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BYOT and Me: Teacher Perceptions of a Bring Your Own Technology Initiative

A Dissertation

Submitted by

Ilana Jones

In partial fulfillment of the requirements
For the degree of
Doctor of Philosophy

Lesley University
March 1, 2014

Abstract

Educational institutions have begun to implement Bring Your Own Technology (BYOT also referred to as Bring Your Own Device or BYOD) initiatives. The purpose of a BYOT implementation is to encourage active student learning resulting in increased student achievement through the use of personal, mobile technology devices. To achieve implementation success, school-leaders and teachers must develop effective strategies to manage the integration of BYOT into classroom teaching practices. The purpose of this research was to explore teacher perceptions regarding the implementation of a school-based BYOT initiative. This case study consisted of asynchronous online interviews of 12 high school teachers working in a Title I School in Charlotte, North Carolina currently involved in a school-wide BYOT initiative. Follow-up email exchanges and a document review phase of nine teachers as well as school-building administrators were also included in this research. The results of this study indicate: confidence in personal technology ability may not be a factor in a teacher's willingness to integrate BYOT; personal technology use and experience may not influence a teacher's decision to incorporate BYOT; technology-centered teacher training offerings may have little influence on the classroom integration of BYOT; in order to be deemed effective, BYOT professional development opportunities should be relevant to specific content areas and customized to meet the needs of adult learners; and finally, teachers in this study reported that BYOT initiatives may actually increase the digital divide amongst students resulting in classroom management issues that outweigh BYOT benefits. The implications of this study are significant in that it is imperative for school district leaders and professional development designers to understand the factors that influence a teacher's decision to revise current teaching practices to integrate new technologies as well as understand the classroom challenges associated

with a BYOT implementation. Obtaining this knowledge will assist school-leaders in building a foundation in which effective professional development sessions are developed to better address the needs of teachers being asked to carry out BYOT initiatives.

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Preface

As I embarked on my journey as a PhD student my primary goal was to find a way to contribute to the field of instructional/educational technology. Because I have worked in a PreK-12 public school setting for over 16 years my focus has always been on best practices to improve student learning and achievement. Prior to enrolling in the doctoral program at Lesley University it never occurred to me how andragogy and an understanding of the ways in which adults develop and learn were directly linked to possibly improving student achievement through the use of technology. Once immersed in the adult learning program I realized that teachers could better teach with technology if the learning or professional development opportunities with which they were provided were better. Superficially, I always understood that professional development sessions were needed for good teaching in PreK-12 settings; however, I lacked an understanding of the relationship between customizing professional development and adult learning theory. As I began to make the connection, I was able to dig deeper into the ways in which adults learn and focus on how adults best learn to work with technology and more specifically, learn to integrate technology into classroom teaching and learning. The greatest lesson resulting from my doctoral study has been my realization that in order for Prek-12 school leaders to truly impact and improve student learning an understanding of the teacher or adult learner is imperative. Classroom teachers are expected to employ new and emerging educational initiatives and an understanding of how teachers learn best as well as careful consideration of their thoughts regarding newly implemented initiatives should be the focus of all school leaders interested in improving student achievement. My doctoral journey has ended and I would like to thank the following members of my committee: Nancy Wolf- Committee Chair, Jon Margerum-Leys, and June Smith. Your guidance and support through this process is forever appreciated.

Chapter I

As school districts begin to implement Bring Your Own Technology (BYOT) or Bring Your Own Device (BYOD) initiatives, educators are charged with finding appropriate and manageable ways to integrate mobile technologies into classroom teaching (Pascopella, 2009). A BYOT program initiative provides a potential solution for school districts faced with technology budget constraints and an inability to integrate technology into classroom teaching and learning (Intel Corporation, 2012). BYOT programs allow students to bring personal devices such as laptops, tablets, smartphones, and eReaders into the classroom for educational use. While many school leaders believe BYOT programs are beneficial because students are given the opportunity to learn using personal technology devices they own and are comfortable using in the classroom, some educators believe the use of personal student devices actually hinders classroom teaching and learning (Intel Corporation, 2012).

Background

The term 21st century learning has been used to describe various aspects of digital teaching and learning within PreK-12 settings. The Intel Corporation (2012) describes a 21st century learning environment as follows:

Today's world is constantly changing, requiring independent learners with new skills for changing work environments. 21st century learning is connected, mobile, and on-demand. Educators recognize the power of technology tools to support 21st century learning and create an environment that focuses on the "Four Cs" of 21st century education: communication, creativity, critical thinking, and collaboration. (p. 1)

In an effort to arm students with 21st century skills and as a starting point for a BYOT implementation the Charlotte-Mecklenburg school district located in Charlotte, North Carolina (a

district containing almost 150,000 students) began an initiative to revise the current technological infrastructure to provide students with the ability to bring in and use personal, mobile devices within the school setting. To assist with this effort, school district leaders also provided student tablets to 60 schools with the goal of successfully achieving the integration of mobile technology and classroom teaching and learning (Charlotte-Mecklenburg Schools, 2012). Many teachers working in the Charlotte-Mecklenburg school district are now required to include technology strands in their lessons to demonstrate the use of student mobile devices. Previously, teachers working in this district stated their inability to integrate technology into the classroom resulted from a lack of technological resources. As a result of this concern, school and community leaders voted to use state technology funding to purchase additional student mobile devices (Charlotte-Mecklenburg Schools, 2012).

The second phase of the BYOT implementation process included an invitation for schools to apply to become BYOT Sites. Schools completed and submitted applications to the district level Instructional Technology Department requesting a school-based guest wireless network in which personal devices could access the Internet. Schools were also required to outline the ways in which teachers would incorporate student mobile devices into classroom teaching in an effort to ensure student devices would access the school-based wireless network for instructional purposes. At the end of the pilot phase, 25 schools in the district had become BYOT sites (personal student devices could be used in the school building) and as a result, some teachers were asked to revise teaching practices to include technology strands (Charlotte-Mecklenburg Schools, 2012). When asked about technology and teaching practices previously, teachers in this school district indicated that the lack of access to technology resources made it extremely difficult to plan lessons around the use of technological devices (Charlotte-

Mecklenburg Schools, 2012). The goal of the BYOT implementation was to provide access to technology for all students. Students would have the ability to bring in personal devices for classroom use which would then allow other students to use school provided technology devices possibly creating a one-to-one student to computer ratio for enhanced classroom teaching and learning.

School districts embracing BYOT implementations may face certain challenges. Teachers may be expected to have higher state mandated end of grade or end of course test scores simply because devices are present. Additionally, the digital divide one-to-one student to computer initiatives were meant to narrow could potentially be increased as a result of BYOT. Students once teased at school for their choice of clothing may now be teased for not having the newest technology device or not owning a personal device at all and using a school-issued device (National Education Association, 2012).

Research Problem

This research study was designed to explore teacher perceptions regarding the implementation of a school-based BYOT initiative. This study seemed timely in that Charlotte-Mecklenburg Schools has now developed an infrastructure to support the use of personal student mobile devices. Some teachers in the district are being evaluated by school building administrators on their ability to integrate technology and revise current teaching practices to include the use of personal student devices into classroom teaching and learning (Charlotte-Mecklenburg Schools, 2012).

The purpose of this research study was to examine the attitudes and perceptions of teachers being asked to carry out a BYOT initiative. The following additional research

constructs related to the integration of BYOT initiatives into classroom teaching and learning were examined:

- The teacher's individual confidence level or belief in his or her ability to teach effectively using technology;
- Beliefs and actions regarding classroom management and technology integration;
- Attitudes related to technology-centered professional development opportunities; and
- Perceived challenges and/or benefits of integrating student devices into classroom teaching and if these benefits transfer over into teaching practices.

Because classroom teachers are responsible for implementing BYOT initiatives into classroom teaching it is imperative that school district leaders are knowledgeable and understand teacher perceptions regarding the BYOT implementation. The perception of a classroom teacher expected to integrate the use of personal student devices may dictate the degree to which devices are actually used as well as play a key role in the overall success or failure of the initiative. Once teacher perceptions have been communicated, school district leaders can make decisions regarding any additional teacher support needed that may include: revised, improved, or more frequent professional development offerings or school district and building level policy changes that should be instituted to ensure BYOT program success.

Study Significance

As an Instructional Technology Specialist my professional role is to support teachers in their efforts to integrate technology into classroom teaching practices. In an effort to best serve teachers, I sought to better understand what teachers really think about BYOT Initiatives and how the integration of personal student devices within classroom teaching and learning has

impacted or enhanced current teaching practices. The information gained as a result of this research may be used to better inform BYOT program decisions, assist school-based administrators with determining ways to work along side teachers, parents, and students to ensure program success, and provide strategies for professional development teams to offer more effective professional development opportunities to educators involved in BYOT implementations.

The idea of developing a well-defined team is a crucial factor to the success of school-district based BYOT initiatives (Intel Corporation, 2012). A core team of technology specialists should be identified to work in conjunction with school-based administrators for the purpose of exploring emerging technologies, troubleshooting, and planning professional development opportunities. The consideration of planning appropriate professional development is also imperative to BYOT implementation success. If students simply bring in personal devices student achievement does not automatically increase. Teachers need professional development opportunities in order to devise effective classroom management and teaching strategies that incorporate the use of personal student devices in the classroom. Intel (2012) states the following:

Simply inviting students to bring their own devices into school does not raise achievement; rather, it's how teachers choose to implement the devices that can determine if a Bring Your Own Device program succeeds or fails. After implementing a Bring Your Own Device program, establish a plan to provide ongoing professional development and extensive training for staff members who are responsible for implementing the program and procedures on a daily basis. (p. 17)

When offering educational technology professional development opportunities facilitators and designers should develop sessions in which the needs of the teachers drive the professional development sessions. It is important that school district instructional and educational technology departments find ways to train teachers on best practices for teaching with technology and integrating the use of technology into a public school classroom. In order to successfully accomplish this task, instructional technology specialists must develop a functioning knowledge of the best ways to provide effective professional development opportunities, understand what constitutes effective professional development, learn how adequate professional development may be measured, and determine the differing ways in which adults learn. It is imperative that school district leaders, professional development trainers, and school-based administrators have a clear understanding of what teachers perceive to be the successes and challenges of implementing a BYOT initiative to ensure the support provided via professional development opportunities is appropriate and effective.

Theoretical Approach

Understanding the ways in which adults learn is an essential factor to successfully develop effective professional development opportunities. Further, focusing on customizing training to meet varying adult learning styles should provide opportunities for teachers to better integrate personal student devices into classroom teaching. Adult-learning theories may be applied to better customize professional development opportunities for PreK-12 classroom teachers. While specifically considering learning theories relevant to the ways in which adults can learn to teach with technology, I noted that a constructivist paradigm was overwhelmingly present. In an effort to create epistemological diversity, Aaron Pallas (2001) challenges us to determine if we believe knowledge is constructed or discovered. In a constructivist research

paradigm, participants who play a direct role in the research process construct knowledge (Mertens, 2010). The constructivist paradigm grew from the study of hermeneutics (a focus on understanding or meaning) and was expanded to describe the ability to find or make meaning as a result of a specific position or situation. Constructivists believe that people socially construct knowledge. The attitudes, rather the personal perceptions based on individual experiences of teachers who have integrated BYOT initiatives into classroom teaching, were the foundation of this research study. A constructivist research paradigm states that there are multiple realities as there may be several ways to obtain the same knowledge because all information that is accessible to learn or know is socially constructed. A constructivist paradigm also asserts that knowledge is not found or discovered by people but constructed and may evolve during the course of research (Mertens, 2010). As human perceptions and attitudes were the driving force of this study constructivism was clearly evident.

Research Approach

I conducted online interviews employing a qualitative case study research approach to examine teacher perceptions of BYOT school-based initiatives. A case study research approach is used when a researcher seeks to examine an issue by reviewing one or more cases included in a "bounded system." The term bounded refers to a shared criterion amongst the case or cases being studied. This criteria may include: a shared setting, location, context, or time period in which an event or incident has occurred (Creswell, 2007). I developed an online asynchronous interview questionnaire through the case study process to determine the manner in which various teachers in a single setting were integrating BYOT initiatives and to ascertain how teachers incorporated the use of mobile student devices into classroom teaching and learning.

Upon completion of the interview process, I completed a document review with willing participants to assess the manner in which BYOT implementations were taking place within classroom settings. The following documents were reviewed: lesson plans, school technology plans, the school report card (outlines school performance on statewide tests), and teacher professional development plans that included technology components. This process incorporated a constructivist researcher epistemology in that I sought information based on input from the research participants to best inform research (Mertens, 2010).

For this study, a purposeful sample was selected to include teachers teaching in the same school. Selecting this sample eliminated certain barriers (such as a varying student population) that could be present if involving participants from differing school sites. A high school that had been implementing a BYOT initiative for at least one full academic year was selected. To avoid any potential conflict because I am employed by the school district, a sample within a zone I am not assigned to work was selected. The participants of the study included both genders and the study was open to teachers of all ages and all teaching experience levels.

Researcher Assumptions

I have worked as an Instructional Technology Specialist for the last 12 years. As a result, based on numerous opportunities to train and work with thousands of teachers for the purpose of integrating technology into classroom teaching, several researcher assumptions were made regarding this study. First, teachers will not revise teaching practices to include BYOT if they do not believe the integration of BYOT will somehow improve student achievement. Student test scores often linked to teacher raises, bonuses, and/or performance evaluations sometimes drive instruction and dictate the educational initiatives in which teachers choose to focus (North Carolina Department of Instruction, 2012). A second assumption was the more teachers use

technology in their personal and professional lives the more likely they will be to incorporate mobile student devices into classroom teaching. If a teacher has been using his or her own mobile device for personal use or professionally for completing paperwork, sending emails, or for presenting instructional lessons, the teacher's perceived value of the student use of personal devices for the purpose of classroom learning may be stronger. Third, teachers would be more likely to implement BYOT initiatives if appropriate and effective professional development opportunities were provided. Simply offering BYOT professional development sessions is not enough. A fourth and final assumption I made was that the data would reveal a relationship between years of teaching experience and teaching with technology.

The Researcher

At the time of this study, I was employed as an Instructional Technology Specialist for the school district studied. Understanding that my professional role could potentially serve as a benefit as well as an obstacle to obtaining candid responses from teachers, I opted to interview teachers in which no professional relationship was present. I selected a school outside of my assigned work zone to eliminate potential conflicts. Prior to becoming an Instructional Technology Specialist, I worked as a public school teacher. Having the knowledge of what is required of teachers and understanding the challenges and time constraints teachers face when trying to include current school district and building initiatives into classroom teaching assisted as I designed questions to better understand teacher perceptions regarding BYOT. While my experiences as a public school teacher were beneficial in the development of research questions, the challenge of ensuring that a professional bias as an Instructional Technology Specialist and technology-centered professional development facilitator would not impede my ability to objectively analyze research study results was acknowledged. During the data analysis phase, I

consistently reviewed direct participant quotes to ensure close attention was given to the actual data instead of simply trying to find support for my assumptions. My goal as a researcher was to possibly reveal findings not previously considered.

This chapter provides background information regarding the need to examine teacher perceptions regarding the implementation of a school-based BYOT initiative. Also included in this chapter is an overview of the study significance, the theoretical approach used and information regarding the researcher as well as researcher assumptions. The second chapter includes a literature review focusing on adult development and learning, professional development, educational technology trends, classroom technology use and integration, benefits and challenges of using BYOT in the classroom, and learning opportunities present when implementing a BYOT initiative. The third chapter describes the methods used to conduct this study, the research approach used, and information regarding the study participants. The fourth chapter outlines the study process, findings and analysis, and emerging themes. The final chapter outlines ethical considerations, a discussion of the study findings, implications and recommendations resulting from the study, study limitations, and the possibility of future research studies as an expansion of this case study.

Definitions of Key Terminology Used in This Study

21st Century Learning- a term used to describe core technological competencies that include: collaboration, critical thinking, problem solving, and digital literacy while promoting on-demand learning through the use of technology.

Bring Your Own Technology (BYOT)- a program initiative in which students bring personal mobile devices to school and access the school-based wireless network for the purpose of classroom learning. BYOT is also referred to as Bring Your Own Device (BYOD).

Instructional Technology Specialist- a public school, district level employee who works with classroom teachers to devise best practices to incorporate the use of technology within classroom teaching and learning.

Mobile Devices- Technology devices that are portable and easily carried from one location to another (such as a laptop, smartphone, or tablet)

Wi-Fi Network- a technological infrastructure in which devices such as: computers, laptops, tablets, and smartphones with Wi-Fi capabilities can connect to the Internet within a specific radius without the use of wires.

Chapter II: Literature Review

While examining teacher perceptions of integrating technology into teaching and learning within a public school setting it is important to consider the factors that may influence the attitudes and beliefs of teachers as it relates to Bring Your Own Technology (BYOT) implementations. Within the Charlotte-Mecklenburg School district located in Charlotte, North Carolina teachers have been given a choice regarding whether or not to incorporate the use of personal student devices into current teaching practices (Charlotte-Mecklenburg Schools, 2012). If given a choice, a teacher may decide to integrate or not to integrate a BYOT initiative based on personal attitudes and beliefs. This literature review focuses on five key areas that could potentially influence teacher perceptions regarding BYOT programs. The concepts to be considered include: the significance of adult development and learning as it relates to teachers, the impact of professional development on teacher beliefs related to classroom technology initiatives, the role of current educational technology trends within a public school setting, a teacher's current classroom technology use and integration strategy, and an overview of the components of a BYOT initiative as the program variables may shape teacher perceptions. In conducting this review, various sources of information were consulted, including: Internet sources, books, and professional journals. Electronic sources were retrieved via searches through ERIC and ProQuest. The selection criteria used for each component of this review is included.

Adult Development

When considering factors that may impact the degree to which teachers choose to change teaching practices and incorporate emerging technologies and initiatives into the classroom it is important to understand the ways in which adults develop. Adult development and reaching a

specific stage in life may play a role in a person's willingness to modify professional practices. The selection criteria for literature reviewed in the area of adult development as well as the area of adult learning for the purposes of this research study included the following:

- Literature must have been peer reviewed
- Literature obtained from web sites must have been peer reviewed (conference and journal web-sites were used as sources)
- Literature published prior to 2000 was included when necessary to provide foundational information related to adult development and learning however, this literature was only included when recent literature was present (published no later than 2003) to reinforce the original study
- Literature must have demonstrated a relationship of adults and their ability to learn to use technology or have demonstrated the impact adult developmental stages may have on the willingness of adults to incorporate and adapt to the use of technology when necessary due to an organizational change

Daniel Levinson's (1978) adult development theory asserts that an individual's willingness to accept organizational changes such as the increased use of technology may be related to the adult's developmental stage. All adults go through the same series of developmental stages that correspond to specific ages; he titles these stages seasons. Regardless of individual and specific life situations or circumstances, all adults go through four eras or seasons in life that include: childhood and adolescence, early adulthood, middle adulthood, and late adulthood. Daniel Levinson's theory of adult development has a foundation built from Sigmund Freud's field of depth psychology, Carl Jung's theory and study of adult development, and Erik Erikson's theory of adult development and focuses on "the life course" (Levinson,

1978). As mentioned above, developmental eras correlate to seasons and include: The spring-time of life (the period in which blossoming and growth takes place), the summer of life (rewards and a metaphorical reaping of a harvest is ascertained), the autumn of life (middle adulthood is reached and this season includes the experience commonly referred to as a Mid-Life Crisis), and the winter season (life is winding down and a realization that the majority of life has been lived occurs). A second study produced the same findings as the initial study and found that both males and females move through the same stages of life during the same age ranges (Levinson & Levinson, 1996).

Levinson's work is particularly relevant to understanding why some teachers are unwilling to adjust previous teaching practices to include the use of technology. Levinson (1978) describes a phenomenon he titles psychological retirement. Psychological retirement is an experience that may occur during the mid-life transition period. During this transition period, adults reappraise and reassess their current occupational or organizational environment specifically because the environment has changed. In thinking about Levinson's theory of adult development and how it relates to my area of research I am drawn to the idea that a man or woman may begin to reappraise his or her occupational role during the mid-life transition period as organizational changes such as technological advances may occur. What I find interesting about this theory of adult development is when organizational changes such as these occur an adult is left with a choice to try to embrace and adapt to changes so he or she may try to advance occupationally, leave or break-out in an attempt to find a different job not requiring a change, or stay in the current setting performing in a psychologically retired state in which the adult performs the required job duties well enough to keep his or her job but the employee does not find the job personally fulfilling and no longer tries to grow or advance (Levinson & Levinson,

1996). Organizational changes may be brought on by the implementation and required use of new technologies according to Levinson (1978). Individuals working in a state of psychological retirement are described as persons who no longer experience job fulfillment or satisfaction and do not seek to advance or grow. As mentioned above, one of the organizational changes that may accelerate a state of psychological retirement is the use of new technologies in the workplace (Levinson, 1978). If this organizational change is one that may cause a teacher to operate in psychological retirement, the willingness of a teacher to incorporate BYOT strategies and change teaching practices that have previously been successful may be low.

Considerations

Strengths of Levinson's (1978) theory of adult development as it relates to a teacher's ability to teach with technology includes a framework to better understand the impact a developmental stage may have on a teacher's willingness and ability to adapt to new initiatives and organizational changes. Also understanding the developmental stages in which teachers are open to career exploration (occurring during the early adulthood stage) or the reappraisal and possible revision of career goals (occurring during the middle adulthood stage) can serve as a foundation to determine the best approach to introduce the concept of teaching with technology as it may be received by some teachers as a cutting edge and innovative career move or as a way to reenergize and revitalize current teaching practices. A weakness commonly addressed in the literature related to Levinson's (1978) adult development theory relates to whether or not the same life stages and eras can be applied to both males and females. This concern is particularly relevant as demographic information indicates that women comprise 75% of the educational workforce (Collay & Cooper, 2008). In an effort to address this critique Levinson conducted a

second study and found men and women experience the same stages of adult development during the same age ranges (Levinson & Levinson, 1996).

