

Technology Integration, Beliefs, and Pedagogical Practices in the Social Studies:
A Phenomenological Case Study of Teacher-Initiated,
One-to-One Technology in Middle School Social Studies

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A dissertation in partial fulfillment of the
requirement for the degree of Doctor of Education.
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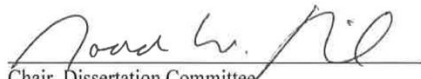
Towson, MD 21252

May, 2016

**TOWSON UNIVERSITY
COLLEGE OF GRADUATE STUDIES AND RESEARCH**

DISSERTATION APPROVAL PAGE

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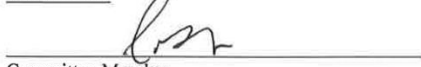
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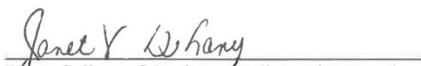
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Acknowledgments

I would like to thank my committee, Drs. Todd Kenreich, Kati Stein, Sarah Lohnes-Watulak, David Vocke, and David Wizer, for making this research possible. I would also like to thank the unnamed teachers who participated in this study. Without their thoughtful participation, I could not have completed this work. Finally, I would like to thank the professors in the Educational Technology program, the friends and colleagues who supported me throughout the writing, and my family.

It is with sincere gratitude that I acknowledge the teachers who have guided me to this educational milestone. Thank you, Ms. Heil, the teacher who helped convince me that I did not need to be afraid of school. Thank you, Mrs. Hedberg, the teacher who challenged me academically and sparked my love of world history. Thank you, Drs. Neubert and Binko, the teachers who taught me how to teach. Thank you, Mrs. Fucile, the teacher who inducted me into the craft and mentored me in social studies. Thank you, Dr. Berkeley, the teacher with the ever present encouragement. Thank you Dr. Kenreich, the teacher who served as my dissertation advisor and whose tireless work and thoughtful encouragement brought this research to fruition. Thank you, Mom, the teacher whose curious mind is an inspiration for living life and who taught me the power of unconditional love for a child. Thank you, Dad, the teacher who sparked my love of history while explaining the alliances of WWI at the dinner table and who always has a

book in his library to answer my questions. Thank you, Mark, the teacher who shows me every day what it looks like to patiently, *very* patiently, love and support a partner and a family. Thank you to my children, Ben, Josie, and William, for cheering me on through every chapter. To all my teachers, this endeavor is also your endeavor. Your support, encouragement, and most of all your love, are all part of me. Thank you.

Abstract

Technology Integration, Beliefs, and Pedagogical Practices in the Social Studies: A Phenomenological Case Study of Teacher-Initiated, One-to-One Technology in Middle School Social Studies

Marie K. Heath

In the United States, social studies education plays a critical role in preparing students to be active citizens in a democracy. Student-centered, inquiry-based instruction helps foster learner agency, but it occurs infrequently in social studies classrooms. One-to-one (1:1) technology, in which every learner uses a personal computing device, has been suggested as a tool to facilitate shifts in social studies pedagogy. Despite this potential, little research exists which examines one-to-one technology in social studies. The purpose of this study was to explore the experiences of two social studies teachers who initiated and integrated one-to-one technology over a two-year period in a racially diverse, high-poverty middle school. Using a phenomenological methodology, data were collected through interviews, observations,

and artifacts and were interpreted using transcendental phenomenological reduction. The theory of Technological, Pedagogical, and Content Knowledge (TPACK) (Koehler & Mishra, 2005) framed discussion of findings.

Findings reveal themes of teachers' positive beliefs about technology, teachers' belief in themselves as professionals with agency, teachers' relationship with the larger school district, and the ways in which teacher empowerment, technological knowledge, and pedagogical shifts led to greater student autonomy in learning. The study contributes to the foundation for one-to-one research in social studies by concluding: meaningful integration of one-to-one in social studies occurs at a confluence of complex factors; positive teacher beliefs about technology *and* teacher beliefs about professional agency impact integration; teacher voice is critical to research; and a modified version of TPACK is necessary in order to more fully capture the complex relationship between teacher beliefs *and* the teacher's interaction with administration and district goals. The study recommends that policymakers and practitioners should empower teachers by: building teacher capacity and supporting development of positive teacher beliefs well in advance of technology initiatives; designing and providing professional development that honors teacher voice, existing beliefs, and offers opportunities to take risks with technology; limiting the levels of bureaucracy in districts; and facilitating greater trust between the school leaders and teachers within the school community.

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Chapter One

Introduction

Sherwood Middle School is a high-poverty, majority-minority school located in a large urban-suburban district in the mid-Atlantic. Anne is one of seven social studies teachers at Sherwood, and she is one of two teachers who instruct in its law and finance magnet program. She and the other law and finance teacher, Steve, initiated their own one-to-one tablet program for the law and finance students in January, 2013. Since that time, Anne and Steve have experienced an evolution in the ways that they teach social studies. Anne's lesson, as described below, is indicative of the ways that Anne and Steve have both fostered student agency in their social studies students.

Eighth grade students at Sherwood Middle School chatted with each other during an economics lesson evaluating China's economic shift from a command economy to a capitalist economy. Their conversation centered on the day's inquiry question: "Would the nation or individual be better off in a command or market economy?" The twelve and thirteen year olds spoke face-to-face, and they also conversed and argued via text on their cloud repository for classwork and homework, provided via Microsoft Office 360. Each student had access to her or his own district provided tablet-netbook hybrid device, and some students used their tablet to record themselves answering the question and posted their video on the cloud.

Before the lesson started, their teacher, Anne, had copied and pasted the inquiry question on the bottom of every PowerPoint slide and every online activity that she had created for the students. Students found evidence from CNN videos, news articles, and

from research through the district's online library media resources. Anne used the technique of jigsawing, a method to divide up the content and learning among students which allows them to eventually teach each other content in which they have become experts. However, Anne accessed the affordances of the cloud and virtually jigsawed the students so that they worked together to complete a shared resource in the cloud. She differentiated the reading and videos by pre-selecting groups based on student reading ability. Some students utilized more video or different readings. When modeling the activity, Anne not only modeled the content she expected to see as evidence for claims, but also how to use technology to capture that content. She also modeled her metacognitive thought process by saying, "this comment feature is a great way, when you're reading something, to reflect on your reading and put a comment in the reading." Finally, students needed to log-on to Anne's "Today's Meet" online site to answer the inquiry question for the day and support their answer with evidentiary claims from the sources they researched online.

Student responses included work that argued "China is better off with its Command economy for example the GDP has gone up but it's not enough but not enough to sustain life for them" or "China should go back to its command economy because the factory pollutes the environment and they don't have enough money to stop the pollution." Another student considered individuals' living and working environments, saying, "Businesses that are actually in the mall do not get many sales and they cannot provide for themselves since people are not buying their products. People's houses are very small and do not fit everyone and soon their home will be demolished."

Anne's lesson demonstrates the ways in which she intentionally considered the affordances of one-to-one technology and then harnessed these affordances to design inquiry-based social studies instruction. Her instructional decisions ensured that students would be responsible for asking questions of the content, constructing meaning from the content, and then using the content to defend their answers to the inquiry questions. A combination of technology and social studies pedagogy facilitated inquiry-based learning that fostered students' sense of agency.

Overview

Our democratic republic relies on active and engaged citizens to sustain it. Social studies education plays a critical role in encouraging students' belief that they can be active citizens for change (NCSS, 2014). Effective social studies education should develop the "knowledge, intellectual processes, and democratic dispositions" for effective citizenship by fostering a sense of agency in learners (NCSS, 2014). The National Council for the Social Studies (NCSS) has proposed that, in order to promote agency in learners, social studies pedagogy must shift to inquiry-based, student-centered instruction which encourages critical thinking and argumentation grounded in evidentiary warrant (National Council for the Social Studies, 2013).

