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Technology-Based Professional Development for Teaching and Learning in K-12 Classrooms

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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the review committee have been made.

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Walden University
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Abstract

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MA, Georgia State University, 2006

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Project Study Submitted in Partial Fulfillment

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Abstract

In an urban Georgia school district, teacher satisfaction surveys revealed that technology-based professional development was not equipping teachers with the skills or support needed to implement technology into their teaching practices. The purpose of this mixed-methods case study was to explore teachers' experiences and perceptions of technology-based professional development and its effect on self-efficacy. Guided by Piaget's constructivist theory, this study was based on the perspective that teachers often construct knowledge rather than gain it. Guiding questions explore the experiences teachers have had with technology integration in daily teaching practices, their self-perceived competency level and self-efficacy regarding technology, their attitudes about provided professional development and time and resources provided for their collaborative professional work, and perceptions about their technology related professional development needs. A purposeful sample of 35 teachers was used to collect quantitative data through a survey and 8 of these teachers were interviewed. Interview data were transcribed, coded, and member checked. Three themes emerged: teacher-centered versus student-centered use; necessity of differentiated professional development; and lack of support, resources, and time. Descriptive analysis revealed that most teachers were using technology daily. Factors contributing to the frequency and quality of technology use included resources, support, and self-efficacy. As a model intervention, the final outcome is a comprehensive professional development plan to provide teachers with a platform to share and improve their teaching practices, which when implemented will offer positive social change, in the form of support for these and other teachers, which will lead to improvements in teaching and learning and achievement of educational outcomes.

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Dedication

This work is dedicated to my mother, Nedy, who started with me on this journey of obtaining my doctoral degree in the physical sense and is now with me in the spiritual as I complete it. I learned from her that through hard work and determination anything is possible.

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I would like to take this time to acknowledge my family, friends, and committee members for their unwavering support throughout this journey toward obtaining my doctoral degree.

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Lastly, I would like to thank my friends near and far who encouraged me with kind words and checked on my progress throughout. Your friendship means the world to me!

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Section 1: The Problem

Professional development opportunities that aid teachers with using technology in the classroom are a challenge (Rose & Plants, 2010; Hartsell, Herron, Fang & Rathod, 2009; Wade, Bohac & Platt, 2013), particularly in school districts across the state of Georgia. The Georgia Department of Education (2017) centers its mission and values around the vision of "graduating students who are ready to learn, ready to live, and ready to lead" (p. 4). An increase in student achievement can be attained by an increase in the use of technology in the classroom (Ladbrook, 2009; Neill & Matthews, 2010; Suhr, Hernandez, Grimes, & Warschauer, 2010). Leaders of Georgia school districts recognize the importance of effective professional development for their teachers and the role that technology plays in educating their students. One metro Atlanta school district prioritized teacher development in its 2015-2020 Strategic Plan, and outlined a strengths-based development model to strive for excellence in teaching (Atlanta Public Schools, 2015).

The district's strategic plan includes a technology-focused element aimed at enhancing instructional technology support in classrooms and building the infrastructure necessary to remain innovative (Atlanta Public Schools, 2015). Despite the technology focus, research indicated that a gap exists between the availability of technology and the level of use by teachers and students (Herron et al., 2009; Moeller & Reitzes, 2011; Reel, 2009; Ross, Morrison, & Lowther, 2010; Smolin & Lawless, 2011). Like many school districts, the Atlanta Public Charter School network equips its teachers with technological resources to promote their vision. The district provides teachers with professional development opportunities that train teachers to use these resources.

This study was prompted by the problem the local school district has had with providing its educators with effective technology-based professional development opportunities that encourage teachers to use technology in their classrooms. One district leader claimed that technological resources are meaningless unless coupled with adequate teacher training (Hui, 2013). Because of the ineffective integration of technology in the public-school curriculum, students are ill-prepared to compete in a global society (Pierce, 2010). Professional literature indicated that this problem is not exclusive to Georgia school districts but is seen in the broader education population. Todorova and Osburg (2010) found that improving communication and presentation of resources through professional development will enhance the sustainability of resources and improve student achievement. Moeller and Rietzes (2011) addressed the current reform efforts in education to have recent graduates ready for college and careers. Moeller and Rietzes asserted that availability of technology does not guarantee impact on student outcomes and proposed a shift in organizational support, teacher attitude, and integration as a means to do so. Zelenak (2015) asserted that "technology may not be a panacea to solve education's problems, but it is a new pedagogical dimension that brings a unique set of challenges and opportunities to education" (p. 4).

I conducted a project study to provide a scholarly response to this educational problem. I defined and investigated the local education problem and used relevant research and theoretical literature to suggest practical solutions. The case study was designed to examine teacher perceptions toward implementing technology in the curriculum and to investigate factors that contribute to effective teacher professional

development. I offered solutions for getting teachers properly trained and supported in their quest to integrate technology in their everyday teaching practices. Research findings were used to support the need for providing teachers with comprehensive and engaging professional development sessions aimed at increasing student achievement through the implementation of technology (Ansyari, 2015; Huston & Weaver, 2008).

The Local Problem

Professional development opportunities that aid teachers with effectively using technology in the classroom are a challenge (Hartsell, et al., 2009; Rose & Plants, 2010). There is a pressing need to provide teachers with content, pedagogy, and exploratory centered teaching through technology-related professional development (Beriswill, Bracey, Sherman-Morris, Huang, & Lee, 2016). This project study focused on the professional development opportunities available to educators in a public charter school network in urban Atlanta. I analyzed factors such as the duration of the professional development sessions (i.e., single session, monthly, per semester, as needed), the effectiveness of the session facilitators measured through participant satisfaction, and participant confidence in implementing the resources. The outcome of this project study may contribute to ongoing professional development activities that aid teachers with feeling more confident with implementing technology in their daily classroom instruction. Bottge, Grant, Stephens, and Rueda (2010) contended that teachers must be given resources through professional development opportunities that merge traditional methods of teaching with technology-based instruction.

Most public schools are equipped with a variety of technological resources that are readily available to teachers for use as instructional tools. Public charter schools are no exception. Faculty are fortunate to have an abundance of technological resources at their fingertips; resources include interactive Whiteboards, document cameras, and mobile computer labs for students and teachers to use at their disposal. In the study site district, representatives are often brought in to introduce new tools to teachers but usually provide surface-level instruction on how to use the resources effectively in the classroom. Teachers are then given the task of discovering how to use the equipment or programs on their own because no further training is offered. Between 2009 and 2012, an initiative was announced to equip every classroom with an interactive Whiteboard to assist teachers with motivating students and creating exploratory learning environments (Dekalb County School System, 2012). The district's technology plan did not include a strategy to train teachers on how to use the interactive Whiteboards, and schools were left with the task of implementing quality, ongoing training for teachers. Due to the need for continuous and meaningful training combined with the lack of opportunities to develop effective lessons, teachers lack confidence in their abilities to implement technology in their instruction. According to Mean and Olson (as cited in Perritt, 2010), "schools that give teachers adequate time to acquire technology skills, plan technology-based activities, and share their technology related work with each other are more successful in bringing a large number of teachers to a level of technological proficiency" (p. 74). According to Bos (2009), a deeper understanding of how to incorporate technology will emerge through such opportunities. Teachers in the study site school district lack ample

professional development opportunities that allow adequate time to acquire, plan, and share technological skills to a level of proficiency.

Rationale

Evidence of the Problem at the Local Level

As schools strive to meet both local and state assessment goals, a shift in instructional practices is necessary to improve learning in schools (Ross et al., 2010). One school district in suburban Atlanta spends about 3% of its annual funds on information technology including technological programs and resources to support classroom instruction (Dekalb County School System, 2013). Although monies are allocated for these resources and trainings, many teachers do not use the resources or implement strategies learned in the mandated professional development sessions. Teachers often feel that limited training is not enough to help them feel confident with implementing a new resource, which often leads to ill will toward the use of technology in general. This ill will further supports the notion that attitude and expertise influence effective technology integration (Blakely, 2015; Inan & Lowther, 2010; Moeller & Reitzes, 2011).

It was necessary to explore why teachers are not implementing newly learned strategies from technology-based professional development in their daily instruction as a means to increase student achievement. Ertmer and Ottenbreit-Leftwich (2010) noted that "when technology is used, it typically is not used to support the kinds of instruction (e.g., student-centered) believed to be most powerful for facilitating student learning" (p. 256). The charter school system's most recent instructional vision lists effective teacher habits which include the appropriate use of technology to support instruction, assessment and

data analysis (Knowledge is Power Program, 2016). The district is committed to providing teachers with instructional technology that is readily available and the training and support to efficiently and effectively use these resources. This directed focus indicates the district's need to close the gap between the resources available to students and the appropriate implementation of technology-based instruction.

Evidence of the Problem from the Professional Literature

Despite technological advancements, some teachers have yet to adapt and embrace these changes in their classrooms to better serve students (Bellamy & Mativo, 2010). Hartsell et al. (2009) contended that traditional methods of teaching do not meet the needs of today's students. The need to differentiate instruction and modify lessons to cater to multiple intelligences is more commonly recognized in public schools today (Bas, 2010). Using technology to get students engaged in a mathematical lesson can be done by using virtual manipulatives to give students prompts, feedback, and answers to problems while letting the students engage in more self-exploration activities (Moyer, Bolyard, & Spikell, 2002). Strudler (2010) claimed that "nearly the entire field of technology and education is about change in some way" (p. 221). Strudler also noted that efforts to close the gap between what could be and what is should be the focus when attempting to address this problem. The possibilities of what could be are dynamic and have the potential to induce change, while the realities are that changes are coming about slowly and are laced with many challenges (Strudler, 2010). There is an immediate need to study and address this problem of lack of technology-based professional development

for teachers to so that students are prepared for the 21st century advancements (Beriswill, et al., 2016).

Definition of Terms

The following terms have multiple definitions depending on the source. For this study, the terms were defined as follows:

Collaboration: The process by which people work together to solve real and complex problems by sharing multiple perspectives, traditions and techniques. Collaborative practices should be mutually beneficial to all participants (Cho, 2017).

Common Core State Standards: Clear and consistent expectations of what students are expected to learn. Common Core State Standards "define the knowledge and skills students should gain throughout their K-12 education" (Common Core State Standards, 2017).

Professional development: Opportunities for teachers to learn new skills and teaching strategies and how to apply knowledge in practice to support student learning (Postholm, 2012). Teachers are often obligated to participate in professional development opportunities to satisfy school, district, or state requirements.

Professional learning community (PLC): Educators committed to working together to improve practice through shared values, interdependence, and creating a safe space to struggle (Sindberg, 2016).

Significance of the Study

This project study contributed to the body of knowledge needed to address the lack of effective technology-based professional development opportunities that currently

exists in the Atlanta public charter school district. Findings were used to suggest ways school districts can provide teachers with quality professional development. Trainings are designed to fully prepare teachers for the implementation of technology-based best practices in their classroom instruction. Findings also provide the district with an effective intervention plan based on results from the research and the related literature review. One of the challenges for classroom teachers is having the ability and time to practice and plan for implementing new technological resources in their instruction. Professional development provides the means for an educator to nurture his or her craft. Comprehensive technology integration occurs when teachers apply technological and pedagogical content knowledge in their planning and instruction (Polly, 2010). A significant increase in student achievement can be attributed to comprehensive technology integration in teachers' planning and instruction (Moeller & Reitzes, 2011; Mohd Meerah, Halim, Rahman, Harun, & Abdullah, 2011; Moore, Kochan, Kraska, & Reames, 2011; Perritt, 2010).

Guiding/Research Questions

The local problem addressed in the study was the lack of professional development opportunities that provide teachers with adequate skills and knowledge to feel comfortable integrating technologies that enhance teaching and student learning. There has been significant research addressing the issue of student achievement as it relates to teaching strategies learned through professional development; however, little research has been done on teacher willingness and readiness to do so. The following five research questions guided this project study:

- What experiences have teachers had with technology integration in daily teaching practices?
- How have teachers' experiences with technology-based professional development impacted their self-perceived competency level and self-efficacy?
- How do teachers perceive technology-based professional development sessions as a means of helping with the implementation of technology in daily classroom instruction?
- How does the allocation of time, resources, and peer collaboration aid in teacher willingness to implement technology in daily classroom teaching and learning?
- What are the key characteristics of a technology-based professional development session that would aid in teachers' abilities to successfully integrate technology in daily classroom instruction?

Review of the Literature

The theoretical framework that guided this project study was constructivist theory. Constructivists believe that learners actively construct knowledge rather than gaining knowledge that has been transmitted by others (Harlow, Cummings, & Aberasturi, 2006). Constructivists view learning as cumulative; therefore, new knowledge is gained through previous experiences (Knowles, Holton, & Swanson, 2015). Bruner (1966) contended that both previous experiences and current knowledge aid in the active construction of new ideas. Bruner further asserted that learners select and transform

information, construct hypotheses, and make decisions by relying on cognitive structures. Constructivist learners gain new knowledge through inquiry, exploration, and clarification (Bruner, 1966). The views of Plato, Socrates, Dewey, and other researchers provided the foundation for current research concerning teaching and learning, and teachers need pedagogical strategies that provide students with the opportunity to learn in multiple ways (National Education Association, 2006). Effective professional development opportunities allow educators to construct their own knowledge aided by their experiences to better serve their students. Professional development training opportunities are effective and feasible means of helping teachers learn new skills and teaching strategies to improve student achievement (Huston & Weaver, 2008). In the following literature review, I use constructivist theory and current literature to discuss the impact of professional development for technology integration on classroom instruction and student learning. I conducted a mixed-methods case study to explore the constructivist idea that learning is cumulative and that teachers might learn to integrate technology through inquiry, exploration, and clarification. The study addressed the gap between what teachers know and what they perceive they need to know about the use of integrated learning technologies.

Professional Development

The primary interest in any educational setting should be the betterment of students. Professional development plays a significant role in improving students' problem-solving, critical thinking, and collaboration skills, which can contribute to their future success. Showers and Joyce (2002) contended that effective professional

development not only improves teacher quality but has also become key to the development of school-related programs and procedures.

The concept of professional development is not new. However, professional development has evolved in many ways. Katzenmeyer and Moller (2009) described the evolution of professional development by decade. They charted the 1970s as the workshop method era, which was followed by the expert training model of the 1980s. During the latter half of the 1980s and early 1990s, the focus shifted to shared decision-making. Professional development in the late 1990s focused on collaboration and introduced the concept of professional learning communities (Katzenmeyer & Moller, 2009). Prior to 1998, the term learning community was primarily used among educational researchers but has now become common jargon of educators throughout North America (DuFour, DuFour, & Eaker, 2008). Given this new role for teachers, professional development opportunities should offer specific instruction, guidance, support and collaboration among teachers (VanOostveen, 2017).