It is important to note that Levinson discussed the impact of technology as an organizational change in the workplace in 1978 when available technology and the use of that technology was vastly different than is the case today. However, in 2010 the effects of technology as a driver of organizational change were once again examined. Using the Fessler and Christensen Teacher Career Cycle model, Lynn and Woods (2010) examined the degree to which teachers were able to successfully adjust to organizational or occupational changes that may occur, such as new regulations or mandates throughout the various phases of a teaching career. This teaching model outlines various stages of a teaching career that include: pre-service, induction, competency building, enthusiasm and growth, career frustration, career stability, career wind-down, and career exit phases. The Teacher Career Cycle Model aligns stages of the career cycle to factors that may influence specific career stages that are personal (family, positive critical incidents, crisis, cumulative life experiences, avocational outlets, and individual disposition) and organizational factors (union, regulations and mandates, management style, public trust, societal expectations, and professional organizations) (Lynn & Woods, 2010). The researchers assert that organizational factors may impact whether a teacher is simply continuing to teach for the purpose of keeping his or her job or if a teacher is experiencing continued growth and enthusiasm as a teacher. The use of technology often becomes a teacher mandate or requirement issued by a building principal or at the school district level. If a teacher is required to integrate and implement technology in the classroom this expectation could result in feelings of burnout or psychological retirement especially if the teacher feels uncomfortable using technology. It is important to understand what specifically related to the organizational change

of implementing new technology makes some teachers choose a state of psychological retirement versus adapting to the change. Perhaps better or more customized professional development opportunities would facilitate an increased willingness from teachers to incorporate emerging technology initiatives. To consider this option, it is important to understand the ways in which adults learn.

Adult Learning Theories

The manner in which adults learn may impact teacher perceptions related to their acceptance of new teaching initiatives such as BYOT. Following is an examination of two adult learning theories, the situated learning theory and the attribution theory, as well as the application of each theory as it relates to learning to teach with technology. The situated learning theory focuses on the relationship between learning and the social situations and setting in which learning occurs (Lave & Wenger, 1991). Instead of focusing on a more traditional style of learning in which knowledge is obtained or acquired by listening to a teacher or instructor or watching instruction on a specific topic take place, situated learning describes the ways in which people learn from participation in social settings and the types of social settings and engagements required in order to facilitate learning. A key component regarding the situated learning theory is the concept of legitimate peripheral participation (Lave & Wenger, 1991). Legitimate peripheral participation or LPP, is the idea that a novice or student learns a specific task or skill by working with or participating in an activity with an expert. While participating with an expert, knowledge is gained through practice and doing, but the learner is not responsible for the entire product or project success as participation is limited and accountability falls to the master, expert, or instructor.

Historically, this type of learning has been viewed as an apprenticeship in which an expert teaches a new learner skills and provides knowledge by allowing the learner to shadow the teacher or watch how things are done correctly by a master in order to create a foundation in which he or she can become an expert and later a teacher to someone else. Lave and Wenger (1991) focused less on an apprenticeship in the above sense and considered how social atmospheres and interactions create learning opportunities automatically without a formalized apprenticeship and with a focus on learning by doing. In the LPP model, a student or learner obtains skills and knowledge by doing or performing a task while learning. Once the student or the novice has learned the skills, the learner moves into the category of expert and transitions into a community of practice in which he or she may begin to teach others. The concept of learning while doing is an interesting approach to consider when providing opportunities for teachers to learn ways to effectively teach with technology. When examining a situated learning environment, the idea that learning is not an individual activity or exercise but a social practice that takes place in the midst of specific context areas is clear. Factors that should be considered in a situated learning environment include: tools which will determine the method in which learning will take place, the location and physical structure of the setting in which learning will take place as this will influence the interaction learners have with one another, and the idea that learning is situated or takes place within a set culture or social context (Young Sek & Merriam, 2010).

Young Sek & Merriam (2010) examined the ways in which older Korean adults learned to use technology from peers in a classroom setting. Adults in the class were more likely to seek assistance from peers by asking questions or by simply looking at the computer monitors of other students more so than seeking assistance from the class instructor. As a result of the nature of

situated learning, communities of practice are often formed in which learners work with, help, teach, and learn from each other. Learning in this manner requires learners to make meaning or learn within their experiences in a specific situation. Situated learning is a process in which specific goals and curriculum may not be established as the learners are asked to gain knowledge through practice and exploration within a social setting or context. Activities and tasks do not exist in isolation but have relationships with broader contexts, with deeper meanings, and the relationship between knowledge and the deeper meaning of obtaining knowledge is developed within a social community (Lave and Wenger, 1991). Participation in social settings helps to facilitate learning while skills are not taught in isolation but in the context in which they will be used. When considering how teachers should be taught to teach with technology in their classrooms, not teaching technology in isolation is imperative (Kopcha, 2010). Additionally, if teachers are unable to see the connection between technology and the content they are required to teach, technology may very easily be viewed as an extra, unwanted task. Carl Rogers, thought of as one of the originators of the self-directed learning theory (Merriam, Caffarella, & Baumgartner, 2007), found that in order for learning to successfully take place the following components must be present: a personal interest in learning, learning that is self-initiated, learning which shapes the learner's behavior or personality, a determination by the learner regarding whether or not his or her needs are being met, and finally essence in meaning which describes whether or not learning has become meaningful to the learner. Essence in meaning should occur if teachers are expected to integrate technology into classroom teaching. This may be achieved through a connection of the integration of technology into classroom teaching with a specific focus on the content area in which the teacher teaches.

As stated above, technology skills or best practices related to teaching with technology should not be taught in isolation as technology should be used as a tool or medium to deliver regular course content (Koc & Bakir, 2010). Koc's research examines a social-constructivist paradigm of teaching and learning and makes the claim that teachers will best learn to teach with technology when they are given professional development opportunities that allow them to view or watch the ways in which others are teaching with technology. This assertion is in line with Lave and Wenger's (1991) notion of learning through legitimate peripheral participation and the assertion that adults learn best while learning skills in the context in which they will actually be used. Kopcha (2010) followed teachers who were members of a professional learning network in which teachers in the network served as mentors for other teachers learning to better teach using technology. He determined that teachers who had mentors or colleagues to consult with when questions came up regarding using technology in the classroom experienced greater success with implementing technology in the classroom. A professional learning network employs a socially situated learning environment as teachers are learning from other teachers. In line with this model, the Charlotte-Mecklenburg School district adopted the implementation of professional learning networks with the goal of integrating student mobile devices into classroom instruction (Charlotte-Mecklenburg Schools, 2012).

The question being explored in this review relates to teacher perceptions regarding school-based BYOT initiatives and the manner in which integration is accomplished. As stated above, a key aspect in exploring this question is to better understand how adults learn and develop. Weiner's (2008) adult learning attribution theory asserts that an individual's success or failure in performing or completing a specific task is determined by the individual's self-concept or confidence in his or her personal ability to achieve success. Weiner describes four main

components of successful adult learning that include: ability, effort, task difficulty, and luck. If an adult believes he or she has the ability to be successful then the individual will dedicate more time to completing a task. Conversely, if an adult learner believes he or she lacks the personal ability to be successful and failure is imminent, the individual will devote less time to completing a task. The attribution theory provides one point of view regarding characteristics needed for adults to become successful learners. If teachers believe they have the ability to successfully integrate BYOT into teaching a willingness to do so may increase and teacher professional development may impact this effort.

Professional Development

Following is an overview regarding teacher professional development opportunities that includes: the ways in which professional development has been defined, ideas about what constitutes effective professional development, and information specifically related to designing technology-centered professional development opportunities. The selection criteria for literature reviewed in the area of professional development for the purposes of this research study included the following:

- Literature must have been peer reviewed
- Literature obtained from web sites must have been peer reviewed (conference and journal web-sites were used as sources)
- Literature published prior to 2008 was not included (with the exception of a reference used to help define professional development from 2005) to ensure the most recent literature was considered
- Literature must have demonstrated a relationship to adults and technology-centered teacher professional development

Torff and Sessions (2008) define professional development as a “program of activities designed to enhance the professional knowledge of a group of teachers” (p. 124). The International Technology and Engineering Educators Association (ITEA/ITEEA, 2005) defines professional development as a “continuous process of lifelong learning and growth that begins early in life, continues through the undergraduate, pre-service experience, and extends through service years” (Loveland, 2012, p. 26). Professional development can also be defined as “a change in teacher knowledge and skills, leading to improved classroom instruction and, finally, enhanced student achievement” (Martin, W., Strother, S., Beglau, M., Bates, L., Reitzes, T., & Culp, K. M., 2010, p. 54). Research related to professional development approaches indicates opportunities are most effective when the following components are included: sessions are sustained and intensive versus short term, the session focus is on academic subject matter with links to learning standards, teachers are provided with opportunities for active learning and permitted to engage in leadership roles, and the sessions are meaningfully integrated into the daily life of the school (Torff and Sessions, 2008).

The following measures are standards for effective teacher professional development: focus on instruction and high learning standards, development of content and pedagogical knowledge, activities that model effective instruction practices, a collaborative setting ideally within the school, and a cumulative curriculum aligned with national or state reforms and standards (Loveland, 2012). According to the literature reviewed, professional development opportunities should be customized to incorporate elements in which sessions focus on sustained and long-term learning within a collaborative learning environment such as a school. Professional development may be offered in a variety of formats including traditional lecture

style teaching, learning that occurs within a social context in everyday situations, or by learning facilitated from peer interactions and while functioning in professional learning networks.

Specifically related to technology focused professional development opportunities the goal of any professional development training should be to result in improved student learning (Polly & Hannafin, 2010). To accomplish this goal, teachers should be involved in determining the content included in training sessions while maintaining access to technological tools for ongoing support. In order to ensure teachers do not exit the profession as a result of technology integration mandates, teacher support and appropriate professional development opportunities should be consistently available to teachers (Lynn and Woods, 2010). Holden (2011) examined K-12 teachers in two rural school districts to determine teacher attitudes regarding the use of technology. By using the Teachers Acceptance Model (TAM) survey instrument, Holden found that a teacher's willingness to use and teach with technology related to an individual self-confidence in a personal ability to use technology in the classroom. Essentially, the higher the level of self-efficacy in the teacher, the more willing a teacher was to integrate technology within current teaching practices (Holden & Rada, 2011). This study aligned with Bernard Weiner's (2008) attribution theory in that the study provides evidence of a teacher's belief that he or she can successfully teach with technology and a resulting willingness to do so. The steps taken to facilitate a higher level of self-confidence or self-efficacy regarding teaching with technology are important for professional development designers. Self-concept is an important factor in the attribution theory (Weiner, 2010). A professional development instructor can help shape the self-concept of teachers participating in learning opportunities depending on the feedback they are providing (Anderman & Anderman, 2003). If professional development instructor feedback

is provided in a manner such that a teacher believes he or she can control his or her ability to learn by studying or practicing more, the teacher will feel more motivated to achieve success. However, feedback provided in which the professional development participant attributes failure to lack of personal skill will result in decreased motivation to obtain success because the participant will feel personal skill is something he or she cannot control or change (Anderman & Anderman, 2003). Koc (2010) also conducted research through the use of needs assessments and personal surveys of K-12 teachers and found that regardless of age or current professional development opportunities being offered, teachers who were taught to use technology in the classroom while in college or during their pre-service period felt more comfortable teaching with technology in their current classrooms. While participation in professional development opportunities may influence teacher perceptions related to BYOT, other factors such as current educational technology trends may also play a role in shaping teacher attitudes regarding teaching with technology.

Educational Technology Trends

The selection criteria for literature reviewed in the area of educational technology trends for the purposes of this research study included the following:

- Literature must have been peer reviewed
- Literature obtained from web sites must have been peer reviewed (conference and journal web-sites were used as sources)
- Information was obtained from sources charged with the specific task of identifying educational technology trends such as the New Media Consortium and the International Society for Technology in Education

- Trends published prior to 2011 were not included to ensure the most current trends were identified (references to literature from 2003 and 2009 were included for the purpose of discussing the implications of any educational technology trend)

The New Media Consortium (NMC) in conjunction with the International Society for Technology in Education (ISTE) releases a report each year to “examine emerging technologies for their potential impact on and use in teaching, learning, and creative inquiry within the environment of pre-college education” (New Media Consortium, 2012, p. 3). The NMC (2012) determines which technologies are most likely to be integrated within the next 12 months in the K-12 educational environment. According to the 2012 report, mobile devices, tablets, and Bring Your Own Technology or BYOT implementations were considered to be one the fastest growing dimensions in the educational technology arena (New Media Consortium, 2012). While a review of current trends provides information on growing classroom initiatives, in their analysis of variables that impact technology use in schools, Zhao and Frank (2003) assert that despite educational trends, teachers may not incorporate technology because they are unable to see the true educational value and use of technology in the classroom. The degree to which teachers integrate technology into the classroom is determined by each individual educator’s analysis of the costs versus the benefits of using technology in classroom teaching and learning. Additionally, teachers describe the unreliability of technology as well as confusion regarding the best implementation methods as reasons to avoid classroom technology integration. However, allowing students to bring in their own technology should lessen the burden of teacher management for technology devices because students will be familiar with and able to troubleshoot their own devices making the trend of BYOT more manageable for a classroom

teacher (Pascopella, 2009). A brief overview of educational technology trends has been provided. In an effort to better understand how teachers actually integrate student mobile devices into classroom teaching an understanding of the term integration and the ways in which technology is currently used in the classroom is necessary.

Classroom Technology Use and Integration

The selection criteria for literature reviewed in the area of classroom technology use and integration for the purposes of this research study included the following:

- Literature must have been peer reviewed
- Literature obtained from web sites must have been peer reviewed (conference and journal web-sites were used as sources)
- To focus on recent classroom technology use by teachers and students, literature published prior to 2003 was not included
- Literature must have provided information regarding what defines classroom technology integration and classroom technology use

According to the National Center for Education Statistics (2012) technology integration is defined as “what comes next after making the technology available and accessible as a goal in process, not an end state” (Defining Technology Integration section, para. 2). Classroom technology use may include using emerging technologies to teach content and deliver instruction to students such as: student tablets, computers, smartphones, or interactive whiteboards, or may refer to teacher technology use for teaching preparation such as creating handouts or composing emails. In a study conducted by Dwyer, Russell, and Bebell (2003) four categories of classroom technology were identified and examined which included: teacher use of technology for delivering instruction, teacher-directed student use of technology during class time, teachers

directing students to create products using technology, and teachers' use of technology for preparation. The study results indicated teachers were less likely to incorporate the use of technology to deliver instruction and for preparation if access to technology was limited and professional development opportunities were not provided to assist in using technology for instruction.

In the area of student use, teachers were more likely to direct students to use technology in the classroom if effective technology-centered professional development opportunities were readily available for teachers (Dwyer et al., 2003). As previously mentioned, an emerging use of technology in the classroom includes permitting students to bring in and use their own devices, which again is commonly referred to as BYOT. A study conducted on the issues present when implementing a BYOT initiative found that many teachers are reluctant to implement a BYOT platform for the following reasons:

Teachers are afraid to appear less intelligent and knowledgeable than the students they are teaching, teachers are concerned about the classroom management issues which may arise if a student brings in a device such as a smartphone as this device may distract students from learning, and teachers may believe they are losing control or the full attention of a student who may possibly be texting or surfing the web on his or her device. (Pascopella, 2009, p. 10)

Additionally, many teachers are simply reluctant to change due to an established comfort level created by current teaching methods. Regarding theory associated with change, people have a natural immunity to change. Helping people overcome limitations to become more successful at work is the root of effective management (Harvard Business School, 2011). With this in mind, an action plan was developed in which steps may be followed to institute change in

the workplace. The action plan includes five steps: notice and record current behavior, look for contrary evidence, explore the history, test the assumption, and evaluate the results (Harvard Business School, 2011). Many teachers subscribe to the idea that if the previous teaching methods used have been working there is no need to change or try something new. This thought paradigm appears to be extremely prevalent in the area of incorporating technology in the classroom. Teachers must begin to embrace the idea of technology in the classroom because students are constantly using and learning through the use of technological tools at home and these opportunities should be made available in the classroom as well (Pascopella, 2009). School-leaders should also support teachers in understanding change is best viewed as a process occurring over a period of time. To this end, specific steps or plans need to be outlined and followed when change is instituted and an emphasis should be placed on the importance of ensuring adequate time is provided for those expected to implement changes (Harvard Business Review, 2011). An evaluation of the effectiveness of an organizational change should also be conducted. Additionally, the above text states that the reason many changes fail to fully take effect is simply because the leaders initiating the change do not view change as a process. If current teaching practices are to be modified to include a BYOT initiative the process of change should be carefully considered and well organized to ensure success. Assessing the benefits as well as challenges associated with any change assist in conducting a risk versus reward assessment. Following is a discussion of the perceived benefits, challenges, and learning opportunities related to BYOT.

The selection criteria for literature reviewed in the area of BYOT benefits, challenges, and learning opportunities for the purposes of this research study included the following:

- Literature must have been peer reviewed

- Literature obtained from web sites must have been peer reviewed (conference and journal web-sites were used as sources)
- Information from school districts currently implementing BYOT was obtained to assess the benefits, challenges, and learning opportunities experienced
- Literature must have outlined the integration of a BYOT initiative in a PreK-12 school setting
- Literature published prior to 2011 was not included

Benefits of BYOT

In 2012, Charlotte-Mecklenburg Schools defined BYOT as “an initiative to allow students to use their own technology at specified times during the day to enhance the learning experience” (BYOT frequently asked questions, para. 1). Forsyth County Schools located in Forsyth County, Georgia asserts that the implementation of a BYOT initiative encourages students to bring their personal technology tools to school for the purpose of learning (Forsyth County Schools, 2013). Additionally, The Pew Internet & American Life Project conducted a survey of 2,462 writing teachers in 2013 and found the following:

Seventy-eight percent of writing teachers stated the use of digital tools encourages student creativity and personal expression.

Seventy-nine percent of writing teachers agree that digital tools encourage greater collaboration among students. (The Impact of Digital Tools on Student Writing, para. 3)

The implementation of BYOT is beneficial as it provides low-cost opportunities for school districts to increase digital learning for students almost instantly (Jonathan Costa, 2012). He also posits that in order for schools to meet the needs of modern learners, students need one-to-one technology access as this access shifts the classroom process focus from the teacher to the

learner. Finally, Costa summarizes the national technology plan stating one of the nation's educational priorities is to engage and empower students with a belief that this goal may be achieved through BYOT initiatives.

There are many benefits of school-based BYOT initiatives such as cost incentives (as students bring in and use personal devices the need for large numbers of district issued devices and technology support may be reduced) as well as increased levels of on-demand access to information (students can use personal devices to problem solve and conduct research as needed) (Dawn Nelson, 2012). While examining the benefits of BYOT, Stephens and Fanning (2013) noted the difference of the level of student engagement in one high school social-studies class in which students were permitted and encouraged to use their personal devices versus a high school social-studies class taught by the same teacher, during a different class block, in which student mobile devices were not used. The findings indicated that student access to one-to-one online devices “made an appreciable difference in the quality of learning” (Stephens & Fanning, 2013, p. 12). Mark Ray (2013) describes the BYOT initiative taking place in Vancouver, Washington Public Schools as a means to “promote 21st century skills, foster entrepreneurial teaching and learning, and increase engagement in the classroom” (para. 1). The expertise students and teachers have in the use and operation of their personal devices eliminates the need for district level IT troubleshooting support which can possibly eliminate the need to wait for district level support to fix or reimage devices being used in the classroom resulting in technology downtime (Ray, 2013). The above information provides an overview of the perceived benefits of implementing school-based BYOT programs. However, in addition to assumed benefits, the literature also indicates possible challenges and limitations when instituting BYOT within an educational setting.

BYOT Challenges

While opportunities to enhance teaching and learning through the integration of BYOT initiatives exist, the literature also examines the challenges and obstacles present with this type of program implementation. Many teachers choose not to embrace the use of student devices within classroom teaching because they are unsure of how to effectively integrate devices (Nelson, 2012). Issues related to the unwillingness of some teachers to incorporate BYOT include fear that the use of student devices will create classroom management and technical support issues, concerns that students will have greater opportunities to cheat, and some teachers believe the use of technology cannot be effective or meaningful unless all students are using the same devices (Nelson, 2012). Gary Stager (2011) asks if a BYOT school-based initiative is the “worst idea of the 21st Century” (Introduction section, para. 1). Equitable educational experiences are created only when all students have access to the same materials, or in the case of BYOT, the same devices. Because economic disparities exist amongst students, a digital divide may be present, as the quality of devices will vary within the classroom possibly making it easier for some students to complete technological assignments than other students with less powerful technology devices. Many classroom teachers and school leaders include the use of cell-phones within a BYOT initiative; however, the capabilities of a cell-phone in comparison to a laptop or tablet are vastly different and could present challenges for student learning (Stager, 2011). The screen size of a cell-phone alone may make it more difficult for some students to complete technology assignments. Additional challenges to successful BYOT implementations are increased teacher anxiety (many teachers have been unwilling to integrate school-based technology devices into classroom teaching and learning and the thought of adding more devices into a classroom setting may raise teacher discomfort levels) and the idea that a BYOT program

will send the message that school districts are no longer investing funds in technology for students and as a result, parents will be solely responsible for ensuring their children have a technology device to use at school (Stager, 2011).

Intel (2012) also describes challenges for students using cell-phones as their personal device in the classroom. The following considerations were cited for students not using an actual computer or laptop:

What will students use when they require a keyboard?

How will students use software programs that require a “real” computer?

What will students use when they need a larger screen?

How will students access files that are not supported on their mobile device? (p. 1)

Logistical and security issues for schools implementing BYOT programs should also be explored. School districts should consider guidelines for charging student devices (whether or not students will be responsible for keeping devices charged or if schools will provide student charging stations), procedures for securing student devices when not in use (during lunch or sports activities) and the process for students without devices to checkout or use school devices (Intel Corporation, 2012). Challenges present when implementing BYOT initiatives also provide learning opportunities for key stakeholders. A discussion of these opportunities is below.

