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An Assessment of Middle School Teachers' Efforts to Integrate Technology Effectively

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COLLEGE OF EDUCATION

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2015

Abstract

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

This study focused on a middle school that, according to the website of its district, should be classified as *Target Tech*, which is the highest level of technology integration on the Texas School Technology and Readiness (STaR) chart. The middle school has failed to meet this goal in 3 out of 4 focus areas. This mixed method project study investigated how teachers at the school currently use technology to support their teaching and student learning, situations under which teachers would use more technology, and specific technology trainings teachers have taken. The theoretical framework for this project study, diffusion of innovation, was applied to the adoption of technology at the local campus. The research questions concerned teachers' beliefs in their competence in the technology standards, their self-reported technology integration, technology training needs, and the relationship between technology usage and hours of professional development received. Data for 48 participants were retrieved from the STaR results as well as the International Society for Technology in Education's National Educational Technology Standards (NETS-T) survey. Descriptive analysis of NETS-T data indicated an overall need for additional technology-based professional development. Pearson correlation results indicated a statistically significant relationship between teachers' self-reported technology usage and the amount of professional development taken. Results indicated a need for additional technology-based professional development for campus teachers to increase technology integration. This project study may yield positive social change by providing research data to the local district on teachers' technology competence and needed professional development to ultimately increase the level of technology integration and meet the STaR rating of the district.

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Dedication

This dissertation is dedicated to my mother. Mom, I owe you a lot more than a simple thank you. My gratitude is beyond measure for everything that you have sacrificed for me. I would not have come as far in my life if it hadn't been for you and the examples you set for me.

I would also like to dedicate this dissertation to my amazing wife. I honestly would not have made it through this program without your unrelenting support. You have been able to set my needs ahead of your own and support me in more ways than one. I would have been lost without you.

Finally, I would like to thank my loving daughters. You have been able to somehow grow up so fast and turn into young ladies who are able to conceptualize what working on a dissertation is like. I hope that though my experiences, I have taught you how not to give up and continue going forward. I love you with all my heart. You inspire me more than you could ever know.

Thank you all.

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Section 1: The Problem

Introduction

In a technology-driven world, teachers are educating a generation of tech-savvy students using 20th century teaching methods in the 21st century. A study conducted by Hosseini and Kamal (2013) found that in spite of its availability and accessibility, computer technology is still not being used for teaching to the full extent possible. It seems as though teachers are experiencing difficulty in effectively integrating computer technology into existing curricula (Hosseini & Kamal, 2013). The problem in the school that was the focus of this study is not due to lack of available computers, as there are thousands of computers throughout Texas public and private school systems for the purpose of integration into the curriculum. The federal government under Title II Part D of No Child Left Behind Act of 2002 (NCLB) provided much of the funding for this technology. NCLB (2002) was established for the purpose of improving students' academic achievements through the use of technology. In addition, NCLB contains requirements concerning student literacy in technology: Section 2402, Title II, Part (b) (2) (A) stipulates that every student shall demonstrate technology literacy by the end of the eighth grade (NCLB, 2002). When teachers integrate technology into the curriculum, students are able to improve their technology literacy through hands-on application and teacher modeling.

In this mixed method project study, I aimed to investigate EFG Middle School (pseudonym) teachers' descriptions of their competency in the current National Education Technology Standards for Teachers (NETS-T). The study also investigated the role of technology at EFG Middle School in the following areas:

1. Use of technology to support teaching
2. Use of technology to support student learning

3. Situations under which more technology would be used
4. Specific technology trainings teachers have taken

The data for this project were collected through surveys that include a self-report quantitative portion, with a secondary, open-ended qualitative portion. EFG Middle School is a Title I school that is in the ABC Independent School District (pseudonym), which is one of the largest school districts in Southeast Texas. With over 1,200 students, EFG Middle School employs 100 teachers to deliver instruction across the curriculum. Since 2007, EFG Middle School has been classified by Texas School Technology and Readiness (STaR) chart as being advanced in area of technology infrastructure, which is one of the chart's four focus areas. The State of Texas uses the STaR chart as a tool to help campuses and districts determine their progress toward meeting the goals of the Federal Long-Range Plan for Technology. Despite this recognition, EFG Middle School has remained in the developmental stage in the remaining three focus areas of the STaR chart:

1. Using technology to teach and learn
2. Educator preparation, and development
3. Leadership, administration, and instructional support

Remaining in the developmental stage is problematic because it indicates that the technology is not being integrated to the extent desired by the state and the local district. Adequate technology exists in most schools for teachers to use technology in the classroom, but some teachers do not seamlessly integrate technology (Texas Education Agency, 2012).

When unenthusiastic teachers use technology, it is used to sustain their current teaching practices rather than reform them (Karasavvidis, 2009). The ABC Independent School District's technology plan calls for reformed teaching methods that include an

increase in the frequency and level of technology use. Texas Essential Knowledge and Skills (TEKS; see Appendix C) are the state standards for what students should know and be able to do. These standards are assessed in Section TL5 of the Texas STaR chart (see Appendix B). The technology application portion of the TEKS is the framework for the integration of technology into the students' learning experience. When technology is coupled with the technology-based elements of the TEKS content, the student has substantial opportunity to use technology to assist in learning.

In his introduction to the Visions 2020 Report, former Secretary of Education Dr. Rod Paige noted,

> Indeed, education is the only business still debating the usefulness of technology. Schools remain unchanged for the most part despite numerous reforms and increased investments in computers and networks. The way we organize schools and provide instruction is essentially the same as it was when our Founding Fathers went to school. Put another way, we still educate our students based on an agricultural timetable, in an industrial setting, but tell students they live in a digital age. (U.S. Department of Education [DOE], 2005b, The Plan section, para. 3)

A 2010 Educational Media and Technology Yearbook indicated that the student-to-Internet-connected computer ratio in the United States stood at slightly lower than 3.7 students per computer. In addition, a report in the *Computers & Education Journal* noted that 96% of all instructional computers in schools are equipped with high-speed Internet connections (Ertmer, 2012). *The Journal of Literacy and Technology* published a study (Lawrence, 2014) that suggested a disconnection between teachers' perception of literacy and their integration of technology into the secondary classroom. The results of the study supported the practice of integrating technology as part of everyday lessons to foster

students' 21st-century learning. To increase the integration of technology, teachers need to be adequately trained on how to integrate technology into their daily lessons. Many teachers feel that they do not have necessary training to incorporate technology into the classroom (Davis, 2010).

Definition of the Problem

According to the ABC Independent School District's technology plan, EFG Middle School should be classified as *Target Tech* (the highest level of technology integration) on the STaR chart key area of Teaching and Learning as well as Educator Preparation and Development by the year 2014. The State of Texas's Long-Range Plan For Technology (LRPT, 2008) states that as an indicator of progress, campuses should currently be at the Target Tech level for each of the four key areas (technology infrastructure; using technology to teach and learn; educator preparation and development; and leadership, administration, and instructional support; LRPT, 2008). Although some campuses have reached the Target Tech level, the State of Texas requires all campuses to be at that level by the year 2020. Since 2003, EFG Middle School has consistently been classified as developing tech and advanced tech in the areas of teaching and learning as well as educator preparation and development.

Despite its advanced technology infrastructure, EFG Middle School has remained below the targeted stage in three out of four focus areas assessed by the STaR chart. The chart below shows that EFG Middle School maintained only a 25% developing rating while the district and the state maintained a higher rating. The Texas STaR chart ratings for EFG Middle School indicate that the school has had technology infrastructure in place for years but consistently fails to integrate technology across the curriculum. This rating is an indication of EFG Middle School's need for improvement in the integration of technology. The State of Texas's technology application standards require students to be

technology literate by the end of eighth grade. Currently, the data from the STaR chart show that less than 50% of the students at EFG Middle School have mastered the technology application requirements that are set by the Texas Education Agency (see Appendix C). This is measured through teachers' daily interactions with students and technology and is noted on the Texas STaR chart under teaching and learning in Section 5 (see Appendix B)

On EFG Middle School's 2014 STaR chart survey, teachers reported a lack of technology integration in the classroom (see Appendix B). The State of Texas provides school districts with funding to improve achievement using technology at the elementary through secondary level of education with the expectation that all students will be technologically literate by the end of eighth grade. However, the lack of technology integration reported by EFG Middle School teachers on the STaR chart does not align with state or district expectations.

In this age of technology, the United States' education system is lagging behind in the need to educate students using 21st-century tools (Stansbury, 2011). Industries and students are ahead of teachers in the use of technology (Moore, 2013). For teachers to use technology, they must believe that technology can help them reach the students of this generation (Chen, 2010). Studies have shown that the integration of computers and related information technology can yield great rewards. In a study conducted by Stanley (2013), results showed a significant improvement in the scores of 250 students who took part in the study. According to the study, regression results showed that with the integration of technology, students' exam performance improved significantly. The improvements were consistent over the course of the one-semester study. In a different study, 103 sixth grade students were divided into groups for the purpose of observing the impact of technology on their learning performance. The group that received the

technology-enriched lesson showed the most growth (Chang, Chen, & Hsu, 2011). Despite the studies, the integration of computer technology by EFG teachers has not led to a significant increase in daily use to meet the learning needs of this generation to transition into the workplace.

Many teachers are not providing effective technology integration in the classroom because of lack of training, experience, personal beliefs, anxiety, attitude, and their ability to use technology (Lambert, Gong, & Cuper, 2008). In a related study, teachers had access to computers in their classroom but their lack of technology training resulted in students primarily using computers for drill and practice, for special activities, or as a reward, rather than in meaningful instruction that impacted student learning. Teachers resorted to using computers as special activities in part due to inadequate computer access (Masters, 2010). Based on the results of this study, I plan to develop a project that will assist teachers with integrating technology into their daily lessons.

Rationale

Evidence of the Problem at the Local Level

The Texas Teacher STaR chart has been developed around the four key areas of the Long-Range Plan for Technology, 2006-2020: Teaching and Learning; Educator Preparation and Development; Leadership, Administration and Instructional Support; and Infrastructure for Technology. Within the key areas, there are focus areas that target specific areas of technology integration. The Texas Teacher STaR chart produces a profile of Texas campuses' status toward reaching the goals of the LRPT and NCLB based on profile indicators that place each campus at one of four levels of progress in each key area of the LRPT. The profile indicator on the Texas Teacher STaR chart is the level of progress that teachers mark on an individual STaR survey in relation to the focus areas. The ratings for the four key areas are based on the total number of points scored on

subgroups within the key area categories, which are called *focus areas*. The point system is as follows:

- 6-8 = Early Tech
- 9-14 = Developing Tech
- 15-20 = Advanced Tech
- 21-24 = Target Tech

The local problem is the teacher-reported lack of technology integration in the classroom as indicated on the STaR assessment. Despite the advanced rating in technology infrastructure, the STaR chart report shows that some teachers did not consistently integrate technology into their curricula (see Appendix D). Lack of technology integration can have a negative impact on student achievement. Student achievement is increased when computing devices such as desktops, laptops, and tablets are used as essential tools (Norris, 2012).

According to the STaR chart data, all three classifications being compared need to improve in each key area to reach the STaR rating of Target Tech. Despite its efforts, EFG Middle School's rating remains lower than the rating of the district as well as the rating of the State of Texas. In an effort to meet the State of Texas' goal of technology integration to improve student learning, it is vital that EFG Middle School take the necessary steps to reach the ideal rating of Target Tech. Remaining in the developmental stage is a problem because it indicates that technology is not being integrated to the extent desired by the No Child Left Behind Act of 2002. Students are not receiving the needed and expected technology-based education. Although the district and state have a rating that is higher than that of EFG Middle School, they also have areas that need improvement. The 2013-2014 data was examined because it was the most recent data available from the State of Texas. In 2012-2013, EFG Middle School's classification

changed to Advanced Tech in three categories while the school maintained a rating of Developing Tech in the area of Educators' Preparation and Development.

The following table compares EFG Middle School's key area ratings with those of other schools in the district as well as the State of Texas.

Table 1

EFG Middle School STaR chart Results

Key area	EFG school area STaR classification, 2013-2014	ABC district middle school area STaR classification, 2009-2010	Texas area STaR classification, 2009-2010
I. Teaching and Learning	Advanced Tech	Developing Tech	Developing Tech
II. Educator Preparation and Development	Developing Tech	Developing Tech	Developing Tech
III. Leadership, Admin., Instructional Support	Advanced Tech	Advanced Tech	Advanced Tech
IV. Infrastructure for Technology	Advanced Tech	Advanced Tech	Advanced Tech

Based in part on the consistent results from the STaR chart, the ABC Independent School District in its Technology Plan acknowledges the following needs:

- To increase the frequency and level of utilization of technology in the teaching and learning process.
- To maintain and increase the level of professional development necessary to assist teachers in using technology effectively in the teaching and learning process.

- To update and enhance its technology infrastructure consistent with the Texas STaR chart.
- To support the teaching, learning, professional development, and administrative needs of the district.

ABC Independent School District's technology plan referenced David Thornburg, a nationally recognized educational technology visionary, who stated that "we must prepare learners for their future, not our past" by providing opportunities to utilize technology in their learning experiences. In an effort to address the problem of technology integration, ABC Independent School District created a Technology Vision Statement to clearly communicate its goal. The vision statement states, "As an integral part of the teaching/learning process, instructional technology will facilitate students' active learning and prepare them to meet the challenges of a rapidly changing world." The vision statement is based on the following belief statements (Anthony, 2011):

- Technology facilitates the acquisition of the characteristics as defined in the Portrait of ABC School Graduate (Appendix H).
- Technology assists students in posing problems, conducting critical inquiry, and developing informed insight in order to become effective communicators in a global community.
- Technology is a tool that provides students an opportunity to examine and evaluate ideas, images, and concepts from different perspectives.
- Technology may be used to address the learning needs of all students in a variety of flexible grouping arrangements that facilitate student-centered learning.
- Technology is one of many effective tools that allow teachers and students to be partners in the learning process.

- Technology can provide access to both historical and current resources that would not otherwise be available in the classroom.
- Technology and student needs are constantly changing, therefore demanding flexibility in long-range planning.
- Decisions to invest in instructional technology must reflect consideration of efficiency, effectiveness, and financial resources.
- Required staff development is critical if technology applications are to be effectively integrated into the teaching/learning process.

DeJaeghere's (2009) statement that "the one-size-fits-all approach to teaching and learning does not meet the educational needs and goals for all students" validates ABC District's belief statements. The value of educational technology to equalize the learning environment is evident. *The Journal of Computing in Teacher Education* published an article that stated, "today's students are technology-savvy, and feel strongly about the positive value of technology, and rely upon technology as an essential and preferred component of every aspect of their lives" (Lei, 2009, p. 23). These statements are driving factors that encompass the core beliefs in the Portrait of a District graduate. The Portrait of a District graduate is a district's document that explains the characteristic of its students.

Evidence of the Problem From the Professional Literature

Modern students live in a digital society that demands an education requiring decision-making and problem-solving skills (Hoffman, 2010). According to Warschauer and Matuchiak (2010), students in classrooms today have grown up in a technology-driven world where information is just a click away. Students view acquisition of information differently from the previous generation. Today's students know how to access information for free via the Internet and other electronic sources. Consequently,

instant information piques their interest in the world around them in addition to connecting them to the world in a meaningful way. They seek to solve problems connected to their understanding of the real world (Levy, 2009).

When teachers do not integrate technology, they are at a disconnect with students whose everyday lives are connected to technology sources such as social media, instant messaging, chat rooms, educational software, and the Internet. When disconnected, teachers are unable to help students make the vital connection between their lives and their educational experiences. Secretary of Education Duncan stated, "Our nation's schools have yet to unleash technology's full potential to transform learning. We're at an important transition point. We need to leverage technology's promise to improve learning" (as cited in McDonnell, 2011, p. 304). If educators continue to disregard the need for technology integration into the curriculum, the youth's ability to maximize their potential will continue to be hindered.

Definitions

*Computer technology: "*When a teacher or student uses a computer as a learning tool, it is referred to as *computer technology"* (Morrison & Lowther, 2005, P.17).

Diffusion of innovation: "Diffusion is the process by which an innovation is adopted and accepted by members of a certain community" (Rogers, 1995, P.25).

Innovation: "For the purpose of this study, *innovation* refers to instructional technology as a learning tool" (Texas Education Agency, 2006, P.203).

Integrated/integration : "Use of technology by students and teachers to enhance teaching and learning and to support curricular objectives" (Texas Education Agency, 2006, P.203).

*Interactive communications: "*Two-way communications that may be synchronous or asynchronous and are distinguished by mutually active responses. In

online learning, interactive communications refers to a learning environment that includes a significant amount of discussion and other forms of communications between teachers and students that are enabled by technology. Examples include an Internet-based listserv, class newsgroups, discussion boards, or chat features" (Texas Education Agency, 2006, P. 204).

Long-Range Plan for Technology (LRPT): "Texas plan for integrating technology into the school system. Four key areas are Teaching and Learning; Educator Preparation and Development; Leadership, Administration, and Instructional Support; and Infrastructure for Technology" (Texas Education Agency, 2006, P.204).

Pedagogical support: "Support by the administration that includes providing teachers with the skills necessary to integrate technology and professional development to give the teacher information to use technology for effective teaching and learning, and giving instructional support to teachers who integrate technology in their classrooms" (U.S. Department of Education, 2000). (Texas Education Agency, 2006, P. 204).

State Board for Educator Certification (SBEC): The state board that oversees all aspects of public school educator certification, continuing education, and standards of conduct.

School Technology and Readiness (STaR) chart: "An online resource for self-assessment of campus and district efforts to effectively integrate technology across the curriculum. This rubric serves as the standard for assessing technology preparedness in Texas K-12 schools. This chart has been updated to align with the new Long-Range Plan for Technology, 2006-2020" (Texas Education Agency, 2006, P. 204).

Technology Applications Texas Essential Knowledge and Skills (*TEKS)*: "Technology Applications is the curriculum area that defines what all students should

know and be able to do with technology in Grades K-12" (Texas Education Agency, 2006, P. 204)

Technology literacy: "The ability to responsibly use appropriate technology to communicate, solve problems, and access, manage, integrate, evaluate, and create information to improve learning in all subject areas and to acquire lifelong knowledge and skills in the 21st century. The Technology Applications curriculum defines the technology literacy requirements for students and teachers specified in NCLB Title II, Part D" (Texas Education Agency, 2006, P. 205).

Texas Campus STaR chart: "A tool designed to help campuses and districts determine their progress toward meeting the goals of the Long-Range Plan for Technology, as well as the goals of their district. The Texas Campus STaR chart also assists in the measurement of the impact of federal, state, and local efforts to improve student learning through the use of technology" (Texas Education Agency, 2006, P. 205).

Traditional methods of teaching: "Methods of teaching that include lecture, student-centered discussion, tutorial, and teacher-led instruction are traditional" (Frye, Ketteridge, & Marshall, 2008, P. 31).

Significance

Due to the rapid advancement of society's dependence on technology, it has become essential for EFG Middle School teachers to keep pace with technological developments. The learning environment of the 21st century has dramatically changed with the advancement of technology. Over the next 10 years, researchers anticipate that personal, portable, and wirelessly networked technologies will become ubiquitous in the lives of learners—indeed, in many countries, this is already a reality (Looi et al., 2010). Prensky (2009) referred to today's generation of learners as *digital natives*: the first generation to grow up in the age of technology. Digital natives are eager to explore new

technology to help them grow (Cabanero-Johnson, 2009). Technology plays a valuable role in today's educational system and should continuously be used as a tool to advance students' learning. The integration of technology by today's teachers is mired by lack of successful development opportunities in the constructs of technology and pedagogy (Levin & Wadmany, 2008).

Many educators see the use and integration of technology as a problem (Ertmer, 2010), but Newkirk (2006) recommended that teachers see technology as a valuable resource and embrace it. Prensky (2005) stated that "today's kids are challenging us, their educators, to engage them at their level" (p. 64) by integrating the technology that they use daily into the curriculum. The availability of technology has been significantly increased within schools and households. However, the literature continues to show a disconnect between the need for technology integration and the actuality of implementation of technology in classrooms for the purpose of supporting teaching and student learning (Ertmer, 2010). According to the STaR chart, EFG Middle School has the technology in place, but the level of integration is deficient. Despite the progress of technology integration into the curriculum, it is either relegated to the margins of the school day or left until "after state testing is over" (Ravitch, 2011). In order for technology to be effectively integrated into the curriculum, it has to be a key component in the lesson-planning stage. Donlevy (2006) suggested that "as the newer technologies emerge into view, students, teachers and administrators should be incorporating them into daily teaching and learning practice" (p. 122). Schools can increase their effectiveness in preparing students for the real world by purposely integrating technology rather than just using it on a superficial level. It is not rare that new tools and technologies introduce new challenges and problems (Spector, 2010).

Guiding/Research Question

For the purpose of developing a project for the local setting, this mixed method project study investigated EFG Middle School teachers' descriptions of their competency in the current National Education Technology Standards for Teachers (NETS-T). The study also investigated how EFG Middle School teachers were using technology to support teaching, and student learning situations in which teachers would use more technology, and specific technology trainings teachers have taken. The NETS-T survey was used to address the primary research question, and the subsequent research questions were measured on interval scales based on mixed method attributes.

Primary Research Question

Do teachers believe they are competent in technology standards and the integration of technology?

Subsequent Research Questions

1. How do EFG Middle School teachers describe their level of competency in the National Education Technology Standards for Teachers (NETS-T)?
2. Is there a relationship between the teachers' level of competency and the amount of professional development taken?
3. What situations do EFG Middle School teachers think would help increase technology integration?
4. How does number of technology training classes relate to teacher self-reported technology usage?

The research design included a self-report data collection technique and the use of descriptive and inferential statistics to analyze the survey findings. The mixed-methods part of this study involved addressing the qualitative information gathered through the NETS-T Survey. The qualitative data was analyzed using open-ended coding. Through

data gathered in the open-ended questions, I created response categories that were used to label each comment accordingly. This process assisted with identifying patterns and trends associated with teachers' technology use, which rendered a final analysis.

> Effective teachers model and apply NET standards as they design, implement, and assess learning experiences to engage students and improve learning; enrich professional practice; and provide positive models for students, colleagues, and the community. (ISTE, 2008)

The ISTE's NETS for Teachers (NETS•T) are the standards for evaluating the skills and knowledge educators need to teach, work, and learn in an increasingly connected global and digital society. The NETS-T has five categories:

1. Facilitate and inspire student learning and creativity
2. Design and develop digital-age learning experiences and assessments
3. Model digital-age work and learning
4. Promote and model digital citizenship and responsibility
5. Engage in professional growth and leadership

The Texas Teacher STaR chart was created for the purpose of assisting all classroom teachers in assessing needs and setting goals for the use of technology in the classroom to support student achievement.

Both the International Society for Technology in Education (ISTE) national standards and the Texas School Technology and Readiness (STaR) Chart state standards support technology integration for the purpose of gaining greater depths in learning. ISTE identifies the targeted goals teachers are to achieve in the NETS-T. The state of Texas developed the Texas School Technology and Readiness (STaR) chart to help schools identify the level of technology application each teacher has. The Texas Education Association wants teachers to reach the 'Target Tech' level which means

teachers are able to use technology to guide students to use and develop higher-order thinking skills. This study investigated the relationship between teachers' competence in the use of technology and their practice of integrating technology into their curriculum. The standards of the NETS-T and the STaR chart are very similar, in that the NETS-T areas of *facilitate and inspire student learning and creativity*, *design and develop digital-age learning experiences and assessments*, and *promote and model digital citizenship and responsibility* have similarities to the STaR chart's *teaching and learning*. Additionally, the NETS-T areas of *model digital-age work and learning* and *engage in professional growth and leadership* have similarities to the STaR chart's *educator preparation and development*.

In his article "Our Digital Conversion," Edwards (2012) wrote, "building a culture where adult learning is the norm is vitally important to our digital conversion" (p. 4). In an effort to understand the relationship between individual staff development and level of competency, an investigation was conducted. To conduct the investigation, I used data collected from the teacher technology training section on the NETS-T survey to identify the following:

- The amount of training received
- Whether the trainings were based on teacher use or student use
- Correlations between technology trainings and level of technology use

Teachers were asked to indicate the number of times they attended technology staff development trainings based on a list of known trainings for EFG Middle School's campus. At this point, the amount of time that teachers spend attending technology staff development and their competency appear to have a connection. Based on the findings, more technology staff development opportunities could be established with the intent of equipping teachers for greater levels of success.

