

2015

# Perceptions of High School Teachers on Integrating Technology Following Professional Development

Charnice Starks Ray  
*Walden University*

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Charnice Starks-Ray

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Walden University  
2015

Abstract

Perceptions of High School Teachers on Integrating Technology

Following Professional Development

by

Charnice Starks Ray

MBA, Webster University, 2002

BS, Lander University, 2000

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

December 2015

## Abstract

Teachers integrate technology to make the learning environment interactive and appealing to students. The purpose of this qualitative case study was to explore perceptions of teachers at one high school working to integrate technology into instruction following participation in professional development. Guided by Dewey's constructivist theory and Mishra and Koehler's technological pedagogical content knowledge model, this study explored teachers' perceptions of pedagogy and technology integration following participation in professional development and the strategies they used to overcome barriers to integrating technology. Twelve purposefully selected high school teachers from English, social studies, mathematics, science, electives, health education, and special education provided triangulated data in the form of interviews, lesson plans, and classroom observations. Through the qualitative coding and analysis process, emergent themes were developed. Teachers suggested that professional development for technology integration should benefit the learning environment, be relevant to course content so that teachers can make connections to real-world learning experiences, and that there should be consistent follow-up training. Findings suggested that teachers have limited access to hardware and software and lack time to develop technology-rich lesson plans, and students lack technical skills. The implications for this study include that district and school administrators should plan and implement relevant professional development, assess the needs of teachers through effective communication, and identify additional resources or training to help teachers who struggle to integrate technology.

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## Dedication

I would like to dedicate my dissertation to Tyson Jr., Parker Lauren, and Rodney Jr. (my godson). My prayer for each one of you is to never stop learning, love life and show compassion to others. Tyson Jr., you don't have to call me "Dr. Mommy." I love you all so much. To my nieces and nephews always strive for excellence and achieve greatness!

To my husband, Tyson Sr., my heart is forever in your hands. There are not enough words to express my love and thanks for serving as mommy and daddy many days. You are always in my corner...even when I am not in the corner. I love you and look forward to more date nights.

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To my extended family, family (friends like family), and church family my heart is overjoyed because of the cheers and love you shared by praying, listening, and being there when I needed to break free from writing. May blessings continue to follow each of you.

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*“Delight thyself in the Lord, and He will give you the desires of thine heart.”* Psalm 37:4.

I give all praises and glory to my Lord and Savior. I had a strong faith in order to have a strong finish!

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## Section 1: Introduction to the Study

### **Background of the Study**

Educating students in the 21<sup>st</sup> century can be challenging for teachers due to the rapidly changing role technology plays in the lives of students. Instructional technology serves as a gateway for teachers helping to connect students to the world outside the classroom. Technology use enhances classroom instruction by making lessons interactive and appealing to students. However, research has indicated that teachers lack the skills to integrate technology effectively (Franklin & Peng, 2008; Sherman, Sanders, & Kwon, 2010). Teachers participate in professional development to obtain needed technology skills, but there has been little evidence to suggest integration of the skills learned in professional development into classroom instruction.

With easy access to technology tools and accessibility to communicate with others globally, classroom instruction builds social skills, higher order thinking, and realistic education experiences (Collins & Halverson, 2010; Kahn, 2009). For teachers struggling with technology integration, using technology when teaching content may seem like an extra chore; nevertheless, not understanding technology's impact on 21<sup>st</sup> century learning can be detrimental to students' success. It is important for teachers to know how technology can enrich the learning process. Research has been conducted to explore why some teachers are integrating technology to a larger degree than other teachers (Godfrey, 2013).

For technology integration to be effective in the classroom setting, teachers must have substantial professional development for implementation of strategies. Research

findings have shown the need to incorporate newer and emerging technologies into daily teaching by teachers and educational leaders (Collins & Halverson, 2010; Reed, 2011). Despite the importance of technology, many drawbacks and concerns hinder its integration into classroom instruction. One major concern is a lack of skills and training for teachers, accompanied by time constraints (Ertmer & Ottenreit-Leftwich, 2010). By modifying the instructional day, teachers will be provided professional development opportunities while avoiding weekends and late school nights that prohibit personal time.

Another concern has been outdated equipment and software (Inan & Lowther, 2009), and little or no access to technological equipment and software (Donlevy, 2006; Sam, 2011). Teachers in school districts with limited funding or those in rural areas with infrastructure issues were more likely to experience difficulties in gaining access to current and needed technologies. A major concern has been that teachers use technology mainly for administrative purposes and limit technology use to enhance learning experiences (Ertmer & Ottenreit-Leftwich, 2010; Rogers, 2007). However, the more teachers obtained professional development for technology use in the classroom, the more they were apt to use it in classroom instruction (Brinkerhoff, 2006). Minimal research has been available on the perceptions of teachers' integration of technology into classroom instruction following participation in professional development. Having an understanding of high school teachers' perceptions of technology integration into classroom instruction can help identify areas for improvement in professional development.



For the purpose of this study, Misty Vale High School (a pseudonym) was used as the research site. Despite teachers at Misty Vale High School participating in monthly professional development on technology integration on the local level, the leadership team indicated there was no evidence showing incorporation of taught skills into instruction. In response to this problem, an investigation into teachers' perceptions of how they used technology skills learned during professional development was conducted. The data collected were triangulated with teacher interviews, their lesson plans, and classroom observations.

There was no mandate for teachers to identify and reflect on the skills learned or implemented from the current year of technology training in the lesson plan after participating in professional development. Once the teacher returned to the classroom, follow-up training was minimal to none to examine if there were issues or concerns with technology integration. By examining perceptions of high school teachers after participation in professional development on effective technology integration, this study helped determine whether the problem was classroom integration, structure, or follow-through with professional development.

In the high school of study, each year teachers have been required to submit one lesson plan (Appendix A) demonstrating their ability to integrate technology. The teachers participated in professional development training once a month. Table 1 provides the technology integration professional development schedule from 2012-2013 and 2013-2014.

Table 1  
*Professional Development Technology Training Schedule*

Month	2013-2013	2013-2014
September	Edmodo and eChalk	eChalk
October	Google Calendar	Google Calendar and Google Forms
November	On-line Resources with Research and AASL	Edmodo and Tech Proficiency
December	N/A	SMARTboard Basics
January	SMARTboard Basic/Multimedia	Mid-Year Wrap Up
February	iPad Basics, QR Codes, and Other Mobile Devices	Google Drive
March	AASL Websites & Video Conferencing	Web 2.0
April	Web 2.0	Year End Wrap Up

### **Problem Statement**

This qualitative case study was designed to explore high school teachers' perceptions following their participation in professional development for technology integration. At the selected research site, teachers were required to participate in "Tech Thursdays" training sessions monthly. Based upon the annual technology lesson plan submitted by teachers, there was minimal evidence indicating the integration of skills in classroom instruction learned from participation in these monthly training sessions.

A multitude of studies have been conducted on teachers integrating technology, but there is a gap in the literature. These studies did not analyze the level of active

integration of technology into classroom instruction following participation in professional development (Godfrey, 2013; Graham & Richardson, 2012; Martinez, 2010). As such, data were needed to analyze teachers' viewpoints of integration and review implementation strategies following professional development. The findings from this study will help teachers, administrators, and district level leadership make substantial changes when preparing professional development for technology integration.

### **Nature of the Study**

This qualitative case study was designed as an analysis of integrating technology into instruction from the viewpoints of high school teachers through interviews, classroom observations, and document analysis of lesson plans. Specific to this study was the use of the individual teacher's experiences (Hatch, 2002). Twelve teacher participants were interviewed about their experiences of integrating technology following professional development training. Each participant attended a Tech Thursday training session.

### **Research Questions**

A qualitative case study approach was used to explore the findings related to the following research questions:

1. What are the perceptions of high school teachers following participation in professional development to integrate technology into instruction?
2. What are high school teachers' perceptions of strategies to overcome barriers when integrating technology into instruction?

### **Purpose of the Study**

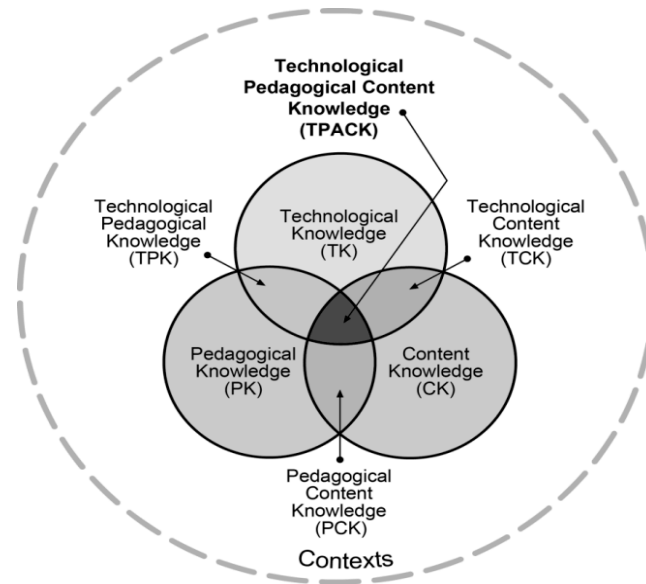
The purpose of this qualitative case study was to explore high school teachers' perceptions regarding technology integration in high school lessons. An understanding was needed for educational leaders to evaluate whether professional development should be reorganized to be more useful for integration of technology into classroom instruction. The study's goal was to provide educational leaders with documented research on the perceptions of high school teachers seeking to integrate technology after being a participant in training. The study provides research-based evidence for educational leaders to understand the effectiveness of technology integration professional development sessions. The themes identified from data analysis also provide educational leaders with categories to consider when evaluating and organizing professional development for effective integration of technology into classroom instruction.

### **Conceptual Framework**

Dewey's constructivist theory (1938) and Mishra and Koehler's (2006) technological pedagogical content knowledge (TPACK) model provided the conceptual framework for this study. Constructivism conveyed a context for teachers seeking to integrate technology into instruction following professional development training. Dewey developed the constructivist theory for the purpose of learners utilizing prior knowledge to promote, genuine, active, and social learning for instruction. While the constructivist theory has expanded with additional research over the years, Dewey's research established the origin for this theory. The guided learning theory of constructivism blends with technology integration by allowing the teacher to connect content and create

learning experiences that engage students. The use of technology in the academic environment is supported by Dewey's theory of constructivism due to involvement, creativity, and innovative development (Liu & Chen, 2010). The individual's ability to understand the use of materials to help motivate learning was the main factor for selecting constructivism as the conceptual framework for this study. When teachers apply technology integration to the constructivism theory, the education process produces higher order thinking through relevancy of topics (Snowman & Biehler, 2006).

TPACK functioned as another framework to support technology, pedagogy, and content. TPACK (Figure 1) supported the study by merging the three focus areas. Teachers were able to go beyond the basics of teaching and incorporate creative ideas with the use of technology and content based on the teachers' pedagogical beliefs (Mishra & Koehler, 2006). Using technology as an instructional tool provided a wide array of possibilities for students to make global connections. Polly and Brantley-Dias (2009) stated, "TPACK gives a holistic perspective of the knowledge associated with effectively integrating technology into learning environments, accounting for what teachers know and what teachers can do" (p. 46). As such, students became independent learners. Student-centered learning was evident when teachers embraced the use of technology; the teacher served as the facilitator while the students took control of their learning (Wetzel, Fougler, & Williams, 2009). Knowledge acquired by teachers in areas of technology, pedagogy, and content demonstrates integration in the learning environment. In essence, the true profession of teaching can be observed in a classroom that embodies the concept of pedagogy.



*Figure 1.* Technological Pedagogical Content Knowledge (TPACK) model. From “What is technological pedagogical content knowledge,” by M. J. Koehler & P. Mishra, 2009, *Contemporary Issues in Technology and Teacher Education*, 9(1), p. 63. Reprinted with permission.

### Definitions of Terms

The following terms were used in this research study:

*Barriers:* Factors that present challenges or make it more complicated for teachers to integrate technology into classroom instruction; inconsistency of training accessibility, time availability (Rogers, 2007).

*Professional Development:* Activities that engage teachers in increasing or improving best practices in the classroom to help students become more successful academically; includes formal and informal learning experiences (North Central Regional Educational Laboratory, n.d.).

*Technology Integration:* Using technology, including computers, digital cameras, storage devices (CDs, DVDs, and flash drives), handheld devices, phones, and related

instruments to deliver or enhance the curriculum already in place (Brabeck, Fisher, & Pitler, 2004).