Learning Communities

Professional learning communities (PLCs) are built on the premise of shared inquiry, collegial discussion, and learning as a social enterprise (Nelson, Deuel, Slavit, & Kennedy, 2010). PLCs aid in the effectiveness of professional development as administrators, teachers, and students work together to increase student achievement and provide feedback and support to one another. PLCs provide teachers with the opportunity to bring different learning styles, experiences, and methods to a collaborative environment. PLCs also provide a platform for teachers to work with their colleagues and

other experts to improve instructional practices, improve student achievement, and implement research-based instructional practices (Loucks-Horsley, Love, Stiles, Mundry, & Hewson, 2003). Hord (2004) asserted that when teachers come together as professional learning groups, they are better equipped to overcome barriers and challenges. The more time that is given to planning and collaborating, the better the chances that strategies from professional development sessions will be effectively implemented in the classroom. Professional learning communities offer a structure by which teachers constructively provide each other with feedback as they attempt to employ new strategies or initiatives (Marzano, 2003). DuFour et al. (2008) pointed out that "though the term *professional learning community* has become commonplace, the actual practices of a PLC have yet to become the norm in education" (p. 14).

Difficulties With Professional Development

A lack of quality professional development opportunities exists (Hartsell et al., 2009). Though teachers decide how a curriculum is taught, administrators play a critical role in developing professional development opportunities that are meaningful (Bottge et al., 2010). Principals who view high quality professional development practices as key to properly implementing standards as well as integrating professional development practices into their school culture are ones who lead high-performing schools (Moore et al., 2011). Substantive and rich professional development opportunities have a significant impact on the quality of classroom instruction (Clements & Sarama, 2008). Every program, initiative, and/or practice in professional development sessions has its strengths and limitations. Professional development opportunities should address limitations and

allow teachers to discuss ways to overcome those challenges (Klein & Riordan, 2011). Strategies that work for some teachers may not work for others; therefore, careful planning of the professional development opportunities is essential to cater to the different learning styles of educators who attend (Zhang, Lundber, Koehler, & Eberhardt, 2011).

Because professional development sessions have shifted from the traditional approach of one trainer delivering instructional techniques to teachers to more unconventional approaches, techniques are now presented to teachers via technology and other tactics that are meant to engage and encourage teachers to use practices in their everyday instruction. Petty (2007) outlined characteristics of effective professional development opportunities as being inquiry based, experiential, collaborative, student focused, sustainable, intensive, and in-line with school improvement efforts. Implementation of ideas derived from professional development opportunities takes root when teachers discuss, debate, invent, and implement solutions that have the potential to bridge theory and practice (Hawley & Rollie, 2007).

Professional Development Focused on Technology Integration

Technology can be a valuable contributor to academic achievement. Technology can also be viewed as a tool that forms or changes culture (Borgmann, 2006). Clements and Samara (2003) supported technology as an instructional tool in the classroom because of its benefits in promoting academic and intellectual achievement but also contended that it is the inappropriate implementation of technology that is responsible for many of the flaws that opponents of technology readily point out. Educational institutions

should meet the technological demands of the 21st century and are obligated to assist students with acquiring the technology skills needed to manage, use, understand, and evaluate technology (Johnson, Levine, Smith & Stone, 2010). Successful integration of technology in education must include (a) a connection to student learning, (b) hands-on technology, (c) curriculum-specific application, (d) active participation of teachers, (e) technical support, (f) administrative support, (g) adequate resources, and (h) continuous funding (United States Department of Education, 2005). An effective professional development opportunity is the critical piece that helps facilitate these factors for successful technology integration.

Inquiry-based instruction is preferred over traditional teaching. Instructional practices must not only be attentive to delivery and support in delivery, but must also pay close attention to improving assessment practices and tools that teachers need to alter and develop their lessons (Marshall, Smart, & Horton, 2011). Renzulli, Siegle, Reis, Gavin, & Reed (2009) contended that technology gifted students and mathematically gifted students are led by teachers who have strong backgrounds in these areas, which usually develop through professional development.

Technology Integration and Classroom Instruction

Towers and Rapke (2011) acknowledged teaching as "a form of practical wisdom that calls on practitioners to make sound judgments in and about practice" (p. 22). As teacher-centered lessons become less popular in the educational realm, the need to insert resources, particularly technology-based resources, into classroom instruction is necessary to produce a more student-centered environment. Examples of resources that

enhance instruction include video lecture archival systems (Cascaval, Fogler, Abrams, & Durham, 2008) and digital videos (Manner & Rodriquez, 2010). Though many other sources exist, these support the findings of my study and show how meaningful technology-based resources are needed to aid in effective classroom instruction.

The norm of learning for most teachers during their schooling most likely consisted of daily routines involving drill-and-practice instruction. Teachers often teach in the way they were taught. Alesandrini and Larson (2002) contended that "until teachers experience constructivism themselves, they may not be equipped to plan and facilitate constructivist activities by their students" (p. 118). Although a teacher's main goal is to increase student achievement, teachers may find it challenging to master different teaching styles, particularly problem-based learning, which is a student-centered strategy (Neufeld & Roper, 2003). The implementation of new technological advancements intended to aid in the instructional delivery of mathematics can create anxiety among teachers with inadequate training. Teachers take ownership of new strategies when they feel confident in their delivery, and student achievement increases (Mohr, Rogers, Sandordd, Nocerino, MacLean, & Clawson, 2004).

In addition to the view that learning occurs through experiences, constructivists also stress that "all knowledge is context bound, and that individuals make personal meaning of their learning experiences" (Knowles et al., 2015, p. 177). For teachers to conceptualize and internalize best practices, they must personally connect to the tasks. In Furtado's (2010) study, teachers were given the opportunity to attend a 5-day professional development training, and then were sent back to a 1-day training in 3 month

intervals. The outcome of this experience resulted in teachers gaining confidence, engaging in peer collaboration, and showing ease and comfort with implementing inquiry-based instruction using technology. Manner and Rodriguez (2010) showcased an ongoing professional development course that was successful in helping its participants assist their students with producing high-quality projects. These students produced digital videos that they took pride in and that provided them with opportunities for personal reflection. These videos were shared with students worldwide. These studies highlight the importance of providing teachers with multiple experiences through professional development that allows them to build on previous knowledge.

Although the use of technology in the classroom to support student learning has proven and identifiable benefits, many teachers do not use technology efficiently (Johnson et al., 2010). Bauer and Kenton (2005) documented that 80% of teachers use technology less than 50% of the time. Most teachers do not use technology as a teaching resource and do not integrate it in their curriculum (Bauer & Kenton, 2005). Many teachers find that incorporating technological advances in their classrooms often leads to ineffective or unproductive teaching outcomes.

Research shows that teachers will avoid integrating new methods and tools in their instructional practices unless they feel comfortable doing so (Engel & Randall, 2009). An average of only 8 hours of professional development per year is given to teachers (Brinkerhoff, 2006). Brinkerhoff (2006) contended that teachers need the time to practice with technology once they have learned to use it to effectively incorporate it in

their teaching. Brinkerhoff also noted that it can take 3 to 5 years to effectively integrate technology that is capable of supporting student learning.

Technology Integration and Student Learning

Student learning and student achievement should be at the forefront of any educational endeavor. Early interventions can increase the quality of instruction and help students develop a solid foundation for content knowledge (Clemets & Sarama, 2008). Students benefit most from using technology that has the potential to improve their learning experience (Bottge et al., 2010). According to Renzulli et al. (2009), "technologically gifted students can usually be identified by the technology products they produce, the way they assist others with technology, and the technology-related questions they ask" (p. 96). Academically gifted students can easily organize data, find patterns, generalize, and solve problems abstractly (Renzulli et al., 2009). Integrating academically and technologically gifted traits has the potential of being an effective way to increase student achievement.

Coppola (2004) pointed out that significant amounts of valuable teaching time and effort are wasted when teachers do not have the appropriate knowledge on how to use educational technology in the classroom. Student learning and achievement occur when capable teachers can communicate through technology (Keengwe, Arome, Anyanwu, & Whittaker, 2006). Professional development is essential to increasing teachers' abilities to effectively integrate technology in the classroom. When the integration of technology is not emphasized, it can cause more harm than good to the students being exposed to the technology implementation (Lei & Zhao, 2007).

Implications

The findings from the literature review indicated the need for teachers to have more comprehensive technology-based professional development sessions. Prior research demonstrated that meaningful technology-based professional development opportunities impact the pedagogy of teachers. In the current project, I examined professional development sessions that modeled ones that were meaningful and comprehensive in nature. Findings may offer strategies that administrators and school districts can use to ensure that they are providing teachers with meaningful and comprehensive professional development opportunities.

Summary

A metro Atlanta school district's vision statement is to aspire to be one that is high-performing and fosters a love of learning in students through inspiring teachers (Atlanta Public Schools, 2015). Without technology-based professional development opportunities, teachers are unable to work towards meeting the district's goal. Districts are not providing comprehensive professional development opportunities that nurture a teachers' ability to effectively implement technological resources into daily instructional practices. The districts' goal can be successful when teachers have the necessary skills, knowledge, resources and support, otherwise all stakeholders (teachers, students and administrators) will continue to carry philosophies and attitudes that oppose standards based reforms (Booher-Jennings, 2005).

In summary, the theoretical framework that guided this project study was the constructivist theory. Supporting literature was used to determine professional

development practices that promote successful integration of technology in the classroom. The framework and literature indicated why teachers are not using technology more in their daily classroom instruction to differentiate instruction. Research questions were developed to address teacher willingness to implement strategies into classroom instruction, student engagement, and student achievement.

In Section 2, I will discuss the methodology and design that was used for my project study, including discussions on the ethical treatment of human participants. The data collection plan and analysis is also included in Section 2.

Section 2: The Methodology

Research Design and Approach

The purpose of the mixed methods case study was to determine how teachers at a variety of levels (novice to veteran) were integrating technology into their classrooms and the challenges faced when doing so. I also sought to determine teacher needs in terms of providing effective technology-based professional development to overcome these challenges. I used a mixed-methods case study design combining both quantitative and qualitative data (Creswell, & Garrett, 2008). The case study design was used to gather in-depth data regarding teacher perceptions via surveys and interviews. Participating teachers were given the opportunity to voice their opinions and share their technology-based instructional experiences and strategies. Exploring teachers' perspectives was consistent with the constructivist notion that learning is cumulative by combining previous experience with current knowledge to construct new ideas. Participants also completed a survey that provided quantitative data. The survey addressed the amount of time teachers dedicate to technology use, the availability of technology, and support and resources for teachers and students.

According to Creswell (2007), "the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone" (p. 6). To provide a comprehensive analysis of the research problem, I employed a concurrent mixed-methods design. In a mixed-methods design, both quantitative and qualitative data is collected at the same time and is then used to inform the interpretation of the final results (Creswell, 2009).

Setting and Sample

The qualitative portion of this mixed-methods case study focused on eight teachers who teach various subjects to K-12 students. All participants who were invited to participate in the interviews, agreed to participate, and provided the qualitative data used. The quantitative survey was open to a wider population of 42 teachers (including the interview participants), of which 35 completed the survey (83% response rate). All participants are full-time district employees who constituted a diverse sample in terms of culture, gender, years of teaching experience, and pedagogical practices. The eight interview participants included highly qualified teachers, noncertified teachers, teachers new to teaching, and special education teachers. These categories framed the cases for this study. Surveys were also used to collect quantitative data. The survey was open to all teachers in the school regardless of subject area and grade level to ensure representation of the diverse teaching staff. This purposeful convenience sampling technique was employed so that results could be generalized to a larger population of classroom teachers to make informed decisions about their needs (Lodico, Spaulding, & Voegtle, 2010).

Characteristics of Sample

Highly qualified teachers. According to the Georgia Department of Education (2015), a highly qualified teacher is one who (a) holds at least a bachelor's degree, (b) is fully certified in a state, and (c) has proven that he or she knows the subject he or she is teaching. Each state must report what percentage of classes have highly qualified teachers. The study site district reported that in the 2015-2016 school year, 97% of its teachers were highly qualified (Governor's Office of Student Achievement, 2016).

Noncertified teachers. The research site is a public charter school in the metro Atlanta area. Although the school strives to hire teachers who have in-field certifications, it is not a requirement that teachers at the site be certified. Noncertified teachers are generally completing a nontraditional route to obtaining their certification. There are 13 teachers (25%) at the site who are not certified.

New teachers. In the 2014-2015 school year, 19% of teachers in the study site had 0-2 years of teaching experience. This is above the state average of 13% (Governor's Office of Student Achievement, 2016).

Special education teachers. Special education teachers are required to teach curriculum standards either in a co-teaching setting or a small group setting. Because these teachers are required to implement the Common Core State Standards, they have been included in this study.

Instrumentation and Materials

Quantitative data were collected through the Teacher Technology and Learning Survey developed by Education Technology Planners, Inc. (Appendix C). This 5-point Likert-type survey was open to the entire population of teachers at the site (42 teachers), and 35 completed it (83% response rate). To measure perceived technology knowledge of teachers, I used Hosseini and Kamal's (2013) questionnaire in conjunction with the Teacher Technology and Learning Survey. Franklin (2007) used a similar survey instrument that addressed four factors that support teachers' use of technology: (a) access and availability, (b) preparation and training, (c) leadership, and (d) time. I employed similar descriptive and inferential statistics as those used in Franklin's study.

Qualitative data were collected from eight teachers in the sample. The one-on-one, semi structured interviews averaged 30 minutes. The interviews allowed each participant to expand on the data from the survey. The interviews addressed teachers' experiences with technology to understand and compare teachers' feelings of self-efficacy and to identify best practices for technology-based professional development based on teachers' experiences. In a similar study, McDonnough and Matkins (2010) employed interviews to explore participants' experiences. Data collection was enhanced by allowing teachers to report personal experiences in their own words.

Data Collection and Analysis

I used a concurrent mixed-methods design. Creswell (2009) described this strategy as one in which qualitative and quantitative data are collected at the same time and one in which the researcher converges quantitative and qualitative data to analyze the research problem. In preparation for the study, I obtained institutional review board (IRB) approval from Walden University.

Qualitative Data

Qualitative data were collected via 30-minute, one-on-one, semi structured interviews with each participant using an interview guide (Appendix E) with prompts that addressed each research question. After obtaining IRB approval, I sent an email to all prospective educators asking for their participation in the interview portion of the study (Appendix D) along with a consent form. The email offered participants an opportunity to contact me via email, by phone, or in person to clarify questions regarding the study and to set up a convenient interview date and time. All interviews were conducted in

teachers' classrooms after school, during lunch or planning periods, or at the teacher's discretion outside of normal teaching hours. At the beginning of each interview, participants were reminded of the purpose of the study and their rights as participants. All interviews were audio taped and transcribed to obtain qualitative data exploring teachers' experiences, perceptions, and needs regarding technology implementation and technology-based professional development.

Data were organized in tables and analyzed for key words, common ideas, and themes. Interviews were transcribed and analyzed line by line to identify relevant information as a means of open coding (see Glense, 2011). Coding is a process in which data are divided into smaller parts of information (Dana & Yendol-Hoppey, 2009). The codes were further analyzed for overlapping themes to show relationships among the data (see Creswell, 2012). Themes emerged by arranging the codes into hierarchies using categories and subcategories (see Glense, 2011). After coding, the interview transcripts were numbered so I could easily retrieve the transcripts when necessary. Data were then analyzed to compare themes and to determine whether connections existed among themes (see Glense, 2011).

Within a week after each interview, each teacher was provided with a report of my analysis and was asked to check for accuracy and to identify information that needed to be changed. Participants were asked whether the information collected was complete and realistic, whether the themes were accurate and appropriate, and whether my interpretations were a fair and an accurate representation of what they intended (see

Creswell, 2012). By having participants complete this member checking process, I enhanced the validity of my findings.

