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Teachers' Attitudes, Beliefs, and Confidence Levels and Technology Integration in Urban Schools

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Walden University
2020

Abstract

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by

Renée R. Rousey

MS, University of Maryland University College, 2003

BA, George Washington University, 1979

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Many K–12 schools do not exploit the advantages of technology, despite the influx of equipment that can enhance pedagogy and student success. A gap exists in the literature about the extent to which urban teachers' perceptions influence technology use in the classroom. The purpose of this qualitative study was to explore the ABCs of K–12 teachers regarding technology integration in their classrooms. Rogers' diffusion of innovation theory and the technological pedagogical content knowledge model were the frameworks for this study. The research questions examined teachers' intrinsic factors that impact the integration of technology in the urban classroom and the perceptions of principals who serve as administrators at urban schools. This single case study examined the impact of technology integration through the perspectives of urban teachers and administrators. The purposeful samples included K–12 teachers and principals. Qualitative data were collected from 6 teachers via interviews, 4 principals via a focus group, and artifacts. The data analysis was based on the organization of participant responses and the development of categories and themes. Key results showed that urban teachers accept and value technology as a pedagogical tool, but the lack of up-to date equipment stalls the use of technology for learning activities in the classroom. The implications for positive social change are overarching and could benefit urban educators by identifying factors that impede technology integration at their schools and serve as the foundation for best practices and pedagogical strategies to reduce and overcome these barriers.

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Dedication

This dissertation is dedicated to my late mother, Sarah. C. Rousey. She instilled in me a persevering spirit and prepared me to face life's challenges with faith and humility. She was a constant source of inspiration to me. I thank my Lord and Savior, Jesus Christ for guiding me through each challenging step.

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Chapter 1: Introduction to the Study

Advancements in educational technology have prompted a shift in the U.S. Department of Education's policy strategies (Darling-Hammond, 2016; Lubienski, Scott, & DeBray, 2014; Roumell & Salajan, 2016). The National Education Technology Plan mandated the development of plans that encourage teachers to integrate technology into their classroom practices (Bakir, 2016; Spector, Merrill, Elen, & Bishop, 2014; Tondeur, van Braak, Ertmer, & Ottenbreit-Leftwich, 2017). Many educational policy-makers sought funding to have technology installed in schools to improve outcomes for students in Grades K–12 (Gamoran, 2016; Husband & Hunt, 2015; Lim, Zhao, Tondeur, Chai, & Tsai, 2013). Pedagogical innovations in education showed great potential with the installation of technology, including computers and the Internet, in many schools since the beginning of the 21st century.

The U.S. government poured billions of dollars into K–12 education during 2015 (McCandless, 2015). Yet, reports show that a decade after the installation of new technology in U.S. schools, the students who live in poor communities have not benefited scholastically from the addition of these new technology tools (Blackwell, Lauricella, & Wartella, 2014; Coburn & Penuel, 2016; Reardon, 2013). Few studies have focused on the use of educational technology in urban schools in the United States (Hohlfeld, Ritzhaupt, Dawson, & Wilson, 2017; Mouza & Barrett-Greenly, 2015; Shank & Cotten, 2014). Most previous research has focused on how equipping classrooms with computers positively impacts student learning achievement (Blackwell et al., 2014; Chuang, Weng, Huang, 2014; Hess, Saxberg, & Hochleitner, 2013; MacCallum & Jeffrey, 2014).

There is a gap between equipping the K–12 urban classroom with technology to support student learning and expecting the teacher to merge the technical goals with the pedagogical goals to enhance the day-to-day educational experience in the classroom. It is essential to recognize and examine the influence that a social system or community has on the diffusion process because the social system has the capacity to facilitate or impede adoption (Rogers, 2013; Swanson, Jin, Fawcett, & Fawcett, 2017). This research adds to the literature by examining the attitudes, beliefs, and confidence levels (ABCs) of teachers when integrating technology in K–12 classrooms at urban schools. The results of this research have the potential to assist K–12 teachers in schools in underserved communities to successfully integrate technology into their classrooms. Chapter 1 includes the background information for the study, the problem statement, the purpose of the study, research questions, and the conceptual framework. The final summary and conclusions of this chapter serve as the segue for Chapter 2.

Background

Technology serves as the backbone for myriad innovations that propel growth and sustainability in many industries in the 21st century (Fazal, Wahab, Yaacob, & Zawawi, 2016; Trindade et al., 2017). Year 2000 ushered in pedagogical innovations to education, which led to the installation of hardware, software, and other technological accouterments in schools across the United States (Lim et al., 2013). Many educational policy-makers relied on technology to improve the educational landscape in the K–12 arena (Lim et al., 2013).

Billions of dollars have gone into the U.S. K–12 educational system since the beginning of the 21st century (Delgado, Wardlow, McKnight, & O'Malley, 2015). Despite the technological investment in U.S. schools and evidence that technology is interwoven into the fabric of life, technology is not the silver bullet for the ails of the educational system (Blackwell et al., 2014; Carver, 2016; Nadelson, Seifert, & Sias, 2015). Research shows that the learning capacity of students who live in poor communities has not improved (Dolph, 2017; Hsu, 2016; Reardon, 2013).

Limited use of new technologies in K–12 classrooms over the course of the past century has left educators exasperated and wary (Dolan, 2016; Wang, Hsu, Campbell, Coster, & Longhurst, 2014). Meanwhile, political pundits point to the pedagogical practices of teachers in underserved communities as the cause of the disparities (Blackwell et al., 2014). The learning potential of these students has stalled despite the presence of technology in the classroom (Blackwell et al., 2014; Dolph, 2017; Hsu, 2016). To date, few researchers have explored why the rate of technology integration at underserved schools is lower than affluent schools, despite the influx of new technology at urban schools (Kimmons, Carpenter, Veletsianos, & Krutka, 2018; Lim et al., 2013). Some educational experts are beginning to inquire about the barriers that negatively impact the capacity of teachers who instruct children in economically depressed neighborhoods from the teachers' perspectives (Bennett, Dawson, Bearman, Molloy, & Boud, 2017; Koch, Heo, & Kush, 2012; MacCallum & Jeffrey, 2014; Tondeur et al., 2017).

Studies have revealed that K–12 teachers perceive barriers as a whole in access, beliefs, professional development, time, and vision (Carver, 2016; Ertmer & Ottenbreit-Leftwich, 2013; Nikolopoulou & Gialamas, 2016). Many researchers suggest that future studies should explore the link between technology use, teacher ABCs, and other intrinsic factors (Andrei, 2017; Ertmer & Ottenbreit-Leftwich, 2013; Gibson et al., 2014; Kumar & Rani, 2016; Lim et al., 2013; Zoch, Myers, & Belcher, 2016). Researchers have explored the intrinsic factors that impact technology integration in U.S. public schools, but there is a lack of understanding of how teachers view their role with integrating technology in the urban classroom, how they perceive the barriers to success in the urban classroom, and how they interpret the barriers, both actual and perceived, to the successful use of technology for pedagogical and administrative activities in the urban classroom.

My research focuses on the intrinsic obstacles faced by educators at K–12 urban schools as they integrate technology in their classroom pedagogical routines. For this research study, I directed attention toward the integration of technology for the advancement of pedagogy in disparate urban communities and not on the use of individual hardware and software technologies. The objective of this study was to uncover the attitudes, pedagogical beliefs, and confidence levels of urban K–12 teachers who can contribute to the successful integration of technology in urban classrooms in the future.

Problem Statement

The U.S. educational system has historically been recognized as the *great equalizer* (Growe & Montgomery, 2003; Holmes & Zajacova, 2014; Tyack & Cuban, 1995). During the 1900s, Booker T. Washington (Fairclough, 2016) and a cadre of African American educators recognized schools as the catalytic force to prepare African Americans for success. More recently, the University of Maryland released the results of the 2014 Digital Inclusion Survey (Bertot et al., 2014) that reported that technology has assumed the role of the *great equalizer* because of its propensity to improve successful educational outcomes for those afforded the opportunity for access (Fuchs, 2014).

The marriage of education and technology appeared to catapult pedagogical advancements in the educational sector with the installation of computers, networks, and the Internet in many schools at the beginning of the 21st century (Bulman & Fairlie, 2016; Claro et al., 2012; Lim et al., 2013; Wild & King, 2016; Zhao, Pugh, Sheldon, & Byers, 2002). Although digital technology has the potential to transform education (Lim et al., 2013), the learning capacity of students in poor communities continues to show no progress (Cilesiz, 2011; Davies & West, 2014; Reardon, 2013). In 2015, the United States allocated $4.7 billion to upgrade K–12 classrooms with technology (McCandless, 2015). Nonetheless, studies have shown that technology alone has not changed teachers' pedagogical practices or the learning potential of students in underserved communities (Blackwell et al., 2014; Curran, 2015).

The findings of several studies (Carver, 2016; Tondeur et al., 2017) concluded that contextual characteristics, such as school culture and student population (Howard,

Chan, & Caputi, 2015) influence technology use and the adoption of pedagogical beliefs. Tondeur et al. (2017) identified a relationship between the use of technology in education and teachers' pedagogical beliefs. The authors acknowledged that the results are not generalizable and recommended that future research build on their findings; they suggested their model should be tested and presented with a different data set. Blackwell et al. (2014) studied how teacher attitudes about technology use and teacher confidence levels relative to the use of technology play a significant role in whether technology is integrated into classroom learning activities.

Many educational pundits blame teachers for students' stalled learning patterns (Blackwell al., 2014) and question whether the ABCs of the teachers are to blame for the lack of integration of technology in K–12 schools in poor neighborhoods (MacCallum & Jeffrey, 2014; Spector et al., 2014). Few studies have explored the barriers that prevent teachers from successfully integrating technology into urban classrooms (Bennett et al., 2017; Howard & Gigliotti, 2015; Koch et al., 2012; MacCallum & Jeffrey, 2014; Tondeur et al., 2017). Consequently, a gap in the literature exists concerning the specific intrinsic barriers (i.e., ABCs) that prevent urban teachers from integrating various forms of technology in classroom activities and administration tasks. This research study was designed to fill this gap and add to the literature by exploring the ABCs of K–12 educators who are expected to use technology as an effective pedagogical tool in the urban classroom.

Purpose of the Study

The purpose of this case study was to examine the ABCs of teachers when integrating technology in K–12 classrooms at urban schools. The information about the ABCs of technology integration should assist K–12 educators who teach at schools in marginalized communities to successfully integrate technology into their classrooms. Identifying the teachers' perspectives and approaches to technology use with respect to real or perceived barriers in the urban classroom was paramount to this study.

Research Questions

The following questions were used to guide this research study:

Main Questions

RQ1: What are the attitudes, beliefs, or confidence levels of K–12 teachers at urban schools who integrate technology into their classrooms?

RQ2: How do the attitudes, beliefs, or confidence levels of K–12 teachers impact the integration of technology in the urban classroom?

RQ3: How do the teachers' viewpoints about technology integration compare to the viewpoints of urban K–12 principals?

Subquestions

SQ1: How do teachers' levels of digital literacy impact their ability to effectively incorporate technology in the classroom?

SQ2: What are the experiences of K–12 teachers who integrate technology into their classrooms at urban schools?

Conceptual Framework

The theory of diffusion of innovation (DOI) highlights factors crucial to the adoption of technology (Rogers, 2003). DOI and the technological pedagogical content knowledge (TPACK; Koehler & Mishra, 2009) model served as the frameworks for this research. DOI can be used to describe how teachers and students interact or respond to new technology in the classroom. TPACK addresses the challenges faced by teachers in a technology-driven classroom and focuses on the skillsets educators need to function in a competent manner in the 21st-century classroom. Research, along with the application of the DOI and TPACK frameworks, offers guidance on ways to isolate and identify the technological knowledge base and personal characteristics of teachers whose aim is to integrate technology in the K–12 classrooms in urban schools. Consequently, the ABCs, as identified in RQ1 and RQ2, were viewed through the lenses of DOI (Rogers, 2003) and TPACK (Koehler & Mishra, 2009).

Based on the DOI theory, the adoption of technology is contingent on a communication channel within the K–12 school system that enhances the user's perception and the user's acceptance of an innovation over time. More specifically, the changing attitudes, behaviors, and infrastructure support for new technology were analyzed through a lens of DOI. RQ3 identifies and compares how individuals within the social system view their roles in relationship to the barriers with respect to technology integration (Rogers, 2003). The commingling of content, pedagogy, and technology positions teachers to exploit subject matter and technology knowledge to enhance their pedagogical experience and the students' learning experience. SQ1 and SQ2 highlight

how technology literacy combined with experience can impact technology integration (Koehler & Mishra, 2009; Rogers, 2003). In Chapter 2, I examine how DOI and TPACK work in concert to identify and isolate the personal characteristics of K–12 teachers and their capacity to integrate technology in their urban classrooms.

Nature of the Study

The nature of this study is qualitative and is based on a constructivist paradigm used to examine the ABCs of teachers when integrating technology in K–12 classrooms at urban schools. The case study design is consistent with understanding the ABCs of teachers challenged with integrating technology in the urban classroom. The foundation of this case study has a contemporary focus and is based on the worldview of the participants within the context of real life (Yin, 2003). This empirical research tool is used for conducting exploratory investigations in underresearched domains. Yin points out that case study research is conducive to field-based research applications focused on determining the *how* and *why* of phenomena that involve contemporary issues in K–12 education.

The focus of this research was to examine the ABCs of teachers when integrating technology in K–12 classrooms at urban schools. This catalytic approach was appropriate because I, as the instrument, sought to discover and understand the experiences of teachers who do not exploit the pedagogical benefits of technology. This qualitative study elucidates how teachers at urban schools incorporate technology into the day-to-day activities of the classroom environment via in-depth teacher interviews and a focus group of principals. In addition, this qualitative analysis assists in understanding an up close, in-

depth, and detailed examination of the case being studied. In this research, the barriers to technological fluency are described from the perception of the teachers.

Definitions

Digital literacy: The cognitive, sociological, and technical skills used to perform tasks and solve problems in a technology-based environment (Alkali & Amichai-Hamburger, 2004).

Educational technology: Any technological process or electronic tool that enhances the learning process (Cifuentes, Maxwell, & Bulu, 2011).

Extrinsic barriers: Also referred to as *first-order barriers*, obstacles external to the educator and result from lack of access to infrastructure, hardware and software, technical support and training, and other factors (Ertmer, 1999, 2005).

Information and communication technologies (ICTs): Technological equipment that is hardware, software, or network-related; interchangeable with the terms computer and technology (Yusuf & Onasanya, 2004).

Intrinsic barriers: Also referred to as *second-order barriers*, obstacles internal to the educator, including teacher ABCs, teaching strategy, technology proficiency, classroom practices, and flexibility (Ertmer, 1999).

Phenomenon: A concept (e.g., problem, issue, or topic) that is the subject of a research investigation. The main focus or official interest exhibited in the case (Stake, 1995, 2005, 2006).

Self-efficacy: Individuals' beliefs about their capacity to attain levels of performance that enable them to meet their goals or complete tasks that affect their lives (Bandura, 1994).

Technology: A variety of equipment, machinery, and tools developed via the application of scientific knowledge. This term is used interchangeably with *computer*, *mobile devices,* and *ICTs* (Perrotta, 2017).

Technology integration: A value-added process that facilitates the effective implementation of technologies to enhance teaching and learning (Ertmer, 1999).

Technological pedagogical content knowledge (TPACK): A framework used to provide guidance to teachers about the knowledge needed to implement technology integration (Koehler & Mishra, 2009).

Urban: A descriptor used for children, families, schools, and communities within social science and educational domains. The term denotes highly populated locals, with children and families who are marginalized and live in a community with increased risks—real or perceived (Gadsden & Dixon-Román, 2017).

Assumptions

The design for this research was based on the assumption that participants would be honest about their level of experience working with technology at urban schools. It was assumed that participants in this study would respond to both the online and face-to-face questions in an open and honest manner. It was assumed that the participant responses would reflect the perceptions of the educators who teach in urban school districts. I presumed that each participant was amenable to responding to the interview

questions honestly and without hesitation because the value of this research was contingent on good, rich data retrieved during the case study.

Scope and Delimitations

This case study was limited to one urban school district located in the northeastern corridor of the United States. The study was restricted to in-depth interviews with a purposefully selected sample that included six K–12 teachers and a focus group consisting of four K–12 principals. According to Yin (2013a), the classic single case study is an in-depth and up close investigation that focuses on a complex phenomenon in a real-world setting. This single case study reflects a contemporary focus; consequently, the research lacks a historical perspective, which limits transferability (Yin, 2013c). The purpose of this qualitative single case study was to examine the ABCs of teachers when integrating technology in K–12 classrooms at urban schools. The holistic design was appropriate because it facilitated the exploration of the complexity and particularity of a single case while focusing on the link between the phenomenon of interest in the case and its contexts (Yin, 2013b). Yin (2017) asserted that bounding the case is just as important as defining the case. The scope of this case study was limited to one urban school district located in the northeastern corridor of the United States. And while the objectives of case study evaluations tend to be exploratory or descriptive, a single case study presents challenges of validity and generalization attributable to the small number of cases. I used triangulation to facilitate data validation via cross verification of data collected from school administrators and artifacts.

Limitations

Limitations in research studies result from the limited control that a researcher has over the investigation (Hatch, 2002). Limitation can negatively impact the research results and can be the result of sample size and data collection. The sample size and population have the potential to present limitations that a researcher cannot anticipate prior to the assemblage of the participant groups. There is the potential that the quality and accuracy of data collected from participants could be impacted by selective perceptions of the interviewees. To ensure that the quality of data collected from the participants would meet the needs of this study, the study was limited to in-depth interviews with a purposefully selected sample composed of teachers from the school district, a focus group with principals from the same school district, and confidentiality was used to encourage the probability of truthful responses.

Significance

Technology empowers both teachers and students and adds a new dimension to the learning process (Spector et al., 2014). This dimension points to a new paradigm for learning that exploits the capacity of technology to facilitate the day-to-day educational experiences in K–12 classrooms. Limited studies have been conducted to identify barriers that prevent teachers who work in underserved schools from successfully integrating technology into their classrooms (Bennett et al., 2017; Koch et al., 2012; Lim et al., 2013; MacCallum & Jeffrey, 2014; Spector et al., 2014; Tondeur et al., 2017). Most previous researchers focused on how equipping the classroom with technology positively impacts student learning.

A gap exists in the literature on the connection between the effectiveness of technology in the classroom and the ability of teachers in urban schools to adopt and incorporate newfound technological knowledge in everyday classroom activities (Hohlfeld et al., 2017; Jensen, Kummer, & Godoy, 2015; Li, Snow, Jiang, & Edwards, 2015; Mouza & Barrett-Greenly, 2015; Papanikolaou, 2016). Enhancing learning for students in high-poverty communities is paramount to student success (Comber & Woods, 2016), and this research adds to the literature because I examined the technology integration dilemma from a unique perspective—via the challenges faced by K–12 teachers who teach underserved students. In this study, I employed a different approach because I did not set out to evaluate the integration of technology in schools with students who live in underserved communities. Instead, I sought to identify the ABCs of the teachers who work in urban schools and are slow to integrate the technology that can increase digital literacy.

Dewey (1938, 1997) defined the *teacher* as the agent of change in the educative process. In a constructivist environment, teachers were positioned to acknowledge the capacity of students as the central force in the learning process. Today, in a similar manner, teachers in urban schools can function as change agents by acknowledging the capacity of technology as a learning tool and integrating technology in the classroom to enhance the learning process for students (Bakir, 2016; Drape, Westfall-Rudd, Doak, Guthrie, & Mykerezi, 2013; Peck et al., 2015; Stone, 2016). By answering in-depth questions via interviews about their ABCs relative to technology use, supported by a focus group of school principals, the teachers can provide valuable information that will

assist in finding effective ways to integrate technology into the urban classroom. Positive social change occurs when teachers are able to increase the digital literacy of students in urban schools (Eyyam & Yaratan, 2014; Hutchison & Woodward, 2014; Kennedy & Odell, 2014), while preparing the students to lead successful lives in the global economy in the future.

Summary

The 21st century ushered in new pedagogical models that integrate technology into the learning experience (Koh, Chai, Benjamin, & Hong, 2015; Miller, 2015; Sharick, 2016). These new education models require teachers to exploit new literacies and skill sets with a student-centered approach (Dolan, 2016; Neuman, Grant, Lee, & DeCarlo, 2015; George, Pope, & Reid, 2015; Zoch et al., 2016). A new way of teaching is paramount to prepare students for success in the evolving global economy. Chapter 1 provided the basis for this case study to explore the barriers that interfere with the seamless integration of technology in urban classrooms from the perspective of urban teachers. Rogers' (2003) DOI and TPACK are the lenses through which I analyzed the integration of classroom pedagogical activities and practices. Chapter 2 is the literature review for the study and provides an educational account of constructivism and urbanization. A review of the literature revealed that technology integration creates a challenge in education in general. Consequently, technology integration presents even more of a challenge in the backdrop of an urban classroom with marginalized students and a teacher attempting to employ modernized tools of pedagogy in a physical infrastructure that also needs systemic upgrades. Chapter 3 identifies the methodological

approach for this study. Chapter 4 and Chapter 5 will present the research results and conclude with a summary of the research and recommendations for future efforts.

Chapter 2: Literature Review

The purpose of this case study was to examine the ABCs of teachers when integrating technology in K–12 classrooms at urban schools. Recent studies have revealed that educators around the world agree that technology is one of the most efficacious and ubiquitous tools available in today's educational toolbox (Fu, 2013; Kennedy, Latham, & Jacinto, 2015; Ruggiero & Mong, 2015). Technology has become a staple of life (Hohlfeld et al., 2017; Jensen et al., 2015; Kumar & Rani, 2016; Neuman et al., 2015) and the U.S. government has invested in technological resources to enhance the teaching capacity for educators at public schools since the turn of the 21st century (Carver, 2016; Dolenc & Aberšek, 2015; Peck et al., 2015). Consequently, technology has become a leading weapon in the teacher's arsenal to combat functional illiteracies for the 21st-century student. Educational tools used in the K–12 classroom include laptops, smartphones, tablets, projectors, printers, learning management systems, Internet, social media tools, e-mail, and Microsoft Office products (Fu, 2013; Li et al., 2015).

Existing literature reveals that educators who teach at schools in urban communities are slow to integrate ICTs into their classroom instruction despite new pedagogical tools in K–12 classrooms (Isik-Ercan, Zeynep Inan, Nowak, & Kim, 2014; Räihä, Tossavainen, Enkenberg, & Turunen, 2014). The TPACK framework highlights the need to include technology in a teaching strategy that depends not only on learning new technologies but on using new pedagogical skills and literacies (Lindstrom, Schmidt-Crawford, & Thompson, 2016; Zoch et al., 2016). Zoch et al. debated that the technology knowledge base of teachers is not an indicator of who will incorporate ICTs in their

classroom and who will not. Admiraal et al., (2017) argued that it is crucial to understand how teacher ABCs influence the diffusion of technology that has the propensity to change learning and teaching practices in the classroom. Information about teachers' ABCs of technology integration can assist K–12 educators who teach at schools located in marginalized communities in successfully integrating technology into their classrooms. This research study sought to understand the attitudes and pedagogical beliefs of urban teachers and how these intrinsic factors affect teacher confidence levels when devising strategies to integrate technology into their everyday classroom activities.

A review of the literature for this chapter is organized into three sections. The first section discusses the theoretical framework based on Rogers' (2003) DOI theory and the conceptual framework based on the TPACK model (Spector et al., 2014). The second section provides a historical account of the constructivist educational paradigm and the urbanization of U.S. public schools from the perspective of established educational scholars. The review of recent literature commences with identifying the role that advancing technologies have on the educational infrastructure in urban schools. The third section includes a summary of the ABCs of urban teachers and their use of technology in the classroom. The third section also addresses the gaps that result from the unknown link between technology use in the classroom and how teachers are positioned to incorporate the technology into their pedagogical strategy. The discussion continues by identifying how this study provides additional insight to close the gap.

Literature Search Strategy

Information from several databases was retrieved based on search criteria in the form of peer-reviewed articles and published dissertations. Because information technology is a rapidly advancing field, I used published dissertations as a source of current information to keep pace with new knowledge continually being added to the ever-changing pool of scholarly literature. Walden University library databases were the primary repositories and sources for literature for the urban teachers ABCs when confronted with integrating technology in their classrooms. This research allowed me to use the existing knowledge base to gauge the pulse in the educational field relative to this topic. Databases used include EBSCOhost, Educational Research, Education Source, ERIC, ProQuest Central, Sage Journals, ScienceDirect, and Taylor and Francis Online. I used Google Scholar to gather some historical and background information and Ulrichsweb to ensure that all resources were classified as peer-reviewed journal articles. Search terms I used were: *computer, mobile devices, information and communication technology, instructional technology, technology integration, teacher attitudes, teacher beliefs, teacher confidence, technology, digital literacy, digital divide, urban, 21st-century learning, constructivism, extrinsic barriers, intrinsic barriers, TPACK, Rogers' theory of diffusion,* and *K–12 classroom*. All sources used for the literature review were published between 2013 and 2017. Publications that include books and journal articles were used for historical and foundational information relative to philosophy, pedagogy, and theoretical and conceptual frameworks and have publication dates outside the 5-year period used for peer-reviewed articles.

Conceptual Framework

Rogers' Diffusion of Innovations

Rogers' (2003) DOI theory is a framework used to discern how novel ideas, products, and practices are diffused throughout distinct populations like groups and organizations. Rogers (2003) posited that an idea, object, or practice can be successfully disseminated to the targeted population when four variables are involved: (a) innovation, (b) channel of communication, (c) time, and (d) a social system. The process of diffusion occurs when a message identified as a new idea is introduced to a social system via its communication channel over time. The art of diffusion revolves around the perceived newness of an innovation irrespective of whether the idea, object, or practice was newly created. The social system can represent individuals in a business, school, or governmental agency, and communication serves as a catalyst that affects the speed of adoption of the technology among members of the group.

