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Survey of Teachers' Use of and Preferences for Professional Development Regarding Available Technology

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2020

Abstract

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MA, Walden University, 2004

BS, Central Michigan University, 1988

Doctoral Study Submitted in Partial Fulfillment

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Abstract

The problem in a medium-sized school district is the lack of data regarding what currently accessible technology and technology learning activities (TLAs) teachers use, have access to, and for which technology and TLAs they desire professional development (PD). There is a gap in practice in that technology directors lack data-based plans for PD. The purpose of this nonexperimental quantitative study was to analyze teachers' ratings of technology access, use, and desire for PD including the correlation between teachers' use of technology and their previous PD hours as well as between teachers' desire to use technology and their location in their different school buildings. Vygotsky's constructivism theory stipulates that teachers construct their perceptions and understanding of technology through engagement. From 300 teachers, 87 responded to email invitations to take the piloted researcher-developed survey. The content and face validity feedback were positive, and the reliability was sufficient with Cronbach's alpha of .621. The results indicated that there was statistically significant correlation at the $p<.05$ level between use of technology and the number of previous PD hours, $r = .298$. There was statistically significant correlation at the $p<.05$ level between a desire for PD and the teachers' location in a school building, $r = .189$. The descriptive results indicated that teachers did not want PD for most of the technology and TLAs, with the exceptions of Virtual Field Trips and Parent Letters. The results of the survey will be disseminated to through a white paper that will serve as resource for the PD instructors. This social change may be district technology coordinators tailoring PD to the teachers' desires from this survey which may increase use of technology in classrooms, which in turn, may increase technology integration that might increase in student learning.

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Thank you to my parents for making everything in my life possible. Thank you to my husband and son, who support me through all my ideas and plans.

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Section 1: The Problem

Introduction

Technology is an integral part of modern life; computers, laptops, and smart phones are in frequent use. Students raised during the last 20 years have been consistently immersed in technologies (Helsper & Eyman, 2010) that include phones, computers, electronic musical equipment, televisions, DVDs, videos, cameras, and game consoles before they even start school (Plowman, McPake, & Stephen, 2010). Varol (2014) states that technology advancements have a considerable influence on educational systems. Despite this influence, it is unclear if technology in schools is sufficiently modern. Schools educate the future adults of society; thus, schools should stay current regarding technological trends and advancements. Instead, some schools are behind. According to President Obama (2014), in his speech *Enhancing Education Through Technology*, "Technology is not a silver bullet. It's only as good as the teachers … using it as one more tool to help inspire, and teach, and work through problems." As technology use in society increases, the need for technologies to be used in the classroom increases (Dagget, 2010). In turn, professional development (PD) for teachers in these new technologies also needs to increase.

In many districts, such as the research site for this study, there are no funds for more technology and funds for increased PD are limited. The problem is that there is no comprehensive information from this medium-sized urban district regarding teachers' technology use and preferences for PD (Technology Director, personal communication, September 2, 2013). In this project study I collected this comprehensive information to

aid the district technology staff in their decisions regarding access to technology and providing PD. Data-based decision-making may increase the use of district-owned technology and enable the delivery of desired professional development, which in turn may also increase the use of technology. New technology can be an improvement, but improving the use of technology the school already has can also be an improvement.

The Local Problem

The problem across this district is the lack of data on what currently accessible technology and technology learning activities (TLAs) teachers use, have access to, and for what activities they want professional development (PD). TLA is a term created for this study that refers to the wide range of interactive student-centered learning activities that are supported by different software, websites, and apps. This needs-assessment will provide the district technology staff with information that will help the staff support teachers to use technology more and to use technology in the service of learning content objectives.

The gap in practice is that district technology staff do not have data-based information for maximizing the district's approximately 300 teachers use of technology and TLAs through the organization of resources and PD (Technology Coordinator, personal communication, September 2, 2013). The context is that in this mid-size urban district, purchasing new technology (released after 2015) is still a luxury, and budget deficits make it unlikely that this will change. Teachers need to make the best use of currently accessible technology, but many teachers do not use the technology that is available to them and do not know what TLAs they could use technology for

(Technology Coordinator, personal communication, September 2, 2013). Encouraging and helping teachers to use TLAs may be one way of increasing teachers' technology use without having to purchase new technology. For example, technology coaches would prefer to educate teachers on how to make use of the advantages of technology, how to integrate technology with the content objectives of lessons, and help teachers use TLAs that may be more worthwhile because TLAs by definition are student-centered. Currently, technology coordinators are frustrated by teacher requests for help to turn worksheets into electronic worksheets, which is not an example of integrating technology (Technology Coach Middle School, personal communication, December 2, 2013). The coordinators would like to show teachers how a TLA could include regularly using textbook supplied software that tracks student progress in a subject area for the teacher and adjusts the difficulty of content based on each students' performance. This software gives the teacher computerized differentiation of the content to fit the individual student's educational levels. To focus attention on the integration of technology, this study asks which TLAs teachers are interested in learning, and which technology the teachers already feel comfortable using. The study will ask teachers specific survey questions about what technology they have access to, what type of TLAs they currently use, and what their desire for PD is for specific technology and TLAs.

The survey (Appendix B) will be useful because it will give the district data that combines common survey questions about access and use of technology from the literature with a section of survey items about TLAs. The combination is useful to the district because it provides not only the traditional basic information about access and

use, but also collects information about technology integration such as the TLAs. Indeed, the final section of the survey includes a list of TLAs, including interactive student-centered uses of technology such as Google Docs cooperative writing tasks. Teachers will indicate for each technology and TLA their use of each and desire for PD in each. The problem is that there is no data to give the technology coordinator of the district an indication of what technology is used, accessed, or what professional development is desired or needed in the district. This data gives the technology coordinator of the district a baseline for current use and a direction for planning PD. The problem that the district does not have data about teacher technology use may be resolved by conducting this survey study. The gap in practice is that technology staff do not currently have the data this study will collect to plan to redistribute available technology to teachers and plan PD that will be helpful to the teachers.

Evidence of the Problem at the Local Level

The problem is that the school district has no comprehensive information regarding teachers' use, access, and desire for PD in terms of technology. Even in the schools in this district that have new technology, the technology coordinator stated that as coordinators they are struggling to help their teachers integrate technology into instruction (personal communication, June 3, 2014). Technology leaders need more information in order to plan efficiently. The Technology Coordinator for the school district (personal communication, June 3, 2014) stated that the district is not sure what to do to help teachers integrate the technology the district has purchased. She continued, "The teachers have state of the art technology, but I never see it used in the classroom"

(Technology Coordinator, personal communication, June 3, 2014). According to the Technology Coordinator (personal communication, June 3, 2014), it does not matter how much technology the teachers have, the technology coordinators believe, but do not have data to support their beliefs, that as technology coordinators they can do a better job of helping teachers use what technology they do have.

This is important information to collect but is heightened by the context of this study, which is that there is no money for new technology and there are few technology coordinators to provide PD. This school district is operating on a budgetary deficit and is on monetary restrictions from the Midwestern state. Since 2013, the district closed approximately eight school buildings due to population loss and budgeting concerns.

Technology access and use. The technology coordinators need a comprehensive view of teachers' technology access and use. According to the middle school technology coach (Technology Coach Middle School, personal communication, November 23, 2012), many teachers across the district are dissatisfied with the technology to which they have access. The teachers in this district are frustrated with the reality of shared interactive whiteboards, a secure Intranet that blocks many websites, and LCD projectors on rolling carts that move whenever a student walks past (two first-year teachers and one second-year teacher, personal communication, September 9, 2012). New teachers report confusion about the technology accessible to them and how to integrate that technology into their lesson activities (two first-year teachers, one second-year teacher, personal communication, September 9, 2012). One new teacher said she was expecting interactive whiteboards in every classroom, unlimited Internet access, projectors mounted on every

ceiling, and the professional development to use them (second-year teacher, personal communication, January 2, 2012). In an informal personal discussion, one new teacher reported that she did not plan for the poor technology in this school district and cannot use many of the ideas she found online (first-year teacher, personal communication, August 10, 2012) because the ideas require technology that she did could not access. For example, in one building, the three teachers with the least seniority have teacher workstation desktops that were bought 10 years ago and are not able to run many of the necessary computer programs or up to date websites (technology lead teacher, personal communication, October 15, 2013). These multiple examples of personal communication are evidence that what is needed is a thorough and systematic accounting of teachers' access and use of each technology to improve situations such as outdated technology and lack of training. In summary, the survey administered in this project study will provide something that the district needs, a current accounting of teachers' perceptions of what technology teachers have access to, how much they want to use each technology, the amount of access they have to each technology, and their preferences to get PD on each technology. With this information, the staff may be able to reorganize existing resources to support teachers better, even if they cannot purchase new equipment.

One specific area where there is evidence of a significant need for support is the use of interactive whiteboards. Most schools in the district have two or three interactive whiteboards that the teachers roll from classroom to classroom as needed. Through discussions with school librarians, (school librarians, personal communication, December 5, 2012), I discovered that in many of the schools, the boards remain idle for the whole

academic year. The interactive whiteboards remain stored in the library or in only one or two teachers' classrooms. Librarians often hear teachers comment that the boards are too difficult to move and hook up. When two or three teachers a week want to use the same board, it is difficult to schedule and physically move the board from room to room. The data collected in this survey may make it possible to improve this situation, for example, by planning a schedule for technical help to move whiteboards. There are a few other areas that are a problem in terms of lack of use. While it is good that through the help of grants, the district was able to purchase interactive whiteboards for every classroom for a couple of school buildings, lack of consistent use may still be a significant problem according to principals who report they are not in use on a consistent basis (elementary principal, personal communication, November 4, 2013). Additional evidence of the problem that teachers may not be using technology is that the district also has student response systems available to teachers, but it appears that they seldom use them (technology lead teacher, personal communication, October 15, 2013). The findings of this study might indicate that teachers want more PD for interactive whiteboards and student response systems. Increase in PD for this technology may lead to an increase in its use.

The problem is that it appears that teachers are not using technology hardware or software, but we do not have sufficient documentation of the problems. For example, technology staff also need data about access to laptops. According to one principal (elementary principal, personal communication, November 4, 2013) her school, like other schools in the district, have over four hundred students and only 72 laptops. These are

distributed among four laptop carts that are available to her staff. The teachers check out the carts to use in their classrooms. A few of the elementary schools have made decisions to have the upper grades use the laptops while the lower grades share one computer lab available in each school. Laptops are valuable for a wide array of reasons, including that textbooks have computer components. Teacher and student access to laptops need to be systematically documented for the district technology staff's use. In summary, the district has issues regarding technology access and use in terms of regular teacher workstations, shared and classroom interactive whiteboards, and laptops.

Technology learning activities (TLAs). The problem of lack of data not only includes teachers use of technology, but the use of TLA's and the integration of the technologies. According to the technology coach, (Technology Coach Middle School, personal communication, January 14, 2013) there is no depth to the integration of technology. A TLA is an in-depth use of technology; an example is when teachers ask students to use features of Google Docs to create papers with pictures or diagrams, share for peer review, and electronically have students submit their work. In contrast, a low-depth use of technology example is when teachers may ask students to complete a worksheet in a Google Doc. Several new teachers express another low-depth use of technology (two first-year teachers, 2 second-year teachers, March 25, 2013), feeling the primary objective of technology use was to use the Internet to discover educational resources. A third example of low-depth technology use is teachers use of interactive whiteboards as a giant touchscreen rather than creating in-depth lessons integrating the interactive whiteboard and connected technologies into lessons. In-depth integrated uses

of technology to achieve learning goals such as the TLAs in this survey need to replace these and other low-depth technology uses.

There are also examples of no-use of technology. A first example is that teachers do not use Google Docs because they do not feel comfortable enough with their training (personal communication, four elementary teachers and five middle school teachers, February 20, 2017). A second example is that teachers do not use the Interactive Whiteboard materials provided with their new series of textbooks (personal communication, four elementary teachers, and five middle school teachers, February 20, 2017). One middle school teacher summed up the four elementary teachers and five Middle School teachers feelings, stating that she feels that her lack of training would make her look inferior to the students (personal communication, fifth-grade teacher, February 20, 2017). This study could identify the PD that teachers want and need regarding TLAs that could support their in-depth integration of technology.

Evidence of the Problem from the Professional Literature

The problem is that the district does not have information about their teachers' technology use, access, and desire for PD. These three issues are also reflected in the professional literature. In terms of increasing technology use, Peck (2012) states that "Technology will not replace teachers, teachers who use technology will replace those who do not" (forward). According to experts, part of the problem is that teachers need to move past using the technology for strictly administrative tasks and move toward integrating technology into the learning process (McCannon & Crews, 2000). According to experts, part of the problem is that teachers' use of technology for student learning

needs to increase past record-keeping (Hammonds, Matherson, Wilson, & Wright, 2013). To use technology, teachers need access to available technology.

The problem in this study there is the lack of data regarding what currently accessible technology and TLAs teachers use, have access to, and for which technology and TLAs they desire PD. In terms of the issue of access, the research is clear that to use technology, teachers often need access. Yet access does not guarantee use. Unal and Ozturk (2012) find that most (66%) of the teachers in their study who have technology in their classroom use it frequently. They also found that the teachers without readily available technology in their rooms stated that lack of easy access is the reason the teachers do not use it. While the placement of equipment is a barrier, some researchers report that a lack of technical support also decreases teacher use of technology (Hammond et al., 2009). Overall, teachers are unlikely to use the technology they have difficulty using. Systematically collecting data on where the difficulties to access technology or technical assistance are needed may improve the technology department's ability to improve the situation. If they know where the problems are, they can develop solutions.

In terms of the issue of using TLAs or integration of technology, the research is clear that teachers need to move beyond basic uses such as typing. Some researchers (Ertmer & Ottenbreit-Leftwich, 2013; Rahman, Zaid, Abdullah, Mohamed, & Aris, 2015; Gibson, Stringer, Cotten, Simoni, O'Neal, & Howell-Moroney, 2013) stress that teachers cannot use technology just for the sake of using technology. Teachers are being asked to use technology in their classrooms but just putting technology in front of students will not

affect student learning if the teachers are not using it with fidelity, reason, and as a part of their teaching (Rahman, Zaid, Abdullah, Mohamed, & Aris, 2015). Johri (2011) discusses that, for technology use to be meaningful, the teachers need to use the structure of regular use, reflecting on and developing teaching with appropriate technology. Gibson et al. (2013) concludes that when teachers have more interventions in their computer use, they become more comfortable with the technology, and therefore are able to support students better; as a result, the students show an increase in their acceptance of technology as a learning tool. There needs to be a reason or theory behind the use of technology in the classroom (Ertmer & Ottenbreit-Leftwich, 2013).

The purpose of this study is to gain a thorough accounting of teachers use, access to, and desire for PD for technology and TLAs. The purpose of determining these correlations is to guide technology staff decision. If there is a positive correlation between PD and technology use, then the department can continue their PD efforts with the knowledge that it increases teacher technology use. If there is a negative correlation then changes to the current PD practices will need to be changed. The correlation between buildings and the teachers' average desire for PD will indicate to the district where to locate the PD sessions because that is where there is the strongest desire. The descriptive statistics and correlation analysis will give the technology staff information to plan their work to meet the needs of teachers. For example, if teachers report sufficient access to interactive whiteboards but a strong desire for PD for interactive whiteboards, this may be a priority area for PD. The problem across this district is the lack of data on currently accessible technology, on access to technology, and use of TLAs and on teacher

preferences for PD. The gap in practice is that the district technology staff do not have data to make plans for maximizing the district's approximately 300 teachers use of technology and TLAs through the organization of resources and PD (technology coordinator, personal communication, September 2, 2013).

Definition of Terms

Technology integration: Technology integration is the use of technology resources such as: computers, interactive whiteboards, smartphones, tablets, digital cameras, social media, software, and the Internet in daily classroom learning practices and management. Successful technology integration is achieved when the use of technology is: (a) routine and transparent; (b) accessible and readily available for the task, (c) supports curricular goals and helping the students to effectively reach their goals (Edutopia, 2011).

Technology tool: This is any hardware or software used in the classroom. In the survey used in this study, technology tools are the hardware and software that are typically used in current classrooms. They include, for example, hardware such as iPads and computers, and software such as Skyward record keeping and the Microsoft Suite.

Technology Learning Activity (TLA): TLA is a term created for this study that refers to the very wide range of interactive student-centered learning activities that are supported by different software, websites, and apps. The third question on the survey used in this study has a list of TLAs, but it is by no means exhaustive. One hallmark of a TLA is that it be integrated to meet the content objectives of a lesson. Interaction with technology can prepare students for learning experiences, but there also needs to be an

educational ingredient to truly influence the students' learning (McManis & Gunnewig, 2012). The ultimate goal is to help teachers use technology more and use technology in the service of learning content objectives with TLAs.

21st century skills: The skills necessary for the 21st-century workplace that generally fall into three categories: cognitive, interpersonal, & intrapersonal. First, the cognitive is critical thinking, analytic reasoning, and how to learn "deeply." Second, interpersonal skill includes teamwork and complex communication. Finally, intrapersonal skill includes attributes such as resiliency and conscientiousness (EdWeek, 2012).

Teacher professional development hours: This refers to the numbers of hours that participants indicate they have participated in professional development.

Overall desire for professional development: This refers to the mean rating that teachers have assigned to all of the questions regarding how much they would like professional development in a group or coaching situation. These will be aggregated for each grade level.

School building: This refers to each individual school building that teachers indicate their classroom is in.

Technology professional development: This refers to professional development workshops that are specific to a type of software or hardware teachers are to use in the classroom.

Teacher's overall use of technology: This refers to time spent using technology.

Grade level: This refers to each grade level K-12 that teachers indicate they teach.

Significance of the Study

The immediate significance of this survey research is that it may provide information that results in data to drive an action plan for the technology staff, which would be a contribution to the local setting. This study could have a significant impact on the district's ability to focus their technology PD on what is necessary and not on educated guessing of what teachers need. Some teachers complain that technology professional development workshops are focused on general skills that are not internalized and used by teachers and are therefore a waste of money. It could be more cost-effective if PD is targeted according to what teachers desire and will put into practice. The district in question has limited funding for professional development. The district is currently deciding what technology professional development to offer teachers, and decisions are random or based on ideas about what teachers may want(Technology Coordinator, personal communication, September 2, 2013). The overall goal of the technology department is to help teachers increase student learning with the use of technology (Technology Coordinator, personal communication, September 2, 2013). Mumtaz (2000) found that over the last two decades, studies show an increase in student achievement through students' use of technology. The targeted technology PD will help teachers bring technology to their students in a productive way and in turn, improve their student's achievement.

Another significant factor of this research is that by focusing on using technology that is currently accessible, an effort can be made toward making the best use of resources possible. This focus would include using TLAs that use technology currently in

the school. The potential long-term significance of this contribution could be an increase in technology access, additional desired PD, and overall technology use

Finally, schools across the country likely lack data on usage, TLAs, and PD, and could potentially use this survey to collect data on their schools to improve their own situations. For example, there is evidence that some districts are rich in technology for their students but cannot find teachers trained in the use of the technology-based activities as an integrated part of the instruction (Singhal, 2013). This survey could help them make data-based decisions on the PD they offer.

In summary, this research is significant to the district because it will identify the problems with access to technology, it will identify any low use that can be increased, and identify the needs and preferences of the type of technology that teachers want to use. Data analysis will also investigate if there are two correlations: if there is a significant positive correlation between technology PD hours and technology use and if there is a significant positive correlation between building and desire for PD. No correlation would have an absolute value of $r < 0.3$, a very weak correlation would be $0.3 < r < 0.5$, a moderate correlation would be $0.5 < r < 0.7$, and a strong correlation would be $r > 0.7$. This information will inform decisions of the technology department for the district as they explore different professional development programs. The survey is an opportunity for the teachers to provide the district with a specific set of teacher needs in regard to technology and their teaching. This is important because by tailoring the professional development to the needs of the teachers, the district may save time and money.

Research Question(s) and Hypotheses

The research questions are to best inform the technology department staff about where they might be able to provide PD to increase the use of technology and TLAs. This survey asks about the teachers' current access, use, and desire for PD for each technology and TLA. The first research question asks how accessible each technology is. This is the most common way to survey teachers about technology. It may be that some technology could be more accessible if technology directors know which buildings are having access problems.

Research Questions 2 and 3 refer to teachers use of and desire for PD for each technology. Questions 4 and 5 refer to use and desire for PD for each TLA. Research Questions 2-5 are designed to guide technology directors' planning for PD to increase use according to teacher desires.

The next two research questions are investigating correlations. The sixth research question is to investigate whether teachers who have had more technology-based training use technology more frequently. If this correlation is positive, then it is more likely that the training efforts that teachers have participated in have increased the use of technology. This is also a commonly asked question for technology surveys. The seventh research question investigates whether there is any correlation between a building and an overall desire for PD. This possible correlation may be used to direct effort toward the buildings that would most desire PD. Finally, Questions 8 and 9 ask for data that will answer a logistical question for the technology department. The data analyses can help

technology coordinators schedule and advertise the most desirable PD in the right building, and design it to focus on a particular grade level.

RQ1. How accessible is each technology tool?

RQ 2. How much do teachers use each technology tool?

RQ 3: How much do teachers want PD for each technology tool?

RQ 4: How much do teachers use each TLA?

RQ 5: How much do teachers want PD for each TLA?

RQ6: Is there a significant positive correlation between teachers' overall use of technology and their hours of technology professional development?

H6o: There is no significant positive correlation between teachers' use of technology and their hours of technology professional development.

H6a: There is a significant positive correlation between the teachers' use of technology and their hours of technology professional development.

RQ 7: Is there a significant positive correlation between teachers' overall desire for PD and their building?

H7o: There is no significant positive correlation between teachers' desire for PD and their *building*.

H7a: There is a significant positive correlation between the teachers' desire for PD and their *building.*

RQ8: For each building and grade level, what are the instructional tools that teachers give the 4.0 or higher mean ratings for desiring PD?

RQ 9: For each building and grade level, what are the TLAs that teachers give 4.0 or higher mean ratings for desiring PD?

Review of Literature

The problem experienced by the study district is the lack of data on what currently accessible technology and TLAs teachers' use, have access to, and what PD they desire. The data will be collected at the building level to determine if there is a correlation between building and desire for PD to locate PD meetings in buildings where there is the most desire. The ultimate goal is to provide the district technology staff with information that will help the staff support teachers to use technology more and to use technology in the service of learning content objectives. The gap in practice is that the district technology staff do not have data to develop plans for maximizing the use of technology and TLAs through the organization of resources and PD (technology coordinator, personal communication, September 2, 2013).