BYOT Learning Opportunities

In an effort to overcome some of the challenges and obstacles related to BYOT implementations, professional development and learning opportunities focused on this initiative should be developed for classroom teachers, students, school district technology personnel, and parents. Educational leaders hoping for successful BYOT programs should provide learning

opportunities for all stakeholders involved in the program initiative. A review of the literature examines focus areas for all participants.

Technology Personnel

School district technology personnel are charged with developing a network infrastructure to support the increased traffic BYOT programs bring. Questions to consider include the way student information will be protected to avoid data security conflicts, ways to protect the network from viruses and malware, whether or not the school network has the ability to handle a large number of devices simultaneously, if the network can be accessed at all times, ensuring network bandwidth is capable of handling multimedia applications, and whether or not the network has growth potential (Intel, 2012).

David Greer (2013) examined BYOT network solutions used at various educational institutions. One of the challenges involved with network management when allowing a mass number of personal devices to access a school-based network is finding a way to protect students from accessing malware, which can cause viruses not only to the mobile device but to the institution's network as well. A potential solution would be to employ a mobile device management (MDM) solution. MDMs force users to authenticate (log in to the network) any time a device connects to the Internet. Doing this provides school districts with the ability to limit which users have access to specific websites or applications based on a predetermined policy. This solution means student users may be unable to access websites deemed inappropriate for their use; however, adult users when signed into the network may have access to sites unavailable to students.

Schools are bound by the Children's Internet Protection Act (CIPA), which was enacted by Congress in 2000 as a solution to protect students from accessing harmful or inappropriate

content on the Internet (FCC, 2013). When school districts are CIPA compliant they may receive discounts on the cost of Internet and other network based connections through a program called E-rate. School CIPA requirements include monitoring the online activities of minors as well as educating minors about proper online behavior, cyber-bullying, and social networking etiquette. School district technology leaders are required to develop Internet safety policies that include the following components:

- a) access by minors to inappropriate matter on the Internet;
- b) the safety and security of minors when using electronic mail, chat rooms and other forms of direct electronic communications;
- c) unauthorized access, including so-called “hacking,” and other unlawful activities by minors online;
- d) unauthorized disclosure, use, and dissemination of personal information regarding minors; and
- e) measures restricting minors’ access to materials harmful to them.

(Requirements section, para. 3)

Employing a MDM solution when instituting a BYOT program will assist with ensuring students are not accessing inappropriate sites using the school-based network as these sites will be inaccessible and blocked by network filtering once students log in and authenticate to the school-based network even while on their personal devices.

Teachers

When integrating BYOT initiatives into the classroom curriculum teachers will have to make adjustments to current teaching practices and should be provided with ongoing professional development opportunities (Intel, 2012). Many teachers describe the use of student

technologies in the classroom as disruptive or distractive in nature, which illustrates the importance of providing staff training (Johnson, 2012). Effective BYOT professional development opportunities should include the following components: provides teachers with skills to develop classroom guidelines for the use of personal devices, assists teachers with developing lessons in which student devices are used productively, and provides opportunities for teachers to learn about applications and methodologies that encourage productive mobile technology use. When designing technology-centered professional development opportunities focused on BYOT implementations school leaders should consider allowing teachers to visit schools districts and classrooms in which students are successfully using personal devices for learning (McLester, 2012). The idea of on-going teacher support in which teachers can form professional learning networks and learn from a group or cohort of teachers during varying phases of a BYOT implementation process is also invaluable as teachers can serve as resources for one another. To that end, the Forsyth County school district (located in Georgia and one of the first school districts to integrate BYOT) provides opportunities for teachers and school leaders from all over the United States to sign up for tours throughout the school year in which classroom lessons incorporating the use of student devices can be observed and students, teachers, school-based administrators, and district level technology personnel are available to answer questions related to program implementation (Forsyth County Schools, 2013).

Students

Disparities exist related to access to technology amongst students based on the student's community, ethnicity, and earnings (48% of low-income families have a computer at home compared to 91% of high-income families). Also reported in the same study conducted by the

Pew Internet & American Life Project in 2013 in which technology use by 802 youths (ages 12-17) was examined were the following findings:

Seventy-eight percent of teens now have a cell-phone, and almost half (47%) of them own smartphones. That translates into 37% of all teens that have smartphones, up from just 23% in 2011.

Twenty-three percent of teens have a tablet computer, a level comparable to the general adult population.

Ninety-five percent of teens use the Internet.

Ninety-three percent of teens have a computer or have access to one at home.

Seven in ten (71%) teens with home computer access say the laptop or desktop they use most often is one they share with other family members. 77% of young adults ages 12-17 own a cell-phone. (Teens and Technology section, para. 3)

Several school districts have begun BYOT initiatives by allowing students to use their cell-phones for the purpose of classroom learning (Charlotte-Mecklenburg Schools, 2013; Forsyth County Schools, 2012). If a student does not own a laptop or tablet teachers may choose to use applications such as *Today's Meet* or *Poll Everywhere* which allow students to participate in on-line classroom discussions in real time using a smartphone (Charlotte-Mecklenburg Schools, 2013). Students using personal devices should understand school and classroom guidelines regarding the appropriate use of devices.

Parents

As school districts implement BYOT initiatives parental questions and concerns should be considered and addressed. Several school districts have developed parental information sheets, conducted BYOT parent information sessions, as well as established website portals in

which parents can find answers to frequently asked questions. The Forsyth County School district located in Forsyth County, GA has a parental tech toolkit webpage in which parent information is available. For example, the site states, if a child does not own a device, a school device will be provided and information regarding the safety of the school network for use with personal devices (school networks follow the United States government Children's Internet Protection Act guidelines) is accessible on the toolkit webpage as well. The issue of who is responsible or liable for the student's device (the child is solely responsible and liable for his or her device) is also addressed (Forsyth County Schools, 2013). The Charlotte-Mecklenburg school district located in Charlotte, North Carolina provides the following information to parents: information regarding the parent's responsibility to provide additional software on student devices (parents are not required to provide software for the purpose of BYOT as applications used are web based and the school district software-monitoring filtering system is employed to ensure students do not access inappropriate websites using the school-based wireless network), statements related to actual device use (teachers will determine how devices will be used in the classroom for the purposes of teaching and learning), and a statement regarding the appropriate procedures if a device is stolen on school property (the student should inform school-based administrators that a device has been stolen; however, the school nor school district is responsible for replacing the device) (Charlotte-Mecklenburg Schools, 2013).

The Evergreen Public School District (2013) located in Vancouver, Washington sends home a BYOT parent letter with each student. The following information is included in the letter:

Please note that students are never required to bring in outside technology to school.

All students will continue to be able to utilize our school equipment. No student will

be left out of the instruction process.

Students will only use appropriate technology at the teacher's discretion.

Students will only use appropriate educational applications on their device unless they have staff permission.

Students are not to call, text message, email, or electronically communicate with others from their personal device without permission. (Evergreen Public Schools Parent Letter, para. 3)

Ensuring that school leaders, technology personnel, teachers, students, and parents understand BYOT expectations and guidelines, and are provided with an opportunity or forum to learn and ask questions will assist with increasing the likelihood of smooth program implementation.

Conclusion

This literature review summarizes research on factors that may impact successful school-based BYOT implementations as well as the importance of considering the ways in which adults learn and develop in an effort to provide effective technology centered professional development opportunities for teachers. An overview of adult learning and development was provided as well as information regarding teacher professional development and technology-centered professional development opportunities. Classroom technology trends, current classroom technology integration practices, and benefits, as well as challenges, regarding a BYOT implementation were also examined. Additionally, the importance of ensuring key stakeholders (school district and technology leaders, teachers, students, and parents) are included in the decision-making and learning process regarding a BYOT initiative and the importance of developing guidelines and set expectations in which personal technology devices will be used was also highlighted.

Chapter III Methodology

This research study sought to examine the perceptions and attitudes of teachers currently implementing a Bring Your Own Technology (BYOT) initiative. The following four constructs related to the integration of BYOT initiatives into classroom teaching and learning were the focus of this study:

- The teacher's individual confidence level or belief in his or her ability to teach effectively using technology;
- Beliefs and actions regarding classroom management and technology integration;
- Attitudes related to technology-centered professional development opportunities; and
- Perceived challenges and/or benefits of integrating student devices into classroom teaching and if these benefits transfer over into teaching practices.

Background

In 2012 the Charlotte-Mecklenburg School district located in Charlotte, North Carolina embarked on a BYOT initiative for students (Charlotte-Mecklenburg, 2012). This initiative allowed students to bring in personal technology devices such as tablets, cell-phones, eReaders, and laptops for use in the classroom for instructional purposes. The school district began with a pilot of 25 schools, inviting each school to develop a BYOT plan. Each pilot school was asked to develop a school-based implementation plan customized for the individual school's teacher and student population. As a result, some schools opted to begin with staff-only implementations in which teachers were permitted to bring in personal devices and connect to the district network for the purpose of teaching (personal devices had not been allowed previously), some schools opted to start by permitting only one grade level or department to use student devices in the classroom, and other schools opted to allow all students to bring in devices

and asked individual teachers to determine when devices could and could not be used during instruction (Charlotte-Mecklenburg Schools, 2012).

Information Needed to Conduct Study

This research study focused on teacher perceptions and attitudes regarding the implementation of a BYOT initiative at one of the pilot high schools within the Charlotte-Mecklenburg school district. Some of the information useful in discerning teacher perceptions included: demographic information of teacher participants (gender, years of teaching experience, amount of time at current school location), the ways in which teachers allow students to use personal mobile devices as well as the challenges and obstacles involved in classroom use, and the expectations of school-based administrators during the implementation process. While the integration of BYOT was not a school mandate, the use of technology while teaching was encouraged. School administrators modeled the use of technology by posting important documents such as staff and student handbooks on websites and by requiring teachers to submit lesson plans electronically. Teacher perceptions related to teaching with technology in the classroom may also be impacted by the ways in which teachers currently use technology in their personal lives; therefore it was also beneficial to learn if and in what ways teachers use technology personally.

Research Setting

The research site for this study was a Title I High School (71.4% Free/Reduced lunch) in which there were 1,943 students and 165 licensed/certified staff (63% of teachers have four or more years of teaching experience). Included in the staff were two dedicated Technology Facilitators in which one focused on providing professional development for teachers while the other focused on troubleshooting and/or repairing school-based technology equipment. The

professional demographic breakdown of the research site was as follows: 142 teachers work at this site, 82% of teachers are fully licensed (not working from a provisional or probationary license), 29% of teachers at this site have advanced degrees, 23% of teachers have 0-3 years of teaching experience, 43% have four to ten years teaching experience, and 34% of teachers have over 10 years of teaching experience. The teacher turnover rate reported for the last three years at this site was 16% (Charlotte-Mecklenburg Schools, 2013). Regarding BYOT specifically the school vision and mission are as follows:

Vision

Technology will be seamlessly integrated into the educational process to supplement traditional classroom instruction to better serve our learners and provide means for better communicating and collaborating. An important aspect of our curriculum, technology facilitates learning, enhances the relevance of learning to students' dreams and career aspirations, helps individualize instruction, and encourages the active, constructivist, learner-centered teaching that we strive to achieve. (BYOT, para. 1)

Mission

Our mission is to provide a technology-rich environment, along with professional development on effective integration and both administrative and instructional support, which facilitates the development of 21st century skills and provides access to learning for all students. Technology empowers teachers to engage students and provides opportunities for communication and collaboration that can maximize the instructional process and thereby supports the mission to inspire, enable, and empower every student to meet high academic standards, demonstrate responsible citizenship, and develop essential skills to lead ethical, productive lives in a dynamic, global society.

(BYOT, para. 2)

The school has also instituted specific guidelines and a student agreement that must be signed regarding the student use of BYOT, which states the following:

The use of personal technology to provide educational material is not a necessity but a privilege. A student does not have the right to use his or her laptop, cell-phone or other electronic device while at school. When abused, privileges will be taken away. When respected, privileges will benefit the learning environment. (BYOT, para. 3)

The following guidelines are in place for students utilizing BYOT:

Students take full responsibility for personal digital devices at all times. The school is not responsible for the security of the device. The device must be in silent mode while on school campuses unless otherwise directed by the teacher. The device may not be used to cheat on assignments or tests or for non-instructional purposes during instructional time.

The device may not be used to record, transmit or post photographic images or video of a person, or persons on campus during school activities and/or hours unless assigned by the teacher. The device may only be used to access files or Internet sites which are relevant to the classroom curriculum. Non-instructional games are not permitted.

Students must comply with teachers' request to turn off the device.

Students acknowledge and agree that the school's network filters will be applied to the school guest network access to the Internet and should not be circumvented

Students acknowledge and agree that a teacher or administrator may collect and examine any device at any time for the purpose of enforcing the terms of this agreement, investigating student discipline issues, or for any other school-related purpose.

Students acknowledge and agree that personal technology must be charged prior to bringing it to school and the device must run off its own battery while at school

Students acknowledge and agree that the students remain subject to all other school behavior rules. (BYOT, para. 4)

Qualitative Research Approach

According to Creswell, 2008 research is defined as follows:

Research is a process of steps used to collect and analyze information to increase our understanding of a topic or issue. At a general level, research consists of three steps:

- Pose a question.
- Collect data to answer the question.
- Present an answer to the question. (p. 3)

More specifically according to Patton 2002, a qualitative research approach is one in which the information the researcher seeks to find does not focus on how much or how many. It is research conducted with a focus on how participants feel or their attitudes and perceptions (what they think and believe). To this end, a qualitative research approach does not employ sample size rules as the purpose of this research approach is to collect rich, in-depth information not generate generalizability from the study. In an effort to better understand teacher perceptions regarding a school-based BYOT initiative a qualitative research approach was most appropriate.

Case Study Approach Overview

I conducted interviews through a qualitative case study research approach for the purpose of examining teacher perceptions of a BYOT school-based initiative. A case study approach is used when a researcher examines an issue by reviewing one or more cases included in a "bounded system." A bounded system refers to a shared criterion amongst the case or cases being

studied. Criterion bounding cases may include: a shared setting, location, context, or time period in which an event or incident has occurred (Creswell, 2007). For this study, participants were bound by their school setting. When conducting case study research, comprehensive data collection is needed. Interviews, observations, documentation, and the use of audio-visual materials may be used as a means for obtaining data. At the conclusion of data collection, a case description is reported which provides information on the case themes that may include several programs (a multi-site study) or a description based on one program (a within-site study).

The type of case study research conducted may vary depending on the size of the bounded case (individual or group cases) or based on the specific intent of the case or research analysis (Creswell, 2007). When determining the intent of a case analysis, there are two main considerations. A single instrumental case study is one in which the researcher focuses on one bounded case to explain and describe the issue being studied. In a collective or multiple case study the researcher again focuses on one single issue or concern but uses multiple case studies to explain and describe the event or topic being researched. To assess teacher perceptions regarding the implementation of BYOT for the purposes of this study a single instrumental case study was employed. There were 25 sites or cases that participated in the BYOT pilot process. I used purposeful sampling to conduct research and write up a case of a school I do not support as a district level employee.

When conducting case study research, the following process should be followed: Identifiable cases with boundaries should be present for study and purposeful sampling may be employed to provide varying perspectives on the research topic being studied. Extensive data collection methods should be used which may incorporate documents, archived records, interviews, artifacts, direct observations, and participant observations. A data analysis should be

conducted which may take the form of a holistic analysis (analyzing the entire case) or an embedded analysis (analyzing one aspect of a case). Lastly, the meaning of the case should be reported and this may include an analysis of themes identified from the case study to assist with better understanding the case or cases being studied as well as providing "lessons learned" or next steps to be taken as a result of the case study research conducted (Creswell, 2007).

As with all research, employing a case study approach presents challenges. Challenges related to this approach include the difficulty of selecting a case and bounded system to study and the ability of the researcher to determine whether focusing on one specific case is best (Creswell, 2007). Several bounded systems may be present and a researcher must decide on which system to focus as well as decide if varying perspectives are needed, which would then call for studying multiple cases. However, studying a single unique case may be best to refrain from diluting the research results with multiple cases (Creswell, 2007). Again, I focused on a single case and developed an online asynchronous interview questionnaire through the case study process to determine the attitudes of teachers in a single setting implementing a BYOT initiative. This process incorporated a constructivist researcher epistemology in that I sought information based on feedback and input from the research participants to best inform research (Mertens, 2010).

Constructivism Paradigm Overview

According to Mertens (2010) Researchers operating from a constructivism paradigm believe meanings are interpreted and created from various points of views or situations and that all knowledge is constantly being interpreted and reinterpreted. The role of a constructivist researcher is to understand and report on the numerous socially constructed views of meaning and knowledge. Researchers must allow concepts to emerge and grow throughout the research

process and pay attention to the ways in which truth and knowledge are constructed, not discovered. The following describes the methodology of constructivist researchers:

They want to know what meaning people attribute to activities...and how that related to their behavior. These researchers are much clearer about the fact that they are constructing the “reality” on the basis of the interpretations of data with the help of the participants who provided the data in the study. (Eichelberger as cited by Mertens, 2010)

The methodology used for data collection also illustrates the researcher-participant roles in a constructivist paradigm. Researchers use qualitative methods such as interviews to collect data. The researcher then interprets the data and this interpretation may include personal assumptions (Mertens, 2010). Ethical considerations for constructivist researchers include: ensuring there is a balanced representation of research participants regarding race, gender, socio-economic status, and so forth, ensuring a sense of authenticity has been established in the data collection and reporting phase, and building a sense of trustworthiness between the researcher, the participants, and the community involved in the research study. The findings of this research study were based on the perspectives of the participants and their beliefs related to BYOT.

Participants

For this study, I selected a purposeful sample and interviewed teachers teaching in the same school. As defined by Creswell (2007) a purposeful sample means, “the inquirer selects individuals and sites for study because they can purposefully inform an understanding of the research problem” (p. 125). I selected a high school that had been implementing a BYOT initiative for at least one full academic year. Teachers participating in this study were able to formulate BYOT perceptions based on experiences from a previously completed school year. I

purposely studied a high school as that provided me with a forum to invite a larger number of teachers in a single setting to participate in this study (high schools in this particular school district have more classroom teachers than at the elementary or middle school levels). I was able to select a school from a list of 25 schools that participated in a BYOT Phase I pilot. The list of schools was available to me because I am an employee of the Charlotte-Mecklenburg School district's Instructional Technology department. To avoid any potential conflict because I am employed by the school district, I then opted to select a sample within a zone with which I am not assigned to work. I selected a school in which I offer no professional development or support and in which I have no influence and cannot affect their positions, teacher evaluations, or income in any way.

The participants of this study included both genders and the study was open to teachers of all ages and all teaching experience levels. The study included six male participants and six females while seven participants identified themselves as Black or African-American and five participants identified themselves as White. The following table provides additional participant demographics.

Table 1: Actual Participant Demographics

Participant Number	Number of Years as a Classroom Teacher	Number of Years at Current School Site	Age	Subject Taught
Participant 1	13	12	35	English
Participant 2	0-1	0-1	23	Science
Participant 3	3	3	25	English
Participant 4	22	12	44	Career Technical
Participant 5	2	2	24	Foreign Language
Participant 6	10	9	32	Art
Participant 7	10	1	32	English
Participant 8	3	3	26	Science
Participant 9	13	10	35	English
Participant 10	4	1	26	Math
Participant 11	8	4	31	Exceptional Children
Participant 12	24	4	47	Did not provide an answer

Research Process and Data Collection

In the month of August during the 2013-2014 school year I contacted the principal of my proposed research site via email to ask if I could speak with her regarding possibly conducting research at her school. In a face-to-face meeting two weeks later, I explained the scope of my research (examining teacher perceptions related to BYOT), explained the process I would use (online asynchronous interviewing as well as conduct a document review of the school report card, school technology plan, school improvement plan, school BYOT guidelines and resource

information, and lesson plans from willing teachers). I also explained that teacher participation would be strictly voluntary and that teachers could withdraw from the study at any time. Lastly, I explained that the results would be strictly confidential and I would not use any school, teacher, or administrator identifiers when reporting my findings. I provided the principal with access to the initial interview questions, informed consent form (Appendix A), and explained all interactions including the initial interview, follow-up interview questions (Appendix B), and all document reviews would occur electronically (teachers at this school submit lesson plans electronically and could forward plans to me via email). The principal suggested that I attend a staff meeting the following month. After obtaining permission from the principal, I also spoke with the director of the school district's research department and provided the above information. The director stated that the fact that teachers could participate in an online interview versus a face-to-face format would be beneficial because they could participate at any time that was convenient for their schedules. Once I received approval from the district research department I confirmed a time to attend a staff meeting with the school building principal.

During the staff meeting I attended, I provided teachers with an overview of my study and explained that responses would be collected electronically and could be submitted completely anonymously. I also explained that teachers willing to share lesson plans during the document review phase would be able to indicate this intent during the online asynchronous interview process. I assured teachers that their responses would not be shared with any school building or school district personnel and explained the purpose of this research study was for my work as a student and not related in any way to my job as a school district technology specialist. I passed around a clipboard and asked teachers to provide an email address for which I could

send a link to the interview questions. I explained that their responses would be collected using a secure Google Form in which I would have to sign into and enter a password to retrieve results. The form also included information regarding informed consent and the right to withdraw at any time (Appendix A). The principal was not present for this portion of the staff meeting. This allowed teachers to participate or choose not to participate without any school-building administrators knowing which teachers were going to be a part of the study. I emailed all teachers that provided an email address a link to the interview questions and informed consent form (Appendix A) on the same afternoon they agreed to participate.

