Characteristic	n
Transformational Leadership	
II (A) Idealized Attributes	3
II (B) Idealized Behaviors	0
(IM) Inspirational Motivation	7
(IS) Intellectual Stimulation	1
(IC) Individual Consideration	3
Transactional Leadership	
(CR) Contingent Reward	2
(MBEA) Management-by-Exception: Active	0
Passive/Avoidant Behavior	
(MBEP) Management-by-Exception: Passive	0
(LF) Laissez-Faire	0

Note. Some leaders had high scores in two areas.

Descriptive Statistics were also run in SPSS for technology leader MLQ scores which are displayed in Table 6. The variance for both Inspirational Motivation, .084, and Laissez-faire Leadership, .071 are both very close to zero suggesting that the data points are very close to the mean.

Table 6

MLQ Descriptive Stats for Technology Leaders (N=13)

Leadership Style	M	SD	Variance
Idealized Influence (Attributed)	3.233	.365	.134
Idealized Influence (Behavior)	3.107	.326	.107
Inspirational Motivation	3.430	.290	.084
Intellectual Stimulation	3.079	.407	.166
Individual Consideration	3.090	.326	.107
Contingent Reward	3.056	.448	.201
Management-by-Exception (Active)	1.774	.620	.385
Management-by-Exception (Passive)	.659	.474	.225
Laissez-faire Leadership	.299	.266	.071
Extra Effort	2.899	.447	.200
Effectiveness	3.418	.334	.112
Satisfaction	3.367	.471	.223

The second survey taken by technology leaders and classroom teachers was the LoTi. While it appeared on an initial glance of the data obtained from The LoTi Profiler that 23 technology leaders had taken the LoTi survey, it was determined that three classroom teachers had mistakenly selected the wrong survey from the pull down menu at the beginning of the survey. Based on the date and time stamps of the surveys from duplicate districts, the researcher was able to eliminate the three surveys that were mistakenly taken by the classroom teachers. A total of 20 technology leaders and 39 classroom teachers completed the LoTi. The results from the three surveys were eliminated from future use. The LoTi, PCU, and CIP scores for technology leaders and classroom teachers can be found in Table 7. A Pearson correlation was run to see if technology leader LoTi scores correlated with classroom teacher LoTi scores. The results show that there is no significant correlation $r(20) = .212$, $p>.05$

Table 7

LoTi Descriptive Stats

	N	Min	Max	M	SD
Technology Leaders					
LoTi	20	2	4	2.65	.587
PCU	20	4	7	6.30	.865
CIP	20	1	6	3.70	1.129
Classroom Teachers					
LoTi	39	0	7	4.08	1.458
PCU	39	4	7	5.97	.959
CIP	39	1	6	2.64	1.224

Research Purpose and Results

Purpose Statement

The purpose of this study was to examine if the leadership style of district technology leaders impacts how K-12 classroom teachers integrate technology into their classroom. This study focused on the barriers that both technology leaders and classroom teachers face, the transformational leadership style, and the technology integration levels determined by the LoTi survey instrument.

Results

First research question. The first research question focused on the leadership style of the technology leader identified by the MLQ survey instrument in comparison with K-12 classroom teacher technology integration scores identified by the LoTi survey instrument. Three research hypotheses were developed to focus on this question.

Research Hypotheses One. Technology leaders with a transformational leadership score on the MLQ have a significant impact on K-12 classroom teachers within their district scores on the LoTi. To examine this hypotheses technology leaders and classroom teachers both took the MLQ survey to determine what the technology leader's leadership style was. The breakdown is displayed in Table 5. Some leaders scored high in multiple categories. The classroom teacher LoTi scores were then examined based on the technology leader's leadership style which can be seen in Table 8.

There were a number of technology leaders who had fewer than the suggested three raters to determine their leadership style. It was strongly suggested that no fewer than three followers, teachers, participate in the rating process (Avolio & Bass, 2004). Of the leaders who had high scores for transformational leaders, seven had fewer than three

raters with some having no raters at all. This means many technology leaders' leadership style was self-perceived. Of the leaders who fell into the transformational leader category, five had no classroom teachers that took the LoTi survey making correlations between leadership styles and classroom integration impossible for these specific leaders.

Due to the low response rate, this led to a high number of technology leaders having a self-perceived leadership style label. Without sufficient data, no further analytical statistics could be run.

Table 8

Classroom Teacher LoTi Scores based on Leadership Styles (N = 39)

LoTi Scores	1	2	3	4a	4b	5	6
Transformational Leader	7	11	11	5	0	1	1
Transactional Leader	1	1	1	0	0	1	0
Passive Avoidant Leader	0	0	0	0	0	0	0

Note. One leader had high scores on transformational and transactional leadership styles, which means classroom teacher LoTi scores that match that particular leader were tallied in both the transformational and transactional leader categories.

Research Hypotheses Two. Technology leaders with transactional or passive/avoidant scores on the MLQ significantly impacting K-12 classroom teacher's LoTi scores. This hypotheses focuses on the non-transformational leadership styles, which due to the low response rate for this study only includes two in the transactional category and zero in the passive/avoidant category. Due to insufficient data, no further analysis was done.

Research Hypotheses Three: Technology leaders with a high inspirational motivation (IM) score on the MLQ [i.e. vision] have teachers within their district with a significantly higher LoTi Level and Current Instructional Practices (CIP) scores. There were 20 out of 31 teachers whom had technology leaders with a high inspirational motivation leader.

There were a number of technology leaders who had fewer than the suggested three raters to determine their leadership style. There is no required minimum number of followers that should take the survey; however, it is strongly suggested that no fewer than three participate (Avolio & Bass, 2004). Of the leaders who had high scores for inspirational motivation, four had fewer than three raters with some having no raters at all which means their leadership style was self-perceived. Of the inspirational motivation transformational leaders, three had no teachers take the LoTi survey. Due to insufficient data, no further analysis was done.

Research Question Two: Do technology leaders who face "barriers" identified by the literature have teachers within their districts with significantly lower LoTi scores in comparison to leaders who may not face the same barriers? These barriers include time spent on technical issues vs. instructional issues (Snelbecker & Miller, 2003; Strudler,

Falba, & Hearrington, 2001), feelings of isolation and jealousy i.e. isolation - no one to bounce ideas off of due to limited number of staff with the same technical knowledge jealousy – teachers often resent the technology leader due to technology leaders not directly facing or understanding the barriers teachers face within the classroom (So, 2002; Wagner, 2004), limited budgets (So, 2002; Wagner, 2004), keeping up with the changes and advancements in technology (So, 2002), workload issues (Lai, Trewern, & Pratt, 2002; Wagner, 2004), and increase in responsibilities as technology becomes more prevalent (Hofer, Chamberlin, & Scot, 2004).

Hypotheses One: The academic degree possessed by technology leaders has no significant difference on K-12 classroom teacher's LoTi scores. Based on the demographic data collected in the LoTi survey, of the 20 technology leaders who took the survey 4 had bachelor's degrees, 14 had a master's degree, and 2 had a doctorate degree. The focus of the degrees varied with three leaders having degrees focusing on computer related skills, four having degrees focusing on instruction and curriculum, ten in both computer and instruction related fields, and three specifying "other" as their survey choice option. Due to low response rates and insufficient data, no further analysis was done.

Hypotheses Two: The number of years a technology leader has been with their district does not significantly affect teacher's LoTi scores. Demographic data was collected in the LoTi survey. Of the 20 technology leaders who took the survey, nine have been with their district for 0-5 years, nine have been with their district for 6-15 years, and two have been with their district for 16-25+ years. Due to the low response rate and insufficient data, no further analysis was done.

Hypotheses Three: Technology leaders who are able to provide instructional support and training have teachers whom have higher LoTi scores. Demographic data was collected in the LoTi survey. Of the 20 technology leaders who took the survey, three technology leaders spent none of their day providing instructional support, twelve spent 10 to 30% of their day providing instructional support, three spent 30-60% of their day providing instructional support, and one spent 60 to 90% of their day providing instructional support. Of the 32 teachers who took the LoTi survey, their technology leaders only fell into two instructional support categories, those who spent none of their day providing instructional support and those who spent 10 to 30 percent of the day providing instructional support. Due to the low response rate and insufficient data, no further analysis was done.

Based on the demographic data collected in the LoTi survey, technology leaders specified how often they provided online or face-to-face training opportunities for classroom teachers. Of the 20 technology leaders who took the survey three technology leaders provided opportunities daily, three technology leaders provided opportunities weekly, seven provided opportunities monthly, and seven provided opportunities a couple times a year. Of the 32 teachers who took the LoTi survey, their technology leaders only fell into three categories, those who provided training daily, monthly, and a couple times a year. Due to the low response rate and insufficient data, no further analysis was done.

Hypotheses Four: Districts that have a higher number of technology support staff members have teachers with higher LoTi scores. Based on the demographic data collected in the LoTi survey, technology leaders specified how many professionals provide computer support district wide. Of the 20 technology leaders who took the

survey, eight technology leaders have 1 to 3 people district wide, seven technology leaders have 4 to 6 people district wide, three technology leaders have 7 to 9 people district wide, and one technology leader had 10+ people district wide. Of the 32 teachers who took the LoTi survey, their technology leaders only fell into three categories, those who have 4 to 6 people, 7 to 9 people, and 10+ people. Due to the low response rate and insufficient data, no further analysis was done.

Hypotheses Five. Districts that have sufficient to abundant technology budgets have teachers with higher LoTi scores. Based on the demographic data collected in the LoTi survey, technology leaders specified if they had an abundant, sufficient, or limited technology budget. Of the 20 technology leaders who took the survey, zero technology leaders had an abundant technology budget, nine had sufficient technology budgets, and eleven had limited technology budgets. Due to the low response rate and insufficient data, no further analysis was done.

Hypotheses Six: Technology leaders with the time to attend and participate in professional development opportunities have teachers with higher LoTi scores. Based on the demographic data collected in the LoTi survey, technology leaders specified if they had time to train themselves. Of the 20 technology leaders who took the survey fifteen technology leaders reported yes and five reported no. Due to the low response rate and insufficient data, no further analysis was done.

Hypotheses Seven: Technology leaders who have had increased responsibility since the time they were hired have teachers with lower LoTi scores. Based on the demographic data collected in the LoTi survey, technology leaders specified if they felt that their responsibilities had increased from the time they were hired. Of the 20

technology leaders who took the survey fifteen reported yes, four reported somewhat and one did not respond. Due to the low response rate and insufficient data, no further analysis was done.