DOI and technology for education. Today, members of a social system can transfer knowledge about innovation via the Internet, smartphones, video conferencing, media (print or online), word of mouth, or electronic distribution, including e-mail and text messaging (Barrett, Davidson, Prabhu, & Vargo, 2015; Shrader et al., 2016; Veletsianos, 2016). The adoption rate of technology varies according to the industry (Rogers, 2013). Education is one discipline that exploits Rogers (2003) diffusion model to analyze the adoption of technology. The socioeconomic and educational inequities that result because of unequal access and distribution of technological resources is known as the *digital divide* (Alizadeh, Grubesic, & Helderop, 2017; Tsetsi & Rains, 2017; National

Telecommunications and Information Administration, 1995, 1997; Wamuyu, 2017). Research shows that the rate of technology adoption varies significantly between educational facilities in affluent communities versus similar facilities in poor neighborhoods, resulting in unequal distribution of ICTs that fuels the digital divide (Rogers, 2001; Simoni, Gibson, Cotten, Stringer, Coleman, 2016). DOI theory can be used to describe how teachers interact and respond to new technology in the classroom. In this qualitative study, I examined and reported on urban teachers' perspectives about the integration of technology in the classroom via the lens of Rogers' (2003) theory of DOI.

In theory of diffusion, Rogers (1995, 2003) depicted the adoption curve for technology as an S-shaped curve. A graphic representation of this phenomenon is shown in Figure 1. The successful innovation of a specific new invention within a specific system is represented by an S-shaped curve. An analysis of the S-curve shows that only a few individuals become adopters at the beginning of the innovation acceptance process.

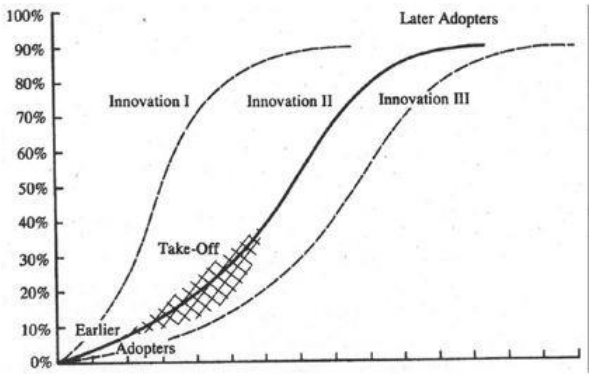

Figure 1. Rogers' S-curve. Reprinted from *Diffusion of Innovations* (p. 11), by E. M. Rogers. 2003, New York, NY: Free Press, a Division of Simon & Schuster, Inc. Copyright 1995, 2003 by E. M. Rogers. Copyright 1962, 1971, 1983, by Free Press. Reprinted with permission (see Appendix A).

As time progresses, the tipping point appears as the rate of change increases due to the positive feedback that drives the social system to a new level (Rogers, 2003; van Nes et al., 2016). As the diffusion accelerates and reaches a maximum level where 50% of the individuals in the social system adopt the innovation, the curve levels off and the adoption takes place at a slower rate until the remaining individuals within the social system adopt the innovation. Rogers (2003) used the field of technology as a template of sorts to show how the S-shaped curve of diffusion is evident when the affordance of a new ICT impedes the purchasing power of individuals on the lower end of the economic scale. As time progresses, adoption takes place at a higher rate due to the decreasing cost of the technology. The remaining few adopt the technology out of necessity or convenience as the lowest cost of the technology is approached.

DOI and cultural groups. Many researchers have used Rogers' (2003) DOI theory to investigate the lag in technology adoption among diverse cultural groups (Baturay, Gökçearslan, & Ke, 2017; De Haan, 2004; Hughes & Ooms, 2004; Rogers, 2001). Hilbert (2011) opined that the digital divide should be analyzed not based on ICT access but on the advantages of technology integration. Hilbert (2011) purported that the relationship between the digital revolution and factors—including culture, location, and income—are contingent on the principles of DOI. In education, culture, location, and income are used as criteria to evaluate digital literacies of urban students, impoverished communities, and families with low socioeconomic status. Hilbert reinforced the widely held concept that the study of DOI serves as the foundation for understanding the digital divide and used a literature review to depict the myriad ways to describe the digital

divide with different technological devices. Hilbert also used the diffusion patterns of mobile phones and broadband technologies to reflect the juxtaposed impact on diffusion rates. The rapid diffusion of cell phones, in comparison to the slow diffusion of Internet broadband subscriptions, resulted in the narrowing and widening of the digital divide relative to mobile phones and Internet subscriptions, respectively. In other words, mobile phone technology bypassed the tipping point while broadband technology has yet to reach the tipping point.

Zhang (2017) conducted a study of the diffusion of mobile phones in 150 countries during the period 1991 to 2013. Zhang (2017) noted that the diffusion of mobile phones followed the pattern of the S-curve for all income groups except low-income country groups (see Figure 2). Zhang surmised that the findings acknowledged that although mobile phones are approaching the saturation point globally, there still exists a gap between the penetration of mobile phones between affluent and poor countries.

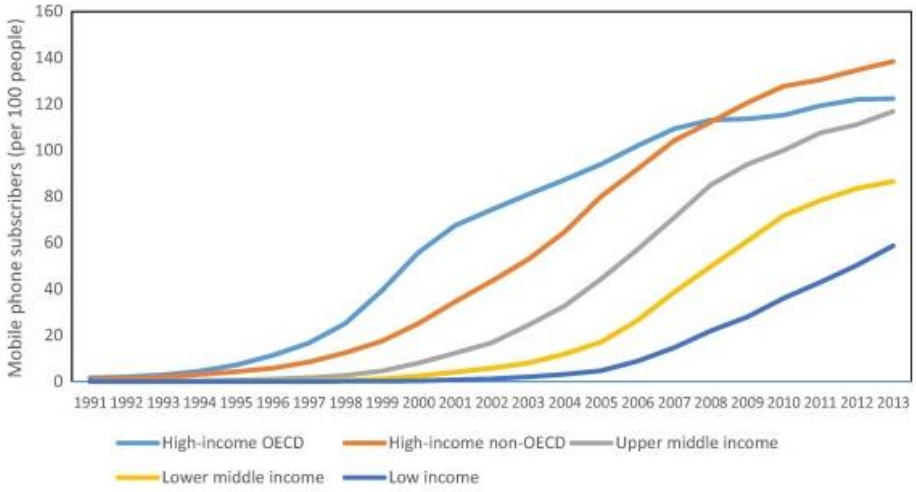

Figure 2. Diffusion curves of mobile phone of different groups of countries. Reprinted from "Exploring the patterns and determinants of the global mobile divide" by X. Zhang, 2017, *Telematics and Informatics 34*/1, p. 443. Copyright 2017 by Elsevier. Reprinted with permission (see Appendix B).

DOI and intrinsic motivations. As Rogers (2003) pointed out, the adoption of new technologies is based on user acceptance. The relevance of the teachers ABCs becomes pertinent to the integration of technology in the classroom because research shows that teacher perceptions are a driving force relative to the success of any new venture in the classroom (Dewey, 1938, 1997; Nappi, 2014; Smith, 2015; Snape & Fox-Turnbull, 2013). If the ABCs of teachers impede the adoption of technology in the classroom, then the perceptions of the teachers interfere with the process of diffusion (Aldunate & Nussbaum, 2013; Domingo & Gargante, 2016; Kumar & Rani, 2016). Therefore, the learners will not be positioned to exploit the advances of technology and will be more prone to become digitally illiterate and victims of the digital divide (Dolan, 2016; Hohlfeld et al., 2017; Li & Ranieri, 2013; Neuman et al., 2015). On the other hand, if teachers perceive that technology facilitates the learning process, the probability of adoption is increased, and technology is accepted in the classroom environment as a conduit to teach students.

Technological Pedagogical Content Knowledge

Technology has increased the speed of social and economic development (Cáceres, Belding, Parikh, & Subramanian, 2012). The educational arena has been slow to incorporate technology in its pedagogical practices when compared with the business community (Peck & Reitzug, 2014; Doering, Koseoglu, Scharber, Henrickson, & Lanegran, 2014). ICTs can be used to support best educational practices that boost learning and teaching initiatives. Instructional tools that appear in the form of computers, software, tablets, mobile phones, and other technical devices have become synonymous

with the techno-pedagogical infrastructure (Oguta, Robert, & Douglas, 2014). TPACK is a theoretical framework used to understand the knowledge that teachers need for effective technology integration (Celik, Sahin, & Akturk, 2014).

Shulman (1986), known for the Pedagogical Content Knowledge (PCK) theory, recognized early on that the knowledge associated with how to teach a subject overlaps with the knowledge that comes from a deep understanding of the content material (Pamuk, Ergun, Cakir, Yilmaz, & Ayas, 2015). Mishra and Koehler (2006) are credited with the TPACK framework that is recognized by researchers in the educational technology field; and, is used by researchers who are seeking to understand the integration of technology in education (Herring, Koehler, & Mishra, 2016; Panmuk et al., 2015). The Shulman (1986) PCK concept served as the foundation for TPACK. The focus of TPACK was to establish a strong theoretical foundation that addressed the challenges of a techno-pedagogical learning environment.

The PCK model served as the foundation for the TPACK framework as shown in Figure 3. The TPACK model created a pathway for teachers to employ technology integration based on the inter-dependencies of the three primary forms of knowledge; content, pedagogy, and technology (Phillips, 2013). The conceptual model does not identify the specifics of how the teacher should use technology in the classroom. Instead, the TPACK model suggests that there is a mutually exclusive relationship between content knowledge, pedagogical knowledge, and technological knowledge, and that teaching in the 21st century requires that the teacher understood how to use technology to complement the content and pedagogy of a subject simultaneously.

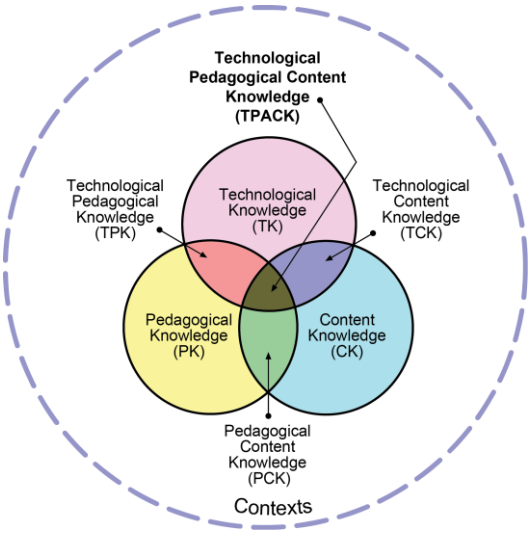

Figure 3. The TPACK model. Copyright 2012 by tpack.org. Reproduced with permission of the publisher (see Appendix C).

The TPACK model reflects a continuum of overlapping factors and attempts to provide guidance for understanding the barriers that teachers face when incorporating technology in everyday classroom activities in a way that is engaging to the students (Jorgenson & Vu, 2016). Teachers and educational administrators have included technology as a tool in the pedagogical infrastructure. The tools appear in the form of hands-on exercises, learning management software, platforms for grading, record-keeping, and repositories used to store the variety of informational products.

Digital transformation has resulted in an overarching impact on the economy, society, and governance internationally (Jorgenson & Vu, 2016). In education, ICT tools are instrumental in enhancing learning and teaching objectives in the classroom (Oguta et al., 2014). The tools include smartboards, projectors, tablets, laptops, and mobile devices. Doering et al. (2014) conducted a study that was designed to show a group of in-service teachers how to use technology to teach geography in the classroom. The findings

showed that the learning management system aided the teachers with content, pedagogical, and technological knowledge. The system used instructional scaffolding to aid the teachers in integrating geospatial technologies and content with pedagogical strategies. The technological tools increased the participant's motivation to continually improve their skill level and generated a positive response. The teachers in the study self-reported that they viewed the use of technology more favorably which aided in removing the barriers that were caused by their limited technological knowledge.

Internet access, mobile devices, and technological accouterments have been added to classrooms in many socioeconomically depressed communities, yet the learning capacity of students who attend those schools has not improved (Cilesiz, 2011; Davies & West, 2014; Ditzler, Hong, & Strudler, 2016; Grant et al., 20015; Mouza & Barret-Greenly, 2015; Reardon, 2013). The TPACK framework is based on the premise that providing the teacher with a knowledge platform that is technological, pedagogical, and content-rich (Phillips, 2013), will enhance the teacher's skillset which will subsequently cause the teacher to be more amenable to integrating technology in the classroom.

Historical Background

Constructivism as a Learning Paradigm

Educational scholars witnessed a paradigm shift during the second half of the twentieth century as the "art of learning" gradually replaced the "act of knowing" as theories of behaviorism that were advanced by Skinner (1972, 2011, 2014) were eventually ousted by theories of constructivism led by Piaget (Boghossian, 2006; Cooper, 1993; Fosnot & Perry, 1996; Fox, 2001; Jonassen, 1991). Educators viewed

constructivism as a response to the de facto educational model that predominated the U.S. public school system (Dewey, 1938/1995; Matsko & Hammerness, 2014; Oldfather, Bonds, & Bray, 1994; Tyack, 1974; Tyack & Cuban, 1995). Numerous iterations of revisions to the existing pedagogical behavioral and cognitive theories did not reflect the evolutionary changes that were taking place during the 19th century by the population. As the debates continued, constructivism became recognized as a learning paradigm; however, by the 21st century, constructivism was raised to the ranks of a learning theory (Fosnot, 2013; Fosnot & Perry, 1996; Fox, 2001; Shcolnik & Abarbanel, 2016).

A constructivist philosophical approach permeated the field of education as Piaget (1964, 1976, 2013), Vygotsky (1978, 1980), and Dewey (1938/1997) framed their individual ideologies using different colored lenses (Barak, 2014; Boghossian, 2006; Jonassen, 2001, 2006). The focus of Piagetian constructivism was the mind that was at the center of the learning process (Schcolnik & Abarbanel, 2016). The Vygotskian perspective was associated with social constructivism which viewed the interface between the learner and the environment as integral to the learning process (Amineh & Asl, 2015; Toven-Lindsey, Rhoads, & Lozano, 2015; Vygotsky, 1978). Dewey's (1938/1997) philosophy focused on a hands-on approach to learning (Goh & Kale, 2016). According to Dewey, the classroom environment was pivotal to the transfer of knowledge with the teacher engaging in one-to-many and one-to-one interactions with students who gained first-hand knowledge from their classmates and the teacher during real and vicarious experiences. As a result, the students, teachers, and the community at large were the stakeholders in a public education system that used a bottom-up

organizational strategy to guide change (Tyack, 1974), while the classroom served as a beacon for opportunity (Dewey, 1938/1997).

Dewey (1938/1997) argued that public education was an overarching tool to improve society and the quality of life of its citizenry by converting immature youth into responsible adults. Tyack and Cuban (1995) showcased public schools as the backbone of American culture and marketed education as an instrument to rid America from what was viewed as the ills of society. And, while the purpose of education was viewed differently by the business and political sectors within the United States, Dewey (1938/1997) self-appointed educators as social change agents in lieu of the fact that educational reform proved to be a seasonal occurrence that coincided with the change in political parties.

The philosophical concept of the "real world" set the stage for a deleterious and poisonous environment for the learner whose development was predicated on a template-based idea of the real-world (Lebow, 1993; Matsko & Hammerness, 2014; Oldfather et al., 1994). The physical representations of knowledge (e.g., books and teachers) were instruments in an instructional system based on a behavioral and cognitive foundation that viewed knowledge and learning as processes that represent a mirrored reality (Jonassen, 1991). The constructivist movement was against using education as a weapon that would bombard the learner with information to the point of asphyxiating the brain and transposing the student into a zombie-like learner yielding rote responses to routine educational inquiries (Boghossian, 2006).

Piaget. Piaget (1964, 1976, 2013) is recognized as the father of social constructivism (Crowther, 1999; Dror, 2008; Petrová & Kozárová, 2017). During the

20th century, the art of teaching took on a new meaning as known educational reformers advocated constructivism to make learning more meaningful and realistic for the student. Alternative pedagogical methodologies for U.S. public schools were created as traditional educational methodologies were being replaced by a newer pedagogical paradigm with a constructivist agenda (Wiggins, 2016). The primary element of this new conceptual framework was experience with the emphasis shifting from the teacher to the student as the center of the educational experience.

Piaget (1964, 1976, 2013) valued children as active thinkers who were inextricably linked to an advanced view of the world where the construction of knowledge was based on the student's cumulative experiences, both direct and indirect (Hirsh-Pasek et al., 2015; Siegler & Ellis, 1996). Piaget (1964, 1976, 2013) posited that it was the interaction between the children as active knowledge builders and the physical manifestation of knowledge that was the core of the learning process (Hirsh-Pasek et al., 2015; Jonassen, 1991). Piaget (1964, 1976, 2013) viewed cognition as a developmental process that was essential to childhood experiences and served as the epicenter of a human's understanding of the world.

Poria and Timothy (2014) used the Theory of Developmental Stages by Piaget (1964, 1976, 2013) to exemplify how children at varying ages of development gained knowledge from their experiences on a trip to the museum, in vastly different ways. The knowledge from this research can be further developed to help teachers to understand how a multifaceted approach can be used to integrate technology in the classroom as well as effectively teaching children how to use ICT tools. Piaget (1964, 1976, 2013) believed

that the child's biological maturation and interaction with their surroundings allowed everyone to create a mental model of their world (Lourenço, 2016). The research results of a project led by Peck et al. (2015), revealed that the constructivist approach to learning via ICT-immersion facilitated the acquisition of knowledge by students who were learning how to use technology (Peck et al., 2015). Cano, Ruiz, and Garcia (2015) argued that constructivism was an alternative to the objectivistic approach to learning. The researchers encouraged the use of a set of design principles and strategies that created learning environments that supported collaboration and employed the successful and effective use of ICTs.

Vygotsky. To understand the overarching impact of the Vygotskian perspective, it is important to view his works within his historical and cultural perspective which is significantly different from the Western cultural perspective (Robbins, 2001). Vygotsky (1978, 1980) framed constructivism with a cultural and historical approach to philosophy. While Piaget (1964, 1976, 2013) and Dewey (1938/1997) emphasized the interaction of the individual with the environment, Vygotsky (1978, 1980) focused on the inner self as a source of knowledge creation. As stated previously, Piaget (1964, 1976, 2013) viewed children as active thinkers. And, the activity theory that served as a sociohistorical lens for scholars was also the foundation for the sociocultural theory that Vygotsky devised to analyze human activity systems. (John-Steiner & Mahn, 1996; Jonassen & Rohrer-Murphy, 1999; Mahn, 1999). The sociocultural theory of Vygotsky (1978, 1980) preceded the constructivist revolution (Jaramillo, 1996), and the activity theory framework served as a bridge to the constructivist movement (Jonassen & Rohrer-

Murphy, 1999), The premise that an individual uses social experiences to define the world via interpretations of everyday social interactions, set the stage for the activity theory to be used for the design of constructivist learning environments.

Vygotsky (1978, 1980) was challenged by many critics who questioned the legitimacy of a behavioral approach to education (Liu & Matthews, 2005). Wertsch (Robbins, 2001) highlighted the social and cultural contributions of Vygotsky that focused on cognition and placed emphasis on the transformation of knowledge via environmental resources. As a philosopher, Vygotsky concentrated on the sociohistorical aspect of knowledge (Alabdulaziz & Higgins, 2017; Fosnot, 2013) using the opinions of Marx and Engels (2002) to substantiate the viewpoint that the laws of history reflect the laws of nature (Liu & Matthews, 2005). The sociocultural theory that is credited to Vygotsky (1978, 1980) served as a precursor and backbone of the constructivist movement (Jaramillo, 1996).

The ideas of Vygotsky (1978, 1980) were credited with supporting education in terms of teaching strategies and curricula development that shaped the teaching methodology of educators (Jaramillo, 1996). Vygotsky researched the transformation of knowledge using the environment as the center of experiential learning and opined that learning occurs because of the interactions between the learner and the environment. Santrock (2009) points out that Vygotsky was indirectly setting the stage for the computer to be used as a tool for teaching children the fundamentals of science and mathematics. Vygotsky proposed the use of math-centric tools to enhance the cognitive

development of children who were encouraged to learn the principles and functions of mathematics and science.

The Vygotskyan concept of mediated learning sheds light on the importance of scaffolding in the daily classroom routine of the teacher (Krahenbuhl, 2016). Alabdulaziz and Higgins (2017) conducted a case study evaluating six educators at two different schools in Saudi Arabia who taught mathematics to students who were experiencing difficulties grasping the concept of multiplication. Three teachers at one school used technology in their classrooms, and the remaining three teachers worked in technology-free classrooms. Data analysis was based on teacher interviews and classroom observations. The results showed that the technology enabled the teachers to save the lessons. In addition, the technology served as an avenue to review the previous lesson content, and to connect the previous lesson to the new lesson. Not only did the students benefit from the scaffolding approach to learning via an adaptive teaching approach; but, the teachers equipped with technology were able to pinpoint a student's weaknesses whereas teachers who did not use technology encountered difficulty with assessing student weaknesses early during the school year to address the individual student needs. Technology use in the classroom increased motivation and collaboration and supported the use of constructivist strategies when teaching the primary students who were struggling with multiplication concepts.

Dewey. Like Vygotsky, Dewey (1938, 1997) rejected the educational theories of the traditionalists who placed the teacher at the center of education and viewed teachers as agents of a traditional school system that exploited the knowledge and skills of the

elders for the advancement of pedagogy (Ferrari & Mahalingam, 1998; Glassman, 2001; Kellner & Share, 2005). According to Dewey, an educational system based on constructivism was juxtaposed to the traditional school system (Prawat, 1992). The traditional schools were based on a system that used elders to prepare the young for the future while teaching the students from a pool of past and limited experiences using books. The books not only provided old and static information; but, served as vestiges of an old and failing educational system.

Dewey (1980) envisioned education as an oscillating process that positioned the student to learn by continuously linking present experiences with past experiences in a never-ending pattern. Dewey described education as ubiquitous in much the same way as technology is viewed as ubiquitous, today (Sedek, Mahmud, Jalil, & Daud, 2014). The constructivist philosophy of Dewey employed research as a tool to examine the intricacies of the educative process. The observed experiences of the individual fueled later efforts to redefine education using technology as a tool to advance the educative process as identified by a constructivist orthodoxy (Somyürek, 2014; Stuckart, & Rogers, 2017; Wurst, Smarkola, & Gaffney, 2008). Teachers in the 21st century are encouraged to exploit computers, mobile devices, and cell phones in the classroom to teach students the knowledge and skills that are needed to lead a successful life. A mixed methods study by Dolenc and Aberšek (2015) reaffirmed that active student participation is vital to achieving the best educational goals. Dewey acknowledged that teacher perceptions were instrumental to the success or failure of student learning in the classroom. And, this train

of thought laid the foundation for this study to discern what impact the ABCs of the teacher have on the advancement of technology-driven instruction in the classroom.

Constructivism as a Learning Theory

Constructivism is a philosophy or belief, that learners create their own knowledge as they interact with their environment (Dewey, 1938/1997; Draper, 2002; Tyack & Cuban, 1995; Von Glasersfeld, 1998). Fosnot and Perry (1996) referred to constructivism as a psychological theory that defines learning as an active process practiced by scholars in the physical and social worlds, as well as a paradigm that offers a myriad of opportunities to the practice of teaching. With this description, Fosnot and Perry (2005) sided with educators on both sides of the aisle as they referred to constructivism as both a theory and a paradigm. Jonassen (2006) argued that constructivism is not a theory of learning because it cannot be empirically validated or empirically proved to be effective. Jonassen questioned the feasibility of demonstrating, directly or empirically, the effectiveness of this phenomenon; and, opined that other self-proclaimed constructivists viewed constructivism as an epistemology that reflects the way that educators support meaningful learning.

The transition from a teacher-student paradigm to a student-centered one fueled the concept of self-managed learning (Fosnot, 2013; Juvova, Chudy, Neumeister, Plischke, & Kvintova, 2015; Walker & Shore, 2015); and challenged the theory-based nature of constructivism. Many educators recognized constructivism as a dominant pedagogical theory that was rooted in Piagetian philosophy (Jonassen, 2006; Siegler & Ellis, 1996; Von Glasersfeld, 1998). Papert (2000) is linked to the constructivist

developmental theories of Piaget (Ackermann, 2001; Bhattacharjee, 2015; Harel & Papert, 1991; Picard et al., 2004); and, as a constructivist, Papert believed that humans construct their knowledge based on experiences that are linked to memories that serve as templates for subsequent thoughts and ideas. Dewey (1938/1997) posited that children learned in the classroom setting from their mentors (i.e., teachers) via conversations. Papert opined that conversations enable the exchange of individualized historical accounts and experiences between the learners and mentors; and, that these conversations advance self-directed learning during the construction of new knowledge. With a constructivist mindset, Papert used an educational technology platform to link the process of knowledge creation in an educational learning environment to a computer model that mimics learning via artificial intelligence (Picard et al., 2004).

Davidson (2014) affirmed that technology increases the student's propensity to increase knowledge; and, conducted a case study that showed that technology enhances the opportunities for learners to collaborate with their peers during classroom activities. Cubillos (2013) discovered from her research that successful technology integration requires the support of a community of learners. Davidson, Richardson, and Jones (2014). purported that a constructivist mindset benefits the integration of technology in classroom activities; but, remarked that educators are challenged with finding creative ways to integrate the use of technology into their curriculum. Fosnot (2013) acknowledges that in the 21st century, the question is not whether constructivism is a theory. The controversy lies in whether the theory of constructionism applies to the educational arena.

Urbanization of Schools

Urbanization became a common term in the educational lexicon as evidenced by the book titled, *The One Best System* (Tyack, 1974). During the turn of the nineteenth century, modernizing forces of diversity and pluralism became the norm as immigration, and urban life increased. The urban school evolved in response to the plight of indigenous people from village schools to the urban school systems. The objective of urbanization was to create a stable public society with a common value system. The racial, cultural, and language disparities were immense and fueled the transformation of community education into a homogenous school system that met the needs of the diversified society. The move from an erratic decentralized educational system, that consisted of enclaves with one room and one teacher to a centralized system with the teacher functioning as a pseudo-CEO of the new quasi-public organization, was very complex.

Initially, the ambiguity of control of an emerging centralized school system was hindered by vestiges of the waning presence of the village schools (Tyack, 1974). The centralization of educational governance resulted in the creation of educational boards that were focused on repositioning the centers of learning from the teacher to the student. The embryonic school boards placed emphasis on transforming the mindset of parents whose attitudes toward the education of their children paralleled their nomadic way of life. The function of school boards started out as a democratic way to administer and standardize educational policy using neighborhood representatives to localize the decision-making process (Diem, Frankenberg, & Cleary, 2015). Toward the end of the

nineteenth century, the politicization of education reform resulted in unequal allocations of resources such as classroom space, fuel to heat the rooms, and hired teachers (Tyack, 1974).