Review of the Literature

For the review of the literature, I used print and electronic resources retrieved from the Walden University online library, Prairie View A and M University Library located in Prairie View, Texas, and Harris County Public Library in Cypress, Texas. In addition, I accessed the following online research databases as part of this search: ProQuest Central, Education, and Technology. My initial search included the following terms: *education or educator, secondary,* and *technology.* That search yielded 28 articles. I conducted a second search and included the following term: *staff development.* That search yielded 15 articles. The years searched in both cases primarily ranged from 2010–2013. My third search included *technology*, *teacher's perception*, and *integration* and spanned the years 2010-2014; this yielded 29 articles.

According to the Office of Educational Technology, U.S. Department of Education (2010), our daily lives have become centered around technology. According to Ahmet, Bulent, & Cemalettin (2011), the integration of technology can yield great benefits in the areas of teaching and learning.

The integration of technology must be provided to students through engaging, powerful, and meaningful learning experiences. Technology is not only motivating, but through its use, literacy learning is enhanced (Hansen, 2008). Ahmet et al. (2011) report that the integration of technology have motivated students to do more through technology in order to improver their level of success I school. Building a 21st century learning environment requires a technological infrastructure that can evolve with the constant changing technology tools (Jones, Fox, & Levin, 2011). When technology infrastructure is in place, teachers tend to fall into one of the five categories described within diffusion of integration theory.

Theoretical Base

Diffusion of innovation was the theoretical base for this study (Rogers, 1995). In this section of the literature review, I examine the traits of diffusion of innovation in relation to the following: (a) the factors affecting the rate of technology adoption by teachers, (b) teachers' attitudes and pedagogical beliefs toward technology, (c) characteristics of exemplary technology teachers, (d) instructional methodology used by exemplary technology teachers, (e) administrative support of technology use, and (f) technology training received by teachers and its influence on effective computer integration in the classroom.

Factors Affecting the Rate of Technology Adoption by Teachers

Lack of Staff Development

In terms of technology adoption, what defining characteristics do novice users of technology in the classroom and nonusers of technology have that signify their differences? Technology-based staff development can make a difference with the proper implementation. Support of staff development programs can be gained through the knowledge of adoption theories that can assist district and school administrators in identifying early adopters as well as late adopters when preparing teachers to adopt and consistently integrate technology into their curriculum design. Rogers analyzed more than 900 research papers of college students to identify characteristics of adopters vs. nonadopters. Based on his analysis, Rogers categorized the adopter by socioeconomic status, personality traits, and communication behavior characteristics. Rogers (1995) based his research on experiential investigation and market research that indicated that a person's rate of adoption could be influenced by conditions that included exposure to technology, personal innovative ability, and socioeconomic status. At the introduction of a new innovation, an individual forms an attitude after mentally initiating the decision

process of recognizing the innovation. Diffusion theory was derived from a synthesis of more than 3,100 publications on diffusion of innovation and a wide range of research on the topic (Straub, 2009).

Rogers' (1995) theory of the diffusion of innovation defines *diffusion* as "the process by which an innovation is communicated through certain channels over time among the members of a social system". The terms *early adopters*, *late adopters*, and *late majority* are categories from diffusion of innovation theory (Murray, 2009; Rogers, 1995). Within this theory, people are divided into five categories in relation to their rate of technology adoption:

1. *Innovators*: These pioneers tend to be quite adventurous and very willing to strike out beyond the bounds of their customary networks to make new contacts and learn new things.
2. *Early adopters*: These buyers tend to be more rooted in the local matrix of social relationships than the innovators are. Because they are both respected and "normal," they tend to be models for others.
3. *Early majority*: These adopters think carefully and long before adopting an innovation. They rarely lead, but they often endorse an innovation's acceptability.
4. *Late majority*: These skeptics only adopt after they have seen the innovation at work and watched the consequences.
5. *Laggards*: Individuals in this category are the last to adopt an innovation.

Within the diffusion of innovation theory, there are four main elements: innovation, communication channels, time, and social system. The rate at which technology is adopted is different for all teachers. In an article on innovation, Harmancioglu (2009) discussed Rogers' theory of diffusion and defined *innovation* as

"an idea, objects, or practices that are perceived as known by an individual or other unit of adoption" (p. 229). In this study, innovation can be defined as instructional technology as a learning tool.

In the Republic of Kenya, a study was conducted to examine the extent to which technology training influenced secondary mathematics teachers' decisions to adopt or not adopt technology in classroom practice. Data from the study confirmed the hypothesis that teachers with the least amount of staff development would have the lowest level of technology adoption. The findings of this study revealed that technology staff development training and the continuing support of good practice were among the greatest determinants of successful technology adoption (Kamau, 2014).

Dr. Alison Schleede conducted a study of the Mooresville Graded School District in Mooresville, NC who in 2007 jumpstarted its initiative to provide three-dimensional education across the district. Teachers were given laptops a year in advance in an effort to familiarize them with the technology. The initiative eventually placed laptops in the hands of over 5,000 students and over 500 educators in Grades 3 through 12. Schleede (2011) conducted a dissertation study to investigate effective professional development models and strategies needed to successfully implement a digital learning environment. The findings of her investigation confirm the importance of professional development as well as the desires of teachers to have more input. Teachers who participated in the study indicated that the professional development received was not relevant enough to meet their needs (Schleede, 2011)

In a different study involving Mooresville Graded School District, it was discovered that teaches understood the need to integrate technology into the curriculum but lacked the necessary training to do so. According to Marsh (2012), support training was provided in two summer technology institutes that included differentiated

professional development on digital applications and strategies for using digital technology in the classroom. Despite the trainings, a high percentage of teachers indicated that they did not know how to meet their professional obligation to help students develop a global understanding, to meet the diversity needs in their classrooms, or to demonstrate the relationship between core content and 21st-century skills (Marsh, 2012).

Teo (2009) theorized that teacher attitudes play a role in motivating teachers to learn to use a new technology prior to actually learning or using it. The study found that negative attitudes could be overcome, as they tend to lack conviction. He concluded that attitudes are not a contributing factor in the total variance of technology usage and that there is a need for more information on teachers' current abilities and classroom routines using technology. A similar study conducted by Aldunate (2013) indicated that attitudes, skills, and practices are considered to be interrelated variables and that relationships among them are significant. Aldunate's study included 85 teacher participants and indicated that teachers who are technologically inclined and regularly take the time to integrate technology will be more open to new technology adoption.

Innovation

Innovators are the first to adopt new technologies and do so without pressure (Dearing, 2009). Innovators are normally risk takers who have high socioeconomic status. Innovators tend to serve as role models for those in all other categories (Rogers, 1995). Technology adoption is a process that is very different depending of the technology used and level of comfort. When innovators and early adopters are not involved in the new waves of technology, it negatively impacts technology adoption (Aldunate, 2013). Early adopters are a group that adopts technology almost independently of its complexity.

The second group of adopters is the *early adopters* (Rogers, 1995). Like the innovators of the first group, early adopters are generally more educated and more sophisticated than those in the remaining three groups. Early adopters and innovators are in the middle socioeconomic class, which allows them to acquire the latest technologies faster than late adopters, who are generally in the lower socioeconomic class. Early adopters search for information about new innovations more assertively than late adopters and have greater exposure to mass media than late adopters do. In addition, they are people who are open to trying new ideas. They readily accept change and maintain a positive attitude regarding technology and its integration. Early adopters are sought after more than any other rate of adoption category for their wisdom and the guidance they provide for those in the late adopter categories (Giannopoulou, 2010; Rogers, 1995).

Early adopters can sometimes be viewed as the trendsetters for innovations. When new technology innovation is viewed as credible by early adopters, the technology likelihood of implementation and acceptance by the mainstream is greatly increased. In the diffusion process of new innovations, it is extremely important that the early adopters' perceptions of new technology are sought. Therefore, ample time should be given to early adopters for the purpose of exploring new innovations at a rate that gives them sufficient time to make an informed opinion. Early adopters that support new innovations are more prevalent in an environment that is rich in curriculum-based, sound educational practices that are connected to classroom practices (Rogers, 1995;Greve, 2009).

The early majority adopter is comprised of one-third of the members of the adoption system, which is the largest adoption category in Rogers's theory of the diffusion of innovations. Early majority adopters interact frequently with their peers, but differ from the early adopters in that they are not often seen as opinion leaders. Unlike early adopters, early majority adopters deliberate and discuss before adopting new ideas

(Rogers, 1995; Weaver, 2008).

Although late majority adopters may give their approval of an idea after their peers have been successful with the new technology, they are reluctant to adopt the new technology until pressured by their peers (Rogers, 1995; Hixon, 2012). Most members of the late majority possess low technology skills and are in low to middle class socio-economic groups. When pressured and innovation is perceived as required, the probability of a late majority adoption increases (Rogers, 1995; Looma, 2012). Providing a supportive environment is the best way to promote a more accepting climate for adoption by reluctant groups.

The final adoption group is the laggards. Laggards are traditionalists who are extraordinarily localized, may be isolated from their own society, and are often in the lowest economic class. Laggards are usually not opinion leaders, and they isolate themselves from others. Skeptical of innovations, laggards' process to adopt innovations is very lengthy (Rogers, 1995).

The decision to either reject or adopt the introduced technology is made by the individual. Adopting the innovation is stronger than accepting the innovation because it shows that the individual likes the innovation and adopts it wholeheartedly. The decision to accept or adopt the innovation has a great impact on level of use. Morales, Knezek, and Christensen (2008) suggested that teachers' attitudes have an impact on technology efficacy based on the type of technology being used, and the grade level being taught. According to the findings of Morales et al.'s (2008) study of elementary and middle school teachers conducted in Mexico (n = 972) and Texas (n = 932), middle school teachers were more proficient in applications like Microsoft Word processing, and Microsoft Excel spreadsheets in the Texas sample, whereas teachers in Mexico matched their skill level only on singular applications, as a participant reported, "I feel confident

that I could make my own World Wide Website homepage" (p. 139).

Teachers' Attitudes and Pedagogical Beliefs Toward Technology

Teachers consider numerous factors when making the decision to integrate or not to integrate technology into their teaching curriculum. Factors include accessibility to hardware and software, self-efficacy, professional development, administrative support, pedagogical beliefs, time constraints, technical support, and personal rate of innovativeness of adoption. Based on evidence, self-efficacy for computer use as a learning tool may be a considerable factor in determining technology integration (Lambert, 2008). In addition, having time to implement technology in their classes, technological support, and access to technology does not automatically mean teachers will use technology effectively in their classrooms (Ertmer, Ottenbreit-Leftwitch, & York, 2007). A teacher's attitude toward technology is often an impediment to integration. Computer use in the classroom is seen by many teachers to be disruptive to their normal teaching practices and to require valuable time to implement (Blin, Munro 2008)

Because of teachers' attitudes towards technology integration, there are a large number of teachers using technology to accomplish administrative tasks rather than incorporating it as an integral part of their daily instruction. In a study using integrated mixed methods conducted by Palak and Walls (2009), the following was evident: (a) teachers use technology most frequently for preparation, management, and administrative purposes; (b) teachers' use of technology to support student-centered practice is rare, even among those who work at technology-rich schools and hold student centered beliefs; and (c) teachers in technology-rich schools continue to use technology in ways that support their already existing teacher-centered instructional practices
(p.436). Palak and Walls (2009) concluded that future technology professional training

programs need to be centered on the incorporation of technology into student-focused teaching while constructing various contexts, which emphasize technology integration. Thus, Palak and Walls (2009) recognized contradictions in the literature, and studied teacher beliefs to investigate their instructional technology applications. A more recent case study conducted by Kurt also shows that teachers use technology for administrative purposes, technology education, non-educational purposes, instructional preparation, teacher-directed instructional delivery, student homework, and instructional assessment (2012). Despite the numerous progressions in technology development, over the past twelve years, technology integrations haven't advanced dramatically in education. This literature review confirms the fact that the research of years past is still true today in that a great amount of technology use in education is still to accomplish administrative task rather than strong integration into daily lessons.

The spectrum in which technology is integrated occurs at different levels, ranging from word data processing to research and problem-solving software. Along this range of technology lie teachers who utilize technology for the purpose of Internet searches, to complete assignments, and to perform drill and practice via computer technology. In 2009, the National Center for Educational Statistics in Washington, DC conducted a study in which a survey of teachers in the K-12 school systems was used. Teachers reported that they or their students used computers in the classroom during instructional time often (40 percent) or sometimes (29 percent). Teachers reported that they or their students used computers in other locations in the school during instructional time often (29 percent) or sometimes (43 percent). According to this data, half of the teachers that utilized computer technology and Internet for instruction and student assignments mainly used it for drill and practice, word-processed documents, spreadsheets, and Internet research. Half of the teachers that used computer technology involved students in using it

for problem solving and data analysis. Teachers who were early adopters of technology integration into the instruction benefited from technology in their classrooms. In contrast, teachers who were less prone to use computer technology were limited to using computer labs. The survey also illustrated that 62% of teachers with more than four computers in their classrooms used them for integration into the curriculum compared to 29% of teachers with only one computer. In the 2009 NCES survey, teachers with at least one computer in the classroom reported that their students used computers during instructional time; often (29%), sometimes (43%), or not at all 28% (Gray et al., 2010).

A known obstacle that prevents teachers from integrating technology into the curriculum is the low computer to student ratio. When the number of available computers to student ratio is unbalanced, the likelihood of teachers integrating computers in their curriculum is diminished (Acemoglu, 2010). This situation has been in existence since the beginning of technology integration and has continued to be an obstacle over the years. A study was conducted in which 348 full-time faculty members of the University of Georgia were given a survey in an effort to identify barriers they faced in the integration of computer technology into their curriculum. Eighty nine percent of the faculty surveys identified the limited availability of technology as a major barrier to the integration of technology into the curriculum (Beggs, 2000; Sokura, 2007).

The quantity of technology available does not play a large role in the teachers' attitudes towards technology integration (Albion, 2001; Gibbone, 2010). A case study conducted by Ertmer, Gopalakrishnan, and Ross (2000) showed that the limited number of computers did not deter the integration of technology by some teachers. Teachers were able to provide students with an opportunity to use technology in the curriculum because of school wide planning strategies. In a similar case study using pre-service teachers, Hsiao (2009) concluded that teachers are more likely to integrate technology when

trained and given time to plan the technology integration.

Teachers' prior experiences and beliefs about computer capabilities can greatly influence their willingness to integrate technology into their curriculum (Paraskeva, 2008). Teachers with a low level belief in the benefits of technology integration most often depended on strategies that were effective when used in a prior lesson and as a result, they were not as willing to integrate new innovations as those with a greater belief in the technology. Medvin, Reed, and Behr (2000) conducted a study that included 38 teachers of a Head-Start program with a low level of belief in the use of technology integration. The conductors of the study found that the teacher's curriculum included technology integration less often and associated an increased level of anxiety when technology was used. The study consisted of a pre-test and a post-test in which teachers received hands- on staff development training and follow up support in technology. Al-Mehrzi (2011) supported these findings when he noted that teachers tend to follow the teaching path that they believe in (Al-Mehrzi, 2011). A suggestion from the study of Medvin, Reed, and Behr's (2000) stated that teachers with low levels of belief toward technology would benefit from hands-on technology staff development that would increase their knowledge and comfort toward technology integration. Medvin, Reed, and Behr's finding validates earlier studies conducted by Woodrow (1992) and Albion (1999).

Educators that understand the impact that technology can have on the education of today's technology driven students are more likely to incorporate it into their curriculum (Coffland & Strickland, 2004). Van Braak's (2001) conducted a study that investigated the relationship between computer use in the classroom and influencing factors on an individual level, such as age, gender, teaching in technology related subject areas, general computer attitudes, attitude towards computers in education and, technological innovativeness. Subjects of this study were identified as 236 secondary school teachers

familiar with computer use in the educational setting. It was noted that the teachers were Dutch-speaking educators with positive attitudes toward computers technology and its impact on education. The study found that male teachers were more involved in classroom use of computers than female teachers. In 2010, Sang conducted the same study as Van Braak but with the central focus on student teachers (Sang, 2010). The findings of Sang's study validate the results discovered in Van Braak's earlier study.

Attitudes toward computers and confidence in the educational use of computers are two major predictors in teachers' future technology use in the classroom (Abayomi, 2009; Myers & Halpin, 2002; Yildirim, S., 2000). A vast amount of educators are in favor of integrating technology into their curriculums, but they are hindered by their inability to effectively integrate technology as well as their lack of confidence (Abayomi, 2009; Myers and Halpin 2002). Basham (2012) conducted a study in which the purpose was to examine the effectiveness of a constructivist-based technology-training model for educators who taught special education. The study looked at the effect as 34 teachers pursued change in their individual teaching techniques and processes. In the study, teachers were split in to two groups and given the task of integrating technology into their curriculums with the assistance for the first group from the technology coordinators and other qualified technology users who served as mentors. The support from the technology coordinators and other qualified technology users not only included mentors for the teacher but also technology training in the classroom as well as in computer labs.

The technology training received by the teachers included the use of three online Macromedia Flash-MX based tutorials and three hands-on cooperative based learning experiences. At the end of the study, teachers acknowledged a positive change in attitude in regards to the use of computers that was reflected in increased integration. Results indicate that the framework led to a significant perceived gain in National Educational

Technology Standards for Teachers (NETS-T) ability (p = .001).

Another project conducted by Godzicki (2013) utilized strategies to promote the effective use of technology in the classroom. The study was a five-month program in which 116 participants were provided technology training, hands-on experience, and continuous classroom technical support. One of the main components of the program included the contributions made by the teachers during a five-month period. During that time, teachers were asked to use their knowledge of the curriculum to assist in the creation and development of curriculum based projects that they would implement into their classrooms. Teachers' interests in computer use in the classroom were peaked and as a result, they became more aware of new pedagogical techniques that could be used when integrating technology. After participating in eight hands-on, collaborative workshops, Godzicki found that most of the teachers' technology skills had increased, they were more comfortable with technology, and increased their use of the Internet. Teachers must be willing to experiment with technology, explore various uses of technology, and take risks. (Marwan, 2010)

Teachers who believe in the sound benefits of technology's impact on students' learning and who possess a positive attitude toward technology use in their classrooms are more apt to implement the technology on a regular base. When the technology skills of teachers are strengthened, their level of comfort in the use of that technology in their curriculum increases. Technology-competent teachers will use technology in their instruction regardless of the number of computers available (Liu, Maddux, & Johnson, 2008).

Characteristics of Exemplary Technology Users

Teachers who are considered to be exemplary technology-using teachers are often teachers who "achieve meaningful technology use in learner-centered, constructive

environments despite the presence of both internal and external barriers" (Ertmer et al., & York, 2006-2007, p. 55). In reviewing the literature, Saleh revealed that teacher' attitudes, personal beliefs toward computers, disposition, ability to change and, pedagogical philosophy contributed to successful technology integration (2008).

There are many factors that contribute to the successful integration of technology in the classroom (Onojaefe, 2009). In an effort to identify best practices, a descriptive study of how exemplary technology-using teachers use technology in their classroom was conducted (Eartmer, 2012). The study included twelve K-12 classroom teachers identified as exemplary technology-users. The study, focused on several areas of instructional design that included targeting teaching techniques, inconsistencies in teacher beliefs, actual teaching practice, and students' use of technology. Teachers that include technology into the instructional design are more likely integrate it into the lesson. Results suggest close alignment; that is student-centered beliefs undergirded student-centered practices (authenticity, student choice, collaboration). Additionally, most teachers indicated that internal factors (e.g., passion for technology, having a problem-solving mentality) and support from others (administrators and personal learning networks) played key roles in shaping their practices. Teachers noted that the strongest barriers preventing other teachers from using technology were their existing attitudes and beliefs toward technology, as well as their current levels of knowledge and skills (Eartmer, 2012).

Teachers can be more effective in integrating technology into the instructional design when they are properly trained. In a survey conducted by Clark (2013), teachers reported that attending technology-based staff development trainings was beneficial; however one of the most important elements in the development of their technology integration skills was independent learning and practice rather than a group-guided

process. In addition, self-learning was described as the most significant way of technology skills acquisition by sixty-one percent of the exemplary technology-using teachers identified. This validates the notion that exemplary technology users are self-guided learners. Similarly, findings by Eartmer et al., (2006-2007) suggest that intrinsic factors such as resolving to use technology in the classroom curriculum, self-confidence in technological abilities (as opposed to technology resources), and time for planning and developing lessons are key factors which influence most exemplary technology teachers' effectiveness in integration. Furthermore, Ermter et al., (2006-2007) suggest that the desire to help students grasp real life concepts in the learning process is a driving force in exemplary technology-using teachers.

Exemplary technology teachers used a constructivist approaches to integrate technology in the classroom. An important component of constructivist theory is to focus a child's education on authentic tasks, which have “real-world relevance and utility, that integrate those tasks across the curriculum, that provide appropriate levels of difficulty or involvement," (Akyol, 2010, p.66-68; Jonassen, 1991). It would be impossible for all learners to become masters of all content areas, so "instruction is anchored in some meaningful, real-world context" (Akyol, 2010, p.66-68; Jonassen, 1991). In the non-constructivist approach, students mainly use computers for typing and desktop publishing, which utilizes problem-oriented learning activities and collaborative work. Students in a constructivist classroom use the computer for research, writing, multimedia authoring programs, and desktop publishing (Berg et al., 1997; Hermans, 2008; Judson, 2006).

A national survey of elementary and high school teachers revealed that computer-using teachers most often have more experience in teaching, more computer training, and a larger number of college course credits and degrees (Becker, 1994; Inan, 2010). The

conclusion of this survey was reconfirmed in the case study of self-proclaimed exemplary technology users (Eartmer's et al., 2010) that concluded that the exemplary technology-using teachers have various levels of teaching experiences and computer training. Exemplary technology-using teachers appeared highly self-motivated, confident in their technology abilities, and most of all believed in the use of technology as a tool for "achieving their visions of teaching and learning" (p. 3). This study used purposeful sampling to select the 78 participants that were involved in this study. In an effort to examine the similarities and differences among the technology practices and pedagogy beliefs, a multiple case-study research design was used. All data were collected through the teachers' webpages as well as through interview.

A study conducted by Clark (2012) revealed that exemplary technology-using teachers invested personal time to enhance their technology skills. The study included 20 teachers from various elementary and secondary schools in North Carolina. Their study illustrates that effective implementation of technology requires technology training, and suggests that teachers should be allowed the necessary time to practice the skills acquired. The level of integration of technology into the curriculum depends on the teacher's attitude towards technology. The findings of a study conducted by Stephanie Tweed (2013), supports the earlier study that was conducted by Clark. Tweed's data revealed from forward multiple regressions shows that the teachers with the greatest self-efficacy tend to push toward a student-centered environment (2013). The study included 124 teachers from two school districts grades k-5. The study also concluded that the amount of time spent in technology training, the amount of personal time applied to technology training, and willingness to accept change are considered to be three main factors which can be used to predict which classrooms computers are used. As a means of improving technology use in the classroom, teachers may find it beneficial to integrate

technology into the daily instruction when they are provided sufficient time to learn, practice, and reflect upon newly acquired technology skills (Gorder, 2008). Vannatta and Fordham validated these findings and expressed the need for teachers to have adequate time to practice existing and new technology skills (Knezek, 2008).

Sleeter (2012) conducted a case study that examined school's technology staff development programs. The targeted areas of improvements included teacher discussion, teacher reflection, and meetings that referenced curriculum-specific goals for technology integration. The teachers reinforced the findings of this study confirming their belief in the benefits of technology integrating into the instruction. The study also concluded the teachers that used the constructivist method focused on the organization of materials and its content based on the students' prior knowledge. Teachers used the constructivist method in an effort to provide students with a hands-on approach to learning that required them to, in conjunction with technology, use problem solving skills as well as higher-order thinking skills to solve the problem (Forsbach-Rothman, 2007). The teachers' focus was primarily on the applicable use of technology integration to support the goals of the curriculum (Sleeter, 2012).

Albion (2008) conducted a study was of over 4,000 U.S. teachers in an effort to examine their educational background, individual teaching philosophy, and instructional practices of technology-using and non-technology-using teachers (Albion, 2008). As part of the study, teachers were grouped into four categories based on their level of professional engagement. The teachers classified as having a higher level of professional engagement were considered to be the teacher leaders. A common trait of the teacher leaders was their high level of interaction with their peers, both in and out of school. They believed and modeled the life long learner and self-reflective practice, as indicated by reports from their workshop presentations, peer mentoring, and teaching at the

university level. Teacher professionals were not defined as ones to take on the leadership role like the teacher leaders. Teacher professionals were defined as active learners beyond the classroom in which they taught, but lacked the desire to interact and share ideas with peers.