This literature review will begin with a review of the theoretical foundations of this study. Next, I will describe the influence of technology on schools and students, including the changing technologies in the classroom and technology integration and student engagement. Then I will present teachers' preparation to use technology for teaching and learning. Then I will present a review of the literature about teacher efficacy and preparation programs, teacher support and professional development, and technology needs and barriers.

To collect the research for this review, I used EBSCO Host Education databases and used the following search terms: *technology education, technology integration,*

technology activities, technology learning activities, technology professional development, technology needs assessment, educational software programs, and SMARTboard integration. I also combined search terms, looked through reference lists, and used the cited by feature provided by Google Scholar to locate articles that had cited an article I found useful for my study. The following headings organize the literature review: theoretical foundation, the influence of technology on schools, including changing technology and technology integration, and student engagement. The next sections are on teachers; including teacher preparation to use technology, teacher efficacy and preparation programs, teacher support and professional development, and technology needs and barriers.

The focus of the literature review was general use of technology. Recent articles within the last five years are a requirement for the purposes of this dissertation. Unfortunately, many general technology use surveys studies were completed at the beginning of the technology boom in education over ten years ago. In contrast, recent studies focus on a specific type of technology, such as iPads or a specific genre of use, such as writing or math. This literature review has a combination of recent and older articles. The older articles focus on general technology use and I feel these studies give a good overall view of teachers and general technology use. When compared with some of the more recent specific technology and or subject area studies the results are similar and consistent.

Theoretical Foundation

Constructivist learning is defined as constructing knowledge from a multitude of sources in different ways based on each individual's unique experiences and beliefs (Paily, 2013). Constructivism applies to both the student and the teachers, and how technology influences their learning experiences. This study specifically looks at the teachers' learning needs and desires. Constructivism aligns with this study because I assume that teachers do not construct learning from merely having the technology tools. Rather teachers need to experience and interact with technology activities in specific professional development.

Teachers' instruction with technology sometimes results in constructivist learning for students. Mueller and Wood (2012) found that teachers are supportive of technology integration to help with the constructivist ideas, using the terms "authentic tasks" and "self-regulated learning" to describe their technology lessons. Educators today require students to use higher-order thinking skills (HOTS). Though this is an older study, these skills are still incorporated into 21st-century skills and require the students to think in more creative and real-world ways so that they can be competitive in an international workforce (Tucker, 2014). In the past, this might have meant books, textbooks, and information from people in their immediate area. Now, with the use of technology, the world of digitized information is open to students.

As was stated many years ago and still holds true today, digitized information "leads to the evolution of new concepts and innovative teaching techniques in the instruction-learning process, changing the way teachers teach and students learn. This

changing landscape of education focuses on learning, rather than on teaching and pedagogy, curriculum and instruction" (Neo & Neo, 2009, p. 254).

With the assistance of digital technology, students are able to take virtual field trips to other countries, interview scholars around the world, and discover the information they would never have been able to before. This makes each students' learning increasingly constructivist as they each experience different information and resources in their assignments.

One leading theorist of constructivism was Lev Vygotsky. He is considered a social constructivist because of his focus on how society, including people and tools, shape the understanding of the human being (Fosnot, 2013). One concept Vygotsky uses is appropriation, in which a tool gradually became a part of a person's means of interacting with the world, including learning within the world. The teachers in this study are essentially being asked, "What tools have you appropriated already and what tools would you like help appropriating for teaching in your classrooms?" The process of appropriation, according to Vygotsky, depends on many factors including time, the tool itself, the goals for using the tool, and the learner's motivation for using the tool (Daniels, 2016).

Broad Review of the Literature

The Influence of Technology on Schools

Changing technology. The world is becoming a technological playground. New technologies are developing rapidly and changing the way everyone completes even the most fundamental tasks. Twenty-five years ago, when college students needed to conduct

research, they would spend hours in the library going through microfiche and card catalogs to look up journals. Today they use internet searches to download articles. Technology in school includes the internet at students' fingertips, social networking, and moved from a passive environment to a more active technological one (Mattar, 2018) Indeed, in some schools, students have personal technology available to them at all times.

Two article in this paragraph that were written years ago apply to today's schools. Technology has been a part of teaching for many years; many schools have at least a computer lab (Hammonds, et al., 2013). As Hammonds, et al. (2013) pointed out, educators today are dealing with students that are carrying their smartphones, tablets, and other technology with them. In some schools bringing personal laptop computers is allowed, and in other schools laptops are provided to each student. According to Leer and Ivanov (2013) technology in the classroom can manifest itself in many ways, from virtual field trips, online learning, videos, to ways that have not yet been discovered. The use of technology is increasing in schools, but there is a difference between using technology and integrating technology as the technology integration and student engagement section discusses.

When students are given opportunities to learn using technology it may give them a different understanding of technology. Mawson (2010) conducted a study focusing on children's understandings of technology and how this understanding changes over the years. He wants to help teachers develop a better understanding of how students develop their technological construct. Children's understanding of technology could influence the way a teacher teaches. The longitudinal, ethnographic study focuses on students under the

age of 11. It was conducted in two phases. The first phrase follows 20 children through the first three years of primary school. The second phase of the study follows 7 of the 20 students through 3 more years of primary school. Mawson (2010) concludes that the students' technology skills were more advanced than the technology-based lessons he was planning for them. He also concludes that the more technology is integrated into the curriculum, the more the students see how it impacts their lives in and out of school. Mawson concludes that technology was not just a specific tool to do a specific task, but rather, technology is something students can use in other parts of their lives.

Technology is being used as part of innovative instructional techniques such as model-based inquiry. Using technology in the classroom this way can be a means of discovering information in a positive, engaging way. Wilkerson, Andrews, Shaban, Laina, and Gravel (2016) research how pre-service teachers engage in creating lessons using different types of model-based inquiry. The study involved 11 pre-service teachers during a 5-week professional development workshop. Wilkerson et al. (2016) collect data throughout the workshop, including videos of student interactions, assignments, both digital and paper-pencil, and the final project. They found that students creating technological simulations were substantially more engaged than students just creating animations. The students had more in-depth discussions around the simulations over the animations. When creating the simulations, the students did not know how things would turn out, they did not know the outcome, and could change the scenarios. When creating the animations, the students had to create an outcome; it was more straightforward. This type of engagement can be created in the classroom when teachers integrate the

technology with TLAs such as simulations, rather than use it as an administrative tool (Wilkerson, et al, 2016).

Gresnigt, Taconis, van Keulen, Gravemeijer, and Baartman, (2014) were curious to find out the advantages and disadvantages of technology integration on the science curriculum. They conduct a review of recent work and studies done investigating using technology in elementary science classes. Gresnigt, Taconis, van Keulen, Gravemeijer, and Baartman, (2014) were looking for the different successes and issues that arose during the different integration models. The researchers develop a hierarchy or staircase for the different levels of integration. The loser level was referred to as "Isolated/cellular/ fragmented" and the staircase rose through 6 levels to the highest level of "Trandisciplinary" or full integration (Gresnigt, Taconis, van Keulen, Gravemeijer, & Baartman, 2014). As they reviewed past literature, they found that there was not enough to do a thorough analysis. To increase validity, they develop a focus group made up of teachers and other researchers. This focus group gave depth to their empirical base and gave the researchers an insight into classroom practices. The analysis found that the use of technology in the primary science classroom was beneficial. Student engagement was higher, the students understood the content, and were able to apply it in authentic situations. The two main hindrances that Gresnigt, Taconis, van Keulen, Gravemeijer, and Baartman, (2014) found were the results were also highly influenced by teacher efficacy in science and technology and the level of PD workshops needed to help raise teacher efficacy. The more authentic quality PD the teachers have, the more efficacy they show, which in turn was seen in the teachers' use of technology in the science class.

Technology integration and student engagement. Devlin, Feldhous, and Bentrem (2013) conducted a study that can still be useful for today's educator. Technology is commonplace in our schools today, and its use enhances student engagement and learning (Devlin et al., 2013). Devlin et al. implement an action research project that use a concurrent triangulation, mixed-methods design that consist of both qualitative interviews and quantitative survey components. The researchers were curious to find which genre students thought were more engaging and easier to follow when given instructions, in person or through video. The study includes three classes made up of 50 students who were given instructions through video and three classes of 37 students who were given instructions in person. Devlin et al. found students were more engaged when using, listening to, or working with technology. This general observation that students are engaged when using technology was made more specific when Devlin et al. found that students were more thoughtful when given instructions through a video rather than verbally. Furthermore, Devlin et al. found that the students were more inspired to work cooperatively and were determined to do their project well.

Neo and Neo (2009) conduct a research study regarding students' engagement in learning during multi-media use. They want to learn the impact that multi-media has on students learning that were not familiar with the problem-solving design environment. The sample includes 53 students who were all in their second-year of study in a Malaysian University. The students were placed in groups, given the theme of "Malaysian Culture," and asked to develop a multi-media presentation. At the end of the presentation, the students were given a survey asking them to self-reflect on key

components such as motivation, critical-thinking and creativity skills, teamwork, presentation and communication skills, and overall attitudes towards learning with multimedia and developing a multimedia project. Neo and Neo conclude in their study that students were more engaged and motivated when presented with a multi-media assignment. In addition, the students also communicate a higher self-esteem when completing the assignment. As Cranston (2012) emphasized in 2012 but can still be applied today, if teachers embrace the engagement technology incites in students, then the teachers in our schools may be better able to meet the challenges of 21st century technology rich students and classrooms.

Technology engages students, but what is student engagement? Measuring student engagement and technology can be very difficult. Student engagement can be helpful in determining the success or failure of technology integration and their success academically and socially (Henrie, Halverson, & Graham, 2015). Henrieet al. conduct a literature review investigating measuring student engagement and technology. Henrie et al. found that teachers are a critical component to student engagement with technology. The researchers search three dominant educational and technology databases looking for any scholarly journal articles that dealt with student engagement. The reviewers initially end their search with 407 unique articles. After reviewing the initial articles for studies that specifically contained data on measurement of student engagement in an academic setting, the initial 407 studies were narrowed down to 176 publications. Henrie, et al. found that a universal definition of student engagement is necessary. Henrie, et al. also found that due to their ease of use that quantitative, scalable surveys were the most used

measurement. Due to the expense of both time and money student observation was not as common. The reviewers were surprised that systematic reports of student technology use were not as common as they thought. In summary, the research on student engagement needs a consistent definition but it was found that the activity that students are asked to perform by their teachers using technology does affect engagement levels of the students.

Engaging technologies that may integrate into classroom instruction are called TLAs in this project study. There exists a wide variety of software and apps that are considered TLAs in this project study. Concept-mapping apps are one example. Stevenson, Hartmeyer and Bentsen (2017) conducted a thematic review of different concept-mapping (CM) articles and how CM heightens self-regulated learning in science education. The reviewers searched five databases and found seventeen studies that they found relevant. The databases include articles that were outside of the realm of technology and education. They want to make sure they include studies in other genres. Stevenson et al) investigate articles that fit the specific criteria of pertaining to students in elementary and secondary science classes. The reviewers wrote narratives for three domains of self-regulated learning including; cognitive, metacognitive, and motivation strategies. Concerning cognitive strategies, Stevenson et al. found that CM technologies may support cognitive strategies necessary for self-regulated learning. The review reveals that student learning can increase when a clear and concise path of learning is provided. Metacognition processes were improved with the use of technology, including a positive impact of immediate feedback on student performance within the software (Stevenson, Hartmeyer & Bentsen, 2017). In regard to motivation, Stevensonet al. found that

technology did not always have a positive effect on motivation even though it did increase learning. Thus, CM has a positive impact on learning, cognition, and metacognition but not always on motivation.

Another example of a TLA is story mapping technologies. Strachan and Mitchell's (2014) explore whether teachers felt that Ersi Story Maps were useful and engaging teaching tools. The sample included 42 participants, 27 of them were K-12 teachers and another 15 were unofficial instructors. The participants were attending different 2-hour workshops for different subject areas and areas of education. The participants were asked to voluntarily fill out a survey regarding their experience with the story map software at the various workshops. Strachan and Mitchell (2014) found that the participants felt the story mapping software was engaging, helpful, and user-friendly. The participants felt their students would find them useful. Even though they had a positive experience, many participants were reluctant to try the story-mapping software on their own due to nervousness of doing something incorrectly (Strachan & Mitchell, 2014). Some of the barriers to using story maps in the classroom, mentioned by the participants, included lack of technology, school firewalls, lack of training, and lack of time. Strachan and Mitchell reported that a large number of participants mentioned they would integrate these into their lessons after receiving more professional development. Strachan and Mitchell state that it is also important that the leaders of the professional development keep in mind the varying needs of teachers including the level of technology experience and level of content taught by the educators (Strachan & Mitchell, 2014). Overall, the participants appreciate the story mapping software but were reluctant to try to use it

without professional development, specifically about the story mapping software. This may be the case with many TLA; teachers like the idea but need PD.

Computer simulations and virtual realities are one-way technologies used in education. Merchant, Goetz, Keeney-Kennicutt and Davis (2014) conducte a meta-analysis of the research literature to determine to what extent virtual reality-based instruction affect student achievement. They start their review by looking at 7078 articles. These articles were then narrowed down to 102, and then 67 of those studies met the criteria decided on by the researchers. The primary criteria was that a learning outcome measure was the dependent variable in each of the 67 studies. Merchant et al. (2014) found that the literature overall found positive learning outcomes in response to virtual reality-based instruction. Further, they found that compared to virtual reality and simulations, game-based learning was more effective in terms of producing learning outcomes. In addition, learning through games, independent learning was more effective than cooperative group work (Merchant, Goetz, Keeney-Kinnicutt and Davis, 2014). Merchant et al. conclude that virtual reality-based teaching pedagogy creates a positive learning environment, but there are better learning outcomes with independent game-based learning

Changes in teachers' technology integration overtime is hard to study, due to changes in technology, changes in goals of integration, behavioral norms, teaching practices, and conceptual structures but is very important (Hsu, 2017). Hsu re-vamped a survey from an earlier study of grade 1-9 Taiwanese teachers and technology integration. The initial survey was given to 3,729 teachers. Three years later, the second survey was

given to 6000 teachers, some being the same teachers from the first survey. The surveys were not exact in their questions but did measure the same attributes. Hsu found that teachers' integration practices did not change much over time and were based mostly in administrative tasks and or basic integration and use. Hsu also found that the technology the school used did not necessarily keep pace with technology advancements. One thing that did come to light was that there was an increase in teachers' worries about student internet safety and integrity (Hsu, 2017).

Other researchers have attempted to study technology integration across time. They, too, found that just having technology does not guarantee teachers are using it with students. Research has shown that at least for the first two years of a five-year study the majority of teachers use technology for administrative rather than educative tasks. Howard, Chan, Mozejko and Caputi (2015) delve into the difference in technology use and benefits of technology in different subjects. They did a five-year, longitudinal study. Howard et al. developed a 30-item survey (Teacher Technology Practices) looking at a range of common teacher-related and student-related technology tasks. The questionnaire was sent to all secondary teachers in New South Wales, and 300 of these were randomly selected for exploratory factor analysis. As the years progressed, the English teachers reported more planned student technology use as a part of their lessons. Howard et al. found that math teachers were less likely to use technology in their lessons for student learning. The study was extensive, and the researchers conclude that the subject area is a mitigating factor. They also identify influencing factors such as teachers' beliefs in technology, teaching practices, and school administration. Unfortunately, they found that

many teachers use technology for administrative tasks instead of engaging student use of technology for learning.

Teachers may be better able to prepare their students for the knowledge to which they are now exposed and a vast array of places to gather that knowledge. Singhal (2013) concludes that teachers and technology need to work hand-in-hand to prepare the students for the demands of their new global world.

Teacher Preparation to Use Technology

The next few studies are older, but the information and results are important for higher education educators and school districts to consider when developing teacher preparation programs. Future studies could be done to see if these changes suggested have been implemented. How the teachers are prepared to use technology in the classroom is an important aspect of its use. Tondeur et al., (2012) review qualitative studies about how pre-service teachers are prepared for teaching and using instructional technology. The researchers use 19 articles for their study. Tondeur et al. (2012) reveal 12 themes. Seven themes were exclusively about pre-service teachers' preparation and five themes about what is necessary to implement change at the university level. These researchers found that technology education that the pre-service teachers receive at their institutions has a strong impact on the teachers' actual use of technology in their classrooms. They conclude that many of the new teachers agree, the sooner they are exposed to technology at the university level, the better. This was backed by Lopez and Juste (2009) who found that bringing more technology into the actual classes of pre-

service teachers was found to be very helpful in their eventual competencies of technology.

According to Chesley and Jordan (2012), new teachers indicate that their universities did not prepare them well enough for the classroom technology of today. Using two focus groups of about 30 teachers each, the researchers asked each group about their feelings concerning their respective teacher preparation programs and technology. The first group was new teachers from 17 universities that had three months to three years' experience in the classroom. The second group consisted of experienced teachers that have acted as mentors for new and beginning teachers. Chelsey and Jordan also notes that the discrepancy between what technology is taught at the university level and what is the reality of the classroom is high.

In 2004, the University of North Texas was one of four schools nationwide to be a finalist for the award of Distinguished Programs in Teacher Education given out by the Association of Teacher Educators (Christensen & Knezek, 2007). The university earned this distinction by changing the way it taught and integrated technology education into its pre-service teaching curriculum. As a part of the Millennium Project, funded by the US Department of Education's Preparing Tomorrow's Teachers to Use Technology (PT3) program, the university revamped its teacher education classes and the way they were delivered. The initiatives not only revolve around what was presented but how it was presented. These actions include tech guides, Technology Integration Fellows, a Computer Education, and Cognitive Systems class, and a Computers in the Classroom class. The professors also made a concerted effort to model technology in every

classroom with online assignments and syllabi, having classes in a computer lab, and then collecting data. This lead to an increase in the pre-service teachers' technology comfort level before and after their classes (Christensen & Knezek, 2007).

Hammonds, Matherson, Wilson, & Wright (2013) found that newly hired teachers should enter the workplace knowing technologies that can be used to engage students and promote learning. The researchers found that this change in education technique places quite a few demands on teachers. Their data confirms that not only do teachers need to be content developers, data acquirers, data researchers, and behavior management specialists, they also need to be proficient with technology (Hammonds, Matherson, Wilson, & Wright, 2013). In order to evaluate their skills, teachers should ask themselves if they have the following skills: “Have I learned how to teach in a 21st-century classroom, using interactive whiteboards, digital storytelling, social networking sites, blogs, and tweets for instructional purposes?” Chorzempa (2011, p.74).

Darling, Osei-Yaw, and Sheehy (2015), use reports from survey studies and data from prior studies conducted by others to conclude that instructors in K-12, higher education, and corporations need to be at the forefront of technology if they wish for their students to be there also. The two main studies Darling et al. looked at were the Study of the Impact of Technology in Primary Schools (STEPS) and data derived from the survey that ICT in Education that was commissioned by the European Commission Directorate General Communications Networks, Content and Technology to implement. STEPS surveyed primary, lower secondary, and upper secondary level education teachers from 31 countries across the EU28, Iceland, Norway, and Turkey. Darling et al, states that

because technology is what is and will be used in corporations of the present and future, it should be a focus for education. They state, however, that currently, corporations cannot rely on what technology education is provided in K-12 or higher education. Darling et al. suggest that it is up to the business to train and educate their employees on the technology needs of their particular company. How people learn must also be taken into consideration when developing their training (Darling, Osei-Yaw & Sheehy, 2015).

Teacher efficacy and preparation programs. In an older study, Moore-Hayes (2011) conducte a quantitative, descriptive study looking at the relationship between teacher efficacy and technology integration. Even though it is older, the information about teacher efficacy is still relative and important to technlogy integration success. Moore-Hayes gives 350 pre-service and in-service teachers a survey using a six-point Likert scale. The survey also includes an open-ended question. The final results were based upon a response rate of 48%. Moore-Hayes found that teachers will use all aspects of technology in their teaching the more they believe they have the skills to do it (Moore-Hayes, 2011). Teacher efficacy, or the belief in their personal skills, will make a difference in their use of technology in the classroom. This efficacy can be nurtured and built. Teachers need to believe they can use technology properly in the classroom before they use it. Moore-Hayes concluded that the more experience pre-service teachers have with technology, the more they will use it.

Lopez and Juste (2009) conducted a study of pre-service teachers in Spain, analyzing their command of competencies for using technology and how their university training affected these. Lopez and Juste's sample consists of two groups of 106 students

enrolled in the first-year education department Curriculum Design course. The study results were derived from field notebook notes, semi-structured interviews and a survey. The survey consists of two types of questions; 5 point Likert scale questions and open-ended questions. The interview questions were based on the survey answers to generate a more in-depth understanding of the students' perceptions. In their study, Lopez and Juste found that when prepared at the university level, pre-service teachers were happy, felt better about their technological competencies, and had higher motivation. The increased efficacy was because the pre-service teachers could see the connection between their future classrooms lessons and the use of the technology (Lopez & Juste, 2009). They could understand the cohesive nature of the integration(Lopez and Juste, 2009).

How comfortable teachers feel with technology, will make a difference on their use of technology in the classroom (Henriksen, Mehta, & Rosenberg, 2019). Teachers need to feel comfortable with the technology before they will use it. Henriksen et al. conduct a study examining teachers confidence with technology. The 74 teachers were participating in a hybrid technology professional development workshop over the course of a school year. The teachers were given a pre and post survey asking them about their confidence level and use of the technology. Henriksen et al. were concurrently examining a specific type of professional development workshop format. In regards to confidence levels, the researchers found that teachers who were more likely to use technology in their classroom, the more confident they were with it themselves. Henriksen et al. also found that teachers became more confident with technology, the more they used it in their workshops in an activity rather than in seclusion. Teachers will use technology the more

they become confident in it, which comes with using it in context of classroom activities (Henriksen, Mehta, and Rosenberg 2019).

Foulger, Graziano, Schmidt-Crawford, and Slykhuis, (2017) did a study asking the question; what knowledge, skills, and attitudes did pre-service teachers need to succeed with technology. They report that teacher preparation programs currently only require one semester of a technology-focused course for pre-service teachers (Foulger, Graziano, Schmidt-Crawford, & Slykhuis, 2017). The researchers did a study through crowdsourcing of technology-related literature, a Delphi method for expert feedback, and an open call for public comments. Through these, Foulger et al. develope 12 competencies of technology education for pre-service teachers or TETCs (Teacher Educator Technology Competencies). They also conclude that all pre-service teachers should have a required, planned, and continuous level of technology training in all of their university classes. The use of technology should be prevalent and integrated through all university classes, not just in one or two semester classes (Foulger, Graziano, Schmidt-Crawford, & Slykhuis, 2017) The importance of pre-service teacher training in technology is not only seen by districts but also by the department of education which are now using these competencies (Foulger, Graziano, Schmidt-Crawford, and Slykhuis, 2017). They also conclude that these TETCs can be developed in current teachers through professional development workshops.