Upon completion of the initial online asynchronous interviews, I reviewed responses and contacted the teachers who stated they would be willing to participate in a follow-up or second round of interviews and a document review. The goal of the teacher document review was to examine the ways in which teachers were including the use of BYOT in their lesson plans. Upon completion of the initial interview process involving 12 participants, I completed a follow-up online asynchronous interview to seek clarification on initial answers and ask participants to elaborate on previous responses (probes) and completed a document review with nine willing participants with the goal of better understanding how BYOT was included in their lesson plans and teaching strategies. While nine participants agreed to provide additional information via a document review of their lesson plans, none of the lesson plans submitted included the use of BYOT not even from teachers stating they were currently integrating BYOT. Teachers were using BYOT in the classroom however; the use of BYOT was not included in the actual lesson plan. Again, teachers at this school submitted their lesson plans electronically and were able to provide me with an electronic copy of their plans via email. Upon realizing the information I was seeking could not be obtained from the document review of teacher lesson plans, I then

followed up with the principal and school-based technology facilitator to obtain additional information. The principal provided me with electronic documentation outlining the school improvement plan, the school technology plan, school-based technology guidelines and expectations for students, and information related to the school-based BYOT initiative. I also reviewed documentation that provided information on the school culture and climate such as: school report cards (this provides information on the percentage of students performing on or below grade level expectations), the school performance plan (targeted areas the school has identified for growth), and teacher demographic information (number of provisional teachers with less than four years teaching experience, number of years teaching at school being studied, education level, and teacher turnover rate).

Online Asynchronous Interviewing

This study employed an online asynchronous interview technique and participants were emailed a link to complete interview questions in which answers were stored in a secure Google Form (Appendix A). One of the benefits of an online asynchronous interview is this technique allows people to respond as time permits and allows participants the opportunity to compose answers at an individual and comfortable pace (James & Busher, 2009). The study participants (teachers) typically have demanding schedules and an online asynchronous interview format provides flexibility for participants to answer questions as time allows. Additional benefits of this method include: minimized interviewer error, minimized interview bias, and research indicates respondents typically complete responses within a 24-48 hour time period (Sheehan, 2002). While there is some debate regarding online asynchronous interviewing as an actual interview method versus an electronic survey data collection method Meho (2006) states the following:

It is important to note that online, asynchronous, in-depth interviewing, which is usually conducted via e-mail, is, unlike e-mail surveys, semistructured in nature and involves multiple e-mail ex-changes between the interviewer and interviewee over an extended period of time. Online, asynchronous, in-depth interviewing is also different from virtual focus groups in that the information volunteered by individual participants is not shared with, viewed, or influenced by other participants. (p. 1284)

Because I am an employee of the school district, I wanted to interview participants in a manner in which they would feel most comfortable. If conducting interviews in a face-to-face format I would have been able to align every response with the face of each person. By conducting online asynchronous interviews, teachers had the option of participating without revealing their identities. To this end, Meho (2006) states, “Many people perceive online communication as anonymous because there is no in-person contact and thus, little accountability. This anonymity may explain why some people are more willing to participate in e-mail interview studies” (p. 1289).

Limitations

When considering limitations of an online asynchronous interview data collection method for the purposes of this study, an initial thought may be teachers who do not integrate technology into classroom teaching will be less likely to respond to questions using an online format.

However, the literature related to online interviewing indicates the following:

It has been suggested that if people feel ill at ease using computers or the Internet, the chances are that they will be reluctant to participate in online research. It would appear, though, that such anxieties are largely unfounded. (Denscombe, 2007, p. 21)

Also, the response rate for traditional versus online participation is similar and when given an option, participants may actually prefer an online method (Denscombe, 2007). The National Center for Education Statistics also states that approximately 85% of teachers use computers in the classroom for teacher preparation and communicating via email despite not integrating technology into classroom teaching (NCES, 2012). In this study, within a two-day period, six out of twelve participants had responded with the remaining six responding within two weeks.

The literature regarding online interviews highlights the following ethical considerations and format limitations: loss of non-verbal cues from participants, the inability to know with 100% certainty questions were answered by the intended participant and the possibility of slower response rates from some respondents (James & Busher, 2009). In an effort to ensure the online asynchronous interview answers were received from the intended participant (a limitation indicated above) a link to the Google Form (Appendix A) was emailed to participants. Also, participants were asked if they would be willing to answer additional or follow-up questions after the initial interview. Willing participants provided their email address when submitting answers so they could be contacted if needed for clarification, to ask additional questions, and to participate in a lesson plan document review.

It has also been said that richer interview responses may be received from face-to-face interviews, versus telephone interviews, while richer responses may be received from telephone interviews versus an online format as the interviewer cannot take advantage of the information provided in non-verbal cues, voice tones, and using multiple senses (Meho, 2006). However, this limitation may also be viewed as a possible advantage as Meho states:

On the other hand, e-mail interviews reduce, if not eliminate, some of the problems associated with telephone or face-to-face interviews, such as interviewer/interviewee

effects that might result from visual or nonverbal cues or status difference between the two (e.g., race, gender, age, voice tones, dress, shyness, gestures, disabilities) and e-mail may safeguard against possible loss of face among some people when they describe potentially sensitive events, experiences, or personal characteristics (e.g., difficult relationships with family, lack of English proficiency, racism, academic problems), thus allowing them to participate in research studies. In short, in many cases e-mail facilitates greater disclosure of personal information, offering further benefits to both the researcher and participants. (p. 1289)

It is quite possible that teachers may not have been as willing to be open and forthright about their beliefs related to BYOT (I am a district level employee, working in the district technology office) if interviews had occurred in a face-to-face format. Some teachers opted not to provide their email addresses or reveal their identities and provide an opportunity for follow-up. However, I was able to probe and ask follow-up questions of nine out of the twelve participants which resulted in ongoing communication albeit electronic communication, and this distinction makes the methodology I used online asynchronous interviewing versus an electronic survey as follow-up or probing are not present when conducting a survey.

Results Analysis

To analyze the interview data collected during the online asynchronous process a qualitative data analysis coding method was used. During the first cycle coding I employed the InVivo method (use of direct participant quotes) as well as a Themeing the Data coding process (organizing repeating ideas and descriptions to determine why something happens) (Saldaña, 2009). During the second cycle coding process I used a Pattern coding technique (an examination of causes and explanations for the data). To assist with the coding process I used

the Dedoose coding and extraction software program. The interview protocol included a total of 28 questions (Appendix A) and sought to examine the following research constructs related to the integration of BYOT into classroom teaching and learning:

- The teacher's individual confidence level or belief in his or her ability to teach effectively using technology;
- Beliefs and actions regarding classroom management and technology integration;
- Attitudes related to technology-centered professional development opportunities; and
- Perceived challenges and/or benefits of integrating student devices into classroom teaching and if these benefits transfer over into teaching practices.

Interview Protocol

The interview questions (Appendix A) developed were designed to ascertain the ways in which teachers integrate personal student devices into classroom teaching. The questions were designed using the Florida Technology Integration Matrix (TIM) as a guide. According to the Florida Center for Instructional Technology (2013) the Florida TIM is a tool used to demonstrate how teachers use technology to enhance learning and associates five levels of technology integration as outlined below:

Table 2: Florida Technology Integration Matrix

Classroom Technology Integration Level	Teacher Action
Entry	The teacher begins to use technology tools to deliver content to students
Adoption	The teacher directs students in the procedural use of technology
Adaptation	The teacher facilitates student exploration of independent technology use
Infusion	The teacher provides the learning context and students choose the technological tool to achieve the outcome
Transformation	The teacher encourages the innovative use of technology tools to facilitate higher order learning activities that may not have been possible without the use of technology

Technology integration levels are also measured within various identified learning environments. An active environment is one in which students are actively engaged and using technology rather than passively receiving information from the technology. Collaborative environments demonstrate students using technology to work with others rather than working individually at all times. A constructive environment is one in which students use technology to connect new information to their prior knowledge rather than passively receiving information. An authentic environment is one in which students use technology tools to link learning to the world beyond the instructional setting. Finally, goal directed environments demonstrate students using technology tools to set goals, plan activities, and monitor progress rather than simply completing

assignments without reflection (Florida Center for Instructional Technology, 2013).

According to the Florida Center for Instructional Technology, a teacher's attitude or beliefs regarding technology may be a determining factor related to the individual teacher's movement between technology integration levels as outline in the above table.

Axiology/Ethical Considerations

All researchers regardless of the paradigm used are required to follow basic ethical principles. The Belmont Report highlights three ethical considerations for conducting research. Beneficence is a principle with a focus on maximizing good outcomes and minimizing or avoiding unnecessary risk, harm, or wrongdoing. Respect for participants is a principle in which treating people with dignity and courtesy including non-autonomous individuals such as children is imperative while the principle of justice ensures anyone bearing a risk from research being conducted will also benefit from the research and ensures research procedures are reasonably and fairly administered (United States National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1978). The researcher-participant relationship should be considered when thinking about the axiology of a research paradigm. As a qualitative researcher, an emphasis has been placed on ensuring trustworthiness and authenticity are evident when presenting qualitative results. This goal can be accomplished by ensuring there is an inclusive representation of all stakeholders involved in the research process and by making respondents aware of their reality constructions or ontological authenticity. Also, educating others of realities experienced by all stakeholder groups and empowering and enabling stakeholders to take action on their own behalf is essential (Mertens, 2010). It is the role of the researcher to ensure the above ethical practices are followed and to conduct research in a manner

in which participants do not feel overpowered by the researcher and feel comfortable withdrawing or behaving in their personal best interest.

As outlined in the Belmont Report, a researcher must ensure participants are protected from potential harm or danger. Protecting participants from potential harm or danger includes protecting the identity of research participants. Confidentiality and privacy must always be considered when conducting research to minimize any possible risks associated with making the participant identities public (Loue, 2000). A researcher must also keep authenticity in mind when presenting research findings to ensure shared data is accurate and in line with the information provided by research participants. The ethical considerations in the study of teacher perceptions regarding a high school BYOT program implementation included: interviewing participants using a secure online format to protect privacy, allowing participants to opt out of the interview process at any time, as well as explaining their right to refrain from answering any questions that may have caused discomfort, and ensuring participation or non-participation in the study would not have a negative impact on their professional or personal positions.

Protection and Confidentiality

Participants were given a research purpose overview in addition to the informed consent. Participants were assured confidentiality would be observed and identifying information would not be shared. No names, school names, or other identifiers that would link responses back to individual participants were used. Information collected was not shared with any school or district level personnel. A statement indicating the above was included on the interview questionnaire. There was no anticipated harm or stress to participants who agreed to participate in this research study. Member checking was not needed in this study as the direct statements as

written by the actual participants (through the use of the online asynchronous interviewing technique) were InVivo coded (the technique of coding direct participant quotes) and analyzed.

Informed Consent

Participants were provided with an informed consent form explaining that all information was confidential and would not be shared with any school district employees. Participants were also made aware of the right to withdraw from participation at any time without any negative consequences. Qualitative measures were used to collect data and ethical considerations were made throughout the research process. Additionally, a site was selected in which I have no influence on their positions, teacher evaluations, or income in any way.

Limitations

Limitations present in this study included those related directly to conducting qualitative research as well as limitations resulting from the study design. The purpose of this study related to teacher perceptions regarding a BYOT initiative was to understand teacher attitudes in one specific high school setting by conducting a case study in which the bounded system criteria was the participants' teaching location. Because participants were all from the same school, the findings of this qualitative study may not be generalizable or applicable to the general population. To accommodate for this potential limitation all members of the teaching faculty were invited to participate in the hopes that data would be collected from both genders as well as teachers of various ages and years of teaching experience.

Researcher Assumptions

As a former classroom teacher and current instructional technology specialist, my professional experiences have caused me to have personal beliefs regarding the use of technology in the classroom as well as thoughts regarding how I would or would not implement

a BYOT initiative in a classroom setting. To prevent my personal experiences as a district technology employee from impeding the actual data analysis as a researcher conducting a qualitative study, I purposefully selected a school in which I provide no professional development. This allowed me to review data without personal prior knowledge regarding any technology training previously provided. I also developed questions based on the Florida Technology Integration Matrix that would help assess participants' perceptions regarding a BYOT implementation. As I researcher, I specifically chose an online asynchronous interview method as well as the InVivo coding method to collect and analyze my data. As stated previously, providing an option for participants to submit answers electronically and anonymously allowed teachers to develop answers carefully and thoughtfully and eliminated any potential discomfort that could have resulted from a face-to-face interview with a district level technology employee. The InVivo coding method (a method in which direct participant quotes are used and analyzed) was useful in that actual participant quotes, as written by participants, were studied.

Summary

In my effort to better understand teacher perceptions and attitudes regarding a BYOT initiative I employed a qualitative case study methodology. Data was collected through an online asynchronous interview format and teacher lesson plans, professional development plans, and school-based technology plans were reviewed to provide additional information regarding the study participants and school setting. The school studied is in the district in which I work as an Instructional Technology Specialist. To maintain ethical research standards I invited participants from a school outside of the zone in which I work and assured participants no identifying information or data would be shared with other school district employees.

Acknowledging my assumptions resulting from my professional experience at the onset of the research process allowed me to develop a data collection process in which the participants' words were captured instead of only my personal thoughts and ideas. Ethical considerations were observed throughout the research process and while study limitations were present, a qualitative methodology using a case study approach was best suited to research teacher perceptions regarding BYOT.

Chapter IV

The purpose of this research study was to examine the attitudes and perceptions of teachers being asked to carry out a Bring Your Own Technology (BYOT) initiative in a high school located in Charlotte, North Carolina. Based on the data collection and results analysis this study yielded the following findings:

- Confidence in technology ability may not be a factor regarding a teacher's willingness to integrate Bring Your Own Technology initiatives within a classroom setting.
- The personal technology use or technology experience of a teacher may not influence his or her decision to incorporate a classroom based Bring Your Own Technology initiative.
- Technology-Centered teacher-training offerings may have little influence on a teacher's decision to incorporate Bring Your Own Technology into teaching.
- In order to be deemed effective, Bring Your Own Technology professional development opportunities for teachers should be relevant to their specific content area and customized to meet the needs of adult learners.
- Participants reported that Bring Your Own Technology initiatives may increase the presence of the digital divide and as a result, create classroom management issues that outweigh possible implementation benefits.

Additionally, the following themes emerged as a result of the data analysis process and are listed below and also explained in greater detail later in the chapter.

- Feelings of teacher unpreparedness to successfully utilize BYOT
- Enhanced teaching and learning resulting from Bring Your Own Technology

- Concerns for student device security and safety
- Lack of student devices
- Disruptions to teaching and learning related to Bring Your Own Technology

Following is information regarding the research setting, additional research questions examined, the codes used to organize and analyze participant responses and research findings, and detailed information related to the emerging themes resulting from the data collection process that included both an interview and document review process. In the initial document review phase, school information was provided by school building administrators and is included in the research setting information.

Process

Using an online asynchronous interviewing technique, within a case study approach, the following four research constructs related to the integration of BYOT initiatives into classroom teaching and learning were examined:

- The teacher's individual confidence level or belief in his or her ability to teach effectively using technology;
- Beliefs and actions regarding classroom management and technology integration;
- Attitudes related to technology-centered professional development opportunities; and
- Perceived challenges and/or benefits of integrating student devices into classroom teaching and if these benefits transfer over into teaching practices.

The initial interview protocol included a total of 28 questions and 12 interview participants. A total of 312 excerpts were collected (excerpts were the answers participants gave to the interview questions). Follow-up questions (probes) (Appendix B) were asked of nine

participants that agreed to be contacted for clarification or elaboration of responses from the first round. To analyze the interview data collected during the online asynchronous process a qualitative data analysis coding method was used. During the first coding cycle I employed the InVivo method (use of direct participant quotes to preserve data accuracy) as well as a Themeing the Data coding process (organizing repeating ideas and descriptions) (Saldaña, 2009). During the second coding cycle I used a Pattern coding technique (an examination of causes and explanations for the data) (Saldaña, 2009). To assist with the coding process I used the Dedoose coding and extraction software program.

The following table provides a list of the 20 codes applied to the data based on the four research constructs of this study and the number of times each code was used (the various codes were applied a total of 478 times).

Table 3: Codes Applied to Participant Responses and Number of Times Applied

<u>Research Construct</u>	<u>Research Construct</u>	<u>Research Construct</u>	<u>Research Construct</u>
The teacher's individual confidence level or belief in his or her ability to teach effectively using technology	Beliefs and actions regarding classroom management and technology integration	Attitudes related to technology-centered professional development opportunities	Perceived challenges and/or benefits of integrating student devices into classroom teaching and if these benefits transfer over into teaching practices
Positive Thoughts Applied 35 Times	Inappropriate student use of Technology Applied 24 Times	Technology Professional Development Received Applied 5 Times	Integration of BYOT enhances teaching Applied 38 Times
Negative Thoughts Applied 48 Times	Positive Impact on Learning Applied 12 Times	No/Ineffective Technology PD Received Applied 12 Times	Integration of BYOT disrupts classroom teaching Applied 40 Times
Technologically Strong Applied 21 Times	Negative Impact on Learning Applied 3 Times	School Admin Support Applied 12 Times	Uncomfortable integrating BYOT into classroom teaching Applied 50 Times
Not Technologically Strong Applied 3 Times	Positive Impact Student Behavior Applied 18 Times	More Technology PD Needed Applied 30 Times	Device Security Concerns Applied 20 Times
Personal Technology Use Applied 50 Times	Negative Impact Student Behavior Applied 22 Times	Adult Learning Needs Addressed Applied 12 Times	Lack of Devices Applied 23 Times

Of the twelve participants studied, seven teachers indicated that at the time of the study they were integrating a Bring Your Own Technology initiative into classroom teaching learning. Teachers provided the following information when asked if incorporating Bring Your Own Technology into classroom teaching: “Yes. It provokes students to be more engaged” (Participant 6), “Yes, technology is of course hit or miss at times but students enjoy engaging

with technology and it helps them build helpful skills like researching, creating presentations, and writing papers” (Participant 7), “I have limited access and a majority of students who do not have the technology to use in the classroom. Also, the classroom I am in does not have a mobile hotspot for them to access, if they do have a device” (Participant 9).

The following table provides a complete participant breakdown.

Table 4: Self-Report of Participants Integrating Bring Your Own Technology

Participant	Self-Report of Participants Integrating Bring Your Own Technology
Participant 1	Yes
Participant 2	No
Participant 3	Yes
Participant 4	Yes
Participant 5	Yes
Participant 6	Yes
Participant 7	Yes
Participant 8	Yes
Participant 9	No
Participant 10	No
Participant 11	No
Participant 12	No

As a result of the research conducted, five findings are presented below.

Confidence in technology ability may not be a factor regarding a teacher's willingness to integrate Bring Your Own Technology initiatives within a classroom setting

Interview questions were asked to better understand each participant's self-perceived level of confidence related to technology and to determine if an individual's technology ability encouraged or discouraged incorporating BYOT in the classroom. Interview participants were asked to reflect back on their initial reaction to the news that their school was going to be a BYOT site. Out of the 12 participants interviewed, five teachers recalled feelings of excitement and positivity regarding the integration of BYOT in their school setting while four teachers expressed concerns, and finally three teachers expressed both positive feelings as well as initial concerns. The participant reactions are outlined below.

Table 5: Self-Report of Initial Participant Reactions After Being Informed Their School Would Become a Bring Your Own Technology Site

Participant	Initial Reaction
Participant 1	"Excited...especially because the students could TEACH me something new."
Participant 2	"I felt like managing cell-phones in the classroom (the appropriate use of them) would be a nightmare -making sure students were actually using cell-phones for proper use."
Participant 3	"I was concerned because these students don't always use it appropriately. This would mean that I would have to be more vigilant while in the classroom."
Participant 4	"My initial reaction was excitement and the challenge about how I could implement the process into the curriculum."

Participant	Initial Reaction
Participant 5	"Hesitant / skeptical / interested to learn more."
Participant 6	"I thought great, now maybe I can integrate more student research into lessons instead of me gathering all the information, I could let students gather information or find contradictory arguments to inform their opinions."
Participant 7	"In favor"
Participant 8	"Very excited for both our students and our district to be able to benefit from tech in school."
Participant 9	"I like the idea, but know that some of my students will not have access to BYOT because of financial limitations."
Participant 10	"Confused, because I did not really know what BYOT was and what it entailed."
Participant 11	" I like the idea because technology use is so ingrained in the daily lives of our students. Iterating the currently used technology into daily lessons should keep students interested in what is going on in the classroom. The issue I have is with many students not having technology to bring and being left out or worse, trying to steal what other students have."
Participant 12	"Excited!"

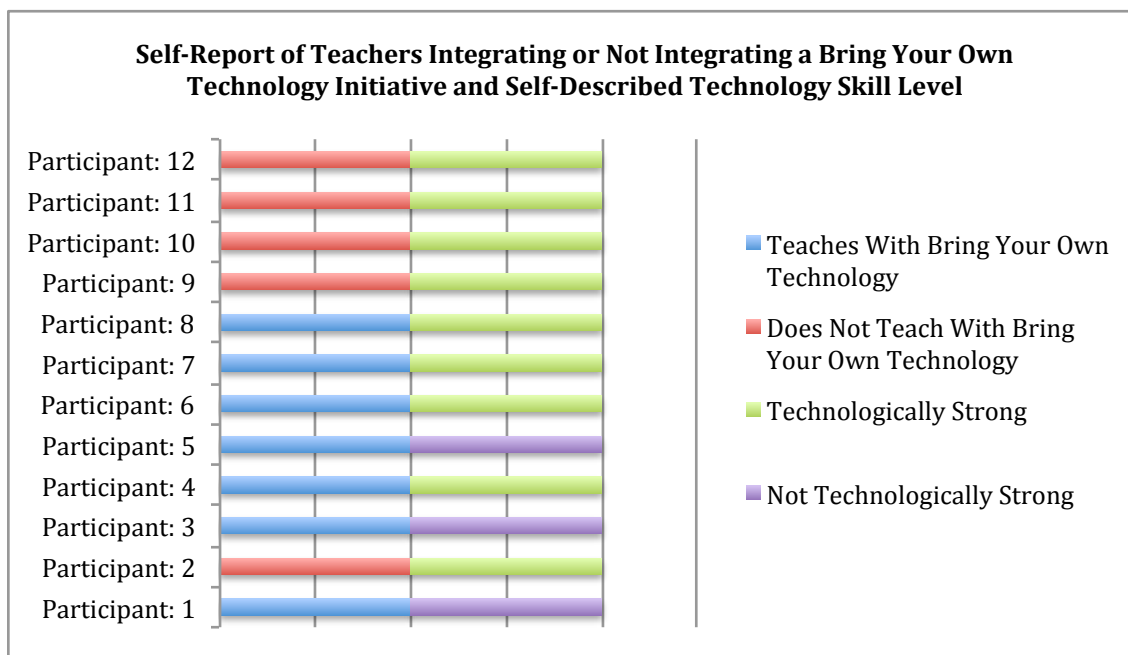
Teachers were also asked to indicate their self-assessed technology skill level to examine whether or not teachers who believed they were technologically strong were more inclined to incorporate BYOT into the classroom. A total of three teachers indicated they would not rate themselves as technologically strong and these participants stated the following: "I'm not" (Participant 3), "Overall I don't consider myself technologically strong" (Participant 5).