Quantitative Data

Quantitative data served as the supplemental component of this mixed-methods design. Once permission to conduct research was granted by the IRB, all perspective participants (which included the entire teaching staff) were invited to complete the online survey (Appendix B) via email. The invitational email requesting participation in the survey portion of the study included study details and a link to the survey. Both the Teacher Technology and Learning Survey and the Questionnaire to Measure Perceived Technology Integration Knowledge of Teachers (TPCK) were administered using the online platform Survey Monkey. I also collected demographic data (subject(s) taught, grade level(s) taught, years of experience, how often technology is used for teaching, etc.) (Appendix C). The 5-point Likert-type survey included a quasi-interval scale in which equal intervals among the responses could not be guaranteed (see Creswell, 2012). Responses were scored and tabulated depending on frequency. Survey data were then analyzed using descriptive statistics and cross tabulation. Survey results were kept in a password-protected database, and descriptive analysis was used to describe the results as well as identify commonalities among of the data (see Creswell, 2012). Results were cross-tabulated to determine trends between factors such as the frequency of technology use compared to years of experience, or the degree of use compared to the frequency of use and degree of professional development pursued.

The TPCK is a pre-established survey that has been documented in literature as a valid instrument thereby increasing the validity of the quantitative data collected (Lodico et al., 2010). To further establish validity and credibility, I asked interview participants to check the data gathered from the TPCK survey to confirm that their experiences with technology integration and technology-based professional development were represented in the data. This check helped determine whether the survey was a reliable measure of participants' experiences. Once data were confirmed as valid and credible, they were classified, coded, and categorized based on similar responses. All data remained confidential and were kept secure at all times. No identifiable information was included, and participants received an open invitation to review the study's results during and after the research process.

Triangulation occurred during the analysis stage. The quantitative data from the survey was cross-referenced with the qualitative data from the interviews. In addition, I performed member checks throughout the study to confirm that my interpretation captures the perspectives of the participants (see Merriam, 2009). Merriam (2009) described reliability as the extent to which the outcomes of a study would be the same if the study was conducted again. Permission from the creators of the survey instruments was obtained prior to administering the data collection tools. Both tools were used in previous, larger scale research and were deemed reliable.

Assumptions, Limitations, Scope, and Delimitations

Assumptions

I assumed that all participants in the study responded honestly to the survey and interview questions. I also assumed that the teachers surveyed had different opinions and responded differently to the shared professional development sessions.

Limitations

Given the small sample size eight interview participants and 35 survey participants, generalizability was limited. Future researchers may conduct a similar study using a larger sample to enhance generalizability (see Creswell, 2012).

Scope and Delimitations

This study was bounded by a population of educators who teach in a small charter school district. The group was chosen to be a representative sample of teachers with varying teaching experience and subject area knowledge. Because the results were supported by previous studies, they may be transferable to similar settings and teacher demographics and may inform additional research on technology-based professional development. The intent of the study was to explore reasons why teachers implement or do not implement technology into their daily classroom instruction. The study did not intend to offer solutions for overcoming the barriers of technology integration, but to highlight those major barriers and determine the role technology-based professional development has in addressing those barriers.

Protection of Participants' Rights

Walden University is committed to ensuring that all research participants are treated ethically. Walden requires researchers to complete the National Institutes of Health (NIH) training course Protecting Human Research Participants. This course must be taken before data can be collected to ensure that researchers are fully aware of the manner in which participants must be treated. Proof of completion of the course was submitted with the IRB application and a copy is provided in Appendix G.

All participants were informed of their rights and were asked to carefully read the consent form and ask questions before signing. There were no risks to participants and all activities were a part of their normal teaching duties (i.e. attending professional development sessions). All information collected was kept confidential to encourage participants to express their opinions comfortably and openly.

Quantitative Results

Based on the results from the Teacher Technology and Learning Survey and the Questionnaire to Measure Perceived Technology Integration Knowledge of Teachers (TPCK), most teachers use technology daily for both teacher use and student learning. Students mainly used technology for researching and reinforcing skills, while teacher's main uses for technology included administrative-type work and classroom instruction (i.e. SmartBoard use). Availability of technological resources, technology-based support, and teacher self-efficacy were the major factors that determined the frequency of technology use.

An invitation to complete the combined surveys was sent out to 42 teachers in which 35 responded (83%). The survey yielded the quantitative data for this case study and was used to address the following research questions:

- What experiences have teachers had with technology integration into daily teaching practices?
- How have teachers' experiences with technology-based professional development impacted their self-perceived competency level and self-efficacy?
- How do teachers perceive technology-based professional development sessions as a means of helping with the implementation of technology into daily classroom instruction?
- How does the allocation of time, resources and peer collaboration aid in teacher willingness to implement technology into daily classroom teaching and learning?

Demographic information such as grade level, subject area and number of years of professional teaching experience (see Table 1) were collected from the surveys. Respondents represented a wide range of classroom teachers that make up the public charter school system. The sample also included highly qualified, non-certified, and special education teachers.

Table 1

Teacher Demographic Data

Teacher Demographic Data	*n*	*%*
Grade Level taught:		
K-5	6	17.14%
6-8	21	60.00%
9-12	8	22.86%
Years of professional teaching experience:		
2 or less	5	14.71%
3-7	10	29.41%
8-20	17	50.00%
21+	2	5.88%
Subject Area(s) Taught:		
Art	1	2.86%
Health &/or Physical Education	2	5.71%
History/Social Studies	7	20.00%
Language Arts	7	20.00%
Mathematics	20	57.14%
Reading	7	20.00%
Science	10	28.57%
Special Education	3	8.57%
Other	3	9%

By gathering data from educators representing diverse backgrounds, content knowledge, grades and subjects taught, a more holistic representation of teachers' experience with technology was analyzed. This data was also used to determine for what purposes technology was being integrated into classrooms.

Technology Integration

Cross referencing data from multiple survey questions revealed potential barriers to technology use in classroom. Barriers were related to the availability of technological resources, intended use and access to support. Figure 1 shows that both students (69%) and teachers (89%) were using technology daily or weekly in most classrooms. All

participants were classroom teachers who have a working Interactive White Board and at least two working computers in their classrooms. Although mandatory duties such as taking attendance daily using an online platform require the use of technology, 11% of teachers (4 out of 35) were still not using technology on a daily or weekly basis and 32% of students were not utilizing available technological resources consistently.

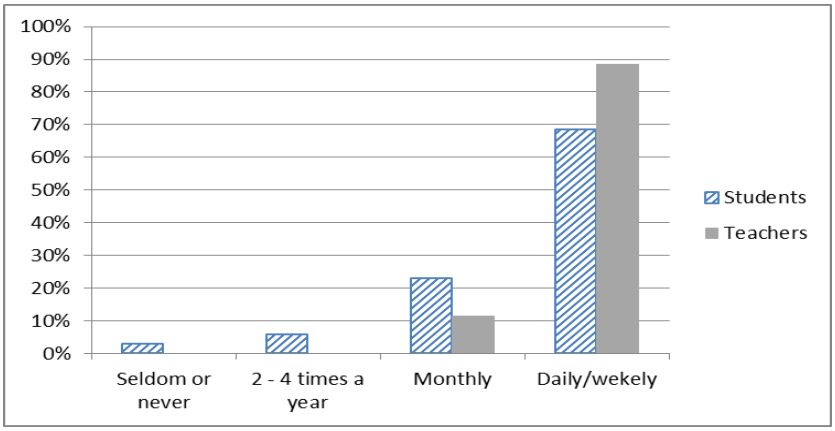

Figure 1 Comparison of Frequency of Student Use and Teacher Use of Technology in the Classroom

The availability of resources had an impact on how often students and teachers used technology in the classroom. When students had technology readily available (76% or more), resources were being used on a daily or weekly basis (95%). When there was a limited number of students who had technology readily available (0 – 20%), those limited resources were still being used on a daily or weekly basis by students (100%). A comparison of these data is shown in Table 2.

Table 2

Comparison of Availability of Resources to Time Students Technology Use

Percentage of my students with daily access to technology	*Classroom use of technology for students*			
	Seldom or never	2 – 4 times a year	Monthly	Daily/Weekly
0 – 20%	0%	0%	0%	100%
21 – 40%	0%	0%	33%	67%
41 – 75%	0%	0%	25%	75%
76% or more	0%	0%	5%	95%

Table 3 shows that when technology was easily and/or always available for teacher use, 90% of teachers used technology on a daily/weekly basis.

Table 3

Comparison of Availability of Resources to Time Teachers Use Technology

Availability of computers for professional use	*Professional use of technology:*			
	Seldom or never	2 – 4 times a year	Monthly	Daily/Weekly
None/not available	0%	0%	0%	0%
Available with effort	0%	0%	0%	10%
Easily available	0%	0%	50%	10%
Always available	0%	0%	50%	80%

Students used technology in the classroom for a variety of reasons. When examining the various ways students use technology in the classroom, results show that technology was mostly used for tasks such as online research, practicing new skills, and as an alternative activity when classwork is completed early. However, less time was spent learning keyboarding skills, participating in online exchanges, facilitating electronic portfolios and supporting online collaborative projects (see Table 4) and other skills essential to 21st century learning.

Table 4

Student Learning Practices with Technology

	Not using technology for this	Using technology for this 2 - 4 times a year	Using technology for this monthly	Using technology for this daily/ weekly	*n*	Rating Average
Conduct on-line research and/or investigations	15.15%	24.24%	36.36%	24.24%	33	2.70
Translate data into visual representations	15.15%	24.24%	30.30%	30.30%	33	2.76
Learn keyboarding skills	70.97%	6.45%	9.68%	12.90%	31	1.65
Learn word processing, spreadsheets and/or databases skills	54.55%	21.21%	9.09%	15.15%	33	1.85
Learn multimedia presentation skills	28.13%	25.00%	21.88%	25.00%	32	2.44
Learn Internet skills	18.75%	28.13%	15.63%	37.50%	32	2.72
Use electronic reference tools	40.63%	12.50%	25.00%	21.88%	32	2.28
Use technology to identify problems and strategize possible solutions	34.38%	21.88%	18.75%	25.00%	32	2.34
Practice skills or concepts not yet learned	6.25%	6.25%	50.00%	37.50%	32	3.19
Provide alternative activities when “class work” is finished	21.88%	6.25%	37.50%	34.38%	32	2.84
Support collaborative projects within the classroom	15.63%	21.88%	43.75%	18.75%	32	2.66
Explore and learn topics of their own choice	21.88%	28.13%	25.00%	25.00%	32	2.53
Provide resource information not available at the school site	25.00%	18.75%	34.38%	21.88%	32	2.53
Participate in on-line exchanges	71.88%	12.50%	9.38%	6.25%	32	1.50
Facilitate electronic portfolios containing actual samples of student work in various media	53.13%	21.88%	12.50%	12.50%	32	1.84
Enable students to demonstrate their achievement in alternative ways	18.75%	31.25%	31.25%	18.75%	32	2.50
Support on-line collaborative projects with groups beyond classroom	48.39%	16.13%	22.58%	12.90%	31	2.00
Provide instructional games	9.38%	18.75%	40.63%	31.25%	32	2.94

While students used technology for various purposes as shown in Table 4, the support available when troubleshooting contributed to the frequency of technology use by students in the classroom. Of the teachers who only used technology for students 2 – 4 times a year, all reported that support is likely to be available while teachers who used technology the most reported that support is sometimes available. The more a teacher allows students to use technology in the classroom, the less support there was available from support staff (see Table 5). A separate question in the survey revealed that students were often capable of fixing technological problems on their own. Teachers also turned to peer teachers to assist with technological issues.

Table 5

Comparison of Time Spent Using Technology for Classroom Use and Availability of Support

When I have trouble with technology, support staff is:	*Classroom Use of Technology for Students*			
	Seldom or never	2 – 4 times a year	Monthly	Daily/Weekly
Likely to be available	0%	100%	50%	33%
Sometimes available	0%	0%	38%	63%
Usually not available	0%	0%	13%	4%

The amount of time spent integrating technology into the classroom for teaching and learning purposes varied from teacher to teacher and classroom to classroom. However, a common trend is evident: the more technological resources and support made available to teachers and students, the more it is used. With an onset of technology readily available to teachers and students, an increase in support is needed on a consistent basis.

Self-Efficacy

Self-efficacy is how one perceives his or her abilities (Romero & Kyriacou, 2016). Self-efficacy was evaluated using data from the Questionnaire to Measure Perceived Technology Integration Knowledge of Teachers (TPCK), which measured technological, pedagogical and content knowledge. Trends were determined given how one perceives his or her ability to integrate technology, teaching experience and time spent using technology.

Participants classified themselves into one of four categories as a technology user: non-user, beginner, confident, or capable of teaching others (see Table 6). Novice teachers deemed themselves mostly confident enough in their abilities as technology users to teach others despite their teaching experience. Veteran teachers (those having 8+ years of experience), also felt confident in their abilities. The district could leverage the abilities of these confident teachers to assist, mentor and train other teachers who are less confident in their abilities. Traditional teachers tend to take on a more traditional approach to teaching that disregard the use of technology (Hartsell et al., 2009). By allowing confident teachers to train teachers who use more traditional teaching methods, the district could utilize the internal collaboration and support.

Table 6

Comparison of Number of Years of Teaching Experience with Classification

Years of professional teaching experience	*As a technology user, I would classify myself as:*			
	Non-user *n* = 0	Beginner *n* = 3	Confident *n* = 20	Capable of teaching others *n* = 11
2 or less	0 (0%)	0 (0%)	2 (40%)	3 (60%)
3-7	0 (0%)	2 (20%)	7 (70%)	1 (10%)
8-20	0 (0%)	1 (6%)	9 (53%)	7 (41%)
21+	0 (0%)	0 (0%)	2 (100%)	0 (0%)

Table 7 shows that 100% of teachers who deemed themselves capable of teaching others, also used technology for professional use, daily or weekly bases. The teachers in the district studied are required to perform many professional duties daily using technology (i.e. taking attendance, submitting lessons plans, sending discipline referrals, etc.). If performing professional duties as required, all teachers should have been using technology daily.

Table 7

Comparison of Time Spent Using Technology to Self-Efficacy

As a technology user, I would classify myself as:	*Professional use of technology:*			
	Seldom or never *n* = 0	2 – 4 times a year *n* = 0	Monthly *n* = 4	Daily/Weekly *n* = 31
Non-user	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Beginner	0 (0%)	0 (0%)	2 (67%)	1 (33%)
Confident	0 (0%)	0 (0%)	2 (10%)	19 (90%)
Capable of teaching others	0 (0%)	0 (0%)	0 (0%)	11 (100%)

To further evaluate how knowledgeable teachers were regarding the effective use of technology in teaching practices, the TPCK questionnaire was administered. Table 8,

measured the knowledge required to use technology tools for various tasks. Most participants were confident in their abilities and knowledge of technological resources. Most could solve their own technical problems and learned how to use technology through trail-and-error. These teachers learn to use technology easily and consistently keep up with modern technologies. While most teachers surveyed used technology to process and report data, they lacked knowledge of designing webpages, authoring software and developing strategies for solving real-world problems (essential skill for 21st century teaching and learning).