Educational reform confronted numerous challenges. The comingling of education and politics sparked corruption with some school board members being more focused on the loyalty to their communities that they represented rather than the consolidation of resources for a unified school system (Tyack, 1974). These actions had a direct impact on the allocation of educational resources. The hidden agendas of competing school board members prompted the failure of an urban system that was designed to address the educative needs of an increasingly diverse student population (Diem et al., 2015). The urbanization of schools became more complex as economic and social conditions impacted student outreach and support for diversification (Tyack, 1974). Although the adoption rate of Philadelphia schools to the new centralized system lagged other jurisdictions, additional communities and cities were quick to replicate the educational governance that was developed on the east side of the country. The administrative progressives paved the way for the centralization of the school systems across multiple jurisdictions. The new universal educational system was being structured to address the needs of the poor Irish, Black children, and similar groups as the programs and institutions were morphing to include children who were ignored by the public school system. The scope of education expanded to include the blind, deaf, and mentally challenged student (Tyack, 1974). The formation of child labor laws and compulsory attendance rules for schools pushed this differentiated educational approach to include

idle youth who were prone to get into mischief or who skipped school to enter the workforce.

Today urban school systems in the United States primarily support minority students who live in financially depressed households (Boyd, Lankford, Loeb, & Wyckoff, 2005; Else-Quest & Peterca, 2015; Hancock, 2013; Ispa-Landa & Conwell, 2015; Lankford, Loeb, & Wyckoff, 2002; O'Neal, Gibson, & Cotten, 2017). Educators who teach at urban schools are challenged with having to teach an increasingly diverse population of students with limited resources. Decreasing budgets prove to be a catalyst that forces school districts to explore innovative ways to educate students in urban communities (Coleman, 2015; Curran, 2015; Dolan, 2016; Ullucci & Howard, 2015).

Urban Schools and Technology

The public schools in the United States are responsible for teaching the myriad of students who live in America; and, the educators are responsible for ensuring that the educational infrastructure can support the learning needs of the students in the 21st century (Blackwell et al., 2014; Margolis, Meese, & Doring, 2016). For this research, the term urban will denote a low-income, financially distressed community, with a high minority population with minimal access to technology and other educative resources (Gadsden & Dixon-Román, 2017; Mouza & Barrett-Greenly, 2015).

Reardon (2013) investigated the disparities between the academic performance of Caucasian and African-American students. The researcher compared the differences in household income between the two groups from the mid-1950 to 2005 timeframe to discern if the family financial status and the residential location could account for the

wide margins that exist relative to digital literacy. The findings of Reardon's study showed that African-American youth disproportionately experienced the negative consequences of the Digital Divide due to inequities associated with race and income. He also reported that school administrators and educators were cognizant of the advantages and potential of digital technologies to improve student success in the classroom.

Reardon (2013) suggested that while schools alone are not positioned to resolve this issue, at the very minimum urban schools should be equipped with high-quality educational resources which include technology. Prior reports detail how billions of dollars have been used to procure technology for all schools within the U.S. public school system since the beginning of the 21st century (Bakir, 2016; Delgado et al., 2015). Despite that fact, studies show that technology alone has not changed the teachers' pedagogical practices or the learning potential of students in underserved communities (Blackwell et al., 2014; Curran, 2015). This study did not address why the teachers did not change their pedagogical practices with the new equipment. There are studies that have examined how teacher ABCs affect the use of technology in the classroom (Andrei, 2016; Curran, 2015; Ertmer et al., 2012; Hirsh-Pasek, Zosh, Golinkoff, Gray, Robb, & Kaufman, 2015; Howard et al., 2015; Leu, Kinzer, Coiro, Castek, & Henry, 2017; Tondeur et al., 2017). However, there is a gap in the literature that focuses on how the ABCs of urban teachers affect the integration of technology in the urban classroom.

Alam and Imran (2015) conducted a study in Australia on a group of refugee migrant workers to show the impact of a digital divide that resulted from the lack of technology access and the socioeconomic disparities in that country. The researchers

showed that digital technology was an effective tool and was instrumental in educating the migrant workers and transitioning migrant workers into the Australian society. The migrant workers assimilated through the majority population by using ICT tools to contact family members and friends in addition to using the technology to identify educational and employment opportunities.

The migrant workers in Australia represent an underserved population (Correa-Velez, Barnett, & Gifford, 2015; Le, Jiang, & Nielsen, 2016). Clark and Maas (2016) described the Australian migrant community in much the same manner as the underserved urban community in America. This study shows how ICT tools empowered migrant workers to improve the quality of their lives via their newfound ability to increase their opportunities for educational and employment opportunities. This study shows how technology can be used to decrease the Digital Divide for marginalized peoples. This study revealed how the migrant worker, an underserved population in Australia, integrated technology in their lives. Alam and Imran (2015) concluded that their findings would be relevant to other underserved groups within a country. The migrants in this study had the propensity to override their disparities and adopt digital technology and integrate the digital technology because it could improve the quality of their lives. The researcher also mentioned how previous research studies overlooked the importance of the link between technology adoption and its implication for social inclusion; and, how positive attitudes towards technology can facilitate and increase the use of technology. My research addressed the gap in the literature that focuses on how the

attitudes, along with beliefs and confidence levels of urban teachers can affect the integration of technology in the urban classroom.

Urban youth face disparities which in many instances have become synonymous with minorities and low-income households (Greene, 2016; Jocson & McLoyd, 2015; Schwartz, Cappella, & Seidman, 2015; Spector et al., 2014). While income and race inequities have become the face of the urban environment, digital illiteracy has also been associated with urban life at a point in time when digital literacy has become a prerequisite for a successful and productive life (Dolan, 2016; Hohlfeld et al., 2017; Milner & Laughter, 2015; Neuman et al., 2015). Rubinstein-Avila and Sartori (2016) argued that a third generation of the digital divide has evolved along economic and racial lines, irrespective of the preponderance of digital devices like laptops, mobile devices, smartphones, and tablets that are used globally.

As another generation of the Divide permeates through the global community, researchers point out that technology use and access are no longer the cause for digital illiteracies (Alizadeh et al., 2017; Tsetsi & Rains, 2017; Wamuyu, 2017). Instead, the Digital Divide becomes enveloped in the race, income, and geographic divides that have blurred the line between the “haves” and “have-nots” (Alizadeh et al., 2017; Andrei, 2016; Scheerder, van Deursen, & van Dijk, 2017;.Tsetsi & Rains, 2017; Wamuyu, 2017). Political and educational policy-makers continue to question the root of the cause that positions poor and minority students and their affluent counterparts at opposite ends of the technology spectrum (Mouza, & Barrett-Greenly, 2015; Ritzhaupt, Liu, Dawson, & Barron, 2013; Wamuyu, 2017).

Numerous articles report that the U.S. government is pouring billions of dollars worth of technology in U.S. schools irrespective of the financial status of the school system (Bakir, 2016; Blackwell et al., 2014; Delgado et al., 2015). According to the National Center for Education Statistics, approximately 97% of the investment in technology was used to purchase computers, projectors, interactive white boards, and other technological devices (Delgado et al., 2015). During 2010, the Federal Communications Commission joined the U.S. Department of Education by investing $3 billion to support the National Education Technology Plan (Bakir, 2016; Spector et al., 2014; Tondeur et al., 2017) and provided iPads and high-speed broadband Internet access to support student-centered learning (Blackwell et al.). Despite the technological investment, children attending urban school systems did not receive the same quality of technology-based education as the students who attended schools in wealthier school districts (Mouza, & Barrett-Greenly, 2015; Rogers, 2001; Simoni et al., 2016). In their quantitative study, Blackwell et al. (2014) reported that abject poverty negatively impacts the utilization of technology by students based on the financial composition of their neighborhoods.

There is a strong body of literature on the affordances and efficacy of technology in education (Andrei, 2016; Curran, 2015; Hirsh-Pasek, et al., 2015; Ertmer et al., 2012; Howard et al., 2015; Leu, Kinzer, Coiro, Castek, & Henry, 2017; Tondeur et al., 2017). A case study by Mouza and Barrett-Greenly (2015) showed that teachers who work in schools that are in predominantly urban areas encounter increased constraints that limit the integration of technology in the classroom. The study followed fourteen teachers who

taught K-8 students at three urban schools in cities on the U.S. east coast. The findings showed that during the study, the technological tools and support offered to the teachers enhanced their educative process. After returning to their classroom environments, two teachers that participated in the study reported that they faced obstacles that prevented the teachers from employing their newfound technology knowledge into their classroom, relative to the iPad. Mouza and Barrett-Greenly found that the move from promise to practice is not automatic; and, the researchers pointed out that budget and safety concerns, time constraints, scheduling issues, accountability pressures, and other competing priorities were problems that the teachers had to contend with in the urban school environment. In addition, the teacher's inability to exploit the power of existing and future technologies minimized the teacher's capacity to use a constructivist and student-centered approach to learning. There is a gap in the literature that focuses on the intrinsic barriers (e.g. ABCs) of urban teachers that affect the teacher's inability to integrate technology in the urban classroom. My research took a holistic view of the role of teachers who use technology integration as a tool for education in the urban classroom; with documented accounts of the ABCs of urban teachers who added technology to their classrooms.

The Role of the Urban Teacher

The pedagogical goal of the K–12 teacher, along with their ABCs, can be a solid predictor of whether technology will be integrated with classroom instruction (Andrei, 2017; Gibson et al., 2014; Kumar & Rani, 2016; Zoch et al., 2016). Teachers are often challenged with the consequences of poverty while teaching in schools that are in African

American and Latino communities (Minshew & Anderson, 2015; Peck & Reitzug, 2014; Vega, Moore III, & Miranda, 2015; Willis, Weiser, & Smith, 2016). Research shows that children who attend public schools in urban communities face numerous adversities and are less likely to be exposed to technological learning tools during their daily classroom activities than their counterparts who live in affluent communities (Simoni et al., 2016). Wood and Howley (2012) pointed out that the Digital Divide is no longer a consequence of the inability of individuals to access technology, instead, the Digital Divide has taken on a new form, and the combination of race and income level are leading factors that fuel the inequity in technology use in schools across the country.

Despite previous theories that pointed to access, availability, and digital illiteracy as the causes for teachers failing to integrate technology in schools in underserved communities, the literature on this topic does not reflect systematic research that documents this dilemma in urban America. There is a scarcity of literature that explores the ABCs of urban teachers to understand the decreased integration of technology in the classroom activities at urban schools (Andrei, 2016; Curran, 2015; Hirsh-Pasek et al., 2015; Ertmer et al., 2012; Howard et al., 2015; Leu, Kinzer, Coiro, Castek, & Henry, 2017; Tondeur et al., 2017).

Simoni et al. (2016) conducted a quantitative study to examine the neighborhood-level effects of abject poverty on computer use of fourth- and fifth-graders attending predominantly African American schools. The five-year study showed that abject poverty could be a contributing factor for the underutilization of technology by the students who live in urban communities. The authors showed that neighborhood-level disparities could

serve as important predictors of computer and technology use. Simoni et al. reinforced the findings of Mossberger, Tolbert, Bowen, and Jimenez (2012) that revealed how the inequality in technology access exacerbates the inferior learning experiences witnessed in impoverished communities. The research group consolidated data from the Integrating Computing Across the Curriculum (ICAC) project, using U.S. Census zip code data from the American Community Survey that coincided with the school years commencing in the Fall of years 2011 and 2012. The researchers used the data to extrapolate computer use of students attending urban schools and revealed that children who live in underserved neighborhoods tend to be victims of the same inequality in their classrooms as their parents are in society in general. Evidence shows that the lack of access and use of technological tools hindered the students' chances for educational attainment, and the results of the study showed that the lack of computer use is commensurate with the social inequities that come from living in urban communities. Simoni et al. (2016) addressed previous literature about the different norms and attitudes that are indicative of the mindset of the students and their peers who live in concentrated poverty neighborhoods that are associated with low computer use. There is no mention of how the teacher's interaction with the students who live in urban areas impacts the use of technology in the classroom. My study explored the ABCs of urban teachers to understand how these intrinsic factors impact technology integration in the classroom.

The digital divide is a global problem that results because of the gap between the availability and use of ICTs based on an individual's access to social and economic resources (Alizadeh et al., 2017; Tsetsi & Rains, 2017; National Telecommunications and

Information Administration, 1995; National Telecommunications and Information Administration, 1997; Wamuyu, 2017). Li and Ranieri (2013) conducted a study of the economic disparities between the populations of students who lived in urban and rural communities in China and concluded that the geographic location was a predictor of digital fluency in the Chinese community. The research revealed that the socioeconomic status of rural families was considerably lower than that of urban families; thus, placing urban schools ahead of rural schools while urban schools in the United States are at the low end of the spectrum of digital equity. The researchers concluded that access to technology alone is not enough to solve the problem of digital literacy that is experienced by disadvantaged students. Li and Ranieri (2013) stated that classroom learning activities should be used to promote digital skills; and, that teachers have a fundamental role in providing classroom support. This support should be in the form of classroom learning activities that are engaging to students while improving their technology skills. Li and Ranieri agree that in the future, schools should be instrumental in devising key strategies to integrate technology in classroom activities for students who are on the lower end of the socioeconomic spectrum. Studies show that for teachers to be successful with integrating technology in the classroom of disadvantaged students, research is needed that explores the barriers that prevent teachers from successfully integrating technology into the classrooms of urban students. (Bennett et al., 2017; Howard & Gigliotti, 2015; Koch et al., 2012; MacCallum & Jeffrey, 2014; Tondeur et al., 2017).

Teacher Attitudes

The teacher is ultimately responsible for ensuring the efficacy and sustainability of changes that take place in the classroom irrespective of whether the teacher works with urban or rural students. (Zoch et al., 2016). The teachers in both instances are responsible for motivating students while adapting the learning environment in a manner that builds a collaborative relationship between the teacher and the students (Peck & Reitzug, 2014; Wang, 2013). On a high level, the school administrators are responsible for procuring, encouraging, and supporting the use of technology for the school as a whole; however, on a lower level, the teacher is the central force who transforms the learning environment by exploiting the benefits of technology in their pedagogical practices. Adapting and reinventing the learning environment to enhance a collaborative relationship between the students and the teacher is key to successful pedagogy (Boydston, 1980; Dewey, 1938/1997). Gibson et al. (2014) examined the impact of ICT use on the attitudes of teachers and the views of the students. The researchers purported that changes in the teacher's attitude about technology use could ultimately influence and change the attitudes of the students.

According to Mustafina (2016), prior qualitative studies reported that teachers appreciated the fact that technology expedites the preparation of their classroom activities, brands education as an inclusive discipline, and fuels distance education while enhancing the teachers' capacity to move toward a more audio-visual type platform. Conversely, negative attitudes were the result of technical problems encountered during classroom lessons with students.

Mustafina (2016) conducted a mixed methods study to discern what impact if any a teacher's attitude contributed to the use of technology in secondary schools in the Republic of Kazakhstan. The 29 teachers in the study, valued the advantages that technology brings to the classroom such as 3D visualization of the content material and distance education. The educators self-reported that their attitudes toward technology integration were very positive because technology has the propensity to facilitate their everyday administrative and teaching tasks. The study confirmed that the teacher's attitude toward technology directly influenced the student's academic motivation, via the results of a questionnaire that was completed by 39 learners. The students reported that the attitude of the teacher toward technology increased their motivation and performance during the course. It is interesting to note that the teachers' interpretations of a positive attitude towards technology did not coincide with the students' viewpoint. The teachers thought that they were exuding a positive attitude if they encouraged and allowed the students to use the ICTs in the classroom. According to Mustafina, a teacher displays a positive attitude toward technology when the teacher is motivated and integrates technology into the classroom learning activities. The literature reflects the teacher's attitude toward technology as running the full gamut from very positive due to the potential of interactive whiteboards to very negative (Balta & Duran, 2015; Overbaugh, Lu, & Diacopoulos, 2015). Mustafina (2016) believed that there was a lack of consensus and understanding among researchers as to what influenced the teacher's attitude toward technology integration.

In Mustafina's (2016) study, the students believed that a teacher exhibited a positive attitude toward technology by being knowledgeable, having the ability to use ICTs creatively, and being able to apply ICTs in the classroom appropriately. The findings of the study revealed that the teachers could identify a variety of ways that technology could enhance the activities in their classroom. Despite the teachers' positive attitudes about the use of technology in the classroom, the students noted that the use of technology during their class was rare (Mustafina, 2016). However, the study revealed that if the teachers had a positive attitude toward technology irrespective of their technical ability to use the equipment, the students proved to be very supportive of their teachers. The students were technically savvy and were anxious to assist the teachers who needed help because helping the teacher proved to be a platform for the students to be exposed to cutting-edge information.

The research team of Phillips and Trainor (2014) did not dispute the need for installing up-to-date technology in the classroom. Instead, the researchers questioned the role that the teachers' attitude about computers contributed to student acceptance of a technology laced environment. Some researchers recognize teachers as change agents and support the premise that computer knowledge and skills reduce computer anxiety which consequently increases technology integration in the classroom (Hao & Lee, 2015; Rana, 2016). While other researchers have discovered just the opposite, some studies show that extensive use of technology can cause technostress that results from the fear of knowing too well the downside or negative ramifications of a technology dependent classroom (Çoklar, Efilti, Şahin, & Akçay, 2016; Howard & Gigliotti, 2016; Joo, Lim, & Kim,

2016). Intensive use of ICT-oriented technology can be accepted as a reason of technostress. The downside includes students not focusing on the subject content but becoming too dependent on technology (Kallweit, Spreer, & Toporowski, 2014; Meuter, Ostrom, Roundtree, & Bitner, 2000; Phillips & Trainor, 2014). Educators may associate discomfort with the use of technology because of prior experience and perceived functionality issues (Curran, 2015). These teachers will resort to bypassing the use of technology in daily classroom activities. For example, if a teacher repeatedly experiences problems when using a digital projector during classroom instruction, the teacher may resort to using a flipchart because there is no associated downtime with using the flipchart. The researchers questioned the generalizability of their findings because the groups that they used were homogeneous and the samples were very small. However, the fact that other researchers are yielding similar results is an indication that further analysis is warranted.

Zoch et al. (2016) argued that when teachers' goals and practices are aligned with technology, the use of technology in the classroom is increased. The researchers conducted a case study that explored the technology used by 19 K–12 teachers. The findings revealed that when the teachers focused on and aligned new literacies (such as blogging, video-conferencing, and other digital tools), with their educative goals, the technology by default supported their teaching agenda and goals. Consequently, as the teachers enhanced their understanding of the various literacies mentioned previously and expanded the use of the new technologies in their classroom instruction, technology integration was expedited. The teachers and the students learned simultaneously under

this new literacy framework. The technological component was engaging, and the teachers learned by doing and by applying what they learned while working with the students. Both groups learned together. The study gave the teachers hands-on experience with using digital tools to engage students during learning. Therefore, the teachers expanded their beliefs about how technology integration could be used in the classroom. Because of this research, the teachers could extrapolate the benefits of technology integration that could subsequently be applied back to their classrooms. Zoch et al. (2016) acknowledged that although professional development aids teachers with integrating technology in the classroom; the professional development should address the teachers' attitudes and beliefs about technology.

Irrespective of whether teachers serve the urban or rural community; the teachers in both cases are tasked with finding strategies to motivate students to use new technologies (Peck & Reitzug, 2014; Wang, 2013). Increasingly, the intrinsic and extrinsic factors have been known to affect the pedagogy in urban and rural schools (Curran, 2015; Dickinson, 2016; Pine-Thomas, 2017). Teachers in urban environments tend to focus on integrating technology with a content delivery methodology; whereas, teachers at rural schools focus on the classroom interactions that promote student motivation. Motivation is achieved via the intrinsic urge to participate in an activity; however, the extrinsic characteristics have been proven to affect the attitudes and anxiety level of the students. Motivation has the propensity to unlock real opportunities using technology as the conduit for students who are digitally literate.

Technology access alone does not increase its use for learning and teaching in the classroom (Andrei, 2017; Carver, 2016; Gibson, Stringer, Cotten, Simoni, O'Neal, & Howell-Moroney, 2014). Skills, time, and available equipment are often lacking for teachers (Andrei, 2017; Carver, 2016). Creating an engaging and technology-rich lesson plan requires additional time that many teachers lack (Andrei, 2017; Bauer & Kenton, 2005). Andrei (2017) set out to prove that technology alone was not enough to engage students in a technology-filled classroom, via using a qualitative study that examined the actions and views of three ESL teachers. The findings revealed that the personal beliefs of the educators played a significant role in supporting the use of technology in the classroom. It was the interaction between the teachers and the students that revealed the underlying attitudes of the teachers that motivated the students to include technology into the classroom environment. The teachers in the study rated their comfort-level with technology in the confident range because they incorporated the technology into daily classroom activities and lesson planning. Having access to current technology and having access to technical support is necessary if the classroom projects are to run as seamlessly as possible. It is equally important to minimize equipment malfunctions that interfere with teaching and learning. The results of this project are not generalizable because the type of ICT used by mainstream teachers in a larger population may not match the tools used in this study that consisted of digital boards, Internet, iPods, and laptops. A technology malfunction may not have the same effect on a classroom concentrating on ESL studies versus the standard education course agenda. The ESL teachers received minimal technological training and lacked adequate time to explore ways to include

technology in their lesson plans. With the cited limitations of the study, the research shows the significance of the overarching link between teacher ABCs (Kim, Kim, Lee, Spector, & DeMeester., 2013; Minshew & Anderson, 2015); however, the researcher did not show a direct link between ABCs and technology use. Andrei (2017) suggested that future research should focus on how instances of technology malfunction affect the teachers' attitude towards classroom use of technology.

Teacher Beliefs

Ertmer (1999, 2005) presented numerous articles that showed that the attitudes toward new and advanced ICT tools tended to challenge the existing beliefs of teachers. Scholars have long recognized that the beliefs and values of teachers serve as a driving force for their decision-making process about teaching practices in their classrooms (Cuban, 2001; Dolan, 2016; Gibson et al.; Ifenthaler & Schweinbenz, 2014; Usher, 2015). Beliefs are the psychological premises, propositions, or understandings considered to be true. A linked physical-social world along with one's self-assessed beliefs serve as the foundation of an individual's comprehensive belief system (Tondeur et al., 2017). Pedagogical beliefs serve as personal guides and are the premises, propositions, or understandings about teaching and learning that are deemed to be true.

Although educators acknowledge that technology is a tool that can enhance constructivist learning by integrating technology in a classroom setting, the benefits of student learning are often limited by internal and external barriers (Cuban, 2001; Ertmer, 2005; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012; Lawless & Pellegrino, 2007). Technology integration is a complex process, and the link between the

use of technology during classroom instruction and teachers' pedagogical beliefs has recently been an area of exploration for researchers (Ertmer et al., 2012; Tonduer, van Break, Ertmer, Ottenbreit-Leftwich, 2016). Teachers should not use technology to mirror traditional teacher-centered instruction like lecturing. Nor, should teachers request that students raise their hands to respond to their questions orally, or rely on pedagogical activities that require students to work independently or in small student groups to complete classwork assignments (Peck et al., 2015). Instead, teachers should engage technology and find novel ways to facilitate student learning in a collaborative student-centered environment via its use (Lawless, & Pellegrino, 2007; McKnight, O'Malley, Ruzic, Horsley, Franey, & Bassett, 2016; Tondeur et al., 2016).

Examining teachers' underlying beliefs toward the use of technology and how the views of the teachers influenced their students' use of technology was the central focus of an experiment conducted by Karaseva, Siibak, and Pruulmann-Vengerfeldt (2015). Data were compiled from two separate databases; data were collected during autumn 2012 in Estonia, while data were collected in spring 2013 in Latvia. The study included a total of 26 middle school teachers who were proficient in ICT use. The participants had access to current technology tools like data projectors, digital cameras and recorders, interactive whiteboards, tablets, and computers. The researchers used interviews to ascertain the significance of animated demonstrations and visualizations during classroom instruction, and in the home environment for students who took advantage of the option to study at home. Teachers with a constructivist approach to teaching viewed ICTs as tools to enhance the teacher-student partnership during the learning process.

The technology-rich environment was viewed to be ideal for the constructivist teacher (Karaseva et al., 2015). Some teachers who believed that ICTs could be effectively used as a pedagogical device used the technology in ways that leaned more toward a teacher-centered environment than a student-centered environment (Karaseva et al., 2015). Some teachers in the study believed that technology functioned as an enabler, leading the students to become too dependent on the ICT tools to the point that the student became a servant to the technology. The teachers also believed that they always needed to be prepared to conduct their class in a manual mode. Teachers who scored at the low end of the self-efficacy scale neglected to see the educational potential of the technology; consequently, the teachers resorted to using the ICT for administrative purposes only. And, the teachers viewed the ICT tool as equipment that the students could readily convert to a game or toy with the potential to diminish the "seriousness'' of learning.

Gibson et al. (2014) argued just the opposite, stating that computers in the classroom could serve as a catalyst to change the student's perception of technology as a game and instead view technology as equipment that could enhance the learning process. Research shows that the mindset of students tends to shift when they have easy access to computers in their classroom. Ciampa (2014) conducted a case study that spanned 3 years and was designed to examine how mobile technology motivates learning in fifth and sixth-grade students via constructivist principles. Prior to the study, the students had limited access to desktop computers; however, during the study the students had regular access to ten tablets. The researcher reported that the mobile devices facilitated

scaffolding activities and multiple learning pathways. This digital learning strategy allowed the students to explore knowledge in multiple ways that met the specific needs of the students. The mobile technology enabled the teacher to create an environment that supported more collaborative and participatory learning experiences. The findings of the research showed that the students were more engaged in learning, learned how to master important concepts like teamwork, and used their curiosity to engage in active learning conversations.

As a result, the students had a newfound respect for technology. They viewed the classroom computers as learning tools and not just a tool for gaming. Technology engages students in the learning process and promotes high-level thinking skills that enable the students to grasp higher levels of understanding while directing the students to be independent learners.