Hypotheses Eight: Technology leaders who receive support from their district superintendent and/or building principals have teachers with higher LoTi scores. Based on the demographic data collected in the LoTi survey, technology leaders specified if their district superintendent and building principals supports technology integration. When asked if their superintendents support technology integration, of the 20 technology leaders who took the survey twelve responded yes, and eight responded somewhat. When asked if their building principals supported technology integration, of the 20 technology leaders who too the survey eleven responded yes, six said most, and three said some support technology integration. Of the 32 teachers who took the LoTi survey, their principal support categories are represented by yes and most. Due to the low response rate and insufficient data, no further analysis was done.

The MLQ instrument which measured the technology leaders' leadership styles gave the leader's raters a chance to give some narrative feedback with an open ended question being asked at the end of the survey. Classroom teachers identified all the barriers technology leaders face in the comments they made to the following question, "What are two or three things that would help this person be more effective?" Thirty-two classroom teachers chose to respond to this question. Four teachers responded with NA, "nothing", or "don't have any". The remaining 28 classroom teachers gave valuable and very insightful comments that fell into a number of categories which align with the barriers cited in this study. The comment theme categories in no particular order are as

follows: technology budgets, technical needs, training needs, technology integration and the need for a teacher's perspective, need for a vision, and technology leader time constraints. Table 9 breaks down the number of teacher responses that fell within each of these categories. There were 28 classroom teachers who gave feedback through this open ended question, and many hit upon multiple categories in their responses.

Table 9

Classroom Teacher Response Categories (N=28)

Category	n
Technology budgets	4
Technical needs	3
Training needs	7
Technology integration & teacher perspective	9
Need for a vision	3
Technology leader time constraints	7

Note. There were 28 classroom teachers who gave feedback. Many teachers mentioned multiple categories which is reflected in the response number adding to 33.

Research Question Three. Is there a difference in LoTi scores among classroom teachers in identified Blue Ribbon School Districts within Pennsylvania in comparison with non Blue Ribbon School Districts? These schools are to act as model schools because they have been academically superior, are in the top 10% in their state assessments, or have demonstrated a superior gain in achievement (U.S. Department of Education, 2009).

Hypotheses One: Exemplary schools identified by the state of Pennsylvania as Blue Ribbon Schools have teachers with higher LoTi scores. Of the school districts that participated in this research study, only one district was represented. Of the 12 districts located on the 2009 Blue Ribbon Schools list from the PA Department of Education website, only one school is slightly represented. No data analysis can be done due to the participant in this district only completing one of the two surveys giving the researcher one LoTi score of one technology leader but no classroom teacher data nor leadership style data.

Summary

Chapter four presents the results of this study examining how technology leaders' leadership styles and knowledge of technology impact how classroom teachers use technology within their classrooms. Data was collected from technology leaders and classroom teachers in public schools in the Commonwealth of Pennsylvania using two online surveys with a 5.6% response rate. With such a low response rate, it was impossible to run any analytical statistics that would be representative of all technology leaders in the Commonwealth of Pennsylvania. No concrete conclusions or generalizations could be made based on the responses received. Research Hypotheses could not be accepted or rejected due to the insufficient data received. Demographic

Data collected from the technology leaders and classroom teachers attempted to give the researcher a better picture of what possible barriers they may be facing in regards to technology integration; however, no significant findings emerged when comparing the data to classroom teacher LoTi, technology integration scores.

Data was collected from technology leaders and K-12 classroom teachers using two online surveys. The first survey, the MLQ, determined what leadership style the technology leader possessed. The second survey, the LoTi, determined what level of technology integration and knowledge the participants had. It was expected that a transformational technology leader would have a more positive impact on classroom teacher's technology integration. Technology leaders facing barriers cited in the literature were expected to have a negative correlation to classroom teacher LoTi, technology integration scores. The data collected did not support either of these hypotheses.

With only 13 technology leaders from the 500 public schools in Pennsylvania completing the MLQ, this gave us a very limited picture of leadership styles that technology leaders possess. While we had the majority of technology leaders falling into the desired transformational leadership style, there were very few leaders who fell into the other categories to give us a true comparison when looking at how varied leadership styles effect technology integration within the classroom.

CHAPTER V

DISCUSSION

Introduction

This chapter presents a summary of the study which focuses on the leadership styles of technology leaders in relation to how classroom teachers integrate technology into the classroom. This chapter will present the findings in connection with the existing literature, conclusions, and implications for action, study limitations, and recommendations for further research.

Summary of the Study

The way students are constructing their knowledge through the use of technology is reflected in today's classroom making it necessary to step back and look at our current curriculums and consider the use of technological devices to make learning more effective (DeGennaro, 2008). Teachers are facing many barriers when they have the task of integrating technology into their curriculum. Technology leaders face many barriers themselves. They are expected to bridge the gap between the technological realm and the instructional needs of the classroom teacher to help enhance student learning. Technological Pedagogical Content Knowledge requires that teachers and technology leaders realize that the roles and knowledge they were responsible for has now shifted with the evolution and accessibility of technology (Mishra & Koehler, 2006). Teachers are now responsible for more than just pedagogy and technology leaders are responsible for more than just technology (AACTE Committee, 2008, p. 9). Technological Pedagogical Content Knowledge offers a new paradigm of thinking and ISTE NETS standards have been set to act as a curriculum guide to help both teachers and technology

leaders meet the needs of today's students. Swain and Pearson (2002) believe that the implementation of ISTE NETS standards and a standards based curriculum have the ability to level the playing field for students in the classroom. This combination will aid in bridging the digital divide we see in our schools.

The role of the technology leader within schools is crucial to the success of how technology is being integrated (lai, Trewern, & Pratt, 2002; Sugar & Holloman, 2009). Transformational leadership is known to involve charismatic and visionary leadership styles to "transform" their followers (Northouse, 2004). This model is looked at as a process between the leader and followers with the follower's role being just as important and integral as the leader's role. Transformational leadership looks at the big picture because it focuses on the role of the follower and what needs to be accomplished (Northouse, 2004).

Many studies have looked at the leaderships styles of the school principal in regards to technology integration and implementation of technology policies (Hadjithoma-Garstka, 2011; Kozloski, 2006; Moses, 2006). Not all of these studies focused on the same leadership classification system nor did they all use the same instruments to measure leadership or classroom integration of technology. This study focused on the leadership styles of technology leaders who are not always in the same building as the classroom teacher like the school principal would be. Technology leaders are still responsible for providing support to all teachers within their district to make technology integration occur. This study attempted to make the connection that transformational leaders make an impact in technology integration in public school classrooms in the Commonwealth of Pennsylvania.

To collect data for leadership styles and to measure technology integration, two online instruments were used. The Multifactor Leadership Questionnaire (MLQ), which determines the leadership style of the technology leader, is the most widely used instrument to measure transformational leadership qualities (Northouse, 2004). The Level of Technology Implementation Questionnaire (LoTi) was used to measure the level of technology integration happening in the classroom. Demographic data was collected through a series of questions that the researcher compiled. This was done to give a clearer picture of what types of literature-based barriers classroom teachers and technology leaders may face which could effect technology integration.

There are 500 public school districts in the Commonwealth of Pennsylvania. This study attempted to survey technology leaders from each of these school districts along with ten K-12 classroom teachers within each district who work with these technology leaders. The potential for a very large population existed; however, a very low response rate of 5.6% after three survey distribution periods has limited the study in its data analysis. Generalizations could not be made based on the low number of responses. The survey results would not be considered a fair representation of the technology leaders or classroom technology integration practices for the entire Commonwealth of Pennsylvania.

The results of the demographic responses demonstrated that many technology leaders and teachers were facing the barriers outlined in the literature. These barriers include time spent on technical issues vs. instructional issues (Snelbecker & Miller, 2003; Strudler, Falba, & Hearrington, 2001), feelings of isolation and jealousy (So, 2002; Wagner, 2004), limited budgets (So, 2002; Wagner, 2004), keeping up with the changes

and advancements in technology (So, 2002), workload issues (Lai, Trewern, & Pratt, 2002; Wagner, 2004), and increase in responsibilities as technology becomes more prevalent (Hofer, Chamberlin, & Scot, 2004). Due to the low response rate, no analytical statistics could be run due to insufficient data.

Findings Related to Literature

Research Question One

Research question one focused on the leadership style of technology leaders determined by the MLQ survey and how it affects K-12 classroom teacher technology integration scores identified by the LoTi survey. If teachers are to shift their teaching practices and therefore their values and beliefs as to how learning takes place, a strong and effective technology leader needs to be available (Lai, Trewern, & Pratt, 2002). The impact that a transformational leader has on their followers has been documented to be beneficial and has led to desired changes within educational settings. Leithwood (as cited in Liontos, 1992) finds transformational leadership as having improved teacher collaboration, changed attitudes towards school improvements, and has changed instructional practices.

Three hypotheses were developed with the researcher expecting to see a correlation between transformational leadership and high technology integration scores for classroom teachers. Other leadership styles such as transactional and passive/avoidant are identified by the MLQ survey. It was expected that these leadership styles would not show the same high correlations as the transformational leadership style in regards to technology integration scores from the LoTi. Of the 13 technology leaders who took the MLQ survey, the majority of them had high scores within the

transformational leadership style. It is important to note that some technology leaders had high scores in multiple areas. One technology leader had a high score in both transformational and transactional leadership. While Avolio & Bass (2004) do not cite how common it may be to score high in two separate leadership categories, they do make the statement, "transformational leaders can be transactional when appropriate" (p. 21) With the view that leadership being more of a process and not a personality trait, this would allow leaders to conform their leadership styles to meet the needs of the environment they may be placed in (Northouse, 2004). No significant correlations were able to be determined based on the 13 technology leaders and the 39 K-12 classroom teachers' LoTi scores.

Inspirational motivation is one subcategory under transformational leadership which focuses on the vision a leader possesses. Creating a shared vision with teachers will eliminate the top-down approach that we often see with technology integration. Teachers who do not see the impact that technology could have in education will resist changing their teaching styles to incorporate technology. Others with greater technological comfort will embrace it. The likelihood of teachers accepting technology as a new teaching tool is more likely to transpire if the teacher believes in the vision (CoSN K-12 CTO Council, 2004; Levin & Wadmany, 2006-07; Salpeter, 2000; Wagner, 2004). Seven of the 13 technology leaders whom participated in this study had high scores within the inspirational motivation category of transformational leadership. Even with half of the participants having this quality, no significant correlation could be found with classroom teacher technology integration scores.

