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Case Study on How High School Teachers Incorporate Technology in the Classroom to Meet 21st Century Student Learning Needs

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Abstract

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Sara L. Sharick

MBA, Tiffin University, 2008

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Students are not adequately prepared to contribute to the workforce or engage in global citizenship in the 21st century. Research indicates proper education of students cannot be accomplished without teachers' acceptance of technology in the classroom, engagement in effective professional development, and ability to transform their curricula. Although there is an abundance of research supporting the use of technology in the classroom, little research has examined how to incorporate the technology into student-centered learning. The research questions in this study examined teachers' use and acceptance of technology in the classroom and how teachers incorporate technology to meet the 21st century learning skills requirements. This qualitative case study used Bandura's social cognitive theory and the Partnership for 21st Century Learning Framework. The purposeful sample included 6 participants teaching in Grades 9-12. Data were gathered using a selection survey, interviews, and course documents. The data analysis included the organization of participant responses and development of 6 primary themes. The results indicated that a high level of technology self-efficacy drove these teachers' integration of technology into student-centered activities that built 21st century learning skills. The results also showed a lack of effective professional development provided to teachers that focused on incorporating technology into the curriculum. These findings are significant for educators to understand how to meet the learning needs of their students. Implications for positive change include providing educators with knowledge and understanding of the importance to design professional development opportunities for teachers that not only teach how to use the technologies available to them but to also teach how to effectively incorporate that technology into the learning process.

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Dedication

This dissertation is dedicated to my mom, Joan Marie Hoffman. She believed I could do anything and that research is my calling. She passed away in 2005, just after I obtained my BA in Organizational Management. She is my heart, my soul, and my guiding light. I did it mom!

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Chapter 1

Education in the United States is undergoing significant changes due to the

Common Core State Standards (CCSS) and the framework designed by the Partnership

for 21st Century Skills (P21) (Partnership for 21st Century Skills, 2009). These changes

require that states, districts, schools, and teachers consider new methods and perspectives

on integrating technology into the learning process to ensure students acquire proficiency

in critical thinking, communication, collaboration, and creativity skills (Lowther, Inan,

Ross, & Strahl, 2012; Voogt, Knezek, Cox, Knezek, & Brummelhuis, 2011). In order for

students to develop the skills necessary to contribute to the workforce and engage in

citizenship in the 21st century, educators must transform their pedagogies, curricula,

professional development, and overall acceptance of technology (Dede, 2011).

These changes are critical to properly prepare students for the workplace and to

insure the continued growth of the United States economy (Annetta, Cheng, & Holmes,

2010; Holt & Brockett, 2012). It is the teacher's responsibility to ensure that students

build mastery of content as defined by P21. However there are barriers to effectively

integrating technology into the curriculum.

The barriers teachers face include lack of effective teacher professional

development and training associated with technology and the pedagogical knowledge to

develop context-specific uses necessary to integrate technology into the curriculum (Han,

Eom & Shin, 2013). These barriers impact teachers' own self-efficacy in relation to

technology integration and changes in their pedagogical practices. Without proper

training and development, teachers are not able to develop the confidence to incorporate the technology and develop the curriculum required in today's classroom.

"Self-efficacy not only influences types of activities to be engaged in but also selection of behaviors that leads to a direction in personal development" (Bozdogan and Ozen, 2014, p. 69). Research has revealed that effective professional development in technology and curriculum construction changed teachers' perspectives and increased self-efficacy as it relates to technology integration (Cviko, McKenney, & Voogt, 2012; Ertmer, 2005; Kopcha, 2012). Understanding these barriers and what teachers need in terms of professional development and technology training will provide states, districts, schools, and teachers with information and strategies to properly incorporate technology into pedagogical practices. This will help teachers and schools meet 21st century learning requirements and close the gap of technology use and acceptance in the classroom.

Effective technology integration, transformation to a learner-centered model, and professional development programs that meet the specific needs of the teachers are critical components to delivering 21st century learning in the high school classroom. The state of Ohio identified the 21st Century Learning Framework as the necessary proficiencies students need to develop prior to graduation (INFOhio, 2010). It is the responsibility of administrators and teachers to ensure that students develop these skills through enhanced teaching methods that utilize technology in the classroom (Dede, 2011). Understanding how teachers are currently using technology and building learner-centered classrooms provides future and current teaches with the information they need to begin developing their own learner-centered, technology-rich classrooms.

Chapter 1 focuses on the background of this study, the importance of incorporating technology in the curriculum, and what role 21st century skills plays in the learning process. Chapter 1 also includes the problem statement and purpose of the study identifying that students are not properly prepared for living and working in the 21st century by the time they graduate from high school. Also discussed is ways this study will help to understand how teachers integrate technology in the classroom to enhance the teaching and learning process. The research questions focus on the theoretical framework and serve as the basis for the research study. The chapter concludes with the assumptions, scope, limitations, significance of social change, and delimitations of the study.

Background of the Study

The Partnership for 21st Century Skills began collaborating with government, business, community, and education professionals in 2002 to begin developing the 21st Century Learning Framework. The goal was to define the skills, knowledge, and expertise students need to be successful as citizens and workers in the 21st century and provide teachers with guidelines for incorporating technology and 21st century skills into the curriculum. Key elements of 21st century education consist of learning and thinking skills, information and communication technology literacy, teaching and learning 21st century content, and life skills (Partnership for 21st Century Skills, 2009a).

The U.S. Department of Education (2010) and Partnership for 21st Century Skills (2010) outlined the importance of incorporating 21st century learning into the curricula in order to prepare students for living, learning, and citizenship in the 21st century. There is a need for educational reform in the U.S. that not only requires teachers to adjust their

teaching methods and curriculum, but that also effectively prepares students for living in a 21st century society (Avargil, Herscovitz & Dori, 2012; Dede, 2011; Kay, 2010). In order to move teaching and learning toward the framework identified by the Partnership for 21st Century Skills (2006), teachers need to be equipped with the skills and knowledge to build the curriculum and address these requirements. This can be accomplished through effective professional development and training activities that meet the needs of the teachers and give them the time, resources, and skills to make this transition.

The 21st century skills defined by P21 were integrated into a new educational reform in the U.S. known as the Common Core (Partnership for 21st Century Skills, 2009). "Over the past decade, many organizations such as P21 have advocated for standards that adequately address both the core academic knowledge and the complex thinking skills that are required for success in college, life, and career in the 21st century" (Partnership for 21st Century Skills, 2011, p. 4). This includes integration into standards, assessments, curriculum, instruction, professional development, and learning environments (Partnership for 21st Century Skills, 2011).

This study examined what effective means teachers used to build the P21 skills into technology-rich student-centered classrooms and professional development options provided to enhance educator knowledge and understanding of curriculum development. Through an understanding of teacher acceptance of technology integration, pedagogical change, and professional development, educators can better prepare their programs to

educate teachers and use this research as a means of social change within their own

district, school, or classroom.

Problem Statement

Students attending school today are not properly prepared for living and working

in the 21st century by the time they graduate because they lack proficiency in core

competencies that are critical for success in education, work, and life (Kay, K. 2010).

Dede (2011) argued that students need to develop the skills necessary to contribute to the

workforce and engage in citizenship in the 21st century and that this cannot be

accomplished without transforming the curricula, professional development, and overall

acceptance of technology in schools. Teachers are not prepared to effectively incorporate

21st century learning skills into the classroom because they are allotted minimal time for

education in technology and professional development that explores the integration of the

technology into pedagogical practices. The use of technology in the classroom has been

inadequate for decades due to limited resources, time, and effort to educate teachers on

technology usage and integration practices into a learner-centered curriculum (Bingimlas,

2009; Dunn & Rakes, 2010; Prestridge, 2012). These barriers have slowed the process of

educational reform toward meeting the 21st century skills required for student success.

Studies have been conducted to identify the barriers to technology integration in

the classroom. A research study conducted by Prestridge (2012) addressed the first order

and second order barriers that teachers face when trying to incorporate technology into

learner-centered teaching practices. First order barriers were defined as resources, time,

access, and technical support (Prestridge, 2012). Le Fevre (2014) defined time as not only

the time to learn the technology, but the time it takes to incorporate the technology into the classroom where teachers tend to lose control of time due to the added effort required to initiating something new. Second-order barriers to technology integration were originally defined by Ertmer, Ottenbreit-Leftwich, Sadikl, Sendurur, and Sendurur (2012) as teacher beliefs, confidence, and use of technology in the teaching and learning process.

Prestridge's (2012) study also examined the relationships between information and communication technology (ICT) competence, confidence, and practice. The study concluded that as teachers became more confident using the technology they were more apt to incorporate it into the classroom. A separate study conducted by Ertmer et al, (2012) concluded with the same results, indicating that a lack of professional development is the driving factor for failed implementation. Ertmer and Ottenbreit-Leftwich (2013) confirmed in a later study that although first order barriers appear to be addressed by school districts and teachers, second order barriers are still an issue for most teachers. "Since confidence, competence, and accessibility have been found to be critical components for technology integration in schools, ICT resources including software and hardware, effective professional development, sufficient time, and technical support need to be provided for teachers" (Bingimlas, 2009, p. 243). Teachers need to be provided with the proper resources in order to deliver the quality of education students require today.

In order to effectively integrate technology, teachers need to acquire the knowledge and understanding of how to use technology to enrich the teaching and learning process without impeding it. "The adoption of technology by teachers in order to facilitate and support the teaching-learning process in the classroom is expected to have a

great impact on the quality of the teaching experience" (Aldunate & Nussbaum, 2013). Research revealed that teachers' pedagogical beliefs and confidence dictate the teaching and learning practice used. However, the emergence of new technologies and requirements to include 21st century learning skills in the curriculum obligates teachers to revisit teaching practices and their own pedagogical beliefs (Bingimlas, 2009; Pamuk, 2012; Prestridge, 2012). There has been extensive research identifying the barriers to technology integration; however, few studies have been conducted that examine the ability of teachers' to integrate technology into a learner-centered environment (Fisher & Waller, 2013; MacDonald, 2009).

Teachers' negative attitudes in regard to technology integration are associated with the level of professional development and training, time allocated to practice, and resources available to support teaching practices and an understanding on how to use the technology for teaching purposes (Bingimlas, 2009; Birgin, Cathoglu, Gurbuz, & Aydin, 2010; Celik & Yesilyurt, 2013; Kreijns, Van Acker, Vermeulen, & van Buuren, 2013). The research also identified that teachers with strong ICT skills and an understanding of the core subject matter are better equipped to deliver instruction through technology and learner-centered activities (Ara, 2013; Becta, 2004; Holden & Rada, 2011). While past researchers have identified the barriers to effective technology integration in the high school classroom, few researchers have examined the ways in which teachers use technologies in their pedagogical practices (Teo, 2009). "The learner-centered model focuses on developing real-life skills, such as collaboration, higher-order thinking and problem-solving, and better meets the complex needs of the information age" (An &

Relgeluth, 2012, p. 54). This study addresses this gap and others to enhance the research available on this topic.

This study addresses two gaps in the literature. The first is regarding teacher's usage, understanding, and knowledge of incorporating technology into a student-centered or learner-centered environment to maximize student learning. The second pertains to the professional development activities, time, and support afforded them to acquire 21st century learning skills. I used the social cognitive theory developed by Bandura (1986) as the theoretical framework by which the data were collected and analyzed for the study.

Purpose of the Study

The purpose of this case study was to examine how teachers incorporate technology into the curriculum to enhance 21st century learning, the teachers' technology self-efficacy, and the extent of professional development opportunities provided by the school district. This study assessed three variables: (a) the quality of teachers' integration of technology in relation to 21st century learning, (b) teachers' technology self-efficacy, and (c) the quality and availability of professional development to properly prepare teachers to effectively incorporate technology into the classroom through enhanced curriculum that is structured through student-centered learning.

The study explored professional development activities that prepared teachers for teaching 21st century skills and how this aligned with Bandura's (1986) social cognitive theory on technology acceptance and self-efficacy. Teacher perceptions of the benefits and barriers to technology integration were also included in this research study.

Research Questions

The research questions for this study were:

1. How does a teacher's level of self-efficacy impact their ability to effectively incorporate technology in the classroom?

2. What are teachers' perceptions of benefits and barriers for creating technology-rich curriculum that promotes student-centered learning?

3. What teacher preparation experiences or strategies are used to prepare teachers for teaching and learning in the 21st century?

Theoretical Framework

The theoretical framework for this study was based on the self-efficacy component of Albert Bandura's (1986) social cognitive theory. Many researchers have used self-efficacy and the social cognitive theory as the theoretical framework for predicting technology use (Celik & Yesilyurt, 2013; Holden & Rada, 2011; Lee & Jihyun, 2014; Ozder, 2011; Piper, 2004). Bandura (1986) defined self-efficacy as an individual's perception of one's ability to perform an action at a certain level of performance. Bandura (1991) stated that people form beliefs about what they can do or achieve based on planning and motivation, a behavior that is regulated by external sources of influence and can impact perceived causes of successes and failures. Outcome expectancy, or the person's expectation that a certain behavior leads to certain outcomes, drives the efficacy expectation or the belief that a task can be successfully completed (Bandura, 1977). This definition of self-efficacy was applied to the current study where it was determined that teachers may believe the outcome of using technology would be

beneficial, but they may lack the self-efficacy and confidence to implement the technology in pedagogical practices due to limitations based on usage, knowledge, and/or confidence.

Nature of the Study

In this qualitative case study, I examined the comfort level of six high school teachers' use and integration of technology into 21st century learning activities, perceptions on the benefits and barriers for creating technology-rich curriculum that promoted 21st century skills, and contributing experiences or strategies used to prepare teachers for 21st century teaching and learning. According to Gay, Mills, and Airasian (2006), qualitative research is the collection, analysis, and interpretation of comprehensive narrative and visual data that is used to gain insights into a phenomenon. I selected the case study approach in order to examine the stories of purposefully selected teachers to understand their individual perspectives, use, and integration of technology in their own classrooms. Purposefully selected participants, as described by Creswell (2007), allow for the results to show multiple perspectives on the issue. Conducting the study in the natural setting where the phenomena occurred allowed for the collection of data for a holistic view and understanding.

Definition of Terms

21st Century Skills: The Partnership for 21st Century Skills Framework for 21st Century Readiness (2011) define this as the "life and careers skills, learning and innovative skills, information, media, and technology skills as well as core subjects and 21st century themes" (p. 2).

Common Core: The standards define the knowledge and skills students should gain throughout their K-12 education in order to graduate high school prepared to succeed in entry-level careers, introductory academic college courses and workforce training programs (Common Core State Standards Initiative, 2011).

Common Core Standards: (1) research- and evidence-based; (2) clear, understandable, and consistent; (3) aligned with college and career expectations; (4) based on rigorous content and application of knowledge through higher-order thinking skills; (5) built upon the strengths and lessons of current state standards; and, (6) informed by other top performing countries in order to prepare all students for success in our global economy and society (Common Core State Standards Initiative, 2011).

Digital Technologies: Computers, PDS's, media players, GPS, and other communication/networking tools, and social networks (Partnership for 21st Century Skills, 2011).

Information and Communication Technology (ICT): All technologies used for processing information and communicating (Voogt & Knezek, 2008).

Learner-Centered Education: Teaching and learning strategies providing time for critical reflection and encouraging students to interact in the classroom and question the subject matter being taught (Dunn & Rakes, 2010).

Net Generation: The generation to be the first to grow up exposed to digital media thought their lifetime. They were born in the 1980's and instinctively use the Internet to communicate, understand, and learn new things (Tapscott, 2009).

Student-Centered Instruction: Students are encouraged to set goals in the classroom, participate through interaction with the teacher and other students, and have an active role in their own education through group activities, active learning, and instructor acceptance (McKeachie, 1954).

Technology: Any systematized practical knowledge, based on experimentation and/or scientific theory, which enhances the capacity of society to produce goods and services and which is embodied in productive skills, organization, or machinery (Gendron, 1977).

Assumptions

This study was based on the assumption that all teachers in the study used technology in the classroom and effectively integrated technology into the curriculum. This assumption was essential to the study because it identified how teachers were using technology and applying technology within the curriculum to enhance teaching and learning skills. Another assumption was that participants would be open, honest, and forthcoming with information during the interview process. This was a vital part of the study in order to collect valuable data to support my research. A final assumption was that there would be a group of teachers of various ages and levels of experience available to participate in the study, and that their involvement would develop an insightful and thorough understanding of technology integration into pedagogical practices. This was an

important factor in verifying that the data would be significant and I would have confidence in the reported findings.

Scope and Delimitations

The scope of this study involved teachers' pedagogical practices and the integration of technology in an urban public high school located in Northeast Ohio. The purpose of this study was to examine how teachers use technology in the classroom and integrate technology into pedagogical practices. Also examined was teacher preparation activities as they align with Banduras' (1986) social cognitive theory on technology self-efficacy and teachers' perceptions of technology integration in the classroom.

The delimitations of this study included participant qualifications and location. This study took place during the 2015-2016 academic school year. The participants included six high school teachers teaching grades 9-12. These teachers were actively using technology in the classroom and developed curriculum that meets the 21st century learning requirements. The research site was selected due to size and availability of the resources.

Limitations

A limitation is an influence or shortcoming of the study where the researcher has limited control and can negatively impact the results. Common limitations are the size of the sample and the length of the study (Gay, Mills, & Airasian, 2006). For this case study, I am the sole researcher collecting and analyzing the data from the sample size that includes only six teachers at one school. There is potential for researcher bias and limitation to the study due to the small sample size.

These limitations were addressed through triangulation. According to Patton (2002), collecting data from multiple sources such as surveys, interviews, and documents was necessary to provide a comprehensive perspective on the topic being investigated and for triangulation of the findings. Specific strategies used during the data collection and analysis process are discussed further in Chapter 3.

Significance for Social Change

Students are not currently receiving the level of education they require in the 21st century to be successful in school, work, and life (Dede, 2011; Kay, 2010; Voogt, Erstad, Dede, & Mishra, 2013). Changing the way students learn in the classroom through the integration of technology and redevelopment of the curriculum is needed in order for students to graduate with the skills required to productively work in society and produce economic growth for the United States (Annetta, Cheng, & Holmes, 2010; Holt & Brockett, 2012).