The teachers' pedagogical beliefs are central to "if," "how," and "when" to use technology to increase student success, in non-traditional ways (Alhomod & Shafi, 2013). For example, Lo and Hew (2017) touched on the positive and negative ramifications of a popular pedagogy referred to as the Flipped Classroom. This instructional strategy dispenses with the traditional teaching model with educators lecturing to the students with minimal interaction. Instead, home study is reserved for learning the content material, while class time is used for employing constructivist pedagogy that includes problem-solving, active learning, and critical thinking (Gough, DeJong, Grundmeyer, & Baron, 2017; Hao, & Lee, 2016; Kostaris, Sergis, Sampson, Giannakos, & Pelliccione, 2017; Lo & Hew, 2017; Minshew & Anderson, 2015).

First and second order barriers are often presented to explain why technology integration is different in the educational realm when compared to other disciplines. First order barriers, also known as external barriers, are external to the teacher and include training, support, and access (Ertmer, 1999; Ertmer, 2005; Zoch et al., 2016). Conversely, second-order barriers, are internal to the teacher and include skillsets, attitudes, and beliefs. Research shows that the extrinsic barriers can serve as a foundation for understanding the beliefs of teachers who attempt to integrate technology into their classrooms (Kim et al., 2013; Minshew & Anderson, 2015). Even though all the teachers received the same technology and technological support and training during the study, the researchers identified inconsistencies in the levels of technology integration practiced by the teachers and found that the teachers' beliefs impacted the degree to which technology was used in the classroom. Second order barriers are resistant to change, and the behavior of the teacher will not change unless the beliefs of the teacher that are based on individual experiences, change (Ertmer, 2005; Kagan, 1992; Kim et al., 2013).

Ertmer (2005) conducted research studies that investigated the intrinsic and extrinsic factors that serve as the foundation for effective technology integration. The studies examined how the pedagogical beliefs of the teachers impacted the use of technology in U.S. classrooms. Howard et al. (2015) posited that the link between technology adoption, teacher practice, and classroom integration is unclear. The authors debated the significance of whether the beliefs of the teachers contributed to their decision to use technology in their classroom. Ifenthaler and Schweinbenz (2013) also argued that there is no clear understanding of how and why educators accept or reject

technology in their classroom practice. The researchers pointed out that teacher beliefs tend to reflect the individual's opinion which is often devoid of real experience or knowledge about technology.

Howard et al. (2015) weighed in on the topic of technology integration in the classroom by conducting a case study that evaluated a population of English, Math, and Science teachers from Australian schools. During the 2010 through 2012 school years, there was an initial response of 4,604 (18%) volunteers of the 9th-grade cohort students who eventually progressed through grades 10 and 11. The study found that the subject matter was more of a determining factor in the success of technology integration than the pedagogical beliefs of the teacher. Howard et al. posited that some of the subjects that teachers taught were more amenable to promoting differing levels of technology integration. Ifenthaler and Schweinbenz (2013) used a pilot study to show that the participants did not have a clear or specific path to facilitate classroom learning with technology. The findings coincide with the results of the research conducted by Zoch et al. (2016) which suggested that the conditions for technology integration are contingent on the alignment of the digital literacy with the teacher's educative practices. Moreover, the researchers suggested that the teacher's area of expertise may play an important part in the speed at which integration takes place in the classroom.

Teacher Confidence

Limited evidence exists that concentrates on the confidence levels of teachers and the way technology is integrated into their classroom. Limited studies suggest that teacher confidence levels can be attributed to the use of technology that enhances a

constructivist strategy for learning and teaching in the classroom (Ndibalema, 2014; Willis et al., 2016). Minshew and Anderson (2015) observed in their study that teachers enhanced their confidence level because of developing their self-efficacy in both their pedagogical practices and technological knowledge. The researchers concluded that the teachers' competency of digital equipment as pedagogical tools increases and results in more engaging learning environments and student success. When identifying the leading factors that impact technology integration in the classroom, teacher confidence levels and teacher attitudes are at the top of the list.

Research shows that there is a correlation between confidence and its antithesis anxiety when evaluating what prompts a teacher to bypass the use of technology in the K–12 classroom (Blackwell et al., 2014; Ertmer, 2005; Ertmer et al., 2012). Nikolopoulou and Gialamas (2016) conducted a quantitative study with 190 preschool teachers in Greece. The Greek schools in this research were plagued with some of the same barriers that hindered technological integration in American urban schools (Dolan, 2016; Nikolopoulou & Gialamas, 2015). These external barriers include limited access to technology, lack of financial resources, and a lack of administrative and technical support (Nikolopoulou & Gialamas, 2015). Nikolopoulou and Gialamas (2016) showed that the confidence level of the teacher can impact the use of technology for classroom organized and play activities; and, linked the teacher's confidence level to the educator's skills and digital literacy. The researchers argued that teacher confidence levels can be a barrier to technology integration when feelings of inadequacy that are based on a lack of technological knowledge and digital classroom preparedness, impede the successful

integration of ICTs (Nikolopoulou & Gialamas, 2015). The researchers stressed that because technology is a discipline that is continually changing, the teachers will need to periodically reassess play activities from a digital perspective.

Willis et al. (2016) conducted a qualitative study to show the link between teacher confidence levels and the use of technology in the classroom. There were 424 participants between the ages of 16–60 in the study. The teachers received technological training to increase their digital capacity and skills. After the training, the teachers engaged in a technology-rich classroom environment with greater levels of confidence, as opposed to with fear and anxiety. The authors surmised that the ICT training was not designed to target the lack of basic computer skills and knowledge; but, to address the root of the resistance and concerns of the teachers. Therefore, the teachers were able to confront their prejudicial ideas about the ramifications of embedding technology in the classroom while placing a value on the digital transformation process within the context of their classroom environment.

Summary and Conclusion

There is limited research about the intrinsic and extrinsic barriers that impact the acceptance of technology by urban teachers (Ertmer, 2005; Ertmer et al., 2012; Heath, 2017; Nath, 2019; Salam, Zeng, Pathan, Latif, & Shaheen, 2018). Consequently, this literature review has an international scope that explores the current knowledgebase about the ABCs of teachers who are challenged with integrating ICTs and other technological devices into their classroom practices. There exists a strong body of literature about the benefits and affordances of technology in the educational sector

(Andrei, 2016; Curran, 2015; Hirsh-Pasek et al., 2015; Ertmer et al., 2012; Tondeur et al., 2017). Studies continue to show the existence of a digital divide between affluent and poor students (Dolan, 2016; Hohlfeld et al., 2017; Simoni et al., 2016). There are numerous studies that show that technology use and access are no longer the cause for why technology integration at affluent schools is higher than technology integration at underserved schools (Alizadeh et al., 2017; Tsetsi & Rains, 2017; Wamuyu, 2017). In fact, research conducted by Mouza and Barrett-Greenly (2015) showed that despite the success of integrating technology in the research environment, the urban teachers were not able to replicate the results and integrate technology in their classroom activities after returning to their classroom environments. Several researchers have identified a link between teacher ABCs with technology integration (Ertmer, 2005; Ertmer et al., 2012; Heath, 2017; Salam et al., 2018).

There is a gap in the literature in terms of how the intrinsic factors (e.g. ABCs) of urban teachers impact the teacher's ability to integrate technology in the urban classroom. Considering this gap, I conducted a study that explored how teacher attitudes, beliefs, and confidence impact technology integration in urban schools. The next section focuses on the design of the research study. This section includes a detailed research design, investigator's role, population, instrumentation, data collection and analysis, and issues of trustworthiness.

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Chapter 3: Research Method

Introduction

The purpose of this case study was to examine the ABCs of teachers when integrating technology in K–12 classrooms at urban schools. Participants were educators and administrators who work at urban schools and use technology as a pedagogical tool in the classroom. This chapter is divided into several sections that outline the methodology I used. In the first section, I explain the justification for choosing the case study design. Subsequently, I explain the role of the researcher. The next section describes the methodology procedure. Subsequent sections include participant selection, instrumentation, data collection, and data analysis. A section is devoted to trustworthiness, a crucial concept that must be addressed in terms of internal and external validity along with ethical procedures. I conclude the chapter with a summary and an introduction to Chapter 4.

Research Design and Rationale

This study focuses on the attitudes, pedagogical beliefs, and confidence levels of teachers who integrate technology into the pedagogical activities in the K–12 classroom. The following questions framed and guided this study:

RQ1: What are the attitudes, beliefs, or confidence levels of K–12 teachers at urban schools who integrate technology into their classrooms?

RQ2: How do the attitudes, beliefs, or confidence levels of K–12 teachers impact the integration of technology in the urban classroom?

RQ3: How do teachers' viewpoints about technology integration compare to the viewpoints of urban K–12 principals?

SQ1: How do teachers' level of digital literacy impact their ability to effectively incorporate technology in the classroom?

SQ2: What are the experiences of K–12 teachers who integrate technology into their classrooms at urban schools?

This research study was designed to discover and understand the perceptions and experiences of the participants. Understanding *how* and *why* teachers do not integrate technology in the everyday activities in the urban classroom can lead to identifying best practices that could enhance the learning opportunities for urban students. I used a qualitative paradigm in the case study tradition. According to Stake (2006), a case study with a qualitative platform depends on real-world experiences that occur during contextual and situational occurrences. The situation frames the interpretation and experiences of the activities. Yin (2017) asserted that a case study may need to support a customized evaluation design with research procedures that are complementary to a qualitative approach. Yin (2013a) contended that a case study is not intended to function as a pseudoempirical research tool used to mimic exploratory investigations in the social sciences. However, Yin (2013b) posited that case study research is conducive to field-based research applications focused on determining the *how* and *why* of a phenomenon involving contemporary issues.

Ethnography was considered as a possible research design for this study because ethnography focuses on the cultural practices and interactions of groups and can be used

to address social and political concerns of marginalized communities (Creswell, 2013). According to Creswell (2009), the ethnographic researcher focuses on the learned and shared patterns of groups. These culture-defined experiences, behaviors, and languages are examined and interpreted using flexible approaches that incorporate the use of participatory and extended observations to determine how a specific culture operates. This is a preferred methodology to view groups that have been devalued or marginalized by society. Although ethnographical research could be instrumental in the analysis of culture-sharing descriptions and interpretations that could add a dimension to the contextual lens, case studies offer flexibility in the methods of data collection, analysis, and representation for a specific case (Runeson & Höst, 2009).

A phenomenological study was another qualitative tradition I considered for this study because it uses a constructivist paradigm to investigate and understand the essence of the problem (Creswell, 2009). The phenomenologist searches for the essence of the lived experience of a phenomenon. This research method is similar to ethnography and has a philosophical base. Phenomenology is a research method and philosophy that seeks to explore the subjective meanings (i.e., the essence) of the lived experiences witnessed by a specific group. The case study is a research method that focuses on the participants and is used to provide detailed descriptions and analyses on a case-by-case basis. The focus of this research was to describe teachers' experiences (not explore the subjective meaning) when attempting to integrate technology into teaching and learning classroom practices. The themes that emerged will be instrumental in analyzing the findings.

Qualitative research grounded in theory is another alternative research tool I considered. This methodology is used to develop an abstract theory based on a process, action, or interaction (Creswell, 2009). The theory would be grounded in the views of the participants in the study. While grounded theory analysis is achieved via constant comparison of data categorized through iterative stages of data collection, the categories that emerge are the result of the sampling of different groups to identify the recurring similarities and differences that serve as the foundation for a new theoretical premise. Although the researcher is positioned to see the commonalities of the experiences between participants from diverse backgrounds with a grounded study, case studies are used to explore issues that have temporal and spatial boundaries and offer a way to understand the meaning of an occurrence for a specific group of people.

The case study was the best approach for my research because it enabled me to gain an in-depth understanding of the ABCs of teachers who use technology in the classroom via one-to-one interviews. Because administrators are responsible for the operation of the school, I conducted a focus group that consisted of school principals from the same urban school district as a second source of data to compare with the data collected from the teachers. A coding strategy is required to effectively analyze qualitative data (Yin, 2017). It is important to connect the codes to the research design in a manner that accurately reflects the concepts of the research. According to Yin, a researcher needs to identify emerging patterns, interpret any observed patterns and themes, and clarify the reason for defining the initial and subsequent codes. With this strategy, I used themes to identify differences and similarities between participant

responses. Using this microanalytical approach offered an effective way to capture details about the topic; consequently, the case study was the best strategy for my study.

Role of the Researcher

The researcher is the primary instrument in data collection and analytical phases of qualitative research (Merriam & Tisdell, 2015; Yin, 2017). As the interviewer, I guided the conversation via semistructured interview questions. During the focus group session, I functioned as a catalyst and moderator during the question-and-answer rounds of the group interview. My role as the researcher in this qualitative study involved contacting and interacting with the participants; collecting, transcribing, and analyzing the data; and reporting the findings. I collected data through interviews, focus group sessions, and an examination of artifacts that included technology plans, walk-through evaluation sheets, formal teacher evaluation rubrics, teacher lesson plans, and documentation from classroom technology projects. As the sole researcher, I was responsible for determining the site locations, obtaining permission from the school principals, recruiting and obtaining consent from the participants, scheduling interviews with teachers and a focus group with principals, and choosing the mode of communication (e.g., face-to-face or virtual).

My professional experience is based in corporate America and not in any aspect of the U.S. educational system. Because I do not have any affiliation with the participants in this study, researcher bias or a power relationship with any participant was nonexistent. The single case study approach allowed me to examine the verbal and nonverbal behavior of the interviewees. I used the case study design as an interactive

process. I engaged in interviews and transcribed and interpreted the data. I conducted interviews with teachers to gather rich data to gain insight into their pedagogical and technological plans to integrate technology into the classroom. I also conducted a focus group comprised of school principals to compare the logistical practices and technology strategies of the schools through comparing and triangulating the data collected from the teacher participants in the study. I summarized, clarified, and confirmed the accuracy of my interpretations via follow-up interactions with the participants.

Methodology

The organization of the methodology section includes the rationale for the selection of participants for the study, instrumentation, procedures for participant recruitment, and issues of trustworthiness. Each section includes supporting information in sufficient detail to provide the reader with the procedures and processes necessary to recreate or extend the study. The section concludes with a comprehensive data analysis plan.

Participant Selection

It was important to ensure that the participants were qualified to answer the questions for this study; therefore, purposive sampling was used. My qualitative analysis used the case study design with depth and transferability functioning as the focus of the sampling strategy. The participants were selected from one urban school district in the northeastern section of the country. Within this school district, a total of six teachers were interviewed; and, four principals participated in the focus group.

Both digital native and technology challenged teachers were recruited to participate in the study. Teachers were selected to participate in the study based on their use and access to technology in their schools as assessed by the preselection survey. Participants for this study were purposefully selected based on the following inclusion criteria: (a) participants are employed as full-time school teachers at schools within an urban school district in the northeast corridor of United States, (b) participants are teaching in classrooms that are equipped with technology, and (c) participants are currently using the technology for pedagogical and administrative purposes in the classroom. A preselection survey guided the selection process for the teachers by identifying the most suited volunteers for the study. From this group of potential participants, I selected the teachers from the individuals who returned a signed consent form to me. I used e-mails to recruit principals in the county to participate in the focus group session; and included the principals who returned a signed consent form to me.

According to Mau (2016), the sample size is contingent on the research problem and design. She also observed that saturation was reached when the categories in her matrix “fit” with all data collected or the responses from the participants became repetitive. Creswell (2013) recommends a smaller sample size indicating that engaging with the participants and collecting extensive details about a few individuals or sites will lead to a data collection that is rich with thick descriptions to the point of saturation. For this study I chose six teachers and four principals to provide rich information about the intrinsic factors that impact technology integration in the urban classroom. To ensure the depth and detail of data collection and a thorough analysis in my study, I interviewed the

teachers and made detailed notes during each interview so that I could observe recurring themes and patterns during data collection and analysis, which is an indication of data saturation (Yin, 2013b). Merriam (1998) posited that data saturation is reached when the researcher observes recurring themes and patterns during data collection and analysis phases of the research. In a similar manner, I used recurring themes and patterns to determine when saturation was reached in the study.

Instrumentation

Instrumentation used in this research study included a preselection survey, interviews with the teacher participants, a focus group with school administrators, follow-up e-mails to the participants for review and validation. In addition, artifacts that include lesson plans, technology plans, teaching routine checklists served as sources of data for the study.

My research was based on collecting data from teachers who have experience using technology in their classroom. To identify a group of participants who have experience using technology in their classroom, I used a preselection survey to select teachers to participate in the study based on their use of technology in their classrooms. A 21-question, Likert-style survey that was originally designed by Wang, Ertmer, and Newby (2004) was used to measure the self-efficacy beliefs of teachers for technology integration. The authors devised the questionnaire to collect data about the perceptions that teachers have about technology integration; and, I received permission from the authors to use their instrument in my study (see Appendix D). The results of this survey assisted me in determining the teachers' use of technology in the classroom and the

teachers' level of competency relative to technology. Schools were added to the pool of available research sites after the principal provided a positive response to the Letter of Invitation (see Appendix E). This survey was distributed to all potential teacher participants at the schools that were chosen for the study. The survey was embedded in an e-mail (see Appendix F) with a link to SurveyMonkey which is an online application where the survey was stored. I used the 21-question survey (see Appendix G) to determine if the individual met the requirements to participate in the study.

The school principals provided an additional source of data for the study. The principals were chosen based on availability; consequently, the composition of the focus group was based on the order that the principals agreed to participate in the study. Recruitment of focus group participants ceased when one of the two criteria was reached: (a) the maximum number of eight principals were chosen with a pool of potential volunteers remaining or (b) the minimum of six principals were chosen and the total number of potential volunteers had been exhausted.

The purpose of this case study was to examine the ABCs of teachers when integrating technology in K–12 classrooms at urban schools; consequently, the interview questions were constructed to highlight the technological experiences and intrinsic factors of the teachers who are responsible for integrating technology in the classroom (Mau, 2016). According to Yin (2006), when collecting data for a case study, the primary objective is to triangulate or have several independent and unrelated sources of evidence converge to yield findings that are as robust as possible. Merriam and Tisdell (2015) opined that focus groups are predicated on a constructivist paradigm that uses the

interactive discussions between the participants in a group to extract rich data during the interview process. To add to the validity of the data in my study, I conducted a focus group with four principals to explore their views about the integration of technology at their schools. The survey of principals provided a level of triangulation to test and compare information that I received from the teacher interviews.

The research questions address the topic of technology integration at urban schools. The research questions were designed to highlight technology integration relative to the intrinsic factors of urban teachers; the role that urban teachers play when it comes to integrating technology because of their ABCs; and, how these intrinsic factors are linked to the digital literacy of the teacher and the experiences of the urban teacher in the classroom. In addition, the role of the principal as it relates to influencing the teacher to integrate technology in the classroom was explored. The research questions that address technology adoption are linked to Rogers (2003) DOI framework; while, the TPACK framework is linked to the technological knowledge base and personal characteristics of the educator (Koehler & Mishra, 2009). The alignment of the research questions to the artifacts of the teachers and principal is reflected in Table 1. The alignment of the research questions, interview questions for the teachers, and interview questions for the focus group of principals are shown in Table 2, which also demonstrates how the questions are aligned with the framework.

Table 1

Alignment of Research Questions and Artifacts

Research Questions	Artifacts for Teachers	Artifacts for Principals
RQ1: What are the attitudes, beliefs, or confidence levels of K–12 teachers at urban schools who integrate technology into their classrooms?	Overall lesson plans covering a two week period	Formal teacher evaluation rubrics
RQ2: How do the attitudes, beliefs, or confidence levels of K–12 teachers impact the integration of technology in the urban classroom?	Overall lesson plans covering a two week period	Walkthrough evaluation sheets
RQ3: How do the teachers' viewpoints about technology integration compare to the viewpoints of urban K–12 principals?	School Technology Plan	District Technology Plan
SQ1: How do teachers' levels of digital literacy impact their ability to effectively incorporate technology in the classroom?	Documentation that reflects the directions for students of an actual technology infused project	Formal teacher evaluation rubrics
SQ2: What are the experiences of K–12 teachers who integrate technology into their classrooms at urban schools?	Documentation that reflects the directions for students of an actual technology infused project	Walkthrough evaluation sheets

Table 2

Alignment of Framework and Research, Interview, and Focus Group Questions

Research Questions	Teacher Interview Questions	Principal Focus Group Questions	Framework
RQ1: What are the attitudes, beliefs, or confidence levels of K–12 teachers at urban schools who integrate technology into their classrooms?	How long have you been teaching at this school?	What do you think about the integration of technology at your school; and, how are you able to secure and allocate resources for technology integration for teaching and learning?	DOI
	What are your views on the integration of technology at the school during the last two years?		
	What factors do you think are responsible for the way technology has been integrated in the classroom?		
RQ2: How do the attitudes, beliefs, or confidence levels of K–12 teachers impact the integration of technology in the urban classroom?	What do you think is the significance of using technology in the classroom for teaching and learning?	What would you say are the top three reasons why teachers do not use technology in their classroom; and, what do your teachers need to ease the transition into technology integration?	DOI/TPACK
	Why do you believe (or not believe) that technology is a valuable resource for teaching? Please elaborate on your response.		
RQ3: How do the teachers' viewpoints about technology integration compare to the viewpoints of urban K–12 principals?	In what ways have your expectations been met towards integrating technology in the classroom since he/she became principal?	How important is it that your teachers integrate technology into their teaching activities and, to what extent do you have the opportunity to use their feedback to improve technology integration at your school?	DOI
	To what extent do you think the present principal has taken to facilitate the integration of technology in the school?	As the school principal and as a leader, just share anything else that you would like to tell me concerning technology in your school or about other directions you would like to take your school with technology.	
	To what extent do you make suggestions on how your principal can support you to improve the integration of technology in your classroom?		
SRQ1: How do teachers' levels of digital literacy impact their ability to effectively incorporate technology in the classroom?	How would you define technology integration? Please provide some examples.	How important is it that your teachers integrate technology into their teaching activities and, to what extent do you have the opportunity to use their feedback to improve technology integration at your school?	DOI/TPACK
	What types of technology do you use in your classroom for instruction? For administrative tasks?		
	What specific examples can you give of how you use technology in your classroom - for both instruction and administrative tasks?		
	How often do you use technology and Internet in your classroom?		
	What encourages or discourages you from integrating technology in your own classroom?		
SRQ2: What are the experiences of K–12 teachers who integrate technology into their classrooms at urban schools?	What barriers do you encounter while using technology in your classroom? Can you provide specific examples?	What would you say are the top three reasons why teachers do not use technology in their classroom; and, what do your teachers need to ease the transition into technology integration?	TPACK
	In what ways has your expectations been met towards integrating technology into the everyday learning activities in the classroom?		
	Is there anything else that you would like to add that would help me to understand how you feel about integrating technology in your classroom?		

Interviews

The controlling factors that influence the diffusion of technology are innovation, communication channels, time, and the social system (Rogers, 2013). Video conferencing is an alternative to face-to-face meetings and offers an effective way to conduct in-depth interviews and collect rich data (Janghorban, Roudsari, & Taghipour, 2014; Rosenthal, 2016). The digital modality provides an avenue for the researcher to notice gestures and vocal cues without being in close proximity to the interviewee. I offered Zoom Meeting as a medium to collect data from the teachers and principals in this study.

Rogers (2013) shows that the communication channel plays a significant role in the diffusion of technology. Using Zoom, as the communication channel for the interview can be an advantage or disadvantage (Rosenthal, 2016). The advantage is that Zoom removes the limitations of geographical boundaries; while the disadvantage is that technological problems can negatively impact the ability of an individual to participate in the study. To avoid missing the opportunity to capture rich data from any potential research participant because of technological problems or challenges, I offered all potential participants the choice to have a face-to-face interview as an alternative to a Zoom interview.

Interview Questions

When I interviewed the first participant, I asked the main questions as outlined in the semi-interview protocol along with impromptu probing questions that came to mind after the responses. Subsequently, I reviewed and analyzed the data collected after the first interview before proceeding to the next interview. I compared the data that was

collected from the second interview to the first and continued this strategy until all participants had been interviewed. According to Kohlbacher (2006), content analysis is the key to the qualitative case study approach. The case study focuses on the underlying processes relative to their context and is central to interpretations and analysis of the data. Consequently, the data analysis phase is dependent on the appearance of themes and patterns (Creswell, 2013). The data collected via interviews, e-mails, audio recordings, documents, and transcripts were housed in NVivo. I used an inductive methodology. Creswell recommends collecting as much information from the participants using a "bottom up" (p. 45) approach for building patterns, categories, and themes.

Jacob and Furgerson (2012) recommend the use of a script when beginning and ending the interview. To ensure that the interview did not exceed the time agreed upon by the teacher participant, I used a semistructured interview format with overarching questions to engage the teacher in a conversation that increased the amount of rich data I received from each participant. I collected data during a face-to-face or Zoom session, and the audio-recorded sessions were reviewed to validate the responses. Note that the participants had the option to have a face-to-face interview if technological knowledge or systems issue preclude a virtual interview with the participant. Five teachers chose a face-to-face interview and one teacher opted to meet with me via Zoom.

Keane (2015) commenced her research inquiry with the standard formalities that asked preliminary questions about the teacher's work and educational background. This interview methodology served as the foundation for her inquiry and helped to build a rapport and a way to warm up to the participant (Jacob & Furgerson, 2012). I engaged the

teachers with questions about their educational and work histories as an icebreaker for the interview process and followed up with questions that were designed to assess the ABCs of the participants. The first few interview questions served as an icebreaker. These simple factual questions assisted in making the interviewee comfortable and at ease. The icebreaker questions I used were: How long have you been teaching at this school? What grade-level do you teach at your school?

The researchers of both projects (Jacob & Furgerson, 2012; Keane, 2015) proceeded with their respective interviews by asking questions about the specific technologies used in the educational environments of the participants. I followed suit with this line of questioning. I kept daily journal notes that I reviewed periodically, to conduct the research in a uniform manner. I followed up and reviewed the information in the transcription with each participant. I emailed each participant a copy of the data and the preliminary analysis from their respective interview to review and provide clarification before I finalized the results of my study.

Focus Group

Due to logistical and scheduling challenges, I conducted a virtual focus group meeting via Zoom. Prior to the scheduled meeting, I sent the principal participants a Zoom invitation that allowed the administrators to join the meeting via their mobile phones, tablets, or laptops. The principals were positioned to provide insight to their perception of what teachers believe about technology in the classroom and the actions that the teachers take to integrate technology in the classroom. My questions were

devised to obtain the principals' perspectives about technology integration; and, how they collaborate with their teachers to maximize computer use in the classroom.