Research Question Two

Research question two focuses on the barriers technology leaders face in helping teachers integrate technology. These barriers include time spent on technical issues vs. instructional issues (Strudler, Falba, & Hearrington, 2001; Snelbecker & Miller, 2003), feelings of isolation and jealousy (So, 2002; Wagner, 2004), limited budgets (So, 2002; Wagner, 2004), keeping up with the changes and advancements in technology (So, 2002), workload issues (Lai, Trewern, & Pratt, 2002; Wagner, 2004), and increase in responsibilities as technology becomes more prevalent (Hofer, Chamberlin, & Scot, 2004). Eight hypotheses were developed around the barriers cited in the literature.

No significant correlations were calculated between the barriers technology leaders face and teacher technology integration LoTi scores due to there not being enough data to run analytical statistics. There are some points that can be made in connection with the barriers that technology leaders face. Technology leaders' roles are vast and different among school districts (Lesisko, 2005; So, 2002; Wagner, 2004). Responsibilities have increased as technological advances continue and the growing amount of technology that is being placed at educators' fingertips increases (Hofer, Chamberlin, & Scot, 2004). Fifteen of the twenty technology leaders who completed the demographic questions feel that their responsibilities have increased from the time they were hired. With this increase in responsibility comes a strain on time. This makes finding a balance of providing technical and instructional support a challenge for technology leaders if their particular district does not have a team of computer support personnel. This researcher speculates that time restraints of technology leaders was a leading factor in the lack of participation with this study. This conclusion was based on

the literature provided dealing with the demanding job roles of technology leaders (Ausband, 2006; CoSN K-12 CTO Council, 2004; Davidson, 2003; So, 2002; Wagner, 2004). It is also based on a handful of responses received from technology leaders via email saying they would love to participate but could not due to lack of available time. One technology leader who was unable to participate stated "I can appreciate the need for collecting data. . . . I have wanted to participate but time has eluded me." Another email received from a technology department stated, "We are bombarded by countless surveys and cannot accept them all." Sheehan (2006) states, "Studies show that some Internet users receive more than 39 unsolicited e-mails per day at the workplace alone" (Discussion section, para. 3) Sifting through these emails would prove to be time consuming along with determining which surveys are legitimate and which surveys are beneficial to the district.

The MLQ survey instrument which measured the technology leaders' leadership styles gave the leaders' raters a chance to give some narrative feedback with an open ended question. Classroom teachers identified all the barriers technology leaders face in the comments they made to the following question, "What are two or three things that would help this person be more effective?" Thirty-two classroom teachers chose to respond to this question. Four of these teachers responded with NA, nothing, or "don't have any". The remaining 28 classroom teachers gave valuable and very insightful comments that fell into a number of categories which align with the barriers cited in this study. The comment theme categories are as follows: technology budgets, technical needs, training needs, technology integration and the need for a teacher's perspective, need for a vision, and technology leader time constraints. The comments gave a better

picture of not only what barriers classroom teachers face but also where technology leaders are struggling due to the barriers that they themselves face.

Beginning with technology budgets, two classroom teachers mentioned limited budgets in their responses and two expressed the need for more technology in classroom and schools. Access to technology and inadequate resources are identified as a barrier teachers face when it comes to integrating technology (Brinkerhoff, 2006; Forgaz, 2006; Franklin, 2007; Hew, 2007; Jazzar & Friedman, 2007; Li, 2007; Lim & Khine, 2006; Mehlinger & Powers, 2002; Roblyer, 2000; Strudler, 1995-96; Strudler, Falba, & Hearrington, 2001; Whitney, 2000). A connection can easily be seen with limited budgets and their correlation to lack of access to technology (So, 2002; Wagner, 2004).

Next, three classroom teachers made comments related to technical-related issues and the need for them to be addressed. Teachers can not teach with technology if the technology is not working properly. Many teachers have identified technical-related issues as a major barrier that they face and this barrier often results in a loss of planning or instructional time (Brinkerhoff, 2006; Hofer, Chamberlain, & Scot, 2004; Li, 2007; Lim & Khine, 2006; Mehlinger & Powers, 2002; Moses, 2006; Sandholz & Reilly, 2004). Technology leaders find themselves spending a great deal of time fixing technical issues which takes away from aiding teachers with the instructional support that they need (Snelbecker & Miller, 2003; Strudler, Falba, & Hearrington, 2001).

Training becomes the next identified category with seven teachers commenting on training. Their comments focused on requests for their technology leaders to share their wisdom, offer a variety of workshops that would ”review and refresh skills”, provide more detail when training, find time to share new technologies with staff, and hold

multiple training opportunities targeting specific grade levels. Training is identified in the literature as a barrier teachers face in technology integration (Brinkerhoff, 2006; Forgasz, 2006; Franklin, 2007; Lim & Khine, 2006; Mehlinger & Powers, 2002; Moses, 2006; Roblyer, 2000; Sandholz & Reilly, 2004; Strudler, 1995-96; Strudler, Falba, & Hearrington, 2001; Wagner, 2004; Whitney, 2000). The need for technology leaders to provide on-going training is imperative to the success of technology integration. On-going support is reflected in the literature as being one of the main ingredients for helping teachers to overcome the barriers they face in the classroom in regard to technology integration (Glazer, Hannafin, & Song, 2005; Kajs, Tanguma, 2005; Mayo, Jazzar & Friedman, 2007; Salpeter & Bray, 2003; Sherry & Gibson, 2002; Snelbecker & Miller, 2003; Swain & Pearson, 2002; Wagner, 2004; Wells, 2007)

The next category deals with technology integration. There were five classroom teachers that had comments that focused on technology integration. Technology leaders need to aid classroom teachers across the many barriers they face in technology integration. The time technology leaders spend providing instructional support to classroom teachers is vital to the successful integration of technology. The technical aspect is extremely important, "technology integration in classrooms is more about teaching and learning than it is about technology" (Kozlaoski, 2006, p. 37). Wagner's (2004) study looked at characteristics that made technology leaders successful. He found that 95% of technology leaders felt their main responsibility was to facilitate the integration of technology into the schools they supported. Despite the fact that technology leaders feel this is their most important role, other studies support the fact that the majority of the technology leaders' time is spent troubleshooting technical issues

(Dexter, Anderson, Ronnkvist, 2002; Hofer, Chamberlin, & Scot, 2004; Lai, Trewern, & Pratt, 2002; Snelbecker & Miller, 2003; So, 2002; Sturdler, Falba, & Hearrington, 2001; Wagner, 2004). This supports the demographic data collected from the technology leaders in this study. The researcher was surprised to find that of the 20 technology leaders, twelve said they only spent 10 to 30 percent of their day providing instructional support, four leaders spent more than 30 percent, and three spent none of their day providing instructional support. The data provided could point to two separate conclusions. First, technology leaders due to the many barriers and time restraints they face are not able to allocate a great deal of time towards instructional support (Hofer, Chamberlin, & Scot, 2004; Lai, Trewer, & Pratt, 2002; Snelbecker & Miller, 2003; Wagner, 2004). The second conclusion could link to a limitation in the study pointing to some districts that have multiple technology leaders. The researcher attempted to get the surveys into the hands of the technology leader who deals mainly with instructional support. In the event the technology leader receiving the invitation to participate did not match this job role, they were asked to forward the invitation to participate to the leader who does deal with instruction support.

The need for a teacher's perspective becomes the next category with five classroom teachers having comments that focused on the need for the technology leader to have a teacher's perspective. Most of these teachers felt technology leaders needed to be actively present in the building interacting with teachers and students to see how teachers were currently using technology. As one teacher stated, "Perhaps [technology leaders need to have] a greater perspective on how teachers will use the technology." One teacher stressed the need for teachers to be a part of the decision making process on

technology use and another teacher stressed the need for the technology leader to ask teachers what their technology needs may be. Teachers are now responsible for more than just pedagogy and technology leaders are responsible for more than just technology (AACTE Committee, 2008, p. 9).

The need for vision is the next comment category. Teachers must understand why integrating technology is paramount and what benefits can ensue from its use (Li, 2007; Lai, Trewern, & Pratt, 2002; Mehlinger & Powers, 2002). Three classroom teachers commented on the technology leader's vision of technology with the following comments, a need for the use of proactive strategies, "A more clear vision for the district and content clarity would be helpful.", and "Perhaps having a technology newsletter go out occasionally would give the rest of the staff a heads-up about the great things going on." These teacher comments fell in line with the literature. A technology leader with a vision has a conceptual map for where the organization is headed" (Northouse, 2004, p.183). The vision of a technology leader will not only give a view of the bigger picture so they can plan, but it also allows teachers to see the big picture as well. Costello (1997) agrees that without a mutual vision, "it will be difficult to set priorities, to know where we are headed, and to know whether we have achieved what we are trying to accomplish" (p. 58). Teachers must understand why integrating technology is so important and what benefits can ensue from its use (Lai, Trewern, & Pratt, 2002). Albion and Ertmer (2002) find that, "teachers are not motivated to tackle the challenges of integrating technology unless they have a vision for how it will improve teaching and learning" (p. 1). which suggests that, ". . . teachers are not motivated to tackle the challenges of integrating

technology unless they have a vision for how it will improve teaching and learning. (Albion & Ertmer, 2002, p. 1)

The last comment category dealt with the time constraints that technology leaders face and classroom teachers recognize. The comment that stood out most to this researcher is, "clarification of role" is needed for technology leaders. The literature supports the fact that the role of a technology coordinator is not an easy job for any one person to fill, "The Technology Coordinator position requires a person with a unique blend of skills and abilities that enables the person to work with both equipment and people." (Lesisko, 2005, p. 14-15) This is the base of many technology leaders' barriers because they are expected to do it all (Lai, Trewern, & Pratt, 2002; Wagner, 2004). This is where time constraints begin to come into play because one person can not meet all the technical and instructional needs within any school district. Marcovitz and Reilly (as cited in So, 2002) both suggest splitting the role into an administrative role, technical role, and instructional role. Other classroom teachers recognized the need for additional people to be on the technology staff, and another teacher states the need for a technology professional in each building that would focus only on classroom integration of technology. Teachers are clearly facing their own set of barriers; however, they recognize the barriers their technology leaders are facing as well. Teachers recognize this because the technology leader's strained time to work with teachers on instructional needs is directly impacting the education process. Hofer, Chamberlin, and Scot (2004) point out that as schools are obtaining more technology, the responsibilities of the technology leader is increasing. Hofer, Chamberlin, and Scot (2004) also look at the roles technology leaders play within their districts and state, "These diverse

responsibilities make it difficult, if not impossible, for the technology coordinators to offer direct instruction to teachers and staff" (p.2).