In education, ICT (Information and Communication Technology) is having a strong impact. With the development of new technologies, teachers are being asked to use technologies they have not been trained to use (Simsek & Sarsar, 2019). Teacher's

use of these technologies plays an important role in the success of the investments districts have made in technology. Simsek and Sarsar examine teachers' views on the competencies of technology integration in education in the context of TPACK-ISTE self-efficacy. The study included 387 secondary and high school teachers from 26 schools, including 15 secondary schools and 11 high schools with the cluster sampling method. The study uses descriptive survey, causal comparison, and correlational survey models. One result that Simsek & Sarsar found was that female teachers' self-efficacy in technology knowledge was lower than male teachers. The male teachers, in regards to technology issues and problems, rated themselves higher. With nine in 10 elementary-school educators being women, and six in 10 secondary educators being women, this is an important issue (Wong, 2019). Simsek & Sarsar also found that teachers that receive inservice training and support use ICT more in the classroom than those teachers that did not receive training and support.

Celik and Yesilyurt (2013) were interested in how different efficacy and attitude factors can affect how teachers use technology. They developed eight hypotheses to test the relationship of these variables: attitude to technology, perceived computer self-efficacy, computer anxiety, and the attitude toward adopting computer supported education. Celik and Yesilyurt developed a relational survey model to present to the teacher candidates in their study. The sample was 471 pre-service teachers attending two universities in Turkey. Celik and Yesilyurt discover that attitude towards technology has a significant and positive effect on the participants perceived self-efficacy, anxiety towards computers and in turn, their technology-supported education. They also conclude

that computer anxiety, technology attitudes, and perceived computer self-efficacy together substantially impact the teachers' attitude toward creating computer-supported learning. Indeed, Celik and Yesilyurt felt the most significant result of this study was that these three factors together were important predictors and unrecognized variables of computer-supported education. The researchers conclude that computer anxiety, technology attitudes, and perceived computer self-efficacy collectively impact the quality of computer-supported education (Celik & Yesilyurt, 2013).

Cuhadar (2018) was interested in finding out how prepared pre-service teachers were in using technology, and what was their exposure to technology use in their college education. Cuhadar uses a survey model to ask 832 senior pre-service teachers, from four universities in Turkey, specific questions about their comfort level of integrating technology in their future lessons and their perceived level of preparedness for these lessons. Six hundred nine of the sample were female and 223 were male, all from various teacher education majors. Cuhadar concludes that pre-service teacher do not feel they receive suitable support and training in technology integration. One of the areas found to be significant in this study was that of the university professors being role-models in the use of technology. The integration of technology was not being modeled in their college classrooms except for when they had a technology assignment. One recommendation made by Cuhadar was that the universities need to re-think their technology education for pre-service teachers and until that is done the PD will now be the responsibility of the hiring school systems.

Research shows that technology integration needs to be integrated into all aspects of pre-service teachers' class experiences and not as a set of skills separate from classroom applications (Foulger, Buss, Wetzel, Lindsey, & Pasquel, 2015). Foulger et al. worked with Arizona State University, the largest teacher credentialing institution in the United States, to examine whether their pre-service teachers are prepared for integrating technology in their future classrooms. Data was collected through an open-ended survey and transcription of the audio of a discussion among three program specialists. The questionnaire was sent to 29 site coordinators and they had a 100% response rate. Foulger et al. found that during their student teaching, the pre-service teachers tried to use the technology but were limited due to access and availability. The pre-service teachers also use the technology mostly for information gathering or content reinforcement. These results are similar to what was found in studies done for current classroom teachers. Foulger et al. conclude that more research needs to be done on why teachers are not using the technology for integration and that it needs to be used in all pre-service classes. By seeing it and using it in all their classes demonstrates integration.

Gudak (2019) conducted a study comparing candidate teachers efficacy in technology with their attitudes towards digital technology. Gudak gave a correlational survey to 102 undergraduate music teacher candidates. The study found that there was a correlation between the candidates teachers self-efficay and their attitude towards digital technology. The higher the candidate teachers self-efficacy in technology, the higher their attitude of digital technology use in the classroom. This was echoed in a study conducted by Ozdamil (2017) who used a mixed-methods study to find the attitudes of candidate

teachers towards future technology use in the classroom. Ozdamil surveyed 275 candidate special education teachers at Near East University. The study found a correlation between the candidate teachers' attitude in their use of technology with their attitude for future use in their classroom.

Though the study is older, it is important to remember what Chorzempa (2011) notes; there is an important need for all teachers to take control of their technology education needs after they graduate. Instead of looking at individual teacher efficacy, one study looks at the social construct of an entire school toward technology use. Indeed, one of the barriers to technology integration can be the social construct of the school and how teachers feel in this social construct (Li & Choi, 2013). The relationship teachers have with each other, administration, and others in their school is an important piece of technology integration. Li and Choi surveyed 1076 teachers from a convenience sample of 130 schools in Hong Kong. The survey contains 30 questions with a 4-point Likert scale. The scale ranges from 1 (strongly disagree) to 4 (strongly agree) assessing teachers' viewpoints on technology integration in their schools. Li and Choi found that social capital of a school can impact the changes necessary for technology integration in teacher's lessons. They conclude that the social capital of a school can affect the way teachers think and feel about technology integration and the effectiveness of professional development. They posited that the social capital of a school can determine whether a technological shift will happen in the teaching of individual teachers (Li & Choi, 2013).

Social capital could be construed as collective teachers' beliefs. Technology integration has been studied in relation to teachers' beliefs by Kim, Kim, Lee, Spector

and DeMeester (2013), who conducted a mixed-methods, exploratory study. Their goal was to discover how teacher beliefs about the essence of knowledge and learning, practices in teaching, and technology integration were all connected. The researchers use the framework of a 4-year professional development project that was working with rural teachers in the southeast United States to improve their technology integration practices. The participants were picked from a pool of 42 teachers that had attended the 4-year professional development. Out of the 42 teachers, 22 were selected based on what they had taught in class during the project and they had participated in at least two of the four years of the project. The data was collected using questionnaires, teacher interviews, and classroom observations. Kim et al. (2013) concludes that teacher beliefs about the essence of knowledge and learning, practices in teaching, and technology integration were all connected. To promote technology integration, teacher's beliefs should be taken into consideration (Kim, Kim, Lee, Spector & DeMeester, 2013).

Support and Professional Development for Teachers

Districts should provide professional development to help teachers as soon as they are hired and for the entire time they are employed to make sure that the teachers are up to date and advancing in technology skills as fast as the students. Smerdon, Cronen, Lanahan, Anderson, Iannotti, and Angeles, (2000) compiled a research report for the National Center for Education Statistics on teacher's use of technology. The data for this report came from three main data sources; The Fast Response Survey System (FRSS), The Current Population Survey (CPS), and the National Association of Educational Progress (NAEP). Smerdon et al. found that technical assistance provided by the district

is significant in the use of technology by teachers. They recommend having a district-level coach or coordinator to work with the teachers on integration of technology into their lessons (Smerdon, Cronen, Lanahan, Anderson, Iannotti, & Angeles, 2000). Though this is an older study, the recommendations are still relevant to this study and the success of technology integration in schools.

Renbarger and Davis (2019) conducted a multiple regression study looking into why new teachers are leaving the profession. This study utilizes the Teaching and Learning International Survey (TALIS) 2013 data created by the Organization for Economic Cooperation and Development (OECD). Though this was an international study, Renbarger and Davis uses the information from the United States teachers. The researchers also use the information from teachers that were in the profession less than 5 years, resulting in a sample of 226 participants. The researchers focus on the impact that barriers to professional development, self-efficacy, and mentoring have on new teachers leaving. Renbarger and Davis found a positive correlation between new teachers' self-efficacy, mentoring, and teachers staying in the profession. The researchers also found that there was a negative correlation between barriers to professional development and the new teachers staying in the profession. When barriers were not addressed and new teachers were not able to have the professional development they needed or wanted they felt unsupported (Renbarger and Davis, 2019). The conclusion was that mentoring was seen as a great support to the new teachers and that addressing the barriers to professional development such as time, availability, and cost would make an impact on keeping new teachers (Renbarger and Davis 2019).

According to Singhavi and Basargekar (2019) teachers use and their acceptance of technology are a pivotal part of the success of technology integration in the classroom. They conducted a study looking into the barriers of this use and acceptance of technology in the classroom. The study uses logistic regression analysis to identify how the willingness to use technology in the classroom can be improved if certain barriers were removed. Singhavi and Basargekar created a questionnaire based on their literature review and sent it out to 515 randomly selected teachers in the greater Mumbai area. The teachers represent grades 5 through 10. The results led the researchers to conclude that many of the technology implementation barriers were outside in nature; insufficient Internet bandwidth, insufficient Internet connected computers, and insufficient software for education. Singhavi and Basargekar also found that internal barriers such as; inadequate skills of the teacher, lack of pedagogical models, inadequate time for the teachers, and lack of flexibility in implementing technology were also barriers. Once these barriers were removed, teachers were more willing to implement technology in their classrooms. Singhavi and Basargekar recommend that to improve technology use in the classroom, school districts should provide training opportunities and encourage teacher participation in these trainings.

Receiving the necessary support is important for technology integration in the classroom. Tondeur, vanBraak, Siddiq, and Scherer (2016) surveyed 688 pre-service teachers in their last year of school in Flanders, Belgium. The researchers wanted to develop a survey instrument to determine perceptions of the scope of their training and support in integrating technology into their classrooms. The participants completed a self-

reporting survey consisting of 24 statements that they rated on a five-point Likert scale from 1 (totally disagree) to 6 (totally agree.) Using the data from the survey, Tondeur et al. developed a scale that can be used to measure effective methods for preparing pre-service teachers for technology integration in their classrooms. They also conclude that scales and questionnaires are an important method in determining the needs and effectiveness of training.

Archer, Savage, Sanghera-Sidhu, Wood, Gottardo, and Chen (2014) examine past studies that investigates technology in education and its effectiveness. The researchers focused on four prior reviews that had been accepted by the scientific community. Out of the original four reviews, one was removed due to missing statistical information the researchers needed for their review. The three subsequent reviews included 38 studies that included computer-based information and communication technologies. Archer et al. discussed the importance of two key instructional points for positive implementation: training and support for the instructors and attention to the fidelity of the technology program. Archer et al. found that the studies reflected the need for continued training and support for instructors implementing the technology. This training and support without the monitoring of fidelity will impede success. Monitoring fidelity and training and support must all be present for optimal results (Archer, Savage, Sanghera-Sidhu, Wood, Gottardo & Chen 2014).

Integration of technology is defined as technology used in teaching and in support of student learning with the ultimate goal of using technology to transform teaching and learning (Peeraer, and Van Petegem, 2012). Professional development may increase

teacher knowledge base of best practices, and change the way they plan, assess, and present their lessons with the integration of technology (Ertmer and Ottenbreit-Leftwich, 2010). Spencer and Smullen (2014) conducted a review of research studies and the impact that technology had on education. Spencer and Smullen argues that teachers may need to be careful with integrating technology. Spencer and Smullen suggests that teachers consider the benefits of including technology in their lessons. Spencer and Smullens' findings suggest to them that in order to have intentional use of technology, teachers may need to come to understand what it means to integrate technology into the lesson rather than just change a lesson plan to include technology. Smullen and Spencer discuss that by changing how you integrate technology in to your lesson plans will also change your philosophy on the integration. One study that Smullen and Spencer cite is by Honan (2012) who guided a small qualitative study on literacy and the teachers' understanding of students' digital use at home. Honan interviews four teachers who taught grade 7 in Australia. Honan felt that if teachers could understand the student's use of digital literacy at home, they could see how it would transfer to the classroom. Honan concludes that teachers and districts need to change and re-think the way teaching is done currently compared to what it could be using digital literacies.

Teacher's input on their wants and needs of technology is very important. Matuk, Gerard, Lim-Breitbart, and Linn (2016) uses a design case study in which the researchers and the participants collaborate to design the best possible instruction. They intentionally want to review how teachers engage in co-design with the researchers, and how it enhances the technology refinements. This five-year study uses design artifacts,

reflections, interviews and observations from 5 yearly 3-4 day WISE workshops. Each workshop includes 10-24 middle and high school science teachers. After every workshop Matuk et al. would conference and go over all of their individual observations and interviews to come to a group consensus. Matuk et al. conclude that is important to good technology design to take into consideration teachers' ideas, educational experiences, and classroom needs. Teachers need to have a voice in what their technology is and how it works. Matuk et al. summarize that it is important for all parties involved in educational technologies to create an environment of learning and engagement for all. By listening to the teachers needs and valuing their expertise, this can be accomplished.

Younger students are being exposed to educational technology and research suggests that teachers need to move past using the technology for strictly administrative tasks and move towards integrating technology into the learning process (McCannon & Crews, 2000). In an older study, McCannon and Crews conducted a quantitative study looking at the technology training needs of elementary teachers. The researchers wanted to look at the access the teachers had to technology, how technology was used, and any training the teachers were exposed to. Due to an influx of funds, the state was buying a considerable amount of computers but training was not very well funded. The researchers sent out 250 surveys to a random sample of elementary teachers, with 127 surveys being returned for a response rate of 50.8%. McCannon and Crews found that 98% of the surveyed teachers had computers in their rooms. They concluded that teachers had the technology and did not have a problem using it for administrative tasks, such as grading, making worksheets, or finding information, but they did not use it as a tool for student

learning. The teachers were not using technology in curriculum integration or presentation enhancement (McCannon & Crews, 2000). McCannon and Crews conclude that teachers indicated that they would like more training on integration practices both at the hardware and software levels. McCannon and Crews discuss that integrating technology into the curriculum as part of the teacher's daily use and as a part of lessons takes educational technology to the next level for student learning. Though this is an older study the reasons for teachers not integrating technology, though they have access, is still relevant today.

Technology Needs and Barriers

The barriers to technology use can be theorized, but Rich, Belikov, Yoshikawa, and Perkins (2018) asked teachers and researched what these barriers are. Rich et al. conducted their study in the second year of a multi-year district implementation of a new technology initiative. The teachers received the technology, professional development workshops, and in-classroom coaching throughout the implementation process. At the end of the second year, the researchers interviewed 17 teachers that had participated in both the first and second year of implementation. After the interviews, Rich et al. coded and organized the responses. The researchers found three main inhibitors: time, changes in the training, and lack of a shared vision, time being the major barrier. The teachers they interviewed mentioned that if it is not on the state test, they do not have time to earn, plan, and implement the technology. Subjects the students were tested on had the teachers' priority (Rich, Belikov, Yoshikawa, and Perkins, 2018).

The drive towards technology integration in the profession is strong but the teachers' level of expertise in using and integrating technology is quite diverse (O'Reilly, 2016). Through an in-depth analyses of different needs assessments used throughout the country and at different educational levels, O'Reilly compiled a list of eight common indicators frequently used in technology needs assessments. These indicators include: self-assessed skill level, technology use and integration, teacher beliefs, barriers to access to technology, professional development resources, leadership, needs and wants, and demographics. O'Reilly concludes that with the influx of technology in schools and the varying levels of teacher competencies needs assessments are a vital data tool. Districts planning for technology integration would benefit from including needs assessments in their overall plan.

One research study looked at the barriers to technology use and found several. Pittman and Gaines (2015) conducted a quantitative research study delving into the use of technology in third, fourth, and fifth grade classrooms. The survey was sent to 218 third, fourth, and fifth grade teachers from 47 pubic school in Florida. Seventy-five surveys were deemed eligible for a response rate of 34%. The researchers found that limited access to technology in the classroom was a problem, even though the school buildings had computers. Schools have increased the number of computers, but just having a computer lab in the building does not make it easier for integration (Pittman & Gaines, 2015). Another barrier was that the professional development offered was not what was needed. The teachers indicated that the amount of PD was sufficient, but the usefulness of the PD was the barrier. The teachers could not use the PD effectively in their classrooms

(Pittman & Gaines, 2015). Pittman and Gaines conclude that more individually tailored professional development, or mentoring opportunities, would be valuable in increasing technology integration in the classrooms.

Teacher attitude can be a limitation to technology use and integration. This attitude is what Luo and Murray (2018) wanted to investigate. They did a study that investigated teachers' attitudes towards online learning and their middle schools 1:1 laptop policy. Luo and Murray wanted to know the teachers' perspective on the initiative and what were some of the problems they saw in the classroom. The researchers' conducted a qualitative study consisting of a transcendental phenomenological approach. Luo and Murray interviewed, surveyed, and observed five teachers from grades 5-8 and two faculty administrators. The teachers in this study were overall very positive with the 1:1 implementation. They were able to see the benefits to the students and their learning. The teachers did feel that technology used all day and in non-structured ways could be detrimental to the students, taking into account their age and inability to always make good choices (Luo and Murray, 2018). Luo and Murray concludes that teachers feeling towards technology also has an impact on the level of integration and use.

Shin (2015) conducted a study on the integration and use of technology in the classroom. Shin wanted to discover what factors influence teachers' use of technology. The study includes a convenience sampling of 31 elementary schools with approximately 20 teachers in each school. Six hundred fifty-nine teachers completed surveys and were included in the study. The surveys included five open-ended questions, which each then had close-ended questions. Shin found that many of the teachers in the study use

technology in their classroom and saw a benefit to using it but did not use it effectively. The teachers use it as a presentation tool such as copying their board notes to a PowerPoint; the only difference was that the notes were on the screen rather than the board (Shin, 2015). Shin concludes that teachers want to use and understand the benefits of technology in the classroom. Teachers would like more administrative and school support in the implementation of technology through professional development and coaching (Shin, 2015).

Critical Summary of Literature

The primary strength of the review is that throughout the range of articles, there were none that show professional development was a negative influence on teacher integration of technology. Indeed, many of the studies teachers put forth that regular PD would help them integrate technology in to their classrooms (An & Reigluth, 2011; Gavis, 2012, Hur, Shannon & Wolf, 2016; Kopcha, 2012; Moore-Hayes, 2011; Wilkerson, Andrews, Shaban, Laina and Gravel, 2016; Tondeur, et al., 2012; Watson, 2006). The basic finding that professional development that is focused and frequent will increase technology integration was found in many strong studies (An and Reigluth, 2011; Gavis, 2012; Hur, Shannon and Wolf, 2016; Kopcha, 2012; Matuk, Gerard, Lim-Breitbart and Linn, 2016; Smerdon, 2000). In fact, there were very few weak studies in this review. The various manners in which the studies in the review were strong is discussed next.

Many of the studies were very strong in that they use both qualitative interviews and quantitative surveys in their studies, thus bringing the strengths of both methodologies to the research. Variation is crucial in surveys because surveys can provide a breadth of a broader range of participants' responses while interviews provide a depth of understanding the reasons and examples underlying participants' responses. For example, Kopcha (2012) uses both surveys of the participants and interview for deeper understanding. Another way to increase the validity of a study is to sample a larger number of the population of interest. For example, An and Reigeluth (2011) and Moore-Hayes (2011) both show strength in their sample sizes, which were 126, with 10.2 average experience level and 350 respectively. Keengwe, Schnellert, and Mills, (2012) was strong in that it includes the students' perspectives on how the use of technology affect their learning in addition to the the teacher's perspective of their own integration and how it affects learning.

There were a few weaknesses found in the studies in this review. For example, Hammond et al. (2009) and Howard, Chan, Mozejko and Caputi (2015) were both longitudinal studies that lost participants throughout the year which weakened their ability to represent the full nature of the changes over time. The primary weakness of the review was due to the timing. Recent articles within the last five years are required for the purposes of this dissertation. Unfortunately, many general technology use surveys studies were completed at the beginning of the technology boom in education over ten years ago. In contrast, recent studies focus on a specific type of technology, such as iPads or a specific genre of use, such as writing or math. As such, this review could have

included many more studies surveying general use of technology if they were more recent. Overall, very few studies were found to have significant weaknesses.

Implications

When teachers believe that what they are doing is right for their students, they will embrace it. Russell, Bebell, O'Dwyer, and O'Connor, (2003) note that as teachers experience their own effective use of technology, that change their beliefs that technology would make a difference. Russell, et al. concludes that this change in belief can be accomplished through exposure to and training in the use of technology. The more comfortable a teacher becomes with technology, the more a teacher will integrate and see its value to the students. As Turel (2014) found, teachers' belief in their ability to use technology affects how often they will use technology in their classroom. The goal of the PD is to help teachers use technology well enough that they feel comfortable enough to use it more often.

One choice that could have been taken for this study would be an evaluation report. The survey did not evaluate a current process or practice, so this was not an option. Another choice might have been a curriculum plan. This would be an option if I was working with a specific content area or technology. This survey is looking for a broad view of access, use, and desire for professional development. The curriculum plan would be an aspect that could be investigated as the coaches bring out different professional development workshops. The project might take the form the researcher working with the technology coach to develop a focused professional development. We would design a focused, specific three-day professional development opportunity for the

teachers and staff of the district. Technology is not transformative on its own. Evidence indicates that when used effectively, student technology use can expand their critical thinking by creating an environment of learning that is based in collaboration and involves real-life problem solving (Means et al., 1993). Instead of focusing on isolated, skills-based uses of technology, schools should promote the use of various technologies for sophisticated problem-solving and information retrieving purposes (Means & Olson, 1995). To fully integrate technology into the classroom, teachers need to be prepared and become digitally literate. The technology coach can take the information from the survey and develop the professional development.

The large implication of this study is that teachers get the PD they want, become more technologically capable teachers, and use technology more often. The direction of this study will be in the form of a policy recommendation. This will have the data generated by this project, presented to the Board of Education and Superintendent in the form of a presentation. I will present my findings in a report and PowerPoint delivered at a board meeting. The findings will include visual tables and graphs presenting the information for all to understand. Depending on the data, new policies for professional development in the district could be developed. The information and data will also be shared with teachers and other stakeholders through smaller presentations at staff meetings or school quality meetings.