I used my focus group protocol as a guide to orchestrate the meeting. At the beginning of the meeting, I reminded the participants that the discussion was confidential and asked that the contents of the discussion not be repeated after the focus group meeting. I notified all participants that I planned to record the meeting to ensure the accuracy of my data. I received approval to record the meeting from each principal and I used a digital audio recorder to memorialize the meeting. During the focus group session, I presented the questions to the panel of school principals one at a time and the principal participants responded in round-robin format. This format allowed the principals to build upon a colleague's comments. After the focus group, I transcribed the recording and reviewed the information in the transcription with each participant via e-mail. I also asked follow-up questions that were specific to each principal. I reviewed all the additional information that I received and sent the final transcription with changes to the members of the focus group.

Artifacts

Artifacts were collected from each participant to assess how technology is used for classroom activities. The technology plan serves as an outline for moving forward with IT initiatives, IT improvements, and enhancements at the schools. I requested a copy of the district technology plan from the principals. The technology plan should describe and demonstrate how instructional technology supports the schools in this urban district. The principals were also asked to provide walk-through evaluation sheets to show the

criteria that principals use to gauge a teacher's technology use at the classroom level. The teachers were asked to provide the school technology plan, their overall lesson plans covering a two-week period, and documentation that reflects the directions for students of an actual technology infused project. The artifacts were orally requested during each teacher interview and during the focus group session. Subsequently, I sent a written request for the artifacts when I sent copies of the transcriptions to each participant. The teachers and principals responded to my request and sent me their artifacts via e-mail.

Procedures for Recruitment, Participation, and Data Collection

I commenced my research after I received approval from the Institutional Review Board at Walden University and the Department of Testing, Research, and Evaluation for the school district where my study was conducted. The participants for this study included K–12 teachers and principals at an urban school district that is responsible for providing quality education for students attending the urban schools within the district. I sent an e-mail to the K–12 principals in the district requesting approval for the teachers in their schools to participate in my study. Upon confirmation from the school principals, I sent an e-mail invitation to the teachers at their schools to recruit volunteers who have technology installed in their classroom as teaching tools. I sent a selection survey to the teachers who agreed to volunteer to participate in the study. The responses to the survey guided the selection process for teachers by identifying the most suited individuals for the study.

The preselection criteria were used as a tool to choose the teacher participants for this study. Because the results from this questionnaire do not appear in the findings,

coding was not required. I used the selection questionnaire to ensure that the teacher participants used technology in the classroom for various learning activities or administrative tasks. An analysis of the prospective teacher participants was based on a score within the competency range for using technology in the classroom. Also note that the first six principals who volunteered to participate in the focus group were chosen for this study.

After selecting the teachers and principals to participate in the study, I sent e-mail invitations to the individuals who were chosen to participate in this study. With this strategy, I was able to conduct my research with a minimum of five teachers or five principals without introducing bias or compromising the internal validity of the case study (Creswell, 2013). This open and holistic platform for data collection facilitated the interpretation and analysis of the information; as well as simplifying the organization of themes and categories across the various data sources.

Data Collection

As the research instrument in this qualitative study, I collected all data for this research study. Qualitative data were collected via interviews, a focus group, and artifacts. These forms of data provided a rich source of information for the researcher (Creswell, 2013). Data collection via interviews is the foundation of my case study, and I used TPACK and DOI to frame the analysis of the data. The TPACK framework served as a model to discern the skill level and best practices for teachers seeking effective ways to integrate technology in their urban classroom (Koehler & Mishra, 2008). The Theory

of DOI was used to support the varied ways that teachers manage the adoption of technology in their urban schools. (Rogers, 2013).

Data Analysis Plan

Coding Strategy

Rubin and Rubin (2012) highlight the use of a coding strategy that matches the collected data using color coding to identify patterns and similarities. Merriam (2015) suggests that a researcher should add codes as the transcript is analyzed; and, I incorporated this methodology into my research practices. Merriam also indicates that effective transcript analysis should be a cumulative process, starting with the complete analysis of one interviewee's transcript before moving on to the next transcript. Merriam (2015) recommends coding and taking notes during the transcription process. My objective was to identify the underlying patterns and themes; and, enter the data in NVivo to facilitate the organization and analysis of the unstructured data (Rubin & Rubin, 2012). NVivo is proprietary software and is compatible with audio, video, text, graphic, e-mail, digital photos, and other file formats; and, facilitates data entry and the process for identifying codes and themes. NVivo served as the primary repository for the data I collected. I conducted a case study, and the theme and case coding were synchronized with my methodology.

As the primary instrument of this qualitative research study, I reviewed the fresh data of each participant several times as I read the responses and, listened to the audio tapes as I transcribed the interview using the online application, NVivo Transcription. Creswell (2013) insists that all data collected should be reported in the findings,

irrespective of whether the information is consistent with the observed patterns or themes. I used this approach when I encountered any negative or discrepant data during my research.

Issues of Trustworthiness

Creswell (2013) indicated that there are eight validation strategies in the qualitative toolbox from which a researcher can choose. Creswell recommends that qualitative researchers should employ at least two of the following validation strategies in their research study. The eight strategies include prolonged field observations, triangulation, peer debriefing, negative case analysis (i.e., discrepant case), identifying researcher bias, member checking, rich and thick descriptions, and external audits.

Credibility

Credibility, also referred to as internal validity, identifies how closely the research findings accurately reflect reality (Merriam & Tisdale, 2015). In qualitative research, data collection and analysis are based on direct observations and interviews. Because the responses of the interviewees are framed based on their reality and different worldviews the, validity and reliability should negate the researcher's predisposition and biases. Lincoln and Guba (1985) used the term, credibility to show that a phenomenon has been accurately represented. This research used triangulation as a strategy to confirm credibility and validity.

Transferability

Transferability or external validity refers to the extent to which the findings of one research study can be applied to another study (Merriam & Tisdale, 2015).

Qualitative research depends on small samples that facilitate the collection of rich data and "thick descriptions" to the point of saturation. Depth and transferability are intended outcomes of the case study because the foundation of the case study lacks a historical perspective and is based on a contemporary focus (Yin, 2013c). Transferability can be enhanced via the collection of detailed descriptive data. Creswell (2012) acknowledges that negative case analysis is an important aspect of data analysis. Recognizing and reporting contrary evidence during the thematic development phase enhanced the transparency of this research and increases the likelihood that the duplication of my work by future researchers may achieve the same results (Shenton, 2004).

Dependability

Dependability increases trustworthiness of the findings; and, is enhanced by intricately detailing the data collection procedure and any changes to the procedures in the research project. The data were collected via interviews with teachers, a focus group of principals, and artifacts that include technology plans, walk-through evaluation sheets, formal teacher evaluation rubric, teacher lesson plans, and documentation from classroom technology projects. Triangulation and member checking were used as tools to ensure that the data collected accurately reflected the perceptions and viewpoints of the participants.

Confirmability.

Confirmability is the assurance that the data collection occurs in an objective manner. I collected data via Zoom or face-to-face interviews while the participant was in a familiar environment. The interview process was facilitated by seeking answers to

generic background questions at the beginning of the interview. This strategy provided rich data and added credibility to the study. Data transcription enhanced confirmability because the recordings and word-for-word documentation of the ideas and experiences of the participants serve as the foundation for my findings.

Ethical Procedures

Walden University requires that research studies follow established guidelines for the ethical treatment of human subjects. I submitted all pertinent and applicable forms to the IRB and the Department of Testing, Research, and Evaluation (DTRE) for the school district where my study was located. After receiving approval from IRB and DTRE, I commenced my research.

I developed an Informed Consent Form for the volunteer participants that coincides with Walden University (IRB) standards to include the purpose and the overall benefits of the study, the participation requirements, potential risks, and the assurance of confidentiality. I emailed the forms to the participants prior to the interviews and focus group session. I obtained informed consent via the participation forms for the school teachers and administrators who agreed to participate in the study, prior to collecting data for the research. Participation in this study was strictly on a voluntary basis; and, individuals who agreed to participate in this study had the option to change their mind and withdraw from the study at any time during the research.

Participant Protection

As Patton (2015) suggests, taking time to explain the purpose of the research to potential participants, in a transparent, clear, and honest manner is crucial to ensuring that

the interviewees are forthcoming with vital information needed to advance my study. Samples of the IRB documents were sent to the participants via the consent forms. I used an interview protocol for both the teacher interviews (see Appendix H) and the principal focus group (see Appendix I). Pseudonyms were used for the names of the schools, participants, and the physical location. Respecting the participant's time, keeping an open channel of communication, and allowing the interviewee to review the information before I publish the results, helped to ensure the integrity of the data. In the current information technology climate, it is important to password protect all forms of data. Hard copies of data are stored and locked in a file cabinet that only I can access. I also stored a set of the data at an offsite location to prevent data loss via fire, theft, or natural disaster. Because of newer technology, the cloud dramatically simplifies this process of secure data backup. At the end of my study, all related data has been encrypted and transferred from my laptop to an external hard drive that is housed in a locked file cabinet that is only accessible by me. The data will be retained for 5 years and will be destroyed afterward.

Summary

Patton (2015) contends that a quality research study provides a systemic, in-depth, and conscientious approach to fact-finding and data analysis. Credibility and respect for the study should be goals of the researcher and participant populations respectively. Tracy (2010) emphasizes the importance of the concept of quality in qualitative research and points out qualities that are indicative of excellent qualitative research, with ethical foundation, credibility, and rich rigor at the top of the list. The focus of my research was to align the research problem, purpose, and questions to facilitate the extraction of rich

data using the protocols for recruitment, sampling populations, data collection, and other factors deemed as essential elements of a qualitative study. I designed my study so that I could explore and document observed trends associated with the integration of technology in urban schools. The case study is the tool that I chose to use for this feat. The primary goal of this case study was to elucidate the experiences of K–12 teachers at urban schools that lead to a lack of integration of technology in the classroom; and, to gain insight into the ABCs of the teachers. Ultimately, resonance and significant contributions can only be gauged by the research community, at the end of my study. In Chapter 4, I present my findings that contain a description of the setting, demographic information, data collection and analysis details, evidence of trustworthiness, and the results.

Chapter 4: Results

Introduction

The purpose of this single case study was to explore the ABCs of teachers when integrating technology in K–12 classrooms at urban schools. Identifying the teachers' perspectives and approaches to technology use with respect to real or perceived barriers in the urban classroom is paramount to this study. Data were gathered from individual interviews with six teacher participants, a focus group with four principals, and artifacts that included technology plans, lesson plans, walk-through evaluation sheets, formal teacher evaluation rubric and documentation that reflects the directions for students of an actual technology-infused assignment. Pseudonyms were used to disguise the identity of individual schools, the school district, and the participants. This chapter is comprised of an analysis of the data aligned with the research question and viewed through the lens of the theoretical and conceptual frameworks. The following research questions guided this research study:

RQ1: What are the attitudes, beliefs, or confidence levels of K–12 teachers at urban schools who integrate technology into their classrooms?

RQ2: How do the attitudes, beliefs, or confidence levels of K–12 teachers impact the integration of technology in the urban classroom?

RQ3: How do teachers' viewpoints about technology integration compare to the viewpoints of urban K–12 principals?

SQ1: How do teachers' levels of digital literacy impact their ability to effectively incorporate technology in the classroom?

SQ2: What are the experiences of K–12 teachers who integrate technology into their classrooms at urban schools?

This chapter includes the research setting and the demographics of the participants. In addition, data collection along with an analysis of the data and evidence of trustworthiness are included. Themes that emerged during data analysis are presented and aligned to the research questions. A discussion of the results and the conclusions of this chapter will serve as the segue for Chapter 5, where I will review the results in relation to the literature in Chapter 2.

Research Setting

Greenglove County Public School System (GCPS), an urban school district located in the northeast corridor of the United Sates, served as the setting for this research study. The student body is composed of over 90% of African American and Latino students. I used e-mail to garner approval from GCPS principals to permit teachers at their schools to participate in the research study. Teacher participants had to be (a) employed as full-time school teachers at schools in GCPS, (b) teaching in classrooms equipped with technology, and (c) using the technology for pedagogical and administrative purposes in the classroom. My research used a preselection survey to determine if teacher volunteers met the technology requirements to participate in the study. A pictorial representation of the preselection survey results for the 20 teachers who took the survey and the six teachers who participated in the research study can be found in Appendix J and Appendix K, respectively.

Demographics

The participants consisted of six teachers and four principals who were employed at elementary schools throughout the urban school district. There were three teacher participants from one elementary school in the county, and the three remaining teachers worked at three other schools in the county. The total years of teaching was not included in this study because the number of years of teaching experience of the teachers exceeded the number of years teaching at their present school for four out of six teacher participants. The focus of this research was to explore the perceptions of teachers when integrating technology in K–12 classrooms at urban schools; consequently, the number of years teaching was not captured in this study.

The demographics of the teacher participants in this study are included in Table 3, which provides pseudonyms for the teachers, their roles, grade levels, number of years teaching at the urban school, and the results of the preselection survey. Table 4 contains demographic information of each principal who participated in the focus group meeting.

Table 3

Teacher Participant Demographics

Pseudonym	Role	Grade Level	Years at School	Preselection Survey	
				Points	Percent
Angela	Teacher	5	5	83/111	75
Anna	Teacher	5	6	80/111	72
Beth	Teacher	4	12	99/111	89
Crystal	Teacher	2	2	96/111	86
Frances	Teacher	5	5	77/111	69
Ricardo	Teacher	5	2	95/111	86

Table 4

Principal Participant Demographics

Pseudonym	Role	Educational Stage
Brenda	Principal	Elementary
Denise	Principal	Elementary
Gayle	Principal	Elementary
Vanessa	Principal	Elementary

Data Collection

I used teacher interviews, a focus group with principals, and artifacts as the modes of data collection. Collecting data from teacher interviews, a focus group of principals, and artifacts positioned me to compare the information and triangulate the data. E-mail was the sole communication tool I used to recruit participants for teacher interviews, to recruit principals for the focus group, and to retrieve artifacts from the participants. The data collection process took place over a period of 3 months starting in December 2018 and ending in March 2019. I commenced the data collection process by sending e-mails to principals at GCPS to request permission to recruit teachers at their schools to participate in my research study. In total, six principals responded favorably with the understanding that it was up to the teachers to decide if they chose to participate in the research.

Interviews

I used a preselection survey as a tool to identify teachers with experience teaching in classrooms equipped with technology and teachers who are currently using the technology for pedagogical and administrative purposes in the classroom. I planned to

collect data from a total of eight teachers with four teachers from two separate K–12 schools in the county. Twenty teachers took the survey and met the criteria to participate in the study. My study was based on collecting data from two schools with four teachers from each school. Even though 20 teachers were found to be eligible to participate in the study, it was not possible to meet the criterion of four teachers working at the same school in the county. Consequently, I requested approval from the IRB of Walden and GCPS CPSS to change my approach for participant selection criteria. I received approval from both IRBs to change my recruitment so that I could base my participant selection on six to eight teachers who work for GCPS , irrespective of the schools where they teach.

I chose six elementary school teachers from four different urban elementary schools who met the criteria and gave their consent to participate in the study. The data collected provided a viable means to identify how six educators who teach at schools in one urban school district perceived and approached technology integration in their classrooms. All teacher participants were given the option to have a face-to-face or virtual interview, five teachers agreed to a face-to-face interview and one teacher preferred to participate in a virtual interview via Zoom teleconferencing. I scheduled a meeting with each teacher at a time that was convenient for them. For the face-to-face interviews, I met each teacher at their respective schools and used a digital audio recorder to memorialize each interview session. I audio recorded the virtual interview via Zoom as the teacher provided responses to the interview questions from her classroom.

Focus Group

I sent e-mails to invite school principals of GCPS to a focus group session to discuss their views of how technology is integrated in the classrooms for pedagogical and administrative activities at their respective schools. Organizing a face-to-face meeting with school principals at the same location and time proved to be an impossible task. Despite all efforts to conduct a face-to-face focus group session, I had to resort to a virtual focus group meeting via Zoom teleconferencing that could accommodate the busy schedules of the principals. Six principals volunteered to participate in the focus group, but only four principals were able to attend the virtual meeting. To ensure the accuracy of the transcript of the focus group meeting, I captured the responses of the principal participants using Zoom's audio recording feature.

During each teacher interview, I requested artifacts in the form of lesson plans, school technology plans, and documentation that reflects the directions for students in an actual technology-infused project. During the focus group meeting, I asked each principal to send school technology plans and walk-through evaluation sheets to show the criteria that principals use to gauge the technology use of teachers at the classroom level. Data collected from interviews with the teachers and the focus group of principals provided a comparison of their perceptions of technology integration.

Responses gathered via the principal focus group were triangulated with data captured during the teacher interviews and the artifacts collected from both teacher and principal participants. There were no organizational or personal conditions that

influenced the participants at the time of the study that would have altered the interpretation of the study results.

Data Analysis

Yin (2017) contends that an effective qualitative analysis is contingent on a coding strategy. Merriam (2015) suggests that the use of a coding strategy during the analysis of the transcripts is an effective way to recognize the underlying patterns and themes that exist in the collected data. The themes are supported by the data and are aligned with the research questions. The research questions served as the foundation upon which the interview questions were designed; and, upon which the theoretical and conceptual frameworks were based. Yin emphasizes the importance of identifying emerging patterns and themes as well as the importance of interpreting and clarifying the coding strategy used. NVivo is a tool used by researchers and is compatible with numerous file formats that include audio, digital photos, e-mail, graphic, text, and other file formats. I used NVivo as a document repository to facilitate the organization, coding, and analysis of the data.

NVivo Transcription was used to auto-transcribe the audio recordings from the teacher interviews and the focus group session. I reviewed each transcript and made changes as needed. I emailed the transcripts of the interviews along with follow up questions to each teacher. A copy of the focus group transcript and follow up questions were sent to each principal participant. In addition, I asked the participants to send me the artifacts that I requested during each interview and the focus group. Subsequently, each

participant approved the transcripts, responded to the follow-up questions, and sent the agreed upon artifacts.

The interview questions served as nodes and themes emerged during the coding process. Meriam (2012) stated that coding is an iterative process and recommended that coding should be included during the transcription process after each interview. Rubin and Rubin (2012) suggested the use of a color-coding strategy to highlight patterns and similarities.

I stored the transcripts from all the teacher interviews and the focus group into NVivo; and, subsequently coded each document by hand. I used NVivo to track the frequency of the codes and extracted the data to an Excel spreadsheet. My initial list of nodes and categories eventually dwindled in size as I used colors to represent distinct concepts and expressions of the participants and varying shades of the different colors to reflect similarities. Appendix L shows the resulting categories along with definitions and examples. I ultimately merged codes of similar colors resulting in the discovery of themes. As I continued to reread the responses of the participants, I aligned the resulting themes with the purpose of the study, the framework, and the research questions that were designed to explore technology integration in the classroom via the lens of K–12 teachers at urban schools.

This methodology positioned me to identify emerging patterns during the transcription analysis, and to detect the similarities discovered between the interview data, focus group discussion, and artifacts collected from teachers and principals. This methodology also facilitated the triangulation of the findings from this study. The

resulting themes from the teacher interviews and the focus group session are shown in Figure 4 and Figure 5, respectively.

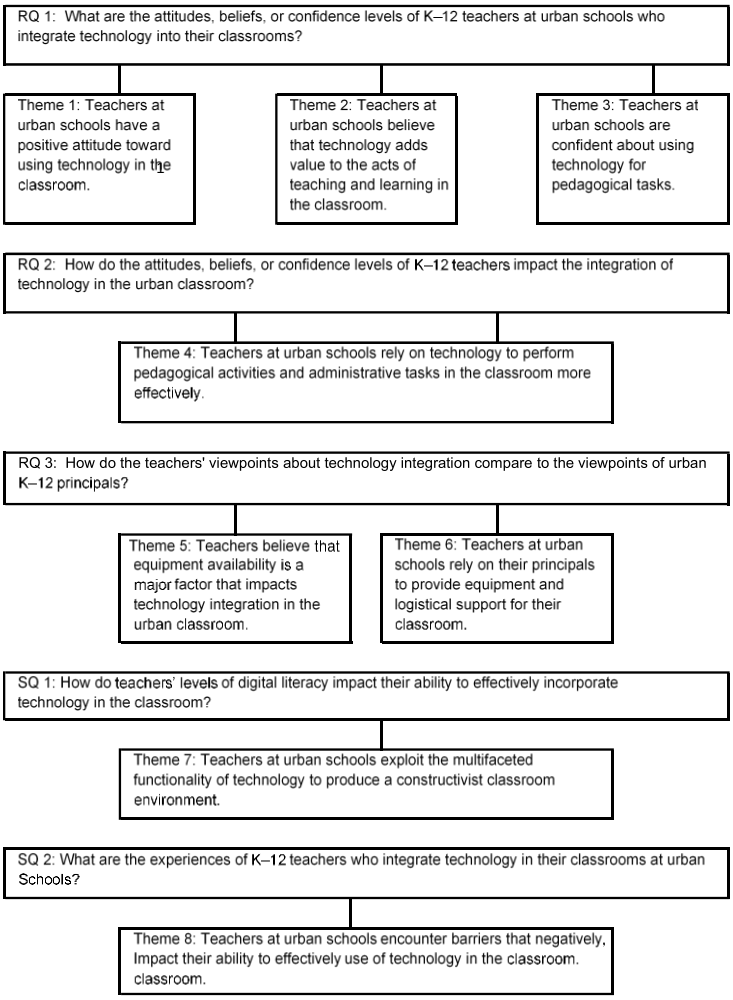

Figure 4. Themes resulting from teacher interviews.

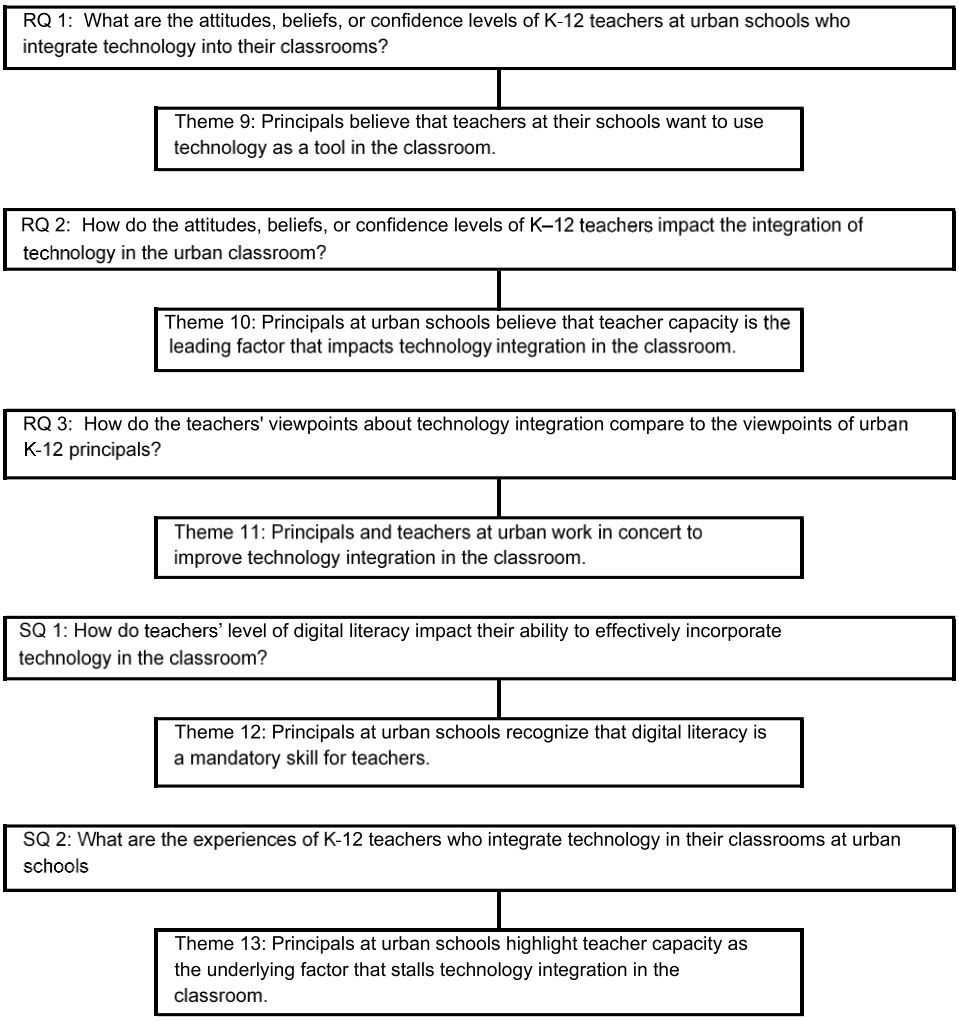

Figure 5. Resulting themes from focus group session.

Discrepant Cases

I carefully reviewed and analyzed the data collected for this qualitative case study to account for any evidence of discrepancies. I interviewed the teachers, who for the most part, stated that the lack of equipment was a major barrier that needed to be considered when planning and implementing pedagogical activities in their classrooms. However, there was one teacher who offered a different perspective. When I interviewed Beth, who also acknowledged that technology devices such as laptops and iPads were limited at her

school; she opined that the teachers' attitude was the underlying reason that technology is not effectively integrated in classroom activities at her school. Beth went on to say,

> I know that I said accessibility [is a problem], but I think people use that a lot as an excuse…Because even though not everybody has technology in their room they do have some that they can share. But one of the problems I think with technology, it's not that you don't have a set of your own, it's that there's a lot of poor implementation.

Beth voiced her disagreement with comments that she often hears from other teachers at her school, some of which include: "Well I can't do anything with my class because I only have five in my room." or "Well I only have two computers in my room and I can't do that." Beth believes that:

> Yes [they] can do it. But they just want to make excuses …And, I think the problem is that teachers don't know how to use the technology correctly or to implement it in their room because they can do a lot of things with just five devices. Proper training might help some of these teachers.