### **Assumptions**

There were three assumptions within this qualitative study related to the perceptions of high school teachers integrating technology following participation in professional development. The first assumption was that teachers have strong understandings of technology integration and the ability to implement strategies learned from professional development. The next assumption reflected the teachers' viewpoints on successful technology integration in the classroom based on experiences. The third assumption was that teachers could make connections to the importance of integrating technology in the teaching and learning the process.

### **Limitations**

Although procedures were followed as outlined, to conduct the study as thoroughly and completely as possible, there were weaknesses and limitations. The first limitation was participation. Research for this study involved a midsized high school and therefore, used a small group of participants. This made it challenging to apply the findings to a larger population. The second limitation was timing. The data were collected for one marking period, which restricted the amount and range of data to a period of 9 weeks. The last limitation of this research was the size of the population in the study. Teachers from one high school resulted in limited viewpoints, limited experiences, and perhaps, homogeneous thinking. The findings of this study should not be generalized

to reflect the perceptions of all teachers working to integrate technology into classroom instruction.

### **Scope**

This study was conducted in a high school with approximately 50 teachers and 760 students. Interviews with teachers, observations of technology use, and analysis of lesson plans were used to help determine the perceptions of teachers specific to my research questions. Relying on perceptions of teachers or any group is risky because of the subjectivity of perceptions (Creswell, 2003). Nevertheless, an examination of what teachers believe can shed new light on areas that otherwise may not be obvious. Analysis of interview transcripts, lesson plans, and observations provided insights into how teachers used technology in the classroom for instructional purposes.

### **Delimitations**

The first delimitation was the study's focus on teacher perceptions of how they integrated technology into instruction rather than actual teaching practice. Also, the focus on a single site with input from a single group of high school teachers from one school district was another delimitation. The third delimitation is that data were collected and analyzed for one school year.

### **Significance of the Study**

This study was significant because it allowed education administrators and others to become more informed regarding teachers' beliefs about and the implementation of information and knowledge derived from professional development sessions on technology integration in the classroom. The results of this study can be used to



strengthen professional development at Misty Vale High School by providing insights into the needs of teachers. The results of this study could increase future integration of technology into classroom instruction and more relevant professional development. Finally, ensuring the implementation of technology for instructional purposes could support clarity and effective instruction, which may improve educational outcomes.

### **Implications for Social Change**

According to Reed (2011), technology is essential in the 21<sup>st</sup> century for communicating throughout life, education, and business. Students can use technology to cultivate and acquire knowledge in the learning environment. The findings from this study contribute to the general understanding to help teachers increase efforts to integrate technology on a consistent basis for the purposes of learning and teaching. Integration can help teachers and students acquire knowledge because the learning environment is enhanced through the use of technology tools. Teachers who understand effective strategies for incorporating the use of technologies into instruction will provide students with the knowledge and skills needed to extend learning beyond the classroom setting.

### **Summary and Transition**

Section 1 begins with an introduction to the research study. Included in the introduction are background information, a statement of the research problem, the purpose of the study, the nature of the study, and the guiding research questions. Also included are a conceptual framework, definitions of terms, assumptions, limitations, scope of the study and delimitations. Section 1 concludes with the study's significance and the implications for social change. Section 2 contains a review of the literature

relevant to the research questions, as well as the benefits, barriers to, and best practices in technology integration. In Section 3, the method for this case study design is detailed to show data collection, analysis, and sampling. Section 4 includes findings from the data analysis. The study concludes in Section 5 with a discussion of social implications and recommendations for further research.

Teachers need assistance in learning and implementing knowledge derived from professional development on integration technology in classroom instruction. Insight into teachers' perceptions, as they attempt to integrate technology after participating in professional development, can lead to improved technology skills and better education outcomes for students. With the knowledge of teachers' educational perceptions and needs, administrators can develop improved techniques regarding professional development.

## Section 2: Literature Review

### **Introduction**

The literature review in this study provides insight into high school teachers' perceptions on integrating technology into instruction following participation in professional development. Section 2 is divided into four parts: (a) an overview of technology integration into classroom instruction, (b) beliefs on professional development through the lens of education, (c) benefits of technology integration and identifies barriers to integrating technology, and (d) best practices for technology integration. A portion of the literature review is an analysis of scholarly and peer-reviewed studies for barriers to integrating technology into teaching.

Resources in Walden University's online library, electronic journals, and other relevant literature served as the academic collection for this study. The research database included ProQuest, Educational Resource Information Center (ERIC), Sage Publications, and the United States Department of Education. Key terms used to narrow the literature search included: *technology*, *technology integration*, *teachers' perception of technology integration*, *barriers to technology integration*, and *teachers' beliefs*.

### **Integrating Technology into Classroom Instruction**

An overview of technology integration into classroom instruction will provide evidence that teachers must have knowledge of how to operate basic tools to integrate technology into instruction. Additionally, they must be made aware of the powerful impact technology tools have on classroom instruction. Over the past 25 years, extensive research has shown that funds from federal and state levels have helped to provide

programs and technology tools in schools (Gray, Thomas, & Lewis, 2010; Summak & Samancioglu, 2011). Despite the investment into these tools, 70% of teachers in the United States still fail to integrate these tools into classroom instruction (Gray, Thomas, & Lewis, 2010; Summak & Samancioglu, 2011). Under President Obama's administration, the United States Congress made a \$650 million dollar commitment in stimulus funds available to enhance education through technology (Miners, 2009, p. 35).

Secretary of Education, Arne Duncan (2010), stated that for students to be successful in the internationally competitive society and knowledge-based economy, advanced technology for students would have to be evident. During the past 22 years, the U.S. Congress passed several educational acts to ensure students are being introduced to technology in classroom instruction. The No Child Left Behind Act of 2002 placed a heavy emphasis on recruiting and retaining high-quality teachers, but also required teachers to be fluent with using technology for instructional purposes. The Elementary and Secondary Schools Act of 2001 declared students should be technologically literate and teachers needed to be able to communicate and manage some form of technology (Culp et al., 2005). Technology integration in the classroom created social change for students by preparing them to enter and successfully operate a society. Global awareness, creativity, understanding new information, and social skills are major elements for 21<sup>st</sup> century learning; therefore, assuring technology integration in the classroom is important (Brinkerhott, 2006; Reed, 2011). When technology is integrated effectively, supported appropriately through training, and given sufficient time, the impact on student achievement is determined to be successful.

### **Professional Development Beliefs on Integration**

Professional development provided for teachers in technology has shown a strong relationship between instructional practices and assessments of technology integration. The integration of technology into education was a common priority under the Clinton, Bush, and Obama presidential administrations. Across the United States, school districts received E-rate federal funds. The funds invested were used to improve the use of instructional technology to enhance student learning, teacher implementation, and knowledge in the 21<sup>st</sup> century (Lawless & Pellegrino, 2007; Schroeder, 2012). Each year teachers receive professional development training for integration from individuals who have knowledge in using technology. Five elements were established by Kleinman (2004) to help improve professional development at the No Child Left Behind Leadership Conference held in 2004:

1. To foster in-depth understanding of the subject content and learn the needs of students.
2. To focus on lesson plans, curriculum development, evaluation of student work, and use of best practices.
3. To build on strategies that requires higher order thinking in the form of problems of practice, analysis, and reflection.
4. To provide an atmosphere that allows the values and environment culture to be professional and collegiate with shared experiences.
5. To use skills learned for daily teaching, collaborating, and modeling.

Along with the implementation of the five essential elements for effective professional development, many training programs were offered to assist teachers. Considerations included adding another component to professional development integrations to help resolve the problem of minimal integration of skills after training.

Assessments and follow-up sessions ensured teachers maintained and continued to learn new skills as technology evolved in schools and the workplace. The Bill and Melinda Gates Foundation, founded in 2000, supported teachers working to integrate technology into the classroom. As part of the Gates Foundation, the Teacher Leadership Project (2011) was designed to help teachers move from the initial phase of being a good teacher to becoming a great teacher. The goal of the project encouraged teachers to utilize 21<sup>st</sup> century skills to help strengthen critical thinking, global awareness, communication, and collaboration among students, community, and themselves (Miners, 2009; Partnership for 21<sup>st</sup> Century Skills, 2009). The program proved to be so successful over the last decade that 18 states implemented 21<sup>st</sup> century skills in professional development. The project also allowed students and evaluators to provide feedback to teachers regarding the academic rigor of the class with an emphasis on technology usage. Teachers used video recordings of themselves teaching to improve techniques and strategies to keep students engaged. Once teachers identified an integration strategy for classroom use, implementation was developed (Glazer & Hannafin, 2008). Professional development allows teachers to explore various technology tools to increase student engagement. Teachers need support through ongoing professional development if they are to integrate technology (Hunter, 2011).

## **Impact of Professional Development**

A national survey reported a high percentage of teachers participated in professional development for technology integration (Gray et al., 2010). The survey was conducted over a 12-month period with updates on training and teachers' perceptions of the training. Portions of the survey used in the Gray et al. (2010) study were about professional development and technology training and produced interesting results. More than half (60%) of teachers received technology training, but participation hours varied with the majority of the hours being low. Only 53% of teachers participated in 1 to 8 hours of training over a 12-month timeframe. Although another 7% participated in 33 hours or more of technology training; another 13% indicated they received no technology training over the past year (Gray et al., 2010). The teachers questioned how successful the training would be in helping with technology integration into the curriculum and 81% felt that they were adequately prepared to teach. Teachers did state that the training met goals and needs at the time of integration. Up to 88% had strongly agreed that technology training aligns with the state, district, and school goals and standards (Gray et al., 2010). Results made it clear that training has been offered to help teachers integrate technology effectively into daily instruction.

Although these teachers were knowledgeable in technology, based on the survey's results, they still had challenges integrating technology into classroom instruction (Gray et al., 2010). Hargreaves (2007) believed that teachers have to participate continually and learn in their profession and that many teachers would rather see ongoing professional development as it related to technology integration. Hildebrandt (2010) felt unprepared

and desired to become more familiar with the latest technologies for successful integration. He reflected on his high school learning experiences using technical equipment. He had used word processing and a little of the Internet to complete his work. As a teacher, he needed training along with demonstrations to implement the new technologies received for teaching.

Belland (2009) focused on why teachers may minimize integration of technology into classroom instruction. Results indicated that teachers' lack of technology skills contributed to minimizing technology integration. Belland recommended additional training and development for pre-service teachers to increase technology integration in classroom instruction. Hinson, LaPrairie, and Heroman (2006) explored teachers' training and the impact on instruction. In their study, the researchers used project goals to assess the way teachers use online resources to assist and communicate classroom instruction to students and parents in one school. Two major findings of the project were that teachers lacked access to technology and that they had negative attitudes and beliefs towards technology. The National Education Association (NEA, 2008) reported teachers lacked training on technology tools and limited resources that affected integration. Two years later, Nagel (2010) confirmed the findings that many teachers were unsatisfied with levels of support and resources for technology integration. Teachers need an opportunity to express their concerns and provide possible solutions to help effectively integrate technology into classroom instruction. This opportunity can allow for more successful technology integration.



### **Benefits of Technology Integration**

Using technology in the classroom presents a plethora of options to students along with teachers for learning and teaching. The use of technology in classrooms offers experiences and opportunities for students to gain a strong understanding of critical thinking concepts and content subject matter. Shihab (2008) considered integration as the bridge for teachers working to connect students to real-world experiences and international learning. According to Shihab, the use of technology helps to teach content, causing an interactive approach and promotes learning far beyond the classroom walls.

The use of advanced technology (social media, online resources, and the latest devices such as smartphones and tablets) in the learning environment is a strategy for increased participation by students. Woodbridge (2008) showed that when they are taught skills and content at the same time, students display an eagerness to learn. In other studies, teachers were informed of the content along with the reasons to use technology in teaching (Groff & Mouza, 2008; Saade, Tan, & Kira, 2008). The use of technology in educational settings is not negotiable as Carrier and Stovall (2010) pointed out: “With 21<sup>st</sup> century resources available, teachers were cognizant and equipped to use every teaching strategy technology tool available” (para. 3). These researchers showed that merely assigning a student to research a topic was not an effective method for technology integration. Effective integration occurs when the teacher provides the student with the hardware, software, and online sources to conduct the research.

## **Podcasting**

Podcasting allows the teacher and student to present subject matter through digital recordings with or without graphics and share ideas online (Foster, Larmore, & Havermann, 2010; Harris & Park, 2008). The basic tools to begin using podcasting are a computer, software, and a microphone. The free applications and software programs most associated with podcasting are Audacity and GarageBand. Podcasting enhances the learning experience by allowing the teachers to make lectures accessible outside the classroom; students can view the videos prior to class and ask questions about the information covered. Podcasts also accommodate the auditory learner (Wohleb, 2011) and allow students to publish assignments in a creative format. This tool provides reinforcement, review, and options to the traditional delivery of lectures for students with special needs.