Summary

Section one begins with presenting the problem in the district, which is the lack of data on what currently accessible technology and technology learning activities (TLAs) teachers use, have access to, and want for what activities they professional development (PD). The gap in practice is that the Technology Coordinators are unable to currently plan relevant PD because they do not have information on what technology teachers in the district have access to, use, and desire PD for, which would in turn increase their use of the technology. Collecting this information is the purpose of this study. The significance of the study was stated as enabling the technology coordinators to provide wanted PD that ultimately increases the use of technology and may even increase the integration of technology. The above sections of the literature review have reviewed the need for technology, teacher preparation, teacher efficacy, and teacher support. This information supports the use of this survey study to collect information that may provide teachers with the technology PD they want and could increase their technology use. The common theme throughout the literature review was the importance of PD for increasing technology use and technology integration. In Section 2, I describe the methodology of the study, including the research design, the participants, the data collection, and the data analysis methods.

Section 2: The Methodology

Introduction

The research design of this study is a descriptive and correlational quantitative survey. The research design of a study is the map that will help take a study from the vast expanse of ideas to a more precise sense of data retrieval and analysis (Creswell, 2009). Three types of research design that I explore for this study were qualitative, quantitative, and mixed methods. Qualitative models have a more inductive approach or derive their analyses from themes developed from the data. Quantitative models are more of a deductive approach, with relationships being found among variables. The mixed-methods approach combines both the qualitative and quantitative design. The design choice is reliant upon the scheme of the problem, the researcher's background, and the people that would benefit from the study (Creswell, 2009).

Research Design and Approach

The design of my study is a quantitative survey study. I chose a quantitative approach because I wanted to gain insight into the technology use and desires of teachers, in regard to technology, throughout the district. Part of the reason for choosing a quantitative study was due to a large number of teachers in the district a survey was ideal. There were other reasons including the existence of partial surveys from the needs-assessment research of previous years. There was also a need to develop additional questions to update these needs-assessments to include more modern educational technology concerns such as TLAs. A quantitative study is also more statistically powerful with a larger sample. My study will examine the relationship between the

technology available to teachers in their school buildings and the teachers' knowledge and use of this technology.

I did not choose to address the problem using a qualitative approach. I rejected a qualitative study because it would likely involve lengthy interviews and document analyses that would decrease the participant pool to far fewer people than a survey. I did not use a qualitative study because it would be difficult to interview a large number of the district teachers. The large number of teachers and diversity of the sample in terms of grade level and content area would make it difficult to find a representative sample. The research questions are, and data needed, is quantitative as opposed to qualitative. This study will use a quantitative survey to gain a numerical evaluation of the technology access, use, and training desires to make decisions for individual school buildings and the PD to increase technology use. The data needed is specific to how many times teachers use technology, the level of access, and numerical desire for PD. The data collected in a qualitative study would be looking more at why or how teachers feel about technology. Thus, this quantitative survey design is ideal.

Setting and Sample

The research district in this study is an urban, mid-sized city in the Midwest section of the United States. According to the district's website (At A Glance, 2013), the district meets the needs of over 7,623 students in 20 schools, including 11 elementary schools, two middle schools, and three high schools. As the 2013 state school data dashboard states, 83% of the district is economically disadvantaged or at-risk. According to High-Schools.com, 74% of the district's students receive free or reduced lunch in

2013. The district is currently experiencing financial problems due to families physically moving out of the city or choosing to educate their children elsewhere.

The population for this study was all classroom teachers in grades K–12 in the district estimated at approximately 300 (January 2, 2018). The population includes approximately 84 elementary teachers, 60 middle school teachers, 25 special education teachers, 75 high school teachers, and 56 specialty teachers.

The sample size was determined based on the population of all the classroom teachers, approximately 300 teachers. A power analysis was conducted in G-POWER using an alpha of 0.05, a power of 0.80, and a medium effect size ($\rho = 0.3$) for a two-tailed t-test. This means that the significance will have to be above 95%, the power rating was a .80 at a medium effect size level and both the upper and lower tails were considered because the correlation could go either way, in other words, there is no a prior assumptions about the correlations. Because Spearman's rank correlation coefficient is computationally identical to Pearson product-moment coefficient, a power analysis was conducted using software for estimating the power of a Pearson's correlation. According to G-Power, the required sample size was determined to be 82 of the 300 potential respondents. These numbers need a 27% response rate and a 10% response rate is typical for educational research (Walden professor, personal communication, April 2017). The first time the survey was sent out it did not receive enough participants to reach the needed 82 respondents. I then resubmitted to the IRB to send out the survey again. It was approved and I sent it out a second time. The second round of the survey did bring up the number of respondents to a number that was acceptable. It was expected that there would

have been considerable interest in this survey as teachers are very eager to participate in technology PD and the district is determined to improve their technological situation.

Protection of human subjects. Prior to sending out the survey, district approval from the superintendent and technology coordinators was obtained. Then the Walden Institutional Review Board (IRB) was given the letters, the application, and the survey materials for their approval. I was careful to make sure that all procedures were done ethically in order to protect the participants. Once IRB approval was granted, potential participants were contacted to volunteer in the study.

An initial invitation was sent to all teachers in the district a week prior to the distribution of the survey. This message gave the teachers a chance to know what is coming and gather their thoughts. The emails contained the informed consent letter. Teachers clicked on the link to the survey in the informed consent letter and were re-directed to Survey Monkey. They were alerted inside of the survey that their completion of the survey indicated their consent to participate. An online consent and information form were provided to each participant. The information form explained the study, the reasons for the study, information about myself, and the participants' rights of participation. The teachers chose whether they wanted to participate or not. No data was collected about which teachers did or did not take part. All precautions were used to protect participants' rights and privacy. The survey was completely anonymous to protect the participants' rights.

The study does collect grade level and specific school information, but the data analysis does not combine grade level and school in such a way that might lead to an

identification of individuals. The raw data is contained in tables prepared by the researcher, located on a stick drive. The frequency of teachers in each school is noted but does not disclose identities. The raw data are all anonymous and will not be shared with the district and will only be seen by the researcher and possibly by her advising professors.

Instrumentation and Materials

The study is designed as a non-experimental, quantitative survey research. The survey (Appendix B) is a combination of published surveys and items that I wrote to address the specific needs of the district. For example, I modified the technology list for the question: Do you have access to this technology in your building? The list is located in Figure 1. The survey instrument is adapted from an earlier research study "First-year Teachers' Use of Technology: Preparation, Expectations, and Realities" conducted by Strudler, McKinney, Jones, and Quinn (1999). Permission to use this survey is located in Appendix E. The current survey has 100 items for the teachers to assess. Section 1 has eighteen items, section 2 has thirty-nine items, and section 3 has thirty-eight items. The questions from the published survey and the questions I wrote use a 5 point Likert-type scale. The scale ranges from 0 for none to 5 for very much. The activities questions were designed to learn how the teachers are actually using the technology and how technology is being used.

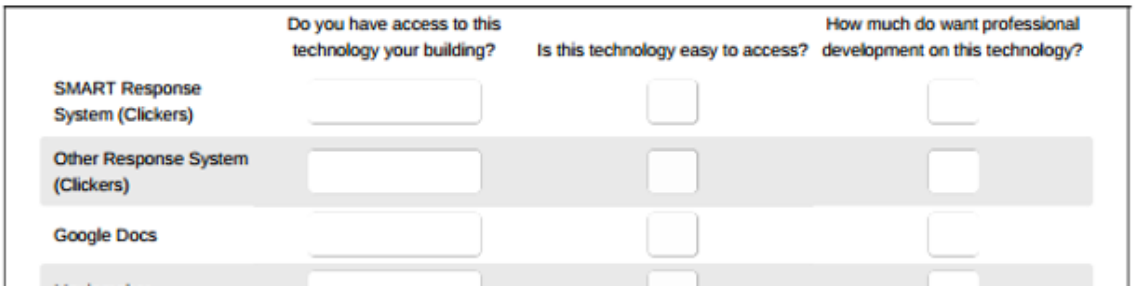

Figure 1. Example of survey questions.

Establishing Survey Validity and Reliability

For the entire survey, face validity and content validity estimates were calculated by using expert analysis. The experts were educational technology professionals within this district: the school district's Technology Coordinator and four of the district's site-based Technology Coaches. These experts are former teachers that have advanced degrees in technology integration. They have also participated in training in coaching and professional development for adult learners. The sample size for the face and content validity estimates were a total of five technology experts chosen for their expertise, which is necessary for construct and face validity. These validity measures do not require high numbers of respondents but rather high levels expertise. The results are explained in the upcoming paragraphs.

Before survey administration, the experts were requested to provide a face validity evaluation of the survey. First, the experts complete the survey as if they were the teacher participants. Second, at the end of each section of the survey, the experts assign a 1-5 rating for how valid the section is for collecting data from teachers. Third, at the end of each section there was a narrative open response box for the experts to write any qualitative assessment of the face validity of the survey.

Once I had all the replies, I did a cursory viewing of each of them. I then began to look for patterns in the surveys and review; what statements were similar, what questions did the experts agree or disagree on, and the experts' overall idea of the survey. They were all in agreement that the survey was a good idea for our district. Nothing to this extent had been done and they all felt it would be helpful for future planning. Expert A and C did not rate each survey question but gave a written response. They both felt the questions were relevant and only had minor suggestions so neither one felt the need to rate each question. They sent me short paragraphs with their information changes.

Four out of five experts felt that question one about access did not need the "desire for professional development" component. I agreed and took that out, leaving just the rating for access. Two of the experts suggested putting together the Google and Microsoft components. This was not changed due to the inherent differences between Microsoft and Google. Google allows the teachers to interact with the students' documents, whereas the Microsoft Office Suite our district uses does not. The components were also kept separate within their platforms. It was felt that teachers may use Word/Docs differently than they use Publisher/Slides or Excel/Sheets. Individual professional development on each of these components was felt to be important. Two of the experts suggested adding Illuminate, a testing platform newly introduced by the district. This was added due to its importance to the teachers and district mandates. After the initial review, two more experts verbally brought forth their suggestions for Illuminate.

Expert E suggested taking out the questions about the SMART Slate. Expert E stated that only one school in the district had this technology and they had ordered it on their own. This was not a districtwide technology, so many of the teachers would not know what it was or have access to it. No other expert recommended this, but it was taken out. Asking teachers about a technology that the district did not provide to all teachers is not what the study is looking for.

To evaluate the content validity of the survey, the experts then took the survey for a second time. They rated on a 1-5 scale, how useful each item was for determining what the professional development needs are of the teachers. This 1-5 scale had 1 as not a useful item, and 5 as a most useful item for determining technology in which teachers would like professional development. The average rating for each item and each section was calculated to provide the concurrent validity information as to whether each item is useful for determining teachers' technology use and needs. I then considered omitting or altering items from the survey. Any of the least valuable items with a mean rating of 1 or 2 were considered for the omission without replacement. Tables were created, grouping experts' average ratings of the items. This preliminary testing with the experts helped create a valid survey.

Reliability estimate were calculated using Cronbach's alpha for the experts' responses in the first administration where they answered questions as if they were teachers. Cronbach's alpha compares how individuals' scores on the same items correspond to one another. The high number of items and the scale of 1-5 increase the likelihood that the estimate of reliability will be more trustworthy. Thus Cronbach's

alpha was also calculated for the larger sample of participating teachers taking the survey. Cronbach's alphas for the 6 questions was .621. Though this is a low number it is still in the acceptable range. The survey was found to be reliable.

Analysis

Data analysis methods started with discussion and explanation of the response rate. According to G-Power, the required sample size was determined to be 82 of the 300 potential respondents. These numbers need a 27% response rate and a 10% response rate is typical for educational research (Walden professor, personal communication, April 2017).The survey had 87 respondents.

The results of the survey are reported using univariate analysis. For each research question, descriptive statistics are reported in tables. For each question, a measure of central tendencies, including the mean, range, and standard deviation are in the tables and discussed in the text. These descriptive statistics describe the basic features and serve as a summary of the data. Descriptive statistics viewed, along with graphs and tables, are the basis of many quantitative analyses of data sets (Trochman, 2006). The descriptive statistics include disaggregation by grade level and buildings. It is impactful to know which buildings use technology more or have a higher knowledge of engagement activities concerning technology. These buildings will be looked at by the district to find out what is working. Conversely, the buildings with small use and/or low efficacy could be considered to decide what changes could be made to better utilize the technology.

As each research question’s descriptive data is noted, the strength and direction of the two hypothesized correlations will be reported. The two correlation hypotheses

investigate if current technology PD has increased technology use and if there is any correlation between building and desire for PD to guide efforts.

Once the participants had completed the survey, I reviewed the preliminary data on Survey Monkey looking for initial trends or disparities. Reviewing the data gave me a chance to just see the overall picture and look for anything particular that stood out. The one thing I found was that not many people wanted PD. The data from Survey Monkey was then downloaded to Excel. Each respondent was given a coded number by the survey collection software to maintain anonymity. Each respondent's data was listed across the Excel document, with each of their scale ratings listed for each question. I organized the data in Excel by research question and survey question. I then calculated the mean, median, and mode of each survey question. I organized the individual survey questions answers by percentages. That data was then put into tables.

Inferential Statistics include the correlations that are used in this study, and are used to provide information beyond the descriptive statistics, providing a powerful tool for quantitative data analyses. To find the answer to the two research questions with hypothesis, all the data was exported from the survey collection software to an Excel document. The mean of each respondents' use of technology on the itemized list was calculated. The mean data was then organized by the hours of technology professional development and building shown for each respondent. A correlation test was then run to look for any significant positive correlations between technology use and prior technology PD workshops or current school building. Correlations are relationships between variables. These relationships can be positive or negative. A negative correlation

$r < 0$ corresponds with a statistically negative relationship between variables. A positive correlation $r > 0$ corresponds with a statistically positive relationship between variables. A zero-correlation $r = 0$ corresponds with no relationship between variables (Statistical Correlations, 2009). Other inferential statistics were discussed, such as, *t* tests, ANOVA, and linear regression but these were not appropriate for this study.

Assumptions, Limitations, Scope and Delimitations

I assumed that this research study was not be able to capture all of the potential PD needs that would increase the teachers' technology use. The survey contains both common uses and TLAs but these are only a small representation of all that is possible. The study also assumes that teachers answer to the best of their abilities and honestly regarding their current use and their desire for PD.

This study is limited by the number of participants that took the time to answer to the survey. Collecting the information from all the teachers would be ideal, but this is not possible in a research study that depends on voluntary participation. This study was also limited to the geographic region and type of school district: a poor urban district with significant challenges.

Results

Introduction

This section will discuss the results of the survey. The survey was sent out to help solve the problem of the lack of data on what currently accessible technology and

technology learning activities (TLAs) teachers use, have access to, and for what activities they want professional development (PD) in the specific district. The survey was developed to answer the following research questions:

RQ1. How accessible is each technology tool?

RQ 2. How much do teachers use each technology tool?

RQ 3: How much do teachers want PD for each technology tool?

RQ 4: How much do teachers use each TLA?

RQ 5: How much do teachers want PD for each TLA?

RQ6: Is there a significant positive correlation between teachers' overall use of technology and their hours of technology professional development?

H6o: There is no significant positive correlation between teachers' use of technology and their hours of technology professional development.

H6a: There is a significant positive correlation between the teachers' use of technology and their hours of technology professional development.

RQ 7: Is there a significant positive correlation between teachers' overall desire for PD and their building?

H7o: There is no significant positive correlation between teachers' desire for PD and their *building*.

H7a: There is a significant positive correlation between the teachers' desire for PD and their *building.*

RQ8: For each building and grade level, what are the instructional tools that teachers give the 4.0 or higher mean ratings for desiring PD?

RQ 9: For each building and grade level, what are the TLAs that teachers give 4.0 or higher mean ratings for desiring PD?

Respondents

The survey was sent out to all the teachers in the district. The teachers had two weeks to complete the survey. At the end of two weeks, there were only 53 completed surveys. According to G-Power, the required sample size was determined to be 82 of the 300 potential respondents. Fifty-Three respondents did not meet the G-Power for the required sample size. Due to this low number, the IRB was contacted for permission to send out the survey one more time. Once permission from the IRB was given the survey was sent out to the teachers again. At the end of two weeks, 87 teachers responded. This number met the needed number of respondents. As illustrated in Table 1 below, out of those 87 respondents the highest number of respondents was from the category of multi-grade level with 13 respondents. There were 11, 3rd grade teachers and 11, 5th grade teachers. There were 8, 1st grade respondents, and 7, 4th grade respondents. Kindergarten, 8th grade, and 11th grade each had 6 respondents. Pre-kindergarten had 5 respondents, 2nd grade had 4 respondents, and 7th grade had 3 respondents. The grade levels of 6th and 9th each had 2 respondents. The least number of respondents was for the 12th grade level with 1 respondent.

Table 1

Number of Respondents per Grade

Grade Level	Number of Participants
Preschool	5

Kindergarten	6
1st	8
2nd	4
3rd	11
4th	7
5th	11
6th	2
7th	3
8th	6
9th	2
10th	2
11th	6
12th	1
Other	13

Totals *N* = 87

Research Question Number 1: How accessible is each technology tool?

This question was rated by participants on a 5 point Likert scale, with 5 being easily accessible and 0 being completely inaccessible. As seen in Table 2, 11 technologies were rated as easily accessible. Google Drive (docs, sheets etc), Skyward and its components (Attendance, Grades, Discipline), Document camera; Microsoft Office and its components (Word, Excel, PPPT, Publisher), Laptop/Chromebook carts for whole class use and the LCD Projector were all easily accessible with 70-88% of participants rating them a 5. There were 16-42% of the participants that rated the

accessibility of the following at a 5: SMART Interactive Whiteboard, Online connections resources that came with textbooks, Smart Notebook (Software on computer), Tests/quizzes resources that came with textbooks, Computer Lab in, school DVD's resources that came with textbooks, and PowerPoint/Presentation resources that came with textbooks had. Moviemaker and PolyCom Video Conferencing station were found to be the most inaccessible with between 60-84% of the participants rating these as a 0 or inaccessible. The research question was regarding what technology are accessible. The analysis illustrated in the table above revealed that all the technology is accessible to the teachers with the exception of the Poly-Com hardware and Moviemaker software.

Table 2

Accessibility Ratings of each Technology Tools

Technology	Ratings					
	0	1	2	3	4	5
Google Drive (docs, sheets etc)	0.00%	0.00%	1.18%	3.53%	8.24%	87.06%
Skyward and its components (Attendance, Grades, Discipline)	1.16%	1.16%	1.16%	4.65%	10.47%	81.40%
Document camera	4.82%	1.20%	1.20%	6.02%	7.23%	79.52%
Microsoft Office and its components (Word, Excel, PPPT, Publisher)	1.18%	0.00%	2.35%	9.41%	14.12%	72.94%
Laptop/Chromebook carts for whole class use	3.53%	3.53%	2.35%	10.59%	8.24%	71.76%
LCD Projector	9.52%	2.38%	2.38%	4.76%	10.71%	70.24%
SMART Interactive Whiteboard	11.76%	3.53%	4.71%	11.76%	16.47%	51.76%
Online connections resources that came with textbooks	12.79%	2.33%	10.47%	11.63%	20.93%	41.86%
Smart Notebook (Software on computer)	19.05%	2.38%	4.76%	15.48%	20.24%	38.10%
Tests/quizzes resources that came with textbooks	10.84%	1.20%	10.84%	19.28%	19.28%	38.55%
Computer Lab in school	21.43%	4.76%	8.33%	10.71%	20.24%	34.52%
DVD's resources that came with textbooks	24.69%	0.00%	11.11%	23.46%	11.11%	29.63%
PowerPoint/Presentation resources that came with textbooks	27.16%	7.41%	8.64%	20.99%	6.17%	29.63%
Interactive whiteboard resources that came with textbooks	34.15%	7.32%	9.76%	21.95%	10.98%	15.85%
Moviemaker	53.09%	8.64%	6.17%	17.28%	4.94%	9.88%
PolyCom Video Conferencing station	60.00%	16.25%	8.75%	8.75%	0.00%	6.25%
SMART or other Response System (Clickers)	0.00%	33.33%	0.00%	0.00%	33.33%	33.33%

Totals N=87 respondents

Research Question Number 2: How much do teachers use each technology tool?

This survey answers for this question were based on a 5 point Likert scale spanning from 0 never use to 5 which is using all aspects deeply. As seen in Table 3, there were several items not used by more than 70% of the teachers. These technologies include Google Classroom basic Blogs/Wikis, Student to student communication: Publish student work on a Web page, Communication with parents: Class Web page, IEP (Easy

IEP), Student to student communication: Creating instructional materials to share, and Smart Exchange (Online resource for teachers). There were several items used by 40-50% of the teachers including: Student inquiry: Web Quests, Video Streaming: Brainpop/Brainpop Jr., Google classroom Posting Homework assignments, Smart Notebook (Software on computer), Google Classroom website Links page, Google Classroom Quiz/Tests, and Google Classroom Calendar.

About 50% of the teachers rated themselves using the following at a frequency level of 3 or higher: Skyward Record keeping: Grades/Discipline/Attendance, Preparation for instruction lesson and unit planning: Finding information, Preparation for instruction, Downloading materials ie: videos or pictures, Creating instructional materials: Worksheets, Communication with parents: Newsletters, Communication with parents: E-mail, and Google Classroom Site. According to the data the teachers are using technology that is mainly focused on record-keeping and lesson planning uses of technology. The analysis revealed that teachers were using the technology tools but in the capacity of record-keeping and lesson planning. This data shows that the teachers are using the tools for creating lessons and using the tools for the students. The teachers are using the technology to add to the textbook lessons and communicate with parents in a digital format. Students are benefitting from the teachers' use of videos and adding information to the lessons from the Internet.