Problematic for social studies is its demonstrated history of struggle in attempting to shift pedagogy from teacher transmission to a more constructivist approach (Diem, 2000; Doolittle & Hicks, 2003). In 2013, in an effort to address this difficulty, the NCSS introduced The College, Career, and Civic Life (C3) Framework to provide guidance for social studies educators. The C3 Framework is intended to support a pedagogical shift toward student-centered inquiry and encourage student intellectual

power in questioning, seeking evidence, and acting upon what they learn in order to affect change and ask more questions of social studies content and the world around them (National Council for the Social Studies, 2013).

Technological innovations have also been suggested as a vehicle which can facilitate the shift in social studies pedagogy toward student-centered and inquiry-based instruction (Beck & Eno, 2012; Diem, 2006; Martorella, 1997; Waring, 2006). In 1997, Martorella suggested that technology could help students access and interpret data for decision making. Waring (2006) argued that the participatory and interconnected nature of the internet could be harnessed by social studies teachers in order to help students believe in their own agentic ability. Diem (2006) similarly concluded that technology could serve as a vehicle for citizenship instruction and development. With the advent of one-to-one technology, Beck and Eno (2012) proposed that the affordances of one-to-one technology could act as a “bridge” to turn inquiry-based pedagogy into a reality.

Problem Statement and Rationale

Despite this potential of technology in social studies, the field lacks a cohesive research agenda to examine technology integration. Social studies scholars have called for more holistic research that addresses the complex nature of schools, the affordances of technology in encouraging constructivist learning in social studies, and the possibilities for technology to encourage participatory citizenship (Diem, 2000, 2006; Doolittle & Hicks, 2003; Friedman, 2014; Friedman & Hicks, 2006). Instead, research in technology integration continues to be, as Friedman and Hicks (2006) called it

“simplistic disassociated efforts” (p. 251). In particular, with respect to one-to-one technology in social studies, there has been little research examining the discipline-specific experience of one-to-one integration (Friedman, 2014).

While research on one-to-one initiatives in social studies is scarce, a growing body of research exists which examines general implementation of one-to-one initiatives. This literature considers teacher perceptions of technology (Ertmer, 1999, 2005; Ottenbreit-Leftwich et al., 2010), professional development (Dunleavy et al., 2007; Oliver & Corn, 2008; Storz & Hoffman, 2013), and first and second order barriers to implementation (Ertmer, 1999; Garthwait & Weller, 2005). Furthermore, current research only examines initiatives which have been implemented as top-down directives from state or local administrations (i.e., Crompton & Keane, 2012; Donovan, Hartley, & Strudler, 2007; Inserra & Short, 2012-2013).

Missing almost entirely from the literature on one-to-one initiatives are examples of integration that have been conceived and implemented from the ground-up, by teachers. Teachers who actively seek out and implement programmatic change serve as an atypical case, drawing a counterpoint to the usual experience of teachers implementing one-to-one technology in their classrooms. The purpose of understanding an atypical case is to richly describe the particulars of that which make the lived experience of these teachers so essentially unique, and to then compare this to understandings about more typical cases. Abramson (1992) explains the value of an atypical case by noting that:

...since such data are rare, they can help elucidate the upper and lower boundaries of experience. Second, such data can facilitate... prediction by demonstrating infrequent, non-obvious, or counterintuitive occurrences that may be missed by standard...approaches. (p. 140)

Finally, there is a need to more deeply explore teacher perceptions and attitudes toward technology, as the literature demonstrates an established link between these beliefs and technology integration (Ertmer, 1999, 2005; Ottenbreit-Leftwich et al., 2010). Phenomenology, an under-utilized methodology for researching technology integration (Cilisez, 2010), can both explore teacher perceptions and help re-include teacher voice in change initiatives and education reform (Fullan, 2007; Giroux, 2005; Hargreaves, 1996; Storz & Hoffman, 2013). This study examines the lived experience of middle school social studies teachers who self-initiate a one-to-one technology program in their classrooms. Thus, the rationale for this study is to address the gaps in the existing literature identified above.

Gap in Research of One-to-One Technology Integration in Social Studies

Research of one-to-one initiatives in social studies education is almost completely absent from the literature on technology in social studies. Currently, seven studies exist which examine one-to-one research in social studies. Of these, one is a review of literature and two are practitioner based action research projects. Only one of the seven studies examines the relationship between teacher beliefs, pedagogical practices, and technology integration. This absence of research continues despite calls from scholars in the field of social studies and technology to explore the use of one-to-

one technology in social studies classrooms (Friedman, 2014; Friedman & Hicks, 2006; Penuel, 2006; van Hover, Berson, Bolick & Swan, 2004).

There has been a particular request in social studies technology research to proactively examine one-to-one initiatives in their implementation phase (Friedman & Hicks, 2006; Friedman, 2014). Without proactive research, practice fails to be influenced by scholarship and results in fragmented efforts at effective technology integration. As Doolittle and Hicks (2003) explain, “Social studies educators are at play in the fields of technology, which results in a disjointed collection of technological integration efforts” (p. 96).

Scholars have criticized the field’s tendency to offer reactive and retrospective examinations of what “could have been” in social studies technology integration, if only research had only kept apace of technology trends (Friedman, 2014). To address this need, a call has been made for research that adheres to a more cohesive research agenda, which is proactive and specific to one-to-one integration in social studies, instead of reactive and disconnected in nature. Friedman (2014) states that while

... Discerning if and when one-to-one mobile computing will be the norm in schools is difficult, social studies and technology researchers would be foolhardy to wait until it is the norm before engaging in research. Rather, this moment should be seen as an opportunity to seize... Then, researchers a decade from now will not be writing retrospective reviews asking whether mobile computing was a “lost opportunity or unexplored frontier” (Friedman & VanFossen, 2010, p.51) as they did regarding the Internet in social studies classrooms. (p. 20)

This study addresses the specific call for research that examines one-to-one technology integration in social studies. It specifically examines mobile computing and one-to-one technology in social studies and contributes to the limited, but essential, body of emerging research on one-to-one technology in social studies.

Teacher Beliefs and Perceptions of Teaching with Technology

There is growing evidence of a link between the success of technology initiatives and teacher perceptions about teaching with technology (Ertmer, 1999, 2005; Ottenbreit-Leftwich et al., 2010; Storz & Hoffman, 2013.) Storz and Hoffman (2013) specifically examined the impact of one-to-one technology on students and teachers by utilizing phenomenology to focus on student and teacher voice. Their findings indicated teachers demonstrate a “genuine delight” (Storz & Hoffman, 2013, p. 14) at the opportunity to have someone hear and give voice to their experiences with one-to-one technology. A conclusion of the study identified the value of teacher voice in one-to-one research, particularly because the teachers were major stakeholders in the change processes who had reflected deeply on their experiences and provided thoughtful suggestions for increased support of the process (Storz & Hoffman, 2013).

Teachers’ beliefs and knowledge are not prescribed while in pre-service and then fully formed as soon as they practice the profession; instead, teachers develop knowledge and beliefs through practice (Porrás-Hernández & Salinas-Amescua, 2013). These perceptions of teaching and learning permeate all actions that teachers make, and need to be explored and given voice. However, there is a trend in research to marginalize teacher voice (Hargreaves, 1996; Porrás-Hernández & Salinas-Amescua,

2013; Swallow, 2015), which runs counter to better understanding the relationship between teacher beliefs and technology integration. This study specifically examined teacher perceptions of technology by utilizing the methodology of phenomenology.