A social studies teacher used podcasts to create study reviews for students (Langhorst, 2007). Not only did the students enjoy the idea of the class content being reviewed at home, but parents participated and learned too. At the end of the school year, 85% of the students were pleased with the way lessons were presented and hoped other teachers would use podcasting to teach lessons. Langhorst claimed that students became active participants in the learning process; learning was individualized and built on written and verbal communication skills. This form of integration was an affordable and easy way to help teachers transition into using technology when teaching content.

## **Blogs and Wikis**

Blogs provide journaling opportunities that give readers the ability to create, comment, and share “text, images, audio files, and video” online (Rosen & Nelson, 2008, p. 216). Blogging affords the participant the opportunity to post topics and interact with others by responding to the discussion. The person who originates the blog topic determines the boundaries for discussions. Blogs are good sources of communication with students for learning purposes inside and outside the classroom (Wohleb, 2011). There are more than 100 million blogs in use worldwide and 30 million more used in the educational realm by teachers and students (Petrilli, 2009). Langhorst (2007) created a virtual book club that was a successful experience of blogging in education. The activity permitted participation from students along with others because the blog had the ability to produce online discussions for open access. A boost was added to the learning environment because boundaries were made clear for all participants.

Although similarities exist between wiki and blog platforms, wikis differ in that users develop topics based on content fundamentals. Multiple users make changes and additions to the information posted (Doyle, 2006; Solomon & Schrum, 2007). Students become active participants in the classroom environment (Boulos, Maramba, & Wheeler, 2006). The researchers showed that teachers saw the many benefits to using wikis in classroom instruction. These include monitoring participation by reviewing contributions to lesson activities, strengthening writing skills, developing creativity, and using higher-order thinking skills. Teachers also use wikis for classroom management and content. Wikis allow students to post their favorite points of the lesson on the wiki board after

studying a chapter (Davis, 2006). For the teacher, a tracking system monitors the contribution of each student. Teachers can also collaborate with colleagues for lesson planning (Wohleb, 2011). Podcasting, blogs, and wikis are three technology tools teachers can use to enhance and improve the learning environment that allows access to additional technologies to help teaching and learning.

### **Interactive Applications**

The uses of online applications provide opportunities for teachers to integrate, collaborate, and enrich classroom instruction. Research has indicated that the use of online applications helps to expand knowledge (Nworie & Haughton, 2008). Previous studies have shown the connections students make when using online applications to learn. Students used technology to help solve problems by reflecting on prior knowledge and critical thinking skills (Anderson, 2007; Ward, Lampner, & Savery, 2009).

Podcasting, blogs, and wikis are a small representation of the technology used in classroom instruction. Online applications, including Edmodo, Google Docs, Prezi, Evernote, and YouTube, help novice and expert teachers integrate technology into classroom instruction. Nworie and Haughton (2008) detailed how incorporating technology increases engagement, interaction, and student achievement when delivered. Integrating the power of technology into classroom instruction provides the potential for all involved in the learning process.

Using technology in instruction provides the teacher with immediate feedback of the students' level of mastery. Sadler (2010) suggested that rapid feedback after an assessment is highly effective for teaching and learning in the 21<sup>st</sup> century because it

boosts the learning environment. Examples of immediate feedback include using track changes and online survey sites with mobile devices. Track changes allow the editor to make helpful comments and suggestions to a student's writing or presentation. The use of track changes to edit students' work serves as a time saver and an interactive feedback tool (Heinrich, Milne, Ramsay, & Morrison, 2009). Smartphones, tablets, and other mobile devices provide alternatives to desktops and laptops in the classroom. When teachers integrate technology into instruction, students reap benefits far beyond the classroom (Tucker, 2013).

### **Barriers to Technology Integration**

There are disadvantages to technology integration into classroom instruction as well as advantages. Although teachers know technology plays an important role in the education process for students, some recognize barriers to technology integration. They indicate it is not enough to have computers, projectors, and SMARTboards in a classroom (Evmenova & King-Sears, 2007). Researchers identified negative responses from teachers, administrators, and parents about technology integration that included resistance, limited support, and improper uses of technology (Cuban, 2006; Harris & Rea, 2009).

### **Resistance to Technology Use**

Teachers are open to learning new skills in the area of technology integration to make learning more engaging and realistic for the student. Buckenmeyer (2008) stated that full integration starts with the teacher. Consequently, resources and professional development need to be applicable and related to integration. Teachers' views affect the

full integration of technology in the classroom (Levin & Waldman, 2008). Teachers who have a strong influence on the way technology is used in the classroom based on their attitude and comfort level to integrate (Angers & Machtmes, 2005; Levin & Waldman, 2008). If teachers are not able to obtain a comfort level when using technology, then integration efforts decrease dramatically. Using the given research, educational leaders can help teachers go beyond textbook content to provide real world experiences and incorporate technological instruction to prepare students to become lifelong learners.

### **Limited Support**

Limited parental and school support is a second barrier to successful integration. There are some parents with negative views of technology devices in the classroom due to limited access at home or school (Flanagan & Jacobsen, 2003; Lewin & Luckin, 2010). A study by Robinson and Sebba (2010) discovered that teachers become reluctant to use devices, such as Personal Digital Assistants (PDA), for instructional purposes, because parents do not support this decision. Robinson and Sebba recommended that schools keep parents abreast of the technology that students use in the classroom. Effective communication with parents encourages them to be more engaged and inclusive in the learning process with their child. Additionally, the study indicated that parents could help students with homework by using the technology or websites to learn and participate in technology events at the school.

**School support.** Teachers need instructional support to integrate technology into instruction. For a teacher planning to integrate into instruction, time is a major factor.

Whether the teacher is planning to create, practice, collaborate, or evaluate, time is still an issue. Numerous hours are spent developing curricula in addition to meeting national and state standards. There is no additional pay when teachers decide to work longer hours to plan technology-rich lessons (Barnett, 2003; Conley, 2010). For teachers to integrate technology into instruction, they have to decide what technology works best. For example, teachers must decide if the technology is easy to navigate, the hardware equipment is appropriate, and the software is accessible. Teachers become “burned out” if there is no or little technical support to help the integration of technology (Hew & Brush, 2007). Time is valuable to teachers because they constantly work to meet deadlines inside and outside the classroom including grading, contacting parents, participating in workshops, and much more. To incorporate technology into daily lessons time needs to be allotted to locate resources to support the content and skills being taught.

### **Improper Uses of Technology**

Another barrier to integration is the improper use of technology through academic dishonesty. A form of academic dishonesty is when an individual uses an electronic source to cheat, plagiarize, or knowingly furnish the information to complete an assignment, test, or project (Underwood & Szabo, 2003). Plagiarism and digital cheating is a growing problem for 21<sup>st</sup> century learners (Ma, Lu, Turner, & Wan, 2007). Plagiarism is a major concern for teachers and educational leaders because of the easy accessibility to the Internet (Harris & Rea, 2009). Plagiarism can include someone incorrectly paraphrasing, not citing references, and copying and pasting work done by others (Park, 2003). The Internet provides a plethora of ideas and thoughts, but high

school teachers must recognize the responsibility to teach students the correct way to research and document work assignments. Research by Szabo and Underwood (2004) reveals one in two students confesses to plagiarism. Software such as Turnitin.com can help teachers scan student work for authenticity.

Technology use in the classroom is useful, resourceful, and efficient for teachers and students. Although cheating is not a new occurrence, the methods students use to cheat are now high-tech because of technology. Many students are more technologically savvy than their teachers; students can download online videos with details on how to successfully cheat using technology (Netter, 2010). An example of cheating is when a student sends or receives answers via text messages during a test (Underwood & Szabo, 2003). Research by Lathrop & Foss (2000) gave three reasons students cheat: (a) easy access to technology, (b) chances of getting caught are low, and (c) no severe consequences if caught. Teachers with the help of administrators have to be proactive along with the development of a plan to address the use of technology and create cheating policies. EVE or WordCHECK software has been shown to be successful for teachers when detecting whether a student copies work from a source (Ercegovac & Richardson, 2004). Although research by Lathrop and Foss (2000) provided recommendations to deal with plagiarism and cheating, teachers still have to be proactive and vigilant to the new innovative methods students may use to cheat.

### **Technology Disconnect**

The perception of technology as a temporary trend was a fourth barrier to integration. Technology integration can cause a disconnection between some teachers and



students. A student learning in the 21<sup>st</sup> century is considered an expert on operating technological devices. However, the student's expertise can be restricted in the classroom setting due to teacher's reluctance to technology integration into instruction (Brooks-Young, 2007; Prensky, 2005). Robin (2008) believed teachers can expect serious repercussions if they are not familiar with integrating technology, especially newer technologies, into instruction. If teachers lack the appropriate training on security, file-sharing, and social media, a disconnect can arise in the learning environment causing inappropriate behavior or distractions to occur. The behavior and distractions could result in the compromise of grading records, tampering of lesson plans or activities, and even unsuitable relationships between teachers and students (Chen & Bryer, 2012).

### **Best Practices in Technology Integration**

Best practices for technology integration in classroom instruction benefits students, teachers, and schools. Lawless and Pellegrino (2007) contended that best practices applied would provide ongoing and lasting effect over time. Collins (2009) specified that schools could attain excellence in technology integration by (a) engaging in planning, (b) organizing activities, and (c) maintaining consistency while using technology leadership, management, and policy pyramid as a guide. Collins further explained that the steps must be done concurrently if educational leaders and teachers want to see improvements in integration in classroom instruction. In a qualitative study, Wright and Custer (1998) sought to understand what strategies help increase the use of technology in the classroom. The study revealed the beliefs of teaching and learning for students. Recurring themes were “excitement and stimulation of learning and working

with new technologies” and “enjoyment of working with students and making a meaningful difference in their lives” (Wright & Custer, 1998, p. 65). The authors shared their ideas for the use of best practices for technology integration to serve as building blocks for teachers. These building blocks create a foundation for innovative lessons and a learning environment that is technology-rich and student centered. Learning is endless when teachers are knowledgeable, energetic, and equipped with the appropriate tools to integrate technology.

### **Summary and Transition**

Overall, this literature review explores some of the positive and negative issues directly associated with technology integration. The literature review in Section 2 begins the introduction and includes the resources used to identify relevant literature about technology integration in classrooms. The following topics are included in the literature review: technology integration in classrooms, professional development beliefs on integration, the impact of professional development, benefits of technology integration, technology uses, barriers to technology integration, and best practices in technology integration. Section 3 provides the methodology used in the study along with the research design, sampling size, and instrumentation. In Section 4, results of data collection and analysis are shared. Finally, Section 5 provides the conclusion as well as recommendations for additional research.

### Section 3: Research Method

#### **Introduction**

A qualitative case study design was used to explore high school teachers' perceptions of technology integration following professional development. The research questions were answered by collecting data from multiple sources that allowed a thorough analysis of 12 high school teachers. This section details the research design, context of the study, ethical protection for participants, and researcher's role. Additionally, this section provides a description of the data collection, data analysis, validity, and reliability.

#### **Research Design**

There are five research designs available to qualitative researchers: narrative, phenomenology, grounded, ethnography, and case study. In the narrative and phenomenology research designs, the emphasis is placed on experiences from a small sample size following clarification in the format of the order of sequence (Creswell, 2007; Merriam, 2009). Grounded theory research uses the abstract theory of a process, action, and interaction from the perspective of the participants in the study (Creswell, 2003). Ethnography requires an observation of the participant and collection of data over long periods of time (LeCompre, Preissle, & Tesch 1993). A case study is an in-depth analysis of a particular situation (Creswell, 2007; Merriam, 2009).

The case study design was selected to share findings with another group, but no theories or explanation of a phenomenon were developed. An in-depth case study design allows a thorough analysis of multiple sources (Creswell, 2009). In addition to sample

size and theme, this case study was bounded by the time available for the 2014-2015 school year. A case study was selected for this research design because it offers an opportunity to explore patterns of experiences, attitudes, perceptions, and beliefs. According to Yin (2009), a single case study provides knowledge on typical experiences or events and contributes substantial information to support or refute a theory. The case study design provides greater visibility into identifying themes across participant interviews, lesson plans, and classroom observations.

### **Research Questions**

This qualitative case study explored perceptions of technology integration for high school teachers following professional development.