Research Question Three

The third research question focused on blue ribbon school districts within the Commonwealth of Pennsylvania in comparison with non blue ribbon school districts. These schools were to act as model schools because they have been academically superior, being in the top 10% in their state assessments, or have demonstrated a superior gain in achievement (U.S. Department of Education, 2009). In the Commonwealth of Pennsylvania, the Pennsylvania System of School Assessment (PSSA) is the assessment used to measure student achievement and a school's ability to help students achieve proficiency. It was expected that schools identified by the Commonwealth of Pennsylvania would have teachers with higher technology integration scores due to the success these schools have had with PSSA scores. The idea that these schools are considered exemplary in the Commonwealth of Pennsylvania, it would have been interesting to see if any correlations could have been made to technology use. Finding a link between PSSA scores to higher technology use within the classroom would have significantly supported the importance of technology use. Because only one survey was completed from a blue ribbon school district, there was not enough data to make any comparisons.

Conclusions

"Technology is change and change requires leadership." (Kozlaoski, 2006, p. 30) This statement encompasses the challenge being faced in our schools and the need for technology leaders to take on an active leadership role. Many barriers exist for K-12

classroom teachers when it comes to integrating technology within the classroom. These barriers include things such as technical support, instructional support, lack of leadership, lack of vision, and many more which are displayed in Table 1. Technology leaders are attempting to overcome their own set of barriers which include time being spent on technical issues vs. instructional issues (Snelbecker & Miller, 2003; Strudler, Falba, & Hearrington, 2001), feelings of isolation and jealousy (So, 2002; Wagner, 2004), limited budgets (So, 2002; Wagner, 2004), keeping up with the changes and advancements in technology (So, 2002), workload issues (Lai, Trewern, & Pratt, 2002; Wagner, 2004), and increases in responsibilities as technology becomes more prevalent (Hofer, Chamberlin, & Scot, 2004). Technology leaders must overcome their own barriers while aiding teachers in overcoming their own set of barriers to achieve a technology infused learning environment for the students of today.

With a 5.6% response rate, generalizations could not be made to the larger population of technology leaders in the Commonwealth of Pennsylvania. Analytical statistics could not be calculated, and no generalizations could be made based on the limited data obtained.

Despite the low response rate, this researcher feels two main foci need to be considered by technology leaders and future researchers. The first main focus should be leadership style. The second focus should be Pedagogical Technological Content Knowledge (PTCK). Each district faces its own unique challenges and barriers. Technology leaders need to address these unique challenges to make technology integration practical in their individual districts. Successful leadership is one of the key correlates that bring together so many variables that are often uncontrollable (Fullan,

2002). Effective schools research looked at schools that were successful despite the demographics of the schools. Researchers such as James Coleman (as cited in Association for Effective Schools, Inc., 1996) disputed that variables such as family backgrounds were directly linked to the success or failure of the school. Edmonds (as cited in Association for Effective Schools, Inc., 1996) found any school could succeed despite the challenges they may face and one key reason for this was attributed to strong administrative leadership. The researcher therefore concludes that technology leaders and their leadership styles should be able to overcome the many variables that exist to be successful at technology integration. Technology leaders need to become aware of their leadership style and consider if changes in how they interact with classroom teachers may impact how technology is being integrated. "The new paradigm does not require technology coordinators to change their personalities; however, it does necessitate the importance of recognizing the leadership significance of their performance and position" (Sugar & Holloman, 2009, p.73). Leithwood and Jantzi (2005) evaluated transformational school leadership research from 1996 to 2005; the majority of participants in the study fell into the transformational leadership style. Leithwood and Jantzi (2005) defined transformational leadership as, "an extremely popular image of ideal practice in schools at the present time" (p. 178). With such a low number of the technology leader population being represented within this study, it can not be confirmed that transformational leadership is still a popular image of ideal practice.

It is imperative that technology leaders are aware of ISTE NETS standards that teachers are following and the TL ISTE standards set for technology leaders. Both sets of standards were designed to hold teachers and technology leaders accountable. It is also

important that they are achieving high levels of PTCK to ensure they can provide teachers with the perspective they need. This will ensure that they are providing quality technology support to teachers as they educate our future leaders of America who need to be fluent in technology to survive in the workforce (Li, 2007). By focusing on PTCK and integrating state technology standards, teachers and technology leaders should be able to achieve higher levels of technology integration and higher LoTi scores. This will demonstrate that students are using technology to enhance learning in authentic learning experiences. As Cuban, Kirkpatrick, and Peck (2001) have found teachers are using technology to sustain traditional forms of teaching rather than transforming their teaching practices to maximize the impact of technology integrated instruction. The shift in teaching practices will be in a large part due to the leadership role the technology leader plays within the change process in their schools (Lai, Trewern, & Pratt, 2002).

Implications for Action

This study attempted to link technology leadership styles to the level of technology integration with K-12 classrooms. With an extremely low response rate no significant generalizations could be made. It was very difficult to draw any clear conclusions or make any generalizations for all technology leaders across the Commonwealth of Pennsylvania. The strain on the technology leader and the roles that they play within their districts remains a barrier that the researcher believes contributes to the low response rate. The literature supports the fact that the role of a technology coordinator is not an easy job for any one person to fill; "The Technology Coordinator position requires a person with a unique blend of skills and abilities that enables the person to work with both equipment and people" (Lesiski, 2005, p. 14-15). With many

districts only having one technology leader, they are forced to meet technical, instructional, and administrative needs. Teachers even recognize the need of technology leader's roles lack of clarity as one teacher comments on the MLQ that clarification of role would be helpful.

Instructional support should remain a top priority for technology leaders to ensure teachers are able to capitalize on the technology tools that will enhance the education of our students. "Schools need leaders who can facilitate this change process and support a learning community for technology integration" (Kozlaoski, 2006, p. 2)

"PTCK is the basis of good teaching with technology. . . "(Mishra & Koehler, 2006, p. 1029) It is the teacher's understanding of the relationship between technical knowledge, pedagogical knowledge, and content knowledge that sound technology integration takes place within the classroom (Koehler & Mishra, n.d.). To measure the level of technology integration, The LoTi instrument was used. It measured levels of technology use using a 6 point scale ranging from nonuse to refinement. At level 1, awareness, teachers use technology for classroom or classroom management tools such as email, grade books, lesson plans, and PowerPoint presentations. At level 2, exploration, technology is used as extension activities or enrichment activities. Learning is more at a knowledge/comprehension level for students. Level 3, infusion, teachers develop multimedia projects and students use thinking skills, problem solving skills, decision making skills, reflection, and scientific inquiry using tools such as databases, spreadsheets, graphs, and PowerPoint. Level 4, integration, is broken into two categories mechanical and routine. At the mechanical level, teachers use technology tools to provide understanding of classroom concepts. The teachers rely heavily on pre-packaged

and outside resources. At the routine level, teachers design and implement authentic learning experiences with little to no outside resources. Level 5, expansion, teachers access networks beyond their classroom walls by connecting with other schools, businesses, government, and research institutes. Lastly, Level 6, refinement, shifts to a solely learner based environment where students are given a real world problem to solve and the technology tools to complete the task (Moersch, 2001).

Moersch (2001) surveyed thousands of classroom teachers from 1999 to 2001 using the LoTi survey instrument. Results showed that 69% of teachers were using technology at a Level 1 and 2. Only 14% were using technology at a Level 4A and above. In this study, data was collected in 2009-2010, 39 K-12 classroom teachers fell in all 6 levels of technology integration with 62% falling into the level 2 and 3 which are the exploration and infusion level. Of the 20 technology leaders who participated in this study 95% fell into levels 2 and 3 as well. If teachers are expected to be efficient at PTCK, where should our technology leaders be? The level of expected knowledge in PTCK should be set at the highest level for technology leaders as they are the individuals training teachers on this topic. There needs to be a shift in how technology leaders are thinking about technology, and there needs to be a drive to move teachers into levels 4 to 6 of technology integration where authentic learning is taking place. If technology leaders do not posses a higher level of PTCK, how are they going to led teachers into these levels of integration? Teachers are expected to develop PTCK within their content areas but are not always provided with examples on how other teachers are integrating technology to enhance learning. Technology training should be shifting to answer these questions, "How do you use technology to improve student achievement? Teachers must

change the way they teach by creating a student centered learning environment where technology is used as a tool for learning. Jonassen, Howland, Moore, and Marra (2003) support the fact that, "Students do not learn from technology, they learn from thinking" (Chapter 1, p. 11). What does it look like to teach a standards-based lesson infused with technology (Salpeter & Bray, 2003, p. 2) The ISTE NETS standards were created as a guide for teachers to integrate technology within their curriculum. These standards focus more on the skills and less on the technology tools supporting a constructivist approach (ISTE, 2007). Ertmer, Gopalakrishnan, and Ross (2001) examined pedagogical beliefs and classroom practices of 17 classroom teachers that were identified as being exemplary technology using teachers and found that these teachers had constructivist teaching approaches. In this teaching approach, students work on collaborative group projects, reflect on their learning, and students essentially construct their own knowledge.