The significance of a study about education is the contribution made to the improvement or understanding of educational theory or practice as it relates to the topic researched (Gay, Mills, & Airasian, 2006). The contribution to social change that this study provided was an understanding of how teachers integrate technology in the high school classroom, pedagogical practices used for effective integration into the curriculum, and methods of training and education provided to help teachers meet the 21st century learning requirements. This study is significant because it could be used by future researchers to develop a deeper understanding of teacher self-efficacy in relation to

technology integration and development of enhanced curriculum that meets the needs of students learning in the 21st century.

Summary

Chapter 1 identified the purpose of this study as an exploration of how teachers in the classroom integrate technology into a technology-rich curriculum while incorporating 21st century learning that students are required to master before high school graduation. The Theoretical framework is based on Bandura's (1986) social cognitive theory that serves as a lens to understand the integration of technology into pedagogical practices and changes in the curriculum to meet the needs of 21st century learning.

Chapter 2 is a review of the research literature for this study. Included in this review are topics relating to Partnership for 21st Century Learning Framework; teacher acceptance of technology integration and the attitudes and the barriers faced in adopting technology in the classroom; teaching practices addressing pedagogical challenges faced concerning innovative approaches to enhance learning; and, teacher education and professional development used to build mastery and self-efficacy. In addition, this chapter includes an overview of the theoretical framework, a description of the major themes and gaps identified in the literature, and where this study fits in the current literature on this topic.

Chapter 2

Computers and other technologies have been a part of the learning environment for decades. According to Fisher and Waller, 2013, instructional technology is not new to education; however, simply adding technology to the classroom alone does not improve the learning environment. In today's classroom, teachers are expected to incorporate computers and other technologies in the learning process; however, teachers have been slow to embrace technology and incorporate it into pedagogical practices. Dunn and Rakes (2010) argued that after more than two decades of concerted effort, little progress has been made by schools regarding the integration of effective technology use in the classroom. Dunn and Rakes (2010) indicated that the delay in technology acceptance can be attributed to the limited education teachers receive on how to use and integrate technology in the curriculum and opportunities to increase self-efficacy in technology use. Davis, Bagozzi, and Warshaw (1989) argued that practitioners and researchers need to acquire a better understanding of why people resist technology.

The purpose of this case study was to understand how high school teachers use technology in the classroom, what technology-related pedagogical practices and effective in-service training activities help teachers to incorporate technology in the learning process, and strategies used to prepare teachers for 21st century teaching and learning. Kay (2010) argued there is a need for educational reform and proper teacher preparation because the students graduating high school are not adequately prepared for the "economic, workforce, and citizenship opportunities—and demands—of the 21st century" (p. xvii). In order for any reform to take place, teachers need to accept the change and

"adjust their pedagogical perceptions to the new curricula and strategies that the reform brings" (Avargil, Herscovitz & Dori, 2012, p. 209).

In this study, I explored the Partnership for 21st Century Framework; teacher acceptance of technology including personal attitudes, barriers, and computer self-efficacy; innovative approaches for enhancing the curriculum and learning process; and teacher professional development programs. I interpreted how teachers used technology and incorporated it into pedagogical practices at the high school level. There was an alignment with the types of technology teachers' use or want to use in the classroom and the self-efficacy associated with the actual use of technology. The social cognitive theory developed by Bandura (1986) was the construct I selected to analyze teacher's acceptance of computer integration and the self-efficacy of teachers with the use of this integration.

This literature review focused on research studies that concentrated on: (a) the Partnership for 21st Century Learning Framework; (b) teacher acceptance of technology integration that includes attitudes and the barriers faced in adopting technology in the classroom; (c) teaching practices that address pedagogical challenges faced concerning technology integration and innovative approaches to enhance learning; and, (d) teacher education and professional development used to build mastery and computer self-efficacy. Identifying these topics and related research studies helped me understand the current research on how high school teachers used technology in the classroom, the pedagogical practices used to support technology, and effective training that helped teachers incorporate technology in the classroom. The result of the review of literature also identified the current gap in the literature that I addressed in the study.

Literature Search Strategy

Several databases used for finding literature to inform this study were available

through Walden's Library. The sources retrieved through these searches consisted of

articles from peer-reviewed journals and published dissertations. The primary databases

searched were Education Research Complete, EBSCOhost, ERIC, Science Digest, and

Academic Search Complete using the terms: *teacher self-efficacy, computer efficacy,*

technology use, attitudes toward technology, technology integration, technology

acceptance, 21st century learning, and *educational reform.* All sources were from

between 2009 and 2016. Articles reviewed were those applicable to teacher acceptance

and teacher beliefs in a high school setting. Additionally, the terms *in-service education,*

teacher education, and *pedagogical practices* were searched to find articles from between

2009 and 2016. These articles pertained to pedagogical changes in teacher practices and

effects of training in technology affects computer integration in the classroom.

A search was conducted on the ProQuest Central database using the terms *social*

cognitive theory and *self-efficacy* in order to locate specific articles written on this theory

and additional articles where it was applied.

Theoretical Foundation: Acceptance and Use of Technology

As technology integration becomes more pervasive in classrooms, it is important

to research teacher acceptance of such technology, as it is a critical factor in successful

implementation. Teachers' self-efficacy can be a barrier to effective technology use.

According to Bandura (1986), self-efficacy is one's own belief in his or her ability to

accomplish a task. Developing comfort with the use of technology is accomplished

through instruction and practice. According to Kao, Tsai, and Shih (2014), the confidence perceived by a learner can be shown through self-efficacy and therefore can greatly influence his/her motivation and learning results. Bandura (1991) identified the self-motivating function as a way learners motivate themselves to attain positive results while developing efficacy through "personal mastery experiences" (Bandura, 1977, p. 195). Bandura continues to explain that successes raise mastery expectations and repeated failures lower them. This is usually true when failure occur early in the course of events. People who set improvement goals for themselves develop self-reactions that drive them to goal attainment. Bandura (1977) stated:

> Self-motivation involves standards against which to evaluate performance. By making self-rewarding reactions conditional on attaining a certain level of behavior, individuals create self-inducements to persist in their efforts until their performances match self-prescribed standards (p. 193).

As Bandura describes above, self-motivation is imperative to changing behavior, such as a teacher's willingness to integrate technology in the classroom. Although behavior is not part of this research study, motivation pertaining to use of technology is important and will be discussed further.

Integration of technology in the classroom has been an ongoing discussion in teacher education. There are various uses of technologies in schools and the primary three are: technology for instructional preparation, technology for instructional delivery, and technology as a learning tool (Inan & Lowther, 2009). With the requirement to meet 21st century learning skills, teachers are faced with more challenges than before when trying

to integrate the technology into teaching and learning (Lowther et al., 2012; Luterbach & Brown, 2011; Starkey, 2011). "Through rapid developments in technology, new equipment is being added" making it difficult for teachers' to keep up on what technologies are available and identifying what "to use in the education-learning process" (Kalemoglu Varol, 2014, p. 157).

The lack of technology integration in schools is primarily due to the barriers teachers face, such as: access and time to use the technology, skill levels and knowledge regarding pedagogical integration, and limited professional development and training (Hew & Brush, 2007; Kopcha, 2012). The literature reviewed explored the social cognitive theory and self-efficacy, the 21st Century Learning Framework, teacher acceptance of technology integration, innovative approaches to enhance the learning process, and teacher professional development and training.

The Social Cognitive Theory

Smarkola (2011) conducted research with experienced and student teachers and found that computer usage intentions were predicted by perceived ease of use and perceived usefulness of integrating technologies within subject-specific lessons. The study also concluded that perceived usefulness of the technology had a greater influence than perceived ease of use. To understand technology integration and teacher intent to use technology in the learning process, it is necessary to study what motivates people to become computing teachers, their self-efficacy beliefs, and self-expectations (goals)" (Kordaki, 2013). Karaseva, Siibak, and Pruulmann-Vengerfeldt's (2015) study supports

this statement, finding that teachers with low technology self-efficacy were not as willing to integrate technology and would argue against the need for technology in the classroom.

Piper and Austin (2004) conducted a study to examine teachers' use of computers in the classroom, the amount of professional development received, and their attitudes towards working with and learning about computers. The three variables that were tested representing self-efficacy included teachers' beliefs about their ability to use the technology, their use of technology in teaching situations, and their use of software and general computer use. The study concluded that although teachers receive the necessary training with extensive professional development opportunities, if the teacher had a negative attitude about the use of computers then the teacher's self-efficacy was negatively impacted. Further research by Piper and Austin (2004) concluded that professional development programs offered by school districts should focus on improving teachers' self-efficacy in relation to using computers in a classroom setting.

Teo (2009) examined the relationship between student teachers' self-efficacy beliefs and their intended use of technology for teaching. He found the literature showed extensive research revealing the factors influencing teachers' technology use in education, however, there was limited research that examined the ways in which teacher use technology in teaching. The study showed a significant relationship between the perception of one's ability to use technology and how technology was used in instruction, either through teacher-led instruction or learner-centered instruction. Learner-centered instruction is a key component to effectively delivering 21st century learning.

21ˢᵗ Century Learning

Multiple attempts have been made in the United States to restructure teaching and learning to meet the needs of the students in a changing environment and culture. The U.S. Department of Education (1983) released a report entitled *A Nation at Risk* outlining the importance of assisting the failing school system. The No Child Left Behind Act (NCLB), released in 2001, was an attempt by the federal government to implement the recommendations from the report; however, the results showed questionable success in student learning (Liebtag, 2013). The most recent approach to address student achievement was the development of the Common Core State Standards (CCSS), which was written by the Council of Chief State School Officers (CCSSO) and the National Governors Association Center for Best Practices (NGA). The CCSS has been adopted by 45 states and the District of Columbia (CCSS, About the Standards, 2011).

The U.S. Department of Education partnered with several major corporations in order to identify a framework for 21ˢᵗ century skills, now known as the Partnership for 21ˢᵗ Century Framework (Partnership for 21ˢᵗ Century Skills, 2006). The Partnership for 21ˢᵗ Century Skills (P21) Framework (2009) encapsulates the outcomes and support systems required for teaching and learning in the 21ˢᵗ century. The framework focuses on two areas: student outcomes and support systems.
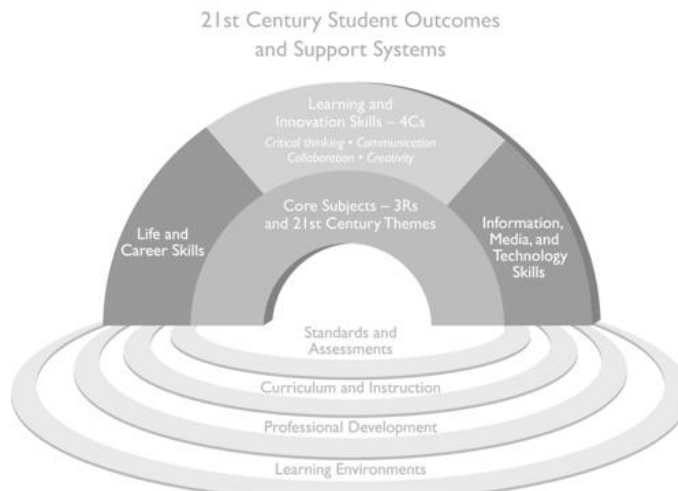
Figure 1. 21st century student outcomes and support systems designed by the Partnership for 21st Century Skills, *P21 framework definitions*, 2009, p. 1.

The 21st century student outcomes include the traditional 3R's: reading, writing, and arithmetic. The 4C's of critical thinking, communication, collaboration, and creativity were added. From there, the framework categorized the 4C's into three groups: (a) learning and innovation skills; (b) information, media, and technology skills; and (c) life and career skills (Holt & Brockett, 2012). The support system is broken down into four areas: standards and assessments; curriculum and instruction; professional development; and learning environments.

There were outcomes developed to address the majority of students in the U.S. who graduate high school without proficiency in core competencies that are critical for success in education, work, and life (Kay, 2010). The Partnership for 21st Century Education (2007) supporters believe there are nine core subjects that are pertinent in education and that education must be founded on content knowledge gained through projects that emulate real life learning activities.

The core subjects are:

- English, reading, or language arts

- Foreign languages

- Arts

- Mathematics

- Economics

- Science

- Geography

- History

- Government and Civics

Teachers are expected to practice interdisciplinary teaching methods and focus on four themes from the P21 Framework (2007) that have special relevance to modern life: Global Awareness; Financial, Economic, Business, and Entrepreneurial Literacy; Civic Literacy; and, Health Literacy. "Interdisciplinary work often draws on a real world context, because as we all know, real life issues don't restrict themselves to knowledge from just one subject domain" (Partnership for 21st Century Skills, 2007, p. 10). The interdisciplinary themes are integrated into each of the core subjects.

The core components of Learning and Innovation Skills are known as the 4C's: communication, collaboration, creativity, and critical thinking (Partnership for 21st Century Skills, 2011). These components focus on higher order thinking and promote the concept of life-long learning to build mastery of other 21st century learning skills. The

Partnership for 21st Century Skills (2010) outlined three primary characteristics our students must develop throughout their education to be successful contributors to society:

- How to make meaning with overwhelming amounts of information.

- How to work with people around the world (empathy).

- How to be self-directed, interdependent, and a superb lifelong learner.

The challenge for educators is to transform the learning process to encourage the development of these attributes in order for students to achieve the academic and technical skills required to be successful in school, life, and work (Annetta, Cheng, & Holmes, 2010; Lowther et al., 2012). The move to 21st century learning begins with the development of 21st century schools that deliver 21st century curriculum through innovative technologies and pedagogies.

The Common Core State Standards (CCSS) were released in 2010 as a common baseline for academic knowledge and college readiness skills (P21, 2011). As a result, over 40 states have adopted CCSS and begun intensive curricular redesign to align with the new standards. The CCSS calls for a rigorous core academic content mastery that acts as a baseline for college readiness that includes competencies such as higher-order thinking skills, critical thinking communication, and media/information/technology literacy as key performance outcomes where the curriculum and assessments need to be focused. The Partnership for 21st Century Skills (2011) identified the integration into the CCSS as a benefit for both initiatives in helping to prepare students for the demands of living in the 21st century:

The P21 Framework serves as a useful framework for states, schools, and

districts to organize and structure the relationship between the CCSS and

the demands of other important content areas such as science, social

studies, world languages, and the arts and music that are also essential for

student success. (p. 4)

The Partnership for 21st century learning (2009) defined Critical Thinking,

Communication, Creativity, and Collaboration as the key skills students need to acquire

before high school graduation. These skills are designed to prepare students to live, learn,

and work as effective contributors in the digital age and have been incorporated into the

Common Core, the most recent move toward educational reform in K-12 education.

School administrators and teachers have been challenged to integrate technology into the

curriculum and encourage students to engage in a new learning process (Annetta, Cheng,

& Holmes, 2010). With the new teaching requirements handed down by the U.S.

Department of Education, the Common Core has become a priority in education.

In order to effectively incorporate technology and the 21st century skills into the

curriculum, there needs to be a clearer understanding of the role Information and

Communicative Technologies (ICT) play in the learning process (Dede, 2010; Voogt,

Knezek, Cox, Knezek, and Brummelhuis, 2011). Voogt, Knezek, Cox, Knezek, and

Brummelhuis (2011) identified eight actions to be addressed for ICT to have a positive

effect on teaching and learning. Several of these actions promote the importance of

integrating technology into the curriculum and the extensive work that needs to be done

in education to meet the requirements of the educational reform taking place in the United States.

Action 1: To establish a clear view on the role of ICT in 21st century learning and its implications for formal and informal learning.

Action 2: To develop new assessments designed to measure outcomes from technology enriched learning experiences.

Action 3: To radically restructure schools to be able to use multiple technology-enhanced pedagogies to address individual needs of students.

Action 4: To better understand student technology experiences in informal learning environments, in order to inform work in formal settings.

Action 5: To develop and use models for teacher learning on technology use in schools and classrooms at the pre- and in-service levels.

Action 6: To develop and use distributed leadership models for technology use in schools and teacher education programs.

Action 7: To develop ideas on international opportunities relating to new and emerging technologies in order to address the needs of developing countries and promote global social awareness and responsibilities.

Action 8: To develop and disseminate a list of essential conditions which need to be in place to ensure benefit from technology investments (Voogt, Knezek, Cox, Knezek, and Brummelhuis, pp. 2-6).

The rapid advancement of technology and technology is reshaping the learning styles of students and challenging educators to transform the learning process in the

classroom to engage students and peak an interest to gain twenty-first learning skills and knowledge (Annetta, Cheng, & Holmes, 2010). With the help of computers and the guidance of the 21st Century Learning Framework, classrooms are slowly transitioning to knowledge focused discovery environments where students are engaged in critical thinking, problem solving, and knowledge creation (Starkey, 2011; Thomas, Ge, & Greene, 2011). Lowther, Inan, Ross, and Strahl's (2012) research revealed that in order for technology to create an impact on teaching and learning, it needs to be used more frequently and effectively in education. "Teachers play a central role in bridging the gap between: (a) the potential of technology to support learning as indicated by research; and, (b) teachers' own choices about pedagogy and classroom practices" (Cviko, McKenney, & Voogt, 2012, p. 32). Ng (2012) argued that it is the duty of educators to raise awareness of the educational technologies available for students to use in the classroom. Teachers' acceptance of technology, proper preparation, and technological support and integration of student-centered teaching practices in the classroom are all factors contributing to the success of technology integration in the high school classroom.

For this study, the social cognitive theory was used to measure teachers' confidence in acceptance and use of technology in the high school classroom. Professional development and training was examined to identify the support provided as facilitating conditions of integration into pedagogical practices, specifically student-centered teaching. Technology self-efficacy by instructors was also considered as it pertains to technology acceptance and application in a learner-centered environment.

Teacher Acceptance of Technology Integration

Hew and Brush (2007) defined technology integration as devices used in the learning process such as desktop computers, laptops, handheld computers, software, or Internet in K-12 schools. One or all of these devices can be found in the high school classroom, however, the computer is the most common technological device used by teachers. Technology integration has traditionally been focused on the classroom computer because computers are commonly found in teaching settings, more than other technologies (Celik & Yesilyrt, 2013). The types of technologies found in the classroom can be determined by the funding of the districts and the monies allocated to purchasing the technology. Students who participate in a technology rich classroom, regardless of the technology used, are more engaged and involved in the learning process (DeGennaro, 2008). Although the technology exists in the classroom, teachers face barriers to effective implementation.