Teacher professionals can be found second on the continuum of levels of professional engagement. On the same continuum, interactive teachers were listed as third. Teachers classified as interactive teachers were considered interactive with their peers, but not at the same interactive level as with teacher professionals. Private practice teachers who reported little or no engagement in a professional dialog or activities beyond those mandated were fourth on the continuum (Albion, 2008; Center for Research, 2000). The study noted the habits of the teacher leaders included attending more selective schools, investing more personal time to continuous learning, and investing twice the amount of professional time than the private practice teachers. Teacher leaders and teacher professionals were the two categories of teachers that employed more of the constructivist methods of instruction and practice into their teaching and learning environments.

In similar research conducted by Albion (2008), questions of whether there "was a relationship between the use of computers and teachers' beliefs and practices" was posed (p. 33). Based on the questioning, the teacher leader category prevailed as the strong, talented leaders that really embraced the integration of technology as a result of the strong beliefs in constructivist learning as a powerful learning tool and in technology as a tool that can be easily adopted into the constructivist practice. The strong teachers in the technology leaders category continually invested their time to learn how to use the computer as a learning tool in their classrooms. As a result of seeing the benefits of computer assisted learning, other teacher leaders adopted a more constructivist approach

to the use of technology.

Exemplary technology-using teachers generally are highly motivated teacher leaders who are confident in their technology skills and believe that technology enhances student learning. Many exemplary technology teachers use the constructivist approach prior to their technology use.

Instructional Methodology Used by Exemplary Technology Teachers

According to the data compiled by the Office of Technology (Guzey, 2009), the majority of teacher education faculty believed that technology was not just a "passing phase" but would have a significant impact in education and teacher education. However, teachers have been reluctant to make changes in their instructional strategies and pedagogical practices to accommodate instructional technology. Change in educational practices requires teachers to adjust their "beliefs and practices to a certain degree" (Donaldson & Knupfer, 2002, p. 89; Kessler, 2010). Change is difficult for many teachers, but to achieve the highest levels of success with technology integration, old methods of instruction should be replaced with a student-centered learning environment (Donaldson & Knupfer, 2002; Kessler, 2010).

Significant changes must occur in order for technology to be used effectively in the classroom. Technology can affect the teaching, learning and disseminating of information in a classroom environment. A classroom's culture can change with the adoption of technology use (Kleiman, 2009). For this reason, some teachers can see change as a barrier when it comes to integrating technology into their teaching practices. Changing teaching methodology and instructional strategies involves time and a restructuring of established practice. According to a literature review of studies, teachers can’t be expected to change their pedagogical beliefs to encourage technology right away. Changing pedagogical beliefs is a difficult process that can be achieved over time

(Keengwe, 2009). Frailich's (2009) research on the impact of theories of learning and instructional strategies on teachers' adoption of technology suggests that teachers must be provided effective technology training, professional development, and support. Are there instructional strategies effective classroom teachers currently use which, when combined with technology, can enhance student learning?

Technology integration and instructional strategies described in Marzano's (2009, pp. 30-37) meta-analysis study of over 100 reports on instructional strategies suggests nine strategies which could lead to student enhanced learning: a) identifying similarities and differences; b) summarizing and note-taking; c) reinforcing effort and providing recognition to students; d) homework and practice; e) nonlinguistic representations; f) cooperative learning; g) setting objectives and planning feedback; h) generating and testing hypotheses; and i) cues, questions, and advanced organizers. These instructional strategies are easily integrated with technology to help improve student learning.

Traditional instruction alone does not create an environment adequate to meet the technological demands of the twenty-first century. Teachers' roles will need to change from purveyors of knowledge to facilitators of knowledge and, in doing so, create a nonlinear learning environment, which encourages critical thinking skills and collaboration among peers (Wheeler, 2008).

As more and more teachers strive to meet the demands of the twenty-first century, they will need to adopt more innovative student-centered instructional styles to accommodate 21st century technologies as they work to educate students for the future (Hirumi, 2002; Nasim, 2011). For example, according to Becker (2001) and Keengwe (2009), teachers who incorporate technology to improve student learning have a more constructivist teaching philosophy and are competent with their computer skills. In comparison to teachers who engage in a traditional philosophy of instruction,

constructivist teachers use the computer more frequently and in more demanding ways as they have their students gather and analyze information. Coupling computers and other technologies such as video and multi-media recordings with traditional methods of instruction provides learners with more content and depth than do traditional methods alone (Amiel, 2008).

Integrating Technology for Inquiry lesson model (NteQ) is a systematic planner that provides a structure for teachers who use technology as a learning tool (Lucey, 2009). In this model, students use technology to solve problems and analyze data. This type of learning environment relies upon higher level thinking skills and requires students to use knowledge and skills that replicate the workplace. For an environment like this to take place, the authors suggest teachers experience using the computer as a learning tool and understand how students learn in regard to the technology being used. As this scaffolding process unfolds, the teacher can establish a student-centered, multi-dimensional learning environment.

Studies indicate that technology should be used as a learning tool to support students' academic achievement (Tseng, 2012; Fonseca, 2014; Gibbon, 2014). For technology to positively affect student learning, the instructional environment needs to change from a traditional model to a more student-centered environment. An environment where technology supports learning will need to "involve more student interaction, more connections among schools, more collaboration among teachers and students, more involvement of teachers as facilitators, and more emphasis on technology as a tool for learning" (Tseng, 2012, pp. 102-115). Using technology in the classroom only to accomplish a "task" does not promote meaningful learning. The teacher should use technology to evaluate and synthesize information. Students are "empowered" when student-centered instruction is coupled with meaningful technology (Kessler, 2010). In

classrooms where technology is being used effectively, students are using computer software and other technologies to analyze data and solve problems. Teachers in these classrooms use student-centered learning approaches like constructivism where technology is viewed as a learning tool. Classrooms using technology have moved away from traditional models of teaching to student-centered ones, focusing on the teacher as a facilitator of knowledge.

In a recent study, Thompson (2013) surveyed 388 freshmen a school in the Midwest in an effort to determine if there are any correlations between the use of technology and students' learning. During the study, t-tests were used to search for any connections. As a result, positive relations were discovered between patterns in the use of technology and student learning. At a time when brains are still developing, todays' generation of students' lives is being saturated with digital media. As a result, several popular press authors suggest that media use has profoundly affected students' abilities, preferences, and attitudes related to learning using traditional methods (Rideout, 2010).

In 2013, a quasi-experimental research study was conducted in an effort to identify correlations of blended pedagogical teaching approach and student success in lesson retention. The study included 128 freshman students that were divided into two groups with the same characteristic for the purpose of establishing a control group. The experimental group benefited from technology integration and significantly outscored their counterparts on assignments (Safar,2013)

Administrative Support of Technology Usage

Campus administrators play a key role in technology development on their campuses, beginning with creating a school culture where teachers are given the opportunity to experiment with other teaching methods and to practice using technology in their classrooms. Part of creating this environment is providing teachers with the

opportunity to learn new technologies and instructional strategies as they are supported and celebrated in their endeavors and success (Chapman, 2010). The Milken Exchange on Education Technology suggests administrators need to be modeling effective technology to support learning and administrative tasks. Clearly not all administrators operate at the same level of technological competency. The Fullan (2013) literature on education technology suggests three stages at which administrators function. Stage one is considered the entry stage where the principal and school community began understanding educational change, but little evidence exists to suggest the learning environment has been changed by technology. Stage two is defined as the local change. During the local change, teachers integrate technology into their teaching practice (Fullan, 2013). At this stage the principal uses basic administrative and educational technologies. The principal becomes a better leader with technology training and sees that technology supports the current teaching practices and learning. As the principal's knowledge of effective technology instruction increases, there will also exist a need for the principal to learn how to implement new technology and instructional developments. Stage three, the transformation stage, occurs when technology is used to change learning practices. At this stage the principal has the ability to effectively evaluate a teacher's integration of technology and make instructional suggestions (Fullan, 2013).

Fullan study closely follows Milken's 1999 study which is still relevant today because with advancements in technology and a generation that thrive on technology, there is an even greater need for administrators to be aware of the benefits of involving the faculty in all stages of the change process. Schools where teachers are encouraged to collaborate, reflect, and discuss ways technology can be used to enhance learning are more apt to discover avenues leading to environments conducive to technology integration (Chapman, 2010). Principals who ask their teachers to reflect upon their

practice and technology use may find new ideas on ways to integrate technology more effectively (Vanderlinde, 2010).

Now is the time for state, school, and district administrators to inform and provide guidance to teachers as technology is rapidly changing the world around us. School administrators need to facilitate teacher readiness by providing quality opportunities for growth (Conrad, 2011). Opportunities for growth can include online learning courses, increasing technology resources and accountability, access to research, proven technology examples, and professional development.

When administrators lead by example, it makes it easier to get buy-in from the teachers (Marwan, 2010). Administrators need to lend two types of technology support to their faculty: 1) instructional and 2) technical. Instructional support includes training, support, and advisement in the areas of pedagogical ideas, instructional strategies, and effective teaching methods. Technical support includes providing current hardware and software, technology resources, professional development, and personal technical support (Ronnkvist, Dexter, & Anderson, 2000; Glazer, 2009).

A principal's role is to be supportive of technology usage, and willing to provide the necessary assistance and resources to teachers in need. Principals who regard technology positively attract teachers who regard technology positively. Principals' attitudes toward technology have an effect on teachers' attitudes toward technology as well (Coffland & Strickland, 2004; Lui, 2011). Along with the attitude boost, teachers need the support of their building level administrators to provide the necessary hardware and software in their classrooms so they can successfully implement technology in their instruction.

Administrators need to involve teachers in the change process, for teachers are at many different levels of technology readiness. Technology professional development and

support systems will be more effective when the principal assesses his or her faculty's technology readiness (Barone & Hagner, 2001, pp. 5-7; Natho, 2010).

Technology Training Received by Teachers

Effective professional development programs can produce more effective teachers and increase teacher quality. Quality teaching has been linked to improved student performance (Wenglinsky, 2000; Stronge, 2011). However, funding for technology frequently goes toward the purchasing of hardware and not to technology training (Sandholtz, 2001; Hanson-Baldauf, 2009). Sparks and Hirsch's (2000) research concluded that effective professional development provides the opportunity for teachers to connect pedagogy to content. Teachers should be provided with opportunities to collaborate with other educators to plan and develop new strategies, skills, and different forms of assessment on a regular basis. The Arkansas Department of Education Information and Technology Plan 2000 (2000) began rallying for these views over twelve years ago and the need is still true today. Teachers need effective professional developments that are based on teachers' needs; involve learning, collaboration and modeling (Gibson, 2012). In addition, The Arkansas Department of Education Information and Technology Plan 2000 indicated teachers should be given "hands on learning, time to experiment, easy access to equipment and availability of support personnel who can help them be effective users of technology" (Arkansas Department of Education, 2000, p. 18).

The 2004 National Technology Plan provided by the U. S. Department of Education and the Office of Educational Technology received input from over 1,500 individuals, including organized groups from educational associations, federal agencies and industrial representatives (U.S. DOE, 2010d). Data were compiled from surveys conducted by the groups as well as consensus activities. The 2004 National Technology

Plan titled *Toward a New Golden Age in American Education* indicated that the problem with lack of technology integration in the classrooms was not necessarily a lack of funds, but a lack of adequate training for teachers. In 2010 that plan was updated and named The National Education Technology Plan, *Transforming American Education: Learning Powered by Technology* (U.S. DOE, 2010d). Technology training in the past did not focus on instructing teachers to understand how to incorporate computers to enrich the learning environment, but simply modeled how to use them as tools. Furthermore, the report revealed that state and local school districts are learning how to restructure existing finances to accommodate the 21st century calling for technologically equipped 21st century schools. The National Education Technology Plan calls for applying the advanced technologies used in our daily personal and professional lives to our entire education system to improve student learning, accelerate and scale up the adoption of effective practices, and use data and information for continuous improvement (US Department of Education, Office of Educational Technology, 2010). Despite this growing awareness, Cullen'(2011) study of 67 teachers indicated that the teacher's commitment to integrate technology into the curriculum was the result of intrinsic and extrinsic motivation with positive attitudes toward technology use. A national study conducted by the United States Department of Education's Integrated Studies of Educational Technology revealed only 48% of teachers surveyed indicated they felt well prepared to integrate technology in their instruction, despite the billions of dollars provided to schools from the federal, state, and local levels (U.S. DOE, 2007).

Hanson-Baldauf (2009) studied two separate types of teacher development programs: a private computer company and a professional development program of a public school district. Both professional development programs recognized these elements as key components of effective technology programs: the importance of the

teacher's role in the planning and choice of technology training; administrators' support and participation; teacher in-class time to implement technology with students; adequate funding; a constructivist environment in which to learn; hands-on, authentic learning; and collaboration with peers. Participants in the study valued creating materials that could be used with technology in their own classrooms Hanson-Baldauf (2009). Similar findings were found in (Sandholtz, 2001) and Reiser's study (2002), which indicated one of the main factors influencing teachers' use of technology integration is support and access to computers, regardless of the effectiveness of the technology training provided.

When teachers are not provided computer access, time to practice newly learned technology, administrative and hardware support, and funding, their likelihood of using technology is hindered (Reiser, 2002). In contrast, when teachers are not constrained by lack of computer availability, administrative support, and technical support, they generally implement the technology plans constructed in their training (Ronnkvist, Dexter, & Anderson, 2000; Glazer, 2009). Available technology does not necessarily translate into technology use nor does self-proclaimed technology support. Successful integration of technology occurs when administrators provide instructional and pedagogical support, quality technology leaders and trainers, and the time and opportunity for hands-on learning opportunities. Professional development and administrative and technical support must be present for effective technology integration (Ronnkvist, Dexter, & Anderson, 2000; Glazer, 2009).

Perhaps there is not a greater witness to the lack of technology readiness and technology professional development of teachers than American students. Students in grades K-12 responded to an online survey conducted by NetDay (2004), a national nonprofit organization that promotes the effective use of technology in American schools. NetDay researchers indicated that students reported that their teachers lacked technology

expertise. A sixth grade student stated: "I think that we [schools] could give technology classes to students and teachers because our teachers are falling behind the students, as they aren't good with computer programs and software" (p. 21).

Training is essential in the development of technology-ready teachers. Most teachers have received very little formal technology training and less direction on how to use, orchestrate, and connect the available technology to content and instruction. Technology training should not be a piecemeal approach, but should emphasize technology as a pedagogical tool and relevant to all subject areas (Office of Technology Assessment, 2012).

Implications

The integration of technology can sometimes be overwhelming for new users. When asking educators to use technology that they have never used or have not become comfortable with, some teachers may require more training than others. As shown in Table 2, through the research, I plan to use research questions one and two to identify teachers that are in need of technology help. Research question three was used to gain insight into the teachers' need for better technology integration. The fourth research question was used to determine which staff development trainings were most beneficial.

Table 2

Research Question Usage

Research question	Planned usage
1. How do EFG Middle School teachers with advanced and above rating classify their use of technology on the STaR chart to support their teaching and student learning?	1. To identify teachers that are in need of technology help.
2. Is there a relationship between the teachers' level of competency and the amount of professional development taken?	2. To identify ways to increase teachers' competency.
3. What situations do EFG Middle School Teachers think would help increase technology integration?	3. To gain insight into the teachers' need for better technology integration.
4. How does number of technology training classes relate to teacher self-	4. To determine which staff development trainings were most beneficial.

If the data support the assumptions, professional development training may be created to address the needs of teachers that lack the necessary skills. When adjusting to technology integration, it is important to focus on the following objectives

1. Increase teachers' comfort levels for using technology
2. Support technology integration through group member
3. Identify and use expert teachers to provide training and mentoring for group

members

4. Assess technology use often and modify plans to accommodate additional instructional needs.

Effective professional development programs are best structured when teachers have an input on the design (Frost, 2013). Support and participation in technology training by the building administrators is also important. For professional development to have the most chance of success, teachers need a constructivist learning environment, hands-on training, and peer collaboration (Frost,2013). Professional development serves as a nice underpinning, but to be successful, administrators need to provide teachers with instructional and pedagogical support and sufficient time and opportunity for hands-on learning.

Summary

Many barriers exist which dissuade teachers from using computers in their classrooms. Through Section 1, I defined the problem as well as provided evidence of the problem at the local level and through professional literature. I have researched and provided a review of literature that examined the factors affecting the rate of technology adoption by teachers, teachers' attitudes and pedagogical beliefs toward technology, characteristics of exemplary technology teachers, instructional methodology used by exemplary technology teachers, administrative support of technology use, and technology training received by teachers and its influence on effective computer integration in the classroom. The need to increase the integration of technology into the curriculum is greater now than any other time. In a world where technology has become an integral part of our everyday lives, its transition into the classroom lesson can yield numerous possibilities such as addressing the need for more innovative learning, which will engage students and help all students to learn in deeper, more connected, and more meaningful

ways. Tools such as games, online databases, mobile computing, multimedia, social networking, simulations, sensors, web resources, virtual reality, and more promise new kinds of learning that are more engaging for students and more relevant to the world they will be living in and creating.

Data collected by the state of Texas indicates that EFG Middle School has the necessary infrastructure to integrate technology across the curriculum but fails to consistently do so. This study aimed to investigate EFG Middle School teachers' descriptions of their competency in the current National Education Technology Standards for Teachers (NETS-T). The study also investigated how EFG Middle School teachers currently use technology to support their teaching and student learning

ABC School District seeks to have technology integrated throughout the curriculum at all grade levels. The goal of ABC School District is to continuously update the technology infrastructure at EFG Middle School in an effort to provide the necessary technology for teachers use in the integration of technology. It is EFG Middle Schools desire that all teachers become exemplary users of technology.

In addition, EFG Middle School recognizes that all teachers may not fit into this exemplary category. Some teachers are impeded by barriers such as pre- existing conditions cited as rate of adoption, attitude and pedagogical beliefs toward technology, type of instructional methodology used in teaching, administrative support, type and amount of technology training, and the type and amount of technology available in classrooms. Effective professional development and administrative support can have an impact on breaking down those barriers for teachers. Teachers who are trained to use technology in the classroom will help students make the connection between what they are learning and the digital society in which they live. Twenty-first century students will need to be technology-savvy and have the problem solving and analytical skills to be

successful in the job market.

The literature review calls for schools to adequately train their teachers in technology integration with ongoing support. When teachers have access to effective professional development in technology, they are better equipped to use the technology in their teaching.

In section 2, I discuss the methodology used for this mixed methods project study including the research design and sample size.

Section 2: The Methodology

Introduction

The purpose of this mixed methods project study was to investigate how EFG Middle School teachers currently use technology to support their teaching and student learning. As part of the project study, teachers provided descriptions of their competency in the current National Education Technology Standards for Teachers (NETS-T). The results of the survey yielded information on the technological needs of EFG Middle School that may inform for future technology staff developments and trainings. The survey included a self-report quantitative portion, with a secondary, open-ended qualitative portion as well.

Research Design and Approach

The research design was mixed methods and included the collection of self-reported data in two forms: qualitative in the use of open-ended questions and quantitative in the use of standardized questionnaires. The mixed methods approach was selected with the intent of making it possible to compare similarities and differences between the trainings and teacher-reported information and the analysis of the open-ended responses (Creswell, 2009). In addition, the mixed methods approach provides corroboration and greater strength of understanding. By combining the information gathered from the statistics with the teacher-provided written statements, a more accurate representation of teachers' levels of use and needs in technology integration was gained.

The strategy for the data collection was concurrent, enabling data to be collected together to form a meta-inference at the conclusion of this study. The benefits of using a concurrent mixed-method strategy include the ability for a researcher to gain "broader perspectives as a result of using the different methods as opposed to using the predominant method alone" (Creswell, 2009, p. 214). Further, descriptive and inferential

statistics along with coding were used to analyze data.

The ultimate goal of this study was to provide quality technology instruction that teachers can use to integrate technology into their daily instruction for students. In order to obtain honest feedback when studying the program, all the feedback forms were anonymous.

Setting and Sample

Every year, the Texas Education Agency's Division of Performance Reporting releases the Academic Excellence Indicator System reports (AEIS), which pull together a wide range of information on the performance of every district and campus in the state. These reports also provide extensive information on staff, finances, programs, and demographics for each school and district (Texas Education Agency, 2012). This report shows that EFG Middle School is a Title I school that is in the ABC Independent School District, which is one of the largest school districts located in Southeast Texas. ABC Independent School District has 17 middle schools, of which 10 are classified as Title I. EFG Middle School has over 1,407 students and employs 90 teachers to deliver instruction across the curriculum. According to the AEIS report, the teachers are diverse in ethnicity, as the staff is 0.9% Native American, 1.9% Asian/Pacific Islander, 8.5% Hispanic, 21.6% African American, and 67.1% White. Male teachers make up 24.6% of the faculty; female teachers make up 75.4%. Teachers' years of experience were described as follows: beginning teachers, 14.6%; 1-5 years experience, 40.5%; 6-10 years experience, 21.2%; 11-20 years experience, 15.3%; and over 20 years experience, 9.5% (AEIS, 2010). As part of the research, I administered the International Society for Technology in Education (ISTE) NETS-T survey to all participating teachers at EFG Middle School and analyzed the results. I also reviewed the State of Texas STaR chart that each individual teacher provided. No students were involved in the process of this

study.

As part of the research, every teacher was asked to volunteer for the survey, and the data was anonymously collected from those who chose to participate. Nonprobability convenience sampling was used in this research because of the need to select population elements on the basis of their availability (O'Sullivan et al., 2003). Out of about 90 teachers, I was hoping for 50-60 participants, and I had 48. In nonprobability convenience sampling, researchers use whatever individuals are available rather than selecting from the entire population. A convenience sample was obtained through voluntary and anonymous participation. According to O'Sullivan et al. (2003), if the purpose of a study is to "identify issues of potential concern to a larger population" (p. 147), then a convenience sample is appropriate.

Instrumentation and Materials

The tools used for this project study were the Texas Teacher STaR chart and the International Society for Technology in Education surveys. The research identified descriptions of middle school teachers who were directly affected by the NETS-T (Creswell, 2009). The NETS-T survey instrument is a tool that was developed and used by Sam (2009) using the NETS-T standard. The teachers' self-reports of their level of competence in each NETS-T standard constituted the quantitative data. The survey instrument also yielded qualitative data collected from open-ended questions. The qualitative data was collected to determine how teachers perceived their use of technology to support their teaching and student learning. The qualitative data was also used to identify patterns among participants' responses. The results of the quantitative data were used to form a holistic picture to clarify the relationship between the identified variables (Creswell, 2009).

STaR Chart

TEA conducted a reliability and validity study over a 2-year period, with Texas Teacher STaR chart survey reporting evaluated in 2004-2005 and 2005-2006. Cronbach's alpha was used as the reliability coefficient and assessed the consistency of the scores generated by the instrument (Sheehan & Shapley, 2007). The STaR chart was 0.91 for both the 2004-2005 and the 2005-2006 school years. Confirmatory factor analysis (CFA) was used to study the construct-related validity, or relationships among the key areas and the items describing the key areas, and whether or not these relationships were confirmed when actual data were studied (Sheehan & Shapley, 2007). The CFA was used to determine whether the data demonstrated that the number of key areas and the component items within the key areas conformed to what was expected based on the designed structure of the STaR chart.

Data Collection

Two data collection instruments were used for this project study. The first tool was the NETS-T survey instrument, which is a tool that was developed and used by Sam (2009) using the NETS-T standard. The teachers' self-reports of their level of competence in each NETS-T standards constituted the quantitative data. The second tool was the Texas School Technology and Readiness (STaR) Chart, which is a survey tool developed by the State of Texas to gauge teachers' progress in meeting the recommendations in the Long-Range Plan for Technology (LRPT), 2006-2020. All data were distributed and returned within a week's time. As the researcher, I placed a drop box in a designated location, and I was responsible for collecting the documents from the drop box. To track the data, a cataloging system was put in place where each document was placed in its own folder and placed in a box off campus for safekeeping.

Each research question was answered using the Texas STaR chart and the NETS-T standards for evaluating the skills and knowledge educators need to teach, work, and learn in an increasingly connected global and digital society. Both surveys have been used in the state of Texas to address questions similar to the overarching research question of this project. The STaR chart was completed during the school year and automatically contains identifying information. The NETS-T survey was turned in with the STaR chart by the teachers. No identifying marks were on any documents. At the end of the day, I collected the STaR chart and NETS-T forms from the drop box. Once all the information had been collected from the drop box and reviewed for identifying marks, all information was ready for analysis. The forms were placed in a folder that I kept with me, and I went to a secure room in an effort to start analyzing the data.