On a scale of 1 to 10, I classify myself at about a 4.5. There is so much more I would like to know...Oh yes, I text, but I don't listen to music on my phone, tweet, blog, or

even *Facebook*, that's it, basically I use the camera, no phone internet...it's too small, and I have a tablet that I use more often. (Participant 1)

Teachers rating themselves as technologically strong indicated the following: “On a scale of 1-10, I am about an eight” (Participant 7), “I like exploring and learning new technologies and pick them up fairly quickly” (Participant 8), “I am one of three people in my department who is fairly comfortable with using computers and learning new skills” (Participant 9). While three teachers indicated they believed they were not technologically strong, all three were integrating BYOT into their classroom teaching strategies. Conversely, all five participants not integrating BYOT in their classrooms rated themselves as technologically strong. The below chart outlines the integration of BYOT in the classroom of each participant as well as the participant’s self-assessed technology skill level and indicates a teacher’s self-described technology skill level may not play a role in the decision to incorporate a BYOT initiative into classroom teaching.

Chart 1: Self-Report of Teachers Integrating or not Integrating Bring Your Own Technology and Skill Level

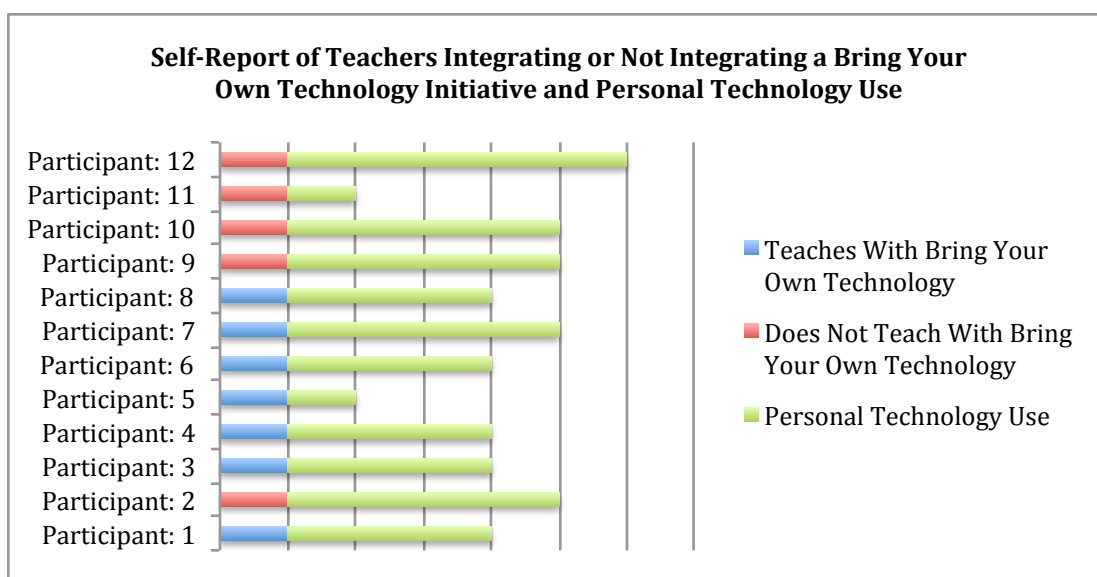


The personal technology use or technology experience of a teacher may not influence his or her decision to incorporate a classroom based Bring Your Own Technology initiative

Interviewees were asked to describe the ways in which technology was being used in their personal lives to determine if teachers using technology personally were more or less inclined to integrate the use of technology in a classroom setting. All interview participants indicated they were using technology in their personal lives. Teachers reported the following information, “I use technology as a communication device, money management, and information literacy” (Participant 4), “*Facebook*, online classes, emails, *Google Voice*” (Participant 7). Teachers not integrating BYOT described their personal technology use as follows: “iPhone 4S for everything, MacBook Pro for anything my iPhone does not do (Emails, text messages, phone calls, *Skype*, grade-books, etc.)” (Participant 2), “smart phone for email, texting, learning to

tweet, tablet for reading and social interactions” (Participant 9), “fully connected with my smart phone” (Participant 11), and “email, text, *Skype*, music, movies” (Participant 12). The below chart illustrates personal technology use and BYOT integration; Participant 2, Participant 9, Participant 10, and Participant 12 all stated high levels of personal technology use and are not integrating BYOT into the classroom.

Chart 2: Self-Report of Teachers Integrating or Not Integrating Bring Your Own Technology and Personal Technology Use

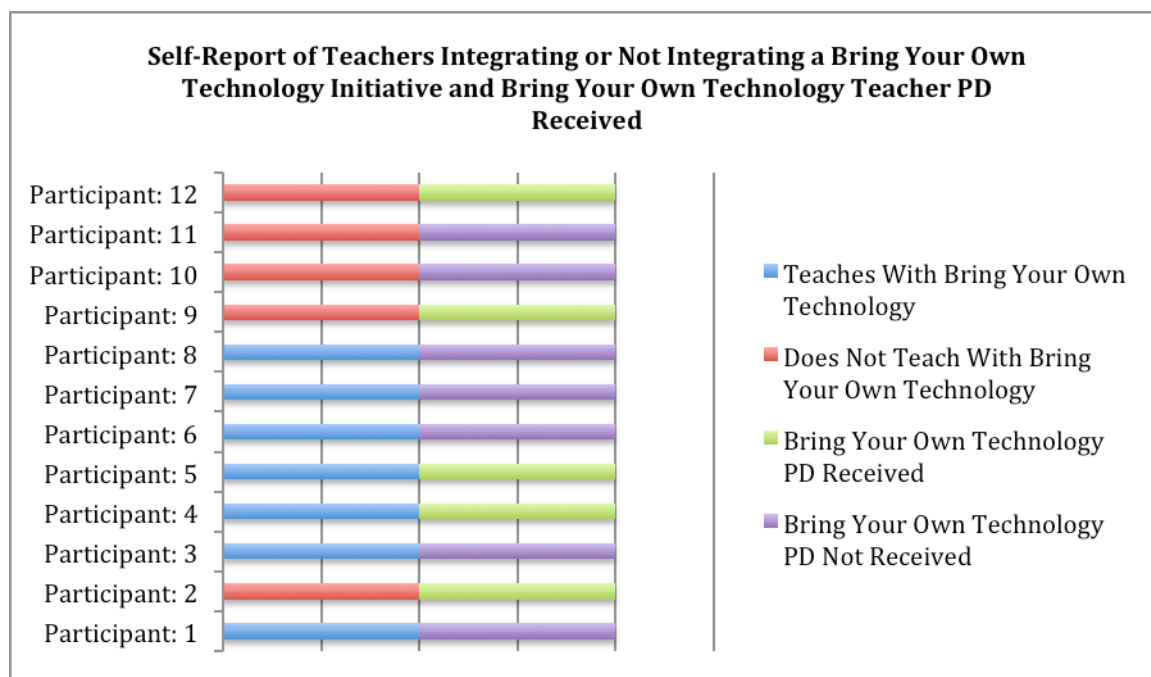


Technology-Centered teacher-training offerings may have little influence on a teacher’s decision to incorporate Bring Your Own Technology into teaching

Interview questions designed around examining what, if any, role professional development opportunities played in teachers’ willingness to incorporate the use of personal student devices through a BYOT program into classroom teaching yielded mixed results. When asked about receiving training related to learning how to implement or teach with BYOT participants stated the following: “Very little training. I was part of a demonstration that used a

QR scanner to check polls, but other than that, very little training” (Participant 2), “I have not had any” (Participant 3), “I have not received any formal training” (Participant 6), “None” (Participant 7), “We had a brief intro at a schoolwork staff meeting and I attended a few district meetings. Didn't learn much from either, it has been mostly trial and error” (Participant 8), “None, I just recently learned what BYOT is” (Participant 10). Participant 2, Participant 9, and Participant 12 all stated BYOT training had been received but do not incorporate BYOT into classroom teaching while Participant 8 attended meetings but did not feel the meetings were actual training sessions or useful for implementing BYOT and Participant 1, Participant 3, Participant 6, and Participant 7, all stated they did not attend training; however, these teachers integrate BYOT into their classroom settings. A graphic illustration is below.

Chart 3: Self-Report of Teachers Integrating or Not Integrating a Bring Your Own Technology Initiative and Training Attendance



Interviewees were asked whether or not technology-centered professional development

had impacted their decision to integrate BYOT into classroom teaching and learning.

Specifically participants were asked “How do the professional development opportunities you receive influence your decision to use BYOT in the classroom?” The following responses were received: “No real influence thus far” (Participant 2), “They don't” (Participant 3), “PD is limited it hasn't influenced my decision” (Participant 5), “I have not had any professional development specifically about BYOT” (Participant 6), “Haven't received much PD on the tech front so N/A” (Participant 8), “They have not” (Participant 11).

In order to be deemed effective, Bring Your Own Technology professional development opportunities for teachers should be relevant to their specific content area and customized to meet the needs of adult learners

Situated learning theory (Lave & Wenger, 1991) suggests that learning take place in social settings, amongst peers. Additionally, situated learning theory asserts meaningful learning takes place when skills are taught and learned within the context they will be used, not in isolation. Participants described BYOT learning opportunities to be most useful when peers were involved and training was specific to their individual classroom environments. When asked about professional development or training sessions needed to better assist with BYOT integration, participants provided the following responses. “I need specific ideas for a World Language class” (Participant 5). “Training teachers with specific strategies they can implement; we often get told too much at once” (Participant 8), “I feel that they need to have professional development that goes over what it is, why we have it, and some different ways to use it in classrooms. I did not even know what BYOT was, I had to ask another teacher” (Participant 10).

I would like a GOOD one on one session to make sure that I can work with what I have.

Then, I would like to see something done specific to my curriculum... possibly sharing

strategies, lesson plans... I think I am creative enough to springboard into ideas... if I could see something done, read something that my peers are doing... I need a jumpstart.

(Participant 1)

Participants reported that Bring Your Own Technology initiatives may increase the presence of the digital divide and as a result, create classroom management issues that outweigh possible implementation benefits

Many school districts implementing BYOT initiatives do so with the intent of providing technology access to all students and are encouraging one-to-one student to computer environments (Stager, 2011). However, participants in this study stated the implementation of BYOT has resulted in classroom management issues attributed to a lack of devices. “My biggest holdup is that the majority of students do not have smartphones. Those that do often don't want to share. Either that or they want to show it off and students with no phone feel bad” (Participant 5).

I like the idea of BYOT, but do not like the possibility of the "haves" and "have-nots" being made to feel different. Students are very judgmental already in school and BYOT just gives the students another way to make a separation between each other in class. (Participant 9)

Emerging Themes

Through a themeing the data coding process (organizing repeating ideas and descriptions) (Saldaña, 2009) the following themes were evident as a result of participant responses.

Feelings of Teacher Unpreparedness to Successfully Use Bring Your Own Technology

Teachers expressed the following regarding personal feelings related to preparedness and teaching with BYOT:

I don't know what to do and how to do it; am I supposed to know how to do it? It did not come with a class book, strategies for technical use... I think I was just supposed to know. I think that those teachers that are in their first or second year have learned how to do this better than those of us who have been in the classroom for some time. It takes a while to adjust to teaching this way. Professional development is lacking and if should be done, it needs to be specific to the curriculum. (Participant 1)

"I am a new teacher and am trying to take small steps into the integration of BYOT into my classroom. It is a new concept to me" (Participant 2), "I don't know how to grade and return digital work (should I print it or leave it as a digital copy)" (Participant 8), "I don't know how to approach the idea of some students who have and those who do not" (Participant 9).

Enhanced Teaching and Learning Resulting From Bring Your Own Technology

Teachers described their perceptions regarding how incorporating BYOT into classroom teaching and learning enhances teaching. "BYOT can be used to show immediate results (voting, graphs, polls, quiz scores, etc)" (Participant 2), "BYOT enhances teaching by preparing our students with 21st Century Skills that are essential in an Information Society" (Participant 4).

It allows students to be independent and feel successful with immediate feedback and support with online assessments. They have fun engaging with digital content and creating media for assignments (last week I was told "class goes by so fast when we do stuff like this, we should do it every day!") and makes management (since they enjoy it) and grading easier for me with digital copies of their work. Also helps decrease the number of copies made. (Participant 8)

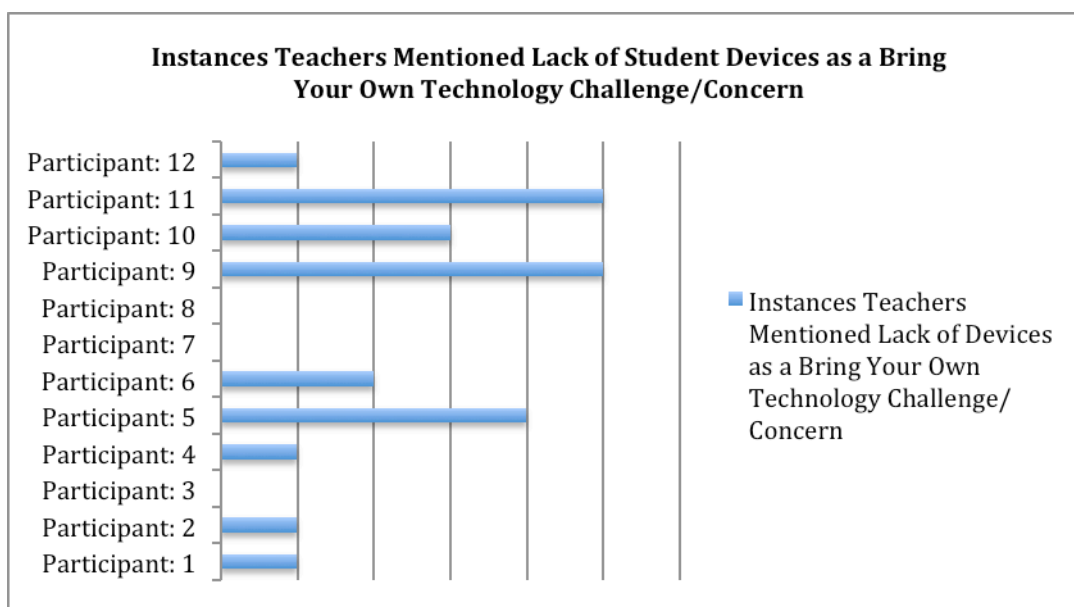
Concerns for Student Device Security and Safety

Teachers described concerns for the security and safety of student devices despite the fact that the school being studied has guidelines in place that clearly state neither the school nor school district will be held responsible or liable for the loss or theft of student devices (Charlotte-Mecklenburg Schools, 2013). Participants stated, “You have to worry about theft” (Participant 3), “Security precautions are important. Students must be very responsible for their devices” (Participant 4), “The thought of a student having their technology break or get damaged in school is concerning as well” (Participant 10), “I have to make sure items do not get stolen” (Participant 11).

Lack of Student Devices

Participants were not asked any specific questions during the interview process regarding lack of student devices; however, all but three teachers mentioned lack of devices as a concern. The chart below outlines this information.

Chart 4: Lack of Devices Mentioned as a Concern



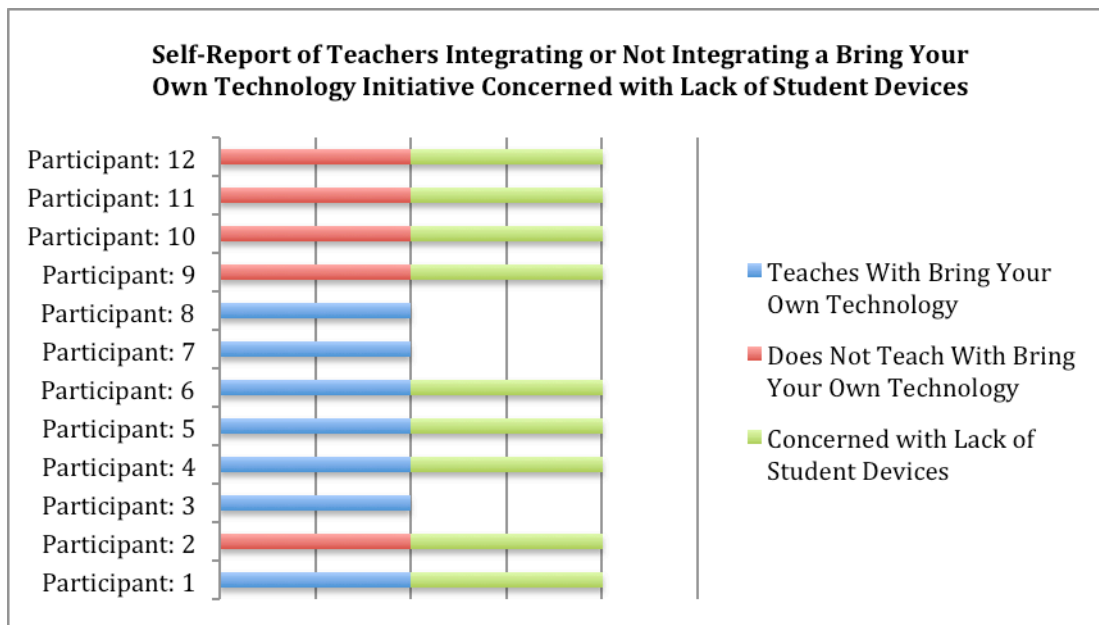
Participants provided the following thoughts regarding the lack of student devices. “I teach in a Title I school and the challenge is affordability for some of our students at a personal level and accessibility to technology ” (Participant 4), “I have limited access and a majority of students who do not have the technology to use in the classroom” (Participant 9), “I cannot implement BYOT if my students do not have any real technology to bring that will work” (Participant 10).

Lack of devices makes me uncomfortable! Even I don't have a smartphone. I don't think it's fair that a Title 1 school should be encouraging its students to buy expensive devices so that they can use them in class. I know technology is important, but I don't think BYOT will be the deciding factor in their future success. (Participant 5)

I feel that BYOT is a neat concept, but it does not work out at the school I'm teaching at. I have students who lights are being turned off and who do not have enough food to eat when they get home, most of them do not have the money to buy technology outside of a smartphone, if that. It is not practical to have it out at our school, because all it does is open the door for more discipline problems verses simply not having it in place. (Participant 10)

Three teachers did not mention lack of devices as a concern and all three teachers are currently integrating BYOT into classroom teaching and learning as outlined below.

Chart 5: Self-Report of Teachers Integrating or Not Integrating Bring Your Own Technology and Lack of devices Mentioned as a Concern



Disruptions to Teaching and Learning and Bring Your Own Technology

Teachers expressed concerns regarding disruptions to teaching and learning resulting from a BYOT implementation. Interviewees shared the following thoughts. “It allows the student to focus more on the classwork, however, you do need to monitor students because EVERYTHING is at the student's fingertips. They can get off track very quickly” (Participant 1), “I think BYOT causes consistency problems for students from classroom to classroom, as some teachers do not utilize BYOT, and some do” (Participant 2), “It makes it so they have to be monitored more because they can take inappropriate pictures in class and post them on sites” (Participant 3), “Students do more texting and listening to music, it is harder to get their attention or to explain instructions, hardly ever is everyone hearing you the first time” (Participant 6), “Students often want to use the devices when they are not supposed to or for other activities” (Participant 11), “Off site usage, watching movies, listening to music, not following directions to

put away when it is not needed” (Participant 12). While teachers above mentioned the use of BYOT as a disruption to teaching and learning, other participants shared the following thoughts regarding increased levels of student engagement and BYOT. “Classroom behavior issues are minimized when students are engaged” (Participant 4), “When implemented right (with an ordered procedure), it can increase student engagement and improve behavior” (Participant 5), “Most students increase engagement, interest and output with the content. Some get more off task with access to the Internet and few are frustrated about using technology” (Participant 8), “Students seem to be more engaged in the lesson during this time” (Participant 11). The intent of the study was to use a case study approach to interview teachers regarding the implementation of a Bring Your Own Technology initiative into classroom teaching and learning within one high school setting.

Second Document Review

An initial document review was conducted to ascertain school-wide information regarding BYOT policies and expectations as described previously in this chapter. Through the interview process participants were asked to share their perceptions regarding the benefits and/or challenges associated with a BYOT initiative. Additionally, nine teachers participated in a lesson plan document review phase that allowed me to determine if teacher perceptions of BYOT benefits and challenges transferred over to their teaching practices. Interviewees mentioned the manner in which personal student devices were being used in the classroom by stating the following: “I use BYOT at least three times per week for each class” (Participant 1), “I have students research online, accessing particular web resources or apps, creating and submitting assignments using *Gaggle*, creating presentations/ videos/concept maps, accessing resources I upload to my wiki, and taking assessments” (Participant 8).

I have used it for independent research of information, fact checking by students, or as a way for students to find out more about a topic I have only a small amount of time to cover in class. I give them (and show them) where to find additional information about the topic. (Participant 6)

Despite the fact that teachers are actually integrating BYOT into their classrooms, of the nine participants involved in the document review no mention or evidence of Bring Your Own Technology use was included in teacher lesson plans.