The barriers that affect technology integration are affecting the use of technology for instructional purposes. Several topics have been researched to understand the barriers teachers face in technology integration: teachers' attitudes, beliefs, and self-efficacy as it relates to technology use (Brinkerhoff, 2006; Hughes, 2005; Celik & Yesilyurt, 2013; Kreijns, Acker, Vermeulen, & Buuren, 2013); support from administration through time, training, technical support, and school culture (Ertmer & Ottenbreit-Leftwich, 2010; Prestridge, 2012); and knowledge and skill needed to successfully integrate technology through pedagogical practices within the established curriculum (Hew & Brush, 2007; Kirkscey, 2012; Kreijns, Acker, Vermeulen, & Buuren, 2013). Teachers' attitudes toward

using technology in educational practices drives the effectiveness of delivering

technology supported education. Ertmer (2005) argued that it is ultimately the teacher's

decision on whether technology is used and relies on the beliefs the teacher has about

technology.

Perceived knowledge, skill, level of computer competency and experience, and

the amount of computer related instruction received influence teachers attitudes about

technology integration (Birgin, Cathoglu, Gurbuz, & Aydin, 2010; Kreijns, Van Acker,

Vermeulen, & van Buuren, 2013). Studies indicate that teachers tend to form a negative

attitude toward teaching with technology due to the time involved, even when they have

been trained. "This is likely due to the fact that the act of integrating technology requires

planning, teaching, and classroom management practices that are new to many teachers

and demands attention that is not normally spent in those areas" (Kopcha, 2013, p. 1118).

Addressing teachers' attitudes through education, communication, and administrative

tasks will not be enough to break down these barriers. Ertmer and Ottenbreit-Leftwich

(2010) recommend that significant time and effort be devoted to increasing the self-

confidence of teachers using technology through personal mastery achieved from

computer education and usage.

Bandura (1991) defined self-efficacy as people's beliefs about their capabilities to

exercise control over their own level of functioning and over events that effect their lives.

Teachers need to obtain the knowledge and self-efficacy to use technology to facilitate

meaningful learning for enabling students to construct connected knowledge that is

applicable to real situations. To successfully do this, teachers must act as an agent of

change by introducing the technology as an innovation. Ertmer (2005) suggested teachers who gain personal experiences and build personal mastery increase self-efficacy. Additionally, confidence increases when teachers witness students successfully using the technology through the facilitation of in-class instruction. Ertmer and Ottenbreit-Leftwich (2010) stressed that simply having knowledge of technology is not enough if teachers do not also feel confident using that knowledge to facilitate student learning. Therefore, it could be surmised here that computer and technology self-efficacy are essential to successful integration into pedagogical practices.

Computer self-efficacy is the confidence an individual has in mastering a specific technology (Compeau & Higgins, 1995; Venkatesh and Davis, 1996). Technology self-efficacy and computer self-efficacy are the same, except computer self-efficacy focuses on the ability to perform tasks on the specific technology (Holden & Rada, 2011). The dimensions of computer self-efficacy, like that of self-efficacy, include magnitude, strength, and generality (Compeau & Higgins, 1995). Bandura (1986) identified self-efficacy as one's belief in his or her ability to execute a particular task or behavior. A person with high computer self-efficacy has the belief that he or she will be successful in using the technology, while a person with low computer self-efficacy has the belief that he or she will have difficulty learning and using the technology.

Teacher self-efficacy directly effects the chance teachers will implement new technologies in the classroom. According to (van Uden, Ritzen and Pieters (2014), teachers' technology integration will be affected by what they know and by their view of the importance of that knowledge. A teacher's feelings of self-efficacy will determine

whether teachers enact specific behaviors or apply specific knowledge. Understanding teachers' self-efficacy toward technology will provide insight into the willingness to incorporate the technology into the curriculum. If a teacher believes that certain outcomes cannot be achieved through technology use, he or she will not be motivated to integrate the technology. Holden and Rada (2011) suggested evaluating teachers' self-efficacy toward technology usage when assessing their attitudes toward technology usage. An essential factor to successful integration of technology in the classroom is teachers' attitudes toward technology usage.

Celik and Yesilyrt (2013) conducted research on teachers' attitudes toward technology, perceived computer self-efficacy, and computer anxiety. This research determined that attitude toward technology significantly explains a user's perceived computer self-efficacy. Another study conducted by Aypay, Celik, Aypay, and Sever (2012) came to the same conclusion revealing that when technology gets easier to operate, teachers tend to develop positive perceptions, which increases the likelihood of using the technology in the classroom. Both studies revealed that attitude to technology and computer self-efficacy is directly related to teachers' attitude toward using technology.

Innovative Approaches for Enhancing Learning

When computers are placed in classrooms they do little more than support existing teaching practices and are rarely used for instructional purposes (Blackwell, Lauricella, Wartella, Robb, & Schomburg, 2013; Kopcha, 2013). Teachers who look favorably to technology integration are more apt to effectively incorporate the technology

in the classroom to enhance the learning process. Teachers are responsible for

constructing the curriculum that will incorporate new technologies and curriculum reform

required in the learning process to encourage student engagement and academic

achievement (Cviko, McKenney, & Voogt, 2012; Voogt & Pareja Roblin, 2012). Fisher

and Waller (2013) argued:

> "The call for teachers to integrate technology into the curriculum, provide
>
> necessary skills for the 21st century workplace, and support best teaching practices
>
> has increased over the last 30 years; however, simply adding technology to a
>
> classroom does not make it a better learning environment" (p. 33).

Students learn differently today due to the increased level of technology use outside of

school thus increasing the need for teachers to integrate technology into the pedagogy in

order to effectively engage students in the learning process (DeGennaro, D., 2008).

Friedrich and Hron (2011) argued that computers should be used in connection with a

student-centered pedagogy and should support active, self-directed, and exploratory

learning. The student-centered model focuses on developing real life skills as defined in

the P21 Framework, such as collaboration, higher-order thinking, and problem solving

(An & Reigeluth, 2011). When there is a higher level of technology use, teachers develop

increased student-centered philosophies where learning is regarded as an active process

of knowledge construction (Hooper & Rieber, 1995). This method is grounded in a

teacher's own belief and comfort that this is the acceptable teaching method for students.

An and Reigelugh's (2011) research revealed that most professional development

concentrated on the use of technology, but not how to integrate that technology into the

pedagogy and content. These findings found that a lack of knowledge about [learner-centered instruction] LCI might prevent teachers from creating learner-centered classrooms.

There is a link between teacher beliefs associated with constructivist approaches and using ICT as a partner to facilitate creative thinking and learner-centered activities (Prestridge, 2012, p. 450). Teachers must take a leading role in the restructure of teaching and learning practices in order to effectively design learning environments to incorporate technology to help students learn (Keengwe, Onchwari, and Onchwari, 2009, p.12). Keengwe, Onchwari, and Onchwari (2009) researched educational reform and the transformation of pedagogical practices to incorporate technology into student learning. In this research, they found that learner-centered approaches focus students on active learning activities, fostering critical thinking, and interactivity in real-life circumstances, confirming that learner-centered teaching is the preferred method for meeting 21st century teaching and learning requirements.

Learner-centered pedagogy requires a rethinking of the traditional classroom by shifting professional development from a behavioristic to constructivist approach (Pitso & Maila, 2013, p. 1).Pitso and Maila (2013) argue that professional development is directly tied to the quality of education and this training must switch to a constructivist approach. Dunn and Rakes (2010) explained that learner-centered classrooms are more custom-built classrooms designed for optimal learning that move away from the one-size-fits-all, teacher-centered, lecture-orientated classroom. Kim, Kim, Lee, Spector, and DeMeester (2013) define teacher-centered as activities teachers use to promote learning

while student-centered are activities that engage the student. Research has revealed that students who apply information and communication technologies in the classroom are able to complete complicated tasks such as problem analysis, self-evaluation, and formulating suitable questions (Sharifi & Imani, 2013). The transfer of knowledge from the teacher to the student is fundamental in the learning process (An & Reigeluth, 2011; Darling-Hammond, 2010; Ertmer & Ottenbreit-Leftwich, 2010). Transitioning teachers to the learner-centered teaching method, although beneficial for the students, could prove to be challenging.

The challenge faced by teachers is the time commitment and re-training they will undergo to develop the skills to deliver 21st century instruction through technology integration. According to Kim et al. (2013), an overwhelming amount of support that satisfies progressive change should be provided for the sustained growth and positive changes in teaching practice to occur. Liu (2013) conducted a study on the impact of teacher professional development on technology use and found that the teachers changed their perspectives on methods for technology integration from lecture-based teaching to student-centered teaching through effective teacher professional development. A change of attitude has shown an increased use of technology.

Dunn and Rakes (2010) hypothesized teachers who embraced learner-centered methods are more likely to integrate technology in the classroom. The findings of this research concluded that teachers who used learner-centered methods with greater efficacy show a higher degree of interest in the effect technology has on the learner and academic outcomes. Additionally, they found professional development provided to teachers was a

key indicator of successful implementation and need to address teacher characteristics that present road blocks to the integration of technology in the classroom.

Mentoring among teachers is one method that can help to close the gap between technology acceptance among teachers and learner-center practices. Kopcha (2013) claimed that mentoring is a way to prepare teachers to negotiate the common barriers and improve their use of technology for instruction. Research has revealed that when teachers share knowledge about technology use and incorporating technology in the curriculum they become more comfortable and motivated to use the technology (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012; Gorozidis & Papaioannou, 2014; Liu, 2013). Accordingly, it could be established that using peer collaboration through learning communities provides an avenue where teachers can share information and build the confidence needed to effectively integrate technology into the curriculum. A cost-effective alternative to mentoring is establishing a community of practice where teachers meet periodically to share ideas and receive support.

Teacher Professional Development

Teacher professional development (TPD) is provided by the administration to inform teachers of current technology integration practices. The National Technology Plan (2010) developed by the U.S. Department of Education identified teacher learning as a primary goal, however, teachers are saturated with course content required to ensure students test well leaving little or no time for professional development. Professional development would offer teachers' the opportunity to learn how to integrate technology into the curriculum and engage students in 21st century learning activities. Kopcha (2012)

conducted research that showed technical training activities increased teachers' abilities to implement technology in the curriculum and positively shape teachers' perceptions of technology and their beliefs, skills, and instructional practices. Formal teacher training increases awareness and builds confidence in utilizing the technology.

Professional development is a required component of instructional technology initiatives that need to be planned and implemented in a timely manner and meet the schools learning goals (Ara, 2013; Keengwe, Schnellert & Mills, 2011). Venkatech et al (2003) argued that in order for technology integration to be successful, certain facilitating conditions such as professional development need to be met so participants believe support services exist and are available. The technological and organizational environment throughout the implementation process needs to incorporate and address facilitating conditions as a core component of the process. Facilitating conditions can break down barriers of technology use through training and support services.

Teachers require access to high-quality training programs designed to provide the level of quality education teachers need to incorporate innovative teaching and learning activities in the classroom (Darling-Hammond, 2014). Teachers need an understanding on how students learn, what motivates students, and how to construct purposeful curriculum to connect with the students. What is lacking in the teacher education programs needs to be addressed through technology training and professional development programs that continually focus on developing student-centered learning (Lui, 2003, Keengwe, Onchwari, & Onchwari, 2009).

The lack of teacher education and professional development are barriers to technology integration and teacher acceptance. Kirkscey's (2012) research supports the idea that professional development plays an important part in preparing teachers for technology integration. Although support for technology is provided, "a majority of instructors reported that they do not have enough time to prepare themselves and/or their students to use technology suggests that they still may lack appropriate professional development" (p. 25). Instructor attitude self-efficacy beliefs toward technology integration is also a factor that can be addressed through training.

Lee and Lee (2014) conducted a study on how teacher education affects teachers' self-efficacy beliefs and if teachers' attitudes regarding technology integration would be affected if practice in lesson planning was provided. The results indicated that practice did not have a significant effect, however, it was determined that "teachers' attitudes toward computers and their lesson planning skills directly influenced their self-efficacy beliefs for technology integration" (p. 126). After training on course development integrating technology in lesson planning, teachers' self-efficacy beliefs regarding technology integration increased.

Teachers play a significant role on if and how technology is effectively integrated into teaching and learning. "Teachers decide on the type, frequency, and quantity of technology tools they use in their curriculum design and lesson delivery" (Teo, 2014, p. 127). The rapid advancements in technology and technologically savvy students are putting pressure on teachers to change pedagogical practices from teacher-centered to student-centered learning (Harris, Mishra, & Koehler, 2009: Keengwe, Onchwari, &

Onchwari, 2009). To effectively deliver instruction with computers, teachers need to

learn how to design the curriculum and in some cases, develop a new way of teaching.

"Constructivism applications lead to [an] active environment based on interactions and

learning activities in project based learning, inquiry based instruction, and student-

centered learning" (Musawi, 2011). This cannot be accomplished without an

understanding of which technologies compliment the subject-matter and how to

effectively implement them into the curriculum.

Review of Alternative Models

Other frameworks considered were the Technology Acceptance Model (TAM)

and the Integrative Model of Behavior Prediction (IMBP). The TAM was rejected due to

the extensive research in technology integration in education that has already been

conducted and the limited predictability of technology acceptance. Venkatesh and Bala

(2008) reported that the TAM could only predict technology acceptance in 40% of the

research studies while the UTAUT predicted technology acceptance in 70% of the cases.

"By providing a considerably better explanation of technology acceptance it can be

considered [a] superior research model than prior models" (Ifenthaler & Schweinbenz,

2013, p. 526). The TAM has been used as a research model in all levels of education,

however, the UTAUT has not been applied in a K-12 context.

The three variables that define the IMBP theory include attitude, perceived norm,

and self-efficacy (Kreijns, Vermeulen, Kirschner, van Buuren, & Van Acker, 2013).

Attitude is based on the perceived outcome achieved by using technology. The teacher's

knowledge and skill of using the technology is the basis of her or his outcome beliefs.

Perceived norm is the likelihood of the teacher to use the technology. The IMBP model was rejected because there is a greater concentration on the psychological understanding of why technology is not used which is beyond the scope of this research.

Creswell (2009) indicated theory is used in qualitative research as a theoretical lens that guides the research to determine the type of questions to be asked and informs how data are collected and analyzed. The social cognitive theory helped to formulate the research questions defined in this study. Therefore, the best approach for this study is to use the social cognitive theory as a theoretical lens to guide the direction where further research is needed with an emphasis on the effort expectancy and facilitating conditions elements.

Summary and Conclusion

This chapter presented a review of the current literature in relation to the integration, use, and acceptance of technology in the high school classroom. The following topics were presented: (a) the social cognitive theory and self-efficacy, (b) the 21st Century Learning Framework, (c) teacher acceptance of technology, and (d) innovative approaches for enhancing learning and professional development.

Chapter 3 discusses the research design, rationale, and methodology. This includes details on the sample size, sampling procedure, instrumentation, and data collection methods. Finally, there is a review of the ethical procedures, rights of the participants, and data analysis.

Chapter 3: Research Method

The purpose of this qualitative case study was to understand the perspectives of six selected high school teachers regarding the benefits of and barriers to creating technology-rich curriculum. In this study I also examined how the teachers perceived the way technology was integrated into their instructional strategies to meet the requirements of 21st century teaching and learning. The case study research method was selected to develop a deep and holistic understanding of the phenomena. The quantitative approach would not provide the intimate level of research required to produce the same results for the questions asked.

This chapter provides insight into the research design selected for this study and the rationale for my use of the qualitative case study design. This includes an explanation of the central concepts surrounding the study and how these concepts were better examined through a case study approach. The role of the researcher is described as well as how any previous relationships, interactions throughout the research study, and ethical issues were addressed to prevent researcher biases. The chapter also includes an explanation for the method of selecting participants, the instrument used for collecting data, the procedures used for participation recruitment, and the collection of data and the data analysis procedures. Finally, this chapter addresses ethical issues to ensure the credibility, trustworthiness, and dependability of the data collected throughout the study. Ethical issues addressed include agreements on the part of the participants to gain access to data through interviews and observations, early withdrawal by participants, and any other concerns that could impact the credibility of the study.

Research Design and Rationale

Research provides professionals and practitioners with a tested and reliable method of understanding a phenomenon. According to Merriam (1998), all research is concerned with producing valid and reliable knowledge in an ethical manner. This study was conducted in an ethical manner to produce quality results and can be used by teachers in the field to learn and explore new ways to deliver instruction through the use of technology. Teachers will also see how 21st century learning is incorporated into the curriculum and the way technology enhances the learning process.

The following research questions were used in this study:

1. How does a teacher's level of self-efficacy impact their ability to effectively incorporate technology in the classroom?

2. What are teachers' perceptions of benefits and barriers for creating technology-rich curriculum that promotes student-centered learning?

3. What teacher preparation experiences or strategies are used to prepare teachers for teaching and learning in the 21st century?

Role of the Researcher

I interacted with the participants through personal interviews, observation, collection, and examination of data. Stakes (2010) describes the researcher as an instrument who observes action and contexts while using his or her own personal experience in making interpretations. As the sole researcher in this study, I was responsible for selecting the site for the study, participant selection, the instruments used to collect data, and the final analysis of the data. I was also responsible for obtaining

permission from the principal of the selected school to conduct the study and consent

from participants who participated in the study. It was critical to have a clear

understanding of the process, issues, and phenomena of the study to avoid bias during the

data collection process and to align to all Internal Review Board (IRB) guidelines. The

research and data collection strategies used in this study are discussed later in this

chapter.

Methodology

I selected the qualitative case study because this design allows for an intimate

approach to collecting data from a small sample of participants. The phenomenon under

investigation in this study was the use of technology to enhance the pedagogical practices

of teachers when delivering instruction. The specified boundary was one public high

school. Identifying the bounded system was necessary. According to Merriam (2007) it is

easier to see the case as a thing, a single entity around which there are boundaries.

Merriam explained that if the phenomenon is not intrinsically bounded, it is not a case

study.

Participant Selection Logic

The participants for this study were six high school teachers at an urban high

school who incorporate technology into their curriculum. Once approval was obtained

from the Institutional Review Board at Walden University, I contacted the superintendent

of the school district to act as a gatekeeper by providing access to the principal of the

high school. The superintendent set up a meeting at his office to introduce me to the high

school principal. The principal provided the names and contact information of teachers in the high school who taught grades 9-12.

I sent an email to all teachers in grades 9-12 at the high school with the invitation letter (Appendix B). I then sent the Participants who responded with interest in participating an email with the consent form. A link to a questionnaire including questions inquiring about the extent of technology use and confidence in integrating technology into teaching and learning were also sent to potential participants.