Table 03

Technology Tool Use of Classroom Teachers

Technology Tool	Rating of Use					
	0 (No use)	1	2	3 (Avr.)	4	5 (Use All)
Skyward Record keeping: Grades/Discipline/Attendance	5.81%	0.00%	3.49%	18.60%	22.09%	50.00%
Preparation for instruction lesson and unit planning : Finding information	3.49%	4.65%	3.49%	31.40%	26.74%	30.23%
Preparation for instruction Downloading materials ie: videos or pictures	3.49%	5.81%	9.30%	32.56%	23.26%	25.58%
Creating instructional materials: Worksheets	12.79%	2.33%	6.98%	37.21%	19.77%	20.93%
Communication with parents: Newsletters	33.33%	6.90%	2.30%	29.89%	8.05%	19.54%
Communication with parents: E-mail	13.79%	13.79%	11.49%	34.48%	8.05%	18.39%
Google Classroom Site	35.63%	4.60%	5.75%	16.09%	21.84%	16.09%
Communication with parents: Attendance	31.40%	12.79%	11.63%	24.42%	6.98%	12.79%
IEP (Easy IEP)	72.94%	4.71%	0.00%	4.71%	4.71%	12.94%
Classroom management and/or incentives for students Reward for completed work	36.05%	5.81%	6.98%	27.91%	12.79%	10.47%
Teacher-student communications: Google Docs for revisions	43.68%	5.75%	13.79%	21.84%	6.90%	8.05%
Creating instructional materials: Readings	25.58%	10.47%	12.79%	33.72%	9.30%	8.14%
Other Online practice	18.60%	6.98%	8.14%	44.19%	13.95%	8.14%
Teacher-student communications: Teacher Posting schedules/due dates	48.28%	8.05%	11.49%	14.94%	10.34%	6.90%
Core curriculum skills development Drill and practice (Such as Math Blaster, Reader Rabbit, Starfall etc.)	27.91%	6.98%	5.81%	38.37%	13.95%	6.98%
Video Streaming: Discovery Education	26.74%	12.79%	13.95%	23.26%	16.28%	6.98%
Video Streaming: You Tube	6.98%	5.81%	12.79%	40.70%	26.74%	6.98%
Video Streaming: Brainpop/Brainpop Jr.	59.30%	10.47%	8.14%	9.30%	5.81%	6.98%
Google Classroom website Links page	53.49%	5.81%	10.47%	15.12%	9.30%	5.81%
Student inquiry: Student research using Internet	19.77%	11.63%	13.95%	36.05%	12.79%	5.81%
Google Classroom Calendar	50.57%	12.64%	9.20%	18.39%	4.60%	4.60%
Google classroom Posting Homework assignments	56.32%	1.15%	6.90%	14.94%	16.09%	4.60%
Video Streaming: Teacher Tube	47.67%	10.47%	9.30%	19.77%	8.14%	4.65%
Communication with parents: Class Web page	78.16%	5.75%	5.75%	4.60%	2.30%	3.45%
Teacher-student communications:Teacher Creating Posters/signs	44.83%	6.90%	5.75%	31.03%	8.05%	3.45%
Google Classroom Quiz/Tests	50.57%	6.90%	9.20%	16.09%	13.79%	3.45%
Illuminate	21.18%	16.47%	23.53%	29.41%	5.88%	3.53%

Table 03 continued

Technology Tool	Rating of Use 0 (No use)	1	2	3 (Avr.)	4	5 (Use All)
Smart Notebook	55.81%	13.95%	12.79%	11.63%	3.49%	2.33%
Teacher-student communications: Online response to written work	40.23%	5.75%	13.79%	22.99%	16.09%	1.15%
Student to student communication: Creating instructional materials to share	70.59%	12.94%	5.88%	7.06%	2.35%	1.18%
Student inquiry: Web Quests	67.44%	10.47%	5.81%	12.79%	2.33%	1.16%
Google Classroom basic Blogs/Wikis	83.91%	5.75%	6.90%	3.45%	0.00%	0.00%
Smart Exchange (Online resource for teachers)	69.77%	6.98%	11.63%	8.14%	3.49%	0.00%
Student to student communication: Publish student work on a Web page	84.71%	7.06%	4.71%	3.53%	0.00%	0.00%

Research Question Number 3: How much do teachers want PD for each technology tool?

This question asks the teachers to rate their desire for professional development on a 5 point Likert Scale: 0 being no professional development desired, to having a great desire for professional development being rated a 5. As seen in Table 4, only two technology tools had 50% or more of the teachers rate the tool a 3 or higher for desired PD. The tools are Communication with parents: Class Web page and Illuminate. Google Classroom site had 43% of the teachers rate their desire at a 3 or higher. Except for the tool Google Classroom Site, over 40% of the teachers rated the desire for professional development on the other technology tools as a 0. These overall low numbers are surprising and reflect that only a small number of teachers want technology professional

development on most of these tools. It is important to address the needs of the teachers that desire professional development, even though it is a small number overall. The analysis revealed that the answer to the research question is that teachers do want specific PD workshops in the areas of Communication with parents: Class Web page and Illuminate and Google Classroom.

Table 04

Teachers Desire for Professional Development in Specific Technology Tools

Technology Tool	Desire for Professional Development					
	0	1	2	3	4	5
Communication with parents: Class Web page	41.89%	10.81%	8.11%	12.16%	4.05%	22.97%
Illuminate	32.39%	11.27%	8.45%	18.31%	9.86%	19.72%
Smart Exchange (Online resource for teachers)	41.67%	8.33%	6.94%	13.89%	12.50%	16.67%
Google Classroom Site	35.14%	10.81%	10.81%	18.92%	10.81%	13.51%
Google Classroom website Links page	50.70%	2.82%	9.86%	15.49%	7.04%	14.08%
Teacher-student communications:Teacher Creating Posters/signs	52.70%	4.05%	13.51%	13.51%	4.05%	12.16%
Google Classroom Calendar	42.25%	4.23%	12.68%	14.08%	14.08%	12.68%
Smart Notebook (Software on computer)	52.86%	5.71%	11.43%	15.71%	2.86%	11.43%
Classroom management and/or incentives for students Reward for completed work	54.29%	5.71%	5.71%	12.86%	11.43%	10.00%
Student to student communication: Creating instructional materials to share	54.41%	8.82%	8.82%	11.76%	5.88%	10.29%

Student inquiry: Student research using Internet	47.83%	5.80%	8.70%	20.29%	7.25%	10.14%
Video Streaming: Teacher Tube	46.38%	15.94%	10.14%	11.59%	5.80%	10.14%
Google classroom Posting Homework assignments	57.75%	8.45%	9.86%	14.08%	1.41%	8.45%
Preparation for instruction Downloading materials ie: videos or pictures	52.24%	8.96%	5.97%	16.42%	7.46%	8.96%
Creating instructional materials: Readings	52.17%	4.35%	11.59%	15.94%	7.25%	8.70%

Technology Tool	Desire for Professional Development					
	0	1	2	3	4	5
Student inquiry: Web Quests	44.12%	5.88%	10.29%	11.76%	19.12%	8.82%
Video Streaming: Discovery Education	47.83%	11.59%	10.14%	10.14%	11.59%	8.70%
Teacher-student communications: Teacher Posting schedules/due dates	59.15%	9.86%	11.27%	8.45%	4.23%	7.04%
Google Classroom basic Blogs/Wikis	51.43%	5.71%	11.43%	14.29%	10.00%	7.14%
Google Classroom Quiz/Tests	43.66%	5.63%	14.08%	22.54%	7.04%	7.04%
Other Online practice	47.06%	11.76%	5.88%	20.59%	7.35%	7.35%
Communication with parents: E-mail	70.83%	11.11%	5.56%	2.78%	4.17%	5.56%
Teacher-student communications: Online response to written work	47.89%	11.27%	9.86%	19.72%	5.63%	5.63%
Teacher-student communications: Google Docs for revisions	49.30%	7.04%	15.49%	15.49%	7.04%	5.63%
Preparation for instruction lesson and unit planning : Finding information	53.62%	5.80%	5.80%	23.19%	5.80%	5.80%
Student to student communication: Publish student work on a Web page	54.41%	5.88%	2.94%	16.18%	14.71%	5.88%

Core curriculum skills development Drill and practice (Such as Math Blaster, Reader Rabbit, Starfall etc.)	52.94%	8.82%	7.35%	16.18%	8.82%	5.88%
Video Streaming: Brainpop/Brainpop Jr.	59.42%	10.14%	10.14%	8.70%	5.80%	5.80%

Table 04 continued

Technology Tool	Desire for Professional Development					
	0	1	2	3	4	5
Communication with parents: Newsletters	67.12%	6.85%	5.48%	10.96%	5.48%	4.11%
Skyward Record keeping: Grades/Discipline/Attendance	52.86%	14.29%	7.14%	14.29%	7.14%	4.29%
Communication with parents: Attendance	74.65%	7.04%	2.82%	8.45%	4.23%	2.82%
IEP (Easy IEP)	76.47%	2.94%	2.94%	11.76%	2.94%	2.94%
Creating instructional materials: Worksheets	51.43%	4.29%	10.00%	21.43%	10.00%	2.86%
Video Streaming: You Tube	58.82%	7.35%	13.24%	13.24%	5.88%	1.47%

Research Question Number 4: How much do teachers use each TLA?

This question was rated by participants on a 5 point Likert scale, with 5 being using all aspects deeply in the classroom and 0 being not used at all in regular classroom practice. Table 5 shows the listed TLA's and the percentage of respondents that rated these a 0 or used not all in regular classroom practice. The TLA section indicated that very few teachers are using technology with the students. Using technology with the students means having the students interact with the technology themselves such as; students working on the Internet finding their information or students working in cooperative groups putting together a presentation on what they are learning or any other student use of technology. A large percentage of participants report that they were not using student expression software such as student-made videos (82.5%) or are not having students

make Prezi or Powerpoints (95%). Many of the teachers are also not using student to student communication (83%, or any creation software (80%). Research has shown (Howard & Mozejko, 2015) that teachers do not use technology for many reasons including lack of efficacy in their abilities, the belief that change is not embraced by the district, and that this initiative shall pass. These TLAs are not used by teachers. Out of the thirty-eight listed TLA's in the survey, twenty-four of TLAs are not used at all in regular classroom practice. Only 1 TLA, Tests/quizzes using student resources that came with textbooks, was rated by 50% of the teachers as a 3 or higher on the Likert Scale. Twenty-four out of thirty-eight TLAs being used means that the teachers are currently only using 37% of the listed TLAs in the survey. The analysis revealed that the answer to the research question is that teachers use TLAs in the classroom in limited ways chiefly for tests and quizzes. Twenty-four of the 38 listed TLAs are not being used by teachers.

Table 05

TLAs Not Used by teachers

Technology Tool	Percentage of teacher's not using TLA
Prezi Presentation: Filed Trip Review with pictures	95.35
Video Conferencing (Polycom/Skype): other classes in district	95.29
Video Conferencing (Polycom/Skype): Classes outside the district	95.24
Video Conferencing (Polycom/Skype): Virtual Field Trips	92.94
Video Conferencing (Polycom/Skype): Conferencing with experts in their field	91.76
Microsoft Publisher: Student made newspapers	91.76
Microsoft Publisher: Student made books	91.76
Prezi Presentation: Student use to show step by step math problem-solving techniques	89.53
Google Slides: Student use to show step by step math problem-solving techniques	89.41

Microsoft PowerPoint: Student use to show step by step math problem-solving techniques	87.06
Microsoft PowerPoint: Field trip review with pictures and comments	85.88
Google Slides: Field Trip review with pictures and comments	85.71
Microsoft Excel: Student made spreadsheets	84.71
Student Expression: Hyperstudio, Moviemaker, Prezi	82.56
Student to Student Communication: E-group projects	83.53
Google Sheets: Student made spreadsheets	83.53
Google Sheets: Student made graphs	81.18
Google Docs: Student creating newspapers or newsletters with pics	80.00
Microsoft Excel: Students making graphs	79.76
Microsoft Word: Student revision tracking and comments	78.57
Microsoft Word: Students creating newspapers or newsletters with pictures	76.47
Microsoft Publisher: Student made brochures	75.29
Microsoft Publisher: Basic student assignments (posters/signs)	73.81
Microsoft Word: Student to student editing	71.76

Research Question Number 5: How much do teachers want PD for each TLA?

This question had the teachers rate their desire for professional development on a 5 point Likert Scale, 0 being no professional development desired, to having a great desire for professional development being rated a 5. As seen in Table 6, Video Conferencing (Polycom/Skype): Virtual Field Trips was the only TLA that more than 50% of the teachers rated a 3 or higher, meaning they had a high desire for PD in that TLA. The rest of the TLAs were rated, by more than 50% of the teachers, as a 0,1, or 2, showing a low level of desire for technology professional development in TLAs. Currently the teachers are only using 34% of the listed TLAs and out of the 63% they do not use they only want PD workshops for one TLA. The analysis revealed that the answer to the research question is the desire for PD workshops in TLAs is low. Teachers have a

low desire for PD workshops in TLAs. The one TLA they did have a desire for PD workshops was virtual field trips with that item rated a 3 or higher by more than 50% of the teachers

Table 06

Teacher Desire for TLA Professional Development

TLA	Desire for Professional Development					
	0	1	2	3	4	5
Video Conferencing (Polycom/Skype): Virtual Field Trips	31.43%	1.43%	10.00%	17.14%	17.14%	22.86%
SMART board materials Interactive: Whiteboard student use	42.03%	7.25%	11.59%	15.94%	10.14%	13.04%
Development of basic computer skills: Keyboarding	53.62%	11.59%	2.90%	14.49%	4.35%	13.04%
Video Conferencing (Polycom/Skype): Conferencing with experts in their field	41.79%	5.97%	17.91%	11.94%	11.94%	10.45%
Student Expression: Hyperstudio, Moviemaker, Prezi	33.33%	4.35%	13.04%	18.84%	20.29%	10.14%
Interactive whiteboard resources: using student resources that came with textbooks	52.24%	7.46%	7.46%	16.42%	7.46%	8.96%
Google Sheets: Student made spreadsheets	54.55%	3.03%	18.18%	9.09%	6.06%	9.09%
Microsoft Word: Students Creating newspapers or newsletters with pictures	61.19%	1.49%	7.46%	13.43%	8.96%	7.46%
Google Docs: Student Revision tracking and comments	52.24%	4.48%	14.93%	13.43%	7.46%	7.46%
Google Sheets: Students making graphs	45.45%	1.52%	16.67%	18.18%	10.61%	7.58%
Google Slides: Student use to show step by step math problem-solving techniques	59.09%	4.55%	7.58%	12.12%	9.09%	7.58%
Video Conferencing (Polycom/Skype):Conferencing with other classes in district	51.43%	8.57%	5.71%	20.00%	8.57%	5.71%
Development of basic computer skills: Mouse skills	76.47%	7.35%	4.41%	5.88%	0.00%	5.88%
Microsoft Word: Student Revision tracking and comments	61.19%	5.97%	8.96%	8.96%	8.96%	5.97%
Google Docs: Basic student assignments	53.03%	6.06%	12.12%	12.12%	10.61%	6.06%
Google Slides: Field trip review with pictures and comments about what was learned.	60.00%	4.62%	13.85%	6.15%	9.23%	6.15%
Prezi Presentation: Student use to show step by step math problem solving techniques	47.06%	1.47%	16.18%	14.71%	14.71%	5.88%

Video Conferencing (Polycom/Skype): Conferencing with other classes out of district	45.59%	11.76%	7.35%	20.59%	10.29%	4.41%
PowerPoint: using student resources that came with textbooks	65.15%	6.06%	9.09%	13.64%	1.52%	4.55%
Online connections using student resources that came with textbooks	54.55%	10.61%	7.58%	18.18%	4.55%	4.55%
Microsoft Word: Basic student assignments	66.18%	7.35%	10.29%	10.29%	1.47%	4.41%
Microsoft Publisher: Basic Student assignments (poster/sign)	61.19%	8.96%	5.97%	17.91%	1.49%	4.48%
Microsoft Publisher: Student made brochures	56.72%	5.97%	7.46%	22.39%	2.99%	4.48%
Microsoft Publisher: Student made books to print for library	60.61%	4.55%	9.09%	16.67%	4.55%	4.55%
Microsoft Publisher: Student made newspaper	62.12%	3.03%	6.06%	15.15%	9.09%	4.55%
Microsoft Excel: Students making graphs	56.06%	1.52%	12.12%	19.70%	6.06%	4.55%
Microsoft Power Point: Student use to show step by step math problem solving techniques	66.18%	0.00%	10.29%	10.29%	8.82%	4.41%
Google Docs: Student to student editing	46.97%	9.09%	7.58%	19.70%	12.12%	4.55%
Google Docs: Students Creating newspapers or newsletters with pics.	48.48%	6.06%	10.61%	21.21%	9.09%	4.55%
Microsoft Word: Student to student editing	64.18%	7.46%	8.96%	11.94%	4.48%	2.99%
Microsoft Excel: Student made spreadsheets	60.29%	4.41%	14.71%	13.24%	4.41%	2.94%
Google Slides: Student use for presentations	46.97%	10.61%	10.61%	21.21%	7.58%	3.03%
Student to Student Communication: E-Group Projects	56.72%	7.46%	7.46%	16.42%	8.96%	2.99%
Prezi Presentation: Field trip review with pictures and comments about what was learned.	54.29%	7.14%	8.57%	10.00%	17.14%	2.86%
Tests/quizzes using student resources that came with textbooks	57.97%	13.04%	11.59%	10.14%	5.80%	1.45%
DVD's using student resources that came with textbooks	69.23%	7.69%	10.77%	7.69%	3.08%	1.54%
Microsoft Power Point: Student use for presentations	60.29%	5.88%	14.71%	11.76%	5.88%	1.47%

Research Question Number 6: Is there a significant positive correlation between teachers' overall use of technology and their hours of technology professional development?

H6o: There is no significant positive correlation between teachers' use of technology and their hours of technology professional development.

H6a: There is a significant positive correlation between the teachers' use of technology and their hours of technology professional development.

To find the answer to this question, all the data from the survey was exported from the survey collection software to an Excel document. Each respondent was given a coded number by the survey collection software to keep anonymity. For the data analysis process each respondent's question data was listed across the Excel document, with each of their scale ratings listed for each question. Each respondent's data was listed across the Excel document, with each of their scale ratings listed for each question. For each item the participants rated technology use. In order to calculate teachers' technology use, I averaged the means across all the items. I organized the mean data for teachers into number of previous technology PD workshop hours and found mean for teachers in each time grouping of previous PD workshops. A Pearson bivariate correlation coefficient was computed using SSPS software. The results are seen in figure 1 below. There was a weak positive correlation between the two variables, $r = .298$.

Overall, there was not a strong, positive correlation between use of technology and the number of previous PD hours.

Table 07

Use of Technology/Number of Previous PD Hours			
		V433	V434
V433	Pearson Correlation	1	.298**
	Sig. (2-tailed)		.007
	N	87	81
V434	Pearson Correlation	.298**	1
	Sig. (2-tailed)	.007	
	N	81	81

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

Research Question Number 7: Is there a significant positive correlation between teachers' overall desire for PD and their building?

H7o: There is no significant positive correlation between teachers' desire for PD and their *building*.

H7a: There is a significant positive correlation between the teachers' desire for PD and their *building.*

To find the answer to this question, all the data was exported from the survey collection software to an Excel document. Each respondent was given a coded number by the survey collection software to keep anonymity. For data analysis purposes each respondent's data was listed across the Excel document, with each of their scale ratings listed for each question. For each item the participants rated their desire for PD workshops. In order to calculate teachers overall desire for PD workshops I averaged the means across all the seventy-two items. I organized the mean data for teachers into buildings and found the building mean for teachers overall desire for PD workshops. A Pearson bivariate correlation coefficient was computed to assess the relationship between

the mean desire for PD and the school building. There was a weak positive correlation between the two variables, r = .189. Overall, there was not a strong, positive correlation between a desire for PD and the school building.

Table 08

School /Desire for Professional Development

		School	Desire for PD
School	Pearson Correlation	1	.189
	Sig. (2-tailed)		.109
	N	80	73
Desire for PD	Pearson Correlation	.189	1
	Sig. (2-tailed)	.109	
	N	73	73

Research Question Number 8: For each building and grade level, what are the instructional tools that teachers give the 4.0 or higher mean ratings for desiring PD?

To find the answer to this question, all the survey data was exported to an Excel document. I then arranged the data by building. I found the mean of each instructional tool for that building and then looked for any mean that was 4 or higher. There were no buildings that had a mean rating of 4.0 concerning their desire for PD in instructional tools.

Research Question Number 9: For each building and grade level, what are the TLAs that teachers give 4.0 or higher mean ratings for desiring PD?

To find the answer to this question, I exported all the survey data to an Excel document. I then arranged the data by building. I found the mean of each TLA for that building and then looked for any mean that was 4 or higher. Only one building, Building 6, had a mean rating of 4.0 or higher in regards to their desire for PD. Building 6 scored the Video Conferencing (Polycom/Skype): Virtual Field Trips at a 4. No other buildings had a 4.0 or higher in their desire for professional development concerning TLA's.

Summary of Results

The results show that the teachers have access to technology. As reported above (Table 3), the teachers use the technology for record-keeping with 90.69% of the respondents rating this category a 3, 4 or 5 with 50% rating this category a 5., lesson planning 96.37% of the respondents rating this a 3, 4 or 5 and communication with 57.48% of the respondents rating newsletters a 3,4, or 5 and 60.92% of the respondents rating Emails with parents a 3,4 or 5. Much of the technology is used for the students rather than with the students. Many teachers are using technology as a tool to achieve a goal (such as Grades/Discipline/Attendance, Preparation for instruction lesson, finding information, downloading materials, and creating instructional materials), rather than a way to deepen their teaching and learning of the student which is the goal of administrators and education technology professionals (Asiksoy, G. & Ozdamli, F., 2017). As shown in Tables 2 and 4, the data indicates a very low or below 50% of the teachers using it, use of technology with the students. The data indicates that most teachers are using the technology for record-keeping, communication, finding information on the Internet, and creating worksheets. The only tools that scored over 50% of the teachers using regularly were Skyward Recordkeeping, Preparation for instruction lesson and unit planning, Preparation for instruction Downloading materials, Creating instructional materials, and Communication with parents. These are all teacher work-related tasks and not work that engages students with technology.

In regard to TLA's Table 4 shows the listed TLA's and the percentage of respondents that rated these a 0, which means not all in regular classroom practice were

in use. Out of the thirty-eight listed TLA's in the survey, twenty-four of TLA's are not used at all in daily classroom practice. Only one TLA, Tests/quizzes using student resources that came with textbooks, was rated by 50% of the teachers as a 3 (average daily use) or higher on the Likert Scale.

For technology tools, the teachers would like PD workshops in Illuminate and creating class web-pages. Illuminate is for assessment and record-keeping of those assessments, and web-pages are a communication tool. The teachers use TLA's but a very small amount. Teachers have a low desire for PD workshops in TLA's predominantly in the area of virtual field trips being the only item rated a 3 or higher by more than 50% of the teachers

The results of this survey have given the district data on the wants and needs of the teachers regarding technology PD workshops. As I was analyzing the results it became clear that there was a greater issue than just giving the appropriate PD and developing a specific PD workshop. I decided against developing a PD workshop as a project. As I continued to analyze the data, I realized it was important for the district to have the results given to them in a white paper. The results did not give a specific direction regarding what the teachers want for PD workshops but it did give suggestions based on the data. The district technology coordinators can to take this information and develop a plan to dig deeper with the teachers to develop a plan that works for everyone.