Phenomenology as Research Method in Technology Integration

In order to give voice to teacher experience and make visible underlying epistemologies, researchers must ask questions which help illuminate the how and why of an experience and use an appropriate corresponding methodology to answer those questions. Teaching with technology is a particular phenomenon, and perceptions and beliefs are difficult to quantify (Cilesiz, 2010). The field is beginning to build an understanding of this experience (i.e. Ottenbreit-Leftwich et al., 2010; Storz & Hoffman, 2013); however, the body of literature which specifically examines teacher voice and experience teaching with one-to-one technology remains thin. More qualitative research which explores the phenomenon of teaching in a one-to-one mobile learning environment will help to fill this gap in understanding (Cilesiz, 2010).

Phenomenology also provides the opportunity to examine teacher belief without imposing expectations of best practice on teachers (Ottenbreit-Leftwich et al., 2010). Teachers are major stakeholders in educational change (Fullan, 2007), but their voices have been repeatedly silenced in the change process (Hargreaves, 1996). Because of its focus on returning to “the things themselves” from a pre-supposition state (Moustakas, 1994), phenomenology as methodology is well suited to giving voice to its participants. Phenomenology is beginning to be utilized by researchers both as a sole methodology and as an interpretive lens for case study (i.e. Baytak, Tarman, & Ayas, 2011; Garthwait

& Weller, 2005; Lim, 2011; Ottenbreit-Leftwich et al., 2010); however, it is still an under-represented methodological choice in the literature on technology integration and in particular, on one-to-one initiatives (Cilesiz, 2010). This study fills the need for more phenomenological research to more deeply examine the essence of teaching with one-to-one technology.

Research of Atypical One-to-One Initiatives

Educational reform and change initiatives have a historically high rate of failure (Fullan, 2007). Essential to effective educational reform is understanding teacher experience of change and building teacher capacity for change (Fullan, 2007). Teachers are the lynchpins of educational initiatives (Fullan, 2007), and teachers who are “more self-actualized and have a greater sense of efficacy ... take action and persist in the effort required to bring about successful implementation” (Fullan, 2007, pp. 96-97). The initiatives studied in the literature have been instituted in a top-down approach to change in which the administration of the state or local districts initiated the change and instituted the one-to-one program (i.e., Crompton & Keane, 2012; Donovan, Hartley, & Strudler, 2007; Inserra & Short, 2012-2013). There are no examples in the literature of teacher initiated and implemented one-to-one programs which would help illustrate examples of teachers who are more self-actualized and demonstrate a strong sense of efficacy.

This is problematic, because in order to fully understand the meaning of educational change, we “must come to understand the small and big pictures” (Fullan, 2007, p. 8) of the meanings of change. The extant research of one-to-one initiatives has

examined the larger picture of barriers and impacts of the more typical cases of top-down one-to-one initiatives. Less understood is the essence of teachers' experiences when they self-initiate a one-to-one technology program and then integrate that technology in their classrooms. The experience of self-actualized teachers, who initiate and implement bottom-up change represent a contrasting experience to the more typical, top-down approach to technology integration. A rich portrait of an atypical case, one which does not conform to the typical phenomenon, can help illuminate unknown or atypical experiences (Stake, 2000; Yin, 2008) and may help spotlight non-obvious, but essential, experiences (Abramson, 1992) of one-to-one initiatives.

The research in this study addressed this gap in literature by examining a one-to-one initiative from conception through implementation, as conceived and implemented by teachers. It examined perceptions and lived experiences of middle school social studies teachers who experience the phenomenon of conceptualizing and implementing a one-to-one program for tablet technology in their classrooms.

Statement of Purpose

The purpose of this research study was to acquire a better understanding of the lived experiences of middle school social studies teachers who integrated one-to-one mobile technology into their classrooms. This study examined individual teacher perceptions of the process of technology integration in the social studies classroom, from conception of the project through the first two years of integration. Typically, one-to-one programs are initiated with a top-down approach to change. In this study, the teachers represented a unique case, teachers who self-initiate a one-to-one tablet

program without the directive of a district or administrator. This research used the case study method to contextualize and describe the boundary of the phenomenon under study. Phenomenology was used as an interpretive lens to analyze the data. This research was framed in literature which examined the role of technology in social studies; the complex relationship between context, teacher beliefs and technological, pedagogical, and content knowledge (TPACK) as epistemology and practice when using one-to-one technology, and the importance of teacher voice and phenomenological research in educational technology studies.

Research Questions

The study's purpose, to acquire a better understanding of the experiences of middle school social studies teachers who are integrating one-to-one tablet based technology into their classrooms, yielded the following question: How do two selected middle school social studies teachers perceive and describe the experience of conceptualizing and implementing a one-to-one program for tablet technology in their classrooms?

The sub-questions addressed in this study were:

- a. How do selected middle school social studies teachers perceive and describe their experiences initiating a one-to-one program in their classrooms?
- b. How do selected middle school social studies teachers perceive and describe their experiences in integrating the technology into their classrooms?

Overview of Methodology

This research used case study to bound the phenomenon under study, and then utilized phenomenology to analyze the phenomenon under study. Case study, as defined by Miles and Huberman (1994), is “a phenomenon of some sort occurring in a bounded context” (p. 25) and the phenomenon under study was analyzed utilizing the lens of phenomenological methodology. Phenomenology seeks to describe the essential reality of an experience. The epistemological match between phenomenology’s grounding of understanding in perception, and the research questions asked in this study regarding perceptions and lived experiences of teachers, made phenomenology the appropriate method for analyzing the data.

Significance

This study concluded that successful implementation and integration of a teacher-led one-to-one program in social studies occurred at a confluence of complex factors. At the essence of the experience of teacher-led implementation and integration of one-to-one technology in social studies classrooms was teachers’ longstanding positive beliefs about technology, the teachers’ belief in themselves as professionals with agency, teachers’ relationship with the larger school district, and the transformation of pedagogy through technology which ultimately fostered student agency and autonomy. If technology is to support meaningful pedagogical change in classrooms, teachers need to be given time, support, and trust to build positive beliefs about technology and a strong professional identity.

Significance for Research

This study contributed to the emerging research agenda on one-to-one technology in social studies by using case study design to draw a rich narrative of social studies teachers' holistic experience initiating and implementing one-to-one technology in their classrooms. Further, it utilized phenomenological reduction in order to highlight essential experiences of teachers implementing one-to-one technology in social studies. It found that empowered teachers use their technological knowledge to make pedagogical shifts toward inquiry-based student learning. It extended understanding of the role of teacher belief in technology integration by suggesting that positive teacher beliefs about technology *and* positive teacher beliefs about professional agency are essential to one-to-one technology integration. It helped re-introduce teacher voice as essential to research on one-to-one technology integration by finding that an essential theme of teachers' experience integrating one-to-one technology was the underlying tension teachers experienced with their district, not with the technology itself. It argued that a modified version of TPACK, meant to more fully capture the synergies between teacher beliefs *and* the interaction with administration and district goals can serve as a holistic framework to analyze technology integration in social studies. Finally, it painted a picture of the upper bounds of what one-to-one technology integration in social studies looks like by examining an atypical case of teachers who demonstrated a proclivity for technology and agency in creating their own programmatic changes.

Significance for Policy and Practice

Building positive beliefs about technology and teacher agency occurs long before a technological initiative is conceived. Policy makers and practitioners can support development of positive teacher beliefs and work to ensure the success of their one-to-one initiatives by committing to capacity building well in advance of technology initiatives. In addition, they must recognize the situative nature of technology integration when designing professional development. This means professional development should provide teachers with opportunities to take risks with technology, opportunities to work with fellow teachers, and honors teacher voice and existing beliefs. Finally, the district can support teachers' positive beliefs about technology by demonstrating a level of trust with their teachers. Policy should be created which empowers teachers, specifically by limiting the levels of bureaucracy with which a teacher must interact and by facilitating principal trust of teachers within the classroom and school community.