The questionnaire provided insight into technology use for instructional purposes and guided the selection of participants. Gay, Mills and Airasian (2006) indicated that a questionnaire is used in qualitative research to collect a large amount of data from participants over a short time. They define a questionnaire as a written collection of self-report questions to be answered by a selected group of research participants.

Ten participants responded initially with an interest to participate in the study. Six of the 10 potential participants completed the consent form and questionnaire. The results from the questionnaire were reviewed to confirm the potential participants met the criteria. All six members met the criteria and they were selected to participate in the study.

Participants were purposefully selected because they: (a) incorporated technology into the curriculum; (b) understood 21st century learning and had or wanted to incorporate it into the curriculum, and (c) participated in professional development in relation to technology integration or curriculum development with technology. Merriam (1998) identified purposeful selection as one of the most a common form of non-probabilistic

sampling strategies. This form of selection allows the researcher to select a sample that provides rich data for the study. There was no requirement for the number of years that a teacher had been teaching overall or at the school, only that the teacher was using technology and had an understanding of 21st century learning. Participants who met the requirements of the research and expressed an interest in participating were emailed a selection letter (Appendix E) to participate in the research study. No teachers requested to withdraw from the study and no replacement participants were required.

Instrumentation

Instrumentation used in this research study included a selection questionnaire, interviews with the subjects including follow-up interviews, and artifacts that include lesson plans, assignments, professional development materials, and any other documentation the participant felt necessary to include. The selection survey was a 21-question survey used to determine if the subject met the criteria for the research study. The interview was comprised of two background questions and twelve questions related to the study topic. At the end of the interview, there were three questions pertaining to how to contact the participant for a follow-up interview, if the participant was willing to participate in a follow-up interview, and if the participant had any further questions.

Selection Criteria Questionnaire

The questionnaire that I used for this study was originally designed for a study conducted by Wang, Ertmer, and Newby (2004) to identify teacher self-efficacy beliefs for technology integration. The questionnaire helped determine a teacher's knowledge of technology and whether or not the teacher used technology in the classroom. The

questionnaire also identified teachers who developed curriculum that incorporated technology into pedagogical practices. The extent of technology used and comfort level with using technology in the classroom was used to select the participants. The goal was to identify a range of participants who effectively used technology to determine what motivates teachers to incorporate 21st century learning activities in the classroom.

Interview

Once a teacher confirmed their interest in participating in the study and returned the consent form, I contacted her or him individually to review the requirements of their participation and confirm that they understood what was expected of them as participants of this study. I took into consideration the purpose of the study and the procedures on how data were collected throughout the research process, following Internal Review Board guidelines. I met with participants on site at the high school or another location to meet the needs of the participant. I sent participants a copy of the open-ended interview questions one week prior to the meeting. I digitally recorded each 20-30 minute interview session.

The interview questions listed in Appendix G focused on the theoretical framework and research questions and were asked during a structured interview with the participant. Gay et al. (2006) identified the structured interview as a formal process that can take up to several hours and the "researcher has a specified set of questions that elicits specific information from the respondents" (p. 418). I asked all participants the same questions to retrieve the information required for the study. Appendix A provides

an overview of each research question and the relationship between these questions, the interview questions, and the theoretical framework.

Only open-ended questions were included in the instrument. Patton (2002) argued open-ended questions provide insight into what the person is thinking and feeling in his or her own words. Patton (2002) explained the purpose of interviews as a way to capture how those being interviewed view their world and to capture the complexities of their individual perceptions and experiences. The extensive responses derived from qualitative interviews through open ended questions is what separates qualitative research from the closed ended questionnaires found in quantitative research studies.

Initial Interview. Questions one and two in the initial interview provided background information about the participant and gave participants an opportunity to discuss their teaching experience at the high school level. The purpose of these questions was to put the participant at ease and to obtain information on the level of experience the subject had in teaching with technology.

Questions four through six focused on research question one. The first question was a restatement of the research question that asked how a teachers' self-efficacy impacts their ability to effectively incorporate technology into the classroom. These questions requested details about the teachers' comfort with technology integration, such as the types of technology the teacher felt comfortable integrating and the comfort level with exploring with new technologies. These questions related to Bandura's (1986) social cognitive theory as it related to technology to understand the level of self-efficacy the participant had in relation to technology use and acceptance.

Questions seven through nine focused on understanding the benefits and barriers teachers face when trying to incorporate technology in the curriculum. The focus was on how the barriers identified affected technology integration and the development of technology-rich curriculum. Question seven asked the subject to explain the benefits perceived in relation to incorporating technology. Question eight asked for the barriers perceived in relation to incorporating technology. Question nine asked for specifics on how the barriers impacted technology integration.

Questions 10-12 were related to the professional development experiences the subjects had in relation to technology integration and curriculum development. The first question inquired about the amount of professional development offered by the school district that the subject participated in within the last two years. The following questions asked about the level of training in technology and curriculum development the subject received through professional development opportunities.

The final three questions were related to follow-up interviews. These acted as a reminder that a follow-up interview may have been necessary for clarification and identified a convenient times in case this need should arise. There was also a question that allowed the subject to add, clarify or change any response obtained during the interview.

Follow-up Interviews. Follow-up interviews were not scheduled, however, an email was sent to participants asking for clarification on the information provided in the initial interview. This included a question about the Bring Your Own Device (BYOD) policy at the school, how technology self-efficacy affects the ability to integrate

technology in the curriculum, and a personal definition of self-efficacy. Three participants responded to the follow-up email (Appendix H).

Artifacts

In the consent form, teachers were asked for permission to review documents such as lesson plans, assignments, and training materials received during teacher in-service or training sessions provided by the school district. The requirement of the artifacts was based on the research questions to determine use and acceptance of technology and incorporation of technology into the curriculum to enhance 21st century learning. Reviewing the actual teachers' lesson plans and teaching material artifacts helped to determine if the participant integrated technology into the lessons and how students used the technology. Additionally, through the review of lesson plans and assignments, I explored how technology was used in the curriculum to enhance 21st century learning and whether or not the participant was familiar with the 21st century learning skills initiative and importance of incorporating these skills in the learning process.

<div align="center">

Procedures for Recruitment, Participation, and Data Collection

</div>

The selection criteria questionnaire used for this study did not require coding. Analysis of prospective participant criteria were based on whether the subject responded yes to all questions and used technology in the classroom. Data was collected through three principle sources including selection questionnaire, personal interviews, and artifacts entries. Data collection protocols were developed for each individual source. It

was my goal to maintain strict adherence to these data protocols in order to improve the trustworthiness of this qualitative case study.

Data Collection

Patton (2002) developed a structured process to guide the data analysis process in a qualitative case study. The purpose is to collect in-depth, detailed, and systematic information about each participant, with the results producing a product, or case study. The individual data collected on each case was compiled to produce the final case study. The first step in Patton's data collection approach is to identify, code, categorize, classify, and label the primary patterns or themes of the data. This procedure produced the significance of the data for proper analysis. For the purposes of this study, Patton's data collection strategies were used to analyze the data.

After Institutional Review Board approval was obtained and the consent form was received from prospective participants, the same potential participants were emailed a link to participate in the selection questionnaire (Appendix D). The questionnaire was available via a website. This information was not coded and was used to identify potential participants in the study. This information was collected over a two week period. There were ten potential participants who responded to the invitation to participate. Eight of the ten potential participants returned the consent form and six out of the eight participants completed the online questionnaire. Those who met the criteria were emailed a selection letter (Appendix E) that confirmed participation in the study. A separate survey was created for each participant for security purposes. The surveys were deleted after the data was collected and transferred to a removable hard drive. The

removable hard drive was password protected and kept secure in a locked location. The removable hard drive also stored the recordings from interviews, electronic copies of interview transcripts, artifacts collected, and analysis of data. After the selection letter was emailed confirming participants participation in the study, an email was sent individually to each participant to set-up interview time and location.

Interviews were conducted in person or via video conferencing, dependent on the preference of the participant. Interviews lasted between 20-30 minutes. The questions in Appendix A guided the interviews and focused on the research questions and theoretical framework. The intent was to interview the participant only once, however, an email was sent to participants (Appendix H) to obtain additional information or for clarification.

Data Analysis Plan

The data included interviews, logs of transcripts, recordings, notes, and communications. Personal information collected from the participant selection questionnaire was organized and maintained in an Excel spreadsheet. For organizational purposes in the data collection process, an identification number was assigned to each participant and attached to all data collected from that participant. Themes were identified from the data collected and each entry hand coded for easy tracking.

There were no participants who elected not to participate in the study, or requested to be removed from the study. If at any point during the study a participant would have been identified as not eligible or not meeting the criteria of the study, that participant would have been contacted by email communication with an explanation and

informed that the data collected would be destroyed, except for the participant selection questionnaire data.

Issues of Trustworthiness

To ensure the study is conducted in an ethical manner, Merriam (1998) stressed the importance of paying close attention to the study's conceptualization, how data is collected, analyzed, interpreted, and reported. The use of triangulation, collecting data from multiple sources, is one way to ensure validity of the data.

Credibility

Merriam (1998) argues that internal validity in research centers on the meaning of reality. The case study approach provides readers with real life situations and the results of the study identify how the findings match reality of the subjects, situation, or phenomenon.

Merriam explains:

And because human beings are the primary instrument of data collection and analysis in qualitative research, interpretations of reality are accessed directly through their observations and interviews. We are thus 'closer' to reality than if a data collection instrument had been interjected between us and the participants. Most agree that when reality is viewed in this manner, internal validity is a definite strength of qualitative research. (1998, p. 203)

Creswell (2009) outlined eight of the most frequently used strategies to ensure credibility and trustworthiness of qualitative data: (a) triangulation; (b) member checking; (c) rich description of findings; (d) clarify bias of the researcher; (e) negative or discrepant case analysis; (f) peer review; (g) extensive time in the field; and, (h) document the research

process. This case study applied triangulation as the strategy to confirm the validity and credibility of the findings. Triangulation of interviews with artifacts made available by the participant established the participant's credibility of recall and accuracy.

Triangulation is the process of collecting data from multiple sources for a better understanding of what is being studied and cross-check the information (Gay, 2006). Data that is collected by more than one method strengthens the validity of the data. According to White (2005), triangulation requires diversity of ideas, experiences, and perspectives. Data collection methods included a technology survey, personal interviewing, and review of artifacts. Triangulation was used in this case study to ensure the validity of the data collected and provide readers with reliable results.

Transferability

Transferability is the ability of the findings in one study to be applied in other situations (Merriam, 2014). The teachers in this study teach at an urban public high school in the state of Ohio. They are required to meet the same teaching standards as other certified teachers within the United States. Guba (1981) identified two strategies for validity: (1) collect detailed descriptive data; and, (2) develop detailed descriptions of the content. These two strategies were used in this case study during the data collection and analysis phases through triangulation.

Each interview conducted was tape recorded. Detailed descriptions of the location, setting, and interview process were documented in order to validate the external validity of the data collected as documented in the field notes. These notes were logged in a spreadsheet that documented the date and time of the interview, length of the recording,

and reference to field notes taken during the interview. The field notes also documented the start and stop times of the recording.

Dependability

In qualitative research, data analysis and interpretation is determined by the researcher which can lead to bias. Therefore, researchers conducting their own studies should adhere to guidelines that check the quality of the data. Creswell (2006) said this can be accomplished by providing "a clear link between data collection, analysis, and interpretation" (p. 482). As the sole researcher, I analyzed and produced the findings from the research in a clear, concise manner without bias.

Confirmability

There were various methods of data collection utilized in this study, which was the basis for triangulation. According to Guba (1981) conformability can be achieved by using triangulation as a strategy when analyzing the data. Triangulation has been defined as a method to be used to validate the data in this study. Through triangulation, the neutrality and objectivity of the data collected in this case study was met.

Bias is a concern when conducting a research study. Some areas of bias that could arise include procedures used to collect data, ensuring conclusions draws are in alignment with the data presented, and affirmation by the researcher identifying an understanding of her own personal biases as it relates to the study. I used artifacts to record and control personal biases in relation to contact with subjects and data. Biases encountered and recorded are reported in the results section of the study. An experienced qualitative researcher was also provide data analysis of a select number of interview question

responses. The results from this review was compared to my analysis to insure no personal bias existed.

Ethical Procedures

I have a National Institutes of Health (NIH) certificate completed on July 5, 2015 (Certificate Number 1793765). Walden University's Institutional Review Board approved this research study, approval number #10-26-15-0064844 on October 25, 2015. After approval from Walden University's Institutional Review Board, the superintendent of the school district was contacted for contact information of the principal at the high school where the study was conducted.

This study included at least one interview with the participants. These interviews could cause mild discomfort, agitation, or limited increased stress. I did not prevent older adults or pregnant woman from participating in the study, so participants were monitored during the interview for any of the above stated conditions. Additionally, I worked toward developing a trusting relationship with the participants by providing detailed information about the study, allowing the participants to ask questions, and ensuring that all information provided during the study remained confidential.

The confidentiality of the information collected during the study was critical. The collection of any personal information only occurred in questions asked in the questionnaire. If the participant divulged any personal information and then recanted it, it was my responsibility as the researcher to ensure the information would not be used.

The selection criteria questionnaire was stored on a password-protected website and only accessible by the potential participants over a two week period. The

questionnaire was taken down from the website and all data was transferred to a

password-protected hard drive for storage. All emails and documentation obtained from

the participants was scanned into the computer and stored in PDF format on the external

hard drive designated for this study. Any hard copies were stored in a locked drawer. All

documents included the unique identifier assigned to that participant. The documents and

artifacts collected were logged into an Excel spreadsheet for tracking purposes. Contact

information and responses from the selection criteria questionnaire was stored in a

separate spreadsheet and be used for contact information only. I was the only person with

access to the files stored on the password-protected external hard drive. After five years,

all files will be destroyed and the hard drive formatted.

Researcher Bias

My own experiences teaching high school students in the traditional classroom

utilizing technology prompted my interest in this research topic. To track these biases, a

research journal was used for recording any encounters while working with subjects and

the data. This included selection criteria, interactions and communications with the

subjects, data gathering and analysis, and final conclusions drawn. These research journal

entries provided a method that allowed me to identify any bias. This information was

valuable in validating the study. The coding of interview responses to determine themes

and categories was partially repeated by an experienced researcher to also assist in

avoiding personal bias in data interpretation.

Summary

This chapter included the research methodology that was used for this study, a detailed explanation of the research design and the reasons why the case study design was chosen. Also included in this chapter was the role of the researcher, the participants, and the sampling techniques that were used. This information was broken down to include the instrumentation, procedures for recruitment of the participants, data collection, and a data analysis plan. For this case study, data was collected from multiple sources. These include a technology survey, personal interviews, and artifacts that provides opportunities to record experiences throughout the research process while interacting with the participants on site and through communications.

The final sections of this chapter reviewed the strategies that were used to improve the trustworthiness of this qualitative study, addressed researcher bias, and ethical issues that could arise during the data collection process. This research study provided implications for social change as it pertains to the acceptance and use of technology in teaching practices that incorporate 21st century learning skills. Readers will take away lessons learned on effective student-centered learning utilizing technology that can be incorporated into the high school curriculum.

Chapter 4: Results

The purpose of this qualitative case study was to examine six teachers' use and acceptance of technology in the high school classroom, how they incorporate technology in the learning process to meet 21st century learning needs of the students, and whether the professional development provided effectively prepared them to construct the curriculum used to integrate the technology. Data were gathered from a participant selection survey, personal interviews with the six teacher participants, and artifacts such as lesson plans and assignments. The information provided a viable means to explore how teachers perceived technology integration and student-centered learning. This study was guided by the following research questions:

1. How does a teacher's level of self-efficacy impact their ability to effectively incorporate technology in the classroom?

2. What are teachers' perceptions of benefits and barriers for creating technology-rich curriculum that promotes student-centered learning?

3. What teacher preparation experiences or strategies are used to prepare teachers for teaching and learning in the 21st century?

This chapter includes details of the data collection and analysis, demographics of the participants, data collection and procedures, and a summary of the findings. Themes that arose during data analysis are also presented as they relate to the research questions. This chapter also includes an assurance of trustworthiness of these procedures and an explanation on how the results for each of the three research questions aligned to the theoretical framework.

Setting

The setting for this qualitative case study was an urban high school in Northeast Ohio. The Washington building is the oldest school still in use, constructed in 1894 (Elyria Historic Book Committee, 1992). Currently, the school serves over 2,000 students in grades 9-12. In early 2000, the existent school buildings were deemed unsafe by the county engineer's office, so a levy was passed to level the school and build a new one. The Washington building was the oldest portion of the school. Instead of tearing it down, it was revitalized and updated to remain as a part of the school's history.

The new high school was completed in 2011. It spans two city blocks and is over 300,000 square feet. In addition to a new building, the faculty and students also benefited from updated technologies that surpassed anything they had in the old buildings. In the new building, teachers and students had Smartboards in every classroom, multiple computer labs, Chrome carts, and advanced media production equipment.

Due to this school's rich history and recent transformation, it was selected as the site for this study. New technologies necessitated training teachers in the use of those technologies and how to integrate them into the curriculum. Transitioning teachers from the pre-existing conditions with limited technology to the newly constructed, technology-rich environment aligned with the research directives of this study.

Demographics

The participants in this study included six secondary school teachers who volunteered to take part in the study. The participants included two math teachers, two

business teachers, one health teacher, and one English teacher. This participant pool

brought a range of disciplines and offered a view of a variety of methods for

incorporating technology. All participants were certified teachers and all participants held

a master's degree. Each participant in the study has a pseudonym identifier so her identity

is not revealed. Table 1 contains demographics of the participants.

Table 1
Demographics

Pseudonym/ Number Code	Age	Gender	Teaching Position	Years Teaching Experience	Degrees
Joan, 12016	40-49	F	Health 9-12	18	Masters
April, 82016	50-59	F	Math	25	Masters
Diane, 92016	40-49	F	Business 9-12	6	Masters
Chris, 72016	50-59	F	Business 9-12	14	Masters
Amy, 22016	30-39	F	9th and 10th grade English 7-12th Language Arts	11	Masters
Laura, 52016	30-39	F	Math	8	Masters

Participant Descriptions

April

April has 25 years of teaching experience. We met at her home in the evening to

accommodate her busy schedule. She has taught math at the junior high, high school, and

college levels and has taught at this high school for the past 15 years. April was the first

teacher at the school to have a Smartboard in the old building and has been using one for

almost 10 years. In the classroom, she requires that every student use a scientific

calculator, which they can purchase or borrow from the math department. April

demonstrated confidence in her use of the calculators and incorporating them into the

curriculum. Her years of teaching experience and comfort level with this technology was

evident by her explanations and examples. I was impressed with her willingness to try new technologies; however, I found that the technologies she uses the most are those with which she is most comfortable.