Limitations

To explain why response rates were so low, ten technology leaders were contacted after the data collection took place for this study. Some of the technology leaders selected were participants in this study while some received an invitation to participate but did not participate for various reasons. These leaders were selected due to connections they may have had with Duquesne University, being in graduate school and having expressed interest in the study during the survey distributions, having offered to help in any way during the survey distributions for this study, and having a research background. Each of these ten technology leaders received an email asking for feedback on technology leader's participation in surveys. In this email the researcher listed numerous factors as reasons why technology leaders may have chosen not to participate

in this study. This list included time constraints, dismissed as non essential to the district and not priority, bombarded with online surveys, length of survey(s), not wanting teachers to rate your leadership style, preference over paper and pencil surveys vs. online, a chance to win 1 of 10 ipod shuffles wasn't enough incentive, and district policy was not to complete outside surveys. The ten technology leaders were asked if they agreed with the list or could add or take away factors on the list. They were also asked to provide any feedback that would aid future researchers in designing studies. Of the ten technology leaders contacted, six responded. Time constraints were cited by five of the six leaders as the leading factor for nonparticipation. The time to complete the two surveys for this research study was stated to be approximately 50 minutes which could be broken up within a two week time span. Technology leaders also had to select 10 K-12 classroom teachers and forward invitation to participate emails to them along with enter their names and email addresses within the Mind Garden online interface for the second survey invitation to be sent to the K-12 classroom teachers they selected. If a technology leader deemed the time was too extensive, the research not only lost the participation of the technology leader from that district but also the 10 potential teachers from that district as well. The other factors that technology leaders specifically highlighted in their feedback as to reasons they did not or would not participate were the fact they are bombarded with surveys, the length of the survey, and the relevance of the survey. There was one leader who said they would add the following to the list of factors, "I prefer not to take surveys that provide limited and defined answers with which I do not agree." One leader said that he would prefer online surveys over paper and pencil due to the time it would take to pack and mail materials. The fact that some of the leaders are graduate students

themselves led to them be more sympathetic to others doing studies for their graduate work. Lastly, one leader found that in his own research studies done across the United States recently had yielded a 19% response rate. This leader validated that all the factors listed were strong with time being the most important factor. While this was a small group of technology leaders providing feedback, this researcher feels that their comments provide a great deal of insight into the limitations of online surveys and methodologies.

There are a number of limitations that need to be addressed with the methodology of this study. The limitations fell into many categories and included distribution of surveys to the correct person within the district, the number of emails each participant received, email limitations, selection of K-12 classroom teachers, timing of the survey distributions, confusion and length of the survey instrument(s), self perceived leadership styles, surveys being viewed as non-essential to the district, use of incentives, and low response rates in connection with representation of the population.

The first main limitation deals with the distribution of surveys. The researcher visited the website of each intermediate unit across the Commonwealth of Pennsylvania to obtain a list of public school names and links to their district sites. Each districts' website was visited to find the email addresses of school superintendents and technology leaders. The majority of school district websites had this information present on them; however, there were 124 school districts out of 500 that did not post email addresses for the district superintendent and/or technology leader. The researcher called each of these districts to obtain the needed information. Without a known central database of this information being in existence, the following limitations ensued. Were district websites up to date? If there were multiple technology team members, was the one selected for the

email distribution the technology leader that worked with instructional integration? And lastly, when phone calls were made to districts to obtain email addresses, it was at the discretion of the person the researcher spoke with to give the correct name and information. To attempt to limit the problem of the wrong technology leader within a school receiving the invitation to participate, the researcher did include the following statement within the introduction email,

> "If your district has many technology leaders and you are not the leader whom works with teachers in regards to technology integration, please forward this email to the person who would best fit this description. Please include my email address msmithresearch@hotmail.com in the CC: section of the email so I do not bother you with any additional email reminders."

Only two technology leaders who received the initial invitation forwarded their invitation to another technology leader within their district that they felt were more suited to take the surveys. It is possible that additional leaders may have forwarded this to other technology leaders but did not carbon copy this change to the researcher.

The next limitation deals with the number of emails that were sent to each technology leader to participate. Each technology leader received three emails. The first email from the researcher contained an introduction letter, consent to participate form, a link to the first survey, and a checklist of what needed to be done to be entered into the iPod shuffle drawing. The second email sent to technology leaders was for the technology leaders to forward to ten teachers of their choice within their district. The third email sent to technology leaders was sent via the Mind Garden Company as an invitation to take the second survey, the MLQ. The reason the link to the MLQ could not

be included in the initial email the researcher sent out was due to the security features set on Mind Garden's website that only allowed the participant to enter their unique page from the link that the company itself sent. The number of emails may have proved to be overwhelming and may have caused confusion.

Email limitations encompass the next set of limitations found by the researcher to have occurred. Limitations ensued within the hotmail account the researcher created for this study, within district spam filters, and with the perceptions of the surveys received as being spam. Emails were sent using a hotmail account created by the researcher. Because of the large number of surveys being sent out, it was discovered that hotmail had a built in spam protection filter that only allowed any one account to mail out 100 emails in a given 24 hour period. This hotmail account was upgraded to hotmail plus to allow for more emails to be sent in a given 24 hour period. The consideration of using a Duquesne based email address may have made the researcher's affiliation to a university clearer than an email coming from a hotmail account making it less likely to be disregarded as spam. It later came to the researcher's attention after receiving an email from a participating classroom teacher that they did not receive an invitation to complete the second survey. After email communications with their technology leader, it was determined that their districts spam filters were blocking the email being sent out by Mind Garden Inc. This was the company distributing the second survey, MLQ. While only one participant brought this to the researcher's attention, it can be assumed that other district's spam filters were blocking these emails as well. After talking with the Mind Garden Company, the researcher was able to include the link to the MLQ in the initial technology leader email eliminating the need for the third email coming from the

company Mind Garden. This was allowed due to an upgrade in the Mind Garden's system that occurred after the first survey deployment had taken place. This did not eliminate the fact that the classroom teacher still had to receive their MLQ link through the email Mind Garden sent. Lastly, the possibility of the researcher's emails being disregarded as spam or deleted without being opened is a very good possibility. Just as telemarketers have caused a decrease in telephone survey responses, the increase in spam within email accounts has made response rates decline and has made it difficult for researchers to make their emails stand out as legitimate (Fricker & Schonlau, 2002; Porter & Whitcomb, 2003; Shih & Fan, 2008; Sills & Song, 2002).

Selection of K-12 classroom teachers arose as the next limitation of this study. The researcher had to depend on the technology leader to choose to participate in the study and then to choose to pass the survey along to ten K-12 classroom teachers of their choice. Technology leaders may have been intimidated by others that would be rating their leadership styles. They may have chosen not to participate in this study for this fact even though it specifically stated within the instructions that no one would see the results within their district. Leaders more confident in their leadership styles may have been more inclined to participate. There was also a slight chance for bias as to whom the technology leader chose to send the invitations to participate to. With such a large sample size, it would have been impossible for the researcher to select up to 10 K-12 classroom teachers within each district. This may have led to selection of first year teachers who may not have known their leaders well. By having the researcher select classroom teachers, it would have placed the names and contact information of a potential 5,000 participants in the researcher's hands. By having the technology leader determine

which classroom teacher received the survey, it gave participants a bit more confidentiality as the researcher did not need to know the names of the classroom teachers participating. It also allowed technology leaders to select people that would best rate their leadership styles. Technology leaders may have also selected people who they know would rate them favorably not giving a true representation of their true leadership style.

Timing of the survey deployments presents itself as the next limitation in this study. Looking at the three deployment dates of this study's surveys, it may lead to the question as to whether the time frames were not conducive for classroom teacher participation. There were three survey deployments each lasting for approximately two to two and half weeks long which were over the 10 days minimum suggested by Fricker and Schonlau (2002) to achieving higher response rates. The first survey deployment took place on December 4, 2009 right before the Christmas break. The second survey deployment took place on January 12, 2009 which may have been at the end of a semester/quarter break where teachers were preparing midterms and or grades. The third survey deployment occurred on February 18, 2009 which was a couple days before the Commonwealth was hit with a massive snow storm closing schools for many days. While these may or may not have been factors for the technology leaders themselves, it may have had an impact on classroom teacher participation levels within the districts that had leaders participating in the study.

The next limitation dealt with the length and confusion of the survey instrument(s). It was estimated that a total of 50 minutes would be needed to complete both surveys and demographic questions within this study. The literature has mixed

reviews on survey length in regards to response rate (Cook, Heath, & Thompson, 2000; Sheehan, 2006). Cook, Heath, & Thompson (2000) analyzed 68 web based surveys and compared their findings with similar studies done with mailed surveys that had on average 72 questions on 7 pages taking on average 30 minutes. They found that web based surveys had lower response rates. Sheehan (2006) also cites mixed reviews in regards to survey length when looking at email surveys since 1986. They found From a handful of technology leaders currently in the Commonwealth of Pennsylvania, three of the six identify survey length as a main factor for not choosing to participate in surveys. One leader also points out that this goes hand in hand with the time constraints they face. The time factor and length of the survey may have been a deterrent for many technology leaders that are already too busy to begin with. There was also some confusion with the survey instruments that were brought to the researchers attention by participants and also evident in the collected data. The main concern was with the LoTi instrument and the pull down menu option that allowed participants to choose the technology leader survey or the classroom teacher survey. If a participant did not choose the correct option, they were not taking the correct survey. One technology leader said they realized that they had chosen the incorrect survey and was able to go back and change it; however, there were 3 classroom teachers that took the incorrect LoTi survey. Their data had to be eliminated from use. Another participant who was a technology leader stated that the LoTi questions were somewhat confusing to answer if the district had a technology team and not just one technology leader.

Self perception of leadership styles is the next limitation within this study especially due to the low response rate received. This study asked technology leaders to

rate themselves as to what kind of leader they perceive themselves to be. The researcher is therefore asking for self perceived information which could be skewed depending on how honestly participants answer questions and rate themselves. Fricker and Schonlau (2002) found one advantage to selecting a web based survey was a perceived anonymity a participant may feel leading to a more honest response to questions. With such a low response rate, self perception became a big problem especially when seven technology leaders who took the MLQ had under the suggested three raters with four of the seven having no raters to determine leadership styles. Their labeled leadership style is therefore self perceived which may or may not be a true representation of this leader.

The next limitation dealt with the idea of participation in this study as nonessential to district needs. Technology leaders were not receiving feedback as to leadership styles or classroom teacher technology integration scores. This was designed so classroom teachers could rate their leaders without the fear that their ratings or comments would be seen by their leader and maybe tracked back to them. The researcher placed the following statement in both introduction emails for technology teachers and leaders to let them know district participants would not be viewing the data collected. "Please keep in mind that the only person analyzing the survey data is the researcher of this study. District names and participant names will not be published." Mind Garden also placed the following within the classroom teacher's invitation email, "This aggregation is to assist you in providing direct and honest feedback to (technology leader) since you will not be identified with your ratings." Technology leaders were not gaining district specific information by participating nor were they gaining district acknowledgements for their participation. One technology leader stated the following

when asked what they felt were factors for nonparticipation, "I have a job to do and if taking the survey isn't going to play directly into that job, I am not going to be very inclined to do it." Over-surveying is becoming a growing problem as the ease of web surveys grows, "Over-surveying in a growing number of areas means that employees are flooded with questionnaires (Weiner & Dalessio, 2006). District leaders are sent many surveys and it is to their discretion to choose which ones to take. It makes more sense that they would choose ones pertinent to their districts. In an email a district representative for the technology department gave the following reason for not participating in the study, "We are bombarded by countless surveys and cannot accept them all." The result is a large number of target individuals or firms who are fatigued and therefore refuse to respond to non-essential questionnaires" (Baruch & Holtom, 2008, p.1142).