Section 3: The Project

Introduction

This section will include an overview of the project. The first part of this section will address description and goals, the rationale, and the literature review concerning this project. The second part of this section will address the implementation, potential resources and existing supports, potential barriers, a proposal for implementation and timetable, and conclude with a description of the roles and responsibilities of participants. The final part of this section will review the project evaluation and implications for social change.

The needs of the teachers in regard to technology access, use, and desire for professional development is the primary focus of this study, position paper, and literature review. I also review research on professional development in the corporate sphere. In a commentary piece by Deborah Delisle (2017), she asserts the need for professional learning for teachers. She cites that businesses spend more than $164 billion a year on professional development and in turn, they see a higher rate of motivation, productivity, and engagement. The bottom line is that companies that invest in their employees' training show a three times profit growth compared to companies that do not invest in training. This may or may not relate to professional development and student learning. More than any other school component, teacher effectiveness affects student success (Delisle, 2017).

Description and Goals

As described in Section 1, the study and project were based in a mid-sized city that is having difficulty with technology integration. The problem across this district is the lack of data on what currently accessible technology and technology learning activities (TLAs) teachers use, have access to, and for what TLAs they want professional development (PD). This project will provide the district technology staff with information that will help the staff support teachers to use technology more and to use technology in the service of learning content objectives. The ultimate goal of this project is to give the Technology Coaches a starting point for developing authentic, data-driven professional development workshops to improve technology use according to teachers' desires.

Rationale

The project developed for this study is a position paper. The results of the study are based in what technologies the teachers have access to, what they currently use, and what technologies they desire PD workshops for. The findings indicate that there are many areas that the teachers do not want PD for, and a few that they do. Video Conferencing (Polycom/Skype): Virtual Field Trips was the only TLA that more than 50% of the teachers rated a 3 or higher, meaning they had a high desire for PD in that TLA. The rest of the TLA's were rated by more than 50% of the teachers as a 0, 1, or 2, showing a low level of desire for technology professional development in TLA's. It also indicates that there are many areas that teachers are not using technology for and therefore may need support of some kind, even if they do not want PD. Out of the thirty-eight listed TLA's in the survey, twenty-four of TLA's are not in use at all in regular

classroom practice. Only one TLA, Tests/quizzes using student resources that came with textbooks, was rated by 50% of the teachers as a 3 or higher on the Likert Scale. Twenty-four out of thirty-eight TLA's in use means that the teachers are currently only using 37% of the listed TLA's in the survey. This information is important for the administration and district coaches to have in order to develop PD workshops that the teachers needs and wants to participate in. A position paper was chosen over developing professional development plan due to the fact that the district coaches are in charge of planning and providing professional development to the district teachers. My project can help the coaches develop that plan and PD workshops, but I would not be able to develop or implement a PD workshop myself. This project gives the coaches an idea of what the teachers are looking for in their professional development. The position paper will lay out the results of the technology needs assessment for the coaches and give them a starting point, from the teachers' point of view, in regards to technology and PD. According to Xavier University, a position paper is used to express a position on a subject and garner support for that position (Xavier.edu, 2014). The position paper will be used to present the data of this study, to promote a positive social change in the technology professional development offered in this district. The coaches will take the data and align the professional development workshops offered with the participants' desires. White papers can be specific to types of audiences and help that specific audience solve problems (Sakamuro, Stolley, and Hyde, 2015). This position paper will be addressed to the district with the primary audience being the administrators, particularly the technology administrators. The position paper will be available as an email attachment to all

teachers, but a shorter summary of the results will be shared in the body of the email. The paper will take into account data on basic accessibility of technology that was reported in the survey and also the sections of the survey asking teachers what technology professional development they prefer.

The goal of the project is to help the teachers with their technology use which hopes to return an increase in student achievement. By giving the district information about the wants and needs of teachers, the technology coaches can develop PD workshops and a district technology plan that has the voice of the teachers. The teachers can become more involved with technology integration, going past using technology for students, and moving towards using technology with students.

Review of the Literature

Introduction

As stated earlier in this paper, the problem, across this district, is the lack of data on what currently accessible technology and technology learning activities (TLAs) teachers use, have access to, and for what TLAs they want professional development (PD). In the survey used in this project was included questions asking teachers about their technology access and desire for professional development. Once the position paper is shared with the district, the technology coaches will develop professional development sessions for the district teachers. In the earlier literature review, the need for technology and technology training was discussed. In this literature review, I will discuss the benefits of professional development sessions, why leadership is essential in professional development sessions and the different types of professional development sessions used

in the educational setting. In the following section, I will discuss the second part of the project and its components. These components include potential resources and existing supports, potential barriers, implementation and timetable, and conclude with roles and responsibilities. This section will review the literature on several topics, including organizational success and professional development. I broke down the professional development section into corporate professional development and teacher professional development. Corporate professional development was included due to the fact that school districts, though non-profit, are corporations. The success of the corporation is dependent on the skills of its employees, similar to the success of education is dependent on the skills of the teachers. How corporations help develop these needed skills is useful to how districts can develop the skills of their teachers. These correspond to each of the sections below in the review.

To conduct the research, for this review, I used Walden Library's Thoreou data base and Google Scholar. I was also led to a few articles by my fellow students at Walden and their discussion posts. One discussion post (December 2017, discussion board post, EDU 8090) cites articles that were similar to my subject area but looks at it from a different angle. By looking into these articles, it led me to articles that I would not have initially looked into before. All the searched articles needed to be within five years and from peer-reviewed publications. While searching for articles, some of the prominent search terms I used were: *educational professional development, what makes professional development successful, types of professional development, and increasing professional capital.*

Organizational Success

Dessler (2016) states that organizational procedures are in place to create employees with the expertise and knowledge needed in their job to reach the goals and objectives of the company. Dessler defines an organization as people that are working together in defined roles to achieve the company's expectations and goals. In this case, the company is a school district, the employees are teachers, and the goals involve student success. The position paper will be organized to give the district the data needed to create the technology resources and professional development suggestions to enable the teachers to achieve student success. Data is what should propel any changes, new ideas, and procedures that can be achieved through people (Dessler, 2016). The position paper will present the data from this study.

Colquitt, LePine, and Wesson (2014) discuss that organizations and how they work with employees are integral parts of companies' success or failure. To find success with their employees/teachers, the district will need to work with the results of this study that communicate teachers' current conditions and future desires for technology professional development. Colquitt states if the organization exhibits its' commitment to teachers by responding to their desires in these results, it may be that teachers will be more committed to their positions. Employee job commitment is tied to organizational commitment (Colquitt et al., 2014). Colquitt also suggests that commitment to employee learning is a large factor in the success of a company. This could also be said about teacher professional development.

Professional development, as defined by Coldwell (2017) is any supports, informal or formal, created to increase and enhance teachers' skills. These supports might include face to face workshops, classes, mentoring, coaching, research, and self-study. Coldwell studies the effects of professional development on teacher careers and retention. The mixed-methods study consists of a survey of over 500 teachers and telephone interviews with 25 of those teachers. The data analysis of the survey shows a statistically significant number of participants, 57%, indicated that their participation in professional development made them more likely to stay in teaching. This significance was not found in the interview data. The data from the interview did show that the teachers indicated that the professional development sessions increased their knowledge and in turn their motivation towards teaching. It is important for schools to understand the importance of planned, teacher-need, and directed professional development when developing a professional development plan (Coldwell, 2017).

Professional Development

The human capacity of a company is determined by how well the company supports and educates its employees (Colquitt, LePine, and Wesson, 2014; Dessler, 2016; MacKay, 2015). The professional development section of this literature review is divided into corporate professional development and teacher professional development. Professional development is one focus of this study, position paper, and literature review. The survey in this project study askes teachers about their use of technology and how much they desire professional development workshops on specific technology and TLAs. In the literature review in Section One of this paper, the need for technology was

discussed, and now in this literature view section, professional development will be discussed.

Corporate professional development. MacKay (2015) did a study of Human Resource managers and their understandings of the impact of professional development on human capital and in turn the advantage to companies. The study is divided into two parts. The first set of data includes 25 human resource directors' summary statements about their qualifications and education. The second set of data came from a sub-sample of 27 employees involved in development activities. The participants were broken into small discussion groups of four to five people. Those participants were asked a series of guiding questions about their development activities and how they felt. For example, one question was, "how do you see your learning development?" Another question was: "in what way are these learning experiences useful for current job activity and future career" (MacKay, 2015)? The preliminary data was coded and then broken down into eight categories. These overlying sub-groups were then put together into three primary groups. MacKay felt that her data indicates that professional development has more influence beyond just increasing immediate employee capital. Her findings indicate that professional development increases individual motivation, self-efficacy, and productivity. Those in turn have a positive influence on resilience and motivation to increase one's own personal knowledge base (MacKay, 2015). This suggests that professional development may have these additional benefits for participating teachers in this local school district.

Professional development sessions increase teacher confidence, which in turn generates professional capital (Nolan & Molla, 2016). This increase in professional capital is a benefit to the district and the students. Nolan and Molla conducted a qualitative study looking into the relationship between teacher confidence and teacher learning with a focus on mentoring. Mentoring as PD was found to be successful if done with fidelity and with the role of the mentor, as a teacher, is clearly defined (Peiser, Ambrose, Burke, & Davenport, 2018). The researchers use three different instruments to gather data from 296 participants. The participants were 221 mentees and 82 mentors. The participants were given a pre-mentoring evaluation and a post mentoring evaluation. The participants were also asked to fill out a statement of purpose explaining their reasoning for taking part in the mentoring program. Applying inductive analysis and thematic coding, Nolan and Molla read and coded the data. The data reveales that participation in the mentoring program creates a positive impact on teacher's confidence. This increase in confidence impacts their acquisition of skills and knowledge (Noland & Molla, 2016). The mentees report that with this increase in skills and knowledge came application of these new skills into their teaching. Nolan and Molla state that, "Teacher confidence is vital for effective teaching and improved student learning." This confidence comes through sustained teacher professional development sessions that are collaborative in nature.

Teacher professional development. For teachers to be considered professionals, it is necessary for them to participate in professional development throughout their teaching career (Van der Klink, Koola, Avissar, White & Sakata, 2017). Van der Klink et

al. (2017) investigated if teachers from different countries had similar ideas about professional development activities and developmental goals. The researchers focus on experienced teachers in 10 different countries throughout Asia and Europe. Controlled interviews of 25 teachers were conducted by 14 members of a professional teaching organization. The Netherlands and Israel interviews were conducted by 3 members. There were a few country specific activities that were found, but a majority of the professional development activities were similar. Van der Klink et al. (2017) conclude that teachers internationally found professional development to be an important aspect of their job. The researchers also found that a majority of the experienced teachers appreciated professional development that attended to their needs and choices.

Professional development of working teachers is very important since they do not always come out of their Universities with all the skills and knowledge needed. Williams (2017) was concerned with just this when she did her study. Williams was interested in whether new teachers felt they received adequate technology training in their pre-service programs. A qualitative study was conducted in a school district that had new teachers that participated in the Digital Opportunity Trust [DOT] TeachUp! USA Program. Williams asks the participants to fill out a survey and then participate in interviews at their respective schools. Through the study, it was found that the new teachers felt that their universities gave them the necessary technological skills but not necessarily the application skills needed for implementation (Williams, 2016). The participants also felt that the professional development sessions they received from their school district was just as important. The professional development sessions received from their school

district helped them in the specific technologies and curriculum the district is using (Williams, 2016). It is important for districts to provide professional development that is specific to their unique needs and logistics.

The divide between the technologies students have available in their classrooms has shrunk, but now there is a divide between the types and amount of professional development that teachers in different districts are receiving (Herold, 2017). Many schools have the technology but not the resources to train their teachers in how to integrate it effectively. Herold states that "teacher already in the workforce, professional development hasn't kept up with the pace of technological change." The technology that is designed for student use is coming into classrooms faster than teachers can be trained. This is especially true for the schools with limited budgets. The districts can buy the technology, but cannot afford the training. Herold mentions that the most ingenious schools stand out because of what they do with the technology they have. The successful districts thoroughly encompass their teachers with training and support throughout the year. (Herold, 2017).

Success of Professional Development

This paper reflects the need for and specific implementation of professional development. The question is whether this will help teachers. Rutz, Condon, Iverson, Manduca, and Willett (2012) .The following section will discuss the second part of the project and its components. These components include potential resources and existing supports, potential barriers, implementation and timetable, and conclude with roles and responsibilities.

Implementation

A needs assessment survey was done asking the teachers what technology they had access to, what technology they used, and what PD workshops they desired. The results of this survey led to the development of the project or position white paper. The following section will discuss the second part of the project and its components. These components include potential resources and existing supports, potential barriers, implementation and timetable, and conclude with roles and responsibilities.

Potential Resources and Existing Supports

There are a few good potential resources and existing supports for this project. One big resource is the support of the district and its administration. The current district administration and technology coaches have been very supportive of the project. Due to curriculum changes and potential administrative changes the district is changing. The board of education understands that things need to change in the process of how professional development workshops are planned. When casually discussing the basis of the study a board member mentioned: “It is a great idea to get teacher input since what we are doing doesn’t seem to be producing results” (Board Member, personal communication 1/16/18). Another board member added that maybe they should do a needs study for all professional development and subject areas (Board Member, personal communication 1/16/18).

Another potential resource is the technology coaches and their willingness to make needed changes in their delivery of technology professional development. Currently, the technology professional development workshops are offered in the summer

and decided on by what the coaches feel are important. The professional development workshops need to be consistent throughout the school year and not just once or twice in the summer. The coaches will need to follow through after training and offer their time in the classrooms to help teachers apply what they have learned at the PD workshops. The technology coaches are eager to deliver professional development sessions that are authentic and wanted by the teachers. They are willing to take the information gathered in this project and apply it to their planning. Planning professional development sessions that give the teachers what they want rather than what the coaches think the teachers want is a positive step. The coaches are also a great support for this project. They are trained with the district technology and curriculum supports. The coaches all have a technology background but first and foremost they were teachers in the district. They understand not only the technology but also the curriculum. This will be a great asset in working with district teachers.

Potential Barriers

Many potential barriers could exist in the implementation of this position paper and the desired results from it. One major barrier is the fact that the district lost the Superintendent that was a part of this project in 2018, the current Superintendent is new and is not familiar with the study and project. This is considered a barrier due to the fact that the project was started with the help of the current Superintendent. The timeline for the project could be impacted if the new Superintendent is not ready to move forward with the project. Another potential barrier is the technology coaches. Due to the change in Superintendent, there is a potential change in the coaches. The coaches have been given

their notice and will not know until the new school year if they will be hired back in their current positions. Once again, this creates a potential barrier since the project was started with the current coaches. Another potential barrier is a change in the procedures of professional development sessions. With a new Superintendent comes potential changes in current policies and procedures

Proposal for Implementation and Timetable

The implementation process for the project's white paper will be done in three steps. The first step in the timeline will be a presentation to the Superintendent and Technology Coach for the district. The next step in the timeline is a presentation to the Board of Education. The final step of the implementation timeline is sharing the white paper with the district teachers through the district website and an email notification with a link to the website. The district currently is in a transition period from the former Superintendent to a new interim Superintendent. Through discussions, he asks that the white paper be discussed and presented to him tentatively pending my graduation in March of 2019 so that he has a chance to familiarize himself with the district and the departments. The presentation of the white paper will be made to the interim Superintendent and the Technology coach at the same time in December 2019. Once the project is presented to the interim Superintendent and the technology coach arrangements will be made to set a time to meet with the Board of Education. The Board of Education meets on the second Thursday of every month. The arrangements will be made to attend and present at the January 2020 board meeting. Once the results are disseminated to the Board of Education, they will be uploaded to the district website for the teachers to read.

I will be available, through e-mail, for any teachers that might have questions about the results.

Roles and Responsibilities

The major role and responsibility will be on myself as the researcher. Once we analyze the data and the proposal paper developed by the researcher, it will be important to convey the information to the district administration and technology coaches. I will have to plan with the district when to formally present the information. The process will start with a private meeting with the Superintendent. At the end of this meeting, we will plan how he/she would like me to present to the coaches and the teachers of the district. The coaches will then take the information in the proposal paper to develop professional development sessions. The professional development sessions will be the responsibility of the coaches to plan and implement. The data will be shared with the teachers through the district website and hopefully, with the professional development plans the coaches set forth.

Project Evaluation

This project's evaluation will be twofold. The first part of the evaluation will be a short quantitative question sheet given to participants in the first two steps of implementation. The superintendent, technology coach, and board members will each be asked to fill out a short four question survey at the end of the presentation. The survey will ask a) Did you feel the presentation was informative, b) Was the information useful for planning, c) Do you see a need for change in how technology professional development is delivered in this district? d) If yes on question 3, what changes would you

implement in how future technology professional development is developed? The results would give a quick test of whether the information given in the project was productive. The second part of the evaluation is more abstract and time-oriented. It would be asking and assessing if technology professional development change is needed in the district in comparison to how it was offered in the past. The district will need to ask if the technology PD workshops of the past are how they want to continue. The district would investigate other ways of doing PD workshops and determine if there is a better way for our teachers.

Implications Including Social Change

Local Community

As stated in section one, the problem across this district is the lack of data on what currently accessible technology and technology learning activities (TLAs) teachers use, have access to, and for what activities they want professional development (PD). This needs-assessment will provide the district technology staff with information that will help the staff support teachers to use technology more and to use technology in the service of learning content objectives. The change that this project will bring at a local level is an awareness. An awareness of what technology the teachers feel they have access to, what technology they are using in their classrooms, and what activities the teachers would like professional development for. This professional development can be in the form of workshops, coaching by peer or technology coach, or on-line instruction. Through the teachers becoming more adept at technology, this will impact the students in a positive manner.

Far-Reaching

Initially, this project study will be beneficial to my district, but through talking to other local districts teachers during local conferences, they have mentioned their interest in the results. “If the survey works out for you, I would like to bring it to my district. Our teachers need a voice” (teacher, personal conversation, November 2017). The other districts in our area are having the same financial issues and have reached out to potentially have mutual professional developments. This would give all districts a chance to pool their resources, bring in outside trainers, and create richer professional

development opportunities. The local Intermediate School District (ISD) holds a summer technology conference that would be an ideal place to present the results of this study to the other districts and to share the survey for their use. They could pool their results with ours and the county could have very specific focused technology professional development workshops.

In a broader context, this needs assessment can be used in other districts across the country. I will put in proposals for speaking at different technology conferences within my state and others to present the process of the survey and how it changed the direction of our technology professional development workshops. Technology is worldwide and the need for it in education is not just in this district. Professional development is necessary across the United States and teachers are asking for authentic help. As Matherson and Windle (2017) found, teachers want professional development that is relevant, practical, teacher-driven, and sustained over time.

Conclusion

Section 3 outlined the proposed project garnered from the results in Section 2. A white paper project was decided on and will be presented to the district and stakeholders. The findings that consistent with the research were the teachers' use of technology tools for the student or for clerical record-keeping. The additional results of the survey were the teachers' limited use of TLAs and their lack of desire for professional development. The results of the survey can best be disseminated to the district and stakeholders through a white paper. The paper will give the results in a concise format giving the district technology coaches a place to start in planning future professional development

workshops for the teachers. Section 3 began with a description of the project that included goals and a rationale for the project. This section also contained a literature review of professional development types and rationale for the use of professional development as a teaching tool for technology education of teachers. The last part of this section includes a timetable and implementation plan, resources, existing supports, and the roles and responsibilities of all involved. This section concludes with a project evaluation plan and implications for social change at a local and broader level. Section 4 will include my reflections of the study, the project, and how and what I, as a scholar, learned from this experience.

Section 4: Reflections and Conclusions

Introduction

Section 4 is a discussion of my reflections on the what I have learned about myself as a scholar and researcher through this project study. The first part of the section begins with an overview of the project's strengths, limitations, and recommendations. The section then reviews what I have learned during this process. This includes what I have learned about scholarship, project development, evaluation, and leadership and change. The last part of section 4 is an analysis of myself as a scholar, practitioner, and project developer.

Project Strengths

This project is a white paper that was developed to provide data for the district to create a data-driven technology professional development plan. According to O'Reilly (2016) using a needs assessment to determine the size of the gap in practice and to determine what is currently available and being used is beneficial. The needs assessment survey that was given to the teachers as a part of this study provides the data for the white paper recommendations. The strengths of this needs assessment are that the results provided are teacher-driven. One of the impetus for this project, as mentioned in section 1, is the gap in practice that the district technology staff did not have data-based information for maximizing the district's approximately 300 teachers use of technology and TLAs through organization of resources and PD (Technology coordinator, personal communication, September 2, 2013). Educators will have varying levels of capabilities and a needs assessment will help determine these levels (O'Reilly, 2016). Once these

levels are determined a plan can be determined. Rather than developing a plan from the top down with no data, the needs assessment embedded in this project is providing the data required by the district.

Recommendations for Remediation of Limitations

This part of the section will discuss the limitations of this project study. One large limitation is participation. Even though this study's survey was sent out to all the teachers in the district, only a small portion participated. Enough teachers participated statistically to make the survey valid. While the survey was statistically valid, a higher response rate may have reflected the desires and technology use of more of the teachers. The study was also limited in terms of demographics. For example, there was only one 12th grade teacher, representing low representation at that grade level. As teachers see the changes being made in what specific offerings are made available in future professional development workshops based on their voice in the survey, additional teachers might be convinced to participate in future surveys. The project white paper is based on limited data from a small but statistically sufficient number of teachers. The position paper would assert that in the future, needs assessment surveys could be given at each individual building's staff meeting to increase response rates. The data for future position papers would then be based on a larger sample giving more accurate assessment of more of the teaching staff's needs.

Scholarship, Project Development, and Leadership and Change

Taking the doctoral path was a scary choice for me. It was late in my career, and any extra time went to my young son. Additionally, all through my educational career, I

was told that my writing was not where it should be. Earlier I had received my Masters from Walden and was delighted with the quality of education I received and the ability to take classes online. So, I decided to take the chance and go for my doctoral degree. It has taken me much longer than expected, but I have learned so much during the process.

Through this process, I look at happenings in our district with a different eye, one that seeks to how I can help rather than looking at what they are doing to me. That might not seem scholarly on the surface, but it has given me a chance to look at education from a new perspective. I am looking at things through the lens of what is the research on this, how this will impact social change, and what do I need to do to help fix the problem. I also have learned to embrace research articles for the information they can give. When I started reading research articles, I saw them as dry and uninspiring. I have now learned how to read them and look at the research through a fellow researchers' lens. I can interpret much of these new research opportunities and deliver the information to teachers I work with in an enthusiastic, meaningful way. I see this as a positive in the fact that I can bring numerous new research opportunities and studies to teachers that might never have an interest in them, which in turn will impact student learning.