One-to-one integration should be deployed in a way that honors teacher voice, established beliefs, and the realities of their daily lives within the classroom. When integrated under these conditions, it is possible that teachers ultimately feel empowered because of their experiences with the technology. It is then possible that teachers allow their students the same trust, time, and honor of their voices and daily lives. When that occurs, students are empowered to make their own meaning and perspectives in knowledge creation. In all instruction, but especially in social studies instruction, teachers need to foster a sense of agency in learners in order to encourage them to believe that they can be active citizens for change (NCSS, 2014). Thoughtful one-to-

one integration in social studies classrooms can help achieve that goal, especially in the ways that it supports inquiry based pedagogy.

Definition of Terms

Mobile Learning

Mobile learning emphasizes the unique attributes which distinguish it from formal learning. This includes a recognition of mobile learning as informal, personal, and contextual. These attributes stem from learning which uses mobile technology to both access knowledge and create knowledge in an anytime, anywhere, environment (Traxler, 2007).

Mobile Technology

Mobile technologies refer to technology which negates a need for a physical setting in order to create a community or group of connected people. It affords new ways of accessing and interacting with knowledge by weaving access to information throughout public and private times in the user's life (Traxler, 2007).

One-to-One Technology

One-to-one technology is characterized by each student and teacher having access to a technological device. This access can be ubiquitous throughout the school day, or the device may be more mobile (i.e. a laptop or tablet) in that the student takes the device home at the end of the day (Inserra & Short, 2012-2013; Penuel, 2006). The device has wireless connectivity to the internet and to a local network (Penuel, 2006).

Delimitations

This study was delimited by the unique boundaries of the case under study. The teachers who experienced the phenomenon of teacher initiated one-to-one program in their middle school social studies classrooms defined the boundary of the case. This study drew a rich picture of teacher beliefs in order to highlight important and useful differences from a traditional, top down, one-to-one initiative. Thus, the selection criteria for inclusion in this study was that the teachers conceptualized and then implemented one to one mobile tablet technology in their classroom. They implemented this change without a directive from administration.

In addition to the boundaries of the case, the study was delimited by time and location. The school was located in a large urban-suburban district which serves over 100,000 students in the mid-Atlantic region. While located in a suburban county, the school in the study shared a boundary with a large mid-Atlantic city.

Organization of the Study

The remainder of this study is organized into five chapters, a bibliography, and appendices. Chapter Two critically examines the current literature on one-to-one mobile technology initiatives and in particular the integration of these initiatives into social studies in order to understand how technology is currently used and researched in the field. Chapter Three delineates the research design and examines the epistemology and methodology of both case study and phenomenology research. Chapter Four analyzes the findings of the data collection, and Chapter Five discusses and synthesizes the research by identifying conclusions and suggestions for future research.

Chapter Two

Review of Literature

This review critically examines the current literature on one-to-one mobile technology initiatives in education. It focuses particular attention on these integration initiatives in social studies education in order to understand how technology is currently used and researched in the field. The review surveys the proposed theories and research trends which frame the analysis of technology integration in social studies education. Next, the review defines one-to-one technology and examines emerging research agendas of one-to-one initiatives, as well as teacher perceptions and beliefs about technology and one-to-one initiatives. The review examines the emergence of Technological Pedagogical and Content Knowledge (TPACK) as a useful and often used framework for analysis of technology integration in education and social studies. Finally, the review synthesizes these bodies of literature to argue that: 1) there is a need to research one-to-one technology in social studies, 2) there is a need to more deeply study teacher perceptions of the phenomenon of teaching with technology, and 3) there is a need to examine atypical and distinctive cases of one-to-one mobile technology integration.

Background and Rationale

The overarching goal of social studies education in the United States is to develop the “knowledge, intellectual processes, and democratic dispositions” for effective citizenship (NCSS, 2014). This goal marries well with call for students to develop 21st century thinking and learning skills (Kereluik, Mishra, Fahnoe, & Terry,

2103). Both skill sets demand the ability to think critically, to argue logically, to develop empathy for the human experience, to work collaboratively, and to become an active participant in the local, national, and global community (Kereluik et al., 2103; NCSS, 2014). The National Council for the Social Studies (NCSS) has recognized that an inquiry approach to instruction leads to the development of the skills necessary for effective citizenship. In 2013, NCSS introduced the Career, College, and Civic Life (C3) Framework meant to provide a suggested overall inquiry-based method for social studies instruction (The National Council of the Social Studies, 2013). Technology integration and social studies education share educational goals, and technology integration should happen consistently in order to support the desired outcomes. This argument is effectively summarized by the National Council of the Social Studies' (NCSS) most recent position statement on technology which concludes:

Technological change has proven one of the few constants of the early 21st century, providing social studies educators with the challenge and opportunity of preparing digital citizens in a global setting. This requires rethinking the type of social studies learning necessary in the 21st century. As the National Academies concluded in the Education for Life and Work report, “the process of deeper learning is essential for the development of transferable 21st century competencies” and “the application of 21st century competencies in turn supports the process of deeper learning, in a recursive, mutually reinforcing cycle. (NCSS Board of Directors, 2013)

Despite this recent call for meaningful technology integration in social studies, technology in social studies still remains what Martorella (1997, p. 511) called a

“sleeping giant” (Friedman, 2014). To understand this seeming reluctance to embrace technology in the field of social studies, it is critical to evaluate existing research that examines technology integration in social studies.

Concurrent with technology integration in the field of social studies is the growing trend of one-to-one mobile technology initiatives in public schools (Friedman, 2014; Friedman & Hicks, 2006; Penuel, 2006; van Hover, Berson, Bolick & Swan, 2004). Since the first attempt at ubiquitous computing during the 1980s with the Apple Classrooms of Tomorrow (ACOT) (Ringstaff, 1990) through statewide initiatives in the 1990s (State of Maine, 2001), to the more recent Bring Your Own Device (BYOD) and mobile one-to-one initiatives, one-to-one technology is a quickly growing movement in education (New Media Consortium, 2015). Wholly apart from social studies and technology integration, one-to-one mobile technology initiatives have spawned their own growing bodies of literature (Penuel, 2006; Traxler, 2010). There has been a particular request in social studies technology research to examine one-to-one initiatives concurrent with their implementation (Friedman & Hicks, 2006; Friedman, 2014). Scholars have lamented the field’s tendency to offer retrospective examinations of what “could have been” in social studies technology integration, if only research had only kept apace of technology trends (Friedman, 2014). To address this need, a call has been made for research that adheres to a more cohesive research agenda, which is pro-active and specific to one-to-one integration in social studies instead of re-active and disconnected in nature (Friedman, 2014).

Exploration of the existing research of one-to-one initiatives and social studies education, with a particular emphasis on teacher beliefs and perceptions of technology,

forms the rationale for this literature review. Thus, this review critically examines the current literature on one-to-one mobile technology initiatives, and in particular the integration of these initiatives into social studies, in order to understand how technology is currently used and researched in the field.

Methodology

This review used Education Research Complete and ERIC (EBSCO) databases to identify peer-reviewed research on technology integration in social studies. To examine one-to-one research in social studies, the search string utilized was “social studies” and “one to one OR 1:1 OR one-to-one” and “technology.” This yielded 320 results. When adding the exclusion criteria of “higher education or college or university,” the search produced 78 results. The result list of 78 works was analyzed for the inclusion criteria. Articles that utilized one-to-one to mean tutoring or direct instruction were eliminated. Articles which referred to social science were also eliminated. This led to seven remaining articles on one-to-one technology integration in social studies.