The following research questions guided this study:

1. What are the perceptions of high school teachers following participation in professional development to integrate technology into instruction?
2. What are high school teachers' perceptions of strategies to overcome barriers when integrating technology into instruction?

The research questions were used to identify potential insights into how teachers effectively integrate technology into classroom instruction after participating in professional development.

### **Context of Study**

The context of the study included the school setting and participants. The case study took place in Misty Vale (a pseudonym), an urban high school located in the southeastern region of the United States. The school district housed approximately

23,000 students. The district has 29 elementary schools, nine middle schools, and seven high schools. The district also has a career and technology center, two charter schools, an alternative school, and a middle college (Study Site's District Accreditation Plan, 2009). Misty Vale opened in 1963 as a junior high school, and in 1971, the school was converted into a high school servicing grades 9 through 12. The school was later racially integrated and eventually served a student population of 1,400. During this time, structural improvements were made to the building. In 2007, the school received funding from the city's bond referendum to build a new facility for learning. In the fall of 2007, a state of the art school opened the doors to its staff and 740 students (South Carolina Department of Education, 2012).

Teachers at the school represented a diverse group in terms of academics, ethnicity, and social groups. The South Carolina Department of Education (2012) provided the academic and demographic data used in this study on the School Report Card. The teacher participants in this study were certified in their content areas and 69.6% have earned degrees beyond the Bachelor's level. The average teaching salary as reported for the school year was \$51,513.00.

Professional development training included teachers' implementation of best practice strategies for student success with attention placed on literacy, development of senior projects, career technical training, and data-driven results. This study used a sample of teachers from the site to explore their perceptions about integrating technology into instruction following their participation in professional development.

**Sampling**

Convenience sampling strategy was used to select 12 participants based on course teaching assignments and time constraints (Creswell, 2007). Based on the diversity of experiences, the subject matter included in this study was English, math, science, social studies, performing arts, and physical education. The participants in this study shared common conditions—their willingness to discuss technology integration as it relates to their experiences.

**Pilot Study**

Prior to interviews with participants, a pilot study was conducted to obtain reliability and validity of the interview questions. A pilot study allowed me the opportunity to test the interview questions on individuals who may exhibit interests similar to the research study participants. Kvale (2007) encouraged pilot testing for newly created instruments used to conduct research studies because the feedback would provide details of mistakes, limitations, and other faults to the researcher. Therefore, the researcher would be able to make revisions to the instrumentation prior to study implementation. As the researcher, I asked three individuals with occupations in the education field and experience using technology to respond to the interview questions and provide feedback. Based on feedback from the pilot study, the following changes were made to the interview questions: re-wording questions and correcting grammatical errors.

### **Ethical Protection for Participants**

The teachers served as the participants in the study and were selected because they are certified to teach secondary education courses. The teachers who participated in this case study worked at the same high school and had participated in monthly technology training session held at the high school.

Twelve participants were selected for this study because the number provided “ample opportunity to identify themes of cases as well as conduct cross-case theme analysis” (Creswell, 2007, p.128). The small size minimized the amount of data that needed to be protected. Upon approval from Walden University Institutional Review Board (IRB 08-15-14-0067315), the study proposal request was submitted to the site’s school district office of Accountability, Assessment, Research, and Evaluation for approval. Additionally, a cooperation agreement in the form of a letter was sent to the principal of the selected site. After all approvals were received, I proceeded to obtain participants for the study.

### **Risks**

Maintaining the participants’ confidentiality was important. To ensure confidentiality of each teacher participating in the study, Walden’s University IRB ethical practice policies for documentation and data collection were followed throughout the analysis process. Every effort was made to protect the participants’ rights. During the research study, participants were identified by a number rather than by name. No contact was made with the general population for the purpose of this study. The confidential data collected from participants through transcripts, audio recordings, observation forms, and

lesson plans will be stored in a secured location on a flash drive. Data will be retained for 5 years following the completion of this doctoral study. Ongoing meetings were also scheduled with the doctoral study committee chair and organizational research staffs to ensure appropriate measures were in place for ethical research.

### **Researcher's Role**

As the researcher of this study, it was my role to conduct a fair and unbiased study. It is important to acknowledge that I serve as the work-based learning consultant for the Career and Technology Education Department in the school district in which this case study was conducted. It should be noted that I did not interact or supervise any of the participants in academic, performing arts, special education, or physical education departments. My duties as the work-based learning consultant included securing internships, organizing career and job fairs, building community partnerships, and designing lessons, activities, and rubrics for employability skills. I had no authority to make any decisions or changes in academics or any educational policies related to the participants in the study. My role did not have an influence on the teachers' willingness to participant in the study.

Merriam (2002) specified that researcher bias could compromise the validity and trustworthiness of the study; therefore, documentation must be used to increase the quality of research along with the results. As such, I outlined my role and purpose of the study to participants prior to data collection. Creswell (2007) argued researchers make interpretations that may not be "separated from their own background, history, context, and prior understandings" (p. 39). My experiences as a career and technology teacher



granted me access to the latest technology tools and training. The experiences allowed me to share instructional strategies using the technology tools with other career and technology teachers entering the field. However, these experiences made me aware of the challenges faced by teachers outside the field of technology. To minimize bias during the collection of data and analysis process, I used field notes. The field notes included ongoing interpretations of the research process in addition to notes about possible researcher bias.

### **Data Collection Procedures**

The data collection was conducted through detailed preparation and implementation. Preparation involved approvals to conduct the research study. The Walden's Institutional Review Board and school district's Office of Accountability, Assessment, Research and Evaluation provided consent to proceed with the study. Next, contact was made with the school administrator to discuss the study and receive permission for teachers to participate. I have not in the past or present supervised any academic, performing arts, special education, or physical education teachers. Career and technology education teachers were excluded from participation in this study because I serve as a direct administrator for those teachers in the school district of this study. There was no conflict between my roles as administrator and researcher. An introductory group meeting was held with all potential participants (excluding career and technology education teachers) in the school's conference room after school hours. The meeting provided a forum for me to outline the research study and explain the requirements, purpose, and voluntary nature of the study. Convenience sampling was used for selection

of the participants due to standardized testing time constraints. Participants were selected to ensure equal representation of content courses throughout the school building. After the meeting, an invitation letter using Google Docs was emailed to potential participants and the Google Docs consent form, secured with a password, was sent to the participants. The password along with a hard copy of the signed consent forms are stored in a secure and confidential location. The participants were assured of their confidentiality and informed that study results will be available for review upon request. The preparation phase of data collection ended after all documents were signed and dated by participants and an update and next steps of the process were discussed with the school administrator and participants.

Data collection was conducted in a 9-week academic marking quarter and used three sources: interviews (Appendix B), lesson plans (Appendix C), and classroom observations (Appendix D). Data were collected from multiple sources to gather information to construct clear and concise themes (Creswell, 2003) and to allow for triangulation. Triangulation involves the collection of multiple data sources to cross check for accuracy (Yin, 2008). The research questions were addressed through analysis of the interviews, lesson plans, and notes taken during classroom observations.

### **Interviews**

The data collected from 12 high school teachers were face-to-face interviews conducted in the teachers' classrooms. Each interview lasted approximately 50 minutes and was recorded using a digital recording device on a laptop computer. All interviews were conducted as scheduled at the site location after school and duty hours. In case of an

emergency, interviews were rescheduled for another time. During the study, reflections were recorded and information processed to maintain the participants' personal perceptions. Audio data were transcribed concurrently over a period of 7 business days with follow-up audio replays and several written drafts for accuracy. Member checking is detailed further in this section.

The protocol for collecting data included the use of open-ended questions asked during a semi-structured interview (Appendix B). Additionally, secondary and probing questions were asked contingent on the responses to the open-ended questions. Open-ended responses allowed the participant to share personal accounts or experiences. I developed the interview questions based on the research questions that guide this study. Upon the completion of each interview, I wrote reflections to ensure the accuracy of information and relevancy.

### **Document Analysis**

Teachers were asked to provide two lesson plans once interviews were conducted. The lessons submitted were current plans and required no additional information from the participants. The lesson plans were reviewed for technology integration connected to recent professional development training. The lesson plans helped to support themes that coincided with interviews. Data gathered from the lesson plans were evidence of the teachers' ability to integrate technology into instruction after participating in professional development. The documents were examined using a checklist created by me (Appendix C). The section of the lesson plan representing emerging themes was color coded accordingly.

## **Observations**

Another method used to collect data for the study was a classroom observation to triangulate information from the lesson plans and interview responses. Data collection in the form of observation took place in the classroom or labs where participants had access to technology tools for instruction purposes. Participants were notified 1 week prior to the observation being conducted. Each teacher was observed once for a total of 12 observations. Observations lasted from 45 – 60 minutes after interviews. Observations assisted in validating the teachers' responses from the interviews. I used the observations to compare and contrast themes developed from the participants' interview responses. The notes collected during the observation provided data about teachers who integrate technology into classroom instruction after participating in professional development. An observation checklist with a commentary section was designed to identify technology integration into classroom instruction (Appendix D). Personal thoughts and reactions during the data collection process were kept in a journal but not included in the doctoral study (Mehra, 2002). The journaling served as a reminder to keep the study objective and not focused on personal beliefs and bias.

## **Data Analysis**

Qualitative research design works best when data collection and analysis occurs concurrently for the purpose of choosing themes associated with the research (Creswell, 2007; Merriam, 2009; Yin, 2008). Organization was important to data collection because the presentation is designed to provide a sense of understanding from interviews,

document analysis, and observations. The development of themes for this study was prepared through a series of steps once data collection was completed.

The data were collected, organized, and transcribed. Interviews were read followed by developing themes for a narrative and careful interpretation to maintain a digital journal of all interactions. I used the audio recordings to review interview responses for clarity. The inductive analysis was used to code the data. Coding the data helped the process of developing common themes (Creswell, 2003). After reading the responses from each participant's interview, I searched for similarities in patterns followed by created codes. Next, raw data were categorized and chunked. I assigned codes to the themes derived from categorizing. Nine codes were applied to the identified themes. Appendix E provides a detailed view of how the interviews were coded. Categories were collapsed to make data manageable and provide meaningful units of narrative description.

Other sources of support to triangulate data were document analysis of lesson plans and classroom observations. These sources help build upon the themes and add an in-depth understanding of high school teachers' perceptions of technology integration following professional development. The analysis of the lesson plan focused on the "Use of Technology" section. The use of technology section was designed to provide a list of technology tools that would be used to support the learning objective identified within the lesson plan. Participants listed the technology tools and possible methods used to integrate technology throughout the lesson.

The document analysis checklist (Appendix C) allowed me to compare and contrast the use of technology listed in lesson plan with participants' responses to interview questions. The observations focused solely on technology integration in the classroom. During the observations, the checklist was used (Appendix D) to identify technology integration. The observations captured an actual view of technology integration in the classroom (Merriam, 2009).

After reading the responses several times, I identified similarities and differences in each participant's interview. The lesson plans and observations also were analyzed to compare and contrast the to the interview data and to develop the themes discussed in this section.

### **Validity and Reliability**

A good qualitative study shows credibility and confirmation (Lincoln & Guba, 2000). The member checking system served as a validation in this study. Member checking allowed the participants to share concerns, inconsistencies, and observations during the study (Creswell, 2003). Participants were allowed to review the transcript of their responses to interview questions to confirm accuracy (Creswell, 2003). Rich and thick descriptions were used to increase the validity of a study as well as support the themes being identified during the analysis process (Creswell, 2009). Quotes from the participant interviews were used to support and justify themes identified in the study. The findings gathered from the study are presented in Section 4 to show a relevant relationship between the problem and participants in the study and the collection and analysis of data.

## **Summary**

This section includes a complete description of the information about the case study design. A review of the research questions and the study's context includes background information on the school and teachers. After a discussion of ethical issues and the researcher's role, the data collection procedures are presented which include interviews, observations, and document analysis. This section details the process taken to maintain the validity and reliability of the study. Section 4 includes procedures for data collection, analysis, and the findings. Finally, Section 5 includes a comprehensive summary of the research along with interpretation of the findings, a description of implications that impact social change, and recommendations for future research and practice.

## Section 4: Results

### Introduction

The purpose of this qualitative case study was to explore high school teachers' perceptions regarding technology integration following participation in professional development. Through this study, teachers' perceptions and studied factors were analyzed that may or may not have contributed to successful integration. This section includes findings based on the interviews, document analysis of lesson plans, and classroom observation.

### Participants

The participants in this study were teachers in a high school in the southeastern United States. Table 2 shows the identification numbers, teaching experience, level of education, and subject area taught for the 12 participants from Misty Vale High School.