Recommendations for Alternative Approaches

An alternative approach to this project would be to address the teachers directly and have a discussion asking them the questions from the survey. The needs-assessment participation was statistically valid but with only 87 teachers participating out of 300 might not have given a thorough sample. Having a district wide discussion to address the access, technology use, and PD desires of the teachers would take this initial needs

assessment and give the coaches a chance to delve deeper in to the whys of the responses. A large group discussion would give the coaches information about whether these results would be consistent throughout the district. Scholl, Landkammer, and Sassenberg (2019) state that teams and groups of people working towards the same goal can be more successful by sharing the ideas that each member has and brings to the discussion. An alternative approach of bringing the district together to openly discuss the issue of technology would bring together different ideas that the coaches and this researcher had not thought of.

Project Development and Evaluation

For 29 years, I have been a special education teacher with a few opportunities to be a technology coach, technology teacher, and an International Baccalaureate (IB) coordinator. During these variations of my career, I was always a big-picture person. I came up with the ideas and counted on others to make plans. I would help implement the plan to reach my vision but rarely was I a part of the planning. When I was called on to design a plan, my plan lacked details. This project has made me stop and look at the details. For example, while deciding on what to do for the project study, I needed to stop and look at who I was trying to impact and what was the best way to do this. My goal was to help the teachers use technology in their teaching, but how was I going to do this on such a large scale? This is where details became important. The details became questions, who was I trying to impact, why was this important, how best could I make an impact, how do I find out what is truly needed. Each of those questions had to be answered in detail before I could proceed with the grand plan.

Once I had those details assessed and the first part of the project underway, I then needed to work on the finer details of the white paper. I approached this the way I do student writing assignments by answering the questions of what the purpose of the paper is and who is the audience. The purpose was to present the findings of the survey to help guide teacher-initiated professional development. Thus, I took the data collected in the survey and turning it into information that the district can use to plan professional development for the teachers. The primary audience is the technology department of my district, but other essential audience members would be the teachers, district leaders, and Board of Education.

Through this process, I have learned that more goes in to project development and evaluation than just the result. One detail that I found was very important was the protection of human rights. As a special education teacher, I always looked out for that population and made sure they were represented and protected, but there are so many other categories to think about. Taking the National Institute of Health's Protecting Human Research Participants course opened my eyes to how we can assume things in projects and plans, but we need to look at it from all angles. When developing a project or questionnaire for my building teachers, I look at how my questions could be perceived by different groups, whether or not it makes someone feel uncomfortable, or unintentionally put them in an awkward position.

Leadership and Change

This project study has been a big undertaking and this section discusses this particular research study, but I cannot separate the dissertation study experience from my

whole Walden doctoral journey, including my coursework and career. Throughout my career, I have taken leadership roles, whether it be union representative, 6th-grade team leader, technology coach, different coordinator positions, or member of numerous district committees. Going into this program with a focus on teacher leadership was the next step. I have learned many things about becoming a teacher leader, but I did not truly realize it until this last two years. Over these two years, due to circumstances, my building principal was out on and off for a total of 4 months. During the time she was out, the staff looked to me for guidance and direction. Each time she was out, there was no discussion, I just became the leader of the building. At the time, I had doubts but continued in the leadership style I had developed through this doctoral program. I realized how much I had learned when the principal retired, and every teacher in the building decided to make a case to the district for why I should be the new principal. I cannot name specific things I have learned through this program, but I have learned a lot. I know the person that started this journey is a much better leader because of the journey.

A big part of the transition in my leadership style was change. Through this process, I have learned that change is not a bad thing. My attitudes have changed, my style has changed, and the way I look at my district and school has changed. The project study had me look at a problem and, to properly look at that problem, I had to dig deeper, talk to people, and do research. The study made me find potential reasons and solutions from different perspectives. By looking more in-depth, I was able to see the problem from not just a local point of view but how did this fit into a larger realm, were others having the same problem, and how did they approach it. The project study I started with

is completely different than the one I ended up with due to these questions and this process of change.

Analysis of Self as Scholar

I have learned that my writing is not bad, it is just not scholarly, and that is not a bad thing. My scholarly writing has improved greatly, but I still have difficulty keeping my voice out of my writing. For example, these few sentences would not be considered scholarly, but I find them to be more interesting to read that a purely academic tone of voice. I realize the need in an academic paper to keep my opinions out of the actual paper and rather depend on the evidence presented in research articles to inform the paper and the study. It is my goal to offer an unbiased representation of the facts. I also understand the need to be professional and to be taken seriously. Doing research is arduous, painstaking work and must be revered as a higher standard of knowledge rather than a newsletter or magazine article. I have come to understand these things but I am still glad I will be able to write in my voice as principal to my teachers. They will appreciate my voice rather than a scholarly tone.

Analysis of Self as Practitioner

I did not always want to be a teacher. I never thought I would be until I took a child development class and decided that this is what I wanted to do. When I started this journey, I had been teaching for quite a while and felt I was doing a good job. Throughout my career, I have always wanted to improve my teaching but waited for new ideas or methods to come to me. This project study process has made me a better practitioner in the fact that now I go find the best practices. Research was always

something somebody else read and then disseminated to me. Now I can sit and read a research study and absorb it myself. This ability has brought new ideas and methods to my teaching. I can read about different programs and give an objective opinion based on the research that I now understand. Being able to discuss whether the research the particular program is giving was done with validity and reliability has helped keep me from jumping in too soon. In my classroom I look at things from multiple perspectives, I also find myself asking students and teachers higher-order questions, asking them to explain their answers and give valid reasons for their answers if they are different from mine. This is attributed to this process, and now I know I am excelling as a practitioner.

Analysis of Self as Project Developer

The development of this project was long and difficult. I also have a hard-time delineating the final project from the process. When I began, I thought this would be a simple straight forward project.

In regard to how to present the findings of the survey, I reviewed quite a few ideas. My first idea was to present a professional development workshop on what the teachers were asking for, according to the survey. I realized this was not feasible because I could not deliver that many workshops and that the idea was to deliver the workshops that the teachers were asking for across the district and at different buildings, not one formulaic workshop. I then investigated what was the best way to present the information in a format the district technology coaches could use. I concluded a white paper was the best way to disseminate the information. The white paper gives me the ability to present the problem, process, results, and conclusions to the needed stakeholders in a format that

is concise and on topic. The white paper also gives me the opportunity to deliver the results to surrounding districts. Other districts may not be able to use the data results but the process is something that could be replicated. This process made me look beyond what I wanted to accomplish. I had to analyze and discover what was needed to achieve my goal and develop a process that would be successful for my district and other districts.

The white paper was developed after the data from the survey had been examined. As I went through the research questions and discovered what was needed concerning the teachers desires, I analyzed the best approach. I looked at where the data was showing need and researched what was out in the educational community about these issues. Through this research I developed suggestions and ideas for the district to address the concerns and needs of the teachers.

The Project's Potential Impact on Social Change

When I began this project, very little research was done on technology in education at a complexity level my school required. Research had been done on the use of technology in education but not necessarily on the integration of technology. As I progressed through the process, I found recent research regarding specific types of technology and their use in education, particularly for specific subjects. Technology is a tool that schools have embraced but how we use that technology is just as important as what we use. This project has opened the door to research on a deeper level, not just looking at do teachers use the computer, but how do teachers help students to use the computer in their learning. When the district applies the information from this study into

their planning of professional development workshops, it will promote a positive growth towards this type of research on a larger scale.

This project has also has given the teachers a voice. Much of the current research ask teachers about what they are currently doing or have done. This research asked about what they want. More needs studies need to be done asking the teachers about what they want concerning curriculum, teaching styles, classroom arrangements, and technology. Many professional development workshops are developed by administrators or directors guessing about what is needed or wanted; this study is based on what teachers want. Maybe this study will promote more research in this direction of giving the teachers a voice and asking them what they need or want rather than what they have done already.

The development of the white paper has also given a voice to the issue of what professional development teachers want. This project will be shared with my district and surrounding districts as part of a technology consortium. The technology coaches of surrounding districts have started meeting every few months to discuss best practices. This is a big step for our district and the surrounding districts that, in the past, have been very cloistered. I will share the white paper at one of these meetings and share the needs assessment survey that was used in the project. Our state also has numerous technology conferences throughout the year. Applying to speak at these workshops and present the results of the project around the state will give more districts an opportunity to share the needs assessment survey.

Implications, Applications, and Directions for Future Research

This study focuses on one district and the needs of its teachers regarding technology and technology integration. What was learned in this study is what type of professional development teachers desire. This information will be given to district technology coaches to develop focused professional development workshops for the district teachers. In the future, this needs study could be done again and then compared to this study to see if any gains or changes are seen. The idea of the needs study could also be used for different subjects within the district, giving the teachers a voice in regard to their teaching of all subjects and curriculums.

During this project, the district has experienced three different Superintendents over 5 years. The technology coach has changed twice, and the board has had three resignations and two removals. With all these changes come changes in vision and priorities. The district's commitment to technology has not changed but the priority for technology professional development has. One way to combat this is embedded in the white paper itself a discussion on the importance and need for targeted, teacher-driven technology professional development protocols and the importance to keep technology PD workshops as a priority.

This study was a quantitative needs study. In the future, it would be interesting to do a qualitative study on technology and integration. It would be valuable to learn why teachers want to learn about and use particular technology instead of just finding out if the teachers are using technology, and if teachers desire professional development. A qualitative study would be able to delve deeper and find out why some teachers are

integrating certain technologies and why others are not. That information could then be useful in helping the teachers that are not integrating,

Conclusion

Section 4 was a discussion about me as a practitioner and a scholar, and how I grew throughout this process. This section began with an overview of the projects' strengths, limitations, and recommendations. The most important strength was also its limitation. The project gave the teachers a voice but also not many teachers took advantage of this voice. The section then reviews what I have learned about scholarship, project development, evaluation, and leadership and change. The final part of section 4 was an analysis of myself as a scholar, practitioner, and project developer. This was the growth section, how have I grown through this process. The amazing thing was that the growth was not all in the technology area, even though this was the focus of the study. Most of the growth came in my ability to expand my mind and become more open-minded in how I approach others through questioning and scholarly writing. The last part of the section discusses implications for social change, implications, applications, and directions for further research. The white paper developed from this project will be shared through meetings, workshops and presentations across the state. This will give other districts a chance to see the results and conduct their needs assessment. As a practitioner, I would like to take this project farther and do a qualitative study to fill in information about why teachers are not integrating technology in their teaching.

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Appendix A: The Project

White Paper

Technology Survey Results

Shannon Main-Petelka

Introduction

Technology is an integral part of modern life; computers, laptops, and smart-phones are infrequent use. Students raised during the last 20 years have been consistently immersed in technologies (Helsper & Eyman, 2010) that include phones, computers, electronic musical equipment, televisions, DVD's, videos, cameras, and game consoles before they even start school (Plowman, McPake & Stephen, 2010). Varol (2014) states that technology advancements are having a significant influence on educational systems. Despite this influence, it is unclear if technology in schools is sufficiently modern.

Schools exist to educate the future adults of our society; thus, schools should be on the cutting edge of technology. Instead, some schools are behind. According to President Obama (2014), in his speech *Enhancing Education Through Technology*, "Technology is not a silver bullet. It's only as good as the teachers … using it as one more tool to help inspire, and teach, and work through problems." As technology use in society increases, the need for technologies to be used in the classroom increases (Dagget, 2010).

In turn, professional development (PD) for teachers in these new technologies also needs to increase. The problem across this district was the lack of data on what

currently accessible technology and technology learning activities (TLAs) teachers use, have access to, and for what activities they want professional development (PD). TLA is a term created for this study that refers to the full range of interactive student-centered learning activities that are supported by different software, websites, and apps. This needs-assessment provides the district technology staff with information that will help the staff support teachers to use technology more and to use technology in the service of learning content objectives. The results are detailed in the following.

The Problem

The problem is that this school district had no comprehensive information regarding teachers' use, access, and desire for PD in terms of technology. Even in the schools in this district that have new technology, the technology coordinator stated that as coordinators they are struggling to help their teachers integrate technology into instruction (personal communication, June 3, 2014). Technology leaders need more information to plan efficiently. The Technology Coordinator for the school district (personal communication, June 3, 2014) states that the district is not sure what to do to help teachers integrate the technology the district has purchased. She continues, "The teachers have state of the art technology, but I never see it being used in the classroom" (Technology Coordinator, personal communication, June 3, 2014). According to the Technology Coordinator (personal communication, June 3, 2014), the technology coordinators believe it does not matter how much technology the teachers have, that as technology coordinators they can do a better job of helping teachers use what technology they do have. However, the coordinators do not have data to support their beliefs.

Technology Access and Use

The technology coordinators need a comprehensive view of teachers' technology access and use. What is needed is a thorough and systematic accounting of teachers' access and use of each technology in order to improve situations such as outdated technology and lack of training where possible. This study gathered that information. The survey administered in this project study provides something that the district needs, a current accounting of teachers' perceptions of what technology teachers have access to, how much they want to use each technology, the amount of access they have to each technology, and their preferences to get PD on each technology. With this information, the staff may be able to reorganize existing resources to support teachers better, even if they cannot purchase new equipment.

Technology learning activities (TLAs)

The problem of lack of data not only includes teachers use of technology, but the use of TLA's and the integration of the technologies. According to the technology coach, (Technology coach middle school, personal communication, January 14, 2013) there is no depth to the integration of technology. A TLA is an in-depth use of technology; an example is when teachers ask students to use features of Google Docs to create papers with pictures or diagrams, share for peer review, and electronically have students submit their work. In contrast, a low-depth use of technology example is when teachers may ask students to complete a worksheet in a Google Doc. Another low-depth use of technology was expressed by several new teachers (two first-year teachers, two second-year teachers, March 25, 2013) who felt the primary objective of technology use was to use the Internet

to discover educational resources. A third example of low-depth technology use is teachers use of interactive whiteboards as a giant touch-screen rather than creating in-depth lessons integrating the interactive whiteboard and connected technologies into lessons. Comprehensive integrated applications of technology to achieve learning goals, such as the TLAs in the survey, would be the ideal replacement for these and other low-depth uses of technology.

There are also examples of no-use of technology. The first example is that some teachers do not use Google Docs because they do not feel comfortable enough with their training (Personal communication, four elementary teachers and five middle school teachers, February 20, 2017). A second example is that teachers do not use the Interactive Whiteboard materials provided with their new series of textbooks (Personal communication, four elementary teachers, and five middle school teachers, February 20, 2017). One middle school teacher summed up the group's feelings stating that she feels that her lack of training would make her look inferior to the students (Personal Communication, fifth -grade teacher, February 20, 2017). This study will identify the PD that teachers want and need regarding TLAs that could support their in-depth integration of technology.

In summary, this research is significant to the district because it may identify the problems with access to technology, it will identify any low use that can be increased, and it identifies the needs and preferences of the type of technology that teachers want to use. This information will inform decisions of the technology department for the district as they explore different professional development programs. This white paper contains

feedback from those teachers and was an opportunity for the teachers to provide the district with a specific set of teacher needs with regards to technology and their teaching. Feedback is important because, by tailoring the professional development to the needs of the teachers, the district will save time and money.

Research Design, Setting and Sample

This research design of this study was a descriptive and correlational quantitative survey. This study examined the relationship between the technology available to teachers in their school buildings and the teachers' knowledge and use of this technology.

Respondents

The survey was initially sent out to all the teachers in the district. The teachers had two weeks to fill out the survey. At the end of two weeks, there were only 53 completed surveys. According to G-Power, the required sample size was determined to be 82 of the 300 potential respondents. Fifty-Three respondents did not meet the G-Power for the required sample size. The survey was sent out to the teachers again. At the end of two weeks, eighty-seven teachers responded. This number met the needed amount of respondents. As illustrated in Figure 1 below, Out of those 87 respondents the highest number of respondents was from the category of multi-grade level with 13 respondents, 3rd-grade teachers, and 5th-grade teachers were next with 11 respondents each. The lowest grade level for respondents was 12th grade.

Figure 1

Number of Teachers at Each grade level

Grade Level	Number of Participants
Preschool	5
Kindergarten	6
1st	8
2nd	4
3rd	11
4th	7
5th	11
6th	2
7th	3
8th	6
9th	2
10th	2
11th	6
12th	1
Other	13
Totals N=87	

Figure 1: Number of teachers at each grade level

Summary, Implications, and Recommendations of Results

This section will discuss the results, implications, and recommendations of the survey. The survey was sent out to help solve the problem of the lack of data on what currently accessible technology and technology learning activities (TLAs) teachers use, have access to, and for what activities they want professional development (PD) in this specific district.

Accessibility

In regards to accessibility, there were several tools that were rated as easily accessible. Easily accessible tools included Google Drive (docs, sheets etc), Skyward and its components (Attendance, Grades, Discipline), Document camera, Microsoft Office

and its components (Word, Excel, PPPT, Publisher), Laptop/Chromebook carts for whole class use, and the LCD Projector. For all of these tools, 70-88% of participants found them to be accessible. In contrast, only 16-42% of the participants rated as accessible the SMART Interactive Whiteboard, online connections resources that came with textbooks, Smart Notebook (Software on the computer), Tests/quizzes resources that came with textbooks. Moviemaker and PolyCom Video Conferencing station were found to be the most inaccessible with between 60-84% of the participants rating these as a 0 or non-accessible on the survey Likert Scale. The reason for these low accessibility ratings is unclear, as the survey did not ask for reasons. An implication of this might be the need to ask teachers more specifically about accessibility and/or inaccessibility of technology in their own buildings.

The data shows that most of the technology tools are accessible, which is good news for the district. This data does seem to show that accessibility is not a problem for the teachers use of technology. The only recommendation for this section would be to do a technology audit in each building addressing the few technologies teachers said they do not have access to such as PolyComs.

Technology Tool Use

There is low use of both technology tools and TLA's teachers are primarily using the technology; for recordkeeping and using the Internet to prepare lessons. For example the data shows; there were several tools NOT used by more than 70% of the teachers including- Google Classroom, Communication with parents- Class Web page, IEP (Easy IEP), Video Streaming- Brainpop/Brainpop Jr., Google classroom Posting Homework

assignments, Smart Notebook (Software on computer), Google Classroom website Links page, Google Classroom Quiz/Tests, and Google Classroom Calendar. It is unfortunate that this is a large amount of potential technology integration that is not being used. The district is spending money on technology for integration and student use. The technology is not being used with the students in the form of integration but is being used for the students in the form of record-keeping with 90.69% of the respondents rating this category a 3, 4 or 5 with 50% rating this category a 5., and lesson planning 96.37% of the respondents rating this a 3, 4 or 5. This money could be invested in other areas that will increase student achievement if the teachers are not going to use the technology with the students. Or plans should be made to increase teacher use of technology.

Table 2

Technology Tool Use

Technology Tool	Rating of Use					
	0 (No use)	1	2	3 (Avr.)	4	5 (Use All)
Skyward Record keeping: Grades/Discipline/Attendance	5.81%	0.00%	3.49%	18.60%	22.09%	50.00%
Preparation for instruction lesson and unit planning : Finding information	3.49%	4.65%	3.49%	31.40%	26.74%	30.23%
Preparation for instruction Downloading materials ie: videos or pictures	3.49%	5.81%	9.30%	32.56%	23.26%	25.58%
Creating instructional materials: Worksheets	12.79%	2.33%	6.98%	37.21%	19.77%	20.93%
Communication with parents: Newsletters	33.33%	6.90%	2.30%	29.89%	8.05%	19.54%
Communication with parents: E-mail	13.79%	13.79%	11.49%	34.48%	8.05%	18.39%
Google Classroom Site	35.63%	4.60%	5.75%	16.09%	21.84%	16.09%
Communication with parents: Attendance	31.40%	12.79%	11.63%	24.42%	6.98%	12.79%
IEP (Easy IEP)	72.94%	4.71%	0.00%	4.71%	4.71%	12.94%
Classroom management and/or incentives for students Reward for completed work	36.05%	5.81%	6.98%	27.91%	12.79%	10.47%
Teacher-student communications: Google Docs for revisions	43.68%	5.75%	13.79%	21.84%	6.90%	8.05%
Creating instructional materials: Readings	25.58%	10.47%	12.79%	33.72%	9.30%	8.14%
Other Online practice	18.60%	6.98%	8.14%	44.19%	13.95%	8.14%

Teacher-student communications: Teacher Posting schedules/due dates	48.28%	8.05%	11.49%	14.94%	10.34%	6.90%

Table 2 Continued

Technology Tool Use

Technology Tool	Rating of Use 0 (No use)	1	2	3 (Avr.)	4	5 (Use All)
Core curriculum skills development Drill and practice (Such as Math Blaster, Reader Rabbit, Starfall etc.)	27.91%	6.98%	5.81%	38.37%	13.95%	6.98%
Video Streaming: Discovery Education	26.74%	12.79%	13.95%	23.26%	16.28%	6.98%
Video Streaming: You Tube	6.98%	5.81%	12.79%	40.70%	26.74%	6.98%
Video Streaming: Brainpop/Brainpop Jr.	59.30%	10.47%	8.14%	9.30%	5.81%	6.98%
Google Classroom website Links page	53.49%	5.81%	10.47%	15.12%	9.30%	5.81%
Student inquiry: Student research using Internet	19.77%	11.63%	13.95%	36.05%	12.79%	5.81%
Google Classroom Calendar	50.57%	12.64%	9.20%	18.39%	4.60%	4.60%
Google classroom Posting Homework assignments	56.32%	1.15%	6.90%	14.94%	16.09%	4.60%
Video Streaming: Teacher Tube	47.67%	10.47%	9.30%	19.77%	8.14%	4.65%
Communication with parents: Class Web page	78.16%	5.75%	5.75%	4.60%	2.30%	3.45%
Teacher-student communications: Teacher Creating Posters/signs	44.83%	6.90%	5.75%	31.03%	8.05%	3.45%
Google Classroom Quiz/Tests	50.57%	6.90%	9.20%	16.09%	13.79%	3.45%
Illuminate	21.18%	16.47%	23.53%	29.41%	5.88%	3.53%

On a positive note, 50% of the teachers rated themselves using the following at a frequency level of 3 average use or higher- Skyward Record keeping-Grades/Discipline/Attendance, Preparation for instruction lesson and unit planning-Finding information, Preparation for instruction, Downloading materials -videos or pictures, Creating instructional materials- Worksheets, Communication with parents-Newsletters, Communication with parents- E-mail, and Google Classroom Site. This data shows that many teachers are using the tools for creating lessons and using the tools for the students. The teachers are using the technology to add to the textbook lessons and communicate with parents in a digital format.