During the interviews and the focus group session, both teachers and principals stated that training would improve the way teachers use the technology in their classroom. It is important to note that Beth stated that:

> … in the school they just don't have enough [devices] for everybody so teachers have to share. And that's one of the reasons why I tried very actively to get my own things because I feel that if you are going to integrate technology in the classroom you have to have it… [I have] 24 Chrome Books and 24 iPads, one for

> each student. I am lucky that I have my own devices. I've gone through different sources … to get my own devices, so I don't have to rely on what the school has or doesn't have. So, in my classroom, we use technology every day. Whereas in the other classes, they don't.

Note that in this school district, the procurement of technology for K–12 schools is the responsibility of the principals. Because Beth was overzealous in her pursuit to acquire technology for her students, her actions were outside the scope of her position as a school teacher. And although, some of Beth's responses were contrary to those of other teachers who work in this urban school district, it is important to acknowledge this negative case analysis. (Creswell, 2012). Recognizing and reporting this contrary evidence enhances the transparency and consequently, the trustworthiness of my research (Shenton, 2004).

Evidence of Trustworthiness

Credibility

According to Lincoln and Guba (1985), a study is found to be credible when it accurately reflects a phenomenon. Triangulation of the data via interviews with teachers, focus group interviews with principals, and artifacts was used to establish credibility for this research. I recorded the interview and focus group sessions and included each participant in the review process of their specific transcript. I used rich data and an iterative color-coded analytical strategy to ensure the accuracy and integrity of the data collected and used for this research.

Transferability

Transferability or external validity refers to the extent to which the findings of one research study can be applied to another study (Merriam &Tisdale, 2015). Qualitative research depends on small samples that facilitate the collection of rich data and "thick descriptions." I purposely targeted urban teachers and urban principals for my study; and while, I provided rich and detailed descriptions that provided a clear path for internal validity, transferability was enhanced via the collection of detailed descriptive data. Creswell (2012) acknowledges that negative case analysis is an important aspect of data analysis. Recognizing and reporting contrary evidence during the thematic development phase enhances the transparency of this research and increases the likelihood that the duplication of my work by future researchers may achieve the same results (Shenton, 2004).

Dependability

In qualitative research, establishing dependability of the findings increases trustworthiness (Golafshani, 2003; Lincoln & Guba, 1985; Seale, 1999). Dependability is the stability of findings over time and conditions of the study; and, is contingent on the detailed reporting of the processes within the study that increase the probability that future researchers will be able to replicate the findings (Connelly, 2016; Korstjens & Moser, 2018; Shenton, 2004). I provided a clear description of the data collection procedure and explained changes in the procedures that occurred during the research study. This information along with detailed documentation of the interviews and focus group collected from the participants produces an audit path that enhances dependability.

I ascertained that the perceptions and views of the participants were accurate via member checking; and I cross-checked the findings by triangulating the data collected from interviews, a focus group, and artifacts.

Confirmability

Triangulation was also used as a tool to enhance neutrality and objectivity, and subsequently, was used as an aid to establish confirmability (Denzin, 1978; Patton, 1990, 1999, 2002). According to Denzin and Patton, there exists four types of triangulation tools which include method triangulation; investigator triangulation; theory triangulation; and, data source triangulation. In the research study of Carter et al. (2014) the use of in-depth individual and focus group interviews was highlighted to demonstrate data validation as described by Fontana and Fray (2000) and Morgan (1996), respectively.

The focus group of principals and one teacher interview were conducted virtually using Zoom conferencing. Consequently, irrespective of whether a face-to-face or virtual interview was conducted, the teacher and principal participants were in their familiar classroom or office environment respectively during the interview. I used the same pre-structured template for each interview, and this strategy facilitated the collection of rich data and added credibility to the study. Data transcription enhanced confirmability because the recordings and word-for-word documentation of the ideas and experiences of the participants served as the foundation for my findings.

Results

Teacher Interviews

RQ1: What are the attitudes, beliefs, or confidence levels of K–12 teachers at urban schools who integrate technology into their classrooms?

Theme 1: Teachers at urban schools have a positive attitude toward using technology in the classroom. There was a consensus among all six teachers that technology has the propensity to enhance the learning of students who attend schools in urban environments. When asked about their perceptions, all teachers had a positive attitude when discussing the use of technology in the classroom and they used terms like good, great, and positive when describing the use of technology in their classrooms. Beth and Crystal stated**,** "I think it [technology] is a good tool to have," and, "I actually think it's a great thing, respectively." Ricardo told me: "I think it's great for teaching … I think we are doing a good job with integrating technology." Anna's response was: "very positive. The school administration and majority of teachers over the last 3 years have been very open to technology." And, Frances mentioned: "I think it [technology] is a good thing in the end." Angela responded: "I really think it's a great thing and I think more schools should be doing it,"

Theme 2: Teachers at urban schools believe that technology adds value to the acts of teaching and learning in the classroom. Teachers' beliefs refer to internal constructs that help individuals to define and understand the meaning of the experiences that guide specific teaching practices **(**Pajares, 1992). Pedagogical beliefs reflect the foundational belief system that is tied to the individual's experience-centered principles

and physical-social world (Tondeur et al., 2017). These intrinsic factors are viewed as a predictor of technology use in the classroom (HSU, 2016); and, cited as reasons for the lack of adoption of technology and consequently technology integration in the classroom (Ottenbreit-Leftwich, Liao, Sadik, & Ertmer, 2018). The intrinsic factors act as strongholds that can impact a teacher's capacity to integrate technology in their classroom.

The teacher participants in this study all believe that technology adds a new dimension to teaching, in a variety of ways. The teachers described technology as: an important pedagogical tool; engaging; flexible; interactive; enhances collaboration, student motivation and participation. Following are direct quotes from all the teacher participants that reflect their beliefs about technology. Anna stated:

> Our students are all exposed even from Pre-K to fifth grade …They all are exposed to a smartphone or an iPad. So to incorporate that into their learning, I believe it's helpful and beneficial in helping them to be more global, and it makes learning more interactive because they can make a connection, whether it's through teaching, learning, or social.

The remaining five teachers support their beliefs as follows:

> Beth: "it allows me to be interactive, or the children to be interactive in a lesson."
>
> Ricardo: "… technology adds a different element to the learning experience… we're allowing the students to interact with it."
>
> Frances: "It can be a tool that I use to give myself more ways to engage with my students."

Crystal: "… it allows me to have a more engaging classroom environment."

Angela: "It is very engaging. A lot of the children love it. It gets them excited and makes them want to do a project."

Theme 3: Teachers at urban schools are confident about using technology for pedagogical and administrative tasks. Confidence, or self-efficacy beliefs, reflects an individual's perceived capacity for learning or performing behaviors that will yield the desired results (Bandura, 1977, 1994, Lee & Lee, 2014). During the interview process, each teacher exuded confidence when talking about their ability to integrate technology in their teaching practices. Angela is the only teacher who reported that she did not use technology in her classroom every day. Instead, she uses technology or the Internet "probably three to four times a week." The remaining five teachers indicated that they use technology or the Internet every day in the classroom.

RQ2: How do the attitudes, beliefs, or confidence levels of K–12 teachers impact the integration of technology in the urban classroom?

Theme 4: Teachers at urban schools rely on technology to perform pedagogical activities and administrative tasks in the classroom more effectively. During the various interview sessions, each teacher expressed their thoughts and ideas about the usability of technology in the classroom. During our meeting, Angela discussed how the increase in technology over a period boosted the ability of the teachers to integrate technology in the lesson planning at her school. Angela stated:

We've got an increase in technology in the past 2 years. We've got two new Chromebook carts and we've got an iPad cart. Those have been divvied up among

> teachers whereas before you had to check them out. And so now they're assigned to the classrooms so the teachers have easier access to the technology so that we can use them in the classroom as a tool… And over the last 2 years we have been doing an arts integration project where we are paired with a specialist, so some teachers have been paired with this teacher who teaches computers. So, they've learned how to do projects on the computer that are also related to a core subject. So that's kind of been a big push across the school here.

Angela went on to say:

> I do almost all of my prep work on a computer. So, I mean all my lessons are planned on a computer. I don't really use a paper grade book. All my grades are submitted virtually, I don't really have a paper grade book. I have a running record of my professional development on my own life personal website. I don't really use any other fancy technology on the administrative angle, just the computer really.

It is important to point out that the other teachers in this urban school district, cited similar examples that reflect the teachers' positive mindset relative to the use of technology in their urban classroom. Excerpts from the other teacher participants include: Beth stated:

> But in the school, they just don't have enough for everybody, so teachers have to share. And that's one of the reasons why I tried very actively to get my own things [technology] because I feel that if you are going to integrate technology in the classroom you have to have it. You don't have to have one for every student,

> but you need to have at least enough that some of the students can use it or they can share.

Crystal stated:

> As a parent, I'm torn because you don't want your child on electronics all day or technology. But as a teacher, I see the benefits … We have online courses coming up. You know we do focus on allowing our children to be college and career ready … [technology] impacts their learning. So, technology would have to be incorporated in order for them to be career and college ready because they will need technology.

Frances informed me that:

> During the last couple of years, it varies from teacher to teacher. For me, I try to, like I said, throw it [technology] in when I can… It is just very difficult because like I said, it is not one to one.

Anna focuses on how her school was converted to a one-to-one school. She proudly stated that:

> The school administration and majority of teachers over the last 3 years have been very open to technology … many of the staff are comfortable with technology and using it. We get wonderful support at the system level from our technology liaison. And in fact, in the last 2 years, our school has been chosen as a one to one school. The system has looked at our school as one of the pilot schools in the county at the elementary level that's one to one.

Ricardo added that:

> As far as implementing technology in our day to day lessons, we're encouraged to do so, and we're given a lot of resources to actually infuse it into our lessons. I think some of us maximize it a little bit more and some of us are kind of held back because we don't have the daily access.

RQ3: How do the teachers' viewpoints about technology integration compare to the viewpoints of urban K–12 principals?

Theme 5: Teachers believe that equipment availability is a major factor that impacts technology integration in the urban classroom. Although an advocate for technology integration in the classroom, Ricardo told me that:

> The shortcomings come with having enough I guess specific pieces of technology, so every student has more access. That's where we struggle. But as far as implementing technology in our day to day lessons, we're encouraged to do so [by our principal] and we're given a lot of resources to actually infuse it into our lessons. I think some of us maximize it a little bit more and some of us are kind of held back because we don't have the daily access.

Frances explained in detail how the size dynamics of her class coupled with a shortage of available computers interfered with her ability to effectively teach her students. Frances explained:

> Last year, we had a computer lab. But many of the computers were not functioning. Our class sizes were very large and so we had this computer lab with maybe 25 computers, but our classes were 30 or 33. So you go to the computer lab trying to do something all at once, and you still had to borrow computers from

> somebody's cart somewhere, and ask "can we borrow this while we go into the computer lab?"

While Frances' detailed account reflects the sentiments of all the teachers that I interviewed, the comments from Beth below succinctly summarize a cause effect relationship between technology availability and technology integration. Beth stated:

> But in the school, they just don't have enough [technology] for everybody so teachers have to share. And that's one of the reasons why I tried very actively to get my own things because I feel that if you are going to integrate technology in the classroom you have to have it.

Theme 6: Teachers at urban schools rely on their principals to provide equipment and logistical support for their classroom. Research indicates that the views of teachers and principals were often different when evaluating the condition of ICTs in the classroom (Claro, Nussbaum, López, & Contardo, 2017). A study conducted by Machado and Chung (2015) found that principals rated technology integration as a peripheral administration responsibility at their schools; and perceived professional development, teacher willingness toward integration, and school district support as their strongest obstacles. There are numerous avenues that the urban teacher participants use to keep their principals abreast of the technology needs in their classrooms. These avenues include weekly and monthly staff meetings, responses to principal-generated surveys about technology, e-mail, and annual budget meetings. In this qualitative case study, all six teachers acknowledged that their principals were directly responsible for the procurement of technology at their schools. The statements from four of the six teachers

were aligned with Anna's response which was, "Our principal is very much aware of the financial weight of this technology. So first of all, the principal wants to see it used. And wants to see it used well. She wants it cared for." Ricardo stated, "We have a very open-door policy and I can literally walk in tomorrow morning and say, 'Hey I just came across this interesting resource.' and have a conversation about it." The statements from the remaining two teachers were juxtaposed to what Anna and Ricardo said as evidenced by the following statement from Crystal: "I don't expect any support from my principal as far as technology integration goes. He has not done any particular improvement in our school for technology integration."

SQ1: How do teachers' levels of digital literacy impact their ability to effectively incorporate technology in the classroom?

Theme 7: Teachers at urban schools exploit the multifaceted functionality of technology to produce a constructivist classroom environment. Since the days of the early constructivists that include Piaget (1964, 1976, 2013), Dewey (1938/1997), and Vygotsky (1978, 1980), constructivism has been viewed as a student-oriented teaching strategy that is designed to make learning more meaningful for the students (Tondeur et al., 2017), who have been labeled as "actors in the acquisition of knowledge" (Girardet & Berger, 2018, p. 141). Today, a technology-focused, constructivist learning environment is described as collaborative, cooperative, engaging, experiential, flexible, group-based, hands-on, interactive, one-to-one, participatory, personalized, and student-centered (Andersson, Wiklund, & Hatakka, 2016; Asiksoy & Ozdamli, 2017; Bryant & Bates, 2015; Koehler & Ertmer, 2016); Zhu, Yu, & Riezebos, 2016).

Evidence shows that a constructivist environment in the 21st century is student-centered, uses interactive tools, and allows students to develop their creative abilities using innovative programs and devices. (Machado & Chung, 2015; Tondeur et al., 2017). Furthermore, this student-centered classroom is hands-on allowing the students to analyze, reason, and discover new knowledge while engaged in small groups. Ricardo stated that "Teacher's need to use equipment continually to be fluent, not just for specific subjects or tasks." Crystal reported:

> What encourages me is that it allows me to have a more engaging classroom environment. More movement because the students can actually get up and come to the Smart Board and interact with it.

Frances likes to incorporate technology in her lessons because:

> It's [the student's work] easy to read. It's easy to access. They share it with me and I can make comments on it and give it back to them. So it can be a tool that I use to give myself more ways to engage with my students.

Similarly, the remaining teachers used the words "engaging" and "interactive" to describe their learning environment.

SQ2: What are the experiences of K–12 teachers who integrate technology into their classrooms at urban schools?

Theme 8: Teachers at urban schools encounter barriers that negatively impact their ability to effectively use technology in their classrooms. Teachers at urban schools reported that they have a backup plan because they always have to be prepared to work by hand if the technology is not working or is not accessible. Reasons

for inaccessibility include time constraints, outdated equipment is broken, the Internet is down, or the equipment is deployed to another teacher for standardized testing. Citations from Frances, Crystal, and Angela illustrate this point. Frances stated:

> We have a person in the building who is our technology person. So, if I happen to have something that goes wrong with the computer that I don't know about … for example, they often jump offline. And so they don't have the Wi-Fi, and they don't immediately go back on their own or whatever. I have to have some special code to be able to make it go back on Wi-Fi. I don't have that code. And our technology person is another teacher in the building … there isn't much else I can do other than wait for them to come in and fix it.

Crystal reiterated that:

> One downside is if the Internet is not working. That can be a barrier for utilizing PowerPoint or Google Slides in the classroom... So, if the Internet is down and we can't access Google, then I would have to go to my backup which is a lesson plan on paper.

Angela explained:

> The Chrome Books are not always maintained very well. Whether that means they need to be updated and I can't update them myself. The county has to do that. Or if they're borrowed for testing and then they are not returned the correct way. My Chrome Books were borrowed for two months for testing and then when they were returned, they weren't returned to me. So that was a problem. The

> county Internet has a lot of issues that will sometimes go down and it will block educational sites that we need which is really frustrating.

Focus Group of Principals

RQ1: What are the attitudes, beliefs, or confidence levels of K–12 teachers at urban schools who integrate technology into their classrooms?

Theme 9: Principals believe that teachers at their schools want to use technology as a tool in the classroom. Brenda started the focus group by stating that "teachers are taking it upon themselves to see the importance and to implement the technology - various modes of technology." Denise observed that she is "seeing the teachers move away from technology from the standpoint of PowerPoint, with students just merely watching videos to them actually using more of the Google Classroom." Gayle and Vanessa reported that their schools are being outfitted to be a one-to-one school starting the next school years.

RQ2: How do the attitudes, beliefs, or confidence levels of K–12 teachers impact the integration of technology in the urban classroom?

Theme 10: Principals at urban schools believe that teacher capacity is the leading factor that impacts technology integration in the classroom. There was a consensus among the four principals that teacher capacity is a major issue at their school and opined that professional development is the key to the solution. Brenda stated that:

> I think capacity is important. Being able to train teachers on how to utilize the technology then how to integrate that and differentiate that based on the needs of the students in the classroom and how to align that with your goals and objectives

> for your lesson. So, a lot of PD, I think would be needed and resources-just additional resources.

Denise, Gayle, and Vanessa agreed that addressing teacher capacity to ensure that the teachers can effectively and seamlessly integrate technology with the curriculum goals is important.

RQ3: How do the teacher viewpoints about technology integration compare to the viewpoints of urban K–12 principals?

Theme 11: Principals and teachers at urban schools work in concert to improve technology integration in the classroom. All the principals use observations, quarterly planning meetings, and weekly staff meetings as modes to enable teachers to make suggestions and present their ideas and for the principals to provide feedback to the teachers. The principals included professional development as a tool to increase teacher capacity. Denise reiterated that the focus is on increasing teacher capacity. She stated:

> We're still at the very basic level with that. When we are in formal and informal observations, we can provide feedback to the teachers regarding their use of technology. Or when we're not seeing technology utilized, we do provide them with feedback about ways that technology can be incorporated.

And while the other three principals spoke about direct communication and interaction with the teachers, they also expanded their scope to include the parents. Brenda added:

> So, I know we have started and are working on creating resources where teachers are doing webinars and different instructional supports where parents can access our Website or some technology platform.

Gayle was able to piggyback on Brenda's comments and said:

> I saw a lot of that with the STEM AIR projects where the kids had been on the spot and some parents were familiar with this and some parents were not familiar with it. So, what we try to do with our PTL is to have what they call parent university.

In the end, the underlying theme is teacher capacity. Brenda's high-level response brings to the forefront the differences between the equipment versus human element dilemma. She stated that:

> Teachers at our school, I think would need additional resources. We can increase the number of technologies, the various types of technology that's in the schools and professional development. So, I think capacity is important. Being able to train teachers on how to utilize the technology then how to integrate that and differentiate that based on the needs of the students in the classroom and how to align that with your goals and objectives for your lesson.

SQ1: How do teachers' levels of digital literacy impact their ability to effectively incorporate technology in the classroom?

Theme 12: Principals at urban schools recognize that digital literacy is a mandatory skill for teachers. In the school district, as more schools are converted to one-to-one schools, the county includes mandatory training that includes professional development. Brenda summarized the comments of the group when she said:

> Oftentimes, as a part of the formal observation and informal observation process, teaches are scored based on how they are integrating technology. So, during that

> time that will be an opportunity, or has been an opportunity, for teachers to express what their challenges are and how they can improve in that area.

SQ2: What are the experiences of K–12 teachers who integrate technology into their classrooms at urban schools?

Theme 13: Principals at urban schools highlight teacher capacity as the underlying factor that stalls technology integration in the classroom. The principals cited the lack of resources, time, capacity, standardization, professional development, in addition to apprehension, laziness, and apathy as reasons why teachers at these urban schools do not integrate technology in their classroom. Vanessa ended the focus group with a soliloquy, of sorts. She stated:

> We're not preparing our students for the society or even college and career readiness if we don't put emphasis on the importance of technology. When we're talking about technology … we're not just talking about the fact of the type of skills that they will learn, and are not speaking solely on that, but we're speaking in terms of being able to use coding skills via technology … And so what we're doing in schools is really preparing our students to understand how to be global citizens.

Artifacts

This research study is about the integration of technology in the urban classroom. Artifacts strengthened this case study and validated the data collected from the interviews and focus group (Yin, 2009; 2014). Technology plans, walk-through evaluation sheets, formal teacher evaluation rubrics, teacher lesson plans, and documentation from

classroom technology projects were requested for review. Although artifacts were mentioned during the teacher interviews and the focus group session with principals; artifacts were formally requested via e-mail while the transcripts were sent to the participants for their review and approval. I used the artifacts to explore the answers to the research questions of this study from a different vantage point. The artifacts that were collected from the teachers and principals are shown in Table 5.

Table 5

Teacher and Principal Artifacts

Teacher Artifacts

	RQ1	RQ2	RQ3	SQ1	SQ1
	Lesson Plan?	Lesson Plan?	Technology Plan?	Project Documentation?	Project Documentation?
Angela	yes	yes	no	yes	yes
Anna	yes	min requirements	no	yes	yes
Beth	outline only	outline only	no	yes	yes
Crystal	yes	yes	no	yes	yes
Frances	no	no	no	yes	yes
Ricardo	yes	yes	no	yes	yes

Principal Artifacts

	RQ1	RQ2	RQ3	SQ1	SQ1
	Teacher Eval Rubric?	Walk Thru Eval Sheet?	District Tech Plan?	Teacher Eval Rubric?	Walk Thru Eval Sheet?
Brenda	no	yes	no	no	yes
Denise	yes	yes	no	yes	yes
Gayle	no	yes	no	no	yes
Vanessa	no	yes	no	yes	yes

Although a technology plan and district technology plan may appear to be central and instrumental to the strategy of technology integration at the school level, neither the teacher nor administrator was able to provide me with this documentation. The consensus among all principals was that the School District was responsible for devising and

distributing the technology plan documentation. The lesson plans showed that teachers use technology for learning activities in the classroom. And, while the text-based lesson plans (see Appendix M) proved to be the norm, several teachers in a one-to-one classroom environment, used the interactive whiteboard technology to display an interactive lesson plan (see Appendix N) that the students could follow along with their iPads. The variety of artifacts that include an animal fact card (see Appendix O), student blog (see Appendix P), and virtual field trip (see Appendix Q) was further evidence of the teachers' willingness to integrate technology in classroom projects.

The artifacts obtained from the principals included teacher evaluation rubrics and walk through evaluation sheets and represented tools that the principals used to assess the capacity and digital literacy of teachers. In a similar manner, the artifacts showed that technology was included as a factor when gauging the pedagogical effectiveness of the teachers (see Appendix R).

Summary

I examined the integration of technology in the urban classroom from the perspective of the teacher's attitude, beliefs, and confidence level. The teachers exuded a positive attitude; displayed a solid belief that technology adds value to the classroom environment; and, despite varying degrees of confidence, the teachers were able to employ technology for the learning and administrative activities in the classroom. The research questions and subquestions were identified, and the results were analyzed.

Research Question 1 sought to identify the specific attitudes, beliefs, and confidence levels of the teachers at urban schools who had technology in their classrooms

for pedagogy. The results revealed that teachers at urban schools were willing and able to integrate technology in their classrooms. All teachers believed that technology had the propensity to maximize the learning capacity of the students while supplementing and reducing the time and effort needed to prepare for classroom and administrative activities in the urban environment. However, access remained a major factor in the use of technology at urban schools. Many teachers needed to share laptops carts with their teacher partners, and the teachers often lost access to their cart of laptops for weeks or months at a time while students at the school prepared for testing.

Research Question 2 was designed to discover how the ABCs of the teachers at urban school impact the way that technology is utilized in the classroom for learning and administrative activities. It is the positive attitudes of teachers that can be credited for the teachers finding creative and novel ways to expose the students to technology, despite the scant appearance of technology that is sometimes outdated at their urban schools. The teachers exhibited confidence when communicating with their principals to request additional software, hardware, and other technological accouterments to enhance the pedagogy in their classrooms.

Research Question 3 addressed the viewpoints of K–12 teachers versus the principals at K–12 schools in this urban school district. The teachers consistently rated access as the major obstacle that stalled their ability to integrate technology in their urban classroom. The school principals in this study overwhelmingly attributed teacher capacity as a major obstacle that accounted for the decreased utilization of technology at their schools. Despite these differences in viewpoints, teachers joined forces with

administrators to conduct fundraisers with the express purpose of purchasing technology for the classroom, as well as using staff, quarterly planning, PTA and other meetings as opportunities to discuss and plan for the expansion and integration of technology at their specific schools.

Subquestion 1 focused on how the teacher's digital literacy affected their ability to incorporate technology in the classroom. All the teachers had, at minimum, a basic understanding of the technology that was used in their classroom. However, there were instances when network issues or hardware failure issues sporadically rendered the equipment inoperative. Teachers and principals alike, discussed the advantages of teachers receiving training to resolve minor network issues (e.g. entering a special code) and small hardware issues to decrease downtime and minimize the disruption of classroom activities.

Subquestion 2 is linked to the previous research questions and focuses on the experiences of K–12 teachers who integrate technology into their classrooms at urban schools. While the issues of decreased technology integration and technology use by students at urban schools are overarching, the experiences of the teacher participants at the urban schools in this study varied based on whether the teacher was employed at a school with a one-to-one ratio of laptop to student or whether the teacher had to share a cart of laptops with a partner teacher. Even with limited technological resources, the teachers used a variety of unique approaches to teaching in their student-centered classrooms.

The results of this research study indicated that the attitudes, beliefs, and confidence levels of the K–12 teacher participants are not deterrents in the integration of technology in the classroom at urban schools. In fact, it is the teachers' attitudes, beliefs, and confidence levels that position the teachers to urge their principals to acquire additional technology while using the equipment that they do have to motivate their students to learn. Chapter 5 includes a discussion of the findings, interpretations, and recommendations for future research.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this qualitative single case study was to investigate the ABCs of K–12 teachers who integrated technology in their classrooms at urban schools. I researched these intrinsic factors from the perceptions of teachers and principals at urban K–12 schools. The perspective of urban elementary teachers and principals were examined using the TPACK and Rogers' DOI frameworks that undergirded this study. A review of the literature revealed that few studies have focused on the disparities that urban teachers encounter when using technology in their classrooms. Consequently, this lack of information was a gap in the literature about the ABCs of urban teachers relative to this topic. The objective of this study was to provide information that can serve as the foundation for best practices and pedagogical strategies to aid in overcoming barriers that stall technology integration at urban public schools.