Laura

Laura was the youngest and newest teacher I interviewed. We met during her break in the classroom where she teaches math. The room was equipped with a Smartboard and computer on the teacher's desk. There were whiteboards on two of the walls with mathematical equations and formulas written on them. Her enthusiasm for using technology was different from the other participants. She indicated that technology was a part of her teacher education program in college and it was used in her own classroom right from the start. As the younger teacher, I expected Laura to embrace technology. However, she surprised me when she pointed to her whiteboard and stated that teaching her lesson with a whiteboard or chalkboard was just as productive as using the Smartboard or other technology. Laura then shared that using computers with the students does help them to see how mathematics is used in a program and possibly visualize how it can be used in business or another field. While new to teaching, she definitely understood when technology benefited the learning process.

The technology Laura uses most in the classroom is the graphing calculator. She took one off of the bookshelf and showed me how to use it. She shared how she introduces it in the beginning Algebra class and informed me of the time it takes to teach

students how to use it. Laura also indicated there is an emulator app on the smartphone that students can download and use during class.

Chris

I met with Chris in the computer lab after school. Chris began as a substitute teacher, then went back to school to obtain her master's in business and teaching certification. She has been teaching at the high school for 2 years. Chris indicated that as a new member of the district, she is still learning; however, she is very confident in her ability to incorporate technology in the classroom. She was excited to share how she develops her lesson plans to connect core topics like science, English, or math while using computers. Chris stressed the importance of incorporating technology because students will require this skill in everyday life.

Diane

Diane is a business teacher who decided 10 years ago that she no longer wanted to continue in her career as a financial advisor, but return to school and obtain a teaching license. We met in her classroom, which is adjacent to a computer lab that she often uses. She had a strong knowledge of business and technology. She was thorough in her explanations on how she used technology and related her lessons back to business. Diane was excited to show me the computer lab with 25 desktop computers that was an addition with the construction of the new school.

It was important to Diane to continually update the curriculum and add new features, including new courses. She is in the process of developing a robotics course and

recently added a Python programming course after learning it on her own. She stressed

that she cannot teach what she does not know, so takes the extra time needed to learn new

technologies on her own time. Her passion for teaching and incorporating new

technologies in the curriculum was beyond that of any teacher I interviewed for this

study. Her energy level was high and enthusiasm to build these new courses showed in

her voice and body language.

Joan

Joan and I met in one of the school gyms after school. This was the smaller of the

two gyms where we sat on the bleachers and discussed her 18 year teaching career. As a

health teacher, she was able to share quite a few examples of how computers are used in

the curriculum and stressed that variety was how she engaged the students. She believes

that using technology is a way to keep the students' attention by exploring different

applications that pertain to the lesson. We walked through the gym and into the

classroom Joan uses to teach her health classes. There was a computer on her desk and a

Smartboard, just like the other classrooms. She said she sometimes relied on the district's

Bring Your Own Device policy to incorporate technology into the curriculum since the

Chrome cart is not always available. She was able to discover new ways to use

technology and provide variety as she incorporated into her classes.

Amy

Amy and I met in her classroom after school. She has been teaching 9th grade

English at this high school for 10 years. The room's walls were filled with written quotes

from authors and information about books to read. There was a computer on her desk and a Smartboard on the wall. She indicated that she periodically used the Chrome books in her classes, yet she does not feel completely comfortable using them. Amy believes there has not been enough instruction provided and she does not have the time to experiment with them on her own. Sometimes she uses the computer lab and finds keeping the students on track with step by step instruction works best. Her classes are large; the smallest one had 27 students. So keeping the students on track and together while delivering instruction helps her to maintain control in the class.

Data Collection

After receiving IRB approval from Walden University (Number #10-26-15-0064844), I met with the superintendent and the principal of the school at the research site. I provided details of my research study and the procedures that would be used for participant recruitment and selection. The support letter (Appendix J) that I emailed to the school superintendent prior to our meeting was signed and given to me at the beginning of the meeting. I presented a copy of the invitation letter (Appendix B), selection letter (Appendix E), interview questions (Appendix G), and questionnaire (Appendix D). The principal emailed all teachers at the high school identifying the purpose of my study and asked anyone interested to respond to the email on which I was copied. After 2 weeks, 10 teachers had responded indicating technology was used in their classroom. I emailed the 10 potential participants a selection letter (Appendix E) that contained a private link for access to the questionnaire and a consent form. One online questionnaire was created

specifically for each respondent. All questionnaire's had the same questions; however, for security purposes a separate questionnaire was created for each individual. Eight of the potential participants gave consent and six of the eight completed the online questionnaire. I sent a follow-up email to those who gave consent but did not complete the questionnaire requesting that they do so, but they did not respond. I moved forward with the six participants who completed the consent form.

The data were collected through the participant selection questionnaire, initial interviews, follow-up interviews, and review of artifacts. All six teachers participated in one individual interview that lasted 45-60 minutes. Each participant was asked the same set of predetermined questions. Follow-up questions for clarification were emailed to teachers 3 weeks after the last initial interview was completed. All six teachers responded by email. The email content was converted to PDF format and saved on an external hard drive. The original emails were deleted.

Participant Selection Questionnaire

The questionnaire used in this research study was developed by Wang et al. (2004) for a research study that looked at preservice teachers' self-efficacy beliefs regarding technology integration. Dr. Ertmer was contacted by email to request permission to use the tool for this research. Approval was received from Dr. Ertmer on November 12, 2015 (Appendix C).

A link to the participant selection questionnaire was emailed to participants in the invitation to participate in the study. The purpose of the questionnaire was to prequalify

possible participants in the study. A separate questionnaire link was sent to each potential

participant coded with the participant number code in the link name in order to identify to

which potential participant the responses belonged. The online questionnaire was

available from December 20, 2015 to January 30, 2016. The data were downloaded from

the questionnaire website upon completion of the last interview and the questionnaire was

removed from the server and all data was deleted. All data retrieved in Excel format were

stored on an external hard drive.

In summary, from the 10 participants invited to participate in the research study,

six agreed to participate and received access to the questionnaire. The questionnaire

contained 21 questions pertaining to self-efficacy in regards to integration of technology

in the classroom and the curriculum. All six participants completed the questionnaire and

were accepted to participate in the research study.

Interviews

Four interviews were conducted at the high school, one interview was conducted

in the participant's home, and one interview was conducted via telephone. The interviews

conducted in person were recorded using a digital audio recorder. The telephone

interview was recorded using Skype for Business to record the audio only. After

completion of each interview, the audio file was retrieved from the recording device used

and saved in digital format on an external hard drive. I transcribed the interviews over a

10-day period using my personal computer, Microsoft Word, and Microsoft Media

Player.

Artifacts

Artifacts collected from participants included lesson plans, assignments, and quizzes used in class to incorporate technology into the curriculum. Each participant provided an electronic copy of one or more of these artifacts as they related to the course discussed during the interview. The digital files were encrypted and saved in a folder with the participant's pseudo name on the external hard drive. Artifacts were emailed by participants after the interview was conducted. During the collection of the artifacts, no variations or unusual circumstances were encountered.

Data Analysis

This section describes the process used to analyze the data collected for this case study. The Chapter 2 literature review concentrated on how teachers incorporate technology in the classroom, benefits and barriers to incorporating technology, teacher self-efficacy in relation to using technology in the teaching process, and teacher preparation activities used to prepare teachers with the pedagogical knowledge to effectively use technology to enhance 21st century learning. The terminology used by the writers in the literature review articles correlated with the terminology used by the teachers interviewed in this study. The responses to the interview questions and experiences shared by the teachers were similar. After reviewing the interview transcripts, it was easier to hand code instead of using a software program. I began the process by identifying a list of Codes (Table 2) and highlighting examples within the transcripts that matched with each code. Then I determined Categories (Table 3) that the

Codes fell under and identified quotations that met the definition of the Category. The Themes (Table 4) were derived from the Codes and Categories that were identified within the transcripts.

With case studies, the case serves to help us understand phenomena or relationships within it (Stakes, 1995). The collection of data through interviews, artifacts, and evaluation were some of the methods used to collect information-rich data in this case study. The data collected through these methods was analyzed, coded (see Table 2), categorized (see Table 3), and themes (see Table 4) were identified.

Table 2

List of Codes, Definitions, and Examples

Categories	Definitions	Examples
Collaboration (CO)	Informal and formal engagement used to share practice and experience.	"If I don't understand some issues I can usually work through it, or I'll ask if I need to." (Joan) "I know I can ask my colleagues how to do this or do that." (Amy)
Perceived Barriers (PB)	The perceived items that block the integration of technology in teaching and learning.	"There was a big push to use cellphones but that didn't do anything but hurt our teaching process. The kids are not using the cell phones for what they are supposed to be used for." (Diane)
Computer Self-efficacy (CSE)	The knowledge and comfort a teacher has on using a computer in the classroom.	"I am very comfortable with technology." (Laura) "I am very confident incorporating technology in the classroom. I love working with computers." (Chris)
Technology Self-efficacy (TSE)	The knowledge and comfort a teacher has on using different types of technology in the classroom.	"The teacher computer and Smartboard, I would say very comfortable with those" (Amy)
Bring Your Own Device (BYOD)	Technologies such as cell phone or iPad that the student owns and brings to class to use in the learning process.	"Then we talk about apps and we get on their phones and look at them because they like to use their phones." (Joan)
Student Engagement (SE)	The level of interest, attention, and curiosity student's express during the learning process that motivates learning.	"I like using the document camera because I ask students to bring up their homework and they share it so the other students can see how a student did it instead of just me." (April)

Table 3

List of Categories, Definitions, and Examples

Categories	Definitions	Examples
Collegial Interactions (CI)	Informal and formal engagement where teachers share pedagogical practices and support new practices.	"We have professional development days where we get to collaborate and discuss." (Laura)
Technology Integration (TI)	The practice of integrating technology into the classroom through pedagogical practices.	"Every aspect of this life now will include electronics and anyone who is not willing to incorporate it will not be respected as an educator whether or not they are comfortable with it." (Chris)
Professional Development (PD)	Instruction or lessons provided by the district to enhance the understanding of technology and how to incorporate it into the curriculum.	"The district has Elyria University for teachers to go and take classes that help incorporate technology in the classroom. Like how to use Chrome books by giving you basics on certain things and then adapting it to your lesson." (Laura)
Curriculum Design for Technology Integration (CDTI)	The development of lessons and assignments integrating technology into the lesson requiring the utilization of technology in the classroom.	"With the right software you can customize student development. You can see how much the student has improved and then add more instructional content to that area." (April)
Student-centered Learning (SCL)	Teaching method that shifts the focus of instruction from the teacher to the student.	"Kids don't want to hear a lecture or read out of a textbook. The bulk of these kids want hands-on interactive learning and technology and is what helps to fuse all that." (Diane)

Table 4

List of Themes, Definitions, and Examples

Themes	Definitions	Examples
Theme 1: Teachers need to incorporate technology into the learning process.	Effective technology integration with enhanced curriculum that meets 21st century learning needs of the students.	"I keep computer skills as part of the curriculum" (Chris)
Theme 2: Teachers need to be comfortable with computers and technology.	Teachers are comfortable with the technology being used in the classroom in order to provide an effective learning environment.	"If I can't grow myself and feel comfortable with the material I am going to teach, then I cannot ask them to bring that course on." (Diane)
Theme 3: Teachers develop courses that encourage student engagement and Student-Centered Learning.	Teachers have the knowledge on how to develop courses to engage students in student-centered learning activities.	"The students really seem to like working at their pace and I feel like it gives them more ownership of the work that they are doing." (Amy)
Theme 4: Perceived benefits and barriers are similar for experience teachers.	Teachers know what is required to effectively implement technology in the curriculum in a way that will engage students and enhance the learning process.	"There is a Chrome book cart that we can share, but you have to take turns with it. The other thing is can we afford the technology." (April)
Theme 5: Teachers need to collaborate and learn from their peers.	Teachers learn from one another in formal and informal situations, such as meetings and professional development sessions or conversations.	"There are times when we get together to do professional development during the year. This gives us an opportunity to collaborate with each other and discuss them." (April)
Theme 6: Teachers need effective learning opportunities to expand their knowledge of technology and how to integrate it into the curriculum.	Teachers need to learn how to use the technology available beyond the basics and examples on how it can be incorporated into the curriculum.	"I don't think we have had the professional development for the integration for what we are doing in our classrooms specifically." (Amy)

Evidence of Trustworthiness

Credibility

The use of triangulation where data is collected from multiple sources, is one way to ensure the trustworthiness and validity of the data. Gay (2006) identified triangulation as the process used to collect data from multiple sources in order to achieve a better understanding of what is being studied and cross-check the information. White (2005) agreed that data collected by more than one method strengthens the validity of the data. Data collection methods for this study included a technology questionnaire, personal interviews, and review of artifacts. This study established credibility by triangulating artifacts collected from the participants with statements collected during the interviews.

Transferability

According to Merriam (2014), transferability is the ability for the findings in a study to be applied in similar situations. External validity was established through the collection of detailed descriptive data and the development of detailed descriptions of the teachers' experiences using technology. The detailed descriptions demonstrated various perceptions of technology usage which enables transferability to similar situations.

Dependability

Dependability was established by triangulating the initial interview and follow up interview data with the artifacts collected from participants. Written notes created during the data collection, and analysis process were kept as an audit trail.

Confirmability

Part of the audit trail included a reflective journal that I kept on my thoughts and reflections which also established confirmability. Reflecting upon the experiences of the teachers and the responses gathered from the interviews allowed for critical analysis that is required in qualitative research. After analyzing the data collected, a data audit was conducted to ensure the methodology selected for this study was feasible. I determined that the case study methodology was the best option because analyzing the interviews of the participants helped to establish the themes of the study to describe the perceptions and technology usage of each teacher. An external case study researcher also blind coded all participant responses to one of the interview questions. The results indicated that our observations and analysis of the responses were aligned.

Results

This section presents the results of this research study, organized by the research questions. The interview questions were grouped according to their relationship to each research question. As themes emerged from the coding process, those recurring themes were aligned to the research question and theoretical framework.

Survey results. The survey was developed by Wang et al. (2004) to explore how learning experiences influence preservice teachers' self-efficacy for integrating technology in the classroom and aligned with the research of this study. The survey link was sent to potential participants in the invitation letter to participate in the study. Ten potential participants received the link and six completed the survey and were selected to participate in the study. Each of the 21 survey questions had five choices using a Likert

scale and were assigned a point value ranging from 1 to 5. The point values used for each descriptor was assigned as follows: 1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree.

The survey touched on three areas regarding self-confidence utilizing technology: (1) confidence in using technology in teaching, (2) confidence helping students use technology in the classroom, and (3) comfort level in advanced technology capabilities for teaching and learning. Research conducted by Celik and Yesilyrt (2013) concluded that the user's computer self-efficacy is directly related to the users' willingness to use technology. A participant responding *strongly disagree* to all questions would obtain a total score of 21, while a participant responding with *strongly agree* to all questions would obtain a total score of 105. Therefore, the survey results were quantified using three categories and assigning point values. The point values were broken down into ranges that represent the confidence level participants had in regards to utilizing technology and incorporating technology into the curriculum. Participants with low confidence in using technology in teaching were assigned point values ranging from 22-72. Participants with a mid-level range of using technology in teaching were assigned point values ranging from 73-89. Participants with high confidence in all three categories were assigned point values ranging from 90-105. Out of the six participants who participated in the study, one fell into the 22-72 point range, two fell into the 73-89 point range, and three fell into the 90-105 point range. One participant had a score of 104, meaning the participant answered strongly agree to all but one question in the survey.

Research Question 1

Figure 2 is a breakdown of the two themes related to research question one. A

detailed explanation of each theme and the findings in the study are presented.

RQ 1 How does a teachers' levels of self-efficacy impact the ability to effectively incorporate technology in the classroom?

Theme 1: Teachers need to incorporate technology into the learning process.	Theme 2: Teachers need to be comfortable with computers and technology.
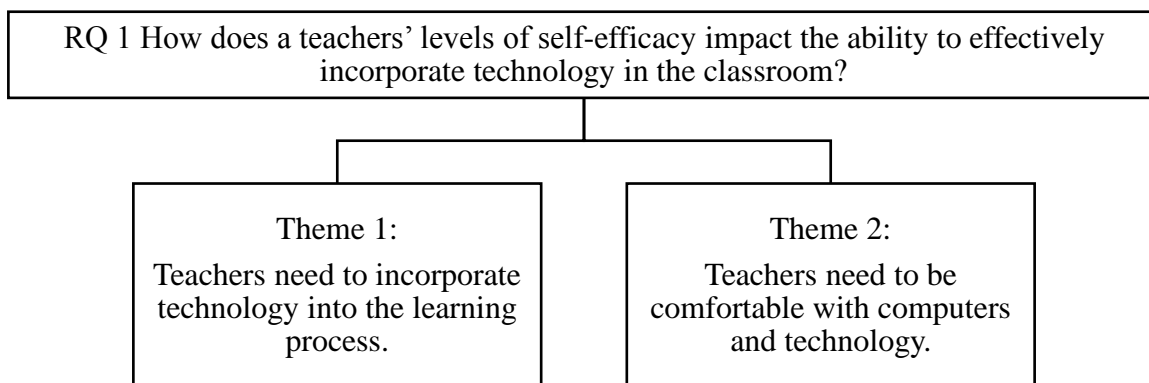
Figure 2. Themes Related to Research Question 1.

Theme 1: Teachers need to incorporate technology into the learning process.

Technology Integration. There is an educational reform movement taking place

in the U.S. called the Common Core Standards (CCSS). CCSS has been adopted by 45

states, including Ohio where this study was conducted. The Partnership for 21st Century

Skills 21st Century Learning Framework was integrated into CCSS. This integration of

both models helps to prepare students for the demands of living in the 21st century. This

initiative calls for teachers to develop curriculum that integrates critical thinking,

communication, creativity, and collaboration. Technology integration in the classroom

and the curriculum was also defined as a requirement for teaching in the 21st century.

> "Every aspect of this life now will include electronics. I keep computer skills as
>
> part of the curriculum, we use it constantly. You can incorporate technology into

almost any area using PowerPoint, Movie Maker, or Photoshop. We branch out

into different areas to keep students at the forefront" (Chris).

All six teachers agreed that it is essential at this stage to incorporate technology in the

learning process.