Table 2  
*Years of Experience, Education Level, and Subject Areas of Participants*

Participant #	Years of experience	Education level	Subject area
1	11 - 20	Master's	elective
2	1 - 5	Master's	math
3	11 - 20	Master's	science
4	11 - 20	Master's 30+	English
5	20+	Master's 30+	English
6	20+	Master's 30+	math
7	11 - 20	Master's	science
8	1 - 5	Bachelor's	social studies
9	11 - 20	Master's	health education
10	1 - 5	Master's	special education
11	11 - 20	Master's	social studies
12	20+	Master's	elective



### **Data Generating and Gathering**

A data collection process was followed to maintain confidentiality and to protect the rights of participants throughout the process. Prior to the data collection, the purpose and steps of the study were discussed with the school district's research committee chair for clarity. After checking with the school principal, the secretary was permitted to give me access to the teachers' email addresses (with the exception of career and technology education teachers). Email messages were sent to teachers on the list inviting them to participate in the study.

Due to time constraints, convenience sampling was used to identify participants for the study. The first 12 teachers to respond to the email along with attaching the completed consent form were selected as participants in the study. These participants also had to represent the specific content areas. Interviews, lesson plans, and observations were the three forms of data collected for this study. The participants were notified 1 week prior to the start of interviews and 1 week prior to observations. The document analysis was conducted after the interviews and prior to observations.

Participants were assigned a number as a pseudonym to ensure confidentiality and privacy, and to protect their rights throughout the data collection process. Each participant was assigned a folder with the same number used to identify all data collected. A sheet with the participant's real name and pseudonym was placed in the folder. Data collected from interviews, lesson plans, and observations were also placed in the participant's folder. The document analysis form and observation checklist were examined and placed in participants' folders as well. After transcriptions had been

completed, a data file was constructed for all documents and was placed in the locked file cabinet.

### **Interviews**

The 12 participants were interviewed to gather perceptions on technology integration following participation in professional development. The interviews were semi-structured with open-ended questions to understand teachers' perceptions of using technology in the classroom. The interview protocol followed is outlined in Appendix B. The questions used in the interviews stimulated participants' reflections about technology integration with some added discussion. Participants were made to feel as relaxed as possible by allowing them to answer questions to the best of their ability and not restricting them to a time frame. Notes and audio recordings were used to transcribe responses within 24 hours of the interview.

### **Document Analysis**

The documents collected for this study were two lesson plans from each participant. The lesson plans reviewed provided details for substantiating other data collected for the study (Yin, 2009). A total of 24 lesson plans were collected and reviewed to authenticate the information shared during participant interviews.

### **Observations**

The classroom observation protocol was followed as outlined in Section 3 to compare and contrast to the themes identified from analysis of the interview responses. Prior to observations, the participants were contacted, and I reviewed the study's purpose

and observation protocol with them. Observations were scheduled based on the lesson plans provided by participants.

### **Presentation of Findings**

Upon completion of data collections, I began the data analysis, which included transcription of each participant's responses to interview questions, review of lesson plans, and classroom observations. This presentation of findings includes emerging themes using qualitative narratives.

Six themes were developed to answer the two research questions. A seventh theme, self-perceptions of technology, also emerged. This theme was unrelated to the research questions but contributed to a greater understanding of the overall problem. The themes for Research Question 1 were (a) technology integration was beneficial in the learning environment, (b) technology integration strategies need to be relevant to make connections, and (c) technology integration training needs to be consistent. Three themes were identified for Research Question 2, which sought to understand barriers to integration: (a) teachers experience restricted access to hardware and software, (b) there is a lack of technical skills among students, and (c) there is limited time to develop technology-rich lesson plans.

### **Self-Perceptions of Technology Integration**

The examination of the perceptions of the 12 participants provided a variety of definitions of technology integration. Participants defined technology integration as the use of technology (mobile devices, SMARTboard, the Internet, and computers) in the learning process; using technology to help supplement and support students' academic

advancements and retain information; enhancing student learning beyond the image of the teacher; engaging students through projects, analysis, and real-world applications; and using technology to make learning student-centered.

Participants with more experience integrating technology listed advanced technology tools such as video conferencing, interactive online websites, tablets, software, iMacs & iPads, TI-84 Graphing Calculators, Test Prep websites and assessments, digital body fat analyzers, Accelerated Reader software, high definition video cameras, and cell phones. The less advanced users listed SMARTboards, document readers, laptops and LCD projectors, which are considered more basic tools.

Participants also described their comfort level integrating technology into classroom instruction. The participants' comfort level with integrating technology varied based on their experiences. The majority of participants felt comfortable integrating technology into classroom instruction. However, three participants perceived their ability to integrate higher than the majority of participants, and two saw themselves as being less able to integrate technology than other teachers. Participants 3, 7, and 11 were extremely confident in their ability to integrate technology into classroom instruction. Participant 3 did not hesitate to state he was "extremely comfortable" integrating technology into instruction. The response from Participant 7 acknowledged that there was a level of ease when integrating technology into instruction: "I feel very comfortable because I feel I have an advanced knowledge of software and apps that enhance teaching in the classroom." Participant 11 also was eager to express views on comfort levels. He said, "I

feel pretty confident. I will usually sit down and play around with the technology on my own until I become comfortable with it.”

Participants 4 and 9 wanted to be more knowledgeable about technology when integrating into instruction but were less confident. The comment from Participant 4 reflected some apprehension when working to integrate technology into classroom instruction. He said, “My comfort level is not where I would like it to be. I am still unsure of how to properly integrate technology and get the academic benefits for my students.” Participant 9 was straightforward in his response to the question of a comfort level when integrating technology into classroom instruction. He said, “I need more strategies and experiences.”

Despite this variation in comfort level, there was a general understanding among the participants as to how they integrated technology into classroom instruction. Participants had a desire to integrate the technology learned from professional development or any other training. As Participant 3 noted, “If I don’t use it, I will lose it.” Both research questions themes are discussed in the following sections.

### **Research Question 1**

Three themes emerged from the data analysis process aligned to Research Question 1. The identified themes were (a) technology integration was beneficial in the learning environment, (b) technology integration strategies need to be relevant to make connections relevant, and (c) technology integration needs to be consistent. The themes characterized the perceptions of high school teachers’ ability to integrate technology into instruction after participation in professional development training. Themes were

developed from interviews, document analysis of lesson plans, and classroom observations.

**Technology integration is beneficial in the learning environment.** Participants in this study desired to have specified technologies available with a clear understanding of the impact on students when integrating technology. The participants expressed that integrating technology into classroom instruction was beneficial, but not always available. All participants understood the importance of having the technology readily available whether at home or school. They knew technology is needed for survival in everyday life. According to Participant 12, it is not beneficial for a teacher to plan a lesson trying to incorporate technology from the latest professional development training only to discover the equipment is not available or limited either due to time or student-to-technology ratio.

Students having access to technology outside the classroom were similar concerns for two participants. Participant 1 stated, “Technology is good, but if it’s not available then it is no good” and Participant 12 remarked, “Every student doesn’t have computer or Internet access when they are home.” Additionally, Participant 10 asked the question, “How beneficial will it (technology) be for my students and how will I individualize for students with disabilities?” When the technology was available, Participants 3, 4, 6, and 8 shared parallel opinions of technology benefits. These participants felt the use of technology for educational purposes would help prepare students for the workforce in the future.

Several participants focused on integrating technology for students to learn essential knowledge. Students' benefit when teachers integrate technology because "it supports students' need to be technologically proficient," declared Participant 6. Participant 8 said technology "allows exposure to different learning strategies." Participant 7 understood technology helped students perform better and made learning **curriculum standards** more exciting. Another benefit of technology integration was that learning became interactive for students, stated **Participant 11**.

Lesson plan analysis indicated that the technology equipment and website resources provided from professional development training were beneficial to Participant 5 for instructional purposes. **Participant 5's lesson plans** included students conducting online research. The section of the lesson plans for use of technology listed computers with Internet access and several websites to assist students with the research. Additional details on the lesson plans outlined the steps for completing the assignment.

**Participant 1's lesson plan** listed the technology to be used, when the technology was to be used, and how the technology would enhance the concepts learned. Specifically, Participant 1's students used desktop publishing software to create brochures on driver safety. The lesson plans from Participant 1 provided clear examples of instructional technology. The lesson plans indicated students' use of computer and software to create a publication for driver's education class. The analysis conducted on the lesson plan further showed technology use would occur in class with no homework assignments requiring the use of technology. Students were allowed to complete all computer work during class time. Students gained the benefit of the technology use

without penalizing those students who did not have computer and Internet access at home.

Participant 11 frequently incorporated technology use into **the lesson plans**. This participant considered the level of engagement from students and made sure to use technology as a tool to introduce or review a concept. For example, a unit on civilization would include using technology to create a customized civilization based on the demographics of students in the classroom. During an observation of Participant 7, students were using online software to study chemical reactions. The lesson plan required time for the teacher to review and identify websites that were interactive and informative about the mixing chemicals.

**Technology integration strategies need to be relevant to make connections.**

The relevancy of professional development was important because many participants wanted to receive training related to their content areas and technology skill level. Although the participants agreed professional development for technology integration was offered monthly at the school, they indicated there was still a need for additional training. In some instances, participants were provided with technology equipment and websites before receiving training; this led to participants not using the technology if they were not comfortable with self-teaching. The user-friendly software, websites, and technology equipment were concerns for one participant in particular. Participant 4 said, “I believe there needs to be more training on how to use the apps and programs students are currently using [e.g. SnapChat]; we [teachers] need to be current.”



Participant 11 indicated the school district offers technology training beyond the monthly professional development at the school; as such, opportunities to learn more about specific technology and apps are available to the individual teacher. Additionally, Participant 2 felt training was adequate for the type of technology available for school. Several participants felt technology is ever changing, and that they would never be able to have training on all the latest trends of technology integration in education. In contrast, Participant 7 was displeased with professional development for technology integration. This participant viewed professional development as insufficient and too widespread when it came to topics covered in technology integration, “I feel more than 50% is a waste” and “the district’s focus on the beginning level teachers.”

Analysis of data collected during observations provided additional evidence of the connection between professional development and relevancy. During the interview, Participant 3 indicated she felt previous professional development was relevant because the resources shared during the training allowed her to integrate review games to help students prepare for a test and made learning interactive. The training she found to be most relevant provided her with review game websites for students and online quiz generator websites. During the observation of Participant 3’s class, I witnessed students using desktop computers to review content learned in a prior lesson. The students were playing “Quia – Millionaire Game” in the computer lab. The game concept was derived from the television show, *Who Wants to Be a Millionaire*. Students had to answer questions from concepts studied earlier in the week to advance to the next level of the

game. During the observation, the teacher monitored student progress and used the time to work with students individually to discuss concepts that were misunderstood.

Two observations in math classes provided evidence that technology was being integrated based on previous training received during professional development. Participant 6 learned how to use math software after attending summer technology professional development training, and I observed him using a closing activity that required students to solve algebraic equations. In the class, the participant had two students work the same problem but using different strategies to solve the problem. One student had access to white dry erase board while another student used the SMARTboard.

In another **math** class observed, Participant 2 was observed using the SMARTboard to demonstrate the steps students must use to calculate angle measurements. No software or other technology was used to teach the lesson. Nonetheless, the participant applied previous technology integration skills learned to teach **math** concepts.

My observation of Participant 11's classroom involved students working in small groups. Each group wrote a (break-up) song about the Declaration of Independence. Students were allowed to use their tablets, cell phones, or computers to research song lyrics, patterns, and background music to help make the song assignment a success. The participant made the use of technology essential for the lesson activity. This participant indicated a desire for training on technology tools as it related to specific subject areas.

**Technology integration training needs to be consistent.** Teachers support students in their work efforts; similarly, teachers need support in their technology

integration efforts. One way this occurs is through consistent support. All of the participants indicated the need for consistent support following professional development, but there was a lack of agreement as to whether the district offered sufficient follow-up support. Participant 3 defined consistency as “the teachers that are uncomfortable to integrate technology should receive additional assistance on technology tools,” particularly if it involves assistance in a possible follow-up training session.

Participant 5 said support was consistent with teachers working to integrate technology. This participant stated the support level for technology integration after professional development training was “great” because teachers were able to contact district personnel for assistance. In another interview, Participant 10 provided an example of assistance that was consistent with Participant 5’s perspective. Participant 10 said, “There was a time when I was having trouble with the Edmodo site for the purpose to upload documentation for the technology proficiency requirement. I went to the media specialist for help and was able to understand.” Consistent follow-up included but was not limited to teachers receiving assistance if needed when integrating or the need to provide additional professional development training.