Table 8

Measure of Technology Knowledge

n = 32	***Strongly Disagree***	***Disagree***	***Undecided***	***Agree***	***Strongly Agree***
I know how to solve my own technical problems	1 (3%)	3 (9%)	2 (6%)	20 (63%)	6 (19%)
I can learn technology easily	1 (3%)	1 (3%)	1 (3%)	17 (53%)	12 (38%)
I keep up with important new technologies	2 (6%)	2 (6%)	3 (9%)	17 (53%)	8 (25%)
I frequently play around with technology	2 (6%)	2 (6%)	1 (3%)	19 (59%)	8 (25%)
I know about a lot of different technologies	2 (6%)	3 (9%)	10 (31%)	10 (31%)	7 (22%)
I have the technical skills I need to use technology	1 (3%)	1 (3%)	4 (13%)	16 (50%)	10 (31%)
I have had sufficient opportunities to work with different technologies	0 (0%)	5 (16%)	6 (19%)	15 (47%)	6 (19%)
I can use technology tools to process data and report results	1 (3%)	3 (9%)	3 (9%)	16 (50%)	9 (28%)
I can use technology in the development of strategies for solving problems in the real world	6 (19%)	6 (19%)	7 (22%)	14 (44%)	7 (22%)
I have the ability to design webpages and to use authoring software	8 (25%)	6 (19%)	5 (16%)	9 (28%)	4 (13%)
I understand the legal, ethical, cultural, and societal issues related to technology	0 (0%)	2 (6%)	5 (16%)	17 (53%)	8 (25%)

To measure teachers' knowledge of technology tools that enhance teaching and learning, participants responded to the *Measure of Technological Pedagogical Knowledge* question (Table 9). Results show a strong trend of teachers who were certain that they could enhance instruction using technology.

Table 9

Measure of Technological Pedagogical Knowledge

n = 32	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
I can choose technologies that enhance the teaching approaches for a lesson.	0 (0%)	1 (3%)	4 (13%)	13 (41%)	13 (42%)
I can choose technologies that enhance students' learning for a lesson.	0 (0%)	0 (0%)	1 (3%)	18 (56%)	13 (41%)
I am thinking critically about how to use technology in my classroom.	0 (0%)	3 (10%)	1 (3%)	18 (58%)	9 (29%)
I can adapt the use of technologies that I am learning about to different teaching activities.	0 (0%)	2 (6%)	0 (0%)	19 (59%)	11 (34%)
My teacher education program has caused me to think more deeply about how technology could influence the teaching approaches I use in my classroom.	2 (6%)	5 (16%)	5 (16%)	10 (31%)	10 (31%)
I can use technology resources to facilitate higher order thinking skills, including problem solving, critical thinking, decision-making, knowledge and creative thinking.	1 (3%)	2 (6%)	3 (9%)	18 (56%)	8 (25%)
I can use technology tools and information resources to increase productivity.	1 (3%)	1 (3%)	2 (6%)	19 (59%)	9 (28%)
I can infuse technology to strategies of teaching.	0 (0%)	1 (3%)	3 (9%)	19 (59%)	9 (28%)
I can use technology for more collaboration and communication among students and with other teachers.	0 (0%)	1 (3%)	4 (13%)	15 (48%)	11 (35%)
I know how to use technology to facilitate academic learning.	0 (0%)	1 (3%)	3 (10%)	15 (48%)	12 (39%)

While notable that participants felt confident in their abilities to enhance instruction with technology, it was equally important to evaluate the knowledge and skills teachers possess that enables them to appropriately select technologies that supplement a specific content area (see Table 10). Results represent a strong tendency of teachers who are confident in their abilities to appropriately select, evaluate, manage, use, and present technologies that enhance teacher and student understanding of specific content.

Table 20

Measure of Technological Content Knowledge

n = 32	***Strongly Disagree***	***Disagree***	***Undecided***	***Agree***	***Strongly Agree***
I know about technologies that I can use for understanding my particular content.	0 (0%)	1 (3%)	3 (9%)	14 (44%)	14 (44%)
I know how to use specific software and Web sites about my particular content area.	0 (0%)	2 (6%)	0 (0%)	18 (56%)	12 (38%)
I can find and evaluate the resources that I need for my particular content area.	0 (0%)	1 (3%)	2 (6%)	17 (53%)	12 (38%)
I can use technology for presenting my particular content.	0 (0%)	0 (0%)	1 (3%)	16 (50%)	15 (47%)
I can use technology tools and resources for managing and communicating information of my particular content area.	0 (0%)	1 (3%)	1 (3%)	18 (56%)	12 (38%)

Table 11 evaluates a combination of technological, pedagogical and content knowledge. Results show that most teachers felt confident in their ability to select, use, combine, and evaluate technology for a specific subject area however these teachers still lacked the confidence in leading others in technology-based instruction.

Table 13

Measure of Technological Pedagogical Content Knowledge

n = 32	***Strongly Disagree***	***Disagree***	***Undecided***	***Agree***	***Strongly Agree***
I can teach lessons that appropriately combine my particular content area, technologies and teaching approaches.	0 (0%)	0 (0%)	1 (3%)	19 (59%)	12 (38%)
I can select technologies to use in my classroom that enhance what I teach, how I teach and what students learn.	0 (0%)	0 (0%)	4 (13%)	16 (50%)	12 (38%)
I can use strategies that combine my particular content, technologies and teaching approaches that I learned about in my teacher preparation program, in my classroom.	0 (0%)	2 (6%)	1 (3%)	19 (59%)	10 (31%)
I can provide leadership in helping others to coordinate the use of my particular content, technologies and teaching approaches at my school and/or district/region.	1 (3%)	6 (19%)	3 (9%)	12 (38%)	10 (31%)
I can choose technologies that enhance the learning of my particular content area.	1 (3%)	0 (0%)	1 (3%)	16 (50%)	14 (44%)
I can evaluate and select new information resources and technological innovations based on their appropriateness to specific tasks in my particular content area.	0 (0%)	2 (6%)	3 (9%)	18 (56%)	9 (28%)
I can use my particular content-specific tools (e.g., software, simulation, environmental probes, graphing calculators, exploratory environments, Web tools) to support learning and research.	0 (0%)	1 (3%)	2 (6%)	15 (47%)	14 (44%)

Technology-Based Professional Development and Support

This study focuses on professional developments' role in effectively supporting teachers with the implementation of technology. The quantitative data gathered through the *Teacher Technology Learning Survey* and the TPCK was used to evaluate teacher's experience with professional development as well as the follow-up support that offered to

teachers. The following data explores trends related to technology use, professional development opportunities and support offered.

In the charter school district studied, 17 of 35 teachers surveyed reported that staff development has been adequate (48%). As shown in Table 12, of the teachers that have found technology-based professional development adequate, 71% classified themselves as confident and the remainder of them (29%) deemed themselves capable of teaching others. All others believed that professional development had not been adequate, was offered but not taken or had not been offered at all. Further evaluation of what has been offered and why teachers opt out is needed. The qualitative data collected further explores the criteria teachers used in classifying a professional development session as adequate and what improvements should be made.

Table 42

Comparison of Hours of Technology-Based Professional Development and Self-Classification

As a technology user, I would classify myself as:				
Technology staff development offered by my school or district has:	Non-user n = 0	Beginner n = 3	Confident n = 21	Capable of teaching others n = 11
Been adequate	0 (0%)	0 (0%)	12 (71%)	5 (29%)
Been offered, but not taken	0 (0%)	2 (33%)	1 (17%)	3 (50%)
Not been adequate	0 (0%)	1 (11%)	6 (67%)	2 (22%)
Not been offered	0 (0%)	0 (0%)	2 (67%)	1 (33%)

The surveys also evaluated how much support is typically available to teachers and to what extent. Teachers reported that support staff was generally available to assist with technological problems with considerable time lags (see table 13). Table 14 shows

the quality of support received when assistance was needed. When support was available it was mostly satisfactory yet lagging. It is important to note that five of the teachers surveyed experienced frustration with support and one to the point of being debilitating to instructional efforts. Teachers reported response time ranging from one school day to one week (Table 15). Response time could create frustration if assistance is needed during a lesson or affects the successful execution of a lesson. Further exploration of teacher frustration is evaluated in the qualitative portion of this study through teacher interviews.

Table 53

Availability of Support with Technology Difficulties

When I have trouble with technology, support staff is	*n*	*%*
Likely to be available	13	39%
Sometimes available	18	55%
Usually not available	2	6%

Table 64

Quality of Assistance with Technology Difficulties

Overall rating of your technical support experiences	*n*	*%*
Outstanding	4	12%
Satisfactory	12	36%
Lagging	12	36%
Frustrating	4	12%
Debilitating to instructional effort	1	3%

Table 75

Response Time

General response time to your technical needs	*n*	*%*
Within the hour	1	3%
Within the school day	8	24%
Within 24 hours	6	18%
Within 48 hours	4	12%
Within the week	8	24%
Within the month	2	6%
Who knows!	4	12%

As the quantitative portion of this studied has provided insight into how teachers are integrating technology, how teachers perceive their ability to integrate technology (self-efficacy), and the technology-based professional development and support offered to teachers, it would all be for null if teachers were not benefiting from technology integration. Table 16, reveals how technology has enabled teachers to enhance their instructional practices. Teachers made significant changes in their instructional practices by using technology in-lieu of lecturing, when presenting complex material, to better assess students, to increase time to work with individual students and groups of students, and to allow students more time to work independently. Teachers are better equipped to individualize and differentiate instruction through technology integration.

Table 86

Technology-Enabled Changes to Instructional Practices

How has the use of technology enabled you to make changes in instructional practices: (check all that apply)		
	n	%
I spend less time lecturing to the whole class	20	58.8
I am better able to present complex material	16	47.1
There is more time with individuals or small groups	20	58.8
I am better able to assess student's individual talents/skills	20	58.8
There is increased time for students to work independently	20	58.8
I am able to be a learner in real-time with my students	7	20.6
I am better able to differentiate, individualize instruction	24	70.6
I have made no significant changes	1	2.9

Qualitative Results

Qualitative data was examined to determine how teachers were integrating technology into their classroom instruction, how teachers perceive their ability levels with integrating technology and to further evaluate teachers' experiences with technology-based professional development. The qualitative data was derived from one-to-one interviews with eight teachers from the charter school district studied. Teachers were asked a series of questions that were used to guide the interview (see Appendix E). Participants were not prevented from, but rather encouraged to, share all relevant experiences and thoughts. After interviews were transcribed, participants were given the opportunity to review the interview, verify accuracy, and clarify any information if

necessary. Data from the qualitative portion of this study was used to address the following research questions:

- What experiences have teachers had with technology integration into daily teaching practices?
- How have teachers' experiences with technology-based professional development impacted their self-perceived competency level and self-efficacy?
- How do teachers perceive technology-based professional development sessions as a means of helping with the implementation of technology into daily classroom instruction?
- How does the allocation of time, resources and peer collaboration aid in teacher willingness to implement technology into daily classroom teaching and learning?
- What are the key characteristics of a technology-based professional development session that would aid in teachers' abilities to successfully integrate technology into daily classroom instruction?

While coding and analyzing the qualitative data collected through teacher interviews, three common themes emerged:

1. Current technology use is more teacher-centered versus student-centered.
2. Effective professional development is differentiated and meets the needs of individual teachers.

3. Teachers are confident in their technological abilities but lack the support, resources and time to effectively implement various approaches to technology integration.

These themes served as the foundation for disseminating the qualitative results.

Technology Integration

Teachers interviewed were very candid about how they integrate technology into the classroom. Answers varied but the common theme was that technology integration is more teacher-focused than student-focused. Teachers interviewed mainly used technology for facilitating teaching and reinforcing concepts but rarely for student-derived deliverables. Although students play games and watch videos with technology, they rarely use technology for students to research, explore and create products. Teachers reported using tools such as the Promethean Board or online resources to help facilitate teaching. To supplement lessons, students watch videos that reinforce skills or use websites that allow them to practice skills. An elementary teacher, Teacher #6, admittedly noted, “I really only use technology to write on the interactive whiteboard when I teach”. She goes on to say, “I also let students play games on the student computers”. A high school teacher, Teacher #5, noted a recent lesson where he used the interactive whiteboard and a graphing program to “graph exponential functions to help students see the rate of change”. In this case, students did not use the same program as it was used simply as a demonstration.

All teachers reported using technology to meet the needs of individual students and individual groups of students. Teachers quickly assess students using online resources

and/or tools such as ActiveVote. Technology is often used to complete daily administrative tasks such as taking attendance, submitting lesson plans, writing administrative student referrals, etc. Teacher #2 often gave her students projects or allowed them to research topics prior to and after the delivery of a lesson. Teacher #5 noted that students find it challenging to relate a concept to the 'real-world' so technology is often used to assist students with making a real-world connection to concepts.

There was some evidence of student-directed technology integration in classrooms. Middle and high school humanities teachers mentioned student-led initiatives such as researching and book reports however, these uses were less prevalent. With such few instances of student-led uses for technology, it was evident that technology integration is mostly teacher-led.

Professional Development and Support

Teachers reported not having computers, laptops or iPads readily available. There were not enough tools in-house and some were broken or outdated. Many online resources require access that come with a cost. Technical issues happen frequently and teachers have either learned how to troubleshoot common difficulties on their own, or have found that students often know how to troubleshoot problems themselves. Teacher #4 stated, "the kids usually know how to fix most technical issues anyways…you know they are always fixing video games". Teachers often received technical help from their peers, but the district does not provide a full-time staff member in each school dedicated to providing needed technical support and training. Teachers #1 and #6 report that they

genuinely want to integrate technology more, but lack the time in the school day to effectively do so and get through the standard curriculum.

Teacher's #2 and #5 noted training for most technology-based resources were at an introductory level only. Teacher #3 recounted initial training as beneficial however, there was a need to have follow-up training to be able to work with resource more in-depth. Although personnel are not designated to provide technical assistance, administrative staff support teachers by suggesting mentors who are proficient with a particular resource. Teachers are offered effective technology-based feedback during observations. Teacher #1 suggested allowing teachers to go to other schools to observe how a technological resource is effectively implemented in another setting.

Veteran teacher, teacher #4, proactively seeks out technology-based professional development opportunities outside of the region. He also led most technology-based PDs offered to teachers. Teacher #8 was a new teacher and had only attended a technology-based PD once. Teachers noted that most PDs throughout the school year incorporated the use of different technological resources but were intended to serve other purposes. Technology-focused professional development is lacking in the charter school district.

Overall teacher favored professional development sessions that were hands-on, content specific and allowed for interactions with a learning community. Sessions that were lecture-style and lacked examples and resources were deemed irrelevant. Teachers would like technology-based professional development to be a priority through the allocation of time for training. Teacher #1 suggested PD sessions be in a station-style to allow teachers to be exposed to multiple resources within a single session.

Self-Efficacy

During the one-to-one interviews, teachers were asked about their competency level and comfort with integrating technology into the classroom after a professional development session. Teachers felt confident in their abilities to implement technology immediately following a PD session due to the relevancy of the session and the general excitement about using a recently introduced technological resource.