Technology is available at the school for all teachers to use in the classroom. Amy

indicated "every classroom has a computer and a Smartboard for teacher use and I use

those daily." There is also a Chrome Book cart and iPads available to teachers to borrow

through a check-out process. Joan stressed the importance of integrating computers and

the districts Bring Your Own Device policy in the classroom because the students are

using the technology on their own. "I think if I went in with an overhead, the kids would

not respect me as much". "I am very confident incorporating technology in the classroom

and love working with computers. Anyone who is not willing to incorporate it will not be

respected as an educator whether or not they are comfortable with it" (Chris). Dede

(2011) supports these beliefs that integration of technology is important in today's

classroom to help students develop the skills necessary for the 21st century and it is up to

educators to transform their pedagogies, curricula, professional development, and overall

acceptance of technology. Dunn and Rakes (2010) argued that "less than desirable

progress has been made in the integration of effective technology use in the classroom"

(p. 57). This research study does not agree with Dunn and Rakes statement and found that

teachers are transforming the curriculum to integrate technology and that progress is

being made to integrate effective technologies into the classroom.

Theme 2: Teachers need to be comfortable with computers and technology.

This study supported research findings that teachers need to obtain knowledge and self-efficacy to effectively deliver learning that enables students to construct connected knowledge that is applicable to real life situations. Ertmer (2005) suggested teachers who gain personal experiences and build personal mastery increase self-efficacy. Diane teaches computer courses in the Business Department at the high school. She teaches herself how to use the software the students will use in class. "If I can't grow myself and feel comfortable with the material I am going to teach, then I cannot ask them to bring that course on. I can't teach what I don't know" (Diane). Bandura's (1999) Social Cognitive Theory support's Diane's statement in that self-efficacy beliefs play a significant role in the self-regulation of motivation and that thought patterns can enhance or undermine performance. Diane's motivation to learn the new material reinforced her ability to build mastery in the content and increase self-efficacy.

Teachers' technology self-efficacy beliefs are connected to the willingness to integrate computers in the classroom. All six teachers in the study indicated she is either comfortable or confident incorporating technology in the classroom. When asked if level of self-efficacy impacts your ability to incorporate technology in the classroom, Joan responded "Very much." She continued by saying "I think it's a must. I think we need to keep up with our students" (Joan). Just as Diane is continually learning new software to develop new classes in the business program, Chris is learning about the technology available at the school as a new teacher in the district. The teachers showed a positive attitude toward learning new technologies and developing the curriculum around them.

Studies conducted by Celik and Yesilyrt (2013) and Aypay, Celik, Aypay, and Sever

(2012) supported this where both studies revealed that attitude to technology and

computer self-efficacy were directly related to teachers' use of technology. All of the

teacher participants in this research study indicated a strong comfort level with using

technology, while only one participant showed a low comfort level when using

technology with the students. Although this one participant used technology in the

classroom, it was limited to technology that she was familiar with and she limited usage

in the classroom.

Research Question 2

Figure 3 is a breakdown of the two themes related to research question two. A

detailed explanation of each theme and the findings in the study are presented.
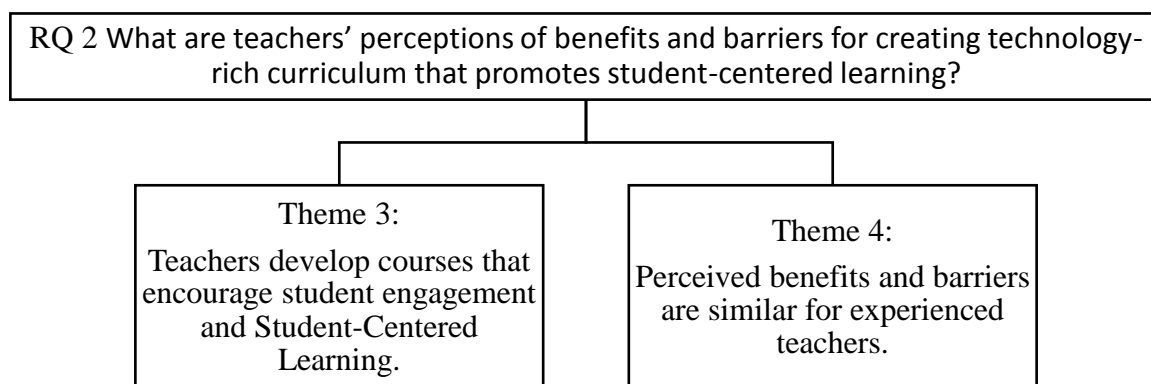
Figure 3. Themes Related to Research Question 2.

Theme 3: Teachers develop courses that encourage student engagement and

Student-Centered Learning

Student-Centered Learning. Holden and Rada (2011) argued that teachers with

strong technology skills are better equipped to deliver technology-rich courses in learner-

centered environments. An and Reigelugh (2012) defined the learner-centered model as one that focuses on developing real-life skills such as higher-order thinking and problem-solving. Amy agreed with this definition when asked how she would define student-centered learning:

> Student-centered learning, to me, is when students take charge and monitor their own progress as well as become responsible for their own learning. It would look like a project in which the student has an option to pick what he or she is learning/reading as well as the final project. This type of teaching (really facilitating) allows students to show case their talents and interests which helps them to shine in the classroom. (Amy).

Student-centered learning was identified as a key component for 21st century learning. The U.S. Department of Education developed the Partnership for 21st Century Framework (Partnership for 21st Century Skills, 2006) that defines Critical Thinking, Communication, Creativity, and Collaboration as the key skills students need to acquire before high school graduation. Fisher and Waller (2013) argued technology integration into the curriculum needs to provide necessary skills for students entering the 21st century workplace. Joan believes offering a variety of student-centered activities incorporating technology is important, however, the barrier she perceives is that the student's do not have the basic skills to effectively complete assignments using technology. "The biggest challenge I have is that our kids have no concept of the basics. Whatever they are taking as far as computers, it is not teaching them" (Joan). The integration of technology needs

to take place prior to high school in order for students to meet 21st century learning requirements.

With the guidance of the 21st Century Learning Framework, classrooms are being transformed into knowledge-focused discovery environments engaging students in critical thinking, problem solving, and knowledge creation (Starkey, 2011; Thomas, Ge, & Greene, 2011). In Diane's business classes, she found that fusing reason and creative thinking into the class material creates a hands-on experience for the students that becomes a more effective learning tool. Chris stated "Every aspect of this life now will include electronics and anyone who is not willing to incorporate it will not be respected as an educator whether or not they are comfortable with it." Chris' statement is supported by Aldunate and Nussbaum (2013) who indicated that teachers who adopt technology to facilitate and support teaching and learning in the classroom could have a greater impact on the quality of the teaching experience.

April teaches math, so technology integration looks different in her classroom. April wrote a grant to purchase a smart document camera for her classroom. "I like using the document camera because I ask students to bring up their homework and they share it so the other students can see how a student did it instead of just me" (April). Cviko, McKenney, and Voogt (2012) support April's technique of student-centered learning, stating that it is the teacher's responsibility to develop activities within the curriculum that encourage student engagement and incorporates new technologies.

Theme 4: Perceived benefits and barriers are similar for experienced teachers.

Benefits. The Business Department has their own computer labs, so this was identified as a benefit for Diane and Chris. Computers are always accessible and can be incorporated into lessons on a daily basis. The other four teachers indicated access to computers is a barrier for them. Chris indicated "there is a Chrome cart that we can share, but you have to take turns with it." If an assignment cannot be completed within that class time period, then the students may not get the Chrome books until the following week to complete the assignment. This gap between availability of the computer was identified as a barrier in the learning process.

Barriers. Research has been conducted to understand the barriers teachers face in technology integration:

- Teachers' attitudes, beliefs, and self-efficacy as it relates to technology use (Celik & Yesilyurt, 2013; Kreijns, Acker, Vermeulen, & Buuren, 2013);

- Time, training, technical support, and school culture (Ertmer & Ottenbreit-Leftwich, 2010; Prestridge, 2012); and

- Knowledge and skill to effectively integrate the technology into the curriculum (Hew & Brush, 2007; Kirkscey, 2012; Kreijns, Acker, Vermeulen, & Buuren, 2013).

This research study identified a barrier to effective implementation of technology use was attributed to teachers' self-efficacy. April was the outlier in this study, scoring

low in the questionnaire on comfort level of implementing technology in the classroom. "I would say that like most people I use technology that is most comfortable for me. I'm open to new technology. I like to experience it so I know what it is" (April). April clearly likes to use technology and learn it for her own use, however, is not comfortable using the technology with the students. Kopcha (2012) supported this in his research indicating that the technology integration gap teacher's face is primarily due to barriers such as access and time to use the technology, knowledge regarding pedagogical integration, and limited training through professional development activities. Just like April, Laura is also a math teacher at the high school. Although Laura scored high in technology self-efficacy and believes herself to be comfortable with technology, she indicated "I am also fine with using a whiteboard, chalk board, and teaching my lesson that way and do just as good a job" (Laura). Smarkola's (2011) research mirrored this belief, finding that perceived ease of use and usefulness of integrating technology with subject-specific lessons predicted computer usage.

Amy identified access to the technology as a barrier, stating "we have limited capabilities of what and when those tools are going to be available to us like we have to sign out the Chrome cart, so you can't have the Chrome books every single day." This limited the use of technology for projects that may span over several days. Lowther, Inan, Ross, and Strahl (2012) conducted research that revealed in order for technology to create an impact on teaching and learning and also be effective in the classroom, it needs to be used more frequently. Several teachers in the study want to integrate the technology,

however, the limitation to using the technology is preventing effective technology integration.

The school district where the study was conducted has a Bring Your Own Device policy in place. There were mixed reactions by the teachers interviewed on this policy. "Ultimately, the decision regarding *whether* and *how* to use technology for instruction rests on the shoulders of classroom teachers" (Ertmer, 2005, p. 27). April points out that "sometimes we have to watch out with the districts' policy BYOD. When the kids bring a device, it may not be a device we are familiar with" (April). Three other teachers also voiced concern over the policy while two participants embraced the use of cell phones in the classroom.

Diane shared there was a big push to use cell phones but that didn't do anything but hurt our teaching process because the kids are not using the cell phones for what they are supposed to be using them for. Diane stressed that she prefers to have control over the technologies used in the classroom. Le Fevre's (2014) research described teacher's unwillingness to take risk and that teachers expressed concern regarding the ramifications of needing to 'give up control. Joan had a different perspective regarding the use of cell phones in the classroom. During a lecture, students research topics on the computer using a browser and then use their phones to research information on various apps. Prestridge (2012) identified a link between teacher beliefs and integrating technology to facilitate creative thinking and learner-centered activities. Joan believed adding variety to the class keeps the students engaged. Although the teacher participants have the knowledge to use

technology and are willing to integrate technology, there is some hesitance in what technologies are used. Kopcha (2013) explained that this is due to planning, teaching, and classroom management demands placed on the teacher that may disrupt normal teaching practices.

This research study found that the teacher participants are willing to integrate technology into the classroom, however, the way the technology is integrated is through simple teaching methods. Voogt, et al. (2011) argued that in order for effective technology integration to take place, there needed to be a clearer understanding of the role technology plays in the learning process. The artifacts review revealed that most teachers used conducting research using the Internet on a computer as effective technology integration. The math teachers used the graphing calculators in lessons and some teachers allowed cell phones to be used as a part of the districts' BYOD policy. The literature review in Chapter 2 confirmed that the computer is the most common technological device used by teachers. Celik & Yesilyrt's (2013) confirmed this through research that found technology integration has traditionally been focused on the computer because it is the most common technology found in teaching settings. Friedrich & Hron (2011) expanded on this in research that argued in order for educational reform to take place, computers need to support active, self-directed, and exploratory learning. It is the teachers' responsibility to develop the curriculum that effectively integrate technology and meet 21st century learning needs of the students.

Research Question 3

Figure 4 is a breakdown of the two themes related to research question three. A

detailed explanation of each theme and the findings in the study are presented.

RQ 3 What teacher preparation experiences or strategies are used to prepare teachers for teaching and learning in the 21st century?

Theme 5:
Teachers need to collaborate and learn from their peers.

Theme 6:
Teachers need effective learning opportunities to expand their knowledge of technology and how to integrate it into the curriculum.
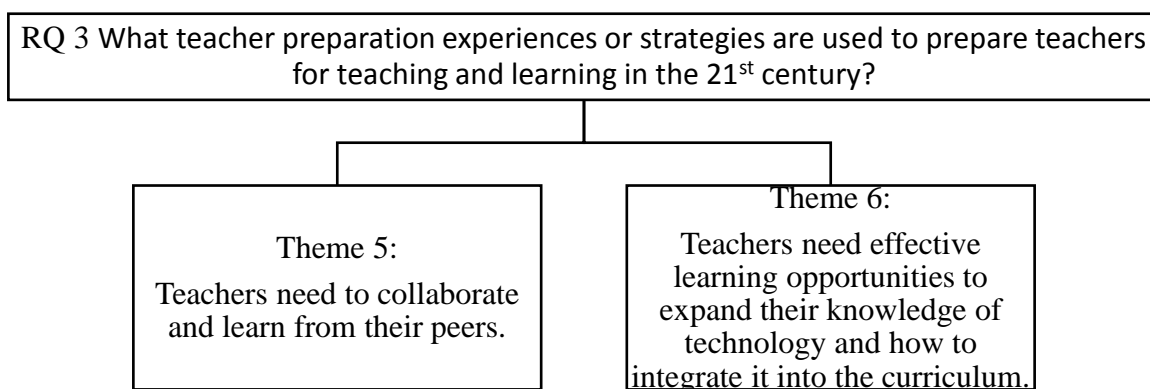
Figure 4. Themes Related to Research Question 3.

Theme 5: Teachers need to collaborate and learn from their peers.

Collaboration. Mentoring was identified in this study as a method that could

close the gap to technology integration. Teacher collaboration was identified by several

of the teachers as an important part of professional development activities. Liu (2013)

researched the affect professional development that incorporates learning communities

has on technology integration. She concluded "teachers changed their perspectives on

the methods for technology integration from lecture-based teaching to student-centered

teaching via processes of teacher professional development" (Liu, 2013, p. 53). April

shared "our district is very much supportive of peer collaboration, teacher to teacher

collaboration." Diane agreed that collaboration is an important part of teaching. "I know

that I can ask my colleagues like how do you do this or what do you think if I check out

the Chrome books, do you think this will be a good activity?" Chris shared the importance of collaboration with teachers outside the district:

> It connects you with other teachers and educators and you can collaborate more with other districts. You are not so isolated it's just a great way to communicate and share ideas and brainstorm and see what other districts are doing. We can base our content on that, what we can improve to keep up. (Chris)

Liu (2013) supported these claims by indicating self-reflection and sharing teaching information during professional development activities, as opposed to lecture's or presentations, are more effective methods of demonstrating technology integration. Professional development with technology and how to integrate that technology into effective pedagogical practices are critical components of teaching teachers how to properly integrate technology into the learning process.

Bandura (1999) identified social models as a way of creating and strengthening self-beliefs of efficacy. Watching peers complete a task inspires others to successfully complete the same task. "Seeing people similar to oneself succeed by sustained effort raises observers' beliefs that they too possess the capabilities to master comparable activities to succeed" (Bandura, 1991, p. 3). This is demonstrated through professional development experiences where teachers share their ideas and collaborate with others. An alternative to mentoring identified in this study is to establish a community of practice for teachers to meet periodically to share ideas and gain support from practitioners and peers.

Theme 6: Teachers need effective learning opportunities to expand their knowledge of technology and how to integrate it into the curriculum.

Professional Development. The school district offers various learning programs for teachers to participate in professional development activities. Although opportunities are available, the teachers in this research study identified three factors as barriers to technology integration: time to participate, pedagogical integration training, and level of activities (need higher level training). Chris and Amy both indicated there are some classes they are interested in taking, however, their schedules are tight and have not found time to take them. Classes are usually offered after school, Saturday's, and over the summer months while school is on break. Amy indicated "I don't think we have had the professional development for the integration for what we are doing in our classrooms specifically." These claims are supported by Pitsoe and Maila's (2012) research that concluded professional development should broaden the teacher's comprehension and develop a deeper understanding of a topic while learning new instructional techniques.

Amy agreed the level of training provided by the district through their professional development activities did not provide the level of instruction required to understand how to thoroughly integrate the technology into the curriculum. She shared that "I could be utilizing the Chrome cart in different ways, but the training we had for Chrome books was super basic (how to turn it on and retrieve documents)." Although teachers with strong ICT skills and an understanding of the core subject matter being taught are better equipped to deliver instruction through technology and learner-centered activities (Holden & Rada, 2011), this cannot occur without providing the teachers with a

level of professional development that meets their individual learning needs. Bandura (1999) stated people with low aspirations and weak commitment to the goals give up quickly in the face of difficulties. Limited training and ineffective professional development deters the teachers from using the Chrome books in the classroom due to low computer-efficacy and as a result limited technology integration is occurring.

Summary

In summary, I investigated the implementation of technology in the high school classroom and integration of 21st century learning skills and whether teachers are effectively embracing both into the curriculum. The teachers expressed a positive attitude and competence toward the use of technology for both work related activities and incorporating technology into some portions of the curriculum. Each research question and the results were clearly identified and analyzed.

Research question one addressed teachers' willingness to incorporate technology into the classroom and technology self-efficacy. The results revealed a correlation between technology use and technology self-efficacy. Teachers who were more comfortable with the use of technology explored new ways to use technology with students while teachers with a lower level of technology self-efficacy only incorporated what was taught in professional development sessions.

Research question two addressed teachers' perceptions of benefits and barriers pertaining to incorporating technology in the classroom. The benefit identified by most teachers included student engagement and meeting the technology requirements identified in 21st century learning. Teachers identified the levels of students' knowledge

of technology, levels of instruction given during professional development sessions, and the limited availability of the technology for use as barriers to integration.

Research question three addressed the professional development experiences of the participants and whether they are effective in helping with the integration of technology in the curriculum. Teachers indicated that very little professional development that incorporated curriculum development was offered by the school district or how to integrate technology into pedagogical practices. Participants also stressed that the limited training provided by the district on how to use the technology beyond the basics prevented their abilities to use the technology available to them in effective ways.

The results of this research study indicated the participants want to incorporate technology more; however, the barriers identified are preventing effective integration. Chapter 5 includes a discussion interpreting these findings and provides recommendations for future research. Chapter 5 also describes the limitations of the study and the study's implications related to social change, educational theoretical and methodology, and this research study's theoretical framework.