The use of incentives have been examined in an attempt to determine if they increase response rates with most studies concluding that there is little to no correlation to higher response rates occurring when an incentive is offered (Cook, Heath, & Thompson, 2000; Shih & Fan, 2008). This researcher decided to offer an incentive hoping that it would encourage technology leaders and classroom teachers to participate knowing that 50 minutes of their time is a lot to ask for. In an attempt to receive a high response rate, a chance to win 1 of 10 2nd Generation 1G iPod Shuffles was offered to participants. From the feedback received from classroom teachers who took both surveys and sent the researcher an email asking to be placed into the drawing for the iPod Shuffles, this was a definite incentive. Many teachers expressed their excitement for the opportunity to participate. There was one email however that suggests that some teachers may have

dismissed the emails received as possible spam because they are not used to receiving such offers. The email received by the researcher was to another teacher within the district asking if they had received this email and if it was "legit". The researcher is not certain that the chance to win one of these prizes was incentive enough for technology leaders to participate as there time may be too strained. It also appears that technology leaders may receive many survey opportunities. The literature cites that the use of prizes in some cases actually results in a lower response rate because, "persons implementing disproportionately long or tedious surveys may have recognized the necessity of providing substantial rewards for survey completions" (Cook, Heath, & Thompson, 2000, p. 832).

The last limitation deals with the low response rate and representation of the technology leader population. With a 5.6% response rate and partial participation where one person may have only completed one of the two surveys, the data analysis was also limited. There were 20 technology leaders who took the LoTi survey but only 13 who took the MLQ survey. Likewise not all teachers who took one survey took the other. The low response rate also gave the researcher only a small representation of the technology leader population which is why clear conclusions were not made this study. It is interesting to note that twelve of the thirteen technology leaders scored high in transformational leadership. Was this by chance, or are these types of leaders more inclined to participate in studies? Are transactional or passive/avoidant leaders less likely to want to participate, or do they fear more as to how their "followers" would rate their leadership styles? After obtaining feedback from a small group of technology leaders, one leader stated that there were two main types of technology leaders, "those that

concern themselves with the acquisition and operation of technology in a school district (the nuts and bolts) and those that have a more holistic approach that joins concerns of operations with educational use. I bring this up because I would surmise that the 'nuts and bolts' folks would not be too concerned with the LoTi approach." This technology leader brings up a vital point that the technical based technology leaders are going to focus on the day to day operations of technology in a district where the leaders that look at a holistic approach mentioned would look at the bigger picture of technology use. This holistic leader would create a vision and would see the LoTi approach as a benefit, so they could see where their own technology integration scores fell along with their classroom teachers. Another leader who provided feedback suggested that if the technology leader did not agree with the content of the survey, they would choose not to take it. "I prefer not to take surveys that provide limited and defined answers with which I do not agree." As the literature has pointed out a low response rate does not automatically suggest bias; however, the non response of some populations needs to be taken into consideration as to why participants did not choose to participate because this could effect how results are analyzed (Sax, Gilmartin, & Bryant, 2003).

Recommendations for Further Research

With an extremely low response rate of 5.6%, clear recommendations on methodology need to be given to attempt to receive a better response rate if this study should be replicated. Future researchers need to take many factors into consideration if trying to replicate this study and if online surveying is going to be used as a data collection method. This study attempted to find the connection between technology leader's leadership styles and technology integration in the classroom. Many limitations

and barriers ensued leading to the following recommendations: the consideration of paper and pencil surveys vs. online, consideration of how email addresses for technology leaders are obtained, use of a university affiliated email address for distributing the surveys, use of a smaller sample size allowing for more personal contact, and making survey results more meaningful to the participants.

Even in this digital age and with a technology related research topic, this researcher would recommend considering a paper survey distribution over the selected online survey methodology. The literature suggests that response rates have been declining over the past decade (Baruch & Hulton, 2008; Johnson & Owens, 2003; Porter & Whitcomb, 2003; Sheehan, 2006) While response rates are decreasing, researchers face an, "increased competition with marketers and spammers on the Internet, for the cooperation of respondents" (Porter & Whicomb, 2003, p. 579) Sheehan (2006) states, "Studies show that some Internet users receive more than 39 unsolicited e-mails per day at the workplace alone" (Discussion section, para. 3) The literature is mixed when looking at response rates for web based surveys vs. mailed surveys (Greenlaw & Brown-Welty, 2009; Fraze, Hardin, Brashears, Haygood, & Smith, 2003; Fricker & Schonlau, 2002; Sheehan, 2006; Shih & Fan, 2008; Sills & Song, 2002) It appears that there was a time period when online surveys were somewhat of a novelty. Sheehan (2006) states, "This novel period is likely to have passed. Thus, as time progresses, it seems likely that response rates to email surveys will continue to decrease" (Discussion section, para. 2). While there are many advantages to using online surveys which is why this researcher selected it for this studies methodology, there are disadvantages as well. The following is cited in the literature as disadvantages to online surveys: populations with low computer

literacy levels, computer screen configurations, Internet connection speeds, socio economic factors such as access to computers with Internet, data security, technical problems with Internet browsers, undeliverable emails, and the appearance that your email may be spam (Fraze, Hardin, Brashears, Haygood, & Smith, 2003; Sax, Gilmartin, & Bryant, 2003; Sheehan, 2006; Sills & Song, 2002) Many problems occurred within this study with the use of the online surveys such as emails being undeliverable, district spam filters, and the number of emails that each participant received. A pencil and paper approach may eliminate a lot of confusion that this researcher felt existed with the online distribution process with two surveys. The researcher would still need to be aware of how to get the survey packets in the correct technology leader's hands, the possible bias of whom the technology leader would distribute packets to, and the cost of creating the packets with postage would be other factors that would need to be considered. The consideration of a paper and pencil based survey even for this technology leader population may get the surveys in the hands of technology leaders. They may be more inclined to look at the content of a mailed whereas an email may simply be deleted and dismissed as spam.

The next recommendation is made to increase the chances of the surveys getting into the hands of the correct person within the district. In the introduction email sent to technology leaders, technology leader receiving the email were asked if they were the leader in charge of providing instructional support to teachers. They were asked to ensure the correct person within their technology department (if there were more than one technology leader within their district) was receiving this email. If the technology leader receiving the email felt another technology leader within their district would be better

suited to answer the questions for this study, they were asked to forward the email to that technology leader and asked to add the researcher's email in the carbon copy section of the email. This allowed the researcher to change the contact information within that specific district for future communication. As an additional method to ensure the correct leader within the district was receiving the invitation to participate, district superintendents could be asked as well. In the current methodology, a courtesy letter is sent to the superintendent. The researcher could use this contact as an opportunity to confirm that the technology leaders name obtained from the district websites were in fact the technology leader that dealt with helping teachers integrate technology. This study had a handful of superintendents who offered this information in their response to the courtesy letter sent.

University affiliation has proven to be a positive impact on survey response rates (Fricker & Schonlau, 2002; Porter & Whitcomb, 2003; Sheehan, 2006; Sills & Song, 2002). As Fricker and Schonlau (2002) state, "A major challenge for researchers will be to distinguish themselves and their surveys from the plethora of commercial and entertainment surveys that exist and continue to multiply on the Web" (p. 365). While this may be difficult to convey in an online format, using a university email address over the selected hotmail.com in this studies methodology may have proven to provide the university affiliation needed.

The next recommendation looks at the sample size. Some of the methodology limitations may have been overcome if the sample size was smaller. A smaller sample size would allow for some personal contact to take place making participants know that the research study is legitimate. A smaller sample size would also allow for the

researcher to select the ten K-12 classroom teachers which would lift some of the burdens and bias from the technology leaders participating. This researcher found some of the most valuable feedback from this study coming from the personal communications that took place via email and not the surveys themselves. More communications via email or by phone is much more feasible with a smaller group and would result in valuable feedback. Some feedback this researcher received comes from a technology leader who has 10 years experience. This technology leader did not participate in this study but did offer some feedback in regards to variables that they felt should be considered as barriers to technology integration. Some of the barriers expressed were addressed in this study and cited in the literature; however, this technology leader was able to offer a unique prospective and cited the following barriers that may be considered in future studies: Does the district have technology coaches?, Does the teacher's union pose limitations in how training is delivered, how curriculum is developed in regards to technology, or how much or how often technology is used?, and Where in the school district is the office of the technology leader located? This technology leader provides a great deal of insight and affirms the number of barriers and variables that effect technology integration almost seems endless. Some of the barriers they offer for review such as technology coaches could be looked at in correlation with the districts that obtained Classroom of the Future Grants compared to those districts that did not. Location of the technology leader's office is also interesting as correlations may exist when comparing the building where that leader is located to other buildings within their district that their office is not located.

The final recommendation for future researchers is to make the study meaningful to the district. The way in which the methodology was set up for this study, technology

leaders and districts did not get the results of the technology leader's leadership style nor their technology integration scores. Sills and Song (2002) state, "making respondents feel that their input is worthwhile" (p. 27) is one way in to increase response rates. The methodology for this study was designed this way to eliminate any fears that leadership ratings would not be honest if the participants knew their leader was going to see their comments and could be tracked back to them being one of ten teachers participating in their district. While this may need to stay confidential to some extent, reporting some of the survey data to the individual districts may improve the response rate if leaders know the data collected could be used. If the leadership style was revealed to the technology leader without raters comments, this would still protect the raters as the leader would not know exactly how they were rated and by whom. The technology integration scores may also be informative to the technology leader. They would be able to gain insight as to where their teachers were with technology integration and maybe even develop an action plan to improve these numbers.

Summary

The overall purpose of this study was to examine the leadership styles of the technology leaders within Pennsylvania's public schools along with their knowledge of technology in relationship to how teachers within their districts are integrating technology into their classrooms. This was accomplished through two online surveys which measured leadership styles and levels of technology integration. Despite all the differences that are evident in technology leader job roles, this researcher hoped to find a connection between one leadership style and its impact on technology integration.