However, four of the 12 participants felt follow-up training was minimal and expressed an interest in having additional professional development specifically designed for technology utilization in the classroom. Participants 4 and 12 indicated the need for professional development to be ongoing and offer follow-up sessions for teachers who struggle to integrate. Participant 7 understood that technology was legislated but may not always be consistent in schools. Although professional development for technology

integration fulfills state and district mandates, there was still a need to follow-up with and/or assess the need for the faculty.

A few participants wanted to use individuals within the school building for technology integration training instead of having an outside person train them. If a teacher in the school building is well informed on using technology to enhance lessons, then this teacher could help to promote effective integration. Participant 10 recognized individuals within the building could present technology training and be a consistent and a convenient resource. According to the participants, such an inside resource would serve as a technology integration specialist within the school. Participant 7, in addition to teaching, he served as a school resource for teachers struggling to integrate technology into instruction took up this role. The participant was thought to be an inside resource for other teachers, frequently being called upon to help troubleshoot problems with hardware and software.

Participant 7, who was skilled in the use of technology, perceived that professional development training was geared towards first-year teachers and did not provide additional support for teachers who were advanced in technology use. This participant was consistent during the interview, submission of lesson plans, and in the classroom observation with his ability to integrate technology into classroom instruction. This participant wanted higher-level training sessions to be consistent for teachers who had more experience with integrating technology into classroom instruction. The lesson plans reviewed and observation conducted for Participant 7 were consistent with his interview responses. For example, the use of technology section of the lesson plans listed

PhET simulations, interactive websites, and online research sites for students to conduct a controlled experiment explaining the motion of an object. During my observation, the teacher gave precise directions on how students were to use technology tools to complete the experiment and document their work.

### **Research Question 2**

Three themes emerged from data analysis process aligned to Research Question 2. The identified themes were (a) teachers have limited access to hardware and software, (b) there is a lack of technical skills among students, and (c) teachers lack time to develop technology-rich lesson plans. The themes characterize the barriers the high school teachers encountered when integrating technology into instruction after participation in professional development.

All the participants acknowledged that there were barriers that prohibited them from using technology to enhance instruction. However, the barriers identified were based on their technological abilities. Advanced users were proficient when it came to integration strategies; the basic users possessed limited skills to integration. Some of the skills advanced technology users included were the use of tablets, video conferencing, SMARTboard tools, and interactive software. Skills for basic users included using word processing software to type information or use of the LCD projector and SMARTboard to display information.

The more advanced users felt a strategy to overcome the barriers should be based on an individual's level of technology usage and understanding. They wanted to learn more so they could integrate technology even more and did not understand the reasoning

for restrictions that were in place that prohibited them from more in-depth assignments such as research. The novice users indicated the barrier was the inability to have laptops in the classroom daily.

Several observations were made about strategies specific to some barriers.

Teachers who used average to limited technology for instruction felt the inability to have a class set of iPads or laptops in the classroom was a barrier and prevented integration. However, the more advanced users indicated a strategy for overcoming the lack of access was to use technology that the students used on a daily basis. These included cell phones and tablets. The less experienced teachers did not think of this as an option.

The majority of participants said communication was a strategy to help overcome barriers for technology integration. The strategy of communication among the district's information technology department, administrators, and teachers was pertinent because it forced accountability so that technology integration could be effective. Findings for Research Question 2 detailed the participants' perceptions of three common themes: (a) limited access to hardware and software, (b) lack of technical skills among students, and (c) time as barriers to integrating technology.

**Limited access to hardware and software.** Access was a reoccurring theme during the interview and observation processes. Although the participants knew their school district embraced technology integration, limited access was acknowledged due to the restrictions as to which resources were available. Not enough computers and Internet access were associated with limited access. Participant 3 believed technology in professional development training was good for integration, but the technology itself may

not always be readily available. Participant 11 indicated, “they [resources] were extremely limited” when researching for information on the Internet; websites were blocked, and students became frustrated in the process of their research.

Access to technology for integration in classroom instruction was determined by the curriculum, standards, and technology inventory in the school by 4 of the 12 participants. Comments made by the participants included “trying to stay on task with the pacing guide and integrate technology was tiresome,” “having no access can be frustrating,” “if a site is too difficult for me to figure out, then I will not use it,” and “I look to see if the software is reliable or can be used to engage and not distract the learning environment.” For example, Participant 12 shared that using videos in class was an acceptable form of integration technology when it applied to the standards being taught. However, when the participant tried to access the video from YouTube or another website, the entire site was blocked. In training, teachers are encouraged to incorporate video clips but in reality have limited access to the websites.

Participant 8 responded by stating, “Resources. I don’t have access to all of the resources that are presented during professional development.” Although computers and other technology equipment were provided to the school, teachers had limited access due to low equipment inventory or classroom sets. All participants did not have similar experiences; Participant 1 recalled a time when Information Technology personnel were on site to immediately assist with technology problems encountered. She said, “After years of having Information Technology persons at the school, the district changed the policy and moved IT person to a central location which required teachers to submit a

ticket to fix any technological problems that occur.” Another concern for participants was the Internet not working or running slowly except for Participant 9. Participant 9 did not experience any barriers when working to implement technology due to minimal integration.

Analysis of the interview responses indicated that the process for accessing blocked websites or requesting technical support was frustrating. Because of the Children’s Internet Protection Act of 2000, access to websites is limited in educational settings and is controlled by the IT department. Requests to access websites not already approved must be submitted to IT. According to Participant 6, IT did not always have a quick turnaround on website restrictions removal, and Participant 7 wanted IT to serve as support rather than an administrative office restricting users from websites or software. Participant 11 said, “The training is not the issue. The issue would be ensuring that IT would let sites be permissible once we return from professional development training.”

Data collected during observation provided further evidence that access was a barrier to technology integration. Participants did not hesitate to discuss the restrictions and micro-management of the district’s IT department. The limited access for technology integration was frustrating for 7 out of the 12 participants. Observations of teachers revealed the following frustrations: Participants 1 and 11 needed software installed on a computer, but it would take IT 2 – 3 days for IT to report to the class. Participant 2 had difficulty with SMARTboard alignment. Participant 4 provided websites to students for research only to learn some websites had been blocked by IT. Participant 8 needed access to use Google Hangout for video conferencing during a project, but district personnel



informed the teacher that the application was not compatible with the software already being used. Participant 10 needed software updates on student computers but would have to wait for IT to perform the update.

Despite these difficulties, many participants did not allow limited access to deter them from technology integration, but they did express dissatisfaction with the restrictions on websites and micro-management of the district's IT department. For instance, Participants 2, 3, 5, 7, and 11 explored different technology tools and websites to use for classroom instruction. These participants were self-taught on how to integrate various technology tools, software, and strategies to enhance the learning environment. Finally, Participant 7 suggested the strategy of communication to help overcome the barrier of access.

**Lack of technical skills among students.** Teacher-to-student ratios when integrating technology are important. Participant 5 said that there is a teacher-to-student ratio of 1:25 on average, and there are four computers in the classroom; as such, there was not a fair opportunity for each student to have sufficient time to use technology. Participant 3 said, "I enjoy project-based learning for my students, but sometimes there are challenges for students due to lack of technology skills on some technology software programs." The participants wanted small class sizes for integrating technology with project-based learning.

A concern for Participant 2 was students' technical skills or ability to use technology equipment. This participant noted students were on different levels in mathematics even when using advanced calculators. Some students were able to use the

calculators with ease while some students struggled to plug formulas into the calculator to solve the math problem. Participant 3 also indicated that required use of technology in the classroom could be challenging for students who do not have the strong technical abilities. Analysis of data collected during observations provided further evidence for the theme of technical skills.

Participant 10 was concerned about technical abilities for students with learning disabilities when using technology. During the interview, Participant 10 shared stories of success and struggle for students in the class using technology. According to Participant 10, the students with advanced technical skills would finish online activities or assessments faster and become a behavior distraction. Students with basic or low technical skills struggled to use the mouse and keyboard to type answers to an online activity or assessment. During the observation, the participant spent 20 minutes helping one student with an online activity. Two other students completed their online activity and began playing online educational games. One student eventually tried to play a game that was not approved by the teacher.

Another observation in English class revealed the struggles of teachers and students using technology. Participant 4's students created a newsletter for a novel read earlier in class. The teacher provided the rubric and websites to assist students with the project. The students were observed using advanced technology skills. These students applied sophisticated software settings to creativity make their newsletters noticeable from other classmates. Some students had difficulties using the software to format the newsletter, add color, change fonts, and insert graphics.

Despite the disparities between student abilities identified by Participant 4, Participant 1 said many students text, play games, and view social media on mobile devices all day. Participant 3 suggested a strategy to overcome the barrier of limited technical skill was to identify appropriate technology tools to help students complete assignments and projects.

**Teachers lack time to develop technology rich lessons.** The teachers said they needed sufficient time to develop interactive lesson plans, grade papers, or even attend technology integration training. The majority of the participants expressed time as a barrier to technology integration following training received from professional development. The participants felt professional development did not leave enough time for questioning and answering sessions or collaboration time. Participant 9 stated teachers were not able to ask any questions at the end of technology training due to limited time. Five of the 12 participants wanted time to surf and play with the technology resources shared before integrating into classroom instruction.

Participant 8 wanted to collaborate with staff members to understand how to integrate technology into classroom instruction. She said, “Professional development should be held by current staff members that are tech savvy and techniques for collaboration.” Participants expressed interest in time to develop collaboratively integration strategies with same content teachers during the school day rather working after school hours. Lack of time during professional development training also hurt collaboration efforts for participant’s wanting to teach across curricula or work with another teacher in the same subject area. Participant 8 wanted more time to discover and

peer collaboration to enhance integration in the classroom. Participant 9 discussed the wish to work with science and culinary arts teachers to develop a healthy lifestyle guide for students. The project would include using technology to research recipes, workout regimens, and create a journal to document activities. The participant knew he was not proficient with technology integration; therefore he would rely on assistance from the science teacher. The participant reported not working on the project due to time constraints and other school obligations. Although Participant 9 discussed collaboration efforts during the interviews, the lessons plans did not show any strategies for collaboration. The lesson plans for Participant 9 lacked technology use, and during the observation the only use of technology was to take roll and display the class agenda. To overcome the barrier of lack of time, Participant 6 listed more time as a strategy.

### **Discrepant Data**

The research addressed discrepancies that did not align with general emerging themes (Creswell, 2009). During the review of the data, it was evident that there were discrepancies among a few participants. Participants 1 and 4 believed more training should be offered because some teachers were still hesitant to integrate technology. Participant 7 was displeased with training because the topics covered in the sessions were too broad and could have been more direct in specific technology integration strategies. The remaining participants disagreed with Participant 7; for these participants training was adequate, and they were able to integrate technology following participation in professional development.

Lesson plan analysis indicated that some teachers were successful at using what they learned in professional development to create technology rich lessons, but other teachers were not able to do so despite their articulated desire to do so. Lesson plans for Participant 9 included minimal technology integration. Under the section labeled use of technology the participants listed computers. No information was provided on how the computers would be integrated. This discrepancy was also apparent in the analysis of classroom observations in which some teachers successfully implemented technology rich lessons and other teachers limited their use of technology to administrative purposes. During classroom observations, Participant 9 did not integrate technology but did mention the use of Fitness Gram software for later use. Participant 12 did not integrate technology during the classroom observation due to lack of access to the type of technology needed to assist with instruction.

### **Patterns, Relationships, and Themes**

Patterns are consistencies found in the data collected that are known to be similar, different, or frequent (Hatch 2002). I used three data sources to establish themes and patterns to provide evidence to answer the research questions. I coded, categorized, and reviewed the qualitative data collected to identify patterns. For example, participants with 1 – 10 years of teaching experience were more inclined to integrate technology even if barriers existed. These participants were able to list current technologies students used outside the classroom and wanted to incorporate these technology tools into instruction.

Relationships are connections among the collected data, which build themes from multiple qualitative data sources (Hatch, 2002). I found three relationships established by

the emerging themes within the data linked to the two research questions. The first relationship identified related to the relevancy of professional development and teacher experience levels integrating technology. Several participants wanted training to be based on their levels of integration ability. The comfort level with integration of Participants 4, 7, 9, and 11 varied, but all preferred to participate in training that would teach strategies based on their comfort level of integration.