Chapter 5: Discussion

The educational landscape in the United States is changing and educators are tasked with incorporating 21st century skills into the curriculum through technology integration. This change is necessary in order to create a 21st century learning environment that provides the level of learning experiences that students require to be successful. The use of technology is no longer limited to administrative tasks. Technology tools are available at many high schools where teaching and learning are accomplished through integrated technological activities. The Partnership Forum for 21st Century Skills (2008) confirmed that organizations today need to incorporate technology into its everyday practices and that it is time for educators to maximize the impact of technology. It is the responsibility of the teacher to incorporate the technology effectively into pedagogical practices that encourage student learning and engagement.

The purpose of this case study was to examine how teachers incorporate technology into the curriculum to enhance 21st century learning, the teachers' technology self-efficacy, and the extent of professional development opportunities provided by the school district. This study assessed three variables: the quality of teachers' integration of technology in relation to 21st century learning, teachers' technology self-efficacy, and the quality and availability of professional development to properly prepare teachers.

Six high school teachers from the same high school in northeast Ohio were selected to participate in this study. Each of the six participants completed a survey on technology use and self-efficacy, participated in one personal interview, and provided artifacts for review. The participants' survey responses determined the teachers' current

technology use and self-efficacy levels. After interviews were conducted, they were transcribed and coded to understand the participant teachers' current technology use and self-efficacy levels. Additionally, the professional development provided by the district was discussed during the interview process to develop an understanding of professional development opportunities available to these teachers.

This chapter discusses and interprets the research study findings in relation to the theoretical framework and the research literature review found in Chapter 2. This chapter also discusses the study's limitations and the methodological, theoretical, and the social implications of this study. Finally, Chapter 5 includes recommendations for future research and practice.

Interpretation of the Findings

In this study, multiple factors that were either work-related or personal played a role in determining teachers' technology use and self-efficacy. The work-related factors included: (a) the amount of time the participants used technology for instruction, (b) time dedicated to develop and deliver lessons that integrate technology into student-centered activities, (c) participants' collaboration with other teachers, and (d) perception of learning opportunities. The personal factors included: (a) attitudes toward technology, (b) perceived benefits of using technology, (c) perceived barriers to using technology, and (d) uncertainties related to technology use.

Six common themes emerged from the personal interviews. The first theme indicated that teachers need to incorporate technology into the learning process. A second theme revealed that teachers need to be comfortable with computers and technology. The

third theme showed the level of teachers' understanding regarding the importance of incorporating technology into pedagogical practices and that teachers are developing courses that encourage student engagement and student-centered learning. The fourth theme revealed that perceived benefits and barriers are or experienced teachers are the same. The fifth theme identified that teachers need to collaborate with and learn from their peers in order to obtain ideas incorporating technology in their own classrooms. The sixth and final theme revealed the importance of educating teachers; teachers need effective learning opportunities to expand their knowledge of technology and improve their ability to integrate it into the curriculum.

The results also showed that personal experience in understanding how to use technology, motivation to learn technology, and a high level of technology self-efficacy were correlated to the amount of time technology was used in the classroom by the teacher. The work-related and personal factors identified in the findings address the themes in three areas: (a) technology self-efficacy, (b) perceived benefits and barriers, and (c) professional development.

Technology Self-efficacy

Research Question 1 asked how teachers' levels of self-efficacy impact their ability to effectively incorporate technology in the classroom. The work-related factor that reflected technology self-efficacy was the amount of time the participants used technology for instruction while the personal factor was the attitude toward technology (Figure 5). As in the literature and theoretical framework, it was teachers' attitudes toward using technology that drove the effectiveness of integrating technology into pedagogical practices. The selection questionnaire indicated that five out of the six participants showed a positive attitude toward integrating technology and all six participants in the study indicated that they used technology in the classroom at some point throughout the school year.
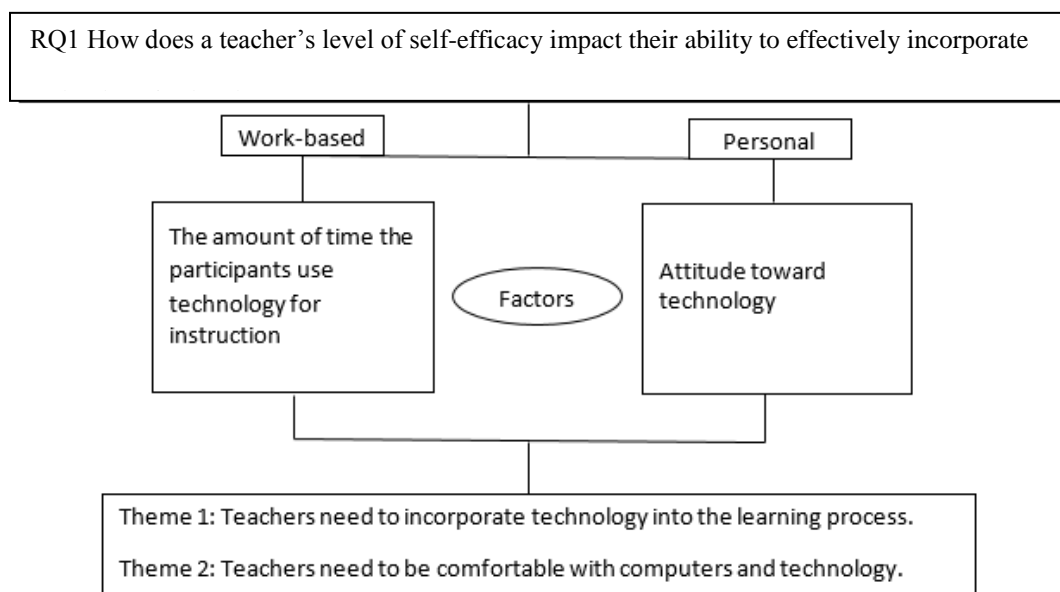
Figure 5. Factors Related to Research Question 1.

During the interview, one teacher indicated she was hesitant to incorporate the technology into the curriculum due to her lack of knowledge on the topic. This was also

apparent in the survey results where this participant scored low in confidence when using technology in the classroom and working with students while using technology in the classroom (refer to Appendix K).

Holden and Rada's (2011) and Karaseva, Siibak, and Pruulmann-Vengerfeldt's (2015) research findings were similar to those in this study and indicated that teachers who demonstrate positive attitudes toward technology integration and have high self-confidence in regard to technology usage are more likely to use technology for instructional purposes.

Although all teachers reported in the survey and interviews a high level of confidence when using technology, this study found that not all teachers felt comfortable incorporating technology into the curriculum or actively using technology with the students in the classroom. This research study found there is a direct correlation between technology self-efficacy, teachers' attitudes toward using technology, and the amount of time teachers use technology in teaching practices. Five of the six teachers showed a high level of technology self-efficacy, all teachers portrayed a positive attitude toward technology, and all teachers identified at least one barrier to technology use in the classroom.

Perceived Benefits and Barriers

Research Question 2 addressed teachers' perceptions of the benefits and barriers for creating a technology-rich curriculum that promotes student-centered learning. The work-related factor that addressed perceived benefits and barriers was the time to develop and deliver lessons that integrate technology into student-centered activities while the

personal factor was perceived barriers (Figure 6). In this study, almost all of the teachers

reported access as a barrier for technology integration. The two teachers who did not

report access as a barrier teach in the business department and have a computer lab

accessible for all classes. The other teachers identified the limited availability of the

Chrome cart during the school day as a limitation, making it difficult to schedule for use

over several days to complete a project.
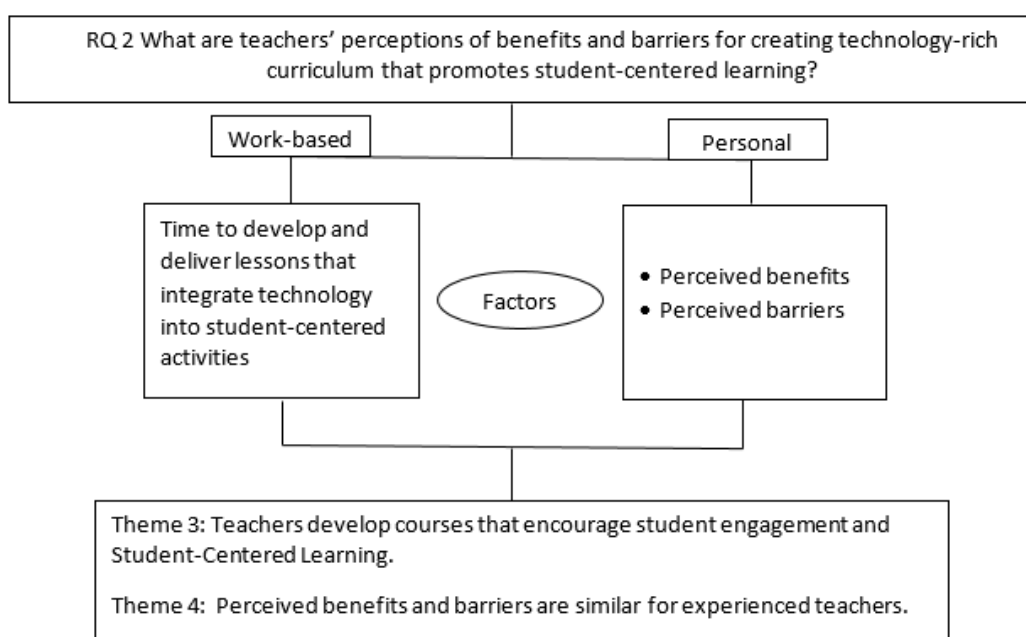
Figure 6. Factors Related to Research Question 2

When teachers believe the outcomes required for the course cannot be achieved

through technology use, he or she was not be motivated to integrate the technology. This

was consistent with the theoretical framework of the study. Bandura's (1991) research

showed that people form beliefs concerning what they can do or achieve based on

planning and motivation and can impact perceived causes of successes and failures. This

research was related to the recurring concerns from teachers in this study: (a) the time it

takes to learn the technology, (b) develop the curriculum to incorporate the technology, and (c) integrating technology into the classroom where the students have an array of technological skills and abilities.

The teachers in this study identified time as a barrier to technology integration. Le Fevre (2014) defined time as having the time required to learn the technology and to incorporate the technology in the classroom. Amy found that the students in her class have a wide range of technology skills and that their different ranges of ability can be a hindrance. Joan agreed with Amy, indicating that many students do not have basic computer knowledge by the time they enter high school. Teachers spend time walking students through the technology step by step which slows the progress of completing the lesson. This perceived barrier addresses the time it takes to integrate technology into pedagogical practices. The limited skills of the students and the time it takes to integrate technology into teaching practices is affecting the motivation of teachers' willingness to use technology.

Professional Development

Research Question 3 asked what teacher preparation experiences or strategies are used to prepare teachers for teaching and learning in the 21st century. The work-related factors that address professional development are collaboration with other teachers and perceptions of learning opportunities while the personal factor is uncertainties relating to technology use (Figure 7).
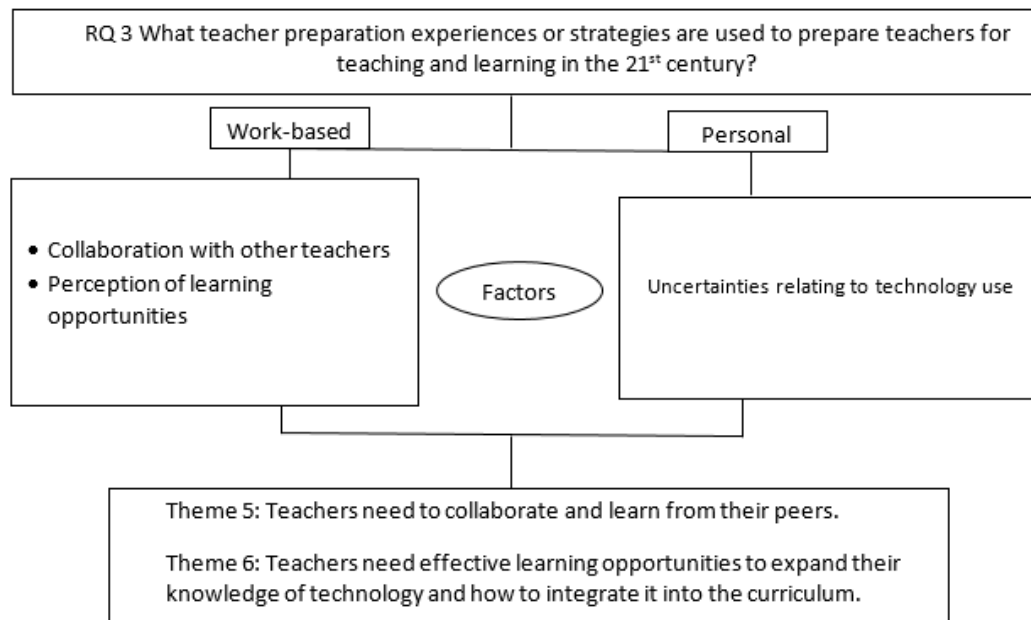
Figure 7. Factors Related to Research Question 3

Effective technology integration was accomplished through professional development to properly prepare teachers with the skills required to develop the curriculum. There was also collaboration with other schools and districts to remain updated on new teaching methods. The findings of this study indicated that teachers were comfortable with using technology and the district has a professional development program in place to teach these technologies. The gap in the learning process for the teachers is an understanding on how to effectively incorporate the technology into the curriculum.

The artifacts received from the teachers included simple online research projects where the students used a search engine on a computer. Although this is important for students to know, it does not incorporate the support systems as defined by the P21 Framework. The P21 Framework requires that curriculum and instruction integrate

technologies that support an inquiry-based and problem-based approach and stressed the importance of incorporating higher order thinking skills. One of the artifacts addressed the 21st century skills required to be successful in work. The assignment was a behavioral interview were students were required to research how to answer five of the most common interview questions.

Mentoring among teachers was identified by five of the six teachers in this study as a method that could help close the gap between technology acceptance and technology integration through learner-center practices. According to Kopcha (2013), mentoring is a way to prepare teachers to acknowledge the common barriers and improve their use of technology for instruction. The teacher participants indicated collaboration is a way to connect with other teachers and a great way to brainstorm and share ideas with other districts to see what they are doing. Amy and Joan indicated that they look to their colleagues for help and advice when using technology. Peer collaboration provides an opportunity where teachers can share information and build the confidence needed to effectively integrate technology into the curriculum.

The findings of this found that 83% of the participants in the study agree with Han, Eom and Shin (2013) who argued that one of the greatest barriers teachers face is the lack of effective professional development and training associated with technology and the knowledge to develop context-specific curriculum that integrates technology. The one teacher who did not find the professional development an issue came to the job with the skills necessary to develop the curriculum.

"The bulk of these kids want hands-on interactive learning and technology is what

helps to fuse all that. Your fusing reason, creative thinking, and class material and

tangibly putting it together into something that is hands-on which a lot of classes

cannot do because you are just sitting there listening and taking notes" (Diane).

All the teacher participants in this research study indicated that although there are

professional development opportunities that offer basic lessons in using the technologies

available to them, there are no advanced training opportunities available or training on

how to integrate technology into the curriculum. The P21 Framework direct teachers to

develop curriculum with a deeper understanding of subject matter that incorporate

enhanced critical thinking, problem-solving, and other 21st century learning skills.

Karaseva, Siibak, & Pruulmann-Vengerfeldt (2015) supported this finding where it was

concluded that professional development could help teachers overcome fears regarding

self-efficacy or beliefs about technologies in education. Enhancing professional

development activities with peer collaboration would also benefit teachers.

Limitations of the Study

This qualitative study has two limitations that have the potential to influence the

findings. First, this study used purposeful sampling of a small sampling group with six

participants. The potential participants contacted represented teachers in grades 9-12 at

one high school within a specific school district. Participants taught in various content

areas, but not including other high schools in other districts limited this study to

participants from only one school. Also, the findings cannot be generalized to technology

integration at the elementary or middle school levels.

Finally, researcher bias is always a limitation in research studies. My experiences, gender, background, and culture may have influenced this study that examined technology integration and teaching methods used to promote student's proficiency in 21st century skills. I believe that 21st century skills are vital for students to acquire before graduating high school and that teacher's pedagogical practices have significant influence over student learning. These beliefs had the potential to influence the data analysis. To mitigate this, I used my professional experience as an educator to step back and remain neutral.

Recommendations

The findings of this research study contribute to the existing literature in two ways: (1) this study provided support from previous research that teachers with strong technology self-efficacy are willing to integrate technology into the classroom, and (2) this study confirmed effective professional development on how to integrate technology into the curriculum is lacking and needs to be enhanced in order for teachers to understand how to develop the curriculum. Additional research should focus on professional development activities that instruct teachers how to effectively develop curriculum that incorporates technology to meet 21st century learning needs. Most of the research found during the literature review focused on professional development that only shows teaches how to use technology. There was also limited research that explored effectively integrating new technologies and how to keep students engaged.

Future research should concentrate on teachers who use technology through difference stages of their career or from different schools using different types of

technologies in the classroom. This study was significant because it could be used by future researchers to reach an understanding of teachers' technology self-efficacy and what changes are needed in the development of curriculum that meets the needs of students learning in the 21st Century. The results of this study could also be used in another study with the same research design but look at schools utilizing the BYOD policy and teacher acceptance. Lastly, it would be important to examine the outcomes for students interacting in 21st century learning classrooms and achievement levels reached, to further understand the relationship between effective technology integration and meeting 21st century learning needs of the students.

Implications

This case study identified factors influencing teachers' technology use and curriculum development to meet 21st century learning needs. The 21st Century Learning Framework was identified by the State of Ohio as the necessary proficiencies students need to develop prior to graduation (INFOhio, 2010). These proficiencies include communication, collaboration, creativity, and critical thinking that focus on higher order thinking and promote the concept of life-long learning to build mastery of other 21st century learning skills. This study revealed there is a relationship between the factors identified and the professional development opportunities available to enhance technology integration. Also revealed was a correlation between technology use and technology self-efficacy. Bandura (1991) defined self-efficacy as an individuals' own beliefs about their capabilities to complete tasks or perform actions that effect their lives. The level of technology self-efficacy is increased when teachers receive effective

professional development and collaborate with other teachers in their school, district, or other schools.