Desire for Professional Development in Using Technology Tools

The PD in technology tools teachers are asking for are Google Classroom and its components, SMART Exchange, and Illuminate (Table 4). The data indicated this by having more than 40% of the teachers rate them a 3,4 or 5 in desire for professional development. Illuminate rated the highest with 47.89% of the teachers rating their desire at a 3,4 or 5. Illuminate is a program to help with testing of content area district assessments. SMART Exchange is a part of the SMART website where teachers can share ideas and projects for the SMARTBoard and Google Classroom is a website based program for teachers to communicate with students and parents. Google Classroom site had 43% of the teachers rate their desire at a 3 or higher. Except for the tool Google Classroom Site, over 40% of the teachers rated the desire for professional development on the other technology tools as a 0. Howard and Mozejko (2015) found that when districts make technology a priority and provide the necessary support both through PD workshops and administration allowing teachers to try and fail, then the teachers are more likely to use the technology. Because the research says district mandates increase use and more than 40% of the teachers indicated a rating of 3, 4, or 5 for desiring PD in Google Classroom and its components, SMART Exchange, and Illuminate technology tools, the district could consider mandating PD. If the focus was on Illuminate, Google Classroom, and its components, or SMART Exchange it could be a success because these are what the teachers indicated on the survey that they want and it would increase the likelihood that all teachers would engage .

Table 4

Technology Tool Desire for Professional Development

Technology Tool	Desire for Professional Development					
	0	1	2	3	4	5
Communication with parents: Class Web page	41.89%	10.81%	8.11%	12.16%	4.05%	22.97%
Illuminate	32.39%	11.27%	8.45%	18.31%	9.86%	19.72%
Smart Exchange (Online resource for teachers)	41.67%	8.33%	6.94%	13.89%	12.50%	16.67%
Google Classroom Site	35.14%	10.81%	10.81%	18.92%	10.81%	13.51%
Google Classroom website Links page	50.70%	2.82%	9.86%	15.49%	7.04%	14.08%
Teacher-student communications:Teacher Creating Posters/signs	52.70%	4.05%	13.51%	13.51%	4.05%	12.16%
Google Classroom Calendar	42.25%	4.23%	12.68%	14.08%	14.08%	12.68%
Smart Notebook (Software on computer)	52.86%	5.71%	11.43%	15.71%	2.86%	11.43%
Classroom management and/or incentives for students Reward for completed work	54.29%	5.71%	5.71%	12.86%	11.43%	10.00%
Student to student communication: Creating instructional materials to share	54.41%	8.82%	8.82%	11.76%	5.88%	10.29%
Student inquiry: Student research using Internet	47.83%	5.80%	8.70%	20.29%	7.25%	10.14%
Video Streaming: Teacher Tube	46.38%	15.94%	10.14%	11.59%	5.80%	10.14%
Google classroom Posting Homework assignments	57.75%	8.45%	9.86%	14.08%	1.41%	8.45%
Preparation for instruction Downloading materials ie: videos or pictures	52.24%	8.96%	5.97%	16.42%	7.46%	8.96%
Creating instructional materials: Readings	52.17%	4.35%	11.59%	15.94%	7.25%	8.70%

Explanation of the Findings

It appears many teachers are using technology as a tool to achieve a goal (such as Grades/Discipline/Attendance, Preparation for instruction lesson, finding information, downloading materials, and creating instructional materials), rather than a way to deepen their teaching and learning of the student which is the goal of administrators and education technology professionals (Asiksoy, G. & Ozdamli, F., 2017). The data indicates that most teachers are using the technology for record-keeping, communication, finding information on the Internet, and creating worksheets. As shown in Tables 2 and 4, the data indicates a very low or below 50% of the teachers using it, use of technology with the students. The only tools that scored over 50% of the teachers using regularly were Skyward Recordkeeping, Preparation for instruction lesson and unit planning, Preparation for instruction Downloading materials, Creating instructional materials, and Communication with parents. These are all teacher work-related tasks and not work that engages students with technology.

Technology Learning Activity use (TLA)

In regard to Table 4 shows the listed TLAs and the percentage of respondents that rated these a 0, which means used not all in regular classroom practice. Out of the thirty-eight listed TLAs in the survey, twenty-four of TLAs are not used at all in daily classroom practice. Only one TLA, Tests/quizzes using student resources that came with textbooks, was rated by 50% of the teachers as a 3 (average daily use) or higher on the Likert Scale.

Table 3: TLAs not used in the classroom

TLA	Percent of Teachers not using in classroom
Prezi Presentation: Field trip review with pictures and comments about what was learned.	95.35%
Video Conferencing (Polycom/Skype): Conferencing with other classes in district	95.29
Video Conferencing (Polycom/Skype): Conferencing with other classes out of district	95.24%
Video Conferencing (Polycom/Skype): Virtual Field Trips	92.94%
Video Conferencing (Polycom/Skype): Conferencing with experts in their field	91.76%
Microsoft Publisher: Student made newspaper	91.76%
Microsoft Publisher: Student made books to print for library	91.76%
Prezi Presentation: Student use to show step by step math problem solving techniques	89.53%
Google Slides: Student use to show step by step math problem solving techniques	89.41%
Microsoft Power Point: Student use to show step by step math problem solving techniques	87.06%
Microsoft Power Point: Field trip review with pictures and comments about what was learned.	85.88%
Google Slides: Field trip review with pictures and comments about what was learned.	85.71%
Microsoft Excel: Student made spreadsheets	84.71%
Student Expression: Hyperstudio, Moviemaker, Prezi	82.56%
Student to Student Communication: E-Group Projects	83.53%
Google Sheets: Student made spreadsheets	83.53%
Google Sheets: Students making graphs	81.18%
Google Docs: Students Creating newspapers or newsletters with pics.	80%
Microsoft Excel: Students making graphs	79.76%
Microsoft Word: Student Revision tracking and comments	78.57%
Microsoft Word: Students Creating newspapers or newsletters with pictures	76.47%
Microsoft Publisher: Student made brochures	75.29%
Microsoft Publisher: Basic Student assignments (poster/sign)	73.81%
Microsoft Word: Student to student editing	71.76%

The TLA section indicated that very few teachers are using technology with the students.

“With the students” means having the students interact with the technology themselves

such as; students working on the Internet finding their information or students working in cooperative groups putting together a presentation on what they are learning or any other student use of technology. As indicated in the next sentences, many teachers in this study reported that they are not be using student-initiated technology. For example, 95% are not having students make Prezi or Powerpoints, 82.5% are not using student expression software such as student-made videos, 83% are not using student to student communication, and 80% are not using any creation software. Research has shown (Howard and Mozejko, 2015) that teachers do not use technology for many reasons including lack of efficacy in their abilities, the belief that change is not embraced by the district, and that this initiative shall pass.

Desire for Professional Development

Video Conferencing (Polycom/Skype) - Virtual Field Trips was the only TLA that more than 50% of the teachers rated a 3 or higher, meaning they had a high desire for PD in that TLA The rest of the TLAs were rated, by more than 50% of the teachers as a 0 or 1, showing a low level of desire for technology professional development in TLAs (Table 4). While only 50% of the teachers indicated a desire for PD in any of the TLAs, the teachers would benefit from PD in the areas they indicated. Based on the data in this research, the following topics could be included in PD workshops. First, Video Conferencing with the Polycom, which 57% of the teachers rated a 3, 4, or 5 indicating a strong desire for PD. While 43% of the teachers rated it at a 2 or below indicating they would not like PD. The second one would be student expressions such as Hyperstudio, Prezi, or Movie Maker. Forty-nine percent of the teachers indicated a rating of 3 or above

in their desire for PD in this area. The PD workshops offered for these should be at a level that does not overwhelm the teachers (Stols, Ferreira, Pelser, Olivier, Van der Merwe, De Villiers, and Venter, 2015). The more comfortable a teacher becomes with technology, the more a teacher will integrate and use the technology (Chui and Churchill, 2015)

Therefore, it is recommended that Video Conferencing and the use of the Polycom be a priority professional development that is offered to the teachers.

Table 4

Desire for TLA Professional Development

TLA	Desire for Professional Development					
	0	1	2	3	4	5
Video Conferencing (Polycom/Skype): Virtual Field Trips	31.43%	1.43%	10.00%	17.14%	17.14%	22.86%
SMART board materials Interactive: Whiteboard student use	42.03%	7.25%	11.59%	15.94%	10.14%	13.04%
Development of basic computer skills: Keyboarding	53.62%	11.59%	2.90%	14.49%	4.35%	13.04%
Video Conferencing (Polycom/Skype): Conferencing with experts in their field	41.79%	5.97%	17.91%	11.94%	11.94%	10.45%
Student Expression: Hyperstudio, Moviemaker, Prezi	33.33%	4.35%	13.04%	18.84%	20.29%	10.14%
Interactive whiteboard resources: using student resources that came with textbooks	52.24%	7.46%	7.46%	16.42%	7.46%	8.96%
Google Sheets: Student made spreadsheets	54.55%	3.03%	18.18%	9.09%	6.06%	9.09%
Microsoft Word: Students Creating newspapers or newsletters with pictures	61.19%	1.49%	7.46%	13.43%	8.96%	7.46%
Google Docs: Student Revision tracking and comments	52.24%	4.48%	14.93%	13.43%	7.46%	7.46%
Google Sheets: Students making graphs	45.45%	1.52%	16.67%	18.18%	10.61%	7.58%
Google Slides: Student use to show step by step math problem-solving techniques	59.09%	4.55%	7.58%	12.12%	9.09%	7.58%
Video Conferencing (Polycom/Skype):Conferencing with other classes in district	51.43%	8.57%	5.71%	20.00%	8.57%	5.71%
Development of basic computer skills: Mouse skills	76.47%	7.35%	4.41%	5.88%	0.00%	5.88%
Microsoft Word: Student Revision tracking and comments	61.19%	5.97%	8.96%	8.96%	8.96%	5.97%
Google Docs: Basic student assignments	53.03%	6.06%	12.12%	12.12%	10.61%	6.06%
Google Slides: Field trip review with pictures and comments about what was learned.	60.00%	4.62%	13.85%	6.15%	9.23%	6.15%

Recommendations for PD on TLAs

Out of the thirty-eight listed TLAs in the survey, twenty-four of TLAs are not used at all in regular classroom practice, rated at a 1,2 or 3. Only one TLA, Video Conferencing, was rated by 50% of the teachers as a 3 or higher on the Likert Scale. There should be a PD on this TLA of using Video-Conferencing because it is what teachers indicated that they wanted PD for.

Explanations of Findings

It is unclear why teachers are not using student-centered technology. The survey did not ask the teachers why they were not using the student-centered technologies such as presentation software, SMARTboard tools, or Google docs. Some possible reasons are that they feel a lack of efficacy in using it themselves (Li, Worch, Zhou, & Aguiton, 2015). In addition, there may be a lack of awareness of the included TLA's. One teacher mentioned, "I don't know what half those TLA things are on your survey" (personal communication, February 2018). They might have access to the Internet, but it is likely they do not know many of the programs because the vast number of programs available to teachers is daunting (Li, et al, 2015). Another reason might be that they do not want to feel that the students are more technologically capable than they are. Many times, students know more about technology than teachers (Gallardo-Echenique, Marqués-Molías, Bullen, & Strijbos 2015). This can make the teacher feel incompetent or not in control (Gallardo-Echenique et al. 2015). These feelings are not pleasant, so teachers do not put themselves in situations where they would feel them (Gallardo-Echenique et al. 2015).

Summary Reflection

Based on the data, it is clear that a very small number of teachers are using technology with the students (TLA use). A more significant number of teachers are using it for the students (Tool use). For example, many teachers are using technology to make worksheets, show videos, or print information off the Internet. They do not have the students find the information, present the information themselves in a creative way, or use the technology to enhance their thinking or inquiry. The technology used is kept at the basics of Bloom's taxonomy, remembering and understanding or being used to recall facts, cut and paste information, fill in worksheets, and the use of search engines. They are not allowing students to advance to the evaluating and creating Bloom's stages, of blogging, podcasting, video making, and creating original material (Sneed, 2016). The reasons for this lack of integration has just started to be investigated (Personal Communication, August, 2019). The district will need to continue working with the teachers to discover and address all the different reasons.

Russell, Bebell, O'Dwyer, and O'Connor (2003) conclude that a change in belief could be accomplished through exposure to and training in the use of technology. Russell, et al. (2003) notes that as teachers experience their effective use of technology, the experiences with technology change their beliefs that technology would make a difference. Due to this, a recommendation for helping teachers integrate TLA's in their teaching would be that the PD workshops offered by the district could include experiences with the TLA's in an authentic setting with real-world examples. The teachers would be working within their content area and be working with TLA's. As the

teachers are working within their content area PD, they would also be learning how to integrate technology into their content area, and they would feel more comfortable with the TLA's. The more use teachers have with technology, the more they see the benefit in their classroom (Russell, et al., 2003).

The ultimate goal of this project is to give the currently employed with the district Technology Coaches a starting point for developing authentic, data-driven professional development workshops and coaching. Another recommendation is in the use of these coaches. Coaches work with teachers where they are on the spectrum of skills rather than teaching to a group at all different levels (Eisenberg, 2016). The districts technology coaches can work with the teachers in their classrooms and be a tool to help teachers access the correct PD workshops.

The data shows that the teachers are not using the technology provided to them. The teachers are not using hardware, such as Polycoms 95% are not using, or interactive whiteboards 80% not using. Many of the teachers are also not using the programs available such as Google Classroom, Prezi, and student to student interactive components (Google docs, and webpages). The coaches should be available to meet with teachers in their classrooms or schools to assess where each teacher is in their technology journey and suggest specific PD workshops. Eisenberg (2016) believes that job imbedded, data-driven, authentic, literacy-based, teacher learning can be accomplished through instructional coaching. The coaches also should be available for modeling technology use at all levels and help teachers put together more advanced lessons as their ready. The goal

of the PD workshops and coaching is to help teachers use technology well so that they feel comfortable enough to use it more often.

While the results do indicate a low desire for PD on TLAs, they do indicate a need for PD on TLAs if the district wants teachers to use TLAs. The teachers are using the technology as a tool; now they need to advance their skills in TLAs. To be clear, teachers did not want PD for TLAs overall. This was a surprising finding because it was thought that teachers would want to use more student-centered technology activities. They did not. To determine if there should be PD for TLA's there is logically a need for leadership to make determinations about which student-centered technology use (TLAs) is most valuable to the school district and learning. There would then be a need for more research to determine if the TLA valued by the administration would be desired by the teachers.

Howard and Mozejko (2015) found that if a district or administration does not prioritize a necessary change, neither will the teachers. This leads to the last recommendation that the district makes technology a priority with their teachers and principals. Howard & Mozejko discusses the three key factors that are essential for teachers' use of technology in their teaching: 1) leadership, 2) shared group vision and 3) technical and pedagogical support. They found that teachers felt more comfortable bringing new technologies into their classrooms when they had the support of their administration. Currently, the district does not mandate technology PD workshops but they do mandate ELA and Math training.

Along with the increase in technology PD workshops and a priority change, Howard & Mozejko (2015) discusses the importance for teachers to feel support from district and their administration in using technology in the classroom without fear of negative repercussions. The district must make it clear to administrators and teachers that they are looking for an increase in technology use in the classroom, but the teachers will not be penalized if they incorporate technologythat does not work to their expectation. Li, Worch, Zhou, and Aguiton, (2015) found that teachers will use technology if they feel they have the support of their district and administration. The district must let the teachers try technologies in a safe environment. Putting out a letter to all staff, encouraging the use of technology and conveying the message that they are allowed to change and adapt their teaching, will provide a message of support. The building administrators then need to create an environment where teachers are encouraged and supported in trying technologies. Increased use of technology will be measured but teachers will not be evaluated on the use of technology. Teachers need to know that they can make a mistake with technology that does not affect the students and still have the ability to be highly effective in evaluations. Teachers will be risk-takers with technology if they know they are supported by the administration (Li, Worch, Zhou, & Aguiton, 2015).

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Appendix B: Survey

Name_____

Teacher Technology Survey

I am asking you and other teachers in our district to respond to the following survey. I am trying to learn about teachers use of technology and their desires for professional development. *I am not evaluating the effectiveness of you or your teaching and administrators will not have access to your individual responses.* I will use the results of the research to help our district work with teachers to meet teachers' needs in technology.

Completing this survey indicates your consent as a participant in this study in so far as your responses will be analyzed. Participating in this study is voluntary, and I will keep all data collected confidential. Your privacy will be protected to the maximum extent allowable by law.

I will protect your confidentiality by using a pseudonym for each school and identification numbers for individual teachers in all publications and written reports.

You may contact#####, in case you have concerns or questions about your rights in participating in this human-subjects research.

If you have any questions or comments, please send me an e-mail or give me a call at the number below. I appreciate you taking the time to respond to this survey.

1. On a scale of 0 being none and 5 being very much please rate the following.

	Is this technology easy to access?	How much do you desire professional development on this technology?
Microsoft Office and its components (Word, Excel, PPPT, Publisher)		
Computer Lab in school		
Laptop/Chromebook carts for whole class use		
PolyCom Video Conferencing station		
Skyward and its components (Attendance, Grades, Discipline)		
SMART Interactive Whiteboard		
Smart Notebook (Software on computer)		
Smart Slate		
SMART or other Response System (Clickers)		
Google Docs		
Moviemaker		
LCD Projector		
Document camera		
Tests/quizzes resources that came with textbooks		
DVD's resources that came with textbooks		
Interactive whiteboard resources that came with textbooks		

	Is this technology easy to access?	How much do you desire professional development on this technology?
PowerPoint/Presentation resources that came with textbooks		
Online connections resources that came with textbooks		

2. On a scale of 0-5, with 0 being none and 5 being very much

	What is your level of integration?(How much is this a part of your regular classroom practice?)	How much do you desire additional Professional Development on this technology?
Communication with parents: Newsletters		
Communication with parents: E-mail		
Communication with parents: Attendance		
Communication with parents: Class Web page		
Teacher-student communications: Response to written work		
Teacher-student communications: Teacher Posting schedules/due dates		
Teacher-student communications: Google Docs for revisions		
Teacher-student communications:Teacher Creating Posters/signs		
Google Classroom Site		
Google Classroom Calendar		
Google Classroom website Links page		
Google classroom Posting Homework assignments		
Google Classroom Blogs/Wikis		

	What is your level of integration?(How much is this a part of your regular classroom practice?)	How much do you desire additional Professional Development on this technology?
Google Classroom Quiz/Tests		
Classroom management and/or incentives for students Reward for completed work		
Skyward Record keeping: Grades		
Skyward Record keeping: Discipline		
Skyward Record keeping: Attendance		
IEP (Easy IEP)		
Smart Notebook (Software on computer)		
Smart Exchange (Online resource for teachers)		
Smart Slate		
SMART or other Response System (Clickers)		
Preparation for instruction lesson and unit planning : Finding information		
Preparation for instruction Downloading materials ie: videos or pictures		
Creating instructional materials: Worksheets		
Creating instructional materials: Readings		
Creating instructional materials: Tests		
Student to student communication Publish student work on a Web page		
Student to student communication: Creating instructional materials Keynals		

	What is your level of integration?(How much is this a part of your regular classroom practice?)	How much do you desire additional Professional Development on this technology?
Student inquiry: Student research using Internet		
Student inquiry: Web Quests		
Core curriculum skills development Drill and practice (Such as Math Blaster, Reader Rabbit, Starfall etc.)		
Remediation Repeat a lesson		
Other Online practice		
Video Streaming Discovery Education		
Video Streaming You Tube		
Video Streaming Teacher Tube		
Video Streaming Brainpop/Brainpop Jr.		

3. On a scale of 0 to five with 0 being none and 5 being very much how would you rate the following?

	What is your level of integration?(How much is this a part of your regular classroom practice?)	How much do you desire additional Professional Development in the following?
Video Conferencing (Polycom/Skype):Conferencing with other classes in district		
Video Conferencing (Polycom/Skype) Conferencing with other classes out of district		
Video Conferencing (Polycom/Skype): Conferencing with experts in their field		
Video Conferencing (Polycom/Skype): Virtual Field Trips		

	What is your level of integration?(How much is this a part of your regular classroom practice?)	How much do you desire additional Professional Development in the following?
SMART board materials Interactive Whiteboard student using		
Tests/quizzes using student resources that came with textbooks		
DVD's using student resources that came with textbooks		
Interactive whiteboard resources using student resources that came with textbooks		
PowerPoint using student resources that came with textbooks		
Online connections using student resources that came with textbooks		
Development of basic computer skills: Keyboarding		
Development of basic computer skills: Mouse skills		
Microsoft Word: Basic student assignments		
Microsoft Word: Student to student editing		
Microsoft Word: Students Creating newspapers or newsletters with pics.		
Microsoft Word: Students Revision tracking and comments		
Microsoft Publisher: Basic Student assignments (poster/sign)		
Microsoft Publisher: Student made brochures		
Microsoft Publisher: Student made books to print for library		
Microsoft Publisher: Student made newspaper		
Microsoft Excel: Students making graphs		

	What is your level of integration?(How much is this a part of your regular classroom practice?)	How much do you desire additional Professional Development in the following?
Microsoft Excel: Student made spreadsheets		
Microsoft Power Point: Student use for presentations		
Microsoft Power Point: Student use to show step by step math problem solving techniques		
Microsoft Power Point: Field trip review with pictures and comments about what was learned.		
Google Docs: Basic student assignments		
Google Docs: Student to student editing		
Google Docs: Students Creating newspapers or newsletters with pics.		
Google Docs: Student Revision tracking and comments		
Google Sheets: Students making graphs		
Google Sheets: Student made spreadsheets		
Google Slides: Student use for presentations		
Google Slides: Student use to show step by step math problem solving techniques		
Google Slides: Field trip review with pictures and comments about what was learned.		
Student to Student Communication: E-Group Projects		
Student Expression: Hyperstudio, Moviemaker, Prezi		
Prezi Presentation: Student use to show step by step math problem solving techniques		

	What is your level of integration?(How much is this a part of your regular classroom practice?)	How much do you desire additional Professional Development in the following?
Prezi Presentation: Field trip review with pictures and comments about what was learned.		

4. Grade primarily worked with:

5. Years of professional teaching experience..

6. What building do you primarily teach at? Only used for statistical purposes will not be reflected with individual answers.

7. As a technology user I would classify myself as:

8. How many hours of district technology PD have you had?

Appendix C: Email Permission to use Survey

Permission for use of the study and its parts were given in an email to the researcher by Neil Strudler of the University of Nevada. The email can be presented upon written request to the researcher. It has been verified by the First Chair.