Due to a very low response rate of 5.6% no clear generalizations could be drawn. The results of the demographic responses showed that while many technology leaders and teachers were facing the barriers outlined in the literature, not enough data was present to run any analytical statistics to show if correlations existed between leadership styles and technology integration.

To attempt to explain for the low response rate that was obtained, the following limitations were examined. These limitations included distribution of surveys to the correct person within the district, the number of emails each participant received, email limitations, selection of K-12 classroom teachers, timing of the survey distributions, confusion and length of the survey instrument(s), self perceived leadership styles, surveys being viewed as non-essential to the district, use of incentives, and low response rates in connection with representation of the population. To address these limitations the following recommendations were made to future researchers: the consideration of paper and pencil surveys vs. online, consideration of how email addresses for technology leaders are obtained, use of a university affiliated email address for distributing the surveys, use of a smaller sample size allowing for more personal contact, and making survey results more meaningful to the participants.

This researcher hopes that the limitations and future recommendations outlined guide future studies to result in better responses in the hope to find more concrete correlations. Should clear correlations emerge, technology leaders and districts may be able to take steps to improve classroom technology integration.

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APPENDIX A

IRB Approval

DUQUESNE UNIVERSITY

INSTITUTIONAL REVIEW BOARD

424 RANGOS BUILDING ♦ PITTSBURGH PA 15282-0202

Dr. Paul Richer
Chair, Institutional Review Board
Human Protections Administrator
Phone (412) 396-6326 Fax (412) 396-5176
e-mail: richer@duq.edu

September 21, 2009

Ms. Molly Smith
247 Coxcomb Hill Road
New Kensignton PA 15068

Re: The impact a technology leader and their leadership style makes in K-12 classroom teacher's implementation of technology (Protocol # 09-89)

Dear Ms. Smith:

Thank you for submitting your research proposal to the IRB.

Based upon the recommendation of IRB member, Dr. David Delmonico, along with my own review, I have determined that your research proposal is consistent with the requirements of the appropriate sections of the 45-Code of Federal Regulations-46, known as the federal Common Rule. The intended research poses no greater than minimal risk to human subjects. Consequently, the research is approved under 45CFR46.101 and 46.111 on an **expedited** basis under 45CFR46.110.

Attached is the consent form stamped with IRB approval and expiration date. You should use the stamped form as original for copies that you distribute or display.

The approval must be renewed in one year as part of the IRB's continuing review. You will need to submit a progress report to the IRB in response to a questionnaire that we will send. In addition, if you are still utilizing your consent form in one year, you will need to have it renewed. In correspondence please refer to the protocol number shown after the title above.

If, prior to the annual review, you propose any changes in your procedure or consent process, you must inform the IRB of those changes and wait for approval before implementing them. In addition, if any unanticipated problems or adverse effects on subjects are discovered before the annual review, they must be reported to the IRB Chair before proceeding with the study.

When the study is complete, please provide us with a summary, approximately one page. Often the completed study's Abstract suffices. You should retain a copy of your research records, other than

those you have agreed to destroy for confidentiality, over a period of five years after the study's completion.

Thank you for contributing to Duquesne's research endeavors.

If you have any questions, feel free to contact me at any time.

Sincerely yours,

Paul Richer, Ph.D.

C: Dr. David Delmonico
Dr. David Carbonara
IRB Records

DUQUESNE UNIVERSITY

INSTITUTIONAL REVIEW BOARD

424 RANGOS BUILDING ♦ PITTSBURGH, PA 15282-0202

Dr. Paul Richer
Chair, Institutional Review Board
Human Protections Administrator
Duquesne University
email: richer@duq.edu
web site: http://www2.duq.edu/research/policies.cfm#human
412-396-6326

November 24, 2009

Molly S. Smith
247 Coxcomb Hill Road
New Kensington, PA 15068

Re: The impact a technology leader and their leadership style makes in K-12 classroom teacher's implementation of technology AMENDMENT (Protocol # 09-89)

Dear Ms. Smith:

Thank you for submitting the amendment to your ongoing study.

Because unexpectedly identifying information might appear on participants' responses, you have added additional safeguards to ensure that data you receive will be de-identified in accordance with assurances in your original protocol. The amendment is approved.

The research remains subject to all stipulations put forth in this IRB's original approval letter.

Annual review and consent form expiration will remain on the cycle established by the original approval date. The protocol number is shown above. Please use it in correspondence with our office.

Sincerely yours,

Paul Richer, Ph.D.

C: Dr. David Delmonico
Dr. David Carbonara
IRB Records

APPENDIX B

Consent Form

Appendix I

DUQUESNE UNIVERSITY

600 FORBES AVENUE ♦ PITTSBURGH, PA 15282

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

TITLE: The impact a technology leader and their leadership style makes in K-12 classroom teacher's implementation of technology

INVESTIGATOR:
Molly S. Smith
247 Coxcomb Hill Road
New Kensington, PA 15068
(412) 400-7498

ADVISOR:
Dr. David Carbonara
Department of Instruction and Leadership in Education
(412) 396-4039

SOURCE OF SUPPORT: This study is being performed as partial fulfillment of the requirements for the EdDIT II doctoral degree in Instructional Technology at Duquesne University.

PURPOSE: This study is comparing the leadership styles technology leaders' posses with K-12 classroom teachers in regards to technology use. This study will look at leadership styles of technology leaders, how K-12 classroom teachers are using technology in the classroom, and the barriers technology leaders face in doing their job.

YOUR PARTICIPATON: You are being asked to complete 2 online surveys at 2 separate web sites. You have approximately 2 weeks to complete these surveys which take approximately 20 minutes each to complete. The surveys are web based, so they can be done on any computer with Internet access. You do have the option to stop and save your responses at anytime on either survey if needed.

RISKS AND BENEFITS: There are no risks greater than those encountered in everyday life. Your participation will however help researchers understand how leadership styles of technology leaders effect technology integration into the classroom.

COMPENSATION: All participants who complete both surveys by the stated deadline will have their name entered into a drawing to win 1 of 10 2nd Generation 1G iPod Shuffles if participants

choose to email their name and contact information to the researcher. You are under no obligation to send your contact information to the researcher to participate in the study alone only if you wish to be entered into the iPod drawing. The winner will be contacted by email and/or phone. Names and contact information will be placed in a secure location until the drawing has taken place. Once the drawing takes place, all names and contact information will be destroyed.

CONFIDENTIALITY: Names of individuals or school districts will never appear in published reports, tables, or graphs. Your responses will only appear in statistical data and summaries. All surveys will be taken online on secure websites. Data will be stored electronically on secure websites and on the researcher's home computer. All data containing names will be removed from the researcher's computer once the study is complete.

RIGHT TO WITHDRAW: You are under no obligation to participate in this study. You are free to withdraw your consent to participate at any time.

SUMMARY OF RESULTS: A summary of the results of this research will be supplied to you, at no cost, upon request.

VOLUNTARY CONSENT: I have read the above statements and understand what is being requested of me. I also understand that my participation is voluntary and that I am free to withdraw my consent at any time, for any reason. On these terms, I certify that I am willing to participate in this research project.

I understand that should I have any further questions about my participation in this study, I may call Molly Smith, researcher, (412-400-7498), Dr. David Carbonara, dissertation chair, (412-396-4039), or Dr. Paul Richer, Chair of the Duquesne University Institutional Review Board (412-396-6326).

Please feel free to contact me with any questions you may have at (412-400-7498) or by email at msmithresearch@hotmail.com

CONSENT: By clicking on the survey link below, you are consenting to participate.

Duquesne University
Institutional Review Board
Protocol #09-89
Approval Date: September 21, 2009
Expiration Date: September 21, 2010

APPENDIX C

Demographic Questions for Technology Leaders

Demographic Questions for Technology Leaders

1. I consent to participate in this research study conducted by Molly S. Smith in partial fulfillment of a doctoral degree at Duquesne University.
   [I consent to participate; I do not consent]
2. Please select your level of education.
   [associates; bachelors; masters; doctorate]
3. Please select what your degree focused on
   [computer related skills; instruction and curriculum; both computer and instruction related fields; other]
4. How many years have you acted as the technology leader for your school district?
   [0-5; 6-15; 16-25+]
5. Are you a [9;10;12] month employee of your school district?
6. Have you found your responsibilities to increase significantly from the time you were hired to today?
   [yes; somewhat; no]
7. How many school buildings do you provide service for?
   [1-3; 4-6; 7-9; 10+]
8. How many professionals within your district provide computer related support not including teachers?
   [1; 2; 3; 4; 5+]
9. How much of your day is spent providing technical support to teachers?
   [none; 10%-30%; 30%- 60%; 60%-90%; 100%]
10. How much of your day is spent providing instructional support to teachers?
    [none; 10%-30%; 30%- 60%; 60%-90%; 100%]
11. How much training do you specifically provide to teachers whether it be online or face to face?
    [daily; weekly; monthly; a couple times a year; none]
12. Do you feel you are provided with adequate time and support to attend training yourself or to advance in your field by earning certificates?
    [yes/no]
13. Do you feel your district superintendent supports your efforts for integrating technology within your district?
    [yes; somewhat; no]
14. Do you feel your district building principals support your efforts for integrating technology within your districts?
    [yes; most; some; none]
15. Describe your technology budget. . . [abundant; sufficient; limited]
16. Did your district receive any money from the classrooms of the future grant in the past or presently?
    [yes; no]
17. Would most K-12 teacher within your district know who you are?
    [yes; no]

APPENDIX D

Demographic Questions for K-12 Classroom Teachers

Demographic Questions for K-12 Classroom Teachers

1. I consent to participate in this research study conducted by Molly S. Smith in partial fulfillment of a doctoral degree at Duquesne University.
   [I consent to participate; I do not consent]
2. What grade level(s) do you teach?
   [K-5; 7-9; 10-12]
3. Please select your level of education.
   [bachelors; masters; doctorate]
4. How many years have you been teaching?
   [0-5; 6-10; 11-15; 16-24; 25+]
5. How many computers do you have within your classroom?
   [1; 2-5; 6-10; 11-20; 20+]
6. How many computer labs/ mobile labs do you have access to at any time?
   [1; 2; 3; 4; 5+]
7. Do you feel you know your district's technology leader well?
   [yes; no]
8. Do you feel you could contact your technology leader with instructional or curriculum related questions and receive help?
   [yes; no]

APPENDIX E

Phone Call Script

Call Script to Districts

Hello, my name is Molly Smith and I am a doctoral student at Duquesne University. I am doing a research study involving leadership styles of technology leaders in the state of Pennsylvania. This study is being done as part of my doctoral dissertation at Duquesne University and has been granted University IRB approval.