The few studies on one-to-one technology in social studies did not provide enough context for the experience of one-to-one technology in social studies. Thus, to more deeply explore this phenomenon, the review also examined technology integration in social studies more broadly. The initial search string for social studies technology integration was “social studies” and “technology integration.” This yielded over 600 works. To further focus the search on in-service social studies technology integration instead of pre-service integration, the search string was amended to exclude “higher

education OR college OR university.” This yielded 145 peer reviewed articles and books. The abstracts were then reviewed to check for relevance to the inclusion criteria. This further narrowed the research to 58 works that were read and analyzed for the review.

Broader research on one-to-one initiatives and perceptions and beliefs of technology was accessed by using the search string “one to one OR 1:1 OR one-to-one” and “teacher beliefs OR perceptions OR attitudes” and “technology” and “education.” This yielded over 2000 results. The search was run again with NOT “higher education OR college OR university” and NOT “parent” added to the search string in order to remove studies exploring higher education attitudes toward technology. The string of NOT “student” was applied, but then removed, as this excluded studies that included both teacher and student perceptions. This then yielded a result of 183 peer reviewed studies. After reviewing abstracts for inclusion criteria, and to remove studies that only examined student perception, the final number of studies included in this portion of the review was 42.

Finally, in order to analyze phenomenology as a methodology for studying perceptions and beliefs about technology, the search string, “phenomenology” AND “technology or technology education OR technology integration” AND “teacher” yielded 43 peer reviewed references. After a review of each article, 13 utilized phenomenology either as a sole methodology or as a methodological lens for interpretation of some phenomenon related to technology integration in P-12 schooling or pre-service teacher preparation. Of those 13 articles, only three directly examined teacher perceptions of technology in their P-12 classroom, and two examined teacher

perceptions of one-to-one technology integration in classrooms, of those two, only one article was published in a peer-reviewed journal. The other phenomenological study examining teacher perceptions in a one-to-one environment was a dissertation published in ProQuest's dissertation database.

Findings

This review of literature identifies what the field already understands about one-to-one technology initiatives in social studies. The inclusion and exclusion criteria for the literature included in this review yielded seven studies that explicitly examined social studies and one-to-one technology integration. Because of the lack of research on one-to-one initiatives in social studies, the literature review more broadly explored the ways in which technology has been integrated in social studies. The review then identified current research in one-to-one technology initiatives in order to contextualize the social studies initiatives in the broader research.

One-to-One Research in Social Studies

Despite the existence of one-to-one computing since the Apple Classrooms of Tomorrow (ACOT) initiative of the 1980s (Ringstaff, 1991), only seven studies (see Table 1) have specifically examined one-to-one technology in social studies. Of these seven studies, one (Farisi, 2016) is a literature review which summarized technology in social studies and points to the potentiality of one-to-one in the field. Two of the studies (Johnson, 2013; Scheuerell & Jaeger, 2015) utilized action research methodology and situated themselves as practitioner based research which reflects on practices specific to their classrooms. Johnson (2013) determined that blended instruction was superior to

fully one-to-one or traditional methods of instruction in her classroom. Scheuerell and Jaeger (2015) made specific recommendations for best practices when teaching African American History utilizing one-to-one technology. Scheuerell & Jaeger (2015) suggested using digital history archives to research and critically examine African American History.

The remaining studies concluded that teachers' beliefs about pedagogy and technology are connected to the ways in which teachers use technology (Beeson, Journell, & Ayers, 2014), but classroom instruction remains mostly transmission in nature before and after a one-to-one social studies initiative (Oliver & Corn, 2008). Inserra and Short (2013) suggested that disciplines which utilize more constructivist pedagogy before one-to-one use more constructivist pedagogy after one-to-one technology is integrated in the classroom. In addition, Lin, Wong, and Shao (2012) asserted that in a middle school social studies classroom, one-to-one learning leads to higher retention than one-to-many; however, one-to-one leads to less group collaboration than one-to-many. This thin research supports Friedman's (2014) critique that social studies needs more pro-active, holistic, and discipline specific research on one-to-one technology.

Authors	Methodology	Topic(s) of Study	Findings
Beeson, Journell, & Ayers (2014)	Qualitative: Case Study with "Models of Wisdom" Approach	• High school civics teachers • TPACK • 1:1 laptops	Teachers' beliefs about pedagogy and technology are connected to ways in which they use technology in classrooms

Farisi (2016)	Literature Review	• Social Studies and 21st c. skills	Social studies has argued for more inclusion of technology. The field should benefit from technology integration, but it is slow to incorporate technology.
Inserra & Short (2013)	Quantitative: Self-reported Survey	• High school teachers • Relationship between pedagogical practices and 1:1 computing	Social studies teachers use more constructivist pedagogy than math teachers in a 1:1 environment
Johnson, A. (2013)	Action Research	• Middle School Teachers • Efficacy of 1:1 versus hybrid versus traditional instruction	Hybrid instruction was most effective for one teacher's students.
Lin, Wong, & Shao (2012)	Quantitative: Quasi-experimental	• Middle School Social Studies Teachers • Efficacy of 1:1 versus 1:many • Collaborative Concept Mapping	1:1 learning leads to higher retention than 1:many; however, 1:1 leads to less group collaboration than 1:many
Oliver & Corn (2008)	Mixed Method: Self-reported Survey and Interview	• Private middle school students • Technology skills • Classroom structures	Direct instruction remained the primary method of instruction before and after 1:1 initiative. Collaborative learning did not increase.
Scheuerell & Jaeger (2015)	Not specified; Practitioner Based	• High school students	Makes recommendations for best practices

		• African American history • 1:1 laptop program	when teaching African American History. Suggests using digital history to research and critically examine African American History
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Table 1. Studies examining one-to-one technology in social studies

Technology Integration in Social Studies

The lack of research on one-to-one technology initiatives in social studies led to a deeper exploration of technology initiatives more broadly in social studies.

Technology research in social studies has developed its own theoretical discourse unique to the field of social studies education. This discourse attempts to ground social studies technology integration in a clear paradigm, and as such, also sounds the call for new research agendas. The research agendas and trends are also examined here.

Theoretical Discourse. Considered the field's foundational piece, Martorella's (1997) article, *Technology and the Social Studies - or: Which way to the Sleeping Giant*, continues to be widely cited as an example of the untapped potentialities of technology and social studies. By identifying the themes of Computer as Alter Ego, Computer as Citizenship Educator, Computer as School, and Computer as Data Gatherer, Martorella set in motion a framework for analysis of technology in social studies education. Deterministic language aside, his illustrations for each theme have turned out to be particularly prescient. For example, to illustrate "Computer as Citizenship Educator" he asks, "What computer-related skills are required for accessing and interpreting data for

political decision making?” (Martorella, 1997, p. 513). These sentiments continue to be echoed today in concerns about digital citizenship and the 21st century learner (Kereluik et al., 2013). He also asked, under the themes “Computer as Workplace” and “Computer as School,” whether we should consider the possibility that in the future technology may help us find virtual alternatives to a traditional brick and mortar school.

Beyond his predictions about technology in the social studies, Martorella (1997) also astutely pointed to an ironic meta-perspective in which students of social studies will study the interconnected nature of humans by using the very technology that makes us even more interconnected. Both this final observation, as well as his more often cited Computer as Alter-Ego, Citizenship Educator, Workplace, School, and Data-Gatherer framework, led him to end his article with a call for more research on the relationship between technology and social studies as well as this final sentence, “Wake the giant!”