Data were collected from purposeful samplings via interviews and artifacts from six K–12 school teachers who completed a preselection survey showing that the teachers had experience using technology in their classrooms. A focus group of principals provided an additional source of data via oral responses to questions during the meeting and artifacts the principals sent to me through e-mail. The transcripts from the teacher interviews and the focus group session were coded to identify themes and underscore how the integration of technology in the classroom is impacted by the attitudes, beliefs, and confidence of the teachers at urban schools. The preponderance of the literature reviewed in Chapter 2 reported that the intrinsic factors of teachers contributed to the way

that technology integration impacts learning and teaching in K–12 classrooms. However, research that specifically examines the integration of technology in the urban classroom is limited. I also presented the teachers' attitudes and beliefs on the use of technology in the classroom through the frameworks of the TPACK model and Rogers' DOI theory.

The key findings that emerged in response to the first research question that sought to identify the ABCs of the urban teachers who integrate technology in the daily pedagogical activities in the classroom were: (a) urban teachers have positive attitudes, (b) urban teachers believe technology adds value to pedagogical activities in the classroom, (c) urban teachers feel confident about their abilities to use technology, and (d) urban teachers view technology as an essential pedagogical tool. RQ2 highlighted the themes that urban teachers rely on technology to teach and teacher capacity is needed when using technology effectively. RQ3 focused on the alignment of teacher and principal viewpoints relative to the specific hardware and software used for pedagogy in the classroom. Teachers rated lack of equipment as the leading challenge in the classroom. As a result, teachers depend on principals to provide the needed technological equipment. The themes of SQ1 emphasized the importance of digital literacy as a skill set for teachers and how technology facilitates the skill of multitasking. SQ2 focused on the barriers of access and teacher capacity that are the primary focus of teachers and principals, respectively. The subsequent sections focus on the interpretation of the findings, limitations of the study, recommendations for future research, implications relative to positive social change, and the conclusion of the study.

Interpretation of the Findings

The first generation of the digital divide, often recognized by the tagline "the haves and have-nots," represented the uneven distribution in the access of information and communication technologies between specific groups (Clark, 2017; Kormos, 2018; Otioma, Madureira, & Martinez, 2019; National Telecommunications and Information Administration, 1995, 1997). Substantial literature indicates that since the beginning of the 21st century, the U.S. government has made strides in eradicating the digital divide at K–12 schools in terms of access (Alizadeh et al., 2017; Fernandez, Reisdorf, Dutton, & Hampton, 2018; Tsetsi & Rains, 2017; Wamuyu, 2017). In fact, the government invested billions of dollars for the installation of Internet and network infrastructures at U.S. public schools, with a push to equip each educational facility with laptops, interactive whiteboards, and other technological tools in an effort to upgrade schools to a level needed to prepare students for college and careers so they can compete in the ever-changing global environment (Bakir, 2016; Blackwell, et al., 2014; Delgado, et al., 2015; Kormos, 2018; McCandless, 2015).

The first generation of the digital divide resulted from the inability of individuals to access technology, and after several iterations of evolution, the digital divide adapted a new form and evolved along economic, geographical, and racial lines (Alizadeh et al., 2017; Ash, Kitchin, & Leszczynski, 2018; Dolan, 2016; Rubinstein-Avila and Sartori, 2016; Tsetsi & Rains, 2017; Wamuyu, 2017). Many educational researchers have focused on the ramifications of access issues from the perspective of race and economics.

Ertmer et al. (1999, 2005, 2012, 2013) and a host of supporting researchers sought to discover why, despite the influx of technology into the U.S. public school system, students who attended schools in underserved communities were still not benefiting from technology in the schools. Studies showed that the mere presence of technology in the classroom does not guarantee that educators will use the technology to facilitate the learning process in the classroom (Kormos, 2018; Zhang, Trussell, Tillman, & An; 2015). And through the studies led by Ertmer, researchers posited that the lack of integration of technology in the classroom could be attributed to intrinsic factors of the teachers.

The pedagogical role of technology in the 21st century has yet to be formalized. (Anthony & Clark, 2011; Dolan, 2016; Ertmer & Ottenbreit-Leftwich, 2010; O'Neal et al., 2017). The TPACK framework focuses on the personal characteristics of teachers and their capacity to successfully integrate technology in their classrooms (Mishra & Koehler, 2006), resulting in the belief that teachers do not need to focus on providing specific types of technology devices for their classroom (Dolan, 2016). Numerous researchers have substantiated the link between teachers' intrinsic factors and technology integration in the classroom (Dolan, 2016; Ertmer, 2005; Ertmer et al., 2012; Heath, 2017; Ottenbreit-Leftwich, Liao, Sadik, & Ertmer, 2018; Salam et al., 2018). As the digital divide morphs along income and geographic lines, access to ICTs continues to be an obstacle to technology integration in urban communities (Rogers, 2001; Simoni et al., 2016). The findings in this study showed that the primary cause for the stalled use of technology in an urban school is juxtaposed to the TPACK model that highlights the

dependency on technology, pedagogy, and content knowledge as precursors to successful technology integration.

Data collected from interviews with teachers and principals in an urban school district in the northeast corridor of the United States suggest that the root of the problem relative to technology integration in the urban classroom is not the result of intrinsic factors (e.g., ABCs) but factors external to the educators. In fact, the effect of extrinsic factors bears similarities to the overarching properties associated with the first generation of the digital divide and Rogers' (2001, 2003) DOI theory. Researchers of the first generation of the digital divide reported the digital inequalities (e.g., computers, laptops, network) of individuals and groups who live and work in underserved communities because of financial constraints (Alizadeh et al., 2017; Tsetsi & Rains, 2017; Van Deursen & van Dijk, 2015). Given the financial barriers in poor communities, teachers are playing catch-up with enriching the urban classroom with technology tools for pedagogy (O'Neal et al., 2017). Rogers (2003) stated, "The individuals or other units in a system who most need the benefits of a new idea (the less educated, less wealthy, and the like) are generally the last to adopt an innovation" (p. 295).

The literature reviewed in Chapter 2 indicated that the ABCs of teachers are intrinsic in nature and are major factors that impact the integration of technology in K–12 classrooms in the United States in the 21st century. An analysis of the findings by research question will reveal the comparison of this study to the prior literature.

Research Question 1

What are the attitudes, beliefs, or confidence levels of K–12 teachers at urban schools who integrate technology into their classrooms? A spirit of positivity is the key finding that summarizes the attitudes, beliefs, or confidence levels of K–12 teachers at urban schools and their ability to integrate technology into their classrooms. The teachers interviewed during this study found creative ways to include technology in their daily classroom activities, despite limited access to equipment. Prior research pointed to the need for school districts to educate urban students despite decreasing budgets and technological resources (Coleman, 2015; Curran, 2015; Dolan, 2016; Ullucci & Howard, 2015). Simoni et al. (2016) proved that the inequality in technology access contributed to the inferior learning experiences of students attending schools in impoverished communities. Research conducted by Mustafina (2016) hinted that teachers believed that if they encouraged and allowed the students to use the limited ICTs in the classroom, that the teachers' positive attitude would serve as a catalyst to encourage and motivate the students. The teachers in my study attributed their strong beliefs in the value of technology as the driving force that allowed them to devise ways to maximize the use of the limited technology in their classrooms.

Research Question 2

How do the attitudes, beliefs, or confidence levels of the teachers impact the integration of technology in the urban classroom? Discerning how the attitudes, beliefs, or confidence levels of the teachers impact the integration of technology in the urban classroom was the primary focus of RQ2. The responses from the teachers who were

interviewed at the urban schools in this study revealed that the usability of technology at the classroom level varied when discussing technology integration in a one-to-one versus a one-to-many classroom environment. Howard et al. (2015) showed that contextual characteristics, such as school culture, student population, and grade level influence technology use. Technology, through its advances has the potential to direct this new culture of learning in a constructivist manner. And, the urban teachers recognized that their goal is to prepare their students for a globalized and technology-rich workforce. The teachers who were working in schools that were converted to a one-to-one school reported a dramatic increase in their ability to engage with the students, conduct collaborative classroom assignments, and provide a flexible pedagogical environment. Conversely, teachers in a one-to-many environment were able to maintain a cooperative, hands-on, interactive, and group-based pedagogical platform. The difference was that the teachers in the one-to-many classrooms were encouraged to share the technology, forcing the teachers to co-own laptop carts with fellow teachers (or partners) and take turns using the laptops. Many times, the teachers would have to forfeit their laptop carts, for the greater good of the school, to allow other teachers who were preparing their students to take standardized tests, to borrow the laptop carts for months at a time.

The literature shows that in education, ICT tools are instrumental in enhancing learning and teaching objectives in the classroom (Oguta et al., 2014). The technological tools increased the participant's motivation to continually improve their skill level and to exude positivity when interacting with their students (Doering et al., 2014). Davidson (2014) affirmed that technology increases the student's propensity to increase knowledge;

and, conducted a case study that showed that using various technologies in the classroom enhances the opportunities for learners to collaborate with their peers during classroom activities, in a constructivist manner.

Research Question 3

How do the teacher viewpoints about technology integration compare to the viewpoints of urban K–12 principals? RQ3 compares the viewpoints of K–12 teachers with K–12 principals relative to the technology integration in the urban classroom. The consensus among the principals in this study is that teacher capacity is the leading issue that prevents teachers from effectively integrating technology in their classrooms. Principals are responsible for providing equipment and logistical support for their respective schools. The principals used quarterly planning meetings, weekly staff meetings, and observations to assess each teacher's propensity to effectively use technology to advance their pedagogical agenda. The consensus among the urban teachers in my study is that access to technology is the major obstacle stalling technology integration in their classrooms. Even though teachers in the study expressed how they struggle to teach with limited and outdated equipment, the teachers cited how quarterly planning meetings, weekly staff meetings, e-mails, and other forms of communication are vehicles used to alert their principals about technology challenges and the need to equip their classrooms with updated and functioning ICTs.

Research Subquestion 1

How does a teacher's level of digital literacy impact their ability to effectively incorporate technology in the classroom? Digital literacy has become a prerequisite for a

productive and successful livelihood (Dolan, 2016; Hohlfeld et al., 2017; Neuman et al., 2015). These researchers also recognized that inequities resulting from race and income divides have also framed urban life; and, unfortunately digital illiteracy has become akin to the urban lifestyle.

The teachers interviewed during my study believe that technology integration should be fluent, all encompassing, and employed throughout the school day for all subjects. With this mindset, the teachers must periodically reassess the academic and play activities from a digital perspective because the teachers know that they are preparing their students for a technology-dependent lifestyle with tech-related jobs in the 21st century.

The previous findings coincide with the results of the research conducted by Zoch et al. (2016), which suggested that the conditions for technology integration are contingent on the alignment of digital literacy and the teacher's educative practices. Moreover, the researchers suggested that the teacher's area of expertise may play an important part in the speed at which integration takes place in the classroom. Nikolopoulou and Gialamas (2016) showed that the confidence level of the teacher is tied to the educator's skills and digital literacy. The researchers argued that teacher confidence levels can be a barrier to technology integration when feelings of inadequacy that are based on a lack of technological knowledge and digital classroom preparedness, impede the successful integration of ICTs.

The principals in the focus group that I conducted recognized the need to include technology training in their teachers' professional development program. The principals

who lead one-to-one schools reported that the school district mandated technology training for each teacher as an integral part of the conversion process when their schools became a one-to-one school. This strategy precludes the teachers from negatively impacting the new classroom setting because of a lack of knowledge about the new ICT tools.

Research Subquestion 2

What are the experiences of K–12 teachers who integrate technology into their classrooms at urban schools? In my study, the teachers with limited technology in their schools described an environment of "unknowing." Because the technology that exists in their classroom is outdated or requires maintenance and is subject to breakdown, the teachers must be armed with a backup plan that will position the teacher to transition to a manual environment with ease, to avoid diminishing the students' opportunity for learning. The previous description mirrors the findings of the research performed by Mouza and Barrett-Greenly (2015) that showed how educators who taught disadvantaged students could effectively use technology to enhance their performance with technology-dependent pedagogical activities, within a research environment. The researchers noted that when some of the teachers returned to their actual classes, they faced obstacles that prevented them from using their newfound technology knowledge within the teachers' actual classrooms. Mouza and Barrett-Greenly (2015) pointed out that budget and safety concerns, time constraints, scheduling issues, pressures, and other competing priorities were problems that the teachers had to contend with, in their urban classrooms.

Limitations of the Study

This study used a case study approach to explore the relationship between teachers' ABCs, and confidence levels, and technology use in the classroom. This study was guided by methodological choices that led to inevitable limitations that were outside of my control. To ensure the depth and detail of data collection, the methodology was to include a sample size consisting of six to eight teachers for interviews and six to eight principals for a focus group. The actual sample size included six teachers and four principals. A preselection survey was used to measure the experiences of potential teacher participants relative to using technology in a classroom setting. My initial plan was to choose four teachers from two schools, for a total of eight, teachers within the urban school district. Due to logistical challenges, the scope of the research was changed resulting in the need to recruit six to eight teachers using the entire urban school district as the boundary for this study.

The goal of the focus group was to examine and triangulate technology integration via a lens of administrative leaders at urban schools; and to compare the results to the data collected from the teachers during their individual interviews about technology integration. Due to time and space constraints, the venue for the focus group was changed from a face-to-face meeting to a virtual one. The focus group of principals was conducted in a Zoom virtual room. Because of this, the ability to observe the full effects of the speaker's body language was compromised.

Although six principals agreed to participate in the focus group, only four principals were able to attend. All the teacher and principal participants are educators at

the elementary school level. Consequently, the groups used in this study were homogeneous; and, perhaps the inclusion of more diverse participant groups could have provided viewpoints that were more detailed and in-depth than those provided by the homogeneous groups that participated in this study. With the small number of participants, six teachers and four principals, the research is limited in generalizability. Transferability of the findings for this qualitative case study is limited because the total number of participants represented in this study equates to a minuscule percentage of a large urban school district that is in the northeast corridor of the United States. The experiences and opinions of this small percentage of participants may not represent schools of this large urban school district due to the potential differences in the cultural and philosophical differences of the school environment and administration. The results are not transferable to other contexts or settings. Future research should build upon these findings to discern if the views of the participants in this study vary from teachers and principals who work in other jurisdictions in the country.

Recommendations

Recommendations for further research are supported by this study, the strengths and limitations of this study, and the literature reviewed in Chapter 2. The first recommendation is to replicate this study in view of the teachers' intrinsic traits and school culture. All the teacher and principal participants in this study represented elementary schools in northeastern United States. Future research should consider studies with samples that are larger and more diverse; studies that explore the views of urban teachers who work in different parts of the country; and, studies with educators who

teach at middle and high school levels. The second recommendation is for researchers to compare the funding that is currently being appropriated for technology at urban schools versus non-urban schools. The third recommendation is to conduct a mixed methods study that explores the attitudes and beliefs of urban teachers about the use of technology at their schools. This platform has the potential to generate more data via teacher interviews and principal surveys; and, could also explore the educators' openness to support innovative pedagogical innovations like the Flipped Classroom model, online courses, and other blended learning strategies. The findings of this study can add to the groundwork for continued research.

Implications for Social Change

The results of this study have implications for positive social change. Vestiges of the first generation of the Digital Divide continue to exist in environments that consist of low-income, underserved, and marginalized people. Technology is a tool that adds a new dimension to the educative process as it empowers both the teacher and the student in novel ways. This study showed that the debate about the challenges of the digital divide relative to access continues in urban schools. While Dolan (2016) references urban myth teachers who perpetuate the perception of access to technology, the reality is that urban schools continue to face numerous obstacles on multiple levels because of the digital divide. Enhancing learning for students in high-poverty communities is the primary focus of urban school administrators and teachers (Comber & Woods, 2016).

With student success ranking number one in terms of pedagogical priorities, urban educators can benefit from the insight that identifies effective strategies to produce

students who are digitally literate. Positive social change becomes the end product, when urban teachers are routinely afforded access to technological tools that will expand their pedagogical skills. This research explored and highlighted the immediate needs of urban teachers who encounter barriers that rob their students of the affordances of technology that has the potential to improve their educational and future employment opportunities. This information empowers administrators and policy makers, who question the effectiveness of the pedagogical practices of the teachers who serve the underserved communities (Blackwell et al, 2014). This study arms urban school districts and educational stakeholders with knowledge and information; and, facilitates the process that determines the best decisions relative to providing urban schools with the funding needed to transform the classroom into a technology-driven learning center. Thus, computer use and computer skills of students at urban schools can approach the knowledge and skill level of their counterparts who live in affluent neighborhoods. And, the eventual outcome will be well-trained and successful students, who are college and career ready and who are prepared to handle the challenges faced in a global economic climate.

Conclusion

The purpose of this qualitative single case study was to explore the ABCs of teachers who integrate technology in their classrooms. The findings of this study add to the body of literature on the intrinsic and extrinsic factors that affect technology integration in the K–12 classroom. The results of this case study confirm that the teachers in this study had positive attitudes, beliefs and were confident about their ability to use

the technology when they had access to it. Although some schools in the school district had transitioned to one-to-one schools, the study showed that access to technology was a major problem for most schools resulting in teachers, at the urban schools, using outdated equipment or sharing laptop carts with other teachers. The principals viewed teacher capacity as the major challenge facing the teachers at their urban schools. The teachers and principals provided artifacts as evidence of the reports and projects that they discussed during data collection. This study triangulated the information gathered from the teachers, with feedback to questions posed to principals in a focus group session, and artifacts provided by both teachers and principals. Because the sample size of teacher participants in this study was small in comparison to the number of teachers in this urban school district, the results are not generalizable and may only be transferable with similar populations and settings.

The social change element of this study ultimately targets the urban student whose quality of life has the potential to catapult to a level of normalcy. This case study was designed to contribute to the literature and positively impact social change by revealing the root cause for the stalled integration of technology in the pedagogical activities in the urban classroom environment. Whether the results of subsequent studies coincide with the results of this study that shows how the absence of updated technology is the culprit; or, show a link to the ABCs of the urban teachers, either way, the findings relative to this topic can propel the educational opportunities for urban students. This de facto paradigm shift will clear the way for U.S. students, irrespective of their background, to be prepared to compete equally in a 21st century global platform.

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Appendix A: Permission to Use Diffusion of Innovation Image

SIMON & SCHUSTER

1230 Avenue of the Americas
New York, NY 10020
212-698-7262 • Fax: 212-698-7284
E-Mail: laura.milunic@simonandschuster.com

Laura Milunic
Permissions Department

November 7, 2017

Renee Rousey
[redacted]

Re: DISSERTATION - The teacher's impact on the integration of ICTs in urban classrooms

Dear Renee Rousey:

You may have our permission to use, in the English language only, material in the manner and for the purpose specified in your request from the following book:

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Sincerely,

Laura Milunic

Laura Milunic
Sr. Permissions Coordinator

Appendix B: Permission to use The Patterns of the Global Mobile Divide Image

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Sep 15, 2018

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Title of your thesis/dissertation	How Teachers Attitudes, Beliefs, and Confidence Impact Technology Integration in Urban Schools

Appendix C: Permission to use TPACK image

From: Punya Mishra [mailto:punya.mishra@asu.edu]
Sent: Monday, July 31, 2017 1:25 PM
To: Renee Rousey [redacted]
Subject: Re: Request for permission to use TPACK image in doctoral dissertation

Renee –

Thank you for your interest in TPACK. You can find instructions on how to download and use the TPACK diagram at TPACK.org

thanks

~ punya
—
Punya Mishra
Associate Dean of Scholarship & Innovation
Mary Lou Fulton Teachers College
Arizona State University
education.asu.edu

punya.mishra@asu.edu
517 303 9567
punyamishra.com

From: Renee Rousey [redacted]
Date: Saturday, July 29, 2017 at 1:20 PM
To: Punya Mishra <punya.mishra@asu.edu>
Subject: Request for permission to use TPACK image in doctoral dissertation

Dear Dr. Mishra,

I am a doctoral student at Walden University, and my field of study is Educational Technology. I am researching the teacher's role in the integration of ICTs in urban classrooms as a means to understand the support needed to increase the use of technology in this learning environment. The field of educational technology has grown exponentially since the first book that you and Dr. Kohler published in 2006. The new book titled, *Handbook of Technological Pedagogical Content Knowledge (TPACK) for Educators* that you co-authored with Herring and Koehler in 2016 has given me additional insight into the challenges of co-mingling pedagogy and technology. As you stated in your recent book, "More research is therefore needed to find out which support most effectively enhances teachers' technology integration" (p. 188).

I would like to use the TPACK image (shown below) in my dissertation and would like to get permission to include the TPACK diagram in my thesis. Please inform me how I can get permission to use the TPACK graphic; and, let me know if you have any questions or comments. I believe that your advancements in the field of Education Technology have expedited tremendous growth in the educational arena and I look forward to following your works in the future.

Sincerely,
Renée Rousey
[redacted]

Appendix D: Permission to Use Selection Survey

From: Ertmer, Peggy A [mailto:pertmer@purdue.edu]
Sent: Tuesday, January 9, 2018 11:35 AM
To: Renee Rousey [redacted]
Subject: Re: Request for permission to use the Computer Technology Integration Survey for doctoral study

Renee,
Yes, of course, you have our permission to use the survey that appeared in JRTE. Just be sure to cite the source and add "Used with permission of the authors."

Good luck with your work -

Peg Ert,er

Peggy A. Ertmer
Professor Emerita of Learning Design and Technology
Founding Editor, Interdisciplinary Journal of Problem-based Learning (IJPBL)
Purdue University, College of Education
pertmer@purdue.edu;
http://www.edci.purdue.edu/ertmer
--
I've learned that I still have a lot to learn ... Maya Angelou

From: Renee Rousey [redacted]
Date: Tuesday, January 9, 2018 at 3:55 AM
To: Peg Ertmer <pertmer@purdue.edu>
Subject: Request for permission to use the Computer Technology Integration Survey for doctoral study

Dear Dr. Ertmer,

My Name is Renée Rousey. I am a doctoral student at Walden University, and my field of study is Educational Technology. I am researching the teacher's role in the integration of ICTs in urban classrooms as a means to understand the support needed to increase the use of technology in this learning environment. During my research, I encountered a plethora of your journal articles and books that document your work in the research community. I also came across the **Computer Technology Integration Survey** that appears in the journal article titled *Increasing Preservice Teachers' Self-Efficacy Beliefs for Technology* that you and your colleagues, Drs. Ling Wang and Timothy J. Newby authored.

I would like to use the **Computer Technology Integration Survey** as a selection questionnaire in my study. Please inform me how I can get permission to use this survey instrument; and, let me know if you have any questions or comments. I believe that your research with technology integration in the educational arena has been instrumental in the growth of the field of Education Technology; and, I will continue to follow your work.

Sincerely,
Renée Rousey
[redacted]

Appendix E: A Letter of Invitation for Principals

Dear Mr./Ms. [XXXX],

I am seeking your permission to conduct a case study in your school for my doctoral research. My study is titled, *How Teachers Attitudes, Beliefs, and Confidence Impact Technology Integration in Urban Schools.* I will obtain the e-mail addresses of your teachers via the school website. I will send the teachers at your school a link to a short online survey that will be used to choose four teachers at your school to interview. I would also like to request a copy of the technology plan for your school.

I propose to collect data during Fall 2018 at a time that is convenient for each teacher. The teacher will have the option to choose a face-to-face interview or a Skype interview; and, I will coordinate the logistics of the interview with each individual who agrees to participate in my study.

Please reply to this e-mail with your positive response if you would like for your school to participate in this research study. Feel free to contact me via e-mail or phone if you have any questions. Thank you for your consideration.

Sincerely,

Renée Rousey


Appendix F: Cover letter for Teachers

Renée Rousey {Date}

RE: Invitation to participate in a research study

Name,

My Name is Renée Rousey. I am a doctoral student at Walden University. I am conducting a case study is to examine how K–12 school teachers use technology in the classroom. My objective is to understand the attitudes and pedagogical beliefs of urban teachers and how these intrinsic factors affect teacher confidence when devising strategies to integrate technology in their everyday classroom activities. Your school was one of the schools in the county that was chosen to participate in my doctoral study. I invite you to provide your perspective relative to this research topic.

Below is the link to a Likert-style survey with questions about technology integration. This online survey can be completed in 10 minutes or less. After the surveys are completed, individuals will be chosen to participate in the research study based on their survey responses and their willingness to participate in the study. Please complete the survey by 11:59 pm on xxxxx xx, 2018.

Click here to begin survey (use your phone, tablet, or computer)

Thank you for taking part in the survey. Feel free to contact me if you have any questions.

Kind regards,
Renée Rousey

Appendix G: Computer Technology Integration Survey

Note. From "Increasing pre-service teachers' self-efficacy beliefs for technology integration.," by L. Wang, P. Ertmer, and T. Newby, 2004, *Journal for Research on Technology in Education, 36*(3), pp. 245-248. Used with permission of the authors.

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 HyperStudio 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. I 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 H: Interview Protocol for Teachers

Study: How Teacher Attitudes, Beliefs, and Confidence Impact Technology Integration in Urban Schools
Time of Interview:
Date:
Method:
Interviewer:
Interviewee:
Script:

Good morning:

My name is Renee Rousey and I am a doctoral student in the Educational Technology program at Walden University. I recently emailed you a copy of the consent form that you agreed to digitally. Thank you again for agreeing to participate in my study. The purpose of this interview is to understand the experiences that teachers at urban schools encounter during teaching and learning activities in the classroom. In order to protect your identity, I ask you to please refrain from using your name during this interview. I will be recording this interview in order to obtain a permanent record. Is it okay with you if I begin recording now? (Record the meeting).

Questions:

1. How long have you been teaching at this school?
2. What are your views on the integration of technology at the school during the last two years?
3. What factors do you think are responsible for the way technology is integrated in the classroom?
4. What do you think is the significance of using technology in the classroom?
5. Why do you believe (or not believe) that technology is a valuable resource for teaching? Please elaborate on your response.
6. How would you define technology integration? Please provide some examples.
7. What types of technology do you use in your classroom for instruction? For administrative tasks?
8. What specific examples can you give of how you use technology in your classroom?
9. How often do you use technology and Internet in your classroom? What encourages or discourages you from integrating technology in your own classroom?
10. What barriers do you encounter while using technology in your classroom? Can you provide specific examples?

11. In what ways has your expectations been met towards integrating technology into the everyday learning activities in the classroom?
12. To what extent do you think the present principal has taken to facilitate the integration of technology in the school?
13. In what ways have your expectations been met towards integrating technology in the classroom since he/she became principal?
14. To what extent do you make suggestions on how your principal can support you to improve the integration of technology in your classroom?
15. Is there anything else that you would like to add that would help me to understand how you feel about integrating technology in your classroom?