To complete my study I need to obtain the name and email address of every technology leader within all Pennsylvania School Districts. Information will be sent to your technology leader about the study along with the option to participate or not. I did check your district's web site and was unable to find this information posted. Would you be willing to give me the name and email address of your school's technology leader or the person who helps teachers integrate technology within their classrooms?

Thank you so much for your time.

APPENDIX F

Superintendent Courtesy Letter

Email to District Superintendents

DUQUESNE UNIVERSITY

SCHOOL OF EDUCATION
PITTSBURGH, PA 15282-0321

Date

Dear Superintendent,

My name is Molly Smith and I am a doctoral student at Duquesne University. I am doing a research study involving leadership styles of technology leaders in the state of Pennsylvania and their knowledge of instructional practices in regards to technology. I hope to find a direct connection to how teachers use technology in the classroom based on what types of leadership styles their technology leader's posses. This study is being done as part of my doctoral dissertation at Duquesne University and has been granted University IRB approval.

I will be sending out an email to all technology leaders in Pennsylvania's public school districts asking technology leaders to complete 2 surveys and to select 10 K-12 classroom teachers to send survey links to as well. Each person receiving an email has the choice to participate or not. No where in my dissertation report will district names or participant names be published.

I am sending this as a courtesy to inform you of my study. If for any reason you do not wish for me to use your district within my study, please feel free to contact me at the following email address msmithresearch@hotmail.com or by phone at (412)400-7498. A summary of the results of this research will be supplied to you, at no cost, upon request which will include results from all participating districts.

Thank you so much for your time!

Sincerely,

Molly S. Smith

APPENDIX G

Invitation to Participate Email to Technology Leader

Dear Technology Leader,

You are being asked to participate in a study that is examining leadership styles of technology leaders in the state of Pennsylvania and their knowledge of instructional practices in regards to technology. I hope to find a direct connection to how teachers use technology in the classroom based on what types of leadership styles their technology leader's posses. This study is being done as part of my doctoral dissertation at Duquesne University and has been granted University IRB approval. Your district superintendent has also received an email in regards to this study taking place.

If your district has many technology leaders and you are not the leader whom works with teachers in regards to technology integration, please forward this email to the person who would best fit this description. Please include my email address msmithresearch@hotmail.com in the CC: section of the email so I do not bother you with any additional email reminders.

As a participant, you will be asked to complete 2 web based surveys taking approximately 20 minutes each to complete. Your district's name nor your name will ever appear in reports or in any publications but will only be viewed by the researcher for data analysis. The link to the first survey is included at the bottom of this email. You will receive a second email with an invitation to take the second survey from the company Mind Garden. I will also send you an email similiar to this one that you will be asked to forward to 10 K-12 classroom teachers within your district which will include a survey link specific for classroom teachers. This is necessary to analyze leadership styles and classroom use of technology. The second email you receive from Mind Garden Inc. will ask you to enter the same 10 teacher names and email addresses so their system can send survey invitations to them as well. You and the teachers you select have the choice to participate or not and can withdraw from the study at any time.

You will have approximately 2 weeks to complete the surveys and to provide your K-12 classroom teachers with survey links via the email I will provide you with. Everyone who completes both surveys and wishes to provide their name and contact information to the researcher will be placed in a drawing to win 1 of 10 2nd Generation 1G iPod Shuffles. The drawing will take place once all data is collected, and the winner will be contacted via email and/or phone. All names and contact information will be destroyed once the drawing has taken place. Be sure to email your name and contact information once you have completed both surveys to msmithresearch@hotmail.com if you wish to be entered into this drawing!

If you are interested in participating, continue to read the consent form below which will

explain the study in more detail. A link to the first survey will follow the consent form below.

Thank you so much for your time! Please feel free to contact me with any questions you may have at msmithresearch@hotmail.com

Molly S. Smith
Duquesne University EdDIT II Doctoral Student

- Consent Form Was Inserted Here -

First Survey:
Go to this website: www.lotilounge.com
Click on the red "Sign me up" link under the Register Free Heading.
Group ID: ********
Password: ********

Checklist:
__Click on the link above this checklist to take the 1st survey
__forward the K-12 classroom teacher email to 10 K-12 teachers within your district.
__Locate your invitation to the 2nd survey in your email from the company Mind Garden and enter the same 10 teacher names and email addresses that you selected to send them an invitation.
__Take the 2nd survey
__Email your name to msmithresearch@hotmail.com if you wish to be entered into the iPod shuffle drawing

APPENDIX H

Invitation to Participate Email to K-12 Classroom Teacher

Dear K-12 Teacher,

You are being asked to participate in a study that hopes to find a link between technology leader's leadership styles and how it impacts technology use in the classroom. This study will be examining these connections in all public school districts in the state of Pennsylvania. This study is being done as part of a doctoral dissertation at Duquesne University and has been granted University IRB approval. Your district superintendent has also received an email in regards to this study taking place.

As a participant, you will be asked to complete 2 web based surveys taking approximately 20 minutes each to complete. Your district's name nor your name will never appear in reports or in any publications but will only be viewed by the researcher for data analysis purposes. You have the choice to participate or not and can withdraw from the study at any time.

You will have approximately 2 weeks to complete the surveys. Everyone who completes both surveys and wishes to provide their name and contact information to the researcher will be placed in a drawing to win 1 of 10 2nd Generation 1G iPod Shuffles. The drawing will take place once all data is collected and the winner will be contacted via email and/or phone. All names and contact information will be destroyed once the drawing has taken place. Be sure to email your name and contact information once you have completed both surveys to msmithresearch@hotmail.com if you wish to be entered into this drawing!

If you are interested in participating, continue to read the consent form below which will explain the study in more detail. A link to the first survey will follow the consent form below. You will then receive a second email from the company Mind Garden which will contain an invitation and access to the second survey.

Thank you so much for your time! Please feel free to contact me with any questions you may have at msmithresearch@hotmail.com

Molly S. Smith
Duquesne University EdDIT II Doctoral Student

- Consent Form Was Inserted Here -

First Survey:

Go to this website: www.lotilounge.com

Click on the red "Sign me up" link under the "Register Free" Heading.

Group ID: ********

Password: ********

You do not have to enter your name during the log in process.

Checklist:

__Click on the link above this checklist to take the 1st survey

__Locate your invitation to the 2nd survey in your email from the company Mind Garden and take the 2nd survey

__Email your name to msmithresearch@hotmail.com if you wish to be entered into the iPod shuffle drawing

APPENDIX I

Scripted Email from Mind Garden Inc.

Dear Technology Leader,

Once you have entered the survey site, you will be asked to take the MLQ survey and enter the names and email addresses of the 10 K-12 classroom teachers that you have selected within your district. They will have the choice to participate or not.

Please keep in mind that the only person analyzing the survey data is the researcher of this study. District names and participant names will not be published.

Thank you again for your time and remember to email your name (this is optional) to msmithresearch@hotmail.com upon the completion of both surveys to be entered to win 1 of 10 2nd Generation 1G iPod Shuffles.

Dear (Classroom Teacher),

Once you have entered the survey site, you will be asked to take the MLQ survey rating your technology leader's leadership style. Please keep in mind that the only person analyzing the survey data is the researcher of this study. District names and participant names will not be published. Thank you again for your time and remember to email your name (this is optional) to msmithresearch@hotmail.com upon the completion of both surveys to be entered to win 1 of 10 2nd Generation 1G iPod Shuffles.

[Mind Garden Scripted Email]

You have been identified as someone who can provide ratings for developmental purposes for (technology leader). There are other raters also completing this survey for (technology leader). Your ratings will be aggregated with the other ratings which will provide development feedback to (technology leader). This aggregation is to assist you in providing direct and honest feedback to (technology leader) since you will not be identified with your ratings. Note that usually higher level ratings (e.g., supervisor) consist of only one person and so are not aggregated. Note also that the textual input questions will not be edited. The report to (technology leader) will contain exactly what you enter.

For the purposes of this evaluation, you should respond by: **December 23, 2009**.

All questions about this process should be addressed to Molly Smith, msmithresearch@hotmail.com. If you have technical problems, please contact Mind Garden, Inc..

Thank You.
Mind Garden
www.mindgarden.com

APPENDIX J

Second Email Reminder to Participate Email

Dear Technology Leader,

I have extended the deadline for responses for my research study to January 29th and would be very grateful for your time. I have been able to include links to both surveys at the bottom of this email in the event you did not receive the second survey email previously.

You are being asked to participate in a study that is examining leadership styles of technology leaders in the state of Pennsylvania and their knowledge of instructional practices in regards to technology. I hope to find a direct connection to how teachers use technology in the classroom based on what types of leadership styles their technology leader's posses. This study is being done as part of my doctoral dissertation at Duquesne University and has been granted University IRB approval. Your district superintendent has also received an email in regards to this study taking place.

If your district has many technology leaders and you are not the leader whom works with teachers in regards to technology integration, please forward this email to the person who would best fit this description. Please include my email address msmithresearch@hotmail.com in the CC: section of the email so I do not bother you with any additional email reminders.

As a participant, you will be asked to complete 2 web based surveys taking approximately 20 minutes each to complete. Your district's name nor your name will ever appear in reports or in any publications but will only be viewed by the researcher for data analysis. The links to both surveys are included at the bottom of this email. I will send you an email similiar to this one that you will be asked to forward to 10 K-12 classroom teachers within your district which will include a survey link specific for classroom teachers. This is necessary to analyze leadership styles and classroom use of technology. You and the teachers you select have the choice to participate or not and can withdraw from the study at any time.

You will have until January 29th to complete the surveys and to provide your K-12 classroom teachers with survey links via the email I will provide you with. Everyone who completes both surveys and wishes to provide their name and contact information to the researcher will be placed in a drawing to win 1 of 10 2nd Generation 1G iPod Shuffles. The drawing will take place once all data is collected, and the winner will be contacted via email and/or phone. All names and contact information will be destroyed once the drawing has taken place. Be sure to email your name and contact information once you have completed both surveys to msmithresearch@hotmail.com if you wish to be entered into this drawing!

If you are interested in participating, continue to read the consent form below which will explain the study in more detail. A link to the surveys will follow the consent form below.

Thank you so much for your time! Please feel free to contact me with any questions you may have at msmithresearch@hotmail.com

Molly S. Smith
Duquesne University EdDIT II Doctoral Student