Martorella’s sleeping giant metaphor has become a ubiquitous force throughout subsequent articles exploring technology integration in social studies, many of which wryly note how awfully tired that giant seems to be (Doolittle & Hicks, 2003; Friedman, 2014). Three years after Martorella, Diem reviewed the literature on technology and social studies and came to this conclusion:

In order to make substantive generalizations about the effect that technology has on social studies learning, researchers need to go beyond these singular social studies constructs. They must begin to describe the holistic effects of technology on the social studies if technology is to be taken seriously as an important tool in social studies education. (2000, p. 498)

By 2003, little had changed in research, despite Diem's (2000) and Martorella's (1997) influential pieces. Doolittle and Hicks (2003) continued to criticize the lack of effective research in technology integration in social studies and called it a "traditionally theoretically underdeveloped" (2003, p. 72) area of research. They suggested framing technology integration through the framework of constructivism. They argued that this served not only as a novel way to evaluate technology integration, but also as an important and necessary methodological choice for social studies educators in general. This problem is important to note. Many social studies teachers employ a transmission of knowledge approach to teaching (Crocco, 2001; Doolittle & Hicks, 2003; Dunn, 2000; Hope, 1996), making constructivist teaching of any type a difficult endeavor. Finally, Doolittle and Hicks (2003) closed their article with an increasingly familiar call:

Social studies educators are at play in the fields of technology, which results in a disjointed collection of technological integration efforts. In our enthusiasm, we may have side-stepped, or merely paid lip service to, the need for a clear foundation. Specifically, the use of technology in social studies needs to be grounded philosophically, theoretically, and pedagogically. A grounded framework for implementing technology in social studies is necessary for advancing the social studies beyond vacuous memorization into the realm of active inquiry, perspective taking, and meaning making. (pp. 96-97)

A year later, Berson and Balyta (2004) noted almost the exact same sentiment. They referenced Martorella and, like the other scholars before them, complained that, "We have lacked universal constructs regarding the integration of technology into the

social studies and struggled to identify a theoretical basis to guide the selection and application of technology in the classroom” (Berson & Balyta, 2004, p. 148).

Since that article, several key scholars in the field have offered frameworks to ground technology integration in the social studies in relevant theories. Diem (2006) suggested that the field view the purpose of social studies instruction on a continuum of instructional goals of citizenship ranging from “Instruction for Conformity” to “Instruction for Information” to “Instruction for Reason” to “Instruction and the Individual.” He concluded that technology could support all of those goals, but that encouraging conformity, either explicitly or implicitly, divested the learner of critical and individual thought (Diem, 2006). Thus, while he offered a framework for understanding social studies pedagogy and technology, Diem (2006) is also the first to offer a caution that technology used to further traditional transmission type instruction is worse than simply poor teaching, but is, in fact, damaging to the learner and to democracy.

Beyond encouraging critical citizens, one of the goals of social studies is to foster a sense of agency in learners in order to encourage them to believe that they can be active citizens for change (NCSS, 2014). Waring (2006) argued that the participatory and interconnected nature of the Internet could be harnessed by social studies teachers in order to help students develop their own sense of agency. Additionally, the increased digitization of primary source documents has led to unprecedented access to historical sources. This has democratized access to information, allowing teachers to more easily craft lessons in which students can “do” history by accessing this previously inaccessible information (NCSS, 2013).

In its recent position statement on technology, NCSS (2013) reiterated these goals by arguing for a more participatory use of mobile digital technology. NCSS argued that social studies educators have a distinct responsibility to help children harness the affordances of mobile technologies to engage themselves more deeply as citizens of the democratic process. The importance of media literacy in order to navigate mobile technology and social media in order to develop participatory culture (Jenkins, 2006) remains, in terms of paradigms and theory development, in its infancy (Mason & Metzger, 2012).

Finally, with the evolution of one-to-one technology, there has been a particular request in social studies technology research to proactively examine one-to-one initiatives in their implementation phase (Friedman & Hicks, 2006; Friedman, 2014). Beck and Eno (2012) completed a critical review of the literature and concluded that one-to-one technology could be the technology which serves as a “bridge” to inquiry-based education. Without proactive research, practice fails to be influenced by scholarship and results in fragmented efforts at effective technology integration. Scholars have criticized the field’s tendency to offer reactive and retrospective examinations of what “could have been” in social studies technology integration, if only research had only kept apace of technology trends (Friedman, 2014).

Research which examines specific technologies in social studies. A majority of the research on technology in social studies examines a specific intervention and the ways in which it is utilized in social studies classrooms. The technologies examined in literature include digital story telling, augmented reality and virtual field trips, Geographic Information Systems (GIS), online discussions, and web 2.0 and other social

media tools. Also examined in literature were the ways in which access to global news sources and digital archives impacted social studies instruction. Doolittle and Hicks (2003) offer a caution when considering specific technologies, instead of the holistic picture of technology in social studies:

If integrating technology means nothing more than enhancing the traditional delivery system of social studies content, where laptops replace notebooks, where PowerPoint slides replace handwritten overheads, where e-textbooks replace hard copy textbooks, then we will be no closer to the NCSS vision of transformative, powerful social studies instruction. (p.75)

Digital storytelling may offer an opportunity for students to realize their own voice and agency for change as they use the medium to document and explore the ideas of culture, cultural diversity, and cultural identity (Fitts & Gross, 2015). Hofer and Swan (2006) used case study to research connections between digital documentary creation, NCSS standards, and teacher pedagogy and beliefs. They determined that while this activity addressed NCSS standards, it was still perceived as an activity, not an integration to the existing curriculum (Hofer & Swan, 2006). In addition, the teacher in the study faced significant technological hurdles which extended the time which had been allotted for the project. The teacher in the study also demonstrated a belief in instruction grounded in her authority on content and her role in leading students to understand content. This belief put her at odds with pedagogical practices which afforded students a significant degree of autonomy (Hofer & Swan, 2006). As Hofer and Swan (2006) explained, “what became clear throughout the two-week experience is that Jenny did have a pedagogical comfort zone, and this historical documentary project

took her outside of it” (p. 54). Ultimately, the researchers concluded that, given the realities of a classroom, including technological barriers and teacher pedagogical beliefs, technology integration in social studies may need to be more incremental than transformational (Hofer & Swan, 2006).

Another use of technology in social studies is through virtual field trips and augmented reality field trips. Sherman and Hicks (2000) suggested that virtual field trips and augmented reality can enhance student understanding of the NCSS content themes of Time, Continuity, and Change; People, Places, and Environment; and Civic Ideals and Practices. Sherman & Hicks (2000) also noted the advantages of small learning communities of teachers who shared ideas about best practices for implementation of the project. However, like Hofer and Swan’s (2006) study of digital movie making, this use of technology is in addition to the curriculum, instead of integrated in the curriculum. Further, Stoddard (2009) reported that teachers usually implement virtual field trips through transmission based models of knowledge acquisition. Virtual field trips could serve as a way to develop inquiry and a potential for life-long learning, but they need to be implemented with more intentionally student-centered inquiry (Stoddard, 2009).

The literature also argues that technology in social studies mirror technology in the field of social sciences (Alibrandi, & Palmer-Moloney, 2001). GIS tools integrated into social studies classrooms could model discipline specific uses of technology (Alibrandi, & Palmer-Moloney, 2001). Additionally, as geo-spacial tools become easier to access through mobile devices and online databases, they have more potential to be utilized in classrooms (Hammond, 2014).

Social studies may benefit from online forums for discussion (Larson & Keiper, 2002) and Web 2.0 tools (Diacapoulos, 2015; Krutka & Carpenter, 2016). Threaded discussions have been used to allow more quiet students an opportunity to express opinions (Larson & Keiper, 2002), but the same study noted that threaded discussions seem less effective than classroom discussion when teaching how to interact with those who hold differing opinions. Larson and Keiper (2002) noted that this has implications for social studies education, since the goal of social studies is to educate students for democratic citizenship.