Summary

This chapter presented five findings yielded from this study as well five themes resulting from the additional research constructs examined. An initial document review provided information specifically related to the school climate and population. This review also provided information regarding students as well as staff demographics and teacher turnover rates. Data provided from an online asynchronous interview process revealed teacher perceptions related to the integration of BYOT within classroom teaching and learning. Aligned with a qualitative research process, participant quotes were used to formulate findings and were included in this document. The use of direct quotes allowed findings to organically develop and emerge from a foundation based on what participants actually said. Finally, conducting a second document review of teacher lesson plans provided an examination regarding whether or not teachers actually incorporating a BYOT initiative included this teaching and learning component when developing lesson plans and provided information regarding the school-based policies and procedures regarding a BYOT initiative. The findings of this study: confidence in technology ability may not be a factor regarding a teacher's willingness to integrate Bring Your Own Technology initiatives within a classroom setting; the personal technology use or technology

experience of a teacher may not influence his or her decision to incorporate a classroom based Bring Your Own Technology initiative; Technology-Centered teacher-training offerings may have little influence on a teacher's decision to incorporate Bring Your Own Technology into teaching; in order to be deemed effective, Bring Your Own Technology professional development opportunities for teachers should be relevant to their specific content area and customized to meet the needs of adult learners; and participants reported that Bring Your Own Technology initiatives may increase the presence of the digital divide and as a result, create classroom management issues that outweigh possible implementation benefits provide a framework for understanding teacher perceptions regarding a BYOT initiative. While analyzing data, feelings of teacher unpreparedness to successfully utilize Bring Your Own Technology, enhanced teaching and learning resulting from Bring Your Own Technology, teacher concerns for student device security and safety, issues related to a lack of student devices, and disruptions to teaching and learning resulting from BYOT initiatives emerged as recurring themes. A discussion of the above findings and themes as well as implications and recommendations for future research is warranted.

Chapter V Discussion and Recommendations

The purpose of this case study was to examine teacher perceptions regarding a school-based Bring Your Own Technology (BYOT) program initiative. The study was framed around the following four research constructs:

- The teacher's individual confidence level or belief in his or her ability to teach effectively using technology;
- Beliefs and actions regarding classroom management and technology integration;
- Attitudes related to technology-centered professional development opportunities; and
- Perceived challenges and/or benefits of integrating student devices into classroom teaching and if these benefits transfer over into teaching practices.

Participants in this study included 12 teachers all teaching within the same high school. The site studied was one case, out of 25 school sites or cases that had been integrating BYOT in Charlotte-Mecklenburg Schools for at least one academic year. Participants were asked to reflect back on their initial thoughts regarding a BYOT initiative as well as provide information regarding their current attitudes and integration practices. I conducted qualitative data collection via online asynchronous interviews of 12 participants as well as document reviews in which nine teachers as well as the school building principal participated.

The data I collected from this research revealed the following findings: confidence in technology ability may not be a factor regarding a teacher's willingness to integrate BYOT initiatives within a classroom setting; the personal technology use or technology experience of a teacher may not influence his or her decision to incorporate a classroom based BYOT initiative; technology-centered teacher-training offerings may have little influence on a teacher's decision

to incorporate BYOT into teaching; in order to be deemed effective, BYOT professional development opportunities for teachers should be relevant to their specific content area and customized to meet the needs of adult learners; and finally participants reported that BYOT initiatives may increase the presence of the digital divide and as a result, create classroom management issues that outweigh possible implementation benefits. Through data coding and analysis, five related themes emerged. Teachers described feelings of unpreparedness to successfully utilize BYOT in a classroom setting as well as perceptions regarding enhanced teaching and learning resulting from BYOT. Teachers also expressed concerns for student device security and safety, issues related to a lack of student devices, and disruptions to teaching and learning possibly caused by a BYOT program initiative. The purpose of this chapter is to provide an interpretation and discussion of the study findings as well as examine their relationships to my guiding research constructs. An overview of study limitations and ethical considerations is also presented. Finally, recommendations based on this study and possible future research resulting from the implications of this case study are also provided.

Data Analysis Ethical Considerations

Researchers must pay close attention to the accuracy and trustworthiness of data analysis and research findings (Mertens, 2010). To that end, the following areas were examined: Reliability (interview questions were developed based on the standards outlined in the Florida Integration Technology Matrix). Also, multiple rounds of coding both manual and computer assisted through the use of the Dedoose software program were conducted to ensure coding schemes and thematic categories were consistent. Validity or credibility was considered and member checking was not required for this study as only respondents' direct quotes were restated and analyzed as I employed an InVivo approach. The concept of believability was imperative in

this study and the results reported by participants were submitted using an online interview protocol (participants could access the interview questions only by logging into their personal email accounts and all results reported and analyzed while interpreted by the researcher, were the statements as written by participants). Finally, the notion of applicability was addressed. Creswell (2008) posits the purpose of qualitative research is not to be generalizable and apply findings to the greater population but to provide study findings that may be used for populations in similar cases.

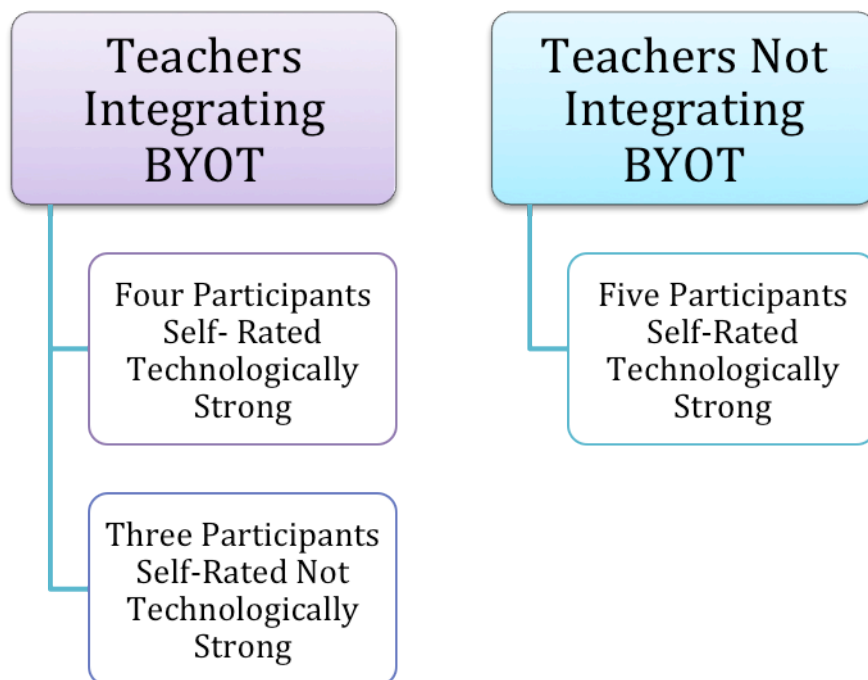
Discussion

Construct 1: The teacher's individual confidence level or belief in his or her ability to teach effectively using technology

The attribution theory states when learners believe they have the personal skills to successfully learn new tasks or skills the possibility of success increases and when learners do not believe in their personal ability to learn something new or the learner feels the mastery of a new skill is out of his or her control the probability of success lessens (Weiner, 2008). Adult learners need to feel confident in their abilities to succeed and that confidence may be derived internally (based on personal belief) or externally (based on positive instructor feedback received from a class or professional development setting). With this theory in mind, my assumption as a researcher was that those teachers who were using technology personally and considered themselves to be technologically strong would be the same teachers currently integrating BYOT into classroom teaching and those teachers who did not believe they were technologically strong would not incorporate BYOT into classroom teaching. However, the research data revealed a teacher's confidence in his or her technology ability may not be a factor in his or her willingness to integrate BYOT into classroom teaching. As reported in the previous chapter, out of the 12

participants interviewed only three teachers rated themselves as “not-technologically strong” but all three were integrating BYOT while all of the teachers not integrating BYOT rated themselves as technologically strong.

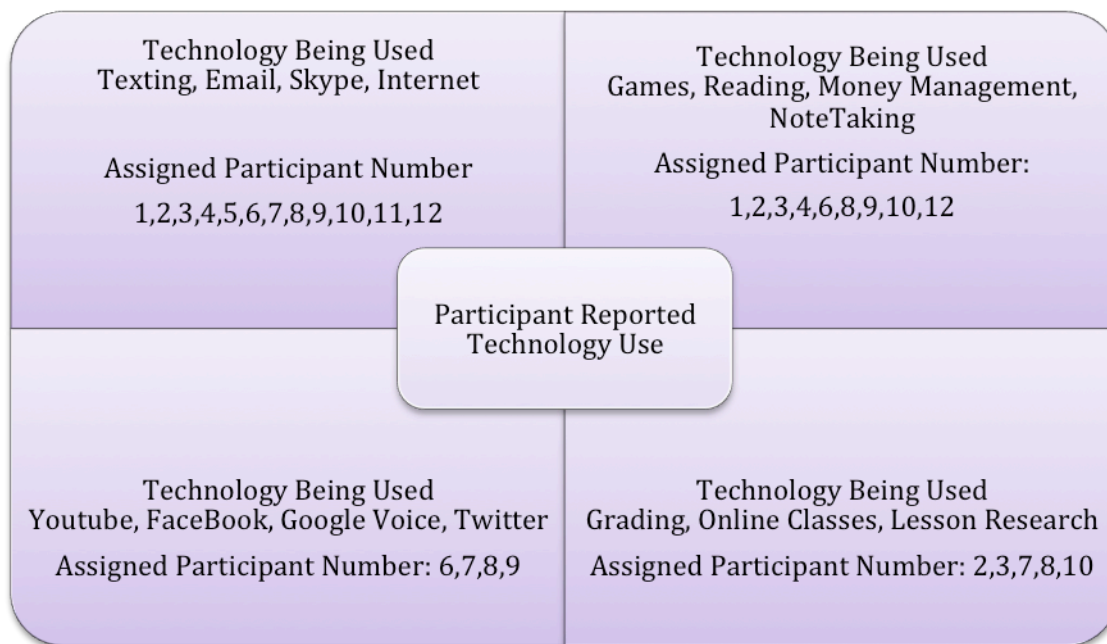
Illustration 1: BYOT Integration and Technology Rating



The question for consideration is why teachers who rate themselves as technologically strong are not incorporating BYOT into classroom teaching while teachers who do not consider themselves to be technologically strong are? One possible explanation could be that although teachers rated themselves as technologically strong they may have confidence in their abilities to use technology personally but not while teaching. If a teacher feels comfortable using a computer or Smartphone to check email, use *PowerPoint*, or video-chat on *Skype*, this personal use may not translate into confidence in teaching with technology. Despite using technology, the teacher may be unaware of how to integrate technology used personally into classroom teaching. The data from this study revealed while all 12 participants stated they used technology in their

personal and professional lives (as communication tools, for grading papers, and conducting lesson research) this use seemingly did not have an impact on the decision to integrate BYOT into classroom teaching.

Illustration 2: Reported Participant Technology Use



The above findings are aligned with literature outlining the technology use of teachers. Responses from the *Teachers Talk Tech* survey conducted by CDW-G in 2006 indicated that 88% of teachers reported using technology for administrative tasks, while 86% reported using technology for communication tasks (Ertmer & Ottenbreit-Leftwich, 2009). It was also reported that 93% of teachers responding to the *Speak Up* 2007 survey indicated using technology to communicate with colleagues and parents. Regarding teaching with technology, using a device does not necessarily translate into the ability to successfully teach with technology.

However, simply knowing how to use a piece of hardware (e.g., digital camera) or a

specific software application (e.g., presentation tool, social networking site) isn't enough to enable teachers to use the technology effectively in the classroom. In fact, if this were true, there'd be little, if any, gap between teachers' personal and instructional uses of technology. But knowing how to use the tools is only the foundation.

(Ertmer& Ottenbreit-Leftwich, 2009, p. 4)

While all teachers reported using technology and teachers not integrating BYOT into classroom teaching were those who rated themselves as technologically strong other variables may have had an impact on the decision to teach with technology. As stated, teaching with technology is more than simply knowing how to use technology and believing that one's ability to use technology is strong. In order for effective technology integration to occur, teachers need to determine which technology tools are appropriate for meeting specific curriculum goals. Additionally, teachers should determine how using specific technology tools will help students meet educational goals, consider how the use of technology will be included in all phases of the learning process, and consider the ways in which teaching with technology will enhance their professional growth and practice.

Despite self-reporting as technologically strong, teachers in this study not integrating BYOT may have made this decision due to the lack of available planning time to determine which technologies best meet specific curriculum standards. Participants may have also decided to concentrate on teaching material directly aligned with state mandated testing instead of implementing a new initiative, while other teachers, despite feeling comfortable using and perhaps even teaching with technology, may not have been comfortable or confident in their students' ability to use BYOT as designated. Teachers may fear that students will use devices to text or take videos during class and post them on *YouTube* instead of using devices for

educational purposes (Pascopella, 2009). The concern regarding appropriate classroom management and BYOT may be a larger determining factor than teacher confidence or personal technology use when a teacher decides whether or not to integrate BYOT. If a teacher does not believe he or she is technologically strong but feels the students being taught will follow classroom guidelines and stay on task as it relates to technology, he or she may be more inclined to incorporate BYOT into classroom teaching and learning. While teachers who believe (despite the fact that they are technologically strong) the students they teach will get off task and use technology inappropriately may be less inclined to teach with technology. This consideration is examined in more detail below.

Construct 2: Beliefs and actions regarding classroom management and technology integration

Using student devices in a classroom setting can possibly hinder student learning, serve as distractions, and lead to classroom management issues. If students are using personal mobile devices during classroom instruction they also have constant access to social media outlets such as *Facebook*, *Twitter*, or *Instagram*. The availability of social media resources could potentially serve as distractions to student learning (Lodge, 2013). Teachers must compete with technological sources of student entertainment and as a result, ensure that lessons incorporating the use of BYOT are comprehensive enough to keep students focused on classwork.

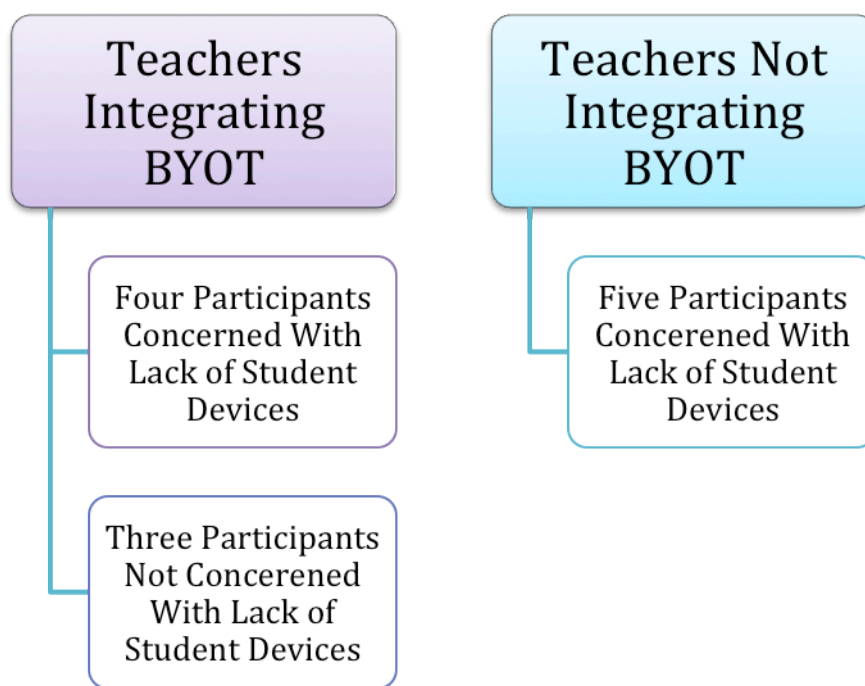
To combat the above issue a participant of this study currently integrating BYOT into classroom teaching stated, “Technology is only used with permission” (Participant 7). Along the same lines of providing specific guidelines for student technology use in an effort to avoid classroom discipline issues, a high school in year two of a BYOT implementation described the use of color-coded signs to illustrate technology use zones which alert students to permissible

technology use as well as possible consequences for not adhering to school guidelines. In this setting, green zones indicate open technology use, blue zones indicate use of technology only for the purpose of classroom teaching and learning, yellow zones indicate devices must be silenced and out of sight, and red zones indicate devices are not permitted for any reasons as is the case during high-stakes testing (Flanigan, 2013).

In addition to student devices distracting students, teachers participating in this study also mentioned the lack of student devices and the digital divide as a classroom management issue. Study participants stated not having enough student devices as well as the unwillingness of most students to share devices often resulted in off-task behavior for students without devices. Teachers in this study work in a Title I school in which many students do not have access to personal technology devices. Students have access to school devices, however; at the time of this research study, there were not enough school-owned devices available for every student without a personal device to use.

Of the seven participants integrating BYOT, four participants expressed concerns related to lack of devices while three participants integrating BYOT were not concerned with a lack of student devices. However, of the five participants interviewed not integrating BYOT, all five reported concerns with the lack of student devices and one participant reported the following: “Students lack of available technology makes me too uncomfortable to integrate BYOT into classroom teaching” (Participant 12). The following illustration outlines this concern.

Illustration 3: BYOT Integration and Lack of Student Device Concerns



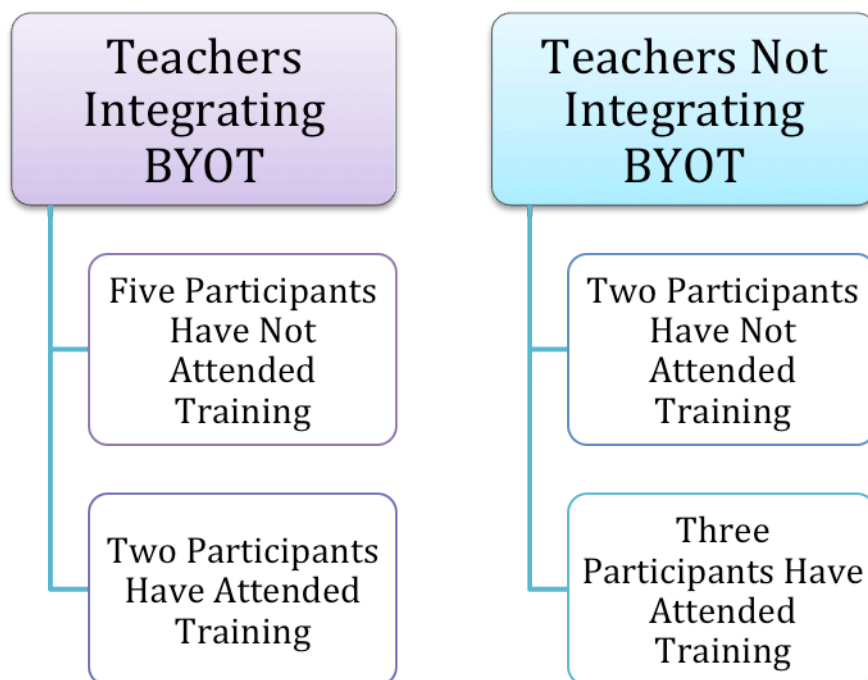
Teachers have also stated the lack of student devices increases the potential for traditional bullying as well as cyber-bullying. If some students have mobile devices while others do not or some students have older, out of date devices, students may be bullied as a result. The digital divide has been compared to the issues some students experience in non-uniform schools. If students are permitted to wear their own clothes to school some students from higher income families may have newer, more expensive clothing while students from lower income families may not. This is not always the case; however, to prevent bullying based on this discrepancy some schools have opted for a school uniform policy requiring all students to wear the same approved clothing only (Roberts, 2013). Allowing students to bring in whatever personal device they choose may result in similar inequities. A participant in this study expressed a similar concern by stating “it is a challenge for me because students that don’t have phones feel bad” (Participant 5). While concerns regarding classroom management and discipline issues may

influence a teacher's decision to integrate BYOT into classroom teaching and learning, technology-centered professional development may also impact this decision.

Construct 3: Attitudes related to technology-centered professional development opportunities

One of the findings resulting from this study indicated that attending technology-centered professional development opportunities actually had little impact on a teacher's decision to teach with BYOT. Of the 12 participants interviewed, seven were integrating BYOT into classroom teaching; however, only two of those seven teachers attended BYOT focused training. Of the five participants not integrating BYOT into classroom teaching, three of the five had actually attended BYOT focused training. An illustration outlining the above information follows.

Illustration 4: BYOT Integration and PD Received



Why would teachers that have attended training designed to assist with teaching with technology choose not to integrate BYOT while most teachers that are actually integrating BYOT have not attended training? One explanation could be the training received did not effectively meet the needs of the participants. If teachers attended sessions with the hopes of learning how to better teach with technology but felt this goal was not accomplished and their specific learning needs went unmet in the training sessions, participants may have still believed they were unprepared to integrate BYOT into classroom teaching. An idea that school-leaders need to fix teachers by providing professional development results in top down decision-making and a lack of teacher ownership in the professional development process. Universal applications of classroom practices without consideration of student age or content area, the lack of variety in professional development delivery methods, and little support in assisting teachers with transferring knowledge learned from professional development sessions into classroom teaching are stumbling blocks in the way teacher professional development opportunities are currently designed and may enhance teachers feelings of unpreparedness to teach with technology (Diaz-Maggioli, 2004).

As outlined in the previous chapter, participants in this study that attended training believed the sessions were not relevant to their specific classroom needs and concerns. This would align with the responses received when teachers said they were provided with information related to techniques of integrating BYOT but received no actual classroom application strategies or effective methods to transfer knowledge from professional development sessions to classroom teaching. Participants also indicated a top-down approach was employed as district personnel developed training rather than allowing teachers to customize training. Participants indicated the need for additional and modified training by stating, “We need for teachers to be equipped with

the knowledge for effective usage in creative and productive ways” (Participant 4). “We need more sessions to introduce specific possibilities” (Participant 9).