The second relationship was consistency linked to follow-up training and time. The majority of participants teaching core content felt confident integrating technology strategies to teach, primarily because of the resources available. Four of the 12 participants sought to have follow-up training on previous professional development training sessions. Participants 3, 4, 9 and 12 wanted to see additional training based on specific content areas along with the use of various technologies tools. Finally, a relationship between the benefits of integration and time for collaboration was identified. The participants believed the lack of time prevented collaboration efforts. Participant 8 saw a need for staff members to collaborate with each other allowing opportunities to motivate peers to integrate technology more into their lessons.

The themes of consistency and lack of time were found across all three data sources collected. Most of the themes were apparent within interviews and observations, but the lesson plans did not always provide details of technology integration. The identification of patterns and the relationships between themes provided more in-depth answers to the research questions.

### **Evidence of Quality**

The validity of this qualitative case study was ensured by the use of triangulation and member checking as described in Section 3. The data and codes identified through analysis of interviews, lesson plans, and observations were reviewed and compared multiple times for accuracy. Creswell (2007) argued that using reflective notes helps researchers to better code and develop themes; I also kept reflective notes. The triangulation strategy was used to compare emerging themes across multiple data sources. The strategy is valuable because it maintains the accuracy of findings in the study (Creswell, 2007; Merriam & Associates, 2002). Each interview was transcribed and reviewed by the participant for accuracy. At this time, participants were able to change, add, or clarify interview responses to maintain the accuracy of the findings of the study (Creswell, 2007).

### **Summary**

This section pertained to the findings and results gathered from data collected. This section identified the participant selection, preparing and collecting data, recording data, and data results. The data were analyzed to answer two research questions. Findings from the analysis presented as a qualitative narrative. Research Question 1 themes were: (a) technology integration was beneficial in the learning environment, (b) technology integration strategies need to be relevant to make connections, and (c) technology integration training needs to be consistent. The narrative contained the participants' definition of technology integration, followed by participant perceptions following

participation in professional development training, the importance of relevant training for integration, and the consistency of follow-ups after initial training.

In answer to Research Question 2, barriers were identified by three themes: (a) teachers experience restricted access to hardware and software, (b) there is a lack of technical skills among students, and (c) there is limited time to develop technology-rich lesson plans. Additionally, participants identified strategies for addressing each barrier to technology integration: communication, teacher input, and more time for planning and collaboration.

Following the presentation of the findings, discrepant data and evidence of data quality were reviewed. In Section 5, I will set forth the interpretation of findings, implications for social change, recommendations for action and further studies, and reflections about the research process.



## Section 5: Discussion, Conclusions, and Recommendations

### **Introduction**

This qualitative case study research was designed to examine the perceptions of teachers at one school in a southeastern state. The participants in the study were 12 high school teachers in multiple content areas. Data were collected for the study through interviews, lesson plans, and observations. The findings were organized according to research questions highlighting identified themes. The research questions, findings, and interpretations presented in this section explore the perceptions of the participants.

### **Interpretation of Findings**

In Section 4, results from this qualitative case study were presented through interview responses from participants, analysis of lesson plans, and classroom observations. Six major themes were identified through the data collection and analysis process. The interpretations of findings include a conclusion that addresses the two research questions. This interpretation also relates the findings to the conceptual framework and the literature.

### **Constructivist Theory**

Aligned with Dewey's (1938) constructivist theory, the findings of this study convey how teachers can connect instructional content to create classroom experiences that explore and expand student learning through technology integration. This study shares the perceptions of participants' efforts to integrate technology into classroom instruction following participation in professional development. Constructivism emphasizes learning as an active process, and technology integration allows the learning

environment to deliver more excitement and engagement (Liu & Chen, 2010). The teacher has to understand technology tools, assess content, and determine how and when the integration will occur. The findings that teachers believed technology integration was beneficial and technology integration strategies must be relevant are consistent with the constructivist theory of active and engaged learning. Professional development training for technology integration into classroom instruction can be a resource to support for teachers seeking to learn skills and strategies for effective integration.

### **TPACK Framework**

The TPACK model illustrates the blending of a three-part framework connecting technology, pedagogy, and content to teach specific subject matter (Mishra & Koehler, 2006). The technology integration professional development training offered to participants was to help incorporate and blend the use of pedagogy and content. Duncan (2010) argued the need for focusing on using technology and content areas collectively rather than separately. Allotting more time for the development of technology-rich lesson plans would allow for the effective blending of technological knowledge, pedagogical knowledge, and content knowledge. Through a skillful blending of the three types of knowledge identified within the TPACK model, teachers would be more apt to find technology integration to be beneficial and relevant to their instruction.

### **Research Question 1**

Research Question 1 asked, what are the perceptions of high school teachers following participation in professional development to integrate technology into instruction? The participants expressed their thoughts about the professional development

training in general and ability to implement technology after participation in professional development training. The findings detailed the participants' knowledge about the impact of technology on the learning environment. Participants' comfort levels varied due to technology integration skills after participating in professional development. Although most participants felt comfortable integrating technology into classroom instruction, two participants expressed some reservations as to how well they could integrate technology.

Research by other scholars corroborates the themes that technology integration needs to benefit pedagogy, relevant to content, and that training should have consistent follow-up. The use of technology in education is beneficial for teachers because of the increase in student participation and opportunity to explore learning beyond the classroom with equipment or software (Woodbridge, 2008). Research into professional development indicates that training must be relevant and consistent for teachers to effectively integrate technology as a tool to teach content (Hargreaves, 2007; Nagel 2010). Their research suggested training should offer varied levels to address the needs of advanced and novice users (Hargreaves, 2007; Nagel, 2010). Continuous professional development training provides consistent opportunities for teachers to integrate and increase the use of technology in classroom instruction (Hunter, 2011).

### **Research Question 2**

Research Question 2 was: What are high school teachers' perceptions of strategies to overcome barriers when integrating technology into instruction? I found the case study's results challenged previous research findings that negative attitudes and beliefs from teachers prevent successful integration (Hinson et al., 2006). The teachers who

participated in this study had positive attitudes towards integrating technology into classroom instruction, but did not always have the correct training for successful implementation. This study analyzed barriers and recommended strategies for addressing the barriers of lack of access, technical skill, and lack of time. With the numerous demands on teachers to meet state standards, update grade books, and monitor students' progress, technology integration is not an easy additive to the mix. However, teachers can improve teaching and learning efforts through increased access to technology (Bauer & Kenton, 2005; Levin & Wadmany, 2008). Once teachers have ample access to technology tools with efficient training and adequate support from IT and administration, learning can extend beyond traditional classroom expectations of lecturing. Students can learn, build social skills, and develop higher order thinking skills (Kahn, 2009; Langhorst, 2007; Luce-Kapler, 2007; Mullen & Wedwick, 2008).

Technical skills also presented a challenge for teachers integrating technology into classroom instruction. For some teachers, the inability to integrate technology for educational purposes is due to lack of understanding and improper use of technology (Harris & Rea, 2009). Other researchers have suggested that the lack of skills and training accompanied by time constraints can affect how often teachers integrate technology into classroom instruction (Ertmer & Ottenreit-Leftwich, 2010). Communication was the strategy for solving this barrier. This required the teachers to be more direct in identifying technological needs, how they plan to use the technology, and the types technology they plan to use. The communication should include teachers' input to determine how to implement and assess the effectiveness of technology integration into classroom

instruction. This strategy addressed the concern for teachers to be proactive in their efforts to integrate technology.

Time was the final theme identified as a barrier to technology integration. The lack of skills and training accompanied by time constraints can affect how often teachers integrate technology into classroom instruction (Ertmer & Ottenreit-Leftwich, 2010). Time was needed for teachers to incorporate technology into daily instruction, which included teachers being able to locate resources that support the content being taught in the classroom. Hew and Brush (2007) recognized time as a valuable factor for teachers and technology integration. Participants often reported time being limited due to meetings, grading work, contacting parents, and planning lessons. Participants in this study believed more time was needed to focus on technology integration. Collaboration among the teachers requires time because of the need to reflect on professional development training and implement the skills learned.

### **Implications for Social Change**

The findings of this study identify the need for professional development training to be tailored to meet the needs of teachers integrating technology at various levels. Professional development is an instrument needed to help teachers effectively integrate technology into classrooms. The implications of this study are for district administrators, school administrators, and teachers. Implications include (a) planning and implementing relevant professional development, (b) assessing the needs of teachers through effective communication, (c) identifying additional resources or training to help teachers that

struggle to integrate technology, and (d) sharing a technology model with the school or district to improvement integration efforts.

Planning and implementing relevant professional development along with assessing the needs of teachers through effective communication should come from the teachers, administrators, and IT departments. Teachers have varied skills and levels of use when integrating technology; it would be in the best interest to allow communication from teachers to include suggestions and feedback when preparing for professional development (Lawless & Pellegrino, 2007). If teachers have a link to particular technology integration strategies or tactic they use to teach a lesson, this would serve as a resource for other teachers who struggle to integrate leading to greater integration throughout the school (Glazer & Hannafin, 2008). Finally, providing a model of a technology plan will help teachers identify their current status and where they need to be in a specific time frame. Once teachers have the appropriate technology training, students will reap the benefits and these strategies can then be shared with other colleagues to ensure meaningful technology integration in all classrooms.

With government officials and lawmakers working hard to make technology more accessible, studies such as this one are important to the district and school level administrators and teachers because better technology integration can help protect the quality of education for students (Lawless & Pellegrino, 2007; Stimmler, 2014). The findings from this study allow me to provide the knowledge for professional development training to be reorganized to support teachers' needs for effective technology integration. Integration should be seamless for teachers, students, and schools to progress to a global

society (Bauer & Kenton, 2005). Using the results of this study, administrators and IT personnel can better meet the needs of teachers by including content that directly benefits teachers' pedagogical needs and is relevant to content curriculum. Additionally, district administration and IT can use the findings to provide consistent follow up after professional development sessions. Successful technology integration from teachers can continue to help students prepare for 21<sup>st</sup> century learning and work experiences. Technology is used in daily life and not limited to business or education use; therefore, this study can have a positive impact for teachers who need to integrate technology into their instruction. With the findings from this study, I will be able to contribute to more effective professional development in the field of technology integration.

### **Recommendations for Further Action**

As a result of this study, the following recommendations are presented to scholars and educational leaders based on the themes of teachers' need for access to technology, time to develop technology-rich plans, relevancy of technology in instruction, and consistency of follow-up after professional development:

- Offer findings from this study to administrators, information technology leaders, and instructional technology departments. These findings can be used to make an argument for more access to hardware and software for educational use.
- Administer surveys to teachers to assess their technology integration needs and evaluate the training they received. This process will allow the administrator and IT personnel to review the implementation of previous

professional development, or if additional skills and time are needed for full implementation by the teachers.

- Establish a school-based technology team of teachers to present monthly support sessions to aid in the success of technology integration. The technology team can ensure the training sessions are relevant and are connected to the subject areas and available technology in the school.
- Build a technology lesson plan bank for teachers to share and use throughout the local school or the school district. The lesson plan bank would allow teachers an opportunity to see how technology is being integrated throughout multiple curriculums.
- Conduct long-term follow-ups with high school teachers after participation in relevant technology professional development to ensure integration is taking place consistently.
- Implement peer training among teachers as an initiative to infuse technology integration in schools. This recommendation is based on the findings that several participants felt some teachers were advanced and would be better trainers because they understood the needs of the children at that school.
- Design a competence system to identify the training needs of teachers based on their technology skill levels.

Technology integration impacts the learning environment and cannot be understood without the assistance of appropriate professional development (Watson et al., 2008). The findings from this study support suggestions for future practice. The main



recommendation would be to provide more training on the actual technology that is accessible within the school district. Although the teachers welcomed the decision to use technology for instructional purposes, they sought to have training on technology tools and resources within the building to help increase engagement and academics.

### **Recommendations for Further Research Study**

The following recommendations are intended for administrators within the district in which the study was conducted. However, similar research could be conducted in other districts, and subsequent findings would enrich the literature on technology integration:

- A case study in the same school could be developed to examine students' perspectives of participating in a classroom where technology integration takes places on a continuous basis.
- A longitudinal study such as this one to be conducted involving elementary and middle school teachers in the same district. Doing so would provide the district with a bigger picture of the professional development needs of teachers around the issue of technology integration.
- A mixed method study could be designed to examine the perspectives of high school teachers who do not participate in professional development for technology to see how integration takes places in their class settings.
- A study to examine technology integration among first-year teachers as they work to implement technology into classroom instruction.

### **Reflections on Researcher's Experience**

As I reflected on this journey for conducting research, I was reminded of how the world of teaching and learning has changed so drastically since my early years of schooling. The days of chalk, paper and pencils, research in bonded books, and teachers lecturing from the podium are truly a thing of the past. Integrating technology into the classroom is a more than turning on the television or writing a report using the word processing software. Infusing technology into the classroom is expected and varied according to the teacher. This study helped me understand how varied the use is even among 12 teachers.