Social media may further the goal of educating students for democratic citizenship and might promote some form of participatory learning (Krutka & Carpenter, 2016). Web 2.0 tools such as Edmodo have the potential to augment social studies instruction when teachers work in professional learning communities to practice their implementation and align implementation with NCSS goals (Diacapoulos, 2015). Twitter is being used by social studies teachers to engage with each other and with their students (Krutka & Carpenter, 2016). Additionally, teachers use Twitter to quickly and informally assess student learning and to communicate with students in an anytime, anywhere, medium (Krutka & Carpenter, 2016). Krutka and Carpenter (2016) concluded that Twitter, and other similar social media platforms, have the potential to transform instruction, but that it will require intentional work on the part of teachers in order to do so. This echoes findings from Bull, Hammond, and Ferster (2008) who noted that Web 2.0 tools developed specifically for history still needed thoughtful teacher implementation in order to transform pedagogy and student learning.

Finally, technology is used to access digital archives and databases for historical inquiry lesson plans (Milman & Bondie, 2012; Salinas, Bellows, & Liaw, 2011). Teachers spend a significant amount of time searching for effective digital sources, but very little time modeling or teaching students how to utilize the sources (Milman & Bondie, 2012). In deciding which sources to choose, teachers demonstrate a complex process of teacher decision making practices (Salinas, Bellows, & Liaw, 2011). This pointed to a need for professional development which specifically addressed the content needs as well as the pedagogical historical thinking skills needed for effective social studies instruction, particular when teachers were confronted with the overwhelming resources on the internet (Salinas, Bellows, & Liaw, 2011).

Research which examines holistic practice. Because of the calls for research that addresses the complex nature of schools, the affordances of technology in encouraging constructivist learning, and the possibilities for technology to encourage participatory citizenship (Diem, 2000, 2006; Doolittle & Hicks, 2003; Friedman, 2014; Friedman & Hicks, 2006), social studies technology research has been working towards more complex and clear research agendas. Several studies have considered teacher perception of technology as part of the complex whole of technology integration (Doppen, 2004; Gulbahar & Guven, 2008; Sheffeld, 2011; Shifflet & Weilbacher, 2015). Collectively, these studies found that teachers believed in the importance of technology, but failed to implement it regularly (Sheffield, 2011, Shifflet & Weilbacher, 2015) because of a lack of access and a lack of effective professional development (Doppen, 2004; Gulbahar & Guven, 2008).

Doppen (2004) followed four novice social studies teachers through their first year of teaching in order to explore how they integrated technology in their classrooms, specifically through ways that they utilized technology to encourage historical thinking skills. Using a case study approach, Doppen (2004) found that the technology integration of the four teachers in the study was specifically influenced by their teacher preparation program, their belief in their own self-efficacy, and their students' dispositions. In particular, the teachers found it difficult to teach the concepts of historical thinking skills, and found that they were sometimes even more difficult to teach using technology; however, Doppen (2004) concluded that in utilizing technology to teach historical thinking skills, teachers developed new pedagogical practices.

Sheffield (2011) also used case study to explore middle school teachers' use of technology in their social studies classrooms. To establish parameters for the case, Sheffield (2011) surveyed 27 social studies teachers at three middle schools in Florida. Following the survey, teachers were invited to participate in the study. The case study followed 10 teachers to explore how they integrated technology in their classrooms and what factors influenced their decisions to use technology. Findings from this study indicate that teachers may believe in the power of technology to change practice, but they may still fail to integrate technology in constructivist ways. In Sheffield's (2011) study, the teachers tended to utilize technology to further transmission based instruction, despite professed beliefs in the necessity of technology. Sheffield (2011) argued that multiple factors influence technology integration, including teacher beliefs about technology, pedagogy, and access to functioning technology.

These studies (Doppen, 2004; Sheffield, 2011) suggest that a link exists between technology integration and teachers' perceptions about teaching and learning as expressed through their philosophies of education. Teachers with a more managerial and transmission based philosophy of education failed to integrate technology in constructivist ways (Sheffield, 2011), while those teachers who subscribed to a constructivist paradigm intentionally incorporated technology to support inquiry-based learning (Doppen, 2004; Sheffield, 2011). These findings reinforce Cuban's (2001) assertions that technology is a tool whose use depends upon a teacher's beliefs, but it will not alter a teacher's beliefs.

Extending this understanding of teacher beliefs, Shifflet and Weilbacher (2015) case study research of two teachers found that social studies teachers who believed in the value of technology viewed themselves as essential to the learning process, because they saw technology as a tool which facilitated learning. Specifically, the teachers believed that technology was a tool which could foster critical thinking, foster autonomous learning, and develop skills for citizenship. An additional finding of the literature is teacher expectations that "digital native" students will be able to transfer their technology skills to the classroom (Shifflet & Weilbacher, 2015). This study found that students asked for assistance from teachers for fact finding information such as "Where is X country in the world?" or "How do I spell (a certain vocabulary word)." Teachers in the study reminded the students that they could easily google the information, and the teachers reported surprise that the students regularly failed to consider the wealth of information readily available to them via the internet (Shifflet & Weilbacher, 2015).

Important conclusions from the research point to a complex relationship among a teacher's philosophy of social studies instruction, self-efficacy, teacher preparation program, familiarity with pedagogy, and familiarity with content area. These are all contributing factors to technology integration. Doppen (2004) asserts that:

...social studies teachers need many opportunities to reconcile their beliefs about history pedagogy, history content, and classroom management/discipline issues with technology integration, exploring a variety of ways to integrate technology in a manner that works best for them and is sustainable in their school setting. (p. 273)

Additionally, Doppen (2004) noted that of particular consideration when analyzing the context of social studies is that social studies is not always a curricular priority for schools or systems, which can mean less funding and resources for technology in social studies. This is reinforced by Sheffield's (2011) findings that teachers report feeling inhibited by the demands of high-stakes testing and thus limit their integration of technology.

One-to-One Mobile Technology Initiatives

The call for greater research on technology, and specifically one-to-one technology, in social studies takes place within the greater context of research on technology in education. In an effort to reform teaching and learning and encourage it to be more constructivist in nature, school districts have been implementing one-to-one technology initiatives since the mid-1980s. The first one-to-one ubiquitous computing attempt in education was through public school participation in Apple Classrooms of

Tomorrow (ACOT) (Ringstaff, 1991). In the mid-1990s, the one-to-one movement expanded through several statewide initiatives including Maine and Georgia (Garthwait & Weller, 2005; Penuel, 2006; State of Maine, 2001). The initial efforts provided a desktop for each student or a laptop with limited connectivity (Chang et al., 1998; Penuel, 2006). With the advent of wireless capabilities at the turn of the 21st century, the definition of one-to-one technology evolved to mean near ubiquitous access to online resources and communications via a personal technological device (Inserra & Short, 2012-2013; Penuel, 2006). Though technology evolved, the rationale for these initiatives remained consistent, using one or more of four overarching goals: (1) improving student achievement through technology, (2) reducing the digital divide, (3) increasing the economic competitiveness of a region, and (4) transforming instruction to a more constructivist approach (Penuel, 2006).

By the early 21st century, innovations in technology led to the evolution of handheld devices as a distinctly different type of one-to-one technology than the desktop or laptop (Traxler, 2007). While there is a tendency to define mobile learning with respect to the technology (i.e. smartphones, tablets, PDAs), this techno-centric approach limits the definition to a fixed point in time of innovation (Traxler, 2007). Instead, mobile technology should be considered within the context of its affordances for the learner and for society.