The following research questions were posed to help determine teachers' self-efficacy with technology integration:

1. What experiences have teachers had with technology integration into daily teaching practices? The teachers interviewed use technology in the classroom in various ways ranging from teaching using a Promethean Board for classroom instruction to videos and websites that help reinforce skills taught. Whether novice or veteran, most teachers use technology daily in some capacity.
2. How have teachers' experiences with technology-based professional development impacted their self-perceived competency level and self-efficacy? Teachers limited experience with technology-based professional development were generally due to being new in the profession. Whether novice or experienced, most teachers described technology-based professional development as generally surface-level and neither ongoing nor in-depth. Technology-based PD does not significantly improve or diminish self-perceived competency or efficacy.

3. How do teachers perceive technology-based professional development sessions as a means of helping with the implementation of technology into daily classroom instruction? Teachers mostly perceived technology-based professional development as a fleeting process that occurs once, when a new, trendy resource is adopted but does not go beyond the initial training. Teachers rely on the collaboration with peers and trial-and-error to get the experience and confidence needed to implement technological resources.
4. How does the allocation of time, resources and peer collaboration aid in teacher willingness to implement technology into daily classroom teaching and learning? Teachers noted that allocation of time, resources, and support weigh heavily on a teacher's decision to implement technology in the classroom. Collaborating with peers and teacher mentors to share ideas or troubleshoot were also main factors for willingness to implement technology into every day teaching practices.
5. What are the key characteristics of a technology-based professional development session that would aid in teachers' abilities to successfully integrate technology into daily classroom instruction? Teachers adamantly noted that professional development sessions that were hands-on, content specific, and allowed for interactions with a learning community most effectively aided in their ability to successfully integrate technology into daily classroom instruction.

Emerging from the results of these research questions were three common themes: (a) current technology use is more teacher-centered versus student-centered, (b) effective professional development is differentiated and meets the needs of individual teachers, and (c) teachers are confident in their technological abilities but lack the support, resources and time to effectively implement various approaches to technology integration.

Conclusion

This project study employed a mixed-methods case study research design combining both quantitative and qualitative data to obtain information regarding teacher experiences and perceptions towards technology use and technology-based professional development. The study targeted a population of K-12 teachers using a purposeful convenience sampling technique. Quantitative data was collected through a confidential, Likert-like survey and qualitative data via one-on-one interviews with participants. Though assumptions and limitations with the study exists', all efforts to ensure ethical treatment of participants was priority.

Several commonalities were present in both the quantitative and qualitative data collected. Teachers implement technology for a variety of reasons and in a variety of ways. When technology is available, teachers attempt to use it. As teachers become more comfortable using technology, the more likely they are to use it for teaching and learning. Most teachers deemed themselves proficient as technology users in the classroom. Technology-based professional development opportunities are sparse so teachers have learned to adapt by 'playing around' with the resources or turn to a peer for assistance.

The most effective professional development sessions have been ones that are hands-on, engaging and relevant to a teacher's content area.

In response to the analyzed data, a project was developed that provides teachers with the opportunity to participate in research-based, comprehensive professional development sessions. The sessions aim to provide the private charter school system with possible solutions to common obstacles teachers experience when integrating technology into their everyday teaching practices. Implications for social change include increased support for teachers who use technology and improved teacher use of technology in the classroom, which can lead to an increase in student engagement and teacher self-efficacy. The next session gives a detailed description of the project.

Section 3: The Project

I developed a detailed professional development plan (PDP) that included a series of technology-based professional development sessions in response to the findings from the current study. The goals of the PDP were to provide teachers with differentiated support, best practices, implementation strategies, and technological resources to meet the needs of the students they serve. Findings from the study combined with previous research supported the implementation of effective technology-based professional development opportunities. In this section, I describe the rationale for the project and how the problem can be addressed, including a review of literature supporting the rationale. I also describe the resources needed, existing supports and barriers, proposal for implementation, implications, and the roles and responsibilities of stakeholders. Finally, I present a comprehensive and detailed evaluation plan. The evaluation plan will be used to assess the effectiveness and impact of the PDP and to measure the level of attainment of the project's goals to provide teachers with differentiated support, technology-based best practices, and implementation strategies and resources. I describe the PDP in this section, and the entire plan is available in Appendix A.

Description and Goals

The PDP was developed to address the problem that exists in the local charter school network: Teachers lack the skills and understanding needed to integrate technology for effective teaching. Currently, this school system does not provide adequate training or support for teachers using technology. Providing teachers with a platform of differentiated and ongoing training is a natural progression of assisting

teachers with integrating technology in their everyday teaching practices. The project included a series of professional development activities designed to (a) be differentiated based on a teacher's experience and self-efficacy with technology-based instruction, (b) reveal best practices and assist teachers with the implementation of these best practices, and (c) provide teachers with a list of practical resources. The PDP sessions will support the local school district's current plan to become a 1:1 technology school.

The projected outcome of the PDP project is that teachers who actively attend the sessions will gain the skills and understandings necessary to effectively implement technology-based instruction in their teaching practices and to effectively enhance student learning. The PD sessions will provide teachers with collaborative and innovative sessions tailored to their strengths, development areas, and personal outcomes. Teachers will walk away with resources and strategies that have been proven effective by other classroom teachers. By the end of the sessions, the different cohorts of teachers will have learned how to effectively lesson plan with different technological tools, anticipate and troubleshoot problems when they occur, and observe others' use of technology. The skills, knowledge, collaboration, and confidence gained will allow teachers to be more successful in their implementation of technology-based instruction and to provide students with more meaningful learning experiences.

Rationale

Although research indicated progression in implementing technology-based instructional practices for teaching and learning in the classroom, additional research on teacher perspectives, factors that promote or discourage teachers from incorporating

technology into classroom teaching practices, and necessary support systems was needed. Findings from the current study served as a foundation for the PDP. The study site public charter school network has a 3-year technology plan for schools to be 1:1 meaning each student has an electronic device to access the Internet, digital course materials, and/or digital textbooks. However, this plan does not include a professional development component that includes ongoing trainings that are differentiated based on teacher and student needs and teacher ability levels.

Based on the findings from the current study, the PDP included a series of professional development opportunities that meet the needs of individual teachers and the students they teach. Teachers' experiences with technology-based professional development were previously a one-time occurrence that did not give teachers the opportunity to immerse themselves in the technologies and forced them to implement technology on a trial-and-error basis. Collaborating with peers and other teacher mentors to share ideas or troubleshoot were main factors for willingness to implement technology. Given these findings, the PDP included a series of trainings that allow teachers to reconvene periodically to share best practices and learn more about the features of a technological resource. Results from the study also revealed that effective training sessions were ones that were hands-on and relevant to teachers' content area. This prompted the need for the PDP to be differentiated and to cater to the needs of individual teachers. Lastly, given that students learn best when they meaningfully construct their knowledge and engage with a topic (Harlow et al., 2006), all PDP sessions focused on technology implementation that is student centered versus teacher centered. The series of

ongoing trainings provides teachers with differentiated access to necessary resources, strategies, and support systems to effectively implement technology in classrooms.

Review of the Literature

The following literature review addresses key themes and concepts related to technology-based professional development. The literature review was based on the results from Section 2 and focuses on current literature related to findings from my study. I used databases through the Walden University library including ProQuest, SAGE Premier, ERIC, and Education Research Complete. Online searches were also conducted using Google Scholar. Search terms used included *professional development in education, effective professional development, professional learning communities in education, teacher development, technology-based professional development*, *teacher self-efficacy with technology use*, and *technology-based best practices*. This literature review includes recently published studies that addressed technology integration in the classroom, professional development and support needed to integrate technology in the classroom, and teacher self-efficacy around technology-based instruction, which were categories that emerged from findings in my study.

Integrating technology in the classroom can be an arduous task particularly when resources, support, and training are not readily available and ongoing to ensure that the implementation is as smooth as possible. The need to provide students with modernized learning opportunities is more pressing than ever. Teaching with technology has been supported in numerous studies as an effective way to increase student engagement, meet the needs of individual learners, expose students to rigorous content, and support teacher

pedagogy (Kennedy & Odell, 2014); however, without proper training, implementation remains teacher-led and another strategy to try without being well thought out or planned.

Technology Integration

The digital age has made it necessary for students to be able to research, use information, and communicate using technology. These skills can be developed through teaching that allows students to be active, innovative, and responsible for their learning (Konokman & Yelken, 2016). Barriers to technology integration are both extrinsic (infrastructure related) and intrinsic (via beliefs and attitudes) (Vatanartiran & Karadeniz, 2015). Many studies showed the benefits of technology use in the classroom to (a) create hands-on and meaningful lessons (Spaulding, 2013), (b) increase student motivation and engagement (Mustafina, 2016; Rabah, 2015; Sabzian, Gilakjani, & Sodouri, 2013), (c) maintain mastery of skills (Vajravelu & Muhs, 2016), (d) increase academic confidence in students (Costley, 2014), and (e) allow time for students to enhance their technology skills and educational performance (Nwoobi, Ngozi, Rufina, & Ogbonnaya, 2016). Transformative teaching with technology can be achieved through careful selection of technologies used, understanding the role and goals of teachers and students, and continuous reflective practices (Kimmons, Miller, Amador, Desjardins, & Hall (2015). Transformative learning occurs not only when a student obtains a certain amount of information but also when his or her thoughts, feelings, and beliefs are transformed (Mirela & Hellen, 2015). This literature review and rationale were used to frame the outcomes of the PDP.

Professional Development and Support

Participants in the current study acknowledged the lack of support offered when attempting to use technology in their classrooms. Support included technical support as well as ongoing support beyond the initial training when a new initiative/technological resource becomes available. Teachers need to receive support not only when they initially use a new technology resource but also when they practice using it and begin to integrate it in their classrooms (Rabah, 2015). Lack of technical support was identified as a major barrier in similar investigations (Al Ghamdi & Samarji, 2016; Gupte, 2015; Helm, 2015; Porter & Graham, 2015) justifying the need for technical support and professional development to be redesigned such that they are responsive to the workplace constraints that teachers face (Muhametjanova & Cagiltay, 2016). Although internal professional development within the region's schools is typically good at introducing innovative technology, ongoing development takes place through the sharing and calling upon of peers mostly in a reactive way. This project included a component for teachers to be able to collaborate during training and beyond so that they continue to feel supported. Novice and veteran teachers will be paired in a mentoring relationship, and resources will be shared using a folder providing ongoing support and resources for teachers as they integrate technologies in current and future lessons.

The constructivist notion that learning happens when learners have formed what they learned through experience (Sabzian et al., 2013) was the theoretical framework for this study. Mirela and Hellens (2015) found that constructivism in transformative teaching and learning facilitated growth in students' self-esteem, perception of abilities

and skills, and motivation to learn. The training sessions in the PDP allow for teachers to manipulate technologies throughout training sessions to promote deep understanding and learning.

Teacher Self-Efficacy

Before students can benefit from technology-based classroom instruction, teachers must have a constructivist learning belief that teaching with technology creates higher level, engaging, inquiry-based, collaborative experiences for students (Hsu, 2016). Teacher attitudes and beliefs about the importance of technology in the classroom combined with their attitudes and beliefs about their abilities to use the technology are key to successfully integrating technology in the classroom (Mustafina, 2016). Teachers' and students' exposure to technology-based instruction has increased in the digital age, and whether it makes teaching and learning easier is related to positive or negative experiences (Konokman & Yelken, 2016). Pedagogical knowledge, content knowledge, and technological knowledge combined do not guarantee a balance of effective technology integration. Rather, it is more of an art involving a teacher's ability to bring knowledge into action and maintain a balance between technology integration and differentiating instruction (Belbase, 2015). Collaborating with a community of professionals has a positive effect on teacher self-efficacy as the development of skills (Oriji & Amadi, 2016). Therefore, structured time for collaborating with peers is an integral part of the PDP to increase teacher self-efficacy and to share best practices.

The preceding literature review highlights the importance of providing teachers with professional development and the support needed to increase self-efficacy and

implementation of technology-based instruction in the classroom. In the digital age, teaching with technology is inevitable. Therefore, teachers must select and use the technological resources that they put in front of students. Effective implementation can be accomplished through the development of support systems for teachers throughout the implementation process from lesson planning to lesson reflections. In doing so, teachers build self-confidence and are provided with a wealth of strategies, resources, and support. Considering the literature review findings, the goals of the proposed PDP were as follows:

1. provide teachers with differentiated support based on comfort level with technology use,
2. provide attendees with models of best practices and implementation strategies, and provide technological resources as well as peer resources that support teachers with technology use for teaching and learning purposes.

Implementation

The following section includes the implementation process of the PDP. I describe potential resources and existing supports. I also include a proposal for implementation, a timetable, and the roles and responsibilities related to implementing the PDP.

As a requirement to effectively implement the technology-based professional development sessions, teachers will be separated into three groups (beginners, intermediates, and mentors) based on their experience with using technological resources in class, as well as their self-prescribed comfort level with technology use. Findings in the case study indicated that teachers need ongoing support and resources when

attempting to implement technology in the classroom. Consequently, the PDP focuses on training using the mentor group to help novice and intermediate teachers in a personalized manner. Mentors will be ongoing trainers to assist others and will have additional responsibilities that include a planning component. Additionally, mentors will be required to troubleshoot hardware and software problems that may arise as teachers implement technology in their classrooms. The following outlines the 3-day training sessions for the mentor teachers:

- Day 1: Introduction to Technology use in the classroom
    - Why Use Technology: Justifying Technology Use?
    - Changing Teacher Roles
    - Enhancing Existing Teaching and Learning Methods
- Day 2: Technology Leaders of Learning Communities
    - Overview of Goals and Outcomes of PLCs
    - Roles and Responsibilities
- Day 3: Planning Learning Communities
    - Planning strategies and steps
    - Assign mentees/groups
    - Calendar monthly training sessions with mentee teachers

Potential Resources and Existing Supports

Additional resources and supports are necessary in the development of this project. Mentor teachers will come with diverse backgrounds and roles and would benefit from leadership development. John C. Maxwell's book *The 21 Irrefutable Laws of*

Leadership is a recommended read for all mentors. Ongoing evaluations on the effectiveness of individual PLCs under the leadership of the mentor will be conducted to provide additional support as needed.

The local charter school network studied has several professional development sessions that it offers teachers throughout any given school year. A cohort of mentor teachers will be created to assist teachers at varying levels with the implementation of technology into classroom instruction. Doing so allows teachers of varying ability levels to receive individualized support during various phases of the implementation process.

Potential Barriers

The proposed professional development sessions will be beneficial to all those involved including novice teachers, experienced teachers, technologically deficient teachers and mentors. A potential barrier to proper implementation is the time commitment required for all those involved. Both mentors and teachers will have schedule time to meet monthly to receive training. Teacher attitudes towards transforming not only their physical space in the classroom but also their shift in pedagogy, could also pose a potential barrier.

Proposal for Implementation and Timetable

The plan for training mentor teachers is included in this project study. Day 1 of the mentor training will focus on the justification of technology-based instruction for enhancing classroom instruction. Day 2 will review the goals and outcomes for the professional learning communities and responsibilities of the PLC's members. All participants will take a survey prior to mentor training and teachers will be placed in

groups based upon their experience, self-efficacy and learning goals as determined by the survey data. On the final day of the initial mentor training, mentors will use the information from the teacher surveys to strategically plan for the cohort of teachers they will assist. Mentors will meet again as a cohort mid-year to discuss strengths and development areas of the PDP and re-strategize if necessary.