Triangulation was used to identify situations in which EFG Middle School teachers believed that technology integration could increase. Triangulation of sources was the method used to examine the consistency between the Texas STaR chart and the NETS-T Survey. A comparison of participants with different viewpoints concerning technology integration into the curriculum was conducted. The main idea was that this research study leads to more confidence if different methods lead to the same result. I gave the data to two colleagues to code independently and compare the results.

Upon approval from the IRB (approval # 12-10-14-0136350), teachers were asked to volunteer to participate in this project study by completing the NETS-T survey and providing their STaR chart results. Every teacher was not under my supervision received a survey with an attached letter explaining the process (see Appendix D). The letter explained that teachers who chose to complete the survey would place anonymous information in a secure drop box that was located by the teachers' mailboxes. Teachers

were informed that participation in the study was totally voluntary and that they could opt out at any time.

When I started this study, my title was Science Teacher. Within the past year, my title has changed to Assistant Principal. As a result of the title change, anyone under my direct supervision was not asked to participate in the study. The anonymity of this study allowed teachers to be free with expressions without fear of any pressure. Prior to introducing the survey for this study to the teachers at EFG Middle School and asking them to participate, I received permission from District (Appendix F). After receiving proposal approval from the committee at Walden University, I submitted the research proposal along with a request to conduct research to Walden's Institutional Review Board.

Data Analysis

To calculate scores for surveys, the Pearson correlation coefficient was used. With *r* taking a range of values from +1 to -1, the closer to -1 or +1 the coefficient is, the stronger the relationship between the two variables. The design of the questionnaire, which included a Likert type scale, the National Education Technology Standards for Teachers (NETS-T), and opened ended questions, required that the entire questionnaire have acceptable reliability of .84. The reliability of the STaR chart is .89. Raw data can be found throughout the tables of this document.

In an effort to analyze the data gathered in the open-ended questions, I created response categories that were used to label each comment accordingly. This process assisted with identifying patterns and trends associated with teachers' technology use, which rendered a final analysis. The trainings are aligned with NETS-T standards for evaluating the skills and knowledge educators need to teach, work, and learn in an increasingly connected global and digital society. The self-report descriptive design was

used for the survey based on Creswell's statement, "The mixed methods design can be identified by its concurrent data collection phase where both qualitative and quantitative data were collected simultaneously" (Creswell, 2009, p. 214). Field (2009) stated correlation research is "where we observe what naturally goes on in the world without directly interfering with it" (p. 12). Both survey instruments served as a record for what naturally happens in the classroom. In mixed methods studies, investigators intentionally integrate or combine the quantitative and qualitative data rather than keeping them separate (Creswell & Plano Clark, 2011).

Likert Scales are ordinal, which is very popularly used in forming Questionnaires. Often known as the Rating Scale, it is the most widely used approach to assessing teachers' attitudes on technology integration with most offering some open-ended items at the end of the questionnaire (Abrami et al., 1990; Anderson, Cain & Bird, 2005; Arbuckle & Williams, 2003; Billings, Connors & Skiba, 2001; Elnichi, Kolarik & Bardella, 2003; Jackson, Teal, Rains, Nannsel, Force & Burdsal, 1999; Onwuegbuzie, Witcher, Collins, Filer, Wiedmaier & Moore, 2007; Young, 2006). Often when we participate in surveys, we see questions that give options for the level of agreement that we have for the subject. This is a basic use of the Likert Scale. The scale was created in consideration to how favorable the concept was for the Measurement. A 5-point Likert was used to indicate teachers' levels of competence in the NETS-T standards. Participants responded 1-5 for low to high competences in the targeted standard.

Quantitative Data

Quantitative research was based on a quantitative or numeric description of technology competencies, attitudes, or opinions of a population by studying a sample of that population (Creswell, 2009 p. 145). In this study a questionnaire using the NETS-T was developed by Sam (2009) and this was chosen to determine how teachers themselves

describe their competence in each NETS-T standard. Sections 1-5 are the quantitative portions of the survey and sections 6 -7 are the qualitative sections.

Section 1 of the NETS-T survey contains an ordinal scale that uses four items that surveyed how teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments.

Section 2 of the NETS-T Survey contains four items that assess how teachers design, develop, and evaluate authentic learning experiences and assessment incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the NETS·S. ISTE NETS·S standards are the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world.

Section 3 of the NETS-T Survey contains four items that assess how teachers exhibit knowledge, skills, and work processes representative of an innovative professional in a global and digital society.

Section 4 of the NETS-T Survey contains four items that assess how teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices.

Section 5 of the NETS-T Survey contains four items that assess how teachers continuously improve their professional practice, model lifelong learning, and exhibit leadership in their school and professional community by promoting and demonstrating the effective use of digital tools and resources.

Qualitative Data

Qualitative data were gathered to enrich and support the quantitative components of the study (Creswell, 2009). In addition, a qualitative approach was also used because

the research questions incorporated a need for both quantitative and qualitative data (Creswell, 2009). The concurrent strategy describes the benefits of using a mixed method as the ability for a researcher to gain "broader perspectives as a result of using the different methods as opposed to using the predominant method alone" (Creswell, 2009, p. 214).

Phenomenal analysis is the process in which the researcher openly reflects on the present data, contemplating the participant's description in a way that allows segments of what were described to be discerned (but not separated) as moments of the participant's experience. Analysis consists of "the distinguishing of the constituents of the phenomenon as well as the exploration of their relations to and connections with adjacent phenomena" (Spiegelberg, 1983, p. 691). I analyzed the data in parts as well as a whole, in an effort to discern and comprehend those relationships in which one finds the psychological significance that speaks to my researcher questions in a relevant way. The phenomenal analysis was used to address open-ended questions in Section 6. I created frequency distribution tables with descriptive headings to explore the qualitative data I collected.

Section 6 of the NETS-T Survey were open-ended questions relating to formative assessment.

The data for this project study was gathered through survey tools that encompass all of the characteristics included in the constant comparison method, which made mixed method analysis the best choice for this study. The qualitative data was comprised of open-ended questions, which was analyzed using constant comparison method. The process of constant comparison "stimulates thought that leads to both descriptive and explanatory categories" (Lincoln & Guba, 1985, p. 341). Triangulation was used as a method for corroborating findings and as a test for validity. Having multiple sources of

data (Creswell, 2003; Yin 2009), and a well developed set of operational measures helped to establish construct validity of the study (Yin, 2009, p.42).

Section 7 of the NETS-T Survey contains a checklist to identify staff developments. Descriptive statistics are initially used in describing and organizing the data in a useful manner. In this study, the descriptive statistics assisted in simplifying large amounts of data to answer research questions one and two. Each descriptive statistic reduces data into a simpler summary. Further, they provide simple summaries about the sample and measures (Ott & Longneckeer, 2011).

What are the characteristics and prevalence rates of EFG Middle School teachers with advanced and above competency ratings classifications of their use of technology on the STaR chart to support their teaching and student learning? The descriptive statistics of central tendency, dispersion and prevalence such as modes, percentages, and frequencies would be presented on each characteristic gathered.

Competency and the Amount of Professional Development Taken

To first see if there was a relationship between the teachers' level of competency and the amount of professional development taken an analysis was done using a Pearson Product Moment Correlation (Ott & Longnecker, 2007). Then a correlational analysis was done to see if the number of technology training classes was positively correlated to teacher self-reported technology usage.

The Pearson correlation coefficient, *r*, can take a range of values from +1 to -1 (Ott & Longnecker, 2010). The closer to -1 or +1 the coefficient is, the stronger the relationship between the two variables. A coefficient of zero shows there were no association between the two variables while a coefficient greater than zero suggests a positive correlation. This means that as the value of one variable increases, so does the value of the other variable. On the other hand, a coefficient less than zero suggest a

negative correlation. This means that as the value of one variable increases, the value of the other variable decreases. Both variables must be in continuous form. Correlation tells the strength and direction of the relationship between two variables, but can never infer the cause of the relationship.

Finally, coding, done by triangulation was used to find out what situations do EFG Middle School Teachers think would help increase technology integration. The researcher used the grounded theory, which occurs in 3 phases: Open coding, axial coding, selective coding (Creswell, 2009). Open coding incorporates and identifies general themes, axial coding which includes assigning categories and subcategories to the data, and selective coding where specific core categories are made.

In order to maintain accuracy for qualitative validity, triangulation was used. Triangulation uses two or more methods in order to check the result of the study (Creswell, 2009). For this study, triangulation of sources method was used to examine the consistency between the Texas STaR chart and the NETS T Survey. The process compared participants with different viewpoints on their use of technology integration into their curriculum. The main idea was that this leads to more confidence if different methods lead to the same result. I gave the data to two colleagues to code independently and compare the results.

Description of Triangulation Methods Used

Triangulation of sources. Triangulation involves examining the consistency of different data sources from within the same method (Denzin, 1978; Patton, 1999). For example,

- at different points in time
- in public vs. private settings
- comparing people with different viewpoints

Triangulation. Triangulation refers to the use of more than one approach to the investigation of a research question in order to enhance confidence in the ensuing findings. The triangulation of sources was the type used in this research because it examined the consistency of two data sources within the same method. Since much social research is founded on the use of a single research method and as such may suffer from limitations associated with that method or from the specific application of it, triangulation offers the prospect of enhanced confidence. Triangulation is one of the several rationales for Multi-method Research. The term derives from surveying, where it refers to the use of a series of triangles to map out an area.

Table 3

Analysis of Research Data

Research question	Specific data source	Data	Analysis
How do EFG Middle School teachers with advanced and above rating classify their use of technology on the STaR chart to support their teaching and student learning?	NETS-T Survey	STaR chart	Descriptive prevalence rates
Is there a relationship between the teachers' level of competency and the amount of professional development taken?	NETS-T Survey STaR chart	NETS-T Survey Analysis	Person product moment Correlation
What situations do EFG Middle School teachers think would help increase technology integration?	NETS-T Survey	NETS-T Survey	Coding
How does number of technology training classes relate to teacher self-reported technology usage?	NETS-T Survey	Integration STaR chart	Correlation

Survey Validity

Sam (2009) stated that the content validity of the NETS-T Survey instrument was established and piloted through the literature and the judgments of three content experts. Nardi (2006) defines content validity as "the way to understand how well a set of items is measuring the complexity of a concept or variable the researcher is studying" (p. 59). The three experts were the technology director of a high school, a library media specialist of a middle school, and the technology director from the state department of education (Sam, 2009). The findings from the pilot survey provided feedback including recommendations and interpretations of the questions (Sam, 2009). This was the same survey I used in my research.

The Texas Teacher STaR chart can assist in the measurement of the impact of state and local efforts to improve student learning through the use of technology as specified in No Child Left Behind, Title II, Part D. It can also identify needs for on-going professional development and raise awareness of research-based instructional goals. It has been validated by the Texas Education Agency.

Survey Reliability

A Cronbach's alpha reliability test was conducted to assess the instrument's reliability. According to Gay and Airasian (2000), "Cronbach's alpha estimates internal consistency reliability by determining how all items on a test relate to all other tests items and to the total test" (p. 174). The higher the alpha value the more reliable would be the survey instrument. The calculations for reliability of data collected were also conducted.

The design of the questionnaire, which included a Likert type scale, the National Education Technology Standards for Teachers (NETS-T), and opened ended questions, required that the entire questionnaire have acceptable reliability of .84. The following

Table sample provides the alpha reliability for data from all five domains in the survey from Dr. Sam's research, which were all NETS-T.

Table 4

Alpha Internal Consistency Reliabilities of Domains Within the National Education Technology Standards for Teachers Questionnaire

Domain	Number of items	Alpha reliability
Facilitating and Inspiring Student Learning	4	.976
Developing and Designing Digital-Age Learning Experiences and Assessments	4	.975
Modeling Digital-Age Work and Learning	4	.976
Promoting and Molding Digital Citizenship and Responsibility	4	.976
Engaging in Professional Growth and Leadership	4	.974

The data for the 20 items NETS-T questionnaire yielded an acceptable reliability higher than .84. The 5-point Likert type scale format of the NETS-T questionnaire demanded that the instrument go through the process of internal consistency. Based on results of a Cronbach's alpha test, the survey developer concluded that, "results of the reliability analysis indicated that the survey items were all measuring the same construct and were highly interconnected".

The Texas Education Agency Educational Technology Advisory Committee (ETAC) developed the Texas School Technology and Readiness (STaR) Chart, an online resource tool for self-assessment of your campus' and district's efforts to effectively integrate technology across the curriculum. This rubric serves as the standard for assessing technology preparedness in Texas K-12 schools. This chart has been updated to align with the new Long-Range Plan for Technology, 2006-2020.

All data related to the STaR chart are available to the public online and was retrieved from the Texas Education Agency website. The Texas Teacher STaR chart has

been developed around the four key areas of the Long-Range Plan for Technology, 2006-2020: Teaching and Learning; Educator Preparation and Development; Leadership, Administration and Instructional Support; and Infrastructure for Technology. The Texas Teacher STaR chart was designed to help teachers, campuses, and districts determine their progress toward meeting the goals of the long-range plan for technology, as well as meeting the goals of their district. A copy of the Texas

Campus STaR chart was inserted as Appendix B and the NETS-T Survey has been inserted as Appendix C. Both instruments allow teachers to self assess their levels of technology and literacy and integration. Voluntary participation by teachers were requested to complete a paper copy of the NETS-T Survey. As a requirement under the district's approval to conduct a study (Appendix D), a research sponsor was appointed to oversee all school related activities. The sponsor was responsible for reviewing a district created cover letter (Appendix E) that explains the research as well as a district created consent form (Appendix E) to all teachers. Completed surveys were returned to a secure mailbox that I checked at the end of each day. All surveys were anonymous to protect the identity of each participant. Each survey was assigned a number (ex: S1, S2…) after it was turned in. No students were used as part of this research. Part of the data for this project study was available online and contains no personal information for any participant. The survey aspect of this project study was completely anonymous and there were neither a risk of identification of employee nor student from the data obtained.

Assumptions, Limitations, Scope, and Delimitations

Assumptions

The first assumption was that teachers would be open and accurate with their responses about the integration of technology use in the classroom. Another assumption was that teachers' responses on the NETS-T Survey coordinate with the STaR chart results. The

final assumption was that the STaR chart is an accurate depiction of the campus' rating in relation to federal mandates. This study assumed that teachers would answer each question openly and honest.

Limitations

A limitation of this study was that only one school setting was studied with a maximum sample size of 90. Another limitation was gathering only teacher responses rather than also gathering student responses to technology implementation into their classes. The lack of trust of the anonymity promise may cause fear of job security, which may result in the risk of inaccurate self-reporting by some teachers. In addition, limitations include the use of self-reported data, as well as the surveyed population's dependency on volunteers who may be descriptively different who choose not to participate. Another limitation was based on the fact that ABC School District would not allow employee interviews for this research. The last limitation was that this study uses nonprobability Convenience sampling; therefore, the results may not be applicable to other middle schools in the state of Texas.

Scope and Delimitations

The scope of this study pertains to the choice of goals, research questions, variables, and the theoretical framework from which to approach the problem and seek a solution. Setting the goal for this study was prompted by the need to better understand the relationship between the Texas STaR chart, NETS-T Survey, and teachers' use or non-use of technology at EFG Middle School. This was a mixed methods study of one middle school in one school district in Texas; in short, it was a relatively small study in scope, the results of which may therefore be more suggestive than conclusive. The target population for this study was classroom teachers who are currently employed in a School District in the Texas. A convenience sample was taken from that middle school for the

purpose of this study.

Data Analysis Results

This mixed method project study aimed to investigate EFG Middle School teachers' descriptions of their competency in the current National Education Technology Standards for Teachers (NETS-T). The study also investigated how EFG Middle School teachers currently use technology to support their teaching, student learning, situations under which teachers would use more technology, and specific technology trainings teachers have taken. The NETS-T survey was used to address the overarching research question; do teachers believe they are competent in technology standards and its integration?

Teachers were asked to volunteer to participate in this project study by completing the survey and providing their STaR chart results. Teachers that completed the survey placed anonymous information in a secured drop box. After receiving the anonymous surveys from the drop box, I analyzed the data in parts as well as a whole, in an effort to discern and comprehend those relationships in which one finds the psychological significance that speaks to my researcher questions in a relevant way. The phenomenal analysis was used to address open-ended questions. I created frequency distribution tables with descriptive headings to explore the qualitative data I collected.

A Pearson Product Moment Correlation was used to first see if there were any relationships between the teachers' level of competency and the amount of professional development taken. A statistically significant positive correlation was found between the number of technology training classes relates to teacher self-reported technology usage at $r = .305$, $p = .035$.

Respondents

Out of 90 teachers, there were a total of 48 respondents who completed the research protocol. The number of respondents represents 53% of the population. Although a higher response rate is desired, it is not always necessary. In a study conducted by Visser, Krosnick, Marquette and Curtin (1996) showed that surveys with lower response rates (near 20%) yielded more accurate measurements than did surveys with higher response rates (near 60 or 70%). In a similar study conducted by Atkerson, Lonna, and Alverez , they examined the representativeness of two surveys using information known about the population, and although they found important differences between the two in terms of sampling and nonresponse bias, they also find that both surveys represent the underlying population despite low response rates. The average number of years taught by respondents was 5.78 (SD = 4.00) with a median of 5 years and a mode of 3 years. The range was 16 years. The data suggests the respondents are relatively new to the teaching profession. See Figure 1.

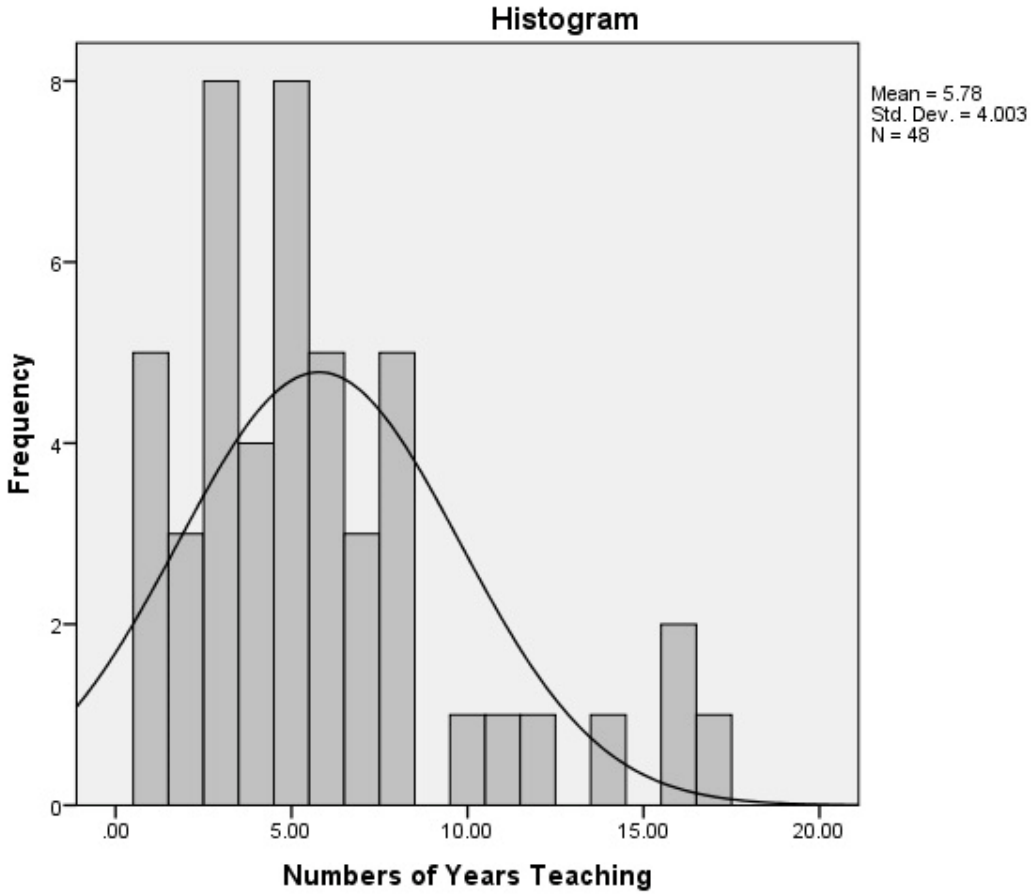


Figure 1. Years teaching.

Research Questions

The following guiding questions were measured on interval scales based on mixed method attributes. Research question one was "How do EFG Middle School teachers describe their level of competency in the National Education Technology Standards for Teachers (NETS-T)?" Research question number two asks "Is there a relationship between the teachers' level of competency and the amount of professional development taken?" There was a statistically significant positive correlation found between level of competency rating and professional development classes taken (r = 0.305, p = 0.035). The effect size here is r 2 = .093. Which means that 9.3 % of the variance is accounted for by the amount of professional development taken on the

teachers' level of competency. However, 90.7% is not accounted for by the amount of professional development taken on the teachers' level of competency. As the number of technology classes taken increases, so does the competency ratings.

Table 5

Competency Rating and Professional Development Classes Taken

			Rating based on the STaR chart	Number of classes taken in technology
	Rating based on the STaR chart	Correlation coefficient	1.000	.305*
		Sig. (2-tailed)	1.	.035
		N	48	48

* Correlation is significant at the 0.05 level (2-tailed).

Research question three asked "What situations do EFG Middle School Teachers think would help increase technology integration?" Most participants did not respond to this qualitative portion of the survey. In most cases, it was just left blank. The responses are summarized in Table 3 but no conclusions are drawn due to the small sample size.

Table 6

Survey Answers

Please describe a situation in which you would likely integrate the use of technology in the classroom more often.

	Frequency	Percent	Valid percent	Cumulative percent
Missing Answers	37	78.4	78.4	78.4
Audiobooks. Research paper. Project (book report) with PowerPoint.	1	2.0	2.0	80.4
I am considering investing in a class set of tablets to eliminate hard copies and further engage students, using a medium they better respond to while learning.	1	2.0	2.0	82.4
I want to check out the program called Dojo. Laser pointers, tablets for digital art, color printer for good references to help see colors.	1	2.0	2.0	84.3
I will most likely integrate technology more often during the introduction of lesson topic as this gives an auditory, visual, and sometimes Kinesthetic learning all at once, and prepare the students minds for learning.	1	2.0	2.0	86.3
I would love to use more technology with the students. In my last district, I had a couple computers in the classroom designated for student use. I used them for stations work, student projects, and quizzes.	1	2.0	2.0	88.2
If students were involved in a brainteaser activity. KAHOOT is an online competition game where students complete and are able to see one another's initials next to their score on the main screen for view.	1	2.0	2.0	90.2
If the programs and the hardware were accessible	2	4.0	4.0	94.1
More technology resources (1 pads, etc). Block math classes. More time to stretch lessons.	1	2.0	2.0	96.1
QR codes	1	2.0	2.0	98.0
Right now I print ELA News stories and quizzes and for homework. I'd like to enroll kids in online accounts so they can quiz online. I could keep track of progress and they could complete more stories.	1	2.0	2.0	100.0

Total			48 100.0 100.0	

Research question four asked "How does number of technology training classes relate to teacher self-reported technology usage?" There was a statistically significant positive correlation found between technology training classes and teacher self-reported technology usage ($r = 0.405$, $p = 0.004$). The effect size here is .164 or 16.4% of the variance is accounted for by technology training classes and teacher self-reported technology usage . Please see Table 4.

Table 7

Technology Training Classes and Teacher Self-Reported Technology Usage

			Teaching of technology in the classroom	Number of classes taken in technology
	Teaching of technology in the classroom	Correlation coefficient	1.000	.405**
		Sig. (2-tailed)	.	.004
		N	48	48
	Number of classes taken in technology	Correlation coefficient	.405**	1.000
		Sig. (2-tailed)	.004	.
		N	48	48

** Correlation is significant at the 0.01 level (2-tailed).

Conclusion

The purpose of this Project study was to investigate how EFG Middle School teachers currently use technology to support their teaching and student learning. The results of the survey yielded the technological needs of EFG Middle School that were the compass for future technology staff developments and trainings. The research design included self-report data collection technique, descriptive and inferential statistics were used to analyze the survey findings of the quantitative data. The qualitative data was analyzed using phenomenological analysis in an effort to capture the teacher's perspective of how their level of technology relates to their level of us.