As stated previously, regarding the most effective professional development design, the following results from a national survey in which 1027 science and math teachers participated indicated PD was rated most effective when it:

- a) was sustained and intensive rather than short-term,
- b) was focused on academic subject matter with links to standards of learning,
- c) provided teachers opportunities for active learning,
- d) afforded opportunities for teachers to engage in leadership roles,
- e) involved the collective participation of groups of teachers from the same school, and was meaningfully integrated into the daily life of school. (Garet et al., 2001, as cited in Torff and Sessions, 2008, p. 124)

The principles of andragogy state the following: adults should be involved in planning professional development opportunities, adults are most interested in learning material that has an immediate relevance to their job or personal lives, experience should serve as the foundation for learning, and adult learning should be problem not content oriented (Culatta, 2013).

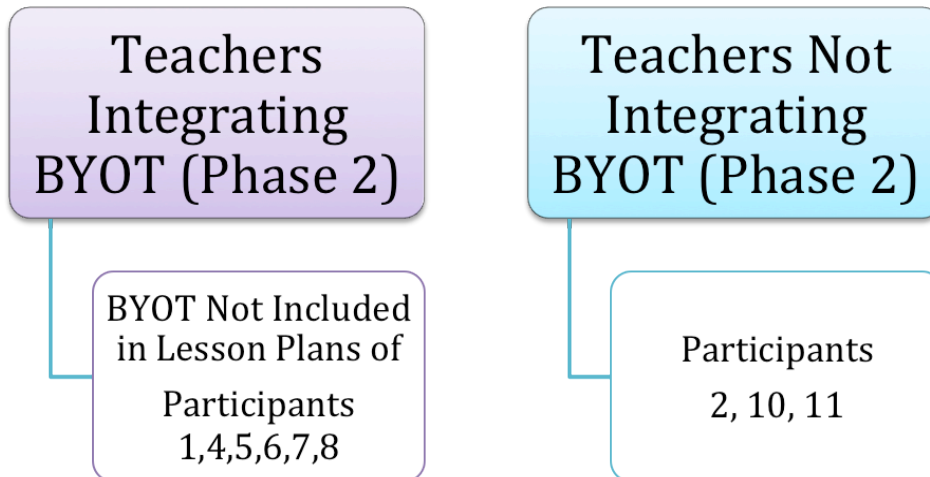
According to the participants in this study the professional development opportunities offered were not developed with the specific needs of adult learners in mind and as a result the BYOT training had little influence on a teacher’s decision to teach with technology.

Construct 4: Perceived challenges and/or benefits of integrating student devices into classroom teaching and if these benefits transfer over into teaching practices

After the initial interview, participants were asked if they would be willing to participate in a follow-up interview and a document review. Two document reviews were conducted as part

of this study; one in which school administrators provided school-based technology plans, BYOT policies, and school demographic information and one in which teachers were asked to submit lesson plans. The purpose for the review of lesson plans was to determine how many teachers included the use of BYOT as part of their structured plans. While seven participants stated they were currently integrating BYOT it was unclear to what degree or what level of classroom integration was actually occurring. A review of teacher plans could better explain classroom application. Of the 12 study participants, nine agreed to participate in follow-up interviews and the document review phase (possible explanations regarding why three teachers chose not to participate follows later in this chapter). Teachers at this school submit lesson plans electronically and were able to email their plans to me (the teachers that agreed to participate in this phase previously revealed their identity by providing me with their email addresses). Teachers were asked to submit lesson plans for the previous and current week for review. After reviewing lesson plans for nine participants it was revealed that none of these teachers included or indicated the use of technology in their lesson plans. Out of the nine phase two participants, six reported they were integrating BYOT but did not indicate this in their planning (BYOT would obviously not be included in the plans of the three participants that stated they were not teaching with BYOT). An illustration is below.

Illustration 5: BYOT Integration Phase 2 and Lesson Plan Review



Teachers participating in this study outlined the challenges with integrating BYOT mentioned previously in this chapter (lack of devices and classroom management issues). However, participants also expressed a belief that the integration of BYOT into classroom teaching had a positive impact on learning as well. Participants reported the following: “It definitely enhances student engagement. They certainly love their phones” (Participant 5). “BYOT can make the lessons more fun and interesting for the students” (Participant 11). If teachers are integrating BYOT into classroom teaching and learning and are able to see the value and student benefit of doing so, what is the reason teachers did not include BYOT in their lesson plans? One possibility could be teachers incorporating BYOT believe the use of technology in the classroom is simply a matter of using a different tool to teach the same content. When teachers develop lesson plans, they do not indicate that students will use a pen and a piece of paper to complete an assignment, as these items are simply tools. Similarly, some teachers may believe including a technology tool in a lesson plan is unnecessary. Additionally, teachers are not planning to teach an actual technology lesson. They are teaching the content within their curriculum area (which was outlined in the lesson plans submitted) while using technology as a resource. The integration of technology into classroom teaching and learning is achieved by

using technology as an instrument or resource to teach curriculum specific content such as math or science. Technology integration is most effective when technology is incorporated into the curriculum not when the curriculum is adjusted for the purpose of using technology tools (Keengwe & Onchwari, 2009). If a science teacher asks students to use a software program to dissect a frog while answering questions about the anatomy of a frog, the focus of the lesson is still on frog dissection while the tool being used to complete the learning activity is technological. Although using technology as a tool to complete the frog dissection activity, some teachers may choose not to specifically highlight the use of the technology tool in the lesson plan.

Implications

The findings of this study indicate that personal teacher perceptions related to BYOT will play the largest role in whether or not classroom integration occurs. Regardless of teachers' personal use or skill in technology if a teacher does not feel prepared to actually teach with technology more traditional teaching methods will prevail. Additionally, if teachers believe they possess the knowledge needed to successfully integrate BYOT into classroom teaching and learning this incorporation will occur without technology-centered professional development. Teachers that do in fact decide to attend technology-training opportunities but do not believe the sessions met their needs as adult learners or that sessions were relevant and useful will be less likely to try to apply information from training sessions in their classrooms. If teachers believe that information from professional development opportunities cannot be translated into actual classroom teaching for their specific content area and they believe attempting to apply what they have learned in training will present greater classroom management issues, teachers will again stick with teaching practices currently in place. Participants of this study also indicated that

while the integration of BYOT may enhance teaching and keep students engaged at certain times, these benefits may be offset by integration challenges such as a lack of student devices and the obstacles related to ensuring students are using devices for appropriate educational purposes not for texting or inappropriately surfing the Internet. Finally, teachers in this study also described the difficulty related to successfully implementing a BYOT program initiative when the students who do not have devices to participate in lessons feel ashamed because they do not possess the same devices as other students. With the above findings and study implications in mind the below recommendations are suggested.

Recommendations

Teachers should be involved in planning professional development

While technology-centered training was offered by the school district to assist with the BYOT implementation, participants reported they were not included in developing the training. Perhaps allowing teachers to provide input regarding the training focus and components would assist with increasing their confidence level regarding their ability to integrate BYOT into classroom teaching as well as provide teachers with techniques related to classroom management issues. Kedzior & Fifield (2004) state the following, “Professional development should respond to teachers’ self-identified needs and interests in order to support individual and organizational improvements. Professional development is more meaningful to teachers when they exercise ownership of its content and process” (p. 2). Teachers expected to implement new strategies should collaboratively design professional development opportunities. Including teachers in the process provides a sense of empowerment and encourages a sense of ownership (The National Joint Committee on Learning Disabilities, 2000).

Participants of this study also expressed frustration with attending technology-centered professional development opportunities that were not useful for specific classroom application.

Professional development sessions should take place in a classroom and include coaching or mentoring

Teachers involved in this study described attending district level training or school-based meetings; however, no teachers received training in an actual classroom setting or through coaching or peer mentoring methods. District technology personnel should consider providing training to teachers in their classroom environments, perhaps through a team-teaching approach or by facilitating communities of practice in which teachers integrating BYOT can team-teach with one another. Professional development opportunities should include peer observations, mentoring, coaching, teacher portfolios, and action research projects extending beyond a traditional workshop format and include collaborative activities as well as strive to meet the individual needs of the teachers in attendance (The National Comprehensive Center for Teacher Quality, 2011). If teachers are given the opportunity to learn how to implement BYOT within their actual classroom setting, in their subject area, and with assistance from someone such as a peer or mentor, a transfer of knowledge may be more likely to occur versus trying to learn skills by simply listening to a presenter.

Schools should have a plan in place to provide students with devices for classroom use

Teachers in this study reported one of the greatest challenges to implementing BYOT resulted from the lack of student devices. If students are asked to complete assignments using personal devices but not all students own a device or own an appropriate device to complete classwork, a learning disparity could occur and the students without devices could potentially be left behind and not share the same learning opportunities as students with devices (Stager, 2011).

While this may not be an issue in schools with higher socio-economic levels, school districts need to consider schools with populations in which students are unable to obtain personal devices for school use. Districts implementing BYOT cannot just assume all students have devices. A device checkout system or access to devices provided by the school should be established so teachers can teach with technology without leaving some students behind because they do not have access to a device.

Discussion of Research Assumptions

As previously mentioned, I had several research assumptions at the start of this study. My first assumption that teachers will not revise teaching practices to include BYOT if they do not believe the integration of BYOT will somehow improve student achievement was not proven in this study. Participants teaching with BYOT did not mention increased student achievement as a reason for using BYOT in the classroom and instead discussed high levels of student engagement as a factor for revising current teaching practices to include BYOT. Participants not integrating BYOT cited classroom management issues and lack of devices as reasons for not incorporating BYOT. The data collected in this study proved my second assumption that the more teachers use technology in their personal and professional lives the more likely they will be to incorporate mobile student devices into classroom teaching untrue. It could be that teachers feel confident using technology personally but do not believe they are strong enough to teach with technology. Additionally, participants may believe the students they teach are unable to stay focused and use technology for instructional purposes only. My assumption that teachers would be more likely to implement BYOT initiatives if appropriate and effective professional development opportunities were provided was partially true. Several participants expressed a desire for more effective training opportunities and the belief that effective professional

development sessions would better prepare them to revise current teaching practices.

However, as mentioned previously, out of the seven teachers integrating BYOT, five teachers had not received any BYOT training. My fourth and final assumption was the data would reveal a relationship between years of teaching experience and teaching with technology. A teacher with only one year of teaching experience and one with 24 years of teaching experience both participants in this study were not using BYOT while a teacher with two years of teaching experience and one with 22 years of teaching experience participating in this study were using BYOT.

Study Limitations

This particular study provided an overview of teacher perceptions related to the integration of BYOT into classroom teaching. However, the findings of this study are relevant for this specific school site. What is unknown at this point is whether or not the same findings would apply to elementary or middle schools (a high school was studied) or the impact differing student populations may have on the ease of integration. The school studied was considered Title I, which denotes a higher population of students receiving free/reduced lunch. While teachers participating in this study were asked to share their current beliefs and challenges as it relates to BYOT, they were also asked to reflect back on their initial thoughts and concerns regarding implementation, which began a year prior to conducting this study. Issues with selective memory are present when asking participants to self-report about the past. Participants generally want to provide answers that make them look as good as possible and may under-report behaviors deemed as negative and over-report behaviors deemed as positive. When reporting about organizational or professional behaviors, a self-report bias may be especially

present due to participant beliefs that there is a remote possibility an employer may somehow access their responses (Donaldson & Grant-Vallone, 2002).

To address the above limitations related to self-reporting and employer access to responses, participants in this study had the option of participating in the interview anonymously. Using an online asynchronous interview method provided teachers with an opportunity to share their thoughts without revealing their identity.

Additionally, there were 12 participants in the study but only nine chose to participate in the document review and follow-up interview phase. The three teachers that did not participate in the second phase were teachers who submitted their answers anonymously. Teachers were asked to express their beliefs about a school-based initiative and some teachers may have had concerns about honestly expressing their thoughts, especially to a district level technology employee. In future research, a method in which teachers can submit lesson plans without revealing their identities may be a solution to have everyone participate in a second round.

Future Studies

The findings of this study provide insight to teacher perceptions related to BYOT. Future studies might consider examining teacher perceptions related to BYOT in schools with a higher socio-economic student population in which most students have devices. Examining perceptions of BYOT of teachers who have received training through peer coaching or mentoring would also be useful. Additionally, researching the specific ways devices are used in the classroom and the actual level of classroom integration would also be useful and lead to further research regarding whether or not a BYOT implementation impacts student achievement either negatively or positively. Future research may also include examining teacher perceptions in schools in which students who do not bring in a personal device have access to school devices. It may also be

worth reviewing teacher lesson plans over a longer period of time to see if technology components are included and if so, it would be helpful to study the components of teacher lesson plans in which the use of technology is indicated.

Conclusion

This study focused on teacher perceptions related to a BYOT implementation. Teachers working in a Title I high school in which a BYOT initiative had been in place for over one full academic year were asked to participate in an online asynchronous interview process. The study included 12 participants in the first round of interviews; nine participants in a follow-up interview and document review of lesson plans phase, as well as included a document review of school-based documents provided by building administrators. This case study yielded the following five findings: confidence in technology ability may not be a factor when deciding to integrate BYOT; the personal technology use of a teacher may not influence his or her decision to incorporate BYOT; technology-centered professional development offerings may have little influence on a teacher's decision to integrate BYOT; in order to be deemed effective, BYOT teacher training opportunities should be relevant to specific content areas and customized to meet the needs of adult learners; and finally, teachers reported that a BYOT implementation may increase the presence of the digital divide and as a result, create classroom management issues that outweigh possible implementation benefits. Implications of this study as well as recommendations resulting from this qualitative study included the notion that teachers should be involved in planning professional development, the idea that professional development sessions should take place in a classroom or the setting in which teachers work and include coaching or mentoring, and that schools should have a plan in place to provide students with devices for classroom use. Additional research is needed to understand teacher perceptions of school-based

BYOT programs in other school district and building settings. At the time this study was conducted, the integration of BYOT in PreK-12 public classroom settings was a fairly recent educational trend. In order to more comprehensively assess teacher attitudes and the implications of BYOT on student achievement, researchers may consider conducting additional studies related to Bring Your Own Technology program initiatives.

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Tables

Table 1: Actual Participant Demographics

Participant Number	Number of Years as a Classroom Teacher	Number of Years at Current School Site	Age	Subject Taught
Participant 1	13	12	35	English
Participant 2	0-1	0-1	23	Science
Participant 3	3	3	25	English
Participant 4	22	12	44	Career Technical
Participant 5	2	2	24	Foreign Language
Participant 6	10	9	32	Art
Participant 7	10	1	32	English
Participant 8	3	3	26	Science
Participant 9	13	10	35	English
Participant 10	4	1	26	Math
Participant 11	8	4	31	Exceptional Children
Participant 12	24	4	47	Did not provide an answer

Table 2: Florida Technology Integration Matrix

Classroom Technology Integration Level	Teacher Action
Entry	The teacher begins to use technology tools to deliver content to students
Adoption	The teacher directs students in the procedural use of technology
Adaptation	The teacher facilitates student exploration of independent technology use
Infusion	The teacher provides the learning context and students choose the technological tool to achieve the outcome
Transformation	The teacher encourages the innovative use of technology tools to facilitate higher order learning activities that may not have been possible without the use of technology

Table 3: Codes Applied to Participant Responses and Number of Times Applied

<u>Research Construct</u>	<u>Research Construct</u>	<u>Research Construct</u>	<u>Research Construct</u>
The teacher's individual confidence level or belief in his or her ability to teach effectively using technology	Beliefs and actions regarding classroom management and technology integration	Attitudes related to technology-centered professional development opportunities	Perceived challenges and/or benefits of integrating student devices into classroom teaching and if these benefits transfer over into teaching practices
Positive Thoughts Applied 35 Times	Inappropriate student use of Technology Applied 24 Times	Technology Professional Development Received Applied 5 Times	Integration of BYOT enhances teaching Applied 38 Times
Negative Thoughts Applied 48 Times	Positive Impact on Learning Applied 12 Times	No/Ineffective Technology PD Received Applied 12 Times	Integration of BYOT disrupts classroom teaching Applied 40 Times
Technologically Strong Applied 21 Times	Negative Impact on Learning Applied 3 Times	School Admin Support Applied 12 Times	Uncomfortable integrating BYOT into classroom teaching Applied 50 Times
Not Technologically Strong Applied 3 Times	Positive Impact Student Behavior Applied 18 Times	More Technology PD Needed Applied 30 Times	Device Security Concerns Applied 20 Times
Personal Technology Use Applied 50 Times	Negative Impact Student Behavior Applied 22 Times	Adult Learning Needs Addressed Applied 12 Times	Lack of Devices Applied 23 Times

Table 4: Self-Report of Participants Integrating Bring Your Own Technology

Participant	Self-Report of Participants Integrating Bring Your Own Technology
Participant 1	Yes
Participant 2	No
Participant 3	Yes
Participant 4	Yes
Participant 5	Yes
Participant 6	Yes
Participant 7	Yes
Participant 8	Yes
Participant 9	No
Participant 10	No
Participant 11	No
Participant 12	No

Table 5: Self-Report of Initial Participant Reactions After Being Informed Their School Would Become a Bring Your Own Technology Site

Participant	Initial Reaction
Participant 1	"Excited...especially because the students could TEACH me something new."
Participant 2	"I felt like managing cell-phones in the classroom (the appropriate use of them) would be a nightmare -making sure students were actually using cell-phones for proper use."
Participant 3	"I was concerned because these students don't always use it appropriately. This would mean that I would have to be more vigilant while in the classroom."
Participant 4	"My initial reaction was excitement and the challenge about how I could implement the process into the curriculum."
Participant 5	"Hesitant / skeptical / interested to learn more."
Participant 6	"I thought great, now maybe I can integrate more student research into lessons instead of me gathering all the information, I could let students gather information or find contradictory arguments to inform their opinions."
Participant 7	"In favor"
Participant 8	"Very excited for both our students and our district to be able to benefit from tech in school."
Participant 9	"I like the idea, but know that some of my students will not have access to BYOT because of financial limitations."
Participant 10	"Confused, because I did not really know what BYOT was and what it entailed."

Participant	Initial Reaction
Participant 11	" I like the idea because technology use is so ingrained in the daily lives of our students. Iterating the currently used technology into daily lessons should keep students interested in what is going on in the classroom. The issue I have is with many students not having technology to bring and being left out or worse, trying to steal what other students have."
Participant 12	"Excited!"

Chart 1: Self-Report of Teachers Integrating or not Integrating Bring Your Own Technology and Skill Level

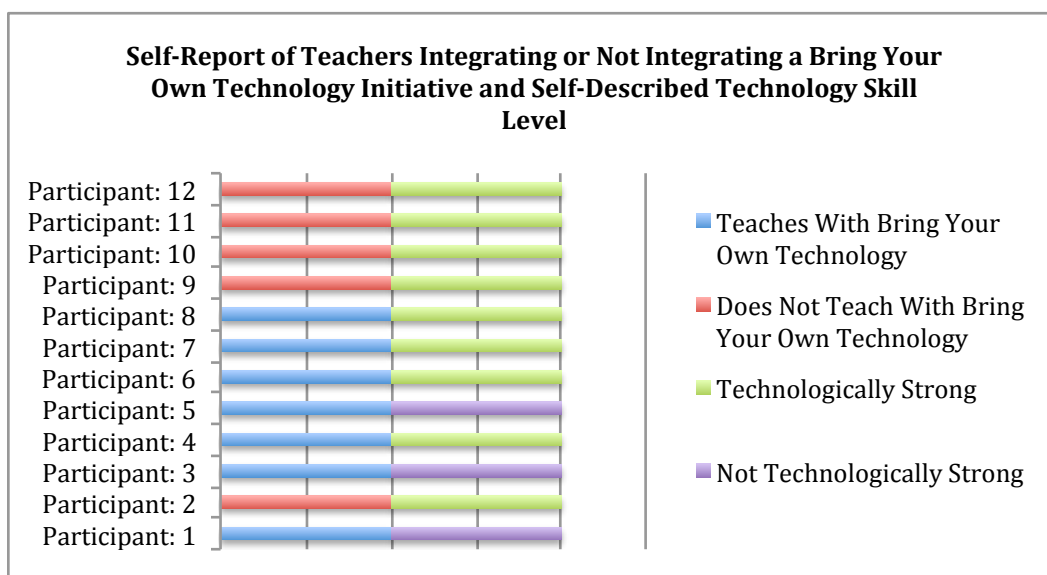


Chart 2: Self-Report of Teachers Integrating or Not Integrating Bring Your Own Technology and Personal Technology Use

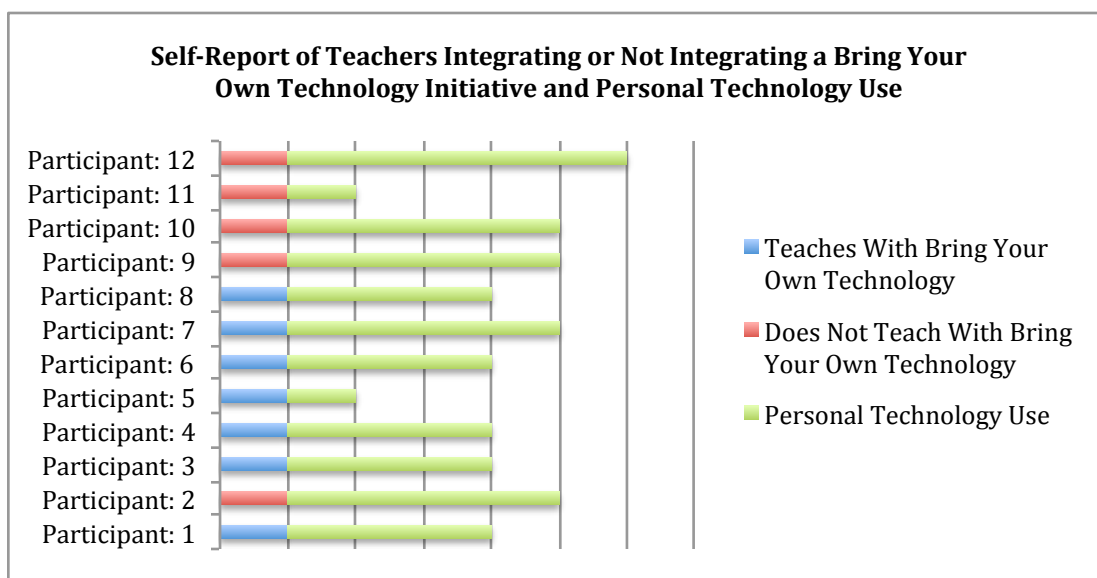


Chart 3: Self-Report of Teachers Integrating or Not Integrating a Bring Your Own Technology Initiative and Training Attendance