The different teams of teachers will then meet after mentor training to get more details about requirements, expectations and the plan for the year-long sessions. Trainings and meetings will be conducted on an ongoing basis, at minimum monthly, and will last the duration of a school year.

Roles and Responsibilities

The project includes a plan that provides detailed guidance for facilitators and participants. A comprehensive PowerPoint presentation has been developed to assist facilitators with the initial three-day training. The initial training will introduce participants to the technology-based PDP, reviews its goals and outcomes, roles and responsibilities, and set expectations for participation. The facilitator will be responsible for gathering materials for each meeting, determining a meeting space, keeping minutes, facilitating discussions, and setting an agenda for each meeting based on the needs of the group. The facilitator will also be responsible for distributing surveys after each session and the summative evaluation at the end (Appendix F). Facilitators will also take an active role in observing teacher's classroom to determine if teachers are implementing the best practices learned from PD sessions.

The dates and frequency of the learning community meetings will be determined by the participants with the expectation of meeting at least once a month. This will help provide ongoing and differentiated support based on the needs of the participants. Participants are expected to attend every session and actively engage in the activities. Additional group norms will be determined by each group.

Project Evaluation Plan

The goal of the PDP is to provide teachers with a resource and support system, a technology-based learning community, that aids teachers with effectively implementing technology into their everyday teaching practices. This Project includes a series of professional development activities aimed at: (a) providing differentiated sessions based on a teacher's experience and self-efficacy with technology-based instruction, (b) reveal best practices and assist teachers with the implementation of these best practices and (c) provide attendees with a bank of practical resources. To ensure that these goals are met and to evaluate the effectiveness of the PDP, Kirkpatrick's four-level evaluation model will be utilized: evaluating reactions, learning, behavior and results (Kirkpatrick, 2009) (Figure 2).

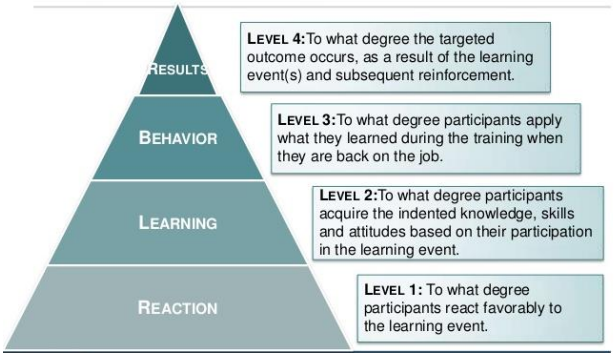

Figure 2. Kirkpatrick's Training Evaluation Model (Cardet, 2016).

The evaluation plan, when implemented, will measure the effectiveness of the PDP and teacher willingness and success with implementing strategies and best practices learned in PD sessions. In addition, the hope is that the evaluation plan will provide results that are positive and gratifying for all involved.

Each time learning communities gather, participant reactions to the content and training model will be evaluated using a brief survey (Appendix F). The survey asks participants to provide feedback about how they liked the session, instructor and presentation style. In addition, questions will allow participants to rate how well the session met their individual needs and how relevant the session was.

To address the second level of Kirkpatrick's evaluation model, evaluation of learning, the survey distributed at the end of each session and will ask the participants to determine if the session's learning objectives were met. Specific questions that are directly aligned to the content of any given session will be given as an 'exit ticket' to determine if learning objectives were met. Sample questions for the initial 3-day mentor training are provided below and the access to the questions can be found in Appendix A:

- Day 1
    - What are the benefits of using technology in the classroom?
    - How has the role of the classroom teacher evolved?
    - List at least four technology-use best practices.
- Day 2
    - What are the goals of the PLCSs?

    - What is your role as a mentor? How will you know how effective you are at your role as a mentor teacher?
    - Based on your cohorts 'Needs Assessment Survey', what specific skills and knowledge will be most beneficial to your PLC?
- Day 3
    - What planning strategy tools will you utilize? Why?
    - Which recommended training sessions will you use with your specific cohort? Why?

Participants' answers should be aligned to the reasons stated in the presentation. These questions should show that there has been a change in knowledge, skills and/or attitudes as a result of the session.

It will also be necessary to determine whether teacher behaviors are changing after each session, Level 3 in Kirkpatrick's evaluation model. Given so, facilitators and administrators will observe classrooms to see if teachers are implementing best practices learned through these PDP sessions. Results from the observations will be used to determine the effectiveness of each session, guide the next sessions agenda and determine further supports needed on an individual teacher basis. Data will be collected throughout the year and aggregated at the end to determine how much technology-based teaching behaviors have changed.

Finally, a deep look into the results of the sessions will be conducted, Level 4 of Kirkpatrick's plan (Kirkpatrick & Kirkpatrick, 2006). An evaluation of the PDP is necessary to determine if the training led to meeting the goals of increasing teacher self-

efficacy with technology integration, providing a support system and cohort for teachers to share best practices and to ultimately determine if an increase in student achievement occurred because of successful technology integration for teaching and learning. Kirkpatrick notes that it is difficult to establish firm evidence that a program way the key source or only source that produced a given outcome. Even so, to achieve Level 4 outcomes, teacher survey data will be evaluated at different intervals throughout the implementation of the PDP to determine the amount of change in teacher self-efficacy. Results from the evaluation plan will be used by the charter school district to enhance future technology-based professional development sessions by revealing the PDPs strengths and areas of development and use them to guide the development and implementation of future trainings. On a broader scale, evaluation results can be used as a baseline for any school or district looking to support teachers with successful implementation of technology-based instruction.

Project Implications

The Professional Development Plan will benefit teachers throughout the charter school network. Through the plan, teachers will participate and contribute to a learning community whose goal is to share best practices and enhance teaching practices through technology integration. Teachers will benefit from the collaboration and available resources. In addition, students will benefit from the opportunity to learn via technology in a more interactive way than they may have traditionally and in ways that are differentiated to their learning modalities. This type of engagement fosters a positive learning environment where students can better thrive academically.

School leaders and other stakeholders will benefit from a plan that caters to the needs of their individual teachers. There should be an increase in technology-use across classrooms and across schools so that lessons are more interactive and engaging for students. Stakeholders will take comfort in knowing that there was a concrete plan and action steps were taken to work towards the goal of becoming a 1:1 region.

In a larger context, the professional development plan will be a catalyst for any school or district looking to support teachers with successful implementation of technology into their classroom for teaching and/or learning. The professional development plan not only provides teachers with individualized support, it also provides resources and a cohort of other educators to teach and learn from. Teachers are liable to show an increase in self-efficacy and in turn increase performance by incorporating best practices learned during PDP sessions.

Conclusion

My project study explored the challenges teachers face with technology-based instruction and the support systems provided to teachers around technology implementation. This comprehensive, technology-based Professional Development Plan should be ongoing so that there is continuous support for teachers when implementing technology into their everyday teaching practices. The evaluation plan provides an opportunity to revisit the needs of teachers in intervals and plan for the evolving support needed. This allows teachers in a cohort to receive the most necessary and up-to-date support needed for implementation.

The goals for the project are to provide teachers with a differentiated support system based on self-identified needs, provide teachers with best practices and implementation strategies, and to suggest additional useful technology-based resources. The project addresses each these areas by offering teachers a cohort of other educators in which to share best practices with. Changes in self-efficacy and teaching practices to meet the needs of students will lead to more active student engagement and an overall better environment for teaching and learning.

Section 4: Reflections and Conclusions

The purpose of this study was to explore teachers' experiences and perceptions of technology-based professional development opportunities and the effect that these have on teacher willingness to use technology in the classroom for everyday teaching and learning purposes. Section 4 encompasses my reflections on this mixed-methods case study while outlining the project's strengths, limitations, and recommendations for managing the limitations. I also include a reflection on the development of the project, the research process, and myself as a scholar, leader, and change agent. I conclude with a discussion of the project's potential impact on social change and the direction for future research.

Project Strengths

The major strength of this project is that it provides teachers with a supportive learning community that allows educators to feel more confident in their use of technology in the classroom. In addition, the project also addresses the overall problem that the state and local school districts are having with providing educators with effective technology-based professional development opportunities that encourage teachers to use technology in their classrooms. Throughout the study, it was evident that teachers who used technology daily felt that technology enhanced student their teaching practices and student learning. Through survey data and interviews, it was also evident that teachers needed a support system that helped them meet the challenges of trying to incorporate technology in daily instruction versus working on a trail-and-error basis. The project addressed this by providing timely and differentiated training such that teachers are more

willing and feel more successful when integrating technology. One final strength of the project is that it was designed for both the novice and experienced teacher. The project provided opportunities for teachers who are new to teaching and/or new to using technology with mentors who are more experienced technology users. The project also provided opportunities to be mentors as well as to receive technology-based training at more advanced levels.

Recommendations for Remediation of Limitations

Although the project has several strengths, it also has a few limitations. One of the project's guiding questions addressed teacher self-efficacy and willingness to incorporate technology in everyday teaching practices. Teacher mind-set and teacher investment are essential to the success of this project. If a teacher has had negative experiences with technology integration or feels that traditional ways of teaching have been working, a growth mind-set is essential. Peer-to-peer observations and data digs are ways to promote this growth mind-set.

Dweck (2012) researched the effect that a growth mind-set versus a fixed mind-set has on individuals' motivation and achievement and ultimately how successful they are at accomplishing a goal or task. Gerstein (2014) suggested ways to develop a growth mind-set in teachers through modeling, creating space for new ideas, building in a time for self-reflection, and providing teachers with formative feedback. In this project study, I recommended that mentor teachers and professional development liaisons model expectations and encourage educators to see themselves as learners capable of learning and improving (Gerstein, 2014). During the technology-based professional development

sessions, there should be a time built in for self-reflection (at the beginning, middle, and end of the sessions), and feedback must be provided from an outside perspective.

Embedded in the project should be a space to share and analyze data. As argued previously, 21st century learning includes technology-based instruction. Teachers must analyze student achievement data so they can determine what is working and what is not, and must revise instruction to meet the needs of their students. Kronholz (2012) argued that there is not enough time for teachers to read data and use the data to rethink their lesson plans. This project provides dedicated time for members of the PLC to do in-depth analysis and adjustment.

Scholarship

Because of this project study, I have learned and grown as a scholar. I have refined my skills in scholarly writing, research, and analysis. I realize the importance of using a scholarly voice in my writing to address the problem of the lack of technology-based professional development for teachers. As a researcher, I examined various sources to get a thorough understanding of what research has been done regarding technology-based professional development and where there is a gap. I now have a better understanding of the importance of using current research to support my claims and findings. Not only do I have a more in-depth understanding of the importance of analyzing and using current research articles to enhance the credibility of findings, I also feel that my ability to analyze data has been enhanced. I intend to use my new skills and knowledge to assist others as they look to refine their practices.

Project Development and Evaluation

My project study was developed as a response to the interest I found in understanding why some teachers in my local school were not using technology to enhance their classroom instruction. I wanted to determine why and how several teachers throughout the building were using technology and were noticing success with their students. When I decided to pursue my doctoral degree, I took classes at Walden University that provided me with the knowledge and skills needed to find background information and other scholarly works related to technology integration, to determine the gap in research, to explore the problem, and to develop a research plan.

I created a PDP based on the findings from the study, which indicated that teachers were lacking the support and training needed to feel comfortable integrating technology in their everyday teaching practices. I designed the project to provide teachers with a community of learners and a mentor willing to provide ongoing support and share best practices. Based on this purpose for developing this project, I put goals and objectives in place to evaluate the project's effectiveness using Kirkpatrick's four-level evaluation model (Kirpatrick & Kirkpatrick, 2006). Results of the evaluation will be shared with stakeholders in the local charter school network and will be used to guide future professional development sessions.

Leadership and Change

This project study has impacted me as a leader as has reignited the desire to use my leadership role to bring about change in my local community of learners and to become more of a global change agent. Educators must adapt to students different

learning styles and must be willing to revise outdated teaching practices to better relate to the students they teach. Technology-based instruction is a huge factor for student success in the 21st century.

Results from this study showed that teachers and students are willing to use technology for teaching and learning if they have support. As a current instructional leader, it is my job to provide teachers with these support systems. This doctoral study provided me with the opportunity to create a PDP that provides these supports.

Analysis of Self as a Scholar, Practitioner, and Project Developer

I have always been a self-proclaimed lifelong learner. Because of the courses taken at Walden University and through my many years of work on this project study, I have grown tremendously as a scholar. By reading various articles and books related to my course work and interest in technology-based instruction, I have gained new knowledge about factors that impact the educational system. I became adept at vetting material and worked hard to be a reputable researcher. It has been challenging, but this experience as researcher and the skills and knowledge gained have refined my scholarly habits and will continue to be beneficial to me beyond the educational setting.

The knowledge and skills gained through the development of this project study have also made me reevaluate my role as a practitioner. I realize the importance of ensuring that teachers get the support needed to be successful educators and to produce successful students. I have the responsibility of sharing my knowledge with others, particularly teachers and other instructional leaders, to develop teachers in their instructional practices and cater to the needs of their technology-dependent students.

Developing the project took quite a bit of time and commitment; however, my passion for technology-based instruction allowed me to develop a project that I am proud of and that will benefit teachers in any educational setting. I worked hard to ensure that the project is suitable and satisfies what teachers need and want. I was pushed to focus on data to drive the project's direction. I hope to use the project as a catalyst in my local region and in other school districts to provide teachers with standardized, ongoing technology-based support.

The Project's Potential Impact on Social Change

I explored teachers' experiences and perceptions of technology-based professional development opportunities and the effect that these have on teacher willingness to use technology in the classroom for everyday teaching and learning purposes. The project was designed in response to an overwhelming desire for teachers to have a support system and ongoing training when attempting to implement innovative technologies. The project has the potential to impact social change locally and beyond as it provides a platform for teachers to share and improve their teaching practices. As teachers participate in these technology-based professional development sessions and improve their teaching craft, technology-integrated classrooms have the potential to significantly enhance student engagement and improve student achievement (Hilliard, 2015).

Implications, Applications, and Directions for Future Research

This study showed how educators value their teaching craft and how important student achievement is to them. Most teachers enter the profession to make a difference in the lives of others and deeply care about their impact on their students. As teachers

embrace the idea that technology-based instruction is inevitable, they can apply their experiences and knowledge from professional development sessions to develop their craft.

Future research with a larger sample size is needed to determine whether the reluctance to integrate technology in instruction is a localized issue or whether the problem is found in other school systems. A larger sample could reveal additional understandings of the difficulties teachers experience with technology integration. Additionally, future research could focus on related areas such as the impact a specific technological resource has on teaching and learning, growth mind-set, and changing teacher perceptions. Data from the evaluation plan should reveal ways to improve the project and reach districts on a larger scale.