Section 3: The Project

Introduction

In this section, I provide an introduction to the project. The surveys for this project were used to address the overarching research question: Do teachers believe that they are competent in technology standards and the integration of technology? The data for this project was collected through anonymous surveys that included a self-report quantitative portion along with a secondary, open-ended qualitative portion. After collection and analysis of the data, it was evident that there was a positive correlation between the level of technology use and the amount of technology staff development taken. This section includes the description and goals of the project, the rationale for selecting this project, and a review of the literature addressing why this solution is an appropriate response based on teachers' descriptions of their competency in the current NETS-T as well as their current use of technology to support their teaching and student learning. In addition, this section includes a proposal and an implementation plan for a project evaluation.

Description and Goals

This project was designed to address the needs of teachers at EFG Middle School (pseudonym) to improve their competency in the current National Education Technology Standards for Teachers (NETS-T) and to gain more knowledge on how to integrate technology into their curriculum effectively. The study also investigated how EFG Middle School teachers currently use technology to support their teaching and student learning, situations in which teachers would use more technology, and specific technology trainings teachers have taken. This project was developed to duplicate identified positive correlations between levels of technology use and staff

development. The responses from participants in this study showed that they all wanted to incorporate technology at a higher level but lacked the necessary skills to do so. In his article "Measuring Meaningful Outcomes in Consequential Contexts: Searching for a Happy Medium in Educational Technology Research," Ross (2014) suggest that the more technology training that teachers receive, the more likely they are to integrate technology on a consistent basis.

As part of the school's effort to increase the level of collaboration among departments, purposeful planning days have already been planned for each department. On purposeful planning days, all teachers of a grade level spend the entire day planning while multiple substitute teachers conduct their classes. As the school has already planned for more purposeful planning days next school year, this structure provides a platform to schedule several small-group technology training sessions. This schedule allows for teachers to participate in a 2-hour hands-on technology professional development session followed by a 30-minute observation of a teacher working at an advanced level of technology integration. This professional development will take place once a month and will be scheduled for the next school year. Trainers for this technology staff development will include district technology trainers who can duplicate the program across the district at all grade levels. After discussing the possibility of integrating technology training as part of a technology-based professional learning community, my administrators were pleased with the idea and wanted to get started right away. The building principal expressed that it would offer a valuable component that we had been missing in our campus-based staff developments.

Rationale

Burkman (2012) stated that the method by which the content is delivered is an essential component of professional development. I am planning to present the training through professional learning communities because I believe it will offer the teachers a professional learning staff development in which they may receive the support that they need and the technology collaboration opportunity that has been missing. With a professional-learning-communities approach to professional development, teachers will have the opportunity to expand meaningful collaborative groups to include technology in an effort to discover, plan, and integrate technology-teaching strategies into their curriculum. The learning communities serve as a method of learning in context rather than in isolation. "Learning communities present a potentially useful mechanism for supporting and enabling professional learning, allowing opportunities to link formal and informal learning with peers" (Milligan, 2014, p12).

Klug (2014) states that lifelong learning is the cornerstone in our education system and that teachers need to be lifelong learners. One way to help teachers remain lifelong learners is to create professional development that can be completed within the confines of the workday. Offering the opportunity to collaborate with peers on new strategies for integrating technology is one way to support teachers while promoting instructional support in education. This project also decreases the amount of time needed to attend technology staff development after school hours and on weekends. With the specific needs of students in mind, collaboration drives a team of professionals to seek appropriate strategies, methodologies, modifications, and accommodations through which the most educational impact can be seen in the

educational environment where our students must perform (Peluso, 2014). Ultimately, the goal of this project is to provide a structured platform that will promote technology-based teaching and learning at EFG Middle School. Through purposeful planning, teachers will benefit from the expertise of others and become engaged in the technology professional learning process through collaboration and sharing successful teaching strategies.

Review of the Literature

In this section, I review literature on technology professional development training aimed at meeting the needs of teachers to learn new strategies for technology integration. Through Walden's' library, I accessed the following databases for the review of this literature: ProQuest, EBSCO, Sage, Education Research Complete, and ERIC. The search terms included *technology learning communities*, *professional technology learning communities*, *professional technology learning communities in education*, *collaborative learning*, *teacher education*, *quality professional development*, *effective professional learning communities*, *professional development*, and *types of professional development*. In this review of the literature, I explain the purpose of professional learning communities, the characteristics of professional learning communities, and teacher collaboration.

Professional Learning Communities

Successful learning communities connect participants so that they can share ideas and construct knowledge in a safe, collegial atmosphere (Johnson, 2014). Hamilton (2014) contended that the quality of a teacher is directly linked to the quality of the staff development the teacher has received. In this age of technology, high-quality technology professional development is indispensable in any effort to aid

teachers in technology integration (Kundi, 2014). In the world of education, professional learning communities are vital to producing a system that enables teachers to collaborate and learn from one another's knowledge and experience. According to DuFour (2007), learning communities are used as a means to develop professional learning while bringing about continuous ways for educators to change and improve their knowledge and skills. Collaborative learning opportunities create a platform for effective educators to continuously learn new strategies in addition to understanding best instructional practices (Trust, 2012). Professional learning communities have been recognized as playing an important role in improving teachers' knowledge in staff development areas (Pella, 2011). Current research also supports the belief that professional learning communities can enhance instruction, leading to a positive effect on teacher reception and application (Vescio, Ross, & Adams, 2008).

Hord (1997) characterized "professional learning communities as an ongoing process through which teachers and administrators work collaboratively to seek and share learning and to act on their learning, their goal being to enhance their effectiveness as professionals for students' benefit. (P. 87)" Through collaboration, teachers can replicate learned strategies and offer insights to enhance and modify lessons. Shagrir (2012) stresses that support is one of the most critical factors for successful professional learning. Current research shows that professional learning is most effective when teachers consistently collaborate. When it comes to learning, many adults learn best through methods that include socializing and reflecting in addition to reading and participating in traditional professional learning programs (Darling-Hammond & McLaughlin, 2011). Easton (2012) stated that successful

professional learning communities are successful because of relationships and open communication. In addition, professional learning communities tend to be more sensitive to the school's climate when they take place consistently within the school (Easton, 2012).

Technology-Based Professional Learning Communities

In this age of technology we have several different resources to collaborate such as tablets, smart phones, and computers. To prepare students for present and future literacy needs, we need to revise how we frame our lessons (Lotherington, 2013). Educational reform is shifting in the United States to demand change in the way technology is used (Laffey, 2012). Technology based professional learning communities is a proven method to provide trainings for teachers in a smaller setting to maximize their learning in the area of technology integration. Successful learning communities connect participants so that they can share ideas and construct knowledge in a safe, collegial atmosphere (Johnson, 2014). The benefits included reduced isolation as a result of educators from multiple constituencies working collaboratively together. In a study conducted in 2012, Kim and Miller determined that professional learning communities that incorporate distributed expertise and resources such as technology-based trainings are crucial for enhancing early career teachers. In this study a professional learning community was used for early teachers in an effort to create a platform for teachers to share knowledge, collaborate, and communicate. Many teachers have little opportunity to share and discuss their technology integration practices in the course of a normal school day. This lack of opportunity can you leave many teachers feeling isolated (Donnelly, 2013)

Reflective Approach

Professional learning communities not only allows teachers the opportunities to collaborate, but it also allows them the opportunity to engage in reflective thinking. The reflective approach in professional learning community offers a thorough, balanced description of the realities for teachers in todays standards-based environment, while encouraging prospective teachers to be as reflective, creative, and independent as possible throughout their careers (Harrell, 2013). The use of reflective learning to encourage higher order learning outcomes has been a growing area in education research and practice (Bell, 2011).

Leadership's Role in a Professional Learning Community

Professional learning communities are gaining interest in educational leadership factions (Leader, 2014). It is becoming known for it effectiveness in creating intimate learning environments. The quality of a school can be linked to the value of its leaders and teachers (Atteberry, 2010). No single person has all the knowledge, skills, and talent to lead a district, improve a school, or meets all the needs of every child in his or her classroom (DuFour, 2012). Leaders are charged with fostering a school's improvement, enhancing its overall effectiveness, and promoting student learning (Lunenburg, 2014). When leaders create the environment for teachers to collaborate, teachers are able to provide insight on how strategies are working in their classroom. In a research study, Kingrey (2014) demonstrated a correlation between effective education leaders support of effective staff developments and student achievement. Creating a vibrant professional learning community can truly make a difference in the quest to maintain life long learners in our schools (Easton, 2011).

Implementation

This project incorporates technology staff development with professional learning communities (PLC). Despite its existence on a different scale in this middle school, *professional learning community* may be a new term for the staff. As an introduction and training of best practices associated with successful models, all staff will participate in a videoconference that will be facilitated by me. The videoconference will be broadcast through Google hangout and is automatically archived on YouTube for continuous viewing. The initial videoconference will take place after school on any computer with Internet access. The conference will broadcast from the auditorium but can be viewed from all classroom computers. The auditorium is a logical choice because of its flexibility of space for staff members that desire to see the broadcast live. During the training, PowerPoint presentations will be shown in an effort to outline the following:

1. The purpose of professional learning communities
2. The definition of PLC
3. The characteristics of effective PLC
4. The rational for using PLC for technology training
5. The benefits of using PLC for technology training

In order to create a successful professional learning community training program, an administrator and designee will be in charge of developing a monthly training schedule as well as the technology content that will be delivered. Each session will be led by a technology liaison from the local school as well as a liaison from the district level. The platform for this technology training is developed and continuously monitored by a team of teachers and administrators as a way to ensure

all training topics and deliveries are in line with the need of the participants. To effectively evaluate the ongoing technology professional learning community program, the following questions will be asked in a survey after each professional development session: (a) how confident are you in your ability to integrate technology into your curriculum? (b) how familiar are you with strategies to integrate technology into your curriculum? (c) what key areas of this professional learning was most beneficial and you're learning? (d) was there any area or areas of this technology professional learning that needed to be provided more support? (e) in what area of technology do you need more support to help you in integrating technology into your curriculum?

Potential Resources and Existing Supports

Fortunately, many of the resources that would be required to ensure the success of this proposed project are already available at EFG Middle School. With the resources that are in place such as computers, internet, and projectors, this project does not need extensive budget and can be implemented immediately. Everything needed to put this project in motion for teachers is already in place. Teachers will just need to adjust their focus to a technology based staff development.

Additionally, because EFG Middle School has such a great technology structure, the administrator, and the liaison in charge of technology and staff developments can develop a program with little to no immediate cost. For technical issues that may arise, the school has a full-time technology technician that is always available to troubleshoot technology issues. In addition to the technology that is available in every classroom, the current planning room is equipped with all the technology that exists in the classrooms as well as an additional set of laptops that can

be used at anytime. Each time a staff development is presented for the first time, it will be videotaped and made available for teachers to review any time.

Potential Barriers

When reviewing this proposed project, there are three possible barriers that may exist. One possible barrier that may exist lies with the attitude of participants. Teachers may be reluctant to spend their time collaborating and sharing their areas of success in technology with the other teachers. The success of this technology professional learning community lies in the willingness of all participants to maintain an attitude of support for their fellow coworkers. Another possible barrier exist in the area of unfamiliarity with the rigor of technology based professional learning communities. Although the basic concept of professional learning communities is already in existence at EFG Middle School, the accountability and dependability aspect of the technology integration is not. It is incumbent upon all participants to give their very best for the success of the program. The last potential barrier is in the area of consistent participation in every staff development that will be provided. When starting new programs, the excitement that is generated based on the perceived potential benefits of the program can have people anxious to get started. However, after a period of time, the excitement tends to wear off and participation can dwindle. There are many issues and circumstances that can impact teacher's ability to attend or maintain focus in these staff developments. Examples of such circumstances may be family related issues, special education meetings, and other teacher duty responsibilities. In anticipation of such an occurrence, each new technology staff development training will be videotaped and archived for teachers to review anytime from school or satellite locations.

Proposal for Implementation and Timetable

The proposed project incorporates technology and staff developments with professional learning communities. The professional learning training will need to take place in order to assist teachers with understanding the purpose, rationale, definition, benefits, and characteristics of effective technology professional learning communities. This training would take place on a Friday morning in place of a regularly scheduled staff meeting. In addition, all information presented or shared during this training will also be video recorded and archived for the viewing pleasure of all. The initial training session would last approximately 60 minutes with additional time given for review, question and answers.

The administrator and liaison will oversee the technology professional learning communities and will provide a calendar of monthly technology training that will take place during their purposeful planning meetings. Each session will be facilitated by the on-campus technology liaison, the administrator in charge of staff developments, and a district level technology staff development personnel.

Roles and Responsibilities of Student and Others

The success of this program is predicated on the active participation of all participants in the planning phase as well as the implementation of the actual staff development. As the researcher, I will work alongside the technology liaison as well as district level personnel to facilitate staff development training. The role of the district level personnel will be to provide input and guidance throughout the process. The district level personnel will also duplicate each of the trainings at various campuses across the district. The technology liaison will be responsible for all technology aspects, which will include but is not limited to presentation development,

video recording, and archiving all presentations for continuous review by current and future employees. In addition to training the staff, I as the administrator, would collaborate with the department heads an effort to schedule trainings and discuss possible changes based on participant feedback.

Participants would be eligible to receive staff development credit for all trainings that they attend. As documentation of attendance, each participant will be required to sign in with his or her employee id number, which is a normal practice on this campus. After completing the initial training session, each teacher will be responsible for collaborating and implementing acquired knowledge into their grade level team curriculums. After each session, participants will be provided a feedback form where they will evaluate the strengths and weaknesses of the program. As a committee, I along with the technology liaison as well as the district representative will review the feedback in an effort to provide a quality program.

Project Evaluation

The purpose of implementing technology-based professional learning communities at EFG Middle School would be to provide teachers with additional tools to support and maximize the learning experiences in the classrooms. One tool that was used to ensure that the program is working as planned, and is an effective use of the teachers' time, will be a goal-based evaluation. Christie and Alkin (2005) stated that goal-based evaluations refer to a class of evaluation approaches that centers on the specification of objectives and the measurement of its outcomes. The ultimate goal is to provide quality technology instruction that teachers can use to integrate technology into their daily instructions for students. In an effort to obtain honest feedback when evaluating the program, all the feedback forms will be anonymous.

The anonymous survey should ease any desires of teachers to be tempered or misleading in their answers. The response from the feedback survey will be used as a tool to enhance the quality of future technology staff development trainings.

Implications Including Social Change

Local Community

Quality technology professional development has the potential to improve first-time classroom instruction and student achievement. Understanding and adjusting to the needs of the teachers can greatly improve teacher buy in. Through purposeful training, hands-on guidance, and practice of the learning communities, necessary improvements will be evident in teacher collaboration. Through this program, the evidence of a nurturing and healthy environment will continue to grow as well as the relationships between teachers and administrators, teachers and teachers, as well as teachers and students.

As a result of this project study, the social change this project will yield is a change in the way teachers deliver instruction. I hope technology based learning communities will become a monthly staff development held on the campus of EFG Middle School. This staff development will give teachers the training needed to immediately integrate technology into their curriculum. The integration of technology into the curriculum will also benefit the students, as it will provide instruction in a style that is geared towards their generation's learning styles. As the success of the technology based staff development grows, I would like to see the same program duplicated across multiple districts in our nation. I believe with the success of the program, the ultimate benefit of student success will be duplicated as well.

Far-Reaching

Development of technology-based professional learning communities has local and far-reaching implications for this school district and community. By growing a culture that is willing to collaborate for the benefit of all, I hope that the end will extend to surrounding schools as well as surrounding school districts. With the success of this program, a step-by-step training guide will be created for use by any school or district that has a desire to duplicate this process. In order to maximize the success of this program, the foundation must be collaborative and effective in meeting the needs of all participants involved.

Conclusion

Section 3 presented a variety of topics that outline the goals and processes for achieving success in the proposed project. In the above topics, the descriptions and goals of the project were discussed. In addition, the rationale, review of literature, summary, a discussion of the project, a proposed implementation plan including vital resources, an evaluation plan, and the implications of this project we're given. In the final section of this paper, I will outline the benefits and high points of this project as well as the limitations surrounding this project.

Section 4: Reflections and Conclusions

Introduction

Section 4 includes my reflections and conclusions on this project. In this section, the reflections include discussion concerning the strengths of this project as well as its limitations. In addition, I analyze myself as a scholar-developer-practitioner, and as a developer of this project. This section concludes with the potential impact of this project and areas of social change, implementation, applications, and directions for future research.

Project Strengths

In reflecting on the strengths of this project, I came to the conclusion that the greatest strength lies in the potential growth of teachers and students' learning. This project provides an avenue by which teachers can gain valuable knowledge and the necessary skills for technology integration. As teachers learn and integrate newfound knowledge, the impact on student growth will become more evident. In reviewing information from the surveys, it is evident that high-quality technology development plays a crucial role in teachers' ability to integrate technology into the curriculum. The use of professional learning communities to teach and support teachers creates a healthy climate as a foundation for teachers' growth. The benefit of professional learning communities is an atmosphere in which to build social interactions in an environment that is fun and conducive to learning. Researchers have endorsed professional learning communities as a way to build teachers' competence in their content.

Recommendations for Remediation of Limitations

In this project, the limitations include a lack of trainers for the different subject matter areas. Another limitation of this project is the fact that it is limited to one training day per month. On this day, a substitute is provided for all teachers in a particular content area and by grade level. A final limitation of this project relates to funding and other obligations for teachers. The training provides new strategies to integrate technology, but funding does not permit the acquisition of new technologies for teachers who are advanced and very knowledgeable concerning the technology that currently exists on this campus.

Alternative Approaches

It would be more beneficial if an initial training took place with a lead trainer and the department heads. Due to lack of time to train department heads and have them train teachers, I opted to start the training with everyone at the same time. If department heads were trained in different aspects of technology integration, they could then modify the lesson for their content area and deliver the training in their department's grade-level meetings. In this way, the trainings could be more personalized, and participants might be more comfortable working hand in hand with their department heads. Although it might be beneficial to host minisessions once a week after school, time constraints prevent this from happening. An alternative to address the problem of financial constraints would be to allow teachers to research and apply for grants or other source of funding that could be used for purchasing new and advanced technology.

Scholarship

The learning knowledge acquired through this project has been a tremendous asset to me. Contouring the staff development to fit the needs of individuals within small learning communities can yield great benefits. The knowledge I have gained as a scholar will allow me to further develop my understanding of technology integration in various subject matter areas. More importantly, the process has assisted me in creating a platform on which I can continue to train others to obtain skills they need in this age of technology growth and student learning. Through the research process, I could not help but notice the enormous amount of research on technology in education being published on a regular basis. In addition, my learning experience extended to the utmost appreciation for the patience and dedication shown in this process by my family, friends, coworkers, and committee members.

Project Development and Evaluation

The development of this project required numerous hours of research and planning. After much consideration, the project that appeared to be most effective was developed. Upon careful review of survey results, it was evident that technology-based professional development was needed before technology integration could grow in every content area. It was also evident that teachers learn at different paces and would benefit from a smaller learning environment. As a result, professional learning communities seem to be an excellent option to merge technology training and a small-group atmosphere. My research indicated that professional learning communities appear to be beneficial in allowing trainers to move around small groups and work with individuals during particular trainings. In light of the need for some teachers to

review the information for a second time, it was apparent that recording and archiving step-by-step videos of the trainings would prove to be vital for many teachers.

Leadership and Change

While researching and developing this project, my knowledge was broadened by the learning experience. I found a key component that lies within the empowerment of the participants. Many teachers believe that they are being heard when time is taken to ask for their input into their learning (Darling-Hammond & McLaughlin, 2011). As a leader, I find it necessary to build on this foundation of success in teacher and administrative collaboration. It is my belief that as a change agent, I have the ability to create a positive impact within our school that may have a domino effect that creates a positive impact on our students and our community. I have also found that it will be necessary in the upcoming year to create a program where teachers who are new to our campus will be able to benefit from previous and future trends that involve the integration of technology. With the development of technology-based professional learning communities, teachers become empowered to make a difference in their lives, the lives of their students, and the relationship with our community.

Analysis of Self as Scholar

Relationship, rigor, and relevance are three things that I have found to be necessary to the growth of people. Through this project, I have found that the most beneficial of those three things is relationship. I have often heard that "people don't care what you know until they know that you care." This process has shown me that as a scholar, I must open my eyes and ears to see and hear what others have experienced. I have learned that in communicating with others, information may not

be received in the way I expect. Through this experience, I have developed a greater understanding of how to conduct staff development for people representing a variety of learning styles and abilities.

As I was gathering and analyzing the data that was associated with this project, it became evident that the hardships of technology integration from EFG Middle School were similar to difficulties experienced in many schools across our nation. Through this process, I have been motivated and empowered to continue the quest for more technology integration on every continent. It is my desire to first mirror this project in every school within this district and then broaden the training to other cities and states. This process has given me a newfound understanding of perseverance and determination; it has motivated me to go on and do greater things.

Analysis of Self as Practitioner

As a practitioner, I have experienced growth as an administrator through lessons learned in my communication and social experiences with the teachers of EFG Middle School. My abilities as a leader, teacher, coach, and resource person were strengthened through this process. I am able to reflect on my time as a novice teacher as well as a seasoned teacher in an effort to create a project from another person's perspective. One of the most rewarding experiences for me has been the camaraderie that this experience has developed.

In education, we push ourselves to be lifelong learners. To enhance learning experiences, educators should share their knowledge with leaders and trainers who allow teachers to reflect, share, and facilitate staff development. It is my belief that when teachers begin training each other, they increase the skills they possess as well. I

have learned that it is important to give teachers a voice in an effort to build a solid, cohesive community.

Analysis of Self as Project Developer

Reading, listening, and practicing are essential components to being a great developer and facilitator of staff developments. As a project developer, I have learned to look at many different viewpoints and approaches that can be taken in training. In addition, developing this project has reiterated the fact that each trainer must take into account the auditory, visual, and kinesthetic learning styles of the participants when developing lessons. This is accomplished by designing lessons that incorporate the different styles into the application of the lesson. Finally, it is my observation that to create and deliver a successful project requires the support of all stakeholders.

The Project's Potential Impact on Social Change

In retrospect, as I reflect over the process involved in this research project, it was at times daunting and overwhelming. Through this process I have learned to lean on my committee chair for support. My level of patience and perseverance has been tried, tested, and strengthened through this process. I have learned that soliciting a team of supporters can help boost your determination. Effective communication is an essential skill that is needed when taking on projects of this magnitude. When taking on projects of this magnitude, I have had times of frustration and lack of willpower. I have also had many experiences that were positive and beneficial to my growth as a leader and as an individual. In the quest to achieve success, there are people who are willing to go above and beyond to assist but as the person on this journey, I have found that my communication must be clear and concise.

Implications, Applications, and Directions for Future Research

It takes a lot of things to develop a quality product. When working with teachers, it is important to solicit feedback in an effort to invoke a feeling of empowerment. As administrators it is equally important to empower and encourage all stakeholders to reach their full potential. When teachers are required to attend staff developments, solicit their input in order to make the training relevant to them. Based on the data, teachers would agree that quality staff development is needed for technology integration. Administration and teachers could agree that the technology-based professional learning communities are an inexpensive option for all.

At the conclusion of the 2014/2015 school years, first steps of this program would be completed. The second step of the program would be to duplicate the first series of trainings on other campuses. By the end of the 2015/2016 school year, it is my goal to have similar training programs in every school in this district. Beginning in 2016/2017, my goal is to distribute samples of the technology professional learning communities to various school districts across our nation. Future research could include:

- Studying the impact of small technology learning communities with students as a way to integrate technology in to their homework assignments.
- Studying the impact of small technology learning communities for parents as a way to provide trainings that will assist them in guiding their student when working at home.

- Studying the impact of small technology learning communities at the college level to measure the success of students who are taking distance learning classes versus students that are enrolled in traditional classes.
- Studying the impact of small technology learning communities as a distant learning style of training to assess the pros and cons of leaning from different off campus sites.

Reflection on the Importance of the Work

In this age of technology, the need for continuous development of knowledge and skills for the workplace has never been greater. This project is a creative platform for technology-based professional learning communities across our nation. Based on my research, there is a need for more staff developments that can satisfy the need to balance effectiveness and time constraints for all teachers. The impact of this project will grow rapidly within our school and has the potential to have an instant impact across our district. The creation of this project will allow stakeholders to view the benefits of staff developments from a different perspective.

Conclusion

In conclusion, this study has afforded me the opportunity to reflect on the journey and experiences of this research project. This study adds to the existing research on how staff developments impact the integration of technology into the curriculum. This study shows a positive correlation between technology-based staff developments and the integration of technology into the curriculum. Participants seem open to sharing their technology success and limitations for the benefit of this study. I believe that participants gave valuable information in hopes of opening dialog about best practices in technology integration.