I appreciate your participation in this study. Is there anything that you would like to add before I end this interview? Again, thank you for your time. I appreciate your participation and input. As stated previously, your responses will remain confidential.

Appendix I: Focus Group Protocol for Principals

Study: How Teacher Attitudes, Beliefs, and Confidence Impact Technology Integration in Urban Schools
Time of Focus Group:
Date:
Method:
Interviewer:
Participants:
Script:

Moderator Introduction and Purpose of Group

Welcome and thank you for being here today. Hello. My name is Renee Rousey and I am a doctoral student in the Educational Technology program at Walden University. I'd like to start off by thanking each of you for taking time to participate today. We'll be here for about an hour.

The reason we're here today is to gather your viewpoint on the attitudes, beliefs, and confidence levels of teachers at your schools while integrating technology in the teaching and learning activities in the classroom.

I will guide the conversation by asking questions that each of you can respond to. If you wish, you can also respond to each other's comments, like you would in an ordinary conversation. It is my job to make sure that everyone here gets to participate and that we stay on track.
I'm going to lead our discussion today. I will be asking you questions and then encouraging and moderating our discussion.

I also would like you to know this focus group will be tape recorded. The identities of all participants will remain confidential. The recording will only be used to make sure my notes are correct and will not be heard by anyone except me.

Ground rules

To allow our conversation to flow more freely, I'd like to go over some ground rules.

1. Only one person speaks at a time. This is doubly important as our goal is to make a written transcript of our conversation today. It is difficult to capture everyone's experience and perspective on our audio recording if there are multiple voices at once
2. Everyone doesn't have to answer every single question, but I'd like to hear from each of you today as the discussion progresses.
3. This focus group today is confidential. This is a confidential discussion in that I will not report your names or who said what to your colleagues or supervisors. Your name will not be used on anything that could identify you in the study. Names of participants will not even be included in the final report about this

meeting. It also means, except for the report that will be written, what is said in this room stays in this room.

4. We stress confidentiality because we want an open discussion. We want all of you to feel free to comment on each other's remarks without fear your comments will be repeated later and possibly taken out of context.
5. There are no "wrong answers," just different opinions. Say what is true for you, even if you're the only one who feels that way.
6. Are there any questions?

Introduction of participants

Before we start, I'd like to know a little about each of you. Please tell me:

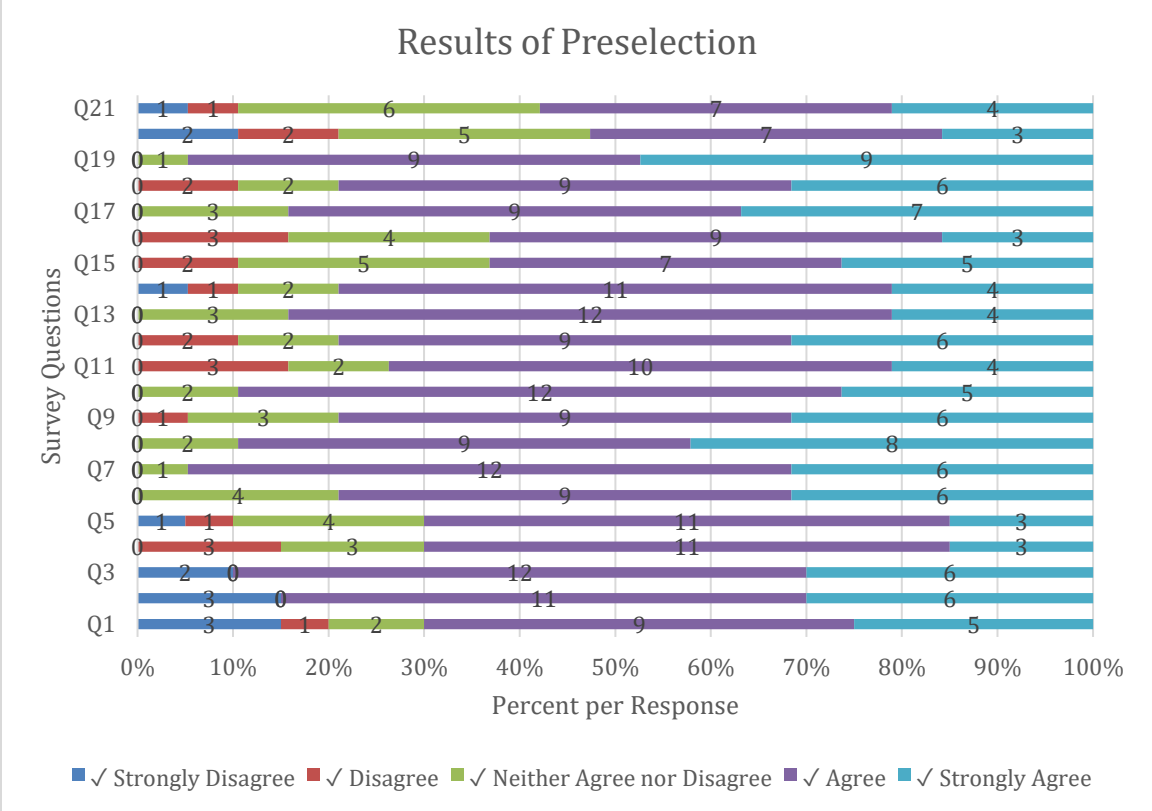
1. Your name
2. What your role is with **[organization]**

Questions (50 minutes)

1. What do you think about the integration of technology at your school?
2. To what extent do you think the integration of technology in the classroom has improved over the years?
3. To what extent do you think the current teachers at your school have taken the initiative to integrate technology in their respective classrooms?
4. In what ways have your expectations been met relative to employing technology in the day-to-day learning activities in the classroom?
5. To what extent do you have the opportunity to use feedback that you received from the teachers to improve technology integration at your school?
6. How important is it that your teachers integrate technology into their teaching activities?
7. What does your district currently do to raise technology fluency? What future goals do you have for assisting teachers integrating technology in to their classrooms?
8. When conducting teacher evaluations, how do you determine if a teacher is using and integrating technology effectively?
9. How are you able to secure and allocate resources for technology integration in teaching and learning?
10. What would you say are the top three reasons that teachers do not use technology in their classrooms?
11. How are you able to secure and allocate resources for technology integration in teaching and learning?
12. How would you define your role as an administrator in promoting technology integration at your school?
13. What do your teachers need to ease the transition into technology integration?
14. As the school principal and as a leader, just share anything else that you would like to tell me concerning technology in your school or about other direction you would like to take your school with technology.

Closing (2 minutes)
Thanks for coming today and talking about these issues. Your comments have given us lots of different ways to see this issue. I thank you for your time.

Appendix J: Preselection Survey Results of 20 Teachers



Q1 I feel confident that I understand computer capabilities well enough to maximize them in my classroom.

Q21 I feel confident that I can carry out technology based projects even when I am opposed by skeptical colleagues.

Q3 I feel confident that I can successfully teach relevant subject content with appropriate use of technology.

Q4 I feel confident in my ability to evaluate software for teaching and learning.

Q5 I feel confident that I can use correct computer terminology when directing students' computer use.

Q6 I feel confident I can help students when they have difficulty with the computer.

Q7 I feel confident I can effectively monitor students' computer use for project development in my classroom.

Q8 I feel confident that I can motivate my students to participate in technology-based projects.

Q9 I feel confident I can mentor students in appropriate uses of technology.

Q10. I feel confident I can consistently use educational technology in effective ways.

Q11 I feel confident I can provide individual feedback to students during technology use.

Q12 I feel confident I can regularly incorporate technology into my lessons, when appropriate to student learning.

Q13 I feel confident about selecting appropriate technology for instruction based on curriculum standards.

Q14 I feel confident about assigning and grading technology-based projects.

Q15 I feel confident about keeping curricular goals and technology uses in mind when selecting an ideal way to assess student learning.

Q16 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.

Q17 I feel confident that I will be comfortable using technology in my teaching.

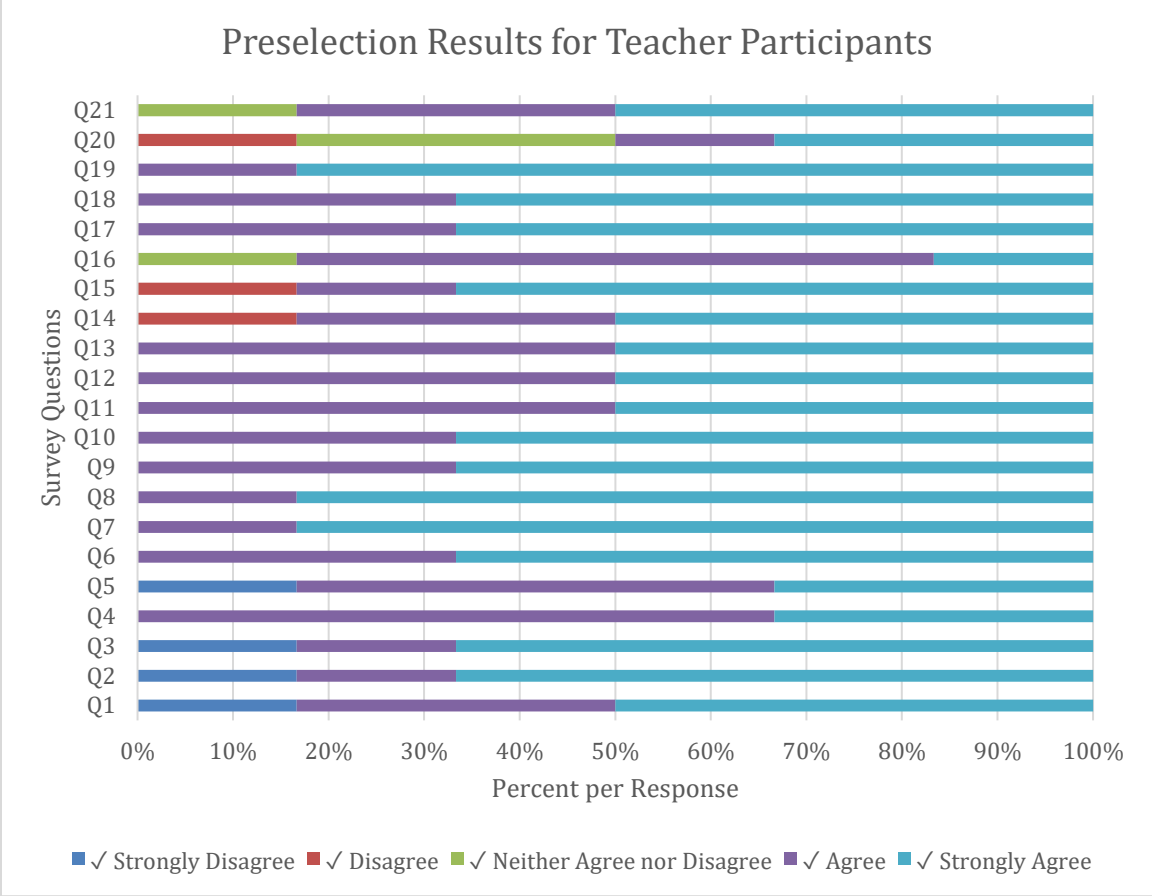
Q18 I feel confident I can be responsive to students' needs during computer use.

Q19 I feel confident that, as time goes by, my ability to address my students' technology needs will continue to improve.

Q2 I feel confident that I have the skills necessary to use the computer for instruction.

Q20 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.

Appendix K: Preselection Survey Results of Six Teacher Participants



Q1 I feel confident that I understand computer capabilities well enough to maximize them in my classroom.

Q2 I feel confident that I have the skills necessary to use the computer for instruction

Q3 I feel confident that I can successfully teach relevant subject content with appropriate use of technology.

Q4 I feel confident in my ability to evaluate software for teaching and learning.

Q5 I feel confident that I can use correct computer terminology when directing students' computer use.

Q6 I feel confident I can help students when they have difficulty with the computer.

Q7 I feel confident I can effectively monitor students' computer use for project development in my classroom.

Q8 I feel confident that I can motivate my students to participate in technology-based projects.

Q9 I feel confident I can mentor students in appropriate uses of technology.

Q10. I feel confident I can consistently use educational technology in effective ways.

Q11 I feel confident I can provide individual feedback to students during technology use.

Q12 I feel confident I can regularly incorporate technology into my lessons, when appropriate to student learning.

Q13 I feel confident about selecting appropriate technology for instruction based on curriculum standards.

Q14 I feel confident about assigning and grading technology-based projects.

Q15 I feel confident about keeping curricular goals and technology uses in mind when selecting an ideal way to assess student learning.

Q16 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.

Q17 I feel confident that I will be comfortable using technology in my teaching.
Q18 I feel confident I can be responsive to students' needs during computer use.
Q19 I feel confident that, as time goes by, my ability to address my students' technology needs will continue to improve.
Q20 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.
Q21 I feel confident that I can carry out technology-based projects even when I am opposed by skeptical colleagues.

Appendix L: Categories

Categories	Definition	Examples
Attitudes	A way of feeling, thinking, or behaving towards a person or thing, as the result of a person's emotional and cognitive evaluations.	Ricardo: "I think it's great for teaching … I think we are doing a good job with integrating technology." Beth: "I think it is a good tool to have,
Barriers	These obstacles are external to the educator and result from the lack of access to infrastructure, hardware and software, technical support and training, or training.	Ricardo: "The shortcomings come with not having enough ... technology so every student has more access." Crystal: "If the Internet is down … I just do it on paper."
Belief	Pedagogical beliefs are the premises, propositions, or understanding that we hold to be true about learning and teaching	Frances: "I believe that it's a valuable resource for teaching." Crystal: "So it can be a tool that I use to give myself more ways to engage with my students."
Collaboration	The joint interaction between stakeholders in a learning community to assist students to be successful in the classroom environment.	Beth: "I could have another group in the room working on a collaborative project." Frances: "… as good teammates and colleagues, we have worked together to make sure it's the best system."
Confidence	Confidence, or self-efficacy beliefs, reflects an individual's perceived capacity for learning or performing behaviors that will yield the desired results for the individual.	Anna: "I did expect it [technology integration] to go well and it is going well." Ricardo: "I try to maximize what's there. But … we're also limited in the software that we get to choose."
Educational Technology	Any technological equipment used for educational purposes and includes hardware, software, or network devices.	Mac & Dell laptops, Chromebooks, MS Office Suite, Google Classroom & Docs, Smartboards, Class Dojo, Internet, Elmo, iPads, Projectors.
Professional Development	A variety of tools, such as formal education and specialized training, that are used to improve the knowledge base, skill sets, and overall effectiveness of educators.	Beth: "I think the problem is that teachers don't know how to use the technology correctly." Angela: "We are paired with a specialist … who teaches computers. [Teachers] learned how to do projects on the computer that are also related to a core subject"

Student-Centered Learning	A constructivist approach to learning that focuses on the strategies of leaning from the student's perspective.	Ricardo: "We're allowing the students to interact with it … and it becomes more personalized." Crystal: "I have my students sit on carpet or at their desks and I do slides and it's interactive."
Support	The administrative, financial, or technical assistance that is used to improve the pedagogical climate for the educator in a classroom learning environment.	Anna: "We get wonderful support at the system level from our technology liaison." Ricardo: "we're also limited in the software ... a lot of the things that the teachers may want to try, we'll have to pay for it on our own."
Technology Availability	The accessibility of educational technology in a classroom environment.	Beth: "they just don't have enough [computers] for everybody so teachers have to share." Ricardo: "We don't have enough let's say Chromebooks … to service all our students at the same time."
Technology Integration	A value-added process that facilitates the effective implementation of technologies that enhance teaching and learning objectives in the classroom.	Angela: "making sure students are learning about the technology that they are using along with different subjects." Frances: "So I like it ... I can use it as a tool to teach something as well as they [students] can use it to learn something on their own."

Appendix M: Text-based Lesson Plan shows use of Technology

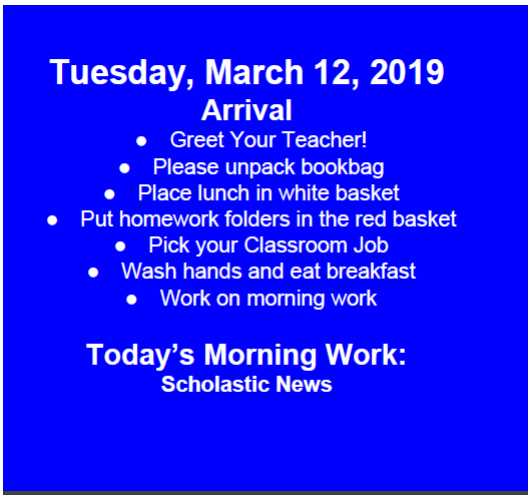
Objectives	**Math:** Students will find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real-world problems.	**Science:** Students will create a community that is designed to protect a local natural resource.

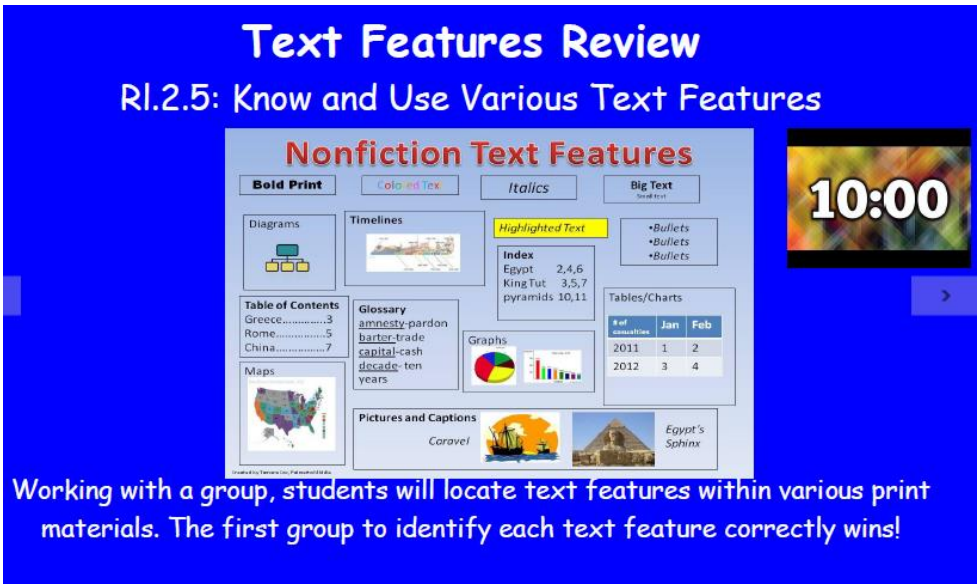
Formative Assessment(s):	**Summative Assessment(s):**	**21st Century Skills:**
☐ Targeted Questioning ☐ Feedback during exploration ☐ Art Rubric for Final Product ☐ Maker Rubric for Process of Creating	• Project using rubric • Student choice exit ticket	*(Choose skills that apply to lesson)* ☑ Creativity & Innovation ☑ Critical thinking & Problem Solving ☑ Collaboration & Team Work ☑ Communication

Lesson Steps/Strategies for Learning

- Engage
  - Day 1 Bay
    - I See, I Think I Wonder with a picture of the Pollution in the Chesapeake Bay
    - Watch the Video, Life in the Chesapeake Bay
  - Day 2: Bay
    - Watch 2nd Video Cleaning Up the Chesapeake Bay
    - Discuss "How are communities helping the Chesapeake Bay?"
- Explore
  - Day 1:
    - Students will research watersheds. What they are? Why they are important? How to protect them?
    - Watershed Project
    - Students will complete this in groups online in google docs. It will be posted on google classroom.
  - Day 2:
    - Students will research ways the people legislature, companies, and communities are trying to protect the bay. They will also design new ways to engage the communities in protecting natural resources.
- Explain
  - Day 2:
    - Students will come up with a complete community plan that explains why it is important to protect the bay.
- Elaborate
  - Days: 3-4
    - During days 3-4 students will design and build their community
    - Building, and measuring the buildings for the community.

Appendix N: Interactive Lesson Plan

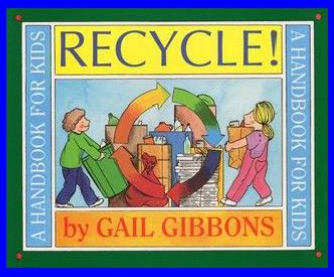




Writer's Workshop

Author Study

Gail Gibbons



Writer's Workshop

Author Study

Recycle by Gail Gibbons

Complete the sentence stem.

"I can tell Gail is passionate about _____ because _____."

Writer's Workshop

Topic- (noun) the subject of a text, discussion or conversation

Independent Writing Activity:

What topics are you passionate about? Brainstorm a list of topics that you are passionate about.

Library Shop!

We will switch out our Read to Self Books! Each group will have 5 minutes to pick 4 Just Right Books.

While you are waiting to pick your Just Right Book, please reread one of your books.

Appendix O: Class Project – Animal Fact Card

ANIMAL FACT CARD

Polar bear

INTERESTING FACTS

The polar bear lives in the arctic. A polar bear sleeps on a flat surface. The polar bear will lie on its stomach. It will travel many miles across frozen seas to hunt. Polar bears are well equipped for survival.

Appendix P: Class Project – Student Blog

[redacted] Oct 26, 2018

Based on what i learned i think the compes was the most important item because the people that traveled before had to know how to get to the place they need to go and how to get back but to do that they had to learn how to navigate the compes they had before.

[redacted] Oct 26, 2018

Based on what I read I think the most important technology in the text /video is the compass or navigation because you have to know where you are going

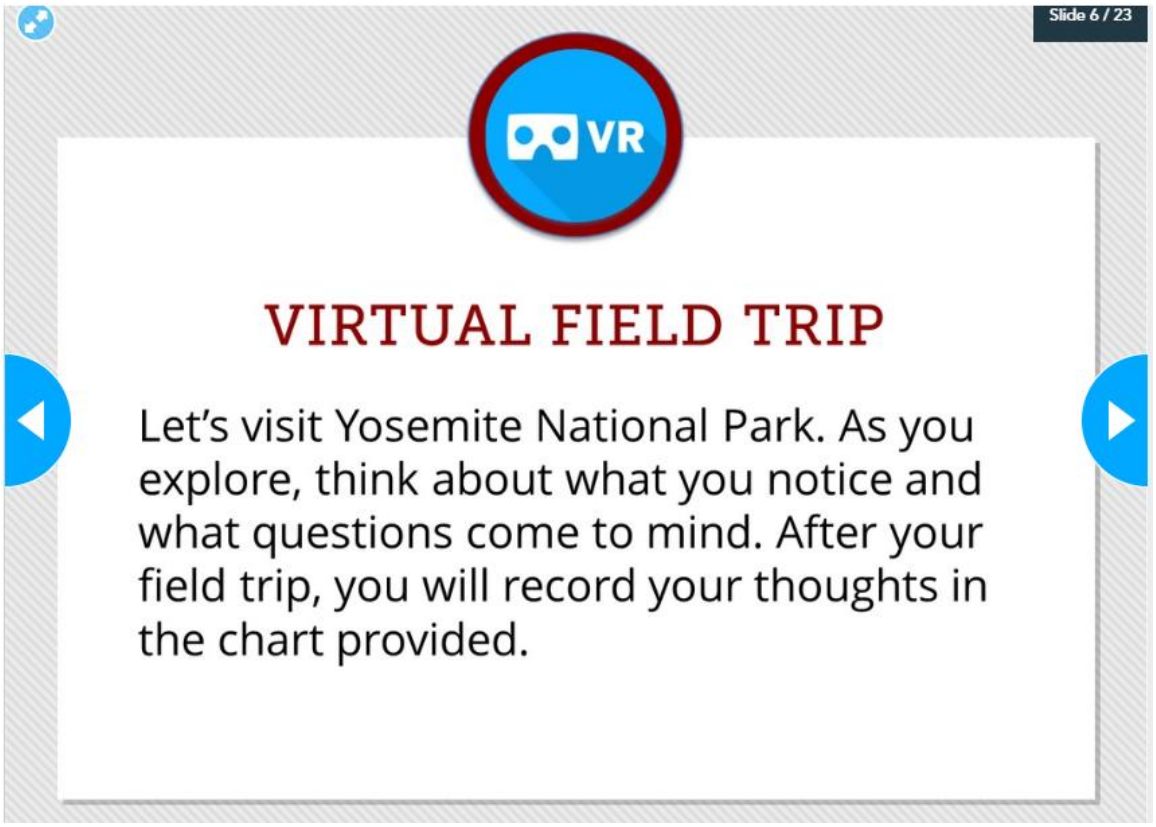
[redacted] Oct 26, 2018

the most important technology was the map so you know were you are because they didnt have phone like we do know and we had to use maps to get around to places also boats are important because they dont have cars , trucks,vans , so boats were think to get around the world in the early day .

[redacted] Oct 26, 2018

In the text the people from asia are like say that the europe are bad people Europe. And europe like say that asia are the bad people. Both want to do an war to asia and europe. People that want to go to asia need food,water,clothing, and ues a compass to help you where your going. And to go to europe you will need the same things to go to asia.

Appendix Q: Class Project – Virtual Field Trip



Appendix R: Principal Walk-through Evaluation Sheet

Elementary Reading Look For's

Students are actively participating in classroom talk and building on each other's ideas		Notes/Questions	
Students work to clarify or expand a proposition			
Students listen attentively			
Students base reasoning on visuals, text, structures or models			
Students challenge the quality of evidence and reasoning			
Students are engaged in discussion strategies such as turn and talk, Think-Pair- Share, Pair/Square, Accountable Talk			
STUDENT LEARNING BEHAVIORS			
Students demonstrate respect and attentiveness to others comments			
Student's support their responses with text evidence			
Students question each other for additional clarity			
TEACHER INSTRUCTIONAL BEHAVIORS			
Teachers model the use of accountable talk			
Teachers use visual models and/or graphic organizers to support students with learning and reasoning as needed			
Teacher sets expectation for student to student discussion points and relates to learning objective			
WRITING AND TECHNOLOGY			
Student work reflects responses to text and authentic writing (not worksheets)			
Students use lined paper, writing journal or notebooks to record responses			
Boxlight Smart Board is used to enhance lesson by teacher or student			
Evidence of student Chrome book use (research, data entry, writing)			