Conclusion

This project study was prompted by the fact that professional development opportunities currently available to teachers are lacking in the breadth and depth necessary to address teachers' needs as they relate to integrating technology in everyday teaching practices. A literature review provided the background to support my investigation of this problem that the local charter school system is experiencing. I sought to identify the factors that were preventing teachers from integrating technology and the impact of professional development on effective integration. Findings indicated that self-efficacy, support received, and quality of professional development opportunities impacted teacher willingness and effectiveness with technology integration. The resulting project was developed in response to the findings and to my personal desire to provide

teachers with the support needed to be master educators. This project is foundational in providing teachers with the desired support system. As the findings and the project are shared with the local charter school network, it is my hope that the implementation will positively impact teachers, students, and school leaders. According to Tyunnikov (2017),

> the need for continuing professional teacher development, as well as for greater efficiency of teachers' innovative activities, is essential by default, due to the urgency and value of the education continuity. The present demand for teachers, showing advanced aptitude for innovations, is an important reason for promotion of innovative practices in the continuous teacher training. (pp. 167-168)

As 21st century teaching and learning evolve and the need to provide students with modernized learning opportunities increases, I have the responsibility to explore best ways to support teachers as they work to create engaging learning environments for their students through technology-based instruction.

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Appendix A: The Project

Technology-Based Teaching and Learning

Professional Development Plan

by Nijia Byrd

Introduction

This Professional Development Plan (PDP) is designed to provide a platform for teachers to acquire and share knowledge, skills and best practices to effectively integrate technology into classroom instruction. The plan is based on data from a comprehensive research study (conducted within this district) as well as recent literature. This Professional Development plan promotes the integration of technology in all instructional classrooms and encourages collaboration and sharing of resources and best instructional strategies to improve classroom instruction and increase student learning.

This Professional Development Plan includes a series activities designed to (a) be differentiated based on a teacher's experience and self-efficacy with technology-based instruction, (b) reveal best practices and assist teachers with the implementation of these best practices and (c) provide attendees with a bank of practical resources. Teachers who actively attend sessions will gain the skills and understandings necessary to effectively implement technology-based instruction into their teaching practices and ultimately enhance student learning.

Goals and Objectives

The overall goal of the Professional Development Plan is to assist teachers with gaining meaningful knowledge, skills, experience and increased self-efficacy with technology-based instruction. There are three specific goals for this PDP:

1) Provide teachers with differentiated support based on comfort level with technology use

2) Provide attendees with models of best practices and implementation strategies, and
3) Provide technological resources as well as peer resources that support teachers with technology use for teaching and learning purposes.

Teachers will be able to provide students with more meaningful learning experiences as a result of the knowledge, skills, experience and self-efficacy gained from attending the PD sessions.

The following outlines the objectives for each day of the mentor training days:

Day 1 Objectives:

Mentor Teachers will be able to:

- justify the use of technology-based instruction
- describe the shift in the teachers' roles in technology-based instruction
- list technology-use best practices
- list methods that enhance existing teaching and learning methods

Day 2 Objectives:

Mentor Teachers will be able to:

- Articulate the goals and outcomes of PLCs
- Understand roles and responsibilities of being a Professional Learning Community Leader

Day 3 Objectives:

Mentor Teachers will be able to:

- Understand the needs and challenges of assigned PLC

- Finalize a year-long PLC plan based on the needs of assigned PLC

Timeline

A 3-day training session will take place for mentor teachers. Day 1 of the mentor training will focus on the justification of technology-based instruction for enhancing classroom instruction. Day 2 will review the responsibilities of the mentors and attendees and the goals and outcomes for the professional learning communities. On Day 3 of the initial mentor training, mentors will use the information from teacher surveys to strategically plan for the cohort of teachers they will assist. Mentors will meet again as a cohort mid-year to discuss strengths and development areas of the PDP.

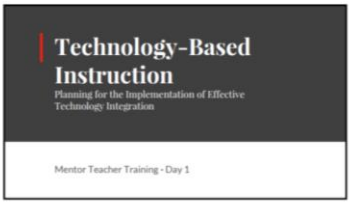
Table 1

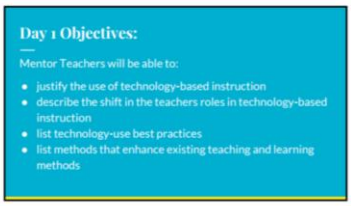
Initial 3-Day Mentor Training

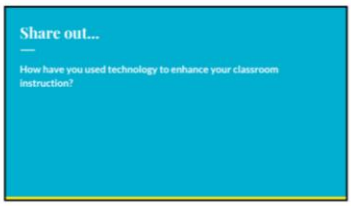
Day 1: Introduction to Technology Use in the classroom	**Day 2: Technology Leaders of Learning Communities**	**Day 3: Planning Learning Communities**

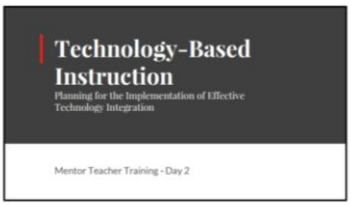
• Why Use Technology: Justifying Technology Use?
• Changing Teacher Roles
• Enhancing Existing Teaching and Learning Methods
• Technology-use Best Practices
	• Overview of Goals and Outcomes of PLCs
	• Roles and Responsibilities
		• Planning strategies and steps
		• Assign mentees/groups
		• Calendar monthly training sessions with mentee teachers
		  ○ Growth Mindset
		  ○ Best Practices
		  ○ Data Analysis

Sample presentation slides are shown below and are intended for use during the 3-day mentor training sessions.









The complete presentation can be accessed at:

https://docs.google.com/a/waldenu.edu/presentation/d/1Zf5yNgK1KXVZSK23R8a6qfb5ZAoG4cXNZAq4R0FE9fs/edit?usp=sharing

Ongoing Professional Development Sessions will be held throughout the school year. Mentors are required to assess their cohorts needs and develop a plan based upon those needs. Table 2 shows a list of possible focus topics but should be used only as a guide use throughout the year as the program is designed to give mentor teachers the autonomy revise as needed in order to meet the needs of their cohort and differentiate appropriately.

Table 2

Ongoing Training

Month	Topic(s) (May be revised by mentor teacher)
August	Why Technology-based Instruction? Needs Assessment Best Practices
September	Resource #1 Lesson Planning with Technology Best Practices
October	Resource #1 Lesson Planning with Technology Troubleshooting
November	Resource #1 Lesson Planning with Technology Peer Observations
December	Resource #2 Lesson Planning with Technology Best Practices
January	Resource #2 Lesson Planning with Technology Troubleshooting
February	Resource #2 Lesson Planning with Technology Peer Observations
March	Resource #3 Lesson Planning with Technology Best Practices/Troubleshooting
April	Resource #3 Lesson Planning with Technology Peer Observations
May	Resource #3 Lesson Planning with Technology Survey

Roles and Responsibilities

The PowerPoint presentation above was developed to assist facilitators with the initial three-day training introducing mentors to the technology-based PDP, reviews the goals

and outcomes, roles and responsibilities and set expectations for participation. At minimum, three resident mentors should be chosen per site. Mentors are interviewed, evaluated and chosen based on their self-prescribed comfortableness with technology-use for teaching and student learning, frequency of technology use and measures of success with technology integration (i.e. student achievement results). At least 3 mentors should be chosen per site (school). Since mentors are considered "building experts", their primary role is to facilitate discussions, provide technology-based resources and set meeting agendas based on the needs of their cohort of teachers. Mentors will be responsible for gathering materials for each meeting, determining a meeting space, keeping minutes, and distributing surveys after each session and the summative evaluation after their last meeting for the school year. Most importantly, mentors will take an active role in observing teacher's classroom to determine if teachers are implementing the best practices learned into their classrooms.

Learning communities will meet throughout the course of a school year to provide ongoing and differentiated support based on the needs of the participants. The expectation is that participants attend every session and actively engage in the activities. Additional group norms will be determined by each group.

Tools, Resources and Materials

Technological tools and resources provided for teacher use will be dependent on the needs of each individual learning community. Teachers will be provided with the book Using Technology with Classroom Instruction that Works by Howard Pitler, Elizabeth Ross Hubbell and Matt Kuhn. The book should be used as a tool and reference

text for the planning process of technology integration. A list of suggested resources and tools can be referenced in Table 3. This list is not exhaustive and should be referenced as needed by the mentor teacher. Teachers are encouraged to share resources and be thoughtful in choosing which resources they will focus on for each meeting in order to maximize its use and training.

Reference Resources		
Google Classroom (https://classroom.google.com)	BrainPOP (www.brainpop.com)	Glogster EDU (https://edu.glogster.com/login)
Discovery Education (www.discoveryeducation.com)	ePals (www.epals.com)	Storybird (https://storybird.com/)
Microsoft Office (Word, Excel, PowerPoint)	Go! Animate (https://goanimate.com)	Edmodo (https://www.edmodo.com/)
Khan Academy (www.khanacademy.org)	Jigsaw Classroom (www.jigsaw.org)	Bitstrips for Schools (www.bitstripsforschools.com)
MathBoard (www.palasoftware.com/mathboard.html)	Math Playground (www.mathpayground.com)	Kidblog (https://kidblog.org)
Prezi (https://prezi.com/)	Promethean (www.prometheanworld.com)	DK Instant Expert (https://www.teachervision.com/)
Mindmeister (www.mindmeister.com)	TeacherTube (www.teachertube.com)	KaHoot (https://getkahoot.com)
MyHistro (www.myhistro.com)	SchoolTube (www.schooltube.com)	Poll Everywhere (www.polleverywhere.com)
SurveyMonkey (www.surveymonkey.com)	SmartBoard (https://education.smarttech.com)	Newsela (https://newsela.com)
Socrative (www.socrative.com)	CollaborizeClassroom (http://library.collaborizeclassroom.com/)	Nearpod (https://nearpod.com)
The Differentiator (http://byrdseed.com/differentiator/)	ReadWriteThink (www.readwritethink.org)	Brickflow (http://brickflow.strikingly.com/)
Vimeo (https://vimeo.com)	Gnowledge (www.gnowledge.com)	SeeSaw (http://web.seesaw.me/)
Formative (https://goformative.com)	LessonCast (www.lessoncast.com)	Remind (www.remind.com)

Nearly every classroom within the district is equipped with Promethean Boards, student desktops and/or laptops, iPads and Elmos. These technological tools should be accessible for each monthly Learning Community meeting. The following Professional Learning Community Planning Sheet should be completed each month the PLCs meet and should be used to inform subsequent meetings.

Professional Learning Community Planning Sheet

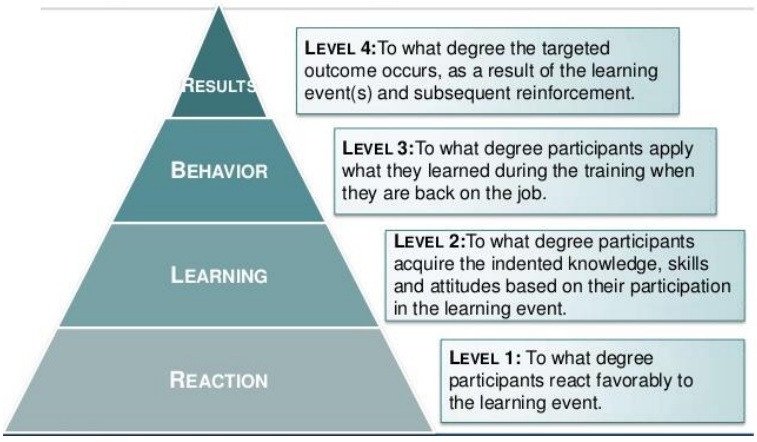
Date: _____ **Team Members: _____** **Facilitator: _____**	
Today's Focus:	
Focus Goal: By _____ (date) all members of our Learning Community will implement _____ (technological strategy/resource) in our daily classroom instruction.	
How will this impact students?	
How will this inform our teaching?	
Specific strategies and steps to meet this goal.	
Next steps (should be used to set the agenda for next monthly meeting)	
Question(s):	

Evaluation Plan

Introduction

The goal of the Professional Learning Communities is to provide teachers with a resource (a technology-based learning community) and support system that aids assists with effectively implementing technology into everyday teaching practices. This Plan includes a series of professional development activities whose goal is to (a) provide differentiated sessions based on a teacher's experience and self-efficacy with technology-based instruction, (b) reveal best practices and assist teachers with the implementation of these best practices and (c) provide attendees with a bank of practical resources. To ensure that these goals are met and to evaluate the effectiveness of the PDP, Kirkpatrick's four-level evaluation model will be utilized: evaluating reactions, learning, behavior and results (Kirkpatrick, 2009) (Figure 2).

Figure 2: Kirkpatrick's Training Evaluation Model (Cardet, 2016).



The evaluation plan, when implemented, will measure the effectiveness of the PDP and teacher willingness and success with implementing strategies and best practices learned in PD sessions.

Evaluation Plan

To evaluate participants reaction to the technology-based PD received, at the conclusion of each professional development session, participants reactions to the content and training model will be evaluated using the following survey:

Technology-based Professional Development Survey

Please complete the following evaluation form based on today's professional development session. Thank you in advance for your time.

Participants Name: _____ Session Name: _____ Group Leader: _____ Date: _____

I am satisfied with today's session

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Handouts were engaging and useful

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Time in the session was sufficient to allow learning & practicing new concepts.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

The session was well planned and interactive.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

The session leader was effective.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

The atmosphere was enthusiastic, interesting, and conducive to collegial professional exchange.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Session content and strategies will be useful in my work.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Today's learning objectives were met.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Comments:

What is the most significant thing you learned today?

_____
_____
_____

What support do you need to implement what you learned today?

_____
_____
_____

How will you apply what you learned today to your work?

_____
_____
_____

How can we build on this session for follow-up training?

_____
_____
_____

If you weren't satisfied with any part of today's session, please explain why.

_____
_____
_____

Thank you very much for taking the time to complete this survey. Your feedback is valued and very much appreciated!

The survey asks participant's to provide feedback about how they liked the session, instructor and presentation style. In addition, questions will ask participants to rate how well the session met their individual needs and how relevant the session was.

To address the second level of Kirkpatrick's evaluation model, Evaluation of Learning, the survey distributed at the end of each session also asks participants to determine if the session's learning objectives were met. The open-ended questions at the end of the survey serves as an area for participants to reflect on each session. Participants reflections on these questions should show that there has been a change in knowledge, skills and/or attitudes as a result of the session.

It will also be necessary to determine whether teacher behaviors are changing as a result of the sessions, Level 3 in Kirkpatrick's evaluation model. Given so, facilitators and administrators should set up an observation schedule to observe classrooms checking to see if teachers are implementing best practices learned through these PDP sessions. Results from the observations should be used to determine the effectiveness of each session, guide the next sessions agenda and determine further supports needed on an individual teacher basis. Data collected throughout the year should be aggregated at the end to determine how much technology-based teaching behaviors have changed.

Finally, to obtain a deep look into the results of the sessions, Level Four of Kirkpatrick's plan, an evaluation of the PDP is necessary to determine if the trainings led to meeting the goals of: (a) increasing teacher self-efficacy with technology integration, (b) providing a support system and cohort for teachers to share best practices, and (c) to determine if an increase in student achievement occurred as a result of successful

technology integration. To achieve Level four outcomes, teacher survey data should be evaluated at different intervals throughout the implementation of the PDP to determine the amount of change in teacher self-efficacy. Results from the evaluation plan will be used to enhance future technology-based professional development sessions by revealing the PDPs strengths and areas of development and use them to guide the development and implementation of future trainings.