The study also indicated the level of professional development offered by the district is not conducive to the learning needs of the teachers and needs to be enhanced to include advanced technology instruction and an understanding of how to incorporate technology into the curriculum. There also needs to be more collaboration among the teachers in the school and other districts to share ideas and learn from other professionals with common goals. The one participant teacher's comfort level in using technology with students was low due to limited training on technology integration and collaboration and should also be addressed. Educational reform is transforming classrooms and challenging teachers to design instruction to meet 21st century learning requirements. This challenge cannot be met without the proper professional development to instruct teachers how to effectively develop student-centered activities that incorporate technologies and advance student learning. When teachers share knowledge about technology use and incorporating technology in the curriculum they become more comfortable and motivated to use the technology (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012; Gorozidis & Papaioannou, 2014; Liu, 2013). This study also revealed there were similarities and differences among participants of varying technology self-efficacy levels.

Summary

The purpose of this study was to assess three variables: (1) the quality of teachers' integration of technology in relation to 21st century learning, (2) teachers' technology self-efficacy, and (3) the quality and availability of professional development to properly

prepare teachers. The findings indicated that teachers have a positive attitude toward integrating technology in the classroom; however, teacher technology self-efficacy influenced the amount of time technology is used in the classroom. The findings also indicate the professional development provided to teachers only teaches how to use the technology available, not how to effectively integrate the technology into the curriculum. The participant teachers used the technology they were most familiar with and only two teachers were willing to explore new technologies.

The results of this case study confirm that teachers are not equipped with the knowledge or professional development to effectively develop curriculum that integrates technology into the learning process. In most cases, teachers are giving simple assignments using technology that do not involve critical thinking or problem solving skills. These research findings will help educational stakeholders understand there are differences in the levels of teachers' technology self-efficacy and abilities to develop effective curriculum and aid in enhancing teachers' professional development that will provide a richer learning experience for the students.

The contribution to social change that this study provided was an understanding on how teachers integrate technology in the high school classroom, what pedagogical practices are used for effective integration into the curriculum, and what methods of training and education is needed to help teachers meet the 21st century learning requirements. A clear understanding of these topics is important in order to develop and deliver effective educational opportunities to properly prepare our students for higher learning, work, and life in the 21st century.

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Appendix A: Relationship of Interview Questions to Research Questions and

Theoretical Framework

Background questions.
The following questions are included to learn more about the participant while developing a relationship and to put the subject at ease.
1. Please tell me about your teaching experience.
2. How long have you been using technology in the classroom?

Research Question 1: How does a teachers' level of self-efficacy impact the ability to effectively incorporate technology in the classroom?

Theoretical framework	Interview question
Bandura (1986) social cognitive theory	1. How does your level of self-efficacy as it relates to technology impact your ability to incorporate technology in the classroom? 2. What technological devices are available to you for incorporating into the curriculum at your school? 3. Describe your comfort level in using each technological device that is available to you for inclusion in your curriculum. 4. Describe your perceptions and beliefs about integrating technology into the curriculum.

Research Question 2: What are teachers' perceptions of benefits and barriers for creating technology-rich curriculum that promotes student-centered learning?

Theoretical framework	Interview question
Bandura (1986) social cognitive theory	1. What is your perception of barriers that you face when trying to include technology in student-centered learning activities? 2. What is the most challenging aspect in relation to these barriers as it pertains to effectively integrating technology in the classroom? 3. With your experience as a teacher, describe the benefits of incorporating the technology in student-centered activates.

Research Question 3: What teacher preparation experiences or strategies are used to prepare teachers for teaching and learning in the 21st century?

Theoretical framework	Interview question
21st Century Learning Framework	1. What teacher preparation experiences or strategies are available to you through your school district to learn new ways to incorporate technology into the curriculum? 2. Describe the professional development opportunities your school district has provided to teachers to explore ways to integrate technology into pedagogical practices? 3. What specifically have you learned through professional development that has helped you to better understand effective ways to incorporate technology into the learning process?

Final Questions related to the study
1. Could I contact you if I have follow up questions regarding this interview?
2. If yes, what would be the available times and preferred method of contact?
3. Is there anything you would like to add, clarify, or change at this time?

Appendix B. Cover letter

Sara L Sharick

{Date}

RE: Invitation to participate in a research study

Name,

I am currently starting my doctoral research study. In conversations with the principal from the High School, your name was mentioned as a person who may be interested in participating in a research study. My research study will attempt to understand teacher's use and acceptance of technology in the high school classroom while integrating 21st century learning techniques. This letter is an invitation for you to share your knowledge on this research topic.

Below is a link to a survey with questions on technology integration. The survey will take about 20 minutes to complete. Upon completion, you will be asked if you are interested in being a participant in the study. The study will use a qualitative interview that will be delivered at a time and location (in person, phone, or Skype) convenient for you. For triangulation purposes, a technology survey and artifacts entries will also be part of the data collection process.

Thank you for taking part in the survey.

Respectfully,

Sara L. Sharick (sara.sharick@waldenu.edu)

Appendix C: Approval to Use Survey

Use of Survey for Dissertation   📁   Inbox   x   🗑 🖨 ⬚

Sara Sharick ▮▮▮▮▮▮▮▮▮▮   11/12/15 ☆   ↰   ▾
to pertmer ▾

Dr. Ertmer,

My name is Sara Sharick and currently working on my doctoral dissertation at Walden university. Dr. Ana Donaldson is my Committee Chair. My topic is How Do Teachers Effective Incorporate Technology in the High School Classroom While Meeting 21st Century Learning Needs of the Students? During my research, I came across the article authored by you, Dr. Wang and Dr. Newby entitled *Increasing preservice teachers' self-efficacy beliefs for technology integration.* I am seeking permission to use the technology survey from this research article in my study.

Please let me know if you require additional information.
Sincerely,
Sara Sharick

Ertmer, Peggy A ▮▮▮▮▮▮▮▮▮▮   11/12/15 ☆   ↰   ▾
to me ▾

Sara
Feel free to use the survey. Good luck with your work!
Peg

Sent from my iPhone

Appendix D: Participant Survey

Direction: The purpose of this survey is to determine how you feel about integrating technology into classroom teaching. For each statement below, indicate the strength of your agreement or disagreement by circling one of the five scales.

Below is a definition of technology integration with accompanying examples:

Technology integration: Using computers to support students as they construct their own knowledge through the completion of authentic, meaningful tasks.

Examples: Students working on research projects, obtaining information from the Internet. Students constructing Web pages to show their projects to others. Students using application software to create student products (such as composing music, developing PowerPoint presentations, developing Hyper Studio stacks).

Using the above as a baseline, please circle one response for each of the statements in the table:

SD = Strongly Disagree

D = Disagree,

NA/ND = Neither Agree nor Disagree

A = Agree

SA = Strongly Agree

1. I feel confident that I understand computer capabilities well enough to maximize them in my classroom. SD D NA/ND A SA

2. I feel confident that I have the skills necessary to use the computer for instruction.
   SD D NA/ND A SA

3. I feel confident that I can successfully teach relevant subject content with
   appropriate use of technology. SD D NA/ND A SA

4. I feel confident in my ability to evaluate software for teaching and learning.
   SD D NA/ND A SA

5. I feel confident that I can use correct computer terminology when directing
   students' computer use. SD D NA/ND A SA

6. I feel confident I can help students when they have difficulty with the computer.
   SD D NA/ND A SA

7. I feel confident I can effectively monitor students' computer use for project
   development in my classroom. SD D NA/ND A SA

8. I feel confident that I can motivate my students to participate in technology-based
   projects. SD D NA/ND A SA

9. I feel confident I can mentor students in appropriate uses of technology.
   SD D NA/ND A SA

10. I feel confident I can consistently use educational technology in effective ways.
    SD D NA/ND A SA

11. I feel confident I can provide individual feedback to students during technology
    use. SD D NA/ND A SA

12. I feel confident I can regularly incorporate technology into my lessons, when
    appropriate to student learning. SD D NA/ND A SA

13. I feel confident about selecting appropriate technology for instruction based on curriculum standards. SD D NA/ND A SA

14. I feel confident about assigning and grading technology-based projects.

    SD D NA/ND A SA

15. I feel confident about keeping curricular goals and technology uses in mind when selecting an ideal way to assess student learning. SD D NA/ND A SA

16. I feel confident about using technology resources (such as spreadsheets, electronic portfolios, etc.) to collect and analyze data from student tests and products to improve instructional practices. SD D NA/ND A SA

17. I feel confident that I will be comfortable using technology in my teaching.

    SD D NA/ND A SA

18. I feel confident I can be responsive to students' needs during computer use.

    SD D NA/ND A SA

19. I feel confident that, as time goes by, my ability to address my students' technology needs will continue to improve. SD D NA/ND A SA

20. I feel confident that I can develop creative ways to cope with system constraints (such as budget cuts on technology facilities) and continue to teach effectively with technology. SD D NA/ND A SA

21. 1 feel confident that I can carry out technology based projects even when I am opposed by skeptical colleagues. SD D NA/ND A SA

Appendix E: Selection Letter

Sara L. Sharick
{Date}

RE: Selection of participants in research study

Name,

The responses to the questionnaire have been reviewed and if you are still interested in participating in this study, I would like to set up a preliminary phone conversation to answer any questions you may have and set-up a time for an in person interview. All conversations will be recorded for later transcription. Enclosed is a consent form, which needs to be signed and returned to me before I can start the interview process. You can mail it back to me or provide it on the day that we meet for the in person interview. There is no obligation on your part, and at any time you may remove yourself from the study. If you have any questions or concerns, I would be happy to answer them during our phone conversation.

Respectfully,

Sara L. Sharick

Appendix G. Interview Questions

Thank you for agreeing to be interviewed for this research study on technology integration in the high school classroom. The purpose of the study is to understand how teachers are integrating technology, identify barriers to integrating technology into pedagogical practices as prescribed by the 21st Century Learning Framework and professional development activities to help train teachers on ways to effectively integrate technology. Your participation is appreciated and your responses will be held in strict confidence. During the interview, I will record your responses. After the interview, I will transcribe them and then send them to you for validation.

I sent you a consent form for you to sign and return. I (have/have not) received it. PLEASE READ THE CONSENT FORM. If you agree to being interviewed, please state your name and that you agree. If at any time you wish to conclude this interview or have the recording stopped, you may do so.

Interview sample questions:

1. What technological devices are available to you for incorporating into the curriculum at your school?

2. Describe your comfort level in using each technological device that is available to you for inclusion in your curriculum.

3. Describe your perceptions and beliefs about integrating technology into the curriculum.

4. How do you incorporate 21st century skill development into a technology-rich curriculum?

5. Barriers such time and access are frustrating to teachers. What is your experience in relation to these barriers?

6. Describe the professional development opportunities your school district has provided to teachers to explore ways to integrate technology into pedagogical practices?

7. What specifically have you learned through professional development that has helped you to better understand effective ways to incorporate technology into the learning process?

8. Do you have any questions or comments?

Thank you for your time and for sharing you experience with me. I will transcribe the audio recording and send a copy to you. When you receive the transcription, please read it and if there are any changes, clarifications, or other editing you wish to make, please do so and return the edits to me. If you do not contact me or I do not receive your edits in two weeks after sending them to you via email, I will assume you are satisfied with the accuracy of the transcription and I will start analyzing the data. All personal information, including yours, the course, and your institution will be removed before the analysis begins. The removal of personal information is for your protection, but increases the challenges associated with removing and modifying data once it analysis begins.

Again, I appreciate you time and cooperation in pursuit of this research.

Sara L. Sharick

Appendix H: Follow-up Email

Sara L. Sharick
April 24, 2016

RE: Follow-up Interview Questions

Name,

If you have time to answer one or all the questions below by next weekend, I would greatly appreciate it.

1. BYOD - some of you discussed the district's policy on BYOD. Is the primary device used the student's cell phone? Does the district provide any training on utilizing a cell phone for instruction?

2. How does your level of self-efficacy affect your willingness to utilize technology in the classroom? How does it affect your ability to develop lessons utilizing technology?

3. What is your definition of student-centered learning? How does this type of teaching method build creativity and critical thinking skills?

4. Is 21st century learning teaching and learning practiced at your school? Are you given instruction on what it is and how to incorporate it in the learning process?

This should be the only sub-questions that I have. Chapter 4 is 1/4 of the way written. Chapter 5 will be a breeze. My goal is to be done writing by end of June.

Thank you for your participation in this study.

Respectfully,

Sara L. Sharick

Appendix I: Coding

Finding themes in the data collected and coding the information is the primary

method that will be used in this study. "Developing some manageable classification or

coding scheme is the first step of analysis" (Patton, 2002, p. 463). The following table is

a reflection of some of the anticipated themes and coding examples.

Code	Theme
Self-Efficacy: 0101 0102	Comfortable using technology
Centry21 Learning 0201 0202	Utilizing 21st century learning in the classroom Student-center learning is part of my curriculum
Professional Development 0301 0302	I have attended training provided by our school district Enhanced curriculum development

Appendix J: Support Letter

September 24, 2015

Dear Sara Sharick,
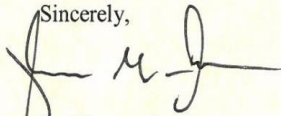
Based on my review of your research proposal, I give permission for you to conduct the study entitled <u>Case Study on How High School Teachers Incorporate Technology in the Classroom to Meet 21st Century Student Learning Needs (IRB Approval #10-26-15-0064844)</u> within the ███ High School. As part of this study, I authorize you to distribute a Questionnaire, interview selected participants, participate in interviews to collect data, utilize member checking, review artifact provided by participants, and results dissemination activities. Individuals' participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include: provide time for interviews in a secure, private location at the high school. We reserve the right to withdraw from the study at any time if our circumstances change.

I confirm that I am authorized to approve research in this setting and that this plan complies with the organization's policies.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the student's supervising faculty/staff without permission from the Walden University IRB.

Sincerely,

Dr. Thomas Jama

Appendix K: Participation Selection Questionnaire Data

I feel confident that I understand computer capabilities well enough to maximize them in my classroom.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	3	50.0	50.0	50.0
	5	3	50.0	50.0	100.0
	Total	6	100.0	100.0	

I feel confident that I have the skills necessary to use the computer for instruction.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	2	33.3	33.3	33.3
	5	4	66.7	66.7	100.0
	Total	6	100.0	100.0	

I feel confident that I can successfully teach relevant subject content with appropriate use of technology.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	2	33.3	33.3	33.3
	5	4	66.7	66.7	100.0
	Total	6	100.0	100.0	

I feel confident in my ability to evaluate software for teaching and learning.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	4	66.7	66.7	66.7
	5	2	33.3	33.3	100.0
	Total	6	100.0	100.0	

I feel confident that I can use correct computer terminology when directing students' computer use.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	16.7	16.7	16.7
	4	3	50.0	50.0	66.7
	5	2	33.3	33.3	100.0
	Total	6	100.0	100.0	

I feel confident I can help students when they have difficulty with the computer.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	16.7	16.7	16.7
	3	1	16.7	16.7	33.3
	4	2	33.3	33.3	66.7
	5	2	33.3	33.3	100.0
	Total	6	100.0	100.0	

I feel confident I can effectively monitor students' computer use for project development in my classroom.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	16.7	16.7	16.7
	3	1	16.7	16.7	33.3
	4	2	33.3	33.3	66.7
	5	2	33.3	33.3	100.0
	Total	6	100.0	100.0	

I feel confident that I can motivate my students to participate in technology-based projects.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	1	16.7	16.7	16.7
	4	3	50.0	50.0	66.7
	5	2	33.3	33.3	100.0
	Total	6	100.0	100.0	

I feel confident I can mentor students in appropriate uses of technology.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	16.7	16.7	16.7
	4	3	50.0	50.0	66.7
	5	2	33.3	33.3	100.0
	Total	6	100.0	100.0	

I feel confident I can consistently use educational technology in effective ways.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	3	50.0	50.0	50.0
	5	3	50.0	50.0	100.0
	Total	6	100.0	100.0	

I feel confident I can provide individual feedback to students during technology use.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	16.7	16.7	16.7
	3	1	16.7	16.7	33.3
	4	3	50.0	50.0	83.3
	5	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

I feel confident I can regularly incorporate technology into my lessons, when appropriate to student learning.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	4	66.7	66.7	66.7
	5	2	33.3	33.3	100.0
	Total	6	100.0	100.0	

I feel confident about selecting appropriate technology for instruction based on curriculum standards.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	2	33.3	33.3	33.3
	4	4	66.7	66.7	100.0
	Total	6	100.0	100.0	

I feel confident about assigning and grading technology-based projects.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	16.7	16.7	16.7
	3	1	16.7	16.7	33.3
	4	2	33.3	33.3	66.7
	5	2	33.3	33.3	100.0
	Total	6	100.0	100.0	

I feel confident about keeping curricular goals and technology uses in mind when selecting an ideal way to assess student learning.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	16.7	16.7	16.7
	3	2	33.3	33.3	50.0
	4	2	33.3	33.3	83.3
	5	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

I feel confident about using technology resources (such as spreadsheets, electronic portfolios, etc.) to collect and analyze data from student tests and products to improve instructional practices.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	16.7	16.7	16.7
	3	2	33.3	33.3	50.0
	4	1	16.7	16.7	66.7
	5	2	33.3	33.3	100.0
	Total	6	100.0	100.0	

I feel confident that I will be comfortable using technology in my teaching.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	3	50.0	50.0	50.0
	5	3	50.0	50.0	100.0
	Total	6	100.0	100.0	

I feel confident I can be responsive to students' needs during computer use.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	16.7	16.7	16.7
	3	1	16.7	16.7	33.3
	4	1	16.7	16.7	50.0

		Frequency	Percent	Valid Percent	Cumulative Percent
	5	3	50.0	50.0	100.0
	Total	6	100.0	100.0	

I feel confident that, as time goes by, my ability to address my students' technology needs will continue to improve.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	1	16.7	16.7	16.7
	4	2	33.3	33.3	50.0
	5	3	50.0	50.0	100.0
	Total	6	100.0	100.0	

I feel confident that I can develop creative ways to cope with system constraints (such as budget cuts on technology facilities) and continue to teach effectively with technology.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	2	33.3	33.3	33.3
	4	2	33.3	33.3	66.7
	5	2	33.3	33.3	100.0
	Total	6	100.0	100.0	

I feel confident that I can carry out technology based projects even when I am opposed by skeptical colleagues.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	2	33.3	33.3	33.3
	3	1	16.7	16.7	50.0
	4	1	16.7	16.7	66.7
	5	2	33.3	33.3	100.0
	Total	6	100.0	100.0	