Through the data collected in my research, I am developing technology-based professional learning community programs that would allow educators to learn strategies to integrate technology into their curriculum. The quality of a teacher is directly linked to the quality of the staff development he or she received (Hamilton, 2014). Learning communities are utilized as a method to provide quality professional developments while providing continuous ways for educators to change and improve their knowledge and skills. In the world of education, professional learning communities are vital to producing a system that enables teachers to collaborate and learn from one another's knowledge and experience (DuFour, 2007). It is my belief that technology based professional learning communities will be an ongoing process through which teachers and administrators will work collaboratively to seek and share learning and to act on their learning. This project study will aid educators in their goal to enhance their effectiveness as professionals for the benefit of their students. This study also afforded me the opportunity to add my personal reflections as a scholar, practitioner, and project developer. It is my belief that the potential impact of this project on social change and future research is great and will be beneficial for a long time to come.

References

Abrami, P. C., d'Apollonia, S., & Cohen, P. A. (1990). Validity of student ratings of instruction: What we know and what we do not. *Journal of Educational Psychology*, *82*(2), 219-231. doi:10.1037/0022-0663.82.2.219

Academic Excellence Indicator System. (2010). State AEIS report. Retrieved July 1, 2012, from http://ritter.tea.state.tx.us/perfreport/aeis/2010/index.html

Acemoglu, D., Aghion, P.; Griffith, R., & Zilibotti, F. (Eds.). (2010). Vertical integration and technology: Theory and evidence [Special issue]. *Journal of the European Economic and Organizations, 30*.

Ahmet, B., Bulent, T., & Cemalettin, A. (2011). Experiencing technology integration in education: Children's perceptions. *International Electronic Journal of Elementary Education*, 3(2), 39-45. Retrieved February 11, 2012, from http://www.iejee.com/ 3_2_2011/3_2_139_151.pdf

Akyol, Z.; Ice. (2010). The relationship between course socio-epistemological orientations and student perceptions of community of inquiry. *Internet and Higher Education, 13*(1-2), 66-68. doi:10.1007/978-1-4614-1785-9

Albion, P. R. (2001). Some factors in the development of self-efficacy beliefs for computer use among teacher education students. *Journal of Technology and Teacher Education, 9*(3), 321-347. doi: 10.2190/EC.44.1.c

Albion, P. (2008). Two imperatives for Web 2.0. *Teacher Education, 25*(3-4), 181-198. doi: 10.1080/07380560802368173

Aldunate, R., & Nussbaum, M. (2013). Teacher adoption of technology. *Computers in Human Behavior*, *29*(3), 519-524. http://dx.doi.org/10.1016/j.chb.2012.10.017.

Al-Mehrzi, R.; & Aldhafri, S (2011). Path analysis of the effects of teaching attitudes and anxiety on pre-service teachers' efficacy beliefs. *World Applied Sciences Journal, 14*, 52-59. doi:10.1016/j.rser.2011.07.124

American Institute for Research. (2002). *The digital disconnect: The widening gap between Internet savvy students and their schools*. Retrieved March 3, 2007, from http:/www.pewinternt.org

Amiel, T., & Reeves, T. C. (2008). *Design-Based Research and Educational Technology: Rethinking Technology and the Research Agenda. Educational Technology & Society, 11*(4), 29-40. Retrieved from http://www.ifets.info/journals/11_4/3.pdf

Anderson, H. M., Cain, J., & Bird, E. (2005). Online student course evaluations: Review of literature and a plot study. *American Journal of Pharmaceutical Education, 69*(1), 34-43. doi: 10.1111/j.1365-2125.2008.03167.x

Anthony, D. (2011, January 3). *Cypress-Fairbanks ISD Technology Plan: 2011-2014*. Retrieved July 1, 2013, from http://www.cfisd.net/files/2113/9336/5624 /Technology20Plan.pdf

Arbuckle, J., & Williams, B. D. (2003). Students' perceptions of expressiveness: Age and gender effects on teacher evaluations. *Sex Roles: A Journal of Research, 49*(9-10), 507-516. doi:10.1057/9781137296344

Arigbabu, A. (2009). Examining psychometric characteristics of the Computer Anxiety Scale. *Computers in Human Behavior, 25*(1), 229-232. doi: 10.1016/j.chb.2008.09.006

Atkeson, L. R., Adams, A. N., & Alvarez, R. M. (2014). Nonresponse and mode effects in self- and interviewer-administered surveys. *Political Analysis*, *22*,

31-37.

Atteberry, A., & Bryk, A. S. (2010). Centrality, connection, and commitment: The role of social networks in school-based literacy. *Social Network Theory and Educational Change*, *12*, 51-76.

Barnett, H. (2003). *Investing in technology: The payoff in student learning*. Minneapolis, MN: Walden University. (ERIC Document Reproduction Service No. ED479 843)

Basham, J., Smeltzer, A., & Pianfetti, E. (2012). An integrated framework used to increase preservice teacher NETS-T ability. *Journal of Technology and Teacher Education*, *21*, 257-276. doi:10.1177/001316446002000104

Becker, H. J. (2001). *How are teachers using computers in instruction?* (Report from the Teaching, Learning and Computing 1998 survey). Seattle, WA: American Educational Research Association.

Bell, A., Kelton, J., McDonagh, N., Mladenovic, R., & Morrison, K. (2011). A critical evaluation of the usefulness of a coding scheme to categorise levels of reflective thinking. *Assessment & Evaluation in Higher Education*, *36*(7), 797-815.

Bennett, S.; & Maton, K. (2008). The "digital natives" debate: A critical review of the evidence. *British Journal of Educational Technology, 39*(5), 775-786. doi:10.1111/j.1467-8535.2007.00793

Billings, D. M., Connors, H. R., & Skiba, D. J. (2001). Benchmarking best practices in web-based nursing courses. *Advances in Nursing Science, 23*(3), 41-52. doi:10.1016/j.profnurs.2004.11.002

Blin, F.; & Munro, M. (2008). Why hasn't technology disrupted academics' teaching

practices? Understanding resistance to change through the lens of activity theory. *Computers & Education, 50*(2), 475-490. doi:10.1016/j.compedu.2007.09.017

Brown, A., & Green, T. (2010). Issues and Trends in Instructional Technology: Growth and Maturation of Web-Based Tools in a Challenging Climate; Social Networks Gain Educators' Attention. *Educational Media and Technology Yearbook, 35*(1), 29-43. *doi:*10.1007/978-*1*-4419-1516-0

Burkman, A. (2012). Preparing novice teachers for success in elementary classrooms through professional development. The Delta Kappa Gamma Bulletin, 78(3). 23– 33.

Bussey, J. ; Dormody, M. (2000). Some factors predicting the adoption of technology education in New Mexico. *Journal of Technology Education, 12*(1), 1-15. doi: 10.1.1.132.3916.pdf

Cabanero-Johnson, P. ; Berge, R. (2009). "Digital natives: back to the future of microworlds in a corporate learning organization". *Learning Organization, 16*(4), 290 – 297. doi: 10.1177/1534484311406421

Chang, C., Chen, T., & Hsu, W. (2011). The study on integrating webquest with mobile learning for environmental education. *Journal Computers & Education*, *57*(1), 1228-1239. doi: 10.1016/j.compedu.2010.12.005

Chapman, L; Masters, K. (Ed.). (2010). International research and pedagogy Do digital divisions still persist in schools? Access to technology and technical skills of teachers in high needs schools in the United States of America [Special issue]. *Journal of Education for Teaching, 36*(2).

Chen, CH. (2008). Why do teachers not practice what they believe regarding

technology integration? *The Journal of Educational Research*. doi: 10.5590/JERAP.2011.01.01.02

Chen, J.Q., & Price, V. (2006). Narrowing the digital divide: "head start teachers develop proficiency in computer technology". *Education and Urban Society, 38*(4), 398- 405. doi: 10.1177/0013124506287910

Chester, A. (2012). Peer partnerships in teaching: Evaluation of a voluntary model of professional development in tertiary education. Journal of the Scholarship of Teaching & Learning, 12(2), 94–108.

Choy, D. ; Wong, H. (Ed.). (2010). Student teachers' intentions and actions on integrating technology into their classrooms during student teaching [Special issue]. *Journal of Research on Technology in Education, 42*(2). doi 10.1007/978-1-46143185-5_68

Christie, C., & Alkin, M. (2005). Objectives-based evaluation. Thousand Oaks, CA: Sage.

Christine, E. ; Murray . (2009). Diffusion of Innovation Theory: A bridge for the research-practice gap in counseling. *Journal of Counseling & Development, 87*(1), 108-116. doi: 10.1002/j.1556-6678.2009.tb00556.x

Clark, C. (2013). A Phenomenological Study Of The Impact Of Pre-Service And In-Service Training Regarding The Integration Of Twenty-First Century Technologies Into Selected Teachers' instruction (Doctoral dissertation, Liberty University).

Conrad, D. ; Brown, L. (2011) Fostering inclusive education: Principals' perspectives in Trinidad and Tobago. *International Journal of Inclusive Education*, *15*(9), 1017-1029

Creswell, J. (2009). *Research design: Qualitative, mixed methods and mixed methods approaches*. Sage Publications, Thousand Oaks, CA

Creswell, J., & Plano Clark, V. (2011). *Designing and conducting mixed methods research.* (2nd ed.). Thousand Oaks, CA: Sage.

Cullen, T. ; Greene, B. (2011) Preservice teachers' Beliefs, Attitudes, and Motivation about Technology Integration. *Journal of Educational Computing Research 45*(1), 29 – 47, doi:10.2190/EC.45.1.b

Darling-Hammond, L., & McLaughlin M. W. (2011). Policies that support professional development in an era of reform. Phi Delta Kappan, *92*(6), 81–92.

Davis, H. ; Hartshorne, S. (2010). Being an innovative teacher: Pre-service teachers' conceptions of technology and innovation. *International Journal of Education, 2*(1). doi: http://dx.doi.org/10.5296/ije.v2i1.242

Dias, L., Davis, E., Sarsar, F., & Cuby-Richardson, C. (2012, March). The use of podcasts in a yechnology integration course for pre-service teachers' development of technological pedagogical content knowledge. In Society for Information Technology & Teacher Education International Conference, *2012* (1), 4672-4678.

Dearing, J. (Ed.). (2009). Applying diffusion of innovation theory to intervention development [Special issue]. *Research on Social Work Practice, 19*(5), doi:10.1177/1049731509335569

DeJaeghere, J. ; Williams, J. (2009). Ugandan secondary school head teachers' efficacy: What kind of training for whom? *International Journal of Educational Development, 29*(3), 312–320. http://dx.doi.org/10.1016/j.ijedudev.2008.03.001

Denzin, NK. (1978). Sociological Methods. New York: McGraw-Hill.

Donnelly, D. F., & Boniface, S. (2013). Consuming and creating: Early-adopting science teachers' perceptions and use of a wiki to support professional development. *Computers & Education*, *68*, 9-20.

Donlevy, J. (2006). Teachers, technology and training: future point learning. *International Journal of Instructional* Media, 3*3*(2), 121-124.

DuFour, R. (2007). Professional learning communities: A bandwagon, an idea worth considering, or our best hope for high levels of learning? *Middle School Journal*, *39*(1), 4–8.

DuFour, R., & Marzano, R. J. (2012). *Leaders of learning: How district, school, and classroom leaders improve student achievement*. Solution Tree. 555 North Morton Street, Bloomington, IN 47404.

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). Thousand Oaks, CA: SAGE Publications Inc.

Easton, L., (2012). From professional development to professional learning. Phi Delta Kappan, *89*(10), 755–761.

Easton, L. B. (2011). *Professional learning communities by design: Putting the learning back into PLCs*. Corwin Press.

Edwards, M. (2012). Our digital conversion. *Education Digest: Essential Readings Condensed For Quick Review*, *78*(1), 4-9.

Elnicki, D., Kolarik, R., & Bardella, I. (2003). Third-year medical students' perceptions of effective teaching behaviors in a multidisciplinary ambulatory clerkship. Academic Medicine, *78*(8), 815-819 doi: 10.1056/NEJM199812313392706

Ertmer, P; Ottenbreit-Leftwich. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology, 42*(3), 255-284. DOI: 10.1002/RRQ.002

Ertmer, P; Ottenbreit-Leftwich. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers & Education, 59*(2), 423–435. http://dx.doi.org/10.1016/j.compedu.2011.10.009

Ertmer, P. ; Ottenbreit-Leftwich. (2010). Change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology Teacher Technology, 42*(3), 255-284.

Fonseca, D., Martí, N., Redondo, E., Navarro, I., & Sánchez, A. (2014). Relationship between student profile, tool use, participation, and academic performance with the use of Augmented Reality technology for visualized architecture models. *Computers in Human Behavior*, *31*, 434-445.

Forsbach-Rothman, T. ; Margolin. (Ed.). (2007). Student teachers and alternate route teachers' sense of efficacy and views of teacher preparation [Special issue]. *Journal of the National Association for Alternative Certification, 2*(1).

Frailich. (2009). Enhancing students' understanding of the concept of chemical bonding by using activities provided on an interactive website. *Journal of Research in Science Teaching, 46*(3), 289-310. *doi:*10.1002/sce.20072

Frost, D., & Durrant, J. (2013). *Teacher-led development work: Guidance and support*. Routledge.

Fry, H., Ketteridge, S., & Marshall, S. (Eds.). (2008). *A handbook for teaching and learning in higher education: Enhancing academic practice.* Routledge.

Fullan, M. (2013). *The new meaning of educational change,* (4th ed). San Francisco:

Jossey-Bass.

Gay, L. R., & Airasian, P. (2000). *Competencies for analysis and application* (6th ed.). Upper Saddle River, NJ: Merrill Prentice Hall.

Gbollie, C., & David, N. M. (2014). Aligning expansion and quality in higher education: An imperative to Liberia's economic growth and development. *Journal of Education and Practice, 5*(12), 139-150.

Giannopoulou1, E. ; Yström, A. (Ed.). (2010). Technology management innovation implications of openness: A study into (all) the growing literature on open I\innovation [Special issue]. *Journal of Technology Management & Innovation, 5*(3).

Gray, L., Thomas, N., & Lewis, L. (2010). Teachers' use of educational technology in U.S.public schools: 2009 (NCES 2010-040). Washington, DC. U.S. Department of Education.National Center for Education Statistics, Institute of Education Sciences. *doi:* 10.1017/S0958344013000013

Gibbone, A., Rukavina, P., & Silverman, S. (2010). Technology integration in secondary physical education: teachers' attitudes and practice. *Journal of Educational Technology Development and Exchange, 3*(1), 27-42. *DOI:*10.3402/rlt.v20i0.18677

Gibson, P. A., Stringer, K., Cotten, S. R., Simoni, Z., O'neal, L. J., & Howell-Moroney, M. (2014). Changing teachers, changing students? The impact of a teacher-focused intervention on students' computer usage, attitudes, and anxiety. *Computers & Education*, *71*, 165-174.

Gibson, S., Brooks, C. (2012). Teachers' perspectives on the effectiveness of a locally planned professional development program for implementing new curriculum.

Teacher Development 16(1), 1-23 *doi:* 10.1080/13664530.2012

Glazer, M. (2009). Factors and interactions influencing technology integration during situated professional development in an elementary school computers in the schools. *Journal of Computer and Education, 26*(1). *doi:*10.1080/07380560802688257

Godzicki, L., Godzicki, N., Krofel, M., & Michaels, R. (2013). Increasing motivation and engagement in rlementary and middle school students through technology-supported learning environments. Retrieved from http://www.eric.ed.gov.ezproxy.cu-portland.edu/contentdelivery/servlet/ERICServlet?accno=ED541343

Gorder. L. (Ed.). (2010). A study of teacher perceptions of instructional technology integration in the classroom Delta Pi Epsilon [Special issue]. *Journal of Educational Technology Development and Exchange, 3*(1). http://dx.*doi*.org/10.3200/JOER.102.1.65-75

Gravetter, F.J., & Wallnau, L. B. (2008). *Essentials of statistics for the behavioral sciences* (6th ed.). Belmont, CA: Wadsworth Cengage Learning.

Gravetter,F. J., & Wallanau, L. B. (2005). *Essentials of statistics for the behavioral sciences*. Belmont, CA: Wadsworth/Thomson Learning.

Greve, H. (2009). Bigger and safer: the diffusion of competitive advantage. *Strategic Management Journal, 30*(1), 1-23. *doi:*10.1016/j.jom.2010.11.001

Guzey, S. S., & Roehrig, G. H. (Eds.). (2009). Teaching science with technology: Case studies of science teachers' development of technology, pedagogy, and content knowledge [Special issue]. *Contemporary Issues in Technology and Teacher Education, 9*(1). *DOI:* 10.4018/978-*1*-60960-750-0.ch002

Hamilton, L. S., Steiner, E. D., Holtzman, D., Fulbeck, E. S., Robyn, A., Poirier, J., & O'Neil, C. (2014). Using Teacher Evaluation Data to Inform Professional Development in the Intensive Partnership Sites. Santa Monica California: Rand Corporation.

Hansen, C. C. (2005). Observing technology enhanced literacy learning. *Contemporary Issues in Technology & Teacher Education, 8*(2), 108-121.

Hanson-Baldauf, D. ; Hassell, H. (2009). The information and communication technology competencies of students enrolled in school library media certification programs. *Information Science Research, 31*, 3-11.

Hanson-Baldauf, D. Hassell, H. (2009). The Information and communication technology competencies of students enrolled in school library media certification programs, library & *Information Science Research*, *31*(1), 3-11. dio:10.1016/jlisr.2008.03.003

Harmancioglu, N. ; Droge, S. (2009). Theoretical lenses and domain definitions in innovation research. *European Journal of Marketing, 43*(1/2), 229-263.

Heidi, M. ; Steinera, S. (2009). The past, present, and possibilities of commons in the academic. *The Reference Librarian, 50*(4), 309-332. *doi:* 10.1080/02763870903103645

Hermans, R. ; Tondeur, R. (2008). The impact of primary school teachers' educational beliefs on the classroom use of computers. *Computers and Education, 51*(4), 1499-1509. doi:10.1016/j.compedu.2008.02.001

Herrell, A. L., Jordan, M., & Eby, J. W. (2013). *Teaching in the Elementary School: A Reflective Action Approach*. Boston, MA: Pearson.

Hixon, E. ; Buckenmeyer, J. (2012). Beyond the early adopters of online instruction:

Motivating the reluctant majority. *The internet and higher rducation, 15*(2), 102-107. doi: 10.1016/j.iheduc.2011.11.005. ISSN: 1096-7516

Hoffman, J. (2010). What we can learn from the first digital generation: implications for developing twenty-first century learning and thinking skills in the primary grades. *Education 3-13: International Journal of Primary, Elementary and Early Years Education, 38*(1), 47-54.

Hord, S. M. (1997). *Professional learning communities: Communities of continuous inquiry and improvement.* Austin, TX: Southwest Educational Development Lab, P. 87-93.

Hosseini, Z.; Kamal, A. (2013). A survey on pre-service and in service teachers' perceptions of technological pedagogical content knowledge (tpck). *The Malaysian Online Journal of Educational Technology 1*(2), *1-7*

Hsiao, W. Y. (2009). Pre-service teachers' beliefs on integrating technology into teaching projects. *Society for Information Technology & Teacher Education*, 1886-1291.

Inan, F. ; Lowther, D. (2010). Pattern of classroom activities during students' use of computers: Relations between instructional strategies and computer applications. *Teaching and Teacher Education, 26*(3), 540-546.

ISTE NETS (2008) NETS Standards for Teachers http://www.iste.org/standards/nets-for-teachers

Jackson, D. L., Teal, C. R., Raines, S. J., Nannsel, T. R., Force, R. C., & Burdsal, C. A. (1999). The dimensions of students' perceptions of teaching effectiveness. *Educational and Psychological Measurement*, *59*(4), 580-596.

Johnson, K., Lucas, L., & Lucas, C. (2014, March). Learning Together: A Technology Professional Learning Community. In *Society for Information Technology & Teacher Education International Conference*, *2014*(1), 1912-1915.

Jones, R., Fox, C., & Levin, D. (2011). Transforming education to ensure all students are successful in the 21st century. *State Educational Technology Directors Association National Educational Technology Trends*: 2011.

Kamau, L. M. (2014). Applying Rogers' diffusion of innovations theory to investigate technology training for secondary mathematics teachers in Kenya. *Journal of Education and Practice*, *5*(17), 19-30.

Karasavvidis, I. (2009). Activity Theory as a conceptual framework for understanding teacher approaches to Information and Communication Technologies. *Computers & Education, 53*(2), 436–444.

Kebritchi, M. (2010). Factors affecting teachers' of educational computer games. *British Journal of Educational Technology, 41*(2), 256-270. DOI: 10.1111/j.1467-8535.2008.00921.x

Keengwe, J. ; Onchwari. (2009). A technology integration professional development model for practicing teachers. *Early Childhood Education Journal Technology and Early Childhood Education, 37*(3), 209-218. *doi:*10.1007/s10643-009-0341-0.

Keengwe, J., Onchwari, G., & Onchwari, J. (2009). Technology and student learning: Toward a learner-centered teaching model. *Association for the Advancement of Computing in Education Journal, 17*(1), 11-22. *doi:*10.1007/s10643-009-0341-0.

Keengwe. (Ed.). (2009). Faculty and technology: Implications for faculty training and technology leadership [Special issue]. *Journal of Science Education and Technology, 18*(3). *doi*>10.1007/s10639-010-9150-8

Kessler, G. ; Haggerty, D. (2010). An online graduate program in digital investigation

management: Pedagogy and overview. *Journal of Digital Forensic Practice, 3*(1). *doi:*10.1109/HICSS.2008.345

Kim, H. J., Miller, H. R., Herbert, B., Pedersen, S., & Loving, C. (2012). Using a wiki in a scientist-teacher professional learning community: Impact on teacher perception changes. *Journal of Science Education and Technology*, *21*(4), 440-452.

Kingrey, B. D. (2014). Secondary teachers as early childhood principals: A qualitative case study. UNI Electronic Theses and Dissertations. Paper 16.

Klug, J., Krause, N., Schober, B., Finsterwald, M., & Spiel, C. (2014). How do teachers promote their students' lifelong learning in class? Development and first application of the LLL Interview. *Teaching and Teacher Education, 37*, 119-129.

Knezek, G.. (2008). The importance of information technology attitudes and competencies in primary and secondary education. *International Handbook of Information Technology in Primary and Secondary Education*, *20*. *doi:*10.1007/978-3-540-69965-1

Kurt, S. (2012). Examining teachers' use of computer-based technologies. *Education and Information Technologies*, 2-3. http://dx.doi.org/10.1155/2012/697357

Laffey, J., & Williams, M. (2012). Communities of Practice, Professional Learning Communities, and Technology. Retrieved from http://web.missouri.edu/~mwcp6/ePortfolio/artifacts/Prpsl_CoP_PLC_Tchnlgy.pdf

Lambert, J., Gong, Y., & Cuper, P. (2008). Technology, transfer and teaching: The impact of a single technology course on preservice teachers' computer

attitudes and ability. *Journal of Technology and Teacher Education, 16*(4), 385-410. *doi:* 10.4018/9781-61520-853-1.ch014

Lara, M. ; Myers., R. Frick, T. ; Aslan., S;, & Michaelidou, T. (Eds.). (2010). A design case: Developing an enhanced version of the diffusion simulation game [Special issue]. *International Journal of Designs for Learning, 1*(1). *doi:* 10.5102/00028312021002455

Lawrence, S. (2014) Exploring teachers' perceptions of literacy and use of technology in classroom practice: Analysis of self- reported practice in one school district. *Journal of Literacy and Technology 52 Volume 14, Number 1* *doi:*10.1016/j.compedu.2006.04.002

Leader, L. L. (2014). The presence of professional learning community characteristics in two South Louisiana school districts (Doctoral dissertation, SOUTHEASTERN LOUISIANA UNIVERSITY).

Lei, J. (2009). Digital Natives As preservice teachers: What technology preparation is needed? *Journal of Computing in Teacher Education, 25*(3). *doi:*10.1002/acp.1730

Levin, T., & Wadmany, R. (2008). Teachers' views on factors affecting effective integration of information technology in the classroom: Developmental scenery. *Journal of Technology and Teacher Education, 16*(2), 233-263.

Levy, S. ;., & Wilensky, U. (2009). Students' learning with the connected chemistry (CC1) curriculum: Navigating the complexities of the particulate world. *Journal of Science Education and Technology, 18*(3), 243-254. *doi:*10.1080/09500691003720671

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage.