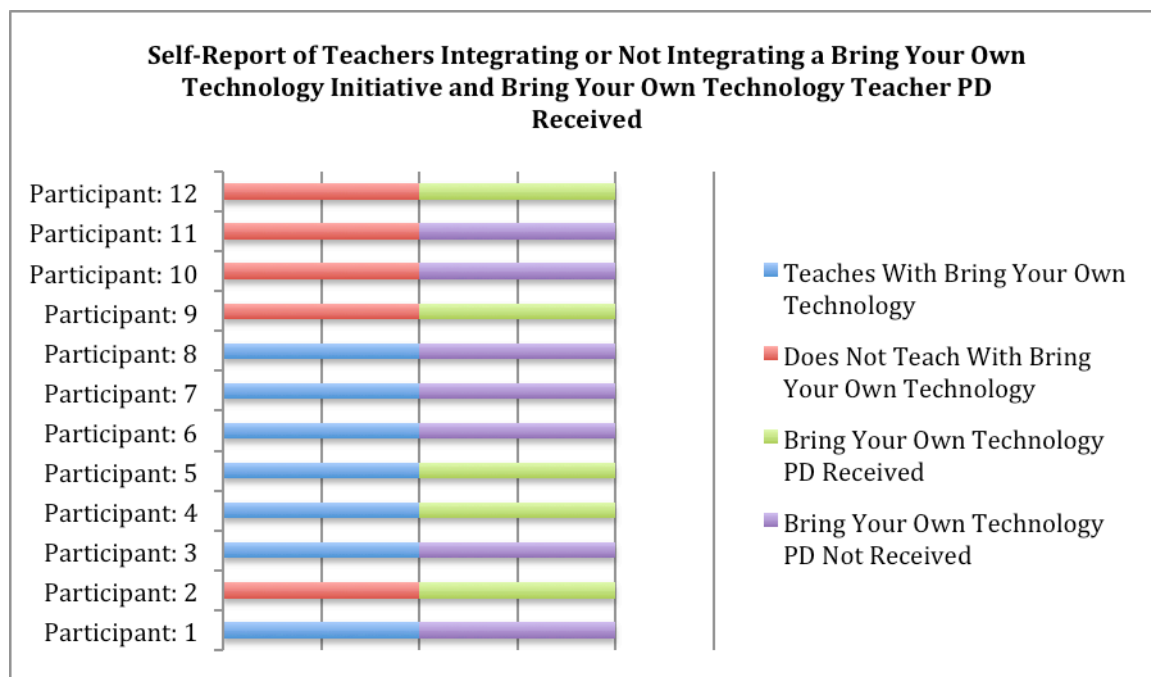


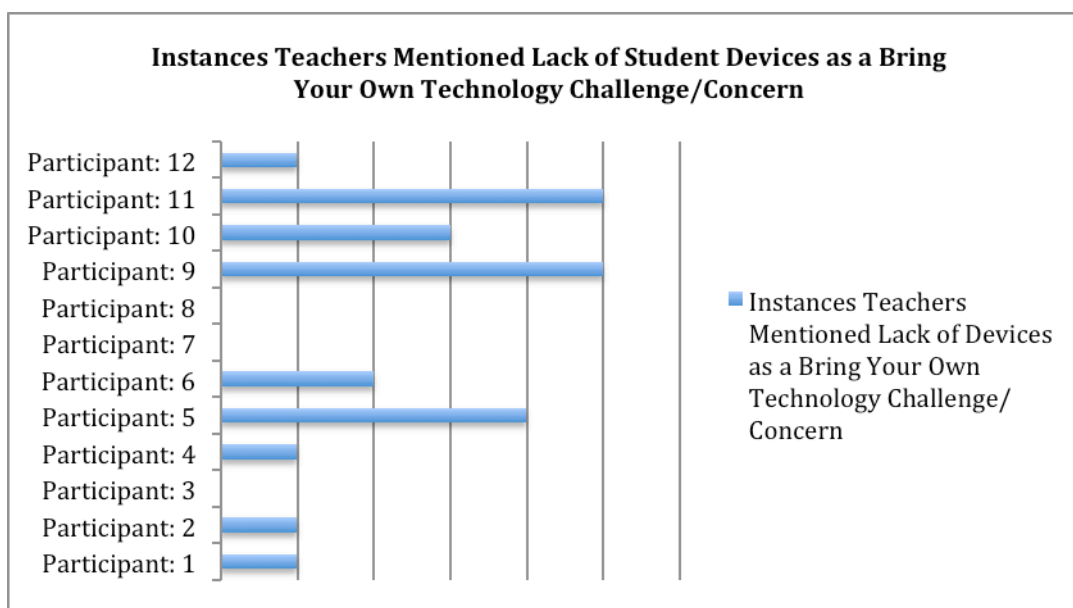
Chart 4: Lack of Devices Mentioned as a Concern

Chart 5: Self-Report of Teachers Integrating or Not Integrating Bring Your Own Technology and Lack of Devices Mentioned as a Concern

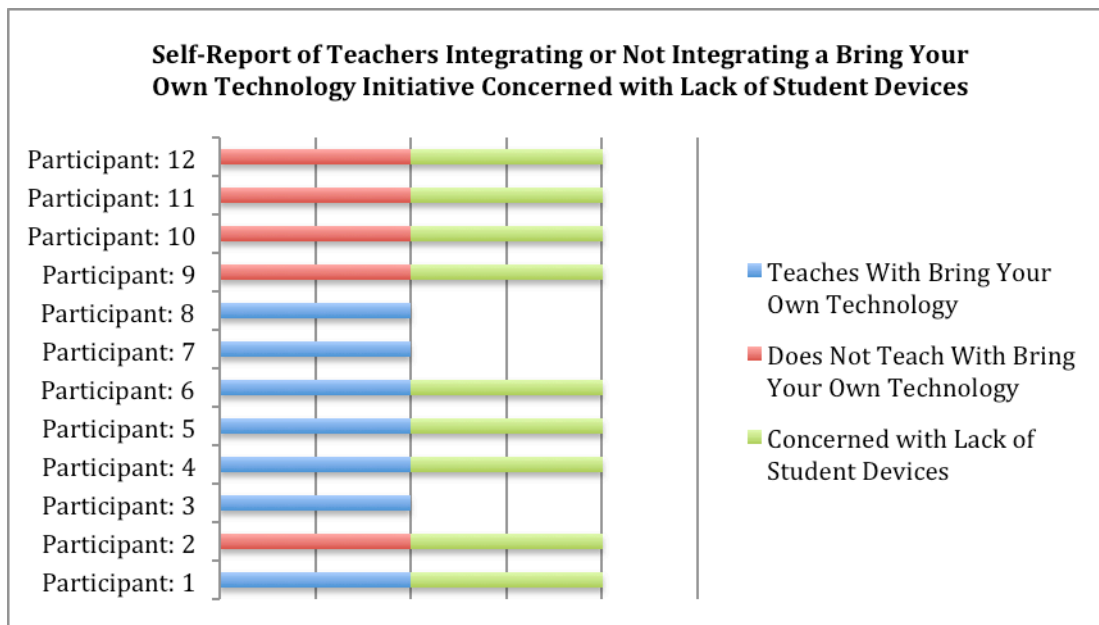


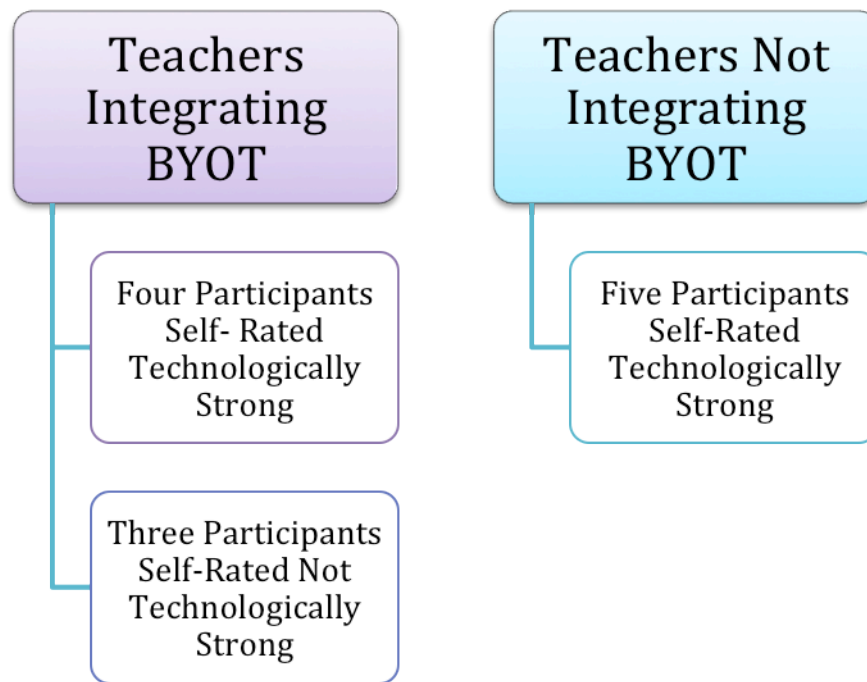
Illustration 1: BYOT Integration and Technology Rating

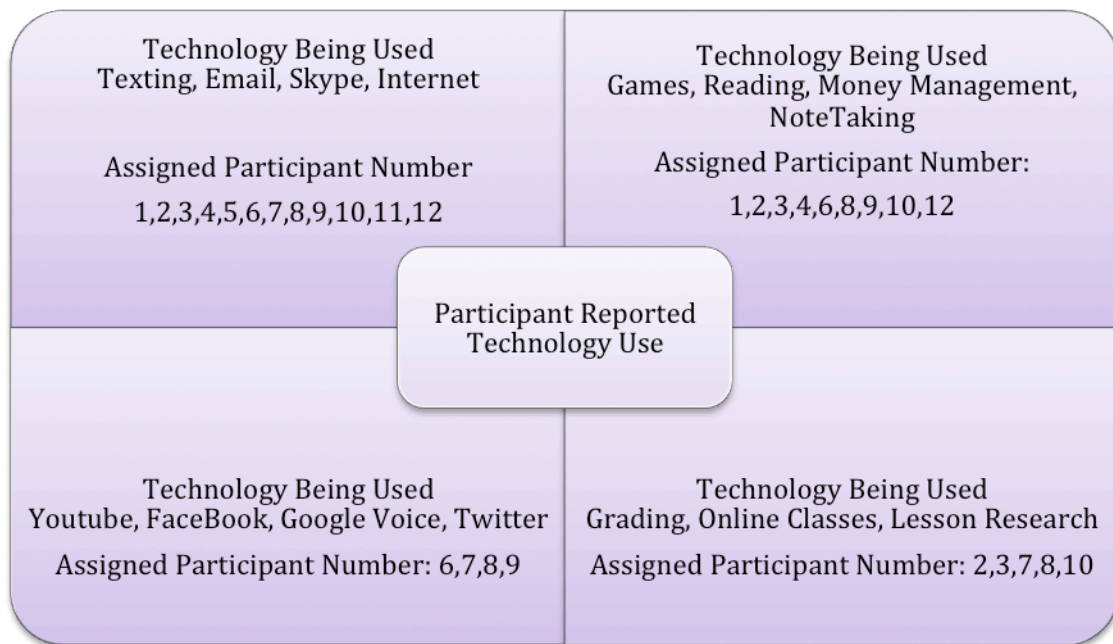
Illustration 2: Reported Participant Technology Use

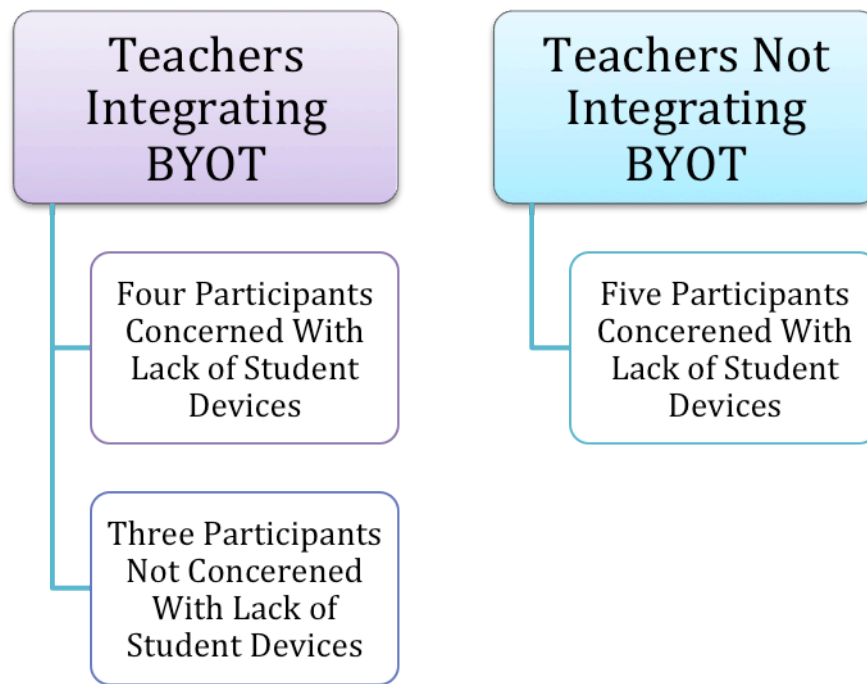
Illustration 3: BYOT Integration and Lack of Student Device Concerns

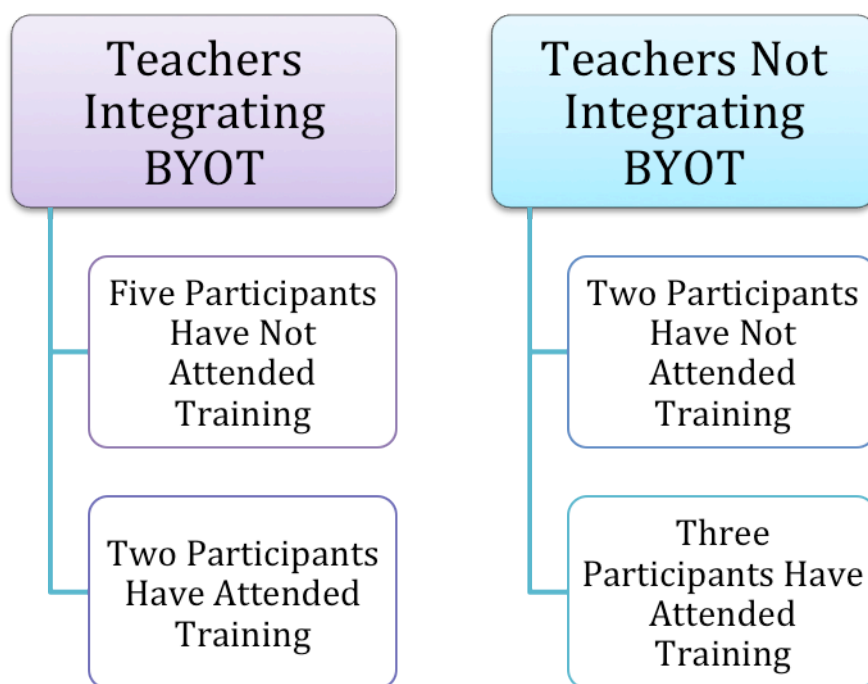
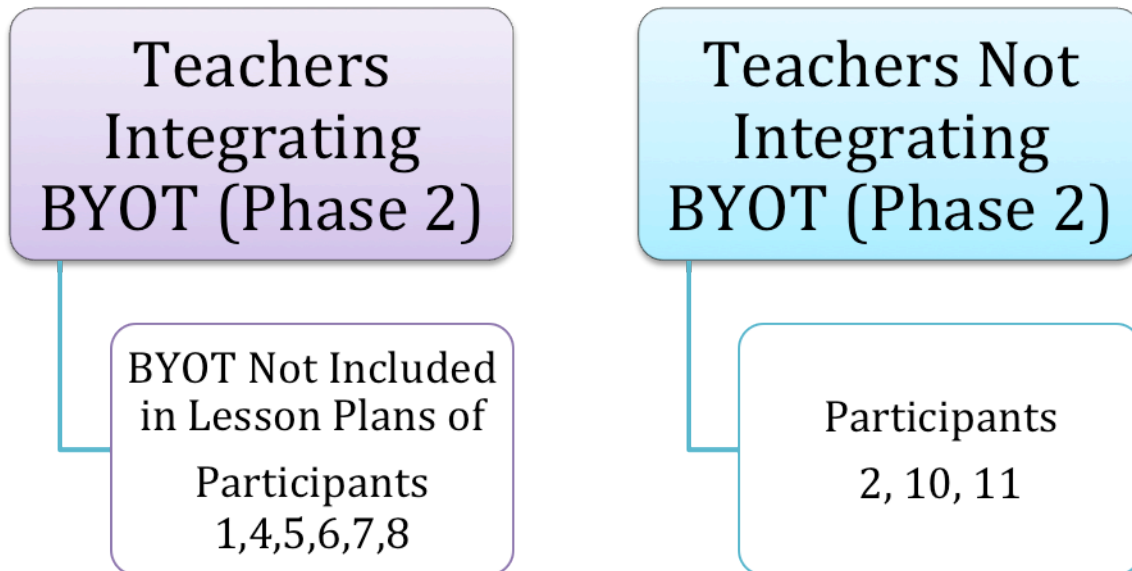
Illustration 4: BYOT Integration and PD Received

Illustration 5: BYOT Integration Phase 2 and Lesson Plan Review



Appendix A

Interview Questions

1. For how many years have you worked as a classroom teacher?
2. What is your age?
3. Please specify your ethnicity
4. What is the highest degree or level of school you have completed?
5. How long have you been a teacher at your current school site?
6. Describe your initial reaction when you learned your school would become a Bring Your Own Technology (BYOT) student site.
7. Do you currently incorporate BYOT in your classroom teaching and learning strategies? Please explain why or why not.
8. If you are using BYOT in your classroom with your students can you please describe when (time of day and frequency)?
9. For how many lessons per day would you say personal student devices are used in your classroom?
10. In what ways do you include the use of BYOT and/or student devices into your lesson plans?
11. In which classes do you incorporate BYOT the most and why?
12. When developing lesson plans to incorporate student devices how do you plan individually and with other teachers?
13. When using student devices in your classroom how do students work in groups and individually?
14. In what ways does the integration of BYOT enhance teaching?
15. What classroom projects have students been able to complete that would not have been possible without a BYOT implementation?
16. Describe the challenges you have encountered integrating BYOT.
17. What impact do you believe implementing BYOT has on student classroom behavior?
18. In what ways does the use of student mobile devices disrupt classroom teaching?
19. What new classroom and student guidelines are in place to accommodate BYOT use?
20. Please describe any training you have received to implement BYOT into teaching.
*Please do not mention trainers by name.
21. In what ways do you consider yourself technologically strong?
22. How do the professional development opportunities you receive influence your decision to use student devices in the classroom?
23. In what ways do you feel uncomfortable incorporating student devices into classroom teaching?
24. What types of professional development sessions are needed to assist with more successful BYOT classroom use?
25. In what ways have your school-based administrators helped with your ability to incorporate BYOT into classroom teaching?

26. Please describe the ways in which you use technology in your personal life (iPads for sending email, etc.).
27. What additional support (if any) is needed from your school administrators to make the school-based BYOT implementation successful?
28. Please provide any additional information regarding factors that influence your thoughts regarding teaching with BYOT.

Please include your email address below if you are willing to assist the researcher with future, more in-depth research regarding your experiences and best practices implementing a Bring Your Own Technology initiative.

Once participants click submit they will receive the message below:
Thank you. Your results have been received.

Appendix B

Follow-Up Interview Questions

Nine participants were asked to clarify any initial responses in which additional information or explanations were needed. The below questions were also asked to expand on the initial interview question responses.

1. What do you believe to be the challenges for teachers to incorporate BYOT in your building?
2. What works well for using BYOT in the classroom?
3. What type of training does your technology facilitator provide if any and how often?
4. Do teachers attend training why or why not?
5. What do you believe to be the student perspectives (challenges, successes, attitudes)?

Appendix C

Informed Consent Letter

(Letter will be posted on the Goggle Form in which participants will access)

September 1, 2013

Dear

Thank you for agreeing to participate in my research for a doctoral program at Lesley University in Cambridge, Massachusetts. Your participation is strictly voluntary and you may withdraw from the project at any time without any negative consequences.

The research project will examine teacher perceptions regarding school-based Bring Your Own Technology initiatives and the ways in which student mobile devices are integrated into classroom teaching. As participants, you will be asked to electronically submit your responses regarding your thoughts of BYOT initiatives. Should you decide to participate in an optional document review process you will be asked to share lesson plans, professional development plans, and any school-based technology plans that may demonstrate the use of technology in your classroom or school setting. Your responses will be completely confidential. No names, school names, or other identifiers that will link your responses back to you will be used.

Should you have questions before, during, and after the study, please feel free to contact me at: ijones2@lesley.edu or one of my program directors, Dr. Nancy Wolf at: nwolf@lesley.edu. You may also contact a member of the Lesley University IRB at: tkeeney@lesley.edu or rcruz@lesley.edu.

Your completion of this form serves as your signature and consent to participate in this research study. Thank you for your willingness to participate in my research. I look forward to working with you.

Sincerely,
Ilana Jones
Lesley University
ijones2@lesley.edu