Conclusion

This Professional Development Plan (PDP) is designed to provide a platform for teachers to acquire and share knowledge, skills and best practices to effectively integrate technology into classroom instruction. The PDP promotes the integration of technology in all instructional classrooms and encourages collaboration and the sharing of resources and best instructional strategies to improve classroom instruction and increase student learning.

Appendix B: Invitation to Participate

Greetings!

You are invited to participate in a research study entitled *Technology-based professional development for teaching and learning in the K12 classroom*. I, Nijia Byrd, am the researcher and a Doctoral student at Walden University. This research study explores how teachers experiences and perceptions of technology-based professional development opportunities, affect their willingness to use technology in the classroom for everyday teaching and learning purposes.

I am inviting you, and other several classroom teachers to complete an anonymous online survey. The survey will take approximately 30 minutes to complete.
Please complete the survey by [deadline will be determined pending IRB approval…within two weeks of sending the invitation]. Please click here to take the survey now.

Thank you in advance for your participation!

Sincerely,

Nijia Byrd

**Please note that participation in this research study is "at-will". You are able to withdraw at any time. In addition, women who are pregnant and those with mental or emotional disabilities, are under no obligation to reveal such condition to participate.

Survey Greeting:

Dear Participants,

I am currently in the process of fulfilling the requirements to complete my Doctoral study through Walden University. For my study, I have chosen to explore teacher perceptions about the challenges of using technology in everyday teaching and learning in the classroom and determine the needs teachers have in terms of providing effective technology-based professional development to overcome these challenges. This survey should take 15 to 20 minutes. The results of this survey are to be used and reported solely in my dissertation and will not use real names in this process for the purpose of maintaining confidentiality.

Sincerely,
Nijia Byrd
Ed.D. Candidate, Walden University

Appendix C: Teacher Technology and Learning Survey and Questionnaire to Measure Perceived Technology Integration Knowledge of Teachers

TEACHER TECHNOLOGY & LEARNING SURVEY

Check the appropriate box for each question. Return the completed survey to your principal. Thanks.

1. I teach: ☐ K-5 grades ☐ 6-8 grades ☐ 9-12 grades School _____

2. Years of professional teaching experience: ☐ 2 or less ☐ 3-7 ☐ 8-20 ☐ 21+

3. I teach the following subjects: (check all that apply)
   - ☐ Art
   - ☐ Business Education
   - ☐ Computer Lab Classes
   - ☐ English as a Second Language
   - ☐ Foreign Languages
   - ☐ Health &/or Physical Education
   - ☐ History &/or Social Studies
   - ☐ Industrial Technology
   - ☐ Language Arts
   - ☐ Mathematics
   - ☐ Music
   - ☐ Reading
   - ☐ Science
   - ☐ Special Education
   - ☐ Vocational Ed.
   - ☐ Other

4. I have taken the following hours of technology staff development within the last 3 years:
   ☐ None–30 hours ☐ 31–50 hours ☐ 51–70 hours ☐ 71+ hours

5. I have used technology for:
   ☐ None – 3 months ☐ 4 months – 2 years ☐ 2 – 4 years ☐ 5+ years

6. As a technology user, I would classify myself as:
   ☐ Non-user ☐ Beginner ☐ Confident ☐ Capable of teaching others

7. I use a computer at home for teaching-related tasks: ☐ Yes ☐ No ☐ No computer access at home

8. At school, a computer for my professional work is:
   ☐ None/not available ☐ Easily available
   ☐ Available with effort ☐ Always available

9. I rate my professional use of technology: (choose one)
   ☐ Seldom or never ☐ 2 – 4 times a year ☐ Monthly ☐ Daily/weekly

10. I rate my classroom use of technology for students: (choose one)
    ☐ Seldom or never ☐ 2 – 4 times a year ☐ Monthly ☐ Daily/weekly

11. The percentage of students in my classes having daily use of technology
    ☐ 0-20% ☐ 21-40% ☐ 41-75% ☐ 76% or more

12. Technology staff development offered by my school or the district has:
    ☐ Been adequate ☐ Been offered, but not taken ☐ Not been adequate ☐ Not been offered

13. When I have trouble with technology: (choose one)
    ☐ Assistance is immediately available
    ☐ Assistance is generally available with time lags
    ☐ Assistance is lacking, impairs learning
    ☐ Students are available to fix the problem

14. When my students use technology, they mostly: (choose one)
    ☐ Work individually
    ☐ Work in pairs
    ☐ Work in small groups
    ☐ Cannot, as technology is rarely available

15. How has the use of technology enabled you to make changes in instructional practices: (check all that apply)
    - ☐ I spend less time lecturing the whole class
    - ☐ There is more time with individuals or small groups
    - ☐ There is increased time for students to work independently
    - ☐ I am better able to differentiate, individualize instruction
    - ☐ I am better able to present complex material
    - ☐ I am better able to assess student's individual talents/skills
    - ☐ I am able to be a learner in real-time with my students
    - ☐ I have made no significant changes

TEACHER TECHNOLOGY & LEARNING SURVEY

Check the appropriate box for each question. Return the completed survey to your principal. Thanks.

Instructions: Select the number that describes how students use technology in your classes.

My students are: **1 = Not using technology for this** **2 = Using technology for this 2 – 4 times a year**
3 = Using technology for this monthly **4 = Using technology for this daily/weekly**

TEACHER MANAGEMENT PRACTICES WITH TECHNOLOGY

16. *Communicate with parents/guardians*	1	2	3	4
17. *Track attendance and other student information*	1	2	3	4
18. *Generate worksheets, reports, letters*	1	2	3	4
19. *Record student grades and print reports with gradebook program*	1	2	3	4
20. *Create electronic templates or graphic organizers for student work*	1	2	3	4

21. STUDENTS LEARNING PRACTICES WITH TECHNOLOGY

22. *Conduct on-line research and/or investigations*	1	2	3	4
23. *Translate data into visual representations (charts, graphs)*	1	2	3	4
24. *Learn keyboarding skills*	1	2	3	4
25. *Learn word processing, spreadsheets and/or databases skills*	1	2	3	4
26. *Learn multimedia presentation skills (links, navigation, transitions, inserting pictures)*	1	2	3	4
27. *Learn Internet skills (search engines, bookmarks)*	1	2	3	4
28. *Use electronic reference tools (dictionaries, atlases, encyclopedias)*	1	2	3	4
29. *Use technology to identify problems and strategize possible solutions*	1	2	3	4
30. *Practice skills or concepts not yet learned (drill/practice software, tutorials)*	1	2	3	4
31. *Provide alternative activities when "class work" is finished*	1	2	3	4
32. *Support collaborative projects within the classroom (composition, research, problem solving)*	1	2	3	4
33. *Explore and learn topics of their own choice*	1	2	3	4
34. *Provide resource information not available at the school site*	1	2	3	4
35. *Participate in on-line exchanges (pen pals, , learning projects)*	1	2	3	4
36. *Facilitate electronic portfolios containing actual samples of student work in various media*	1	2	3	4
37. *Enable students to demonstrate their achievement in alternative ways*	1	2	3	4
38. *Support on-line collaborative projects with groups beyond classroom*	1	2	3	4
39. *Provide instructional games*	1	2	3	4

40. Identify Your Training Needs

From the strategies listed in the *"Teaching and Learning Practices"* section of this survey, identify your top two (2) priorities for immediate training.

Select two (2)

1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24		

41. When I have trouble with technology, support staff is:

☐ Likely to be available ☐ Sometimes available ☐ Usually not available

42. Rate your "Help Desk" experiences:

☐ None ☐ Frustrating ☐ Time lags for help ☐ Timely/helpful

43. Check general response time to your technical needs:

☐ Within the hour ☐ Within 24 hours ☐ Within the week
☐ Within the school day ☐ Within 48 hours ☐ Within the month
☐ Who knows!

44. Check overall rating of your technical support experiences:

☐ Outstanding ☐ Frustrating
☐ Satisfactory ☐ Debilitating to instructional effort
☐ Lagging

Questionnaire to Measure Perceived Technology Integration Knowledge of Teachers (TPCK)

Zahra Hosseini and Anand Kamal

Select one level of agreement for each statement to indicate how you at this time. Place an "x" in the appropriate cell/box. SD = Strongly Disagree D = Disagree U = Undecided A = Agree SA = Strongly Agree

Item for measuring Technology Knowledge	SD	D	U	A	SA
1. I know how to solve my own technical problems					
2. I can learn technology easily					
3. I keep up with important new technologies					
4. I frequently play around the technology.					
5. I know about a lot of different technologies.					
6. I have the technical skills I need to use technology.					
7. I have had sufficient opportunities to work with different technologies.					
8. I can use technology tools to process data and report results.					
9. I can use technology in the development of strategies for solving problems in the real world.					
10. I have ability to design webpages and to use authoring software					
11. I understand the legal, ethical, cultural, and societal issues related to technology.					

Item for measuring Pedagogy Knowledge	SD	D	U	A	SA
1. I know how to assess student performance in a classroom.					
2. I can adapt my teaching based-upon what students currently understand or do not understand.					
3. I can use a wide range of teaching approaches in a classroom setting (collaborative learning, direct instruction, inquiry learning, problem/project based learning etc.).					
4. I am familiar with common student understandings and misconceptions					
5. I know how to organize and maintain classroom management					
6. I can assess student learning in multiple ways.					
7. I can adapt my teaching style to different learners.					

Item for measuring Content Knowledge	SD	D	U	A	SA
1. I have sufficient knowledge about (the particular content)					
2. I can use (the particular subject) as the way of thinking.					
3. I have various ways and strategies of developing my understanding of (the particular content)					
4. I have sufficient knowledge about structure of knowledge (the particular content).					
5. I know concept, facts, theories and procedure within the (the particular content)					
6. I believe in the validity and reliability of the (the particular content)					

Item for measuring Technological Content Knowledge	SD	D	U	A	SA
1. I know about technologies that I can use for understanding (the particular content)					
2. I know how to use of specific software and Web sites about (the particular content).					
3. I can find and evaluate the resources that I need for (the particular content)					
4. I can use technology for presenting (the particular content).					
5. I can use technology tools and resources for managing and communicating information of (the particular content).					

Item for measuring Pedagogical Content Knowledge	SD	D	U	A	SA
1. I know how to select effective teaching approaches to guide student thinking and learning in (the particular content).					
2. I know the purposes and objectives for (the particular content).					
3. I am able to manage of my students' learning about (the particular content).					
4. I have the curricular knowledge (horizontal and vertical) of (the particular content)					
5. I know instructional strategies that are suitable for the topic (content).					
6. I know prior knowledge of students about (the particular content).					
7. I know how and what to assess of (the particular content).					

Item for measuring Technological Pedagogical Knowledge	SD	D	U	A	SA
1. I can choose technologies that enhance the teaching approaches for a lesson.					
2. I can choose technologies that enhance students' learning for a lesson.					
3. I am thinking critically about how to use technology in my classroom.					
4. I can adapt the use of the technologies that I am learning about to different teaching activities.					
5.My teacher education program has caused me to think more deeply about how technology could influence the teaching approaches I use in my classroom					
6. I can use technology resources to facilitate higher order thinking skills, including problem solving critical thinking, decision-making, knowledge and creative thinking.					
7. I can use technology tools and information resources to increase productivity.					
8. I can infuse technology to strategies of teaching.					
9. I can use technology for more collaboration and communication among students and with teacher too.					
10. I know how to use technology to facilitate academic learning.					

Item for measuring Technological Pedagogical Content Knowledge	SD	D	U	A	SA
1. I can teach lessons that appropriately combine (the particular content), technologies and teaching approaches.					
2. I can select technologies to use in my classroom that enhance what I teach, how I teach and what students learn.					
3. I can use strategies that combine (the particular content), technologies and teaching approaches that I learned about in my coursework in my classroom.					
4. I can provide leadership in helping others to coordinate the use of (the particular content), technologies and teaching approaches at my school and/or district.					
5. I can choose technologies that enhance the learning of (the particular content) for a lesson.					
6. I can evaluate and select new information resources and technological innovations based on their appropriateness to specific tasks in (the particular content). *					
7. I can use (the particular content)-specific tools (e.g., software, simulation, environmental probes, graphing calculators, exploratory environments, Web tools) to support learning and research. *					

Appendix D: Invitation to Interview

Greetings!

You are invited to participate in a research study entitled *Technology-based professional development for teaching and learning in the K12 classroom*. I, Nijia Byrd, am the researcher and a Doctoral student at Walden University. This research study explores how teachers experiences and perceptions of technology-based professional development opportunities, affect their willingness to use technology in the classroom for everyday teaching and learning purposes.

I am inviting you, and other classroom teachers, to participate in an interview process that explores your experiences with technology-based professional development and your use of technology in the classroom. The interview will take approximately an hour. After the interview has been transcribed, I will ask you to verify the information that has been recorded through a process called "member checking" which should take no more than about 30 minutes.

The attached consent form has further details regarding the study and what will be asked of you should you agree to participate. Please feel free to email or call me (678-480-2558) with any questions that you may have prior to agreeing to participate.
Thank you in advance for your participation!

Sincerely,

Nijia Byrd

**Please note that participation in this research study is "at-will". You are able to withdraw at any time. In addition, women who are pregnant and those with mental or emotional disabilities, are under no obligation to reveal such condition to participate.

Appendix E: Interview Guiding Questions/Protocol

1. For what purpose or goal do you use technology in your classroom?

2. What difficulties have you found when integrating technology in your curriculum?

3. How does your school support teachers with integrating technology into their daily instruction for teaching and learning?

4. Have you participated in professional development(s) (i.e., workshop, college courses, seminars, etc.) focusing on the use of technology in the classroom? If the answer is no, proceed to question d.

    a. How often do you attend technology-based professional development?
    b. What do you like the most about the professional development sessions?
    c. What do you like the least about the professional development sessions?
    d. Why have you not participated in a professional development?

5. How do you feel about the time allocated for teachers to:

    a. Practice the implementation of strategies learned from technology-based PD sessions?
    b. Consult with their peers concerning integrating technology into their curriculum?

6. How has technology-based professional development helped with the implementation of technology into your daily classroom instruction?

7. In general, how do you feel about your competency and comfort level once you have completed a technology-based professional development session?

8. What changes (if any) would you like to see to help you better integrate technology into your curriculum?

9. Describe your ideal technology-based professional development session. What makes it ideal?

Appendix F: Technology-Based Professional Development Survey

Please complete the following evaluation form based on today's professional development session. Thank you in advance for your time.

Participants Name: _____ Session Name: _____ Group Leader: _____ Date: _____

1. I am satisfied with today's session

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Handouts were engaging and useful

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Time in the session was sufficient to allow learning & practicing new concepts.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

The session was well planned and interactive.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

The session leader was effective.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

The atmosphere was enthusiastic, interesting, and conducive to collegial professional exchange.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Session content and strategies will be useful in my work.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Today's learning objectives were met.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

Comments:

What is the most significant thing you learned today?
What support do you need to implement what you learned today?

How will you apply what you learned today to your work?

How can we build on this session for follow-up training?

If you weren't satisfied with any part of today's session, please explain why.

Thank you very much for taking the time to complete this survey. Your feedback is valued and very much appreciated!

Appendix G: NIH Certification of Completion

Certificate of Completion

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

Date of completion: 07/20/2014

Certification Number: 804386