Liu, L. (2011). Computers and education. *Factors Related to Pedagogical Beliefs of Teachers and Technology Integration, 56*(4), 122, 2012 - 2022.

Lodico, M.G., Spaulding, D.T., & Voegtle, K.H. (2010). *Methods in educational research: from theory to practice* (2nd ed.). San Francisco, CA: John Wiley & Sons, Inc.

"Long Range Plan for Technology." *LRPT, 2006-2020: A Report to the 80th Texas Legislature from Texas Education Agency*. N.p., Nov. 2008. Web. 8 Mar. 2012.

Loogma, K. ; Kruusvall, J. (2012). E-learning as innovation: Exploring innovativeness of the VET teachers' community in Estonia. *Computers and Education, 58*(2), 808-817. 10.1016/j.compedu.2011.10.005

Looi, C. K., Seow, P., Zhang, B., So, H. J., Chen, W.-L., & Wong, L. H. (2010). Leveraging mobile technology for sustainable seamless learning. *British Journal of Educational Technology, 42*(1).

Lotherington, H., Paige, C., & Holland-Spencer, M. (2013). What works? Research into practice. Retrieved from https://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/WW_Professional_Learning.pdf

Lucey. (2009). Ethical issues in instructional technology: An exploratory framework. *Multicultural Education & Technology Journal, 3*(3), 196-212. *doi* : 10.1108/17504970910984871

Lunenburg, F. C., & Irby, B. J. (2014, September). Strengthening the principal's toolbox: Strategies to boost learning. In *National Forum of Educational Administration & Supervision Journal*, *32*(1).

Maddux, C. ; Liu, L. (2008). Web 2.0: On the cusp of a revolution in information technology? *Computers in the Schools, 25*(3-4), 4. *doi:*10.1080/07380560802394807

Marsh, D. L. F. (2012). *Perceptions of educators in the Mooresville graded school district of 21st century learning.* (Order No. 3523196, Wingate University). *ProQuest Dissertations and Theses,* , 218. Retrieved from http://search.proquest.com/docview/1038150248?accountid=14872. (1038150248).

Marwan, A. ; Sweeney,T. (2010). Teachers' perceptions of educational technology integration in an Indonesian polytechnic. *Asia Pacific Journal of Education, 30*(1), 463-476. *doi:*10.1080/02188791.2010.520204

Marzano, R. (2009, September). Setting the record straight on "high-yield" strategies. *The Phi Delta Kappan, 91*(1), 30-37. *doi:* 10.3102/00346543065003245

Masters, J. ; Magidin, R. (2010). The effects of online professional development on fourth grade English language arts teachers' knowledge and instructional practices. *Journal of Educational Computing Research, 43*(3), 355 - 375. doi:10.2190/EC.43.3.e

McDonnell, L. ; Weatherford, S. (2011). Crafting an education reform agenda through economic stimulus policy. *Peabody Journal of Education, 86*(3), 304-318. *doi:*10.1080/0161956X.

McLaughlin, M., & Talbert, J. (2010). Professional learning communities: Building blocks for school culture and student learning. *Voices in Urban Education, 27*, 35–45.

McVeea, M. ; Bailey, B. (2008). Teachers and teacher educators learning from new

literacies and new technologies. *Teaching Education, 19*(3), 197-210. *doi:* 10.1080/10476210802250216

Militello, M. ; Friend. (2011). Preparing educational leaders to harness the power of advanced technologies. *Journal of Research on Leadership Education, 6*(5). *doi:* 10.3102/0002831211408061

Milligan, C., & Littlejohn, A. (2014). Supporting professional learning in a massive open online course. *The International Review of Research in Open and Distributed Learning*, *15*(5).

Moore, D. ; (2013) Bringing the world to school: Integrating news and media literacy in elementary classrooms. *The Journal of Media Literacy Education 5(1) doi:* 10.1177/1077699013503159

Morales, C., Knezek, G., & Christensen, R. (2008). Self-efficacy ratings of technologyproficiency among teachers in Mexico and Texas. Computers in the schools, *25*(1), 126-144. doi:10.1080/07380560802158004.0

Morrison, G. R. & Lowther, D. L. (2005). *Integrating computer technology into the classroom,* (3rd ed). Columbus, OH: Merrill/Prentice Hall.

Nasim, S. ; Hossein, N. (2011). The study of relationship between students' cognitive and meta-cognitive strategies and interactions in virtual education with academic achievement. *Quarterly Journal of Research and Planning in Higher Education, 16*(4), 73-96.

Nardi, P.M. (2006). Doing survey research: A guide to quantitative methods. Boston, MA: Pearson Education, Inc.

Natho, N. ; Knipping. (Ed.). (2010). Collaborative learning in teaching information management [Special issue]. *European Journal of Engineering Education,*

35(4). *doi:*10.1080/03043791003802045

No Child Left Behind (NCLB) Act of 2001, Pub. L. No. 107-110, § 115, Stat. 1425 (2002).

Norris, C., Hossain, A. & Soloway, E. (2012). Under what conditions does computer use positively impact student achievement? Supplemental vs. Essential Use. In P. Resta (Ed.), Proceedings of Society for Information Technology & Teacher Education International Conference 2012 (pp. 2021-2028). Chesapeake, VA: AACE.

Office of Educational Technology, U.S Department of Education. (2010). *Transforming American education: Powered by technology*. *doi:*10.1037/ a0026609

Onojaefe, D. (2009). Partnership and the e-commerce initiative of small businesses. *African Journal of Business Management, 3*(12), 855-861. *doi:* 10.5897/AJBM09.304

Onwuegbuzie, A. J., Witcher, A. E., Collins, K. M. T., Filer, J. D., Wiedmaier, C. D., & Moore, C. W. (2007). Students' perceptions of characteristics of effective college teachers: A validity study of a teaching evaluation form using a mixed-methods analysis. *American Educational Research Journal, 44*(1), 113-160. *doi:*10.3102/0002831206298169

O'Sullivan, E., Rassel, G. R., & Berner, M. (2003). Research methods for public administrators. New York: Longman. *doi:*10.1016/j.pursup.2007.09.015

Ott, L.R. & Longnecker, M. (2010). *An introduction to statistical methods and data analysis*, (6^{th} ed). Belmont: Brooks and Cole Press.

Palak, D., & Walls, R. (2009). Teachers' beliefs and technology practices: A mixed

methods approach. *Journal of Research on Technology in Education*, *41*(4), 417- 441. *doi:*10.3102/00346543062003307

Paraskeva, F. ; Bouta. (2008). Individual characteristics and computer self-efficacy in secondary education teachers to integrate technology in educational practice. *Computers and Education, 50*(3), 1084-1091. *DOI:* 10.1007/978-*3*-642-04271-3_131

Patton, M.Q. (1999). Enhancing the quality and credibility of qualitative analysis. *HSR: Health Services Research, 34* (5) Part II, 1189-1208.

Pella, S. (2011). A situative perspective on developing writing pedagogy in a teacher professional learning community. *Teacher Education Quarterly*, *38*(1), 107–125.

Peluso, M. J., Hafler, J. P., Sipsma, H., & Cherlin, E. (2014). Global health education programming as a model for inter-institutional collaboration in interprofessional health education. *Journal of Interprofessional Care,* (0), 1-3.

Prensky, M. (2009). Digital: From digital immigrants and digital natives to digital wisdom. *Journal of Online Education, 5*(3). *doi:*10.1108/10748120110424816

Ravitch, D. (2011). *The death and life of the great American school system: How testing and choice are undermining education*. New York: Basic Books.

Rideout, V., Foehr, U., Roberts, D. (2010) *Generation M2: Media in the lives of 8- to 18-year-olds* Kaiser Family Foundation Retrieved from http://www.kff.org/entmedia/mh012010pkg.cfm

Rogers, E. (1995). Diffusion of Innovations (4th ed.) . New York: The Free Press.

Ross, S., & Morrison, J. (2014). Measuring meaningful outcomes in consequential contexts: Searching for a happy medium in educational technology research

(phase II). *Journal of Computing in Higher Education*, *26*(1), 4–21. doi:10.1007/s12528-013-9074-6

Safar, A. H., P.H.D., & AlKhezzi, F. A., P.H.D. (2013). Beyond computer literacy: Technology integration and curriculum transformation. *College Student Journal, 47*(4), 614-626. Retrieved from http://search.proquest.com/docview/1490491914?accountid=14872

Shagrir, L. (2012). How evaluation processes affect the professional development of five teachers in higher education. *Journal of The Scholarship of Teaching & Learning, 12*(1), 23–35. Retrieved from http://www.iupui.edu/~josotl

Sahin, I. ; Thompson, A. (2007). Analysis of Predictive Factors That Influence Faculty Members' Technology Adoption Level. *Journal of Technology and Teacher Education, 15*(2), 167-190. *doi:*10.1177/0022487108327554

Saleh, H. (2008). Computer self-efficacy of university faculty in Lebanon. *Educational Technology Research and Development, 56*(2), 229-240. *doi:* 10.1145/1595496.1563029

Sang, G. ; Valcke, M. (2010). Student teachers' thinking processes and ICT integration: Predictors of prospective teaching behaviors with educational technology. *Computers and Education, 54*(1), 103-112. *doi:* 10.1016/j.compedu.2009.07.010.

Sam, D. (2011). Middle school teachers' descriptions of their level of competency in the national education technology standards for teachers. ProQuest LLC. Retrieved from http://www.proquestk12.com/pic/pdfs/pqeduguide.pdf

Schleede, A. (2011). Professional development and its impact on technology integration (Doctoral Dissertation). Retrieved from ProQuest Dissertations and

Thesis (Accession Order No. AAT 3505143)

Sharma, P. (2010). Blended learning. *Oxford Journals Humanities English Language Teaching Journal, 64*(4), 456-458. *doi:* 10.1093/elt/ccq043

Sheehan, D., & Shapley, S. K. (2007) Technical quality of the Texas STaR charts. Austin, Texas: Texas Center for Educational Research.

Sleeter, C. E. (2012). *Keepers of the American dream: A study of staff development and multicultural education.* London: Routledge. *doi:*10.1086/461891

Smith, J. A., Flowers, P., & Larkin, M. (2009). *Interpretative phenomenological analysis: Theory, method and research*. Thousands Oaks, CA: Sage.

Sokura, B. ; Cosby, A. (2007). The Role of information and communication technology (ICT) in the resilience of educational institutions in the wake of Hurricane Katrina. *Journal of the Mississippi Academy of Sciences, 52*(4), 243-261.

Spector, J. (2010). An overview of progress and problems in educational technology. *Digital Education Review*(3). *British Journal of Educational Technology*, 36(*3*), 439-451. *doi:*10.1111/j.1467-8535.2005.0047

Spiegelberg, H. (1983). *The phenomenological movement: A historical introduction* (3rd ed.). Hingham, MA: Kluwer Academic Publishers.

Stanley,D. (2013). Can technology improve large class learning? The case of an upper-division business core class. *Journal of Education for Business, 88*(5), 265-270 doi:10.1080/08832323.2012

Stansbury, M. (n.d.). Five characteristics of an effective 21st century educator. Retrieved from http://www.eschoolnews.com/2011/09/09/five-characteristics-of-an-effective-21st-century-educator/?

Straub, E. (2009). Understanding technology adoption: Theory and future directions for informal learning. *Review of Educational Research, 79*(2), 625-649. *doi:* 10.3102/0034654308325896

Strickland, A., & Coffland, D. (2004). Factors related to teacher use of technology in secondary geometry instruction. *Journal of Computers in Mathematics and Science Teaching, 23*(4), 347-365.

Stronge, J. (2011). What makes good teachers good? A cross-case cnalysis of the connection between teacher effectiveness and student achievement. *Journal of Teacher Education, 62*(4), 339-355. *doi:* 10.1177/0022487111404241

Technology Planning Committee. (Ed.). (2011, March). Anonymous ISD technology plan 2011 - 2014. (Available from https://www.sedl.org/cgi-bin/mysql/eplan/eplan.cgi?l=reportoption_comp. *doi:* 10.1080/10494820802231327

Teo, T. (2009). Examining the relationship between student teachers' self-efficacy beliefs and their intended uses of technology for teaching: A structural equation modeling approach. *Turkish Online Journal of Educational Technology, 8*(4).

Texas Education Agency (2012). School technology and readiness: a teacher tool for planning and self-assessing aligned with the long range plan for technology, 2006-2020: Campus Chart, P. 200-209. Retrieved from http://starchart.epsilen.com/docs/TxCSC.pdf

Thompson,P. (2013). The digital natives as learners: Technology use patterns and approaches to learning, *Computers & Education*, *65*, Pages 12-33, ISSN 0360-1315, http://dx.doi.org/10.1016/j.compedu.2012.12.022

Thornburg, D. (2012). *Edutopia: The Evolving Classroom*. San Francisco, CA:

Jossey-Bass Inc., Publishers.

Trust, T. (2012). Professional learning networks designed for teacher learning. *Journal of Digital Learning in Teacher Education, 28*(4), 133–138.

Tseng, K., Chang, C., Lou, S., Tan, Y., & Chiu, C. -J. (2012). How concept-mapping perception navigates student knowledge transfer performance. *Educational Technology & Society, 15*(1), 102-115.

Tweed, S. (2013). "Technology implementation: Teacher age, experience, self-efficacy, and professional development as related to classroom technology integration". *Educational Technology & Society*, *15* (*1*), 2–14. 2 *doi:* 10.1007/s11423-008-9087-4

US Department of Education, Office of Educational Technology (2010). Transforming American education: Learning powered by technology. Draft National Educational Technology Plan 2010. Washington, DC: Author. *doi:*10.1037/ a0026609

U.S. Department of Education (DOE), Office of Educational Technology (2005)b, The plan section, para. 3 *doi:* 10.1007/BFO1099821

U.S. Department of Justice, Bureau of Justice Assistance by the Institute for Law and Justice, Inc.; 1997. pp. 97-98 and 102-103.

U.S. Department of Education, National Center for Education Statistics. (2010) *Teachers' Use of Educational Technology in U.S. Public Schools doi:* 10.3102/0013189X10369831

Usluel, Y. K., Aşkar, P., & Baş, T. (2008). A structural equation model for ICT usage in higher education. *Educational Technology & Society, 11*(2), 262-273.

Van Braak, J. (2001). Individual characteristics influencing

teachers' class use of computers. *Journal of Educational Computing Research*, 25(2), 141–157

Vanderlinde, R. (2010). The e-capacity of primary schools: Development of a conceptual model and scale construction from a school improvement perspective. *Computers And; Education, 55*(2), 441 - 553. *doi:* 10.1179/135100010X12826446921626

Vannatta, R., & Fordham, N. (2004). Teacher dispositions as predictors of classroom technology use. *Journal of Research on Technology in Education, 36*(3), 253-271.

Vescio, V., Ross, D., & Adams, A. (2008). A review of research on the impact of 148 professional learning communities on teaching practice and student learning. *Teaching and Teacher Education*, 24(1), 80–91.

Visser, P. S., Krosnick, J. A., Marquette, J., & Curtin, M. (1996). Mail surveys for election forecasting? An evaluation of the Columbus Dispatch poll. *Public Opinion Quarterly, 60*(2), 181-227.

Warschauer, M., & Matuchiak, T. (2010). New technology and digital worlds: Analyzing evidence of equity in access, use, and outcomes. *Review of Research in Education, 34*(1), 179-225. *doi:* 10.3102/0091732X09349791

Weaver, D. ; Spratt., C.;, & Nair, C. (2008). Academic and student use of a learning management system: Implications for quality. *Australasian Journal of Educational Technology, 24*(1), 30-41.

Webb, E. J., Campbell, D. T., Schwartz, R. D. and Sechrest, L. (1966) UnobtrusiveMeasures: Nonreactive Research in the Social Sciences. Chicago, IL: *doi:* 10.1037/h0045464

Wheeler, S., Yeomans, P., & Wheeler, D. (2008). The good, the bad and the wiki: Evaluating student-generated content for collaborative learning. *British Journal of Educational Technology, 39*, 987-995. *doi:*10.1080/17439880902759851

Woodrow, J. (1992). The influence of programming training on the computer literacy and attitudes of pre-service teachers. *Journal of Research on Computing in Education, 25*, 200-219. *doi:* 10.1111/*j*.1468-2273.1993.tb01624.x.

Yildirim, S. (2000). Effects of an educational computing course on pre-service and in-service teachers: A discussion and analysis of attitudes and use. *Journal of Research on Computing in Education, 32*(4), 479-495. *doi* 10.1049/el:20020769

Yin, R. (2009). *Case study research: Design and methods* (4thed.). Thousand Oaks, CA: Sage Publishing.

Young, S. (2006). Student views of effective online teaching in higher education. The *American Journal of Distance Education, 20*(2), 65-77. *doi:*10.1207/s15389286ajde2002_1;

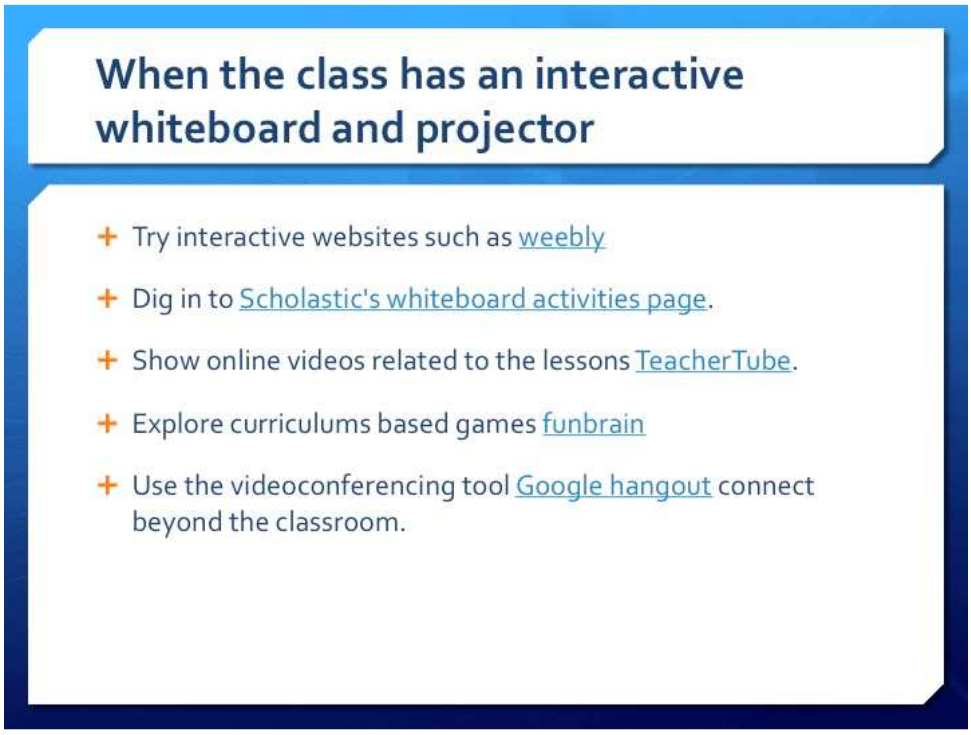
Zhao, Y. ; Cziko. (2001). Teacher adoption of technology: A perceptual control theory perspective. *Journal of Technology and Teacher Education, 9*(1), 5-30 *doi:*10.1007/s10956-007-9084-0

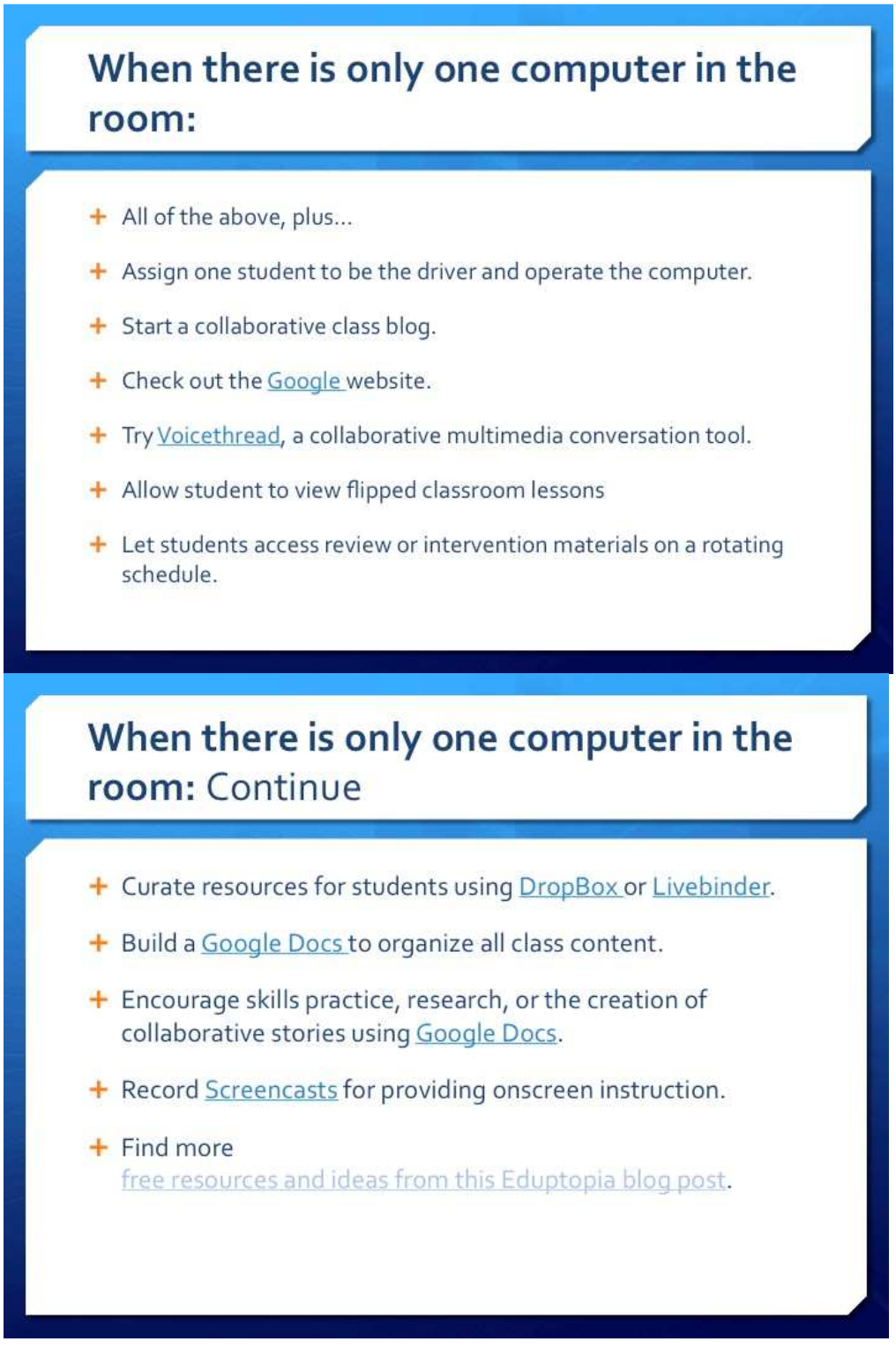
Appendix A: The Project

Training Timetable Sessions

Session 1	**Overview of Professional Learning Communities** • Have teacher login to predetermined URL for video viewing. • Have several teachers give their definition of professional learning communities. • Present collaborative definition of professional learning communities. • Outline upcoming sessions and expectations form teachers. • Exit ticket- Have each teacher email their expectation for professional learning communities.
Session 2	**Understanding Collaboration** • Teachers will report to their previously scheduled grade level/content meeting. • Have teachers discuss benefits of collaboration. • Teachers will participate in a scavenger hunt that will highlight the need for collaboration. • Teachers will reflect on their experiences and identify ways to improve collaboration within their team.
Session 3	**Technology Integration Training** • PowerPoint presentation on tips to integrate technology
Session 4	**Sharing and Collaboration (flipped classroom)** • Teachers will discuss best technology practices that they currently use in class. • Facilitator will provide training on Flipped Classroom Teacher will create and use at least one flipped classroom lesson before next meeting.


Tips to Integrate Technology Into Your Curriculums
Plas Williams Jr.


When the class has an interactive whiteboard and projector
Try interactive websites such as weebly
Dig in to Scholastic's whiteboard activities page.
Show online videos related to the lessons TeacherTube.
Explore curriculums based games funbrain
Use the videoconferencing tool Google hangout connect beyond the classroom.