Through the data collection process I realized the participants had a desire to integrate technology into classroom instruction for the benefit of students and to make connections to real-world learning experiences. I was able to evaluate the advantages and disadvantages of technology integration in the learning. The advantages of integration technology into the learning environment outweighed the disadvantages. It was enlightening to hear the various perspectives from teachers with many years of teaching experience and expertise using technology. Although some teachers with many years of teaching experience were hesitant to integrate, these seasoned teachers were excited to share strategies of technology integration in classroom instruction. I was intrigued because my initial thoughts were that seasoned teachers may be more reserved to integrate technology; whereas a newer teacher would immediately use technology integration strategies. As the participants shared successful experiences with integrating

technology, they did not shy away from explaining what was not working. The participants provided strategies to help improve their efforts to integrate technology.

As a result of this study, I have altered the way I think technology integration should be in all classes. Initially, I believed that technology could easily integrate into any and all classrooms. I now believe professional development for effective technology integration must be relevant for teachers and meet the needs based on content areas. This result of the study increased my understanding of the perceptions of teachers from various subject areas as they seek to integrate technology when appropriate. It is my belief barriers will continue to exist when integrating technology, but many teachers desire to enhance the learning environment with the use of technology.

### **Conclusions**

The purpose of this qualitative case study was to explore high school teachers' perceptions following participation in professional development. I used triangulation of data from three sources to research high school teachers' perceptions of integrating technology after participation in professional development training. The data collected from interviews, lesson plans, and observations confirmed the use of technology for classroom instruction. Multiple sources of data were analyzed to determine possible connections between the effectiveness of professional development and integration of technology in the classroom. It was evident that the participants involved in the study integrated technology into classroom instruction, but there were barriers affecting some teachers working to increase integration. The perceptions of teachers related to professional development should be applied to promote and plan for the increased

technology integration for teaching and learning. In the future, this study can contribute to the planning of how professional development training is shared with teachers based on content areas and experience levels of integrating technology into classroom instruction.

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## Appendix A: Technology Supported Lesson Plan

<b>Technology-Supported Lesson Plan</b> Grade(s) Enter grade level(s)	
<b>Lesson Title: (10 words or less):</b>	
<b>Time Required:</b> Enter time required to teach complete lesson	<b>Materials:</b> List all necessary materials including technology-based items
<b>Content Area Standards and Performance Indicators:</b>  Enter each standard and its supporting performance indicator(s)	<b>Technology Skills Standards and Performance Indicators:</b>  Enter each standard and its supporting performance indicator(s)
<b>Lesson Objective(s):</b> List objective(s)	
<b>Technology Is Used to Support Student Learning in the Following Ways:</b> Describe specifically how technology is incorporated into the lesson and how this supports student learning	
<b>How the Teacher Uses Technology:</b>  Describe how and when the teacher uses technology in the lesson	<b>How the Students Use Technology:</b>  Describe how and when students use technology in the lesson
<b>Classroom Management Techniques:</b> Explain accommodations made for technology use, student grouping, etc.	
<b>Preparation Before Class:</b> List all tasks to be completed prior to lesson	
<b>Introduction to the Lesson:</b> Enter text here	
<b>Instruction:</b> Enter text here	
<b>Guided Activity:</b> Enter text here	
<b>Independent Activity:</b> Enter text here	
<b>Assessment:</b> Enter text here	
<b>Lesson Extensions:</b> Enter text here	

Source: National Education Technology Standards

## Appendix B: Technology Integration Interview

Thank you for participating in a research study of technology integration into classroom instruction following participation in professional development. The researcher is inviting certified high school teachers to be participants in the study. The purpose of the study is to explore the perceptions of high school teachers integrating technology in the classroom after participating in relevant training. The interview will be approximately 45 to 60 minutes, and all information will remain confidential. The researcher will be recording the interview and will ask the each participant to review the transcript of his or her individual interview for the purpose of member checking.

### Interview Opening:

1. Review ethical rights as a study participant (voluntary).
3. Explain the researcher will be recording notes in written and audio formats
4. Allow the participant to ask questions.
5. Inform the participant the interview is strictly confidential.
6. Recording begins! (participant can request to stop the interview at any time)

### Primary research questions to be addressed in the study:

1. What are the perceptions of high school teachers following participation in professional development to integrate technology into instruction?
2. What are high school teachers' perceptions of strategies to overcome barriers when integrating technology into instruction?

### Secondary and Probing questions:

1. Years of teaching experience	1- 5	6-10	11-20	21+
2. Educational background (Degree)	Bachelors	Masters	Masters 30+	Doctorate
3. Would you please define technology integration into classroom instruction?				

4. Identify all technologies you have used to integrate into instruction:

**Teacher Perceptions**

<b>Research Question 1: What are the perceptions of high school teachers following participation in professional development to integrate technology into instruction?</b>	
<b>Technology Integration &amp; Professional Development</b>	<b>Explain your answer</b>
5. Please describe some of the technology use for classroom instruction that is from monthly professional development.	
6. What is your comfort level for integrating technology into instruction on a regular basis following participation in professional development?	
7. When using technology in classroom instruction, what are some factors that personally affect how you use them on a continuous basis after attending professional development training?	
8. Explain how you align content standards after participation in technology integration professional development.	
9. Is the level and amount of training you receive sufficient for the technology integration in your classroom?	
10. What is the level of support for technology integration following participation in professional development in the school building?	

<b>Research Question 2: What are high school teachers' perceptions of strategies to overcome barriers when integrating technology into instruction?</b>	
<b>Barriers to Technology Integration</b>	<b>Explain your answer</b>
11. When you integrate technology into instruction do you feel there are certain barriers that do not allow to you fully implement technology into classroom instruction?	
12. How do the barriers you discussed in question 11, affect your ability to impact technology in classroom instruction?	
13. What can be done to help eliminate the barriers that may prevent you from successfully integrating technology?	
14. Recall a time when you may have encountered a barrier to integrating technology into instruction. How did you handle this issue?	
15. How can technology professional development be made more beneficial and help eliminate barriers?	
16. Is there anything else you would like to add about technology?	

Thanks for your time!!

## Appendix C: Technology Integration Lesson Plan Document Analysis

<b>Technology Integration Objective</b>	<b>Checklist</b>	<b>Notes</b>
1. The lesson plans clearly states how technology will be used for instruction		
2. The lesson plan identifies technology aligned with the technology professional development teachers participate in during the school year		
3. The lesson plan has a clear notation of when technology will be integrated into classroom instruction		
<b>Technology Integration in Instruction</b>	<b>Checklist</b>	<b>Notes</b>
4. The lesson plans are focused on learning a technology skill		
5. The lesson plan indicates the time frame technology will be used independently, collectively, or by the teacher.		
6. The lesson plan includes the use of technology to enhance the lesson activities		
<b>Technology Integration Assessment</b>	<b>Checklist</b>	<b>Notes</b>
7. The lesson plan shows evidence that technology will be used to assist in assessments, presentations, or reflective purposes		
8. The monthly lesson plans outlines the Acceptable User Policy requirements to integrating technology into classroom instruction		
<b>Additional Notes:</b>		

## Appendix D: Technology Integration – Observation Form

**Observation Checklist: (darkens bubbles that are observed)**

- Participant demonstrates continuous use of technology throughout classroom instruction. \_\_\_\_\_  
\_\_\_\_\_
- Participant demonstrates confidence while using technology for classroom instruction. \_\_\_\_\_  
\_\_\_\_\_
- Participant seems to be knowledgeable about using technology. \_\_\_\_\_  
\_\_\_\_\_
- Participant seems to be easily frustrated while using technology for classroom instruction. \_\_\_\_\_  
\_\_\_\_\_
- Participant was able to troubleshoot if problem occurred while using technology. \_\_\_\_\_  
\_\_\_\_\_
- Participant is able to answer questions students may have about using technology. \_\_\_\_\_  
\_\_\_\_\_

## Appendix E: Sample Coded Interview

<b>Research Question 1: What are the perceptions of high school teachers following participation in professional development to integrate technology into instruction?</b>	
<b>Technology Integration &amp; Professional Development (Interviewer)</b>	<b>Explain your answer (Participant's Response)</b>
Please describe some of the technology use for classroom instruction that is from monthly professional development.	Most technology use from professional development training consists of the available resources <b>(A1)</b> that are used school district wide. For example, various applications and software that is available for everyone to use and/or use.
What is your comfort level for integrating technology into instruction on a regular basis following participation in professional development? How often would you prefer more training?	I am extremely confident with using most technology, however, more trainings and professional development to discover more ways on how to maximize the use of technology in the classroom would be beneficial <b>(A2)</b> .  Twice a month would be sufficient <b>(M1, F1)</b> .
When using technology in classroom instruction, what are some factors that personally affect how you use them on a continuous basis after attending professional development training? Anything else?	The factors that affect how I used technology after going to a professional development training are: <ul style="list-style-type: none"> <li>• How beneficial it will be for my students? <b>(A2)</b></li> <li>• Will there be enough of the resources for the entire class? <b>(A1)</b></li> <li>• How will it affect the learning environment, will it enhance or distract?<b>(A2)</b></li> <li>• How can I individualize these resources for my students will disabilities? <b>(A2)</b></li> </ul> None that I can think of at this time.
Explain how you align content standards after participation in technology integration professional development. Do you find yourself not relying on technology to cover the standards at time?	Technology is heavily embedded in the content area I teach. I have to make sure I have enough time to cover the required standards by test time <b>(T1)</b> . The standards require students to use scientific calculators, simulation software and online resources, etc.  Not often.
Is the level and amount of training you receive sufficient for the technology integration in your classroom? Are you aware of any additional training to help with technology integration?	The level of training works, however; with the many advances in technology there can never be a sufficient amount of training to help maximize the use of technology within the classroom <b>(M1)</b> . I think the school district offerings trainings during the summer, but I prefer to attend training sessions during the school year <b>(M1)</b> .
What is the level of support for technology integration following participation in professional development in the school building?	The level of support from the district IT is minimal <b>(A1)</b> . Sometimes they will assist you, but often times I have to rely on my colleagues to help me if I am struggling to integrate <b>(M1, F2, T1)</b> . I remember a time when we had an IT person on staff daily to come and assist. Now, we have to submit a technology ticket and wait several days for someone to come to the school and work on technology <b>(F2)</b> .

<b>Research Question 2: What are high school teachers' perceptions of strategies to overcome barriers when integrating technology into instruction?</b>	
<b>Barriers to Technology Integration</b>	<b>Explain your answer</b>
When you integrate technology into instruction do you feel there are certain barriers that do not allow to you fully implement technology into classroom instruction?	Barriers: blocked sites by IT <b>(A1)</b> , limited resources at times (some equipment is not available) <b>(A1)</b> , students don't always know how to use the technology.
How do the barriers you discussed in the previous question affect your ability to impact technology in classroom instruction?	It's frustrating sometimes when I attend training and then go back to my classroom and realize I can't use the technology with my students <b>(S1)</b> . The limitations really impact the learning...sometimes not for the better too. A lack of technology integration can minimize the students gaining a full understanding of content sometimes.
What can be done to help eliminate the barriers that may prevent you from successfully integrating technology?	If we could have more resources available <b>(A1)</b> and more training <b>(M1)</b> on recent technology advances. I need to be able to come back and ask questions at the next session if I am having trouble integrating. I don't like having to move to the next training with no follow-up <b>(F1)</b> .
Recall a time when you may have encountered a barrier to integrating technology into instruction. How did you handle this issue?	I was trying to use the Google Drive so students could access their work outside of class and submit work to the drive. But the district blocks Google Drive for some reason (shakes head) <b>(A1, S1)</b> . This forced students to purchase a Flash Drive to save their work and eventually emailing to me. They could only email me through their school assigned email account. Sometimes we can't access the school email accounts <b>(S1)</b> .



<p>How can technology professional development be made more beneficial and help eliminate barriers?</p>	<p>Be willing to provide more training throughout the month on one topic. If we are working on Edmodo during the training for the month of February, then we should be able to ask questions throughout that month to make sure we have a full understanding (<b>M1, F1, T1</b>). So having more time would be my opinion. Another thing would be to make sure IT will unblock sites once teachers return from training and in a timely manner. It is a waste of time to attend training and the sites remain block (<b>AR1</b>). This can really hurt the learning environment when a teacher is relying on a certain site or software to teacher concepts.</p>
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