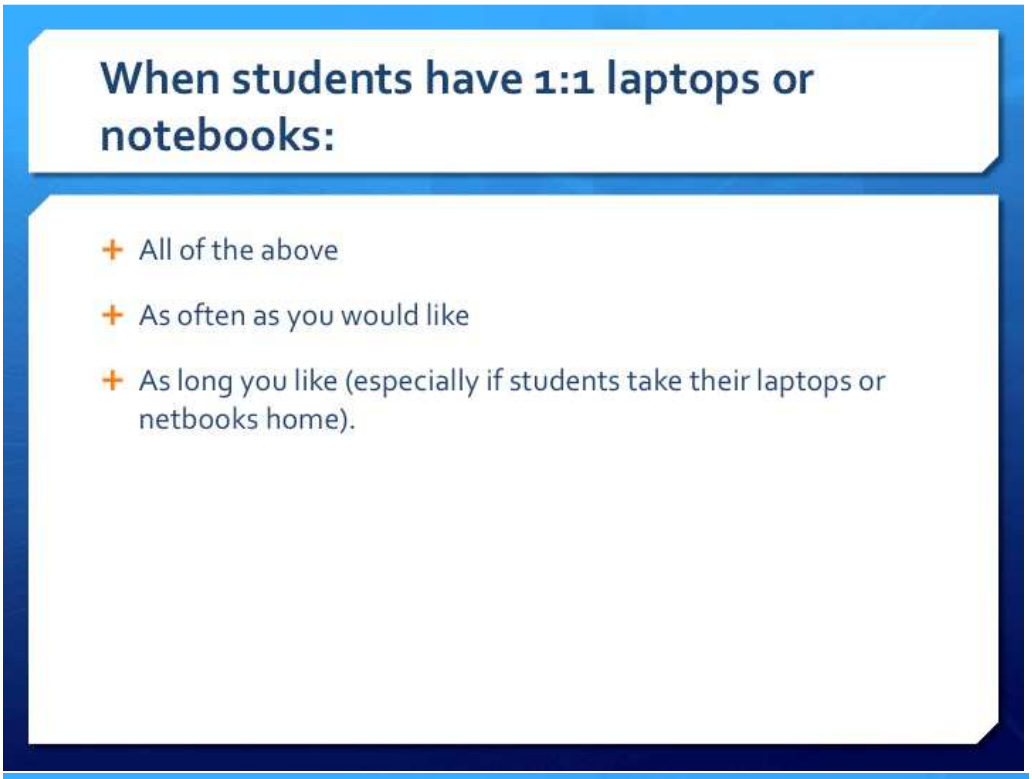

When there is only one computer in the room:
All of the above, plus...
Assign one student to be the driver and operate the computer.
Start a collaborative class blog.
Check out the Google website.
Try Voicethread, a collaborative multimedia conversation tool.
Allow student to view flipped classroom lessons
Let students access review or intervention materials on a rotating schedule.
When there is only one computer in the room: Continue
Curate resources for students using DropBox or Livebinder.
Build a Google Docs to organize all class content.
Encourage skills practice, research, or the creation of collaborative stories using Google Docs.
Record Screencasts for providing onscreen instruction.
Find more free resources and ideas from this Eduptopia blog post.

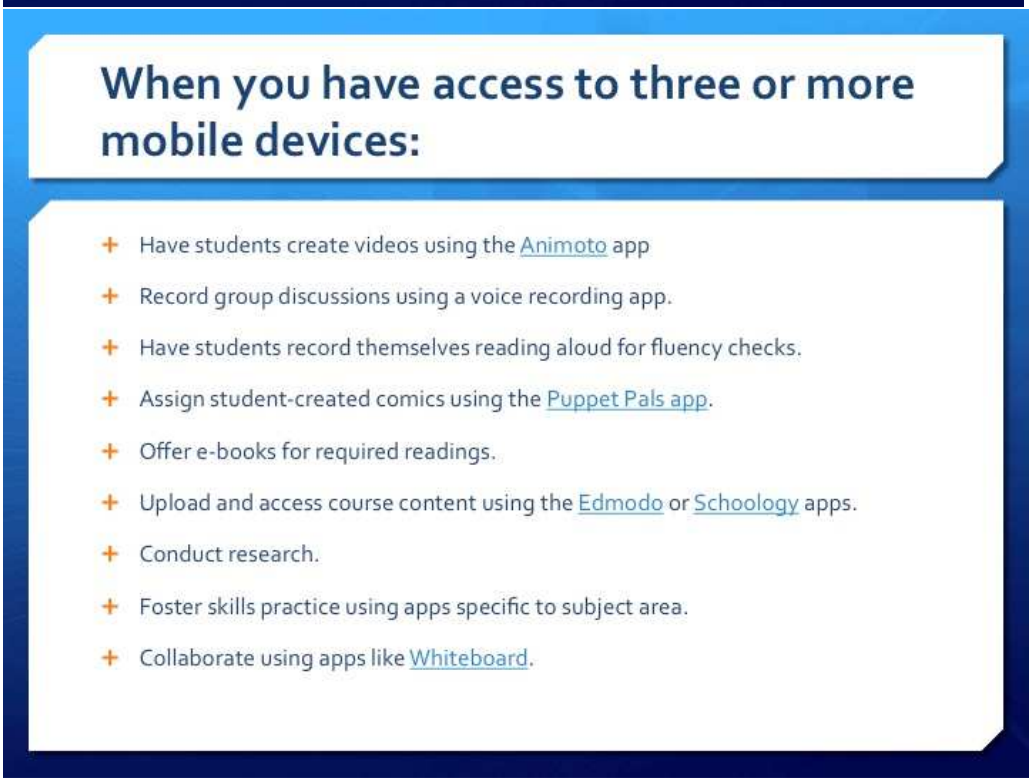
When a pod of three to five computers are available:

- All of the above, plus...
- Encourage individual student blogging using Kidblog.
- Have students create digital stories using Weebly
- Explore student-created multimedia presentations using Microsoft PowerPoint, LibreOffice, Prezi, or Google Docs.
- Use Edmodo, Schoology, or Moodle to manage course content, assignments, and assessments.
- Get the students to create cartoons to illustrate new concepts using ToonDoo.
- Have students make videos using Windows Movie Maker, IMovie or Animoto.
- Build websites with students using Weebly or Wikispaces.

When you have access to a mobile cart or a lab:

- All of the above, plus...
- Enable students to work through course content at their own pace through the use of screencasts, e-books, and other digital media.
- Use Poll Everywhere or Socrative to poll students.
- Start live class discussions with TodaysMeet.
- Explore enhanced digital note taking with Evernote.


When students have 1:1 laptops or notebooks:
All of the above
As often as you would like
As long you like (especially if students take their laptops or netbooks home).


When you have access to three or more mobile devices:
Have students create videos using the Animoto app
Record group discussions using a voice recording app.
Have students record themselves reading aloud for fluency checks.
Assign student-created comics using the Puppet Pals app.
Offer e-books for required readings.
Upload and access course content using the Edmodo or Schoology apps.
Conduct research.
Foster skills practice using apps specific to subject area.
Collaborate using apps like Whiteboard.

When your students to mobile device ratio is 1:1 :

- All of the above, plus...
- Use them as multifunction devices (e.g., e-book readers, calculators, platforms for taking notes).
- Try out a tool like Nearpod to project information onto student devices.
- Check out mobile apps for student polling from Poll Everywhere or Socrative.

Topics: What technology should you use

- When the class has an interactive whiteboard and projector
- When there is only one computer in the room
- When a pod of three to five computers are available
- When you have access to a mobile cart or a lab
- When students have 1:1 laptops or notebooks
- When you have access to three or more mobile devices
- When your students to mobile device ratio is 1:1

Appendix B: STaR Chart

Texas Teacher STaR Chart Summary

9

Using the Texas Teacher STaR Chart, select the cell in each category that best describes your knowledge and skills.
Enter the corresponding number in the chart below using this scale.
1 = Early Tech 2 = Developing Tech 3 = Advanced Tech 4 = Target Tech

Key Area I: Teaching and Learning

TL1 Patterns of Classroom Use	TL2 Frequency/ Design of Instructional Setting Using Digital Content	TL3 Content Area Connections	TL4 Technology Applications (TA) TEKS Implementation (TAC Chapter 26)	TL5 Student Mastery of Technology Applications (TA) TEKS	TL6 Online Learning	*Total

Key Area II: Educator Preparation and Development

EP1 Professional Development Experiences	EP2 Models of Professional Development	EP3 Capabilities of Educators	EP4 Technology Professional Development Participation	EP5 Levels of Understanding and Patterns of Use	EP6 Capabilities of Educators with Online Learning	*Total

Key Area III: Leadership, Administration and Instructional Support

L1 Leadership and Vision	L2 Planning	L3 Instructional Support	L4 Communication and Collaboration	L5 Budget	L6 Leadership and Support for Online Learning	*Total

Key Area IV: Infrastructure for Technology

INF1 Students per Classroom Computers	INF2 Internet Access Connectivity Speed	INF3 Classroom Technology	INF4 Technical Support	INF5 Local Area Network Wide Area Network	INF6 Distance Learning Capacity	*Total

Key Area Summary
Copy your Key Area totals into the rst column below and use the Key Area Rating Range to indicate the Key Area rating for each category.

Key Area	*Key Area Total	Key Area STaR Classi cation	
I. Teaching and Learning	_____	_____	
(6-8 Early Tech	9-14 Developing Tech	15-20 Advanced Tech	21-24 Target Tech)
II. Educator Preparation and Development	_____	_____	
(6-8 Early Tech	9-14 Developing Tech	15-20 Advanced Tech	21-24 Target Tech)
III. Leadership, Administration & Instructional Support	_____	_____	
(6-8 Early Tech	9-14 Developing Tech	15-20 Advanced Tech	21-24 Target Tech)
IV. Infrastructure for Technology	_____	_____	
(6-8 Early Tech	9-14 Developing Tech	15-20 Advanced Tech	21-24 Target Tech)

Teacher Name: _____ County/Campus Number: _____

Campus Name: _____ Completion Date: _____

E-mail: _____ School Year: _____

Check the box which best describes the subject area you teach:

☐ Math ☐ English/Language Arts ☐ Reading ☐ Social Studies ☐ Science ☐ All Subjects
☐ Other _____

Please go to the online Texas Teacher STaR Chart (www.tea.state.tx.us/starchart) to enter your results and print summary reports.

Appendix C: Survey

Formative Assessment Use Scale - Teachers

National Educational Technology Standards for Teachers (NETS-T)

Directions:
Indicate your perception of, the degree to which you feel competent in each NETS-T Standards. Circle the most appropriate number using the scale below.

NETS-T Standard	Level of Competency Low 1 2 3 4 5 High
I. Facilitate and Inspire Student Learning and Creativity - Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments.	
Promote, support, and model creative and innovative thinking and inventiveness.	**1 2 3 4 5**
Engage students in exploring real-world issues and solving authentic problems using digital tools and resources.	**1 2 3 4 5**
Promote student reflection using collaborative tools to reveal and clarify students' conceptual understanding and thinking, planning, and creative process.	**1 2 3 4 5**
Model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments.	**1 2 3 4 5**
II. Design and Develop Digital - Age Learning Experiences and Assessments - Teachers design, develop, and evaluate authentic learning experiences and assessments incorporating contemporary tools and resources to maximize content learning in context and to develop the knowledge, skills, and attitudes identified in the NETS-S.	
Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity.	**1 2 3 4 5**
Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress.	**1 2 3 4 5**

Customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources.	1 2 3 4 5
Provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching.	1 2 3 4 5
III. Model Digital-Age Work and Learning -Teachers exhibit knowledge, skills, and work processes representative of an innovative professional in a global and digital society.	
Demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations.	1 2 3 4 5
Collaborate with students, peers, parents, and community members using digital tools and resources to support student success and innovation.	1 2 3 4 5
Communicate relevant information and ideas effectively to students, parents, and peers using a variety of digital-age media and formats.	1 2 3 4 5
Model and facilitate effective use of current and emerging digital tools to locate, analyze, evaluate, and use information resources to support research and learning.	1 2 3 4 5
IV. Promote and Model Digital Citizenship and Responsibility - Teachers understand local and global societal issues and responsibilities in an evolving digital culture and exhibit legal and ethical behavior in their professional practices.	
Advocate, model, and teach safe, legal, and ethical use of digital information and technology, including respect for copyright intellectual property, and the appropriate documentation of sources.	1 2 3 4 5
V. Engage in Professional Growth and Leadership- Teachers continuously improve their professional practice, model lifelong learning, and exhibit	1 2 3 4 5
Promote and model digital etiquette and responsible social interactions related to the use of technology and information.	1 2 3 4 5
Develop and model cultural understanding and global awareness by engaging with colleagues and students of other cultures using digital-age communication and collaboration tools.	1 2 3 4 5

Standards issued by the International Society for Technology in Education (ISTE), 2008.

Section VI: Open Ended Questions Relating to Formative Assessment

1. Please describe any additional strategies you use to integrate technology into your classroom.
2. Please describe opportunities your students have to use technology in the classroom.
3. Please describe or list technology tools that you typically use ***most*** of the time.
4. Please describe a situation under which you would be likely to integrate technology into your classroom more often

Section VII: Demographics

a. Number of years teaching (combine in-district and out of district): ____
b. What is your rating based on the STaR chart? (check one)
___ Early Tech ___Developing Tech ___Advance Tech ___Target Tech

Technology Staff Development (Please check all Staff Developments you attended)

____ I Xplore trainer 8hrs

____ I Xplore 4hrs

____District staff development day 8 hrs

____ M.S. Excel 2hrs

____ M.S. Word 2hrs

____ M.S. PowerPoint 2hrs

____ Gizmo 4hrs

____ Tablet training 2hrs

____ Scitex Learning 2hrs

_____ Teachscape 2hrs

_____ Share Session 2hrs

_____ Other _____

Thank you for completing this survey, your input is incredibly valuable

Appendix D: Invitation to Participants

Information Letter and Invitation to be Participant in Research

November 25, 2014

Dear Staff:

This letter is an invitation to consider participating in a study I am conducting as part of my Doctoral degree in the Department of Education at Walden University under the supervision of Dr. Ellen McPeek Gilsan. I would like to provide you with more information about this project and what your involvement would entail if you decide to take part.

Despite a Texas School Technology and Readiness (STaR) chart rating of advanced in the focus area of technology infrastructure, [redacted] middle school has not reached the target tech in the three remaining focus areas of the STaR chart. The Texas School Technology and Readiness (STaR) Chart, is an online tool used to help campuses and districts determine their progress toward meeting Federal mandates for technology instruction. Remaining in the developmental stage indicates little to no progress in technology growth.

This mixed method project study aimed to investigate [redacted] middle school teachers' descriptions of their competency in the skills covered by current National Education Technology Standards for Teachers (NETS-T). The study also investigated how [redacted] middle school teachers currently use technology to support their teaching, student learning, situations under which teachers would use more technology, and specific technology trainings teachers have taken. The data for this project was collected through surveys that include a self-report quantitative portion, with a secondary, open-ended qualitative portion. Despite this recognition, [redacted] middle school has remained in the developmental stage in the remaining three focus areas of the Texas School Technology and Readiness (STaR) Chart, which includes:

- Using Technology to Teach and Learn,
- Educator Preparation and Development,
- Leadership, Administration and Instructional Support.

Participation in this study is voluntary. It involved a survey, which will take approximately 10 minutes in length to complete after work hours. You may decline to answer any of the questions if you so wish. Further, you may decide to withdraw from this study at any time without any negative consequences by not completing and turning in the survey. All information you provide is considered completely anonymous. Data collected during this study will be retained for 5 years in locked file cabinet in my home office. There are no known or anticipated risks to you as a participant in this study.

Thank you,
Plas Williams Jr.

Appendix E: Consent Form

CONSENT FORM

You are invited to take part in a research study that will look at which factors affect the use or non-use of computers in classroom instruction by teachers in a technology-rich environment. Teacher attitude, instructional strategies, administrative role, student computer use, and technology training and how all these factors influence effective computer use in a technology-rich classroom will be investigated. The researcher is inviting all classroom teachers who are not under the leadership of the researcher (Plas Williams Jr.) to be in the study. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

This study is being conducted by a researcher named Plas Williams Jr., who is a doctoral student at Walden University. You may already know the researcher as an Assistant Principal, but this study is separate from that role.

Background Information:
The purpose of this study is to explore the status of Campbell middle school efforts towards reaching the goals of the Long Range Plan for Technology (LRPT) and No Child Left Behind.

Procedures:
If you agree to be in this study, you will be asked to:

- complete a one-time questionnaire title ISTE NETS-T survey, which will take approximately 10 minutes to complete.
- print copy of previously completed STaR chart Survey
- make sure there is no identifying information on your survey (so that your anonymity is protected).
- Attach both surveys together
- place the completed survey in a secure drop box in the designated place by the mail box room.

Here are some sample questions:

Directions:
Indicate your perception of, the degree to which you feel competent in each NETS-T Standards. Circle the most appropriate number using the scale below.

	Low				High
I promote, support, and model creative and innovative thinking and inventiveness.	**1**	**2**	**3**	**4**	**5**

I engage students in exploring real-world issues and solving authentic problems using digital tools and resources.	**1**	**2**	**3**	**4**	**5**
I promote student reflection using collaborative tools to reveal and clarify students' conceptual understanding and	**1**	**2**	**3**	**4**	**5**

Voluntary Nature of the Study:
This study is voluntary. Everyone will respect your decision of whether or not you choose to be in the study. No one at Campbell Middle School will treat you differently if you decide not to be in the study. If you decide to participate, all information provided will be anonymous. Including the researcher, no one will know if you actually completed the survey or chose not to participate. If you decide to join the study now, you can still change your mind later. You may stop at any time and not turn your survey in.

Risks and Benefits of Being in the Study:
Being in this type of study involves approximately 10 minutes of your time. Being in this study would not pose risk to your safety or wellbeing. All information obtained in this study will be anonymous.

The outcome of this project study will allow the school to take the necessary steps to add to the bank of knowledge that can help address the lack of technology integration. Educators will be able to create social change by allowing students to experience the use of technology, which will help to catapult them to success within this technology-driven world.

Payment:
No monetary payments or gifts will be provided for research participation.

Privacy:
Any information you provide will be kept anonymous. In this study, no one knows who participated, Your consent is implied through completion of that survey. Data will be kept secure in a locked file cabinet off campus that will only be accessible by Plas Williams Jr. Data will be kept for a period of at least 5 years, as required by the university.

Contacts and Questions:
You may ask any questions you have now. Or if you have questions later, you may contact the researcher. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. . Walden University's approval number for this study is **IRB will enter approval number here** and it expires on **IRB will enter expiration date.**

Please keep this consent form for your records.

Statement of Consent:

I have read the above information and I feel I understand the study well enough to make a decision about my involvement. By returning a completed survey, "I consent," I understand that I am agreeing to the terms described above.
Again, returning the completed survey without any identifying information will serve as your consent to participate in this research.

Appendix F: District Approval

[redacted] Independent School District

[redacted]Middle School

PRINCIPAL
Cheryl T. Henry, Ed.D.

DIR. OF INSTRUCTION
Tracey Bennett

ASSISTANT PRINCIPALS
Jose Lopez
Plas Williams Jr.
Michael Zimmerman

COUNSELORS
Sabrina Barnett
Fiona Brown
Debbie Dinderman

To: Plas Williams Jr.

From: Tracey Bennett

Date: December 5, 2014

Re: Approval of Application to Conduct Research in [redacted] ISD

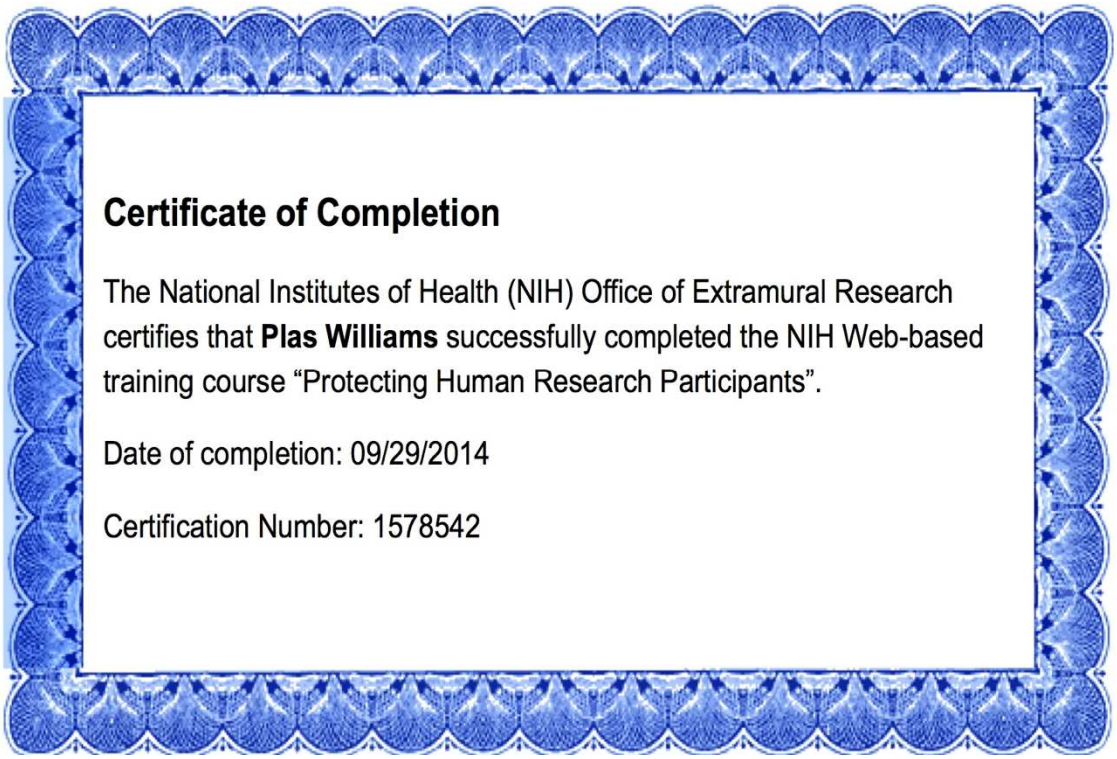
Your request to conduct the following research project in [redacted] ISD was approved on September 5, 2014: A Self-Assessment of a Middle School Campus' Efforts to Effectively Integrate Technology Across the Curriculum.

As you pursue this project, please refer to the updated conditions listed below:

- Keep Dr. Cheryl T. Henry, Principal of [redacted] Middle School, informed of all activities involved with the project.
- I, Tracey Bennett, will continue to serve as your research sponsor, however, I will not have access to any survey instrument.
- You, Plas Williams, Jr., will distribute cover letters and approved consent forms to eligible teachers via teacher mailboxes.
    - Eligible teachers include all teachers who are not appraised by Plas Williams,
- Teachers will return the completed survey instruments to the designated drop box with no identifying information on it. Participants must complete the survey at a time of their convenience.
- Practice confidentiality while conducting the various steps necessary to complete the project.
- Use a random code system to record the student data collected. Never use student names or ID numbers.
- Use a pseudonym instead of the district or campus name in your research.

[redacted]

Appendix G: NIH Certificate



Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Plas Williams** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 09/29/2014

Certification Number: 1578542

Appendix H: Permission

NETST Permission Documents

PERMISSION: TO USE EXISTING SURVEY FORMS

April 19, 13

Dear Dr. Daisy Sam

I am a doctoral student from Walden University Writing my dissertation tentatively titled "A Self-Assessment Of A Middle School Campus' Efforts To Effectively Integrate Technology" under the direction of my dissertation committee chaired by Dr. Ellen McPeek Glisan, Ph.D.

I would like permission to use the NETS-T survey instrument you created in my research study. I would also like permission to make adjustments to the survey to reflect the needs of my research and the changes in technology. The survey (NETS-T) will be used for teachers that will volunteer to take it at one middle school in Cypress Fairbanks ISD in Houston, TX. I hope to administer the survey in the spring of 2014 and conclude by summer 2015. I will use the survey only for my research and will not sell or use it with any compensated or curriculum development activities.

If you have additional questions, please feel free to contact me by email at pwilliamsj@gmail.com or by phone.

Sincerely,
Plas Williams Jr.

Daisy Sam <djsam80@gmail.com> 4/29/13

to me

Dear Mr. Williams Jr.

Congratulations! Please be advise that I am granting only Mr. Pals Williams Jr. permission to use my NETS-T survey instrument. However, please provided me with a copy of your final instrument and findings from the study.

Best,

Daisy Sam

On Fri, Apr 19, 2013 at 8:53 PM, Plas Williams Jr. <pwilliamsj@gmail.com> wrote:

> Thank you for your help