These devices provide users new ways of accessing and interacting with knowledge by weaving access throughout public and private times and places in user's lives (Traxler, 2007; 2010). Mobile devices negate the need for a physical setting in order to create a community or group of connected people. They also facilitate transient

communities that self-create on an as-needed basis, such as for a particular social or political issue (Traxler, 2010). Users of mobile devices can easily consume knowledge through multi-media, but they can also easily capture and create multi-media knowledge, immediately sharing this with their communities (Traxler, 2010).

One-to-one initiatives with mobile technology are a specific type of one-to-one program. One-to-one mobile technology is often less expensive than traditional laptops or desktops. In addition, these initiatives seek to harness the affordances of mobile technology for each student and teacher by providing them with a mobile device. This device is itself physically easy to access and can in turn easily access the network of other devices across the globe.

Emerging Research Agendas for One-to-One Initiatives

The ever-evolving nature of technologies and their affordances provides a challenge to researchers, but it also suggests the need for new methodologies of research that account for the ever present “work-in-progress” nature of rapidly changing technologies and initiatives (Zucker, 2004). This call for new methodologies mirrors similar movements across technology integration research (i.e., Clark, 1983; Cuban, 2001; Kozma, 1991). Zucker (2004) published a theoretical article arguing for a specific research agenda that prioritized certain questions and methodologies. Expressing concern that research is not keeping pace with policymakers’ and practitioners’ need for guidance, he suggested an overarching research framework in which to situate and unify different one-to-one research studies (Figure 1).

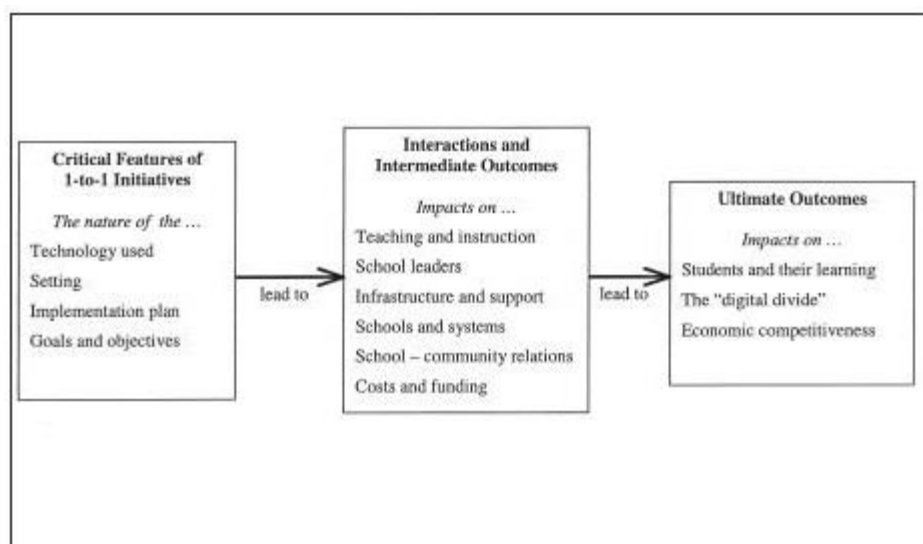


Figure 1. Zucker's (2004) framework for research on one-to-one computing

Each portion of the framework--Critical Features of One-to-One Initiatives, Interactions and Intermediate Outcomes, and Ultimate Outcomes--included suggested research topics and questions. Though Zucker's (2004) framework recognized that the ultimate goals of one-to-one initiatives are student performance outcomes, he was careful to note that:

...Research that focuses on the ultimate outcomes of 1:1 computing is not the only high priority. Proponents of the most rigorous, experimental studies focusing on student achievement agree that understanding *why* certain outcomes occur is important... In other words, research needs to focus on *how* teachers and students work with computers, not just the results of their efforts. (p. 375)

This emphasis on the understanding the how and why of one-to-one initiatives translates particularly well into qualitative research which is designed with these questions in mind (Creswell, 2013).

Beyond the need for more rigorous qualitative research, Zucker (2004) also noted the need for comprehensive reviews of literature. In 2006, Penuel synthesized research on one-to-one initiatives and determined that outcome studies, though important, were still difficult to craft in methodology, and were the rarest type of research. He critiqued the large body of research that failed to specify the goals of the initiatives that were being studied, arguing that without this relevant information, the research may be of limited value for policymakers and practitioners. This echoes Zucker's (2004) attempt to include ultimate goals and outcomes as part of his proposed one-to-one research agenda (see Figure 1). However, Penuel (2006) noted that a complicated relationship existed between "social, pedagogical, and technological elements, and program designers must constantly adapt and reconfigure these elements as programs evolve" (p. 342). Much like Zucker's (2004) hope for more "how" and "why" research, Penuel's (2006) call for more research into the complicated relationship of pedagogy, technology, and social influences, is well suited for qualitative research. Overall, there is a need for researchers to also acknowledge this complex relationship and consider a qualitative approach to describing the how and why of this complex phenomenon.

Barriers and Supports to One-to-One Initiatives

One way to address the complex relationship between pedagogy, beliefs, and technology integration is through an examination of perceptions and beliefs about technology, and the technology itself, as potential barriers to effective one-to-one technology integration. A robust body of literature exists, which examines technology initiatives and reports out on the barriers to technology implementation (i.e. Guha, 2003;

Hill, Reeves, Wang, Han, & Mobley, 2003; Lowther, Inan, Ross, & Strahl, 2012; Ringstaff, 1991); however, a growing body of research specifically examines underlying teacher epistemologies and philosophies of education, influenced by beliefs about technology and influencing teacher practice (Ertmer, 1999, 2005; Ottenbreit-Leftwich et al., 2011). The first body of literature includes references to extrinsic barriers to technology implementation including: access to technology, properly functioning technology (Ringstaff, 1991), lack of resources, and lack technical support (Stanhope & Corn, 2014).

The second body of literature examines the understanding that teacher beliefs are central to a successful change process (Fullan, 2007). Often, teachers are ignored and voices silenced in educational discourse (Giroux, 1998, 2005; Hargreaves, 1996). A failure to include teachers' voices in school reform and change often leads to reform which lacks teeth and does not meet the needs of students and teachers (Giroux, 2005).

Ertmer (1999) argued that real change rests upon an epistemological shift which must occur within a teacher's self (Ertmer, 1999, 2005). This may indicate that the most significant barrier to meaningful technology integration is teacher beliefs (Ertmer, 2005). It also implies that eliminating first order barriers to technology integration will not increase technology use. Instead, it would be better to increase teacher capacity through knowledge and skills, which may have the potential to shift beliefs (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, and Sendurur, 2012).

Sometimes, even when a teacher believes in the value of technology, other factors impact technology integration (Ertmer, 2005). In an effort to better

understanding teacher beliefs while controlling for effective technology integration, Ertmer et al. (2012) studied 12 teachers who earned awards for their outstanding use of technology in their classrooms. All of the teachers in the study reported believing in the value of technology, but they also reported barriers to even more meaningful technology integration, including lack of resources, lack of administrative support, technology issues, and state mandated testing. This study also suggested that even teachers with positive beliefs about technology reach a “barrier threshold” (Ertmer et al., 2012, p. 433), which, if unable to be breached, prevents effective technology integration.

Teacher beliefs help explicate and situate a teacher’s epistemology of education and are tied directly to a teacher’s sense of professional identity (Clarke & Hollingsworth, 2002). Teaching is a complex endeavor, and teacher growth occurs in non-linear, contextualized, and individual ways (Clarke & Hollingsworth, 2002). Support for teacher growth should recognize situative nature of the experience, and allow teachers opportunities to take professional risks and make meaning from experiences in the ways each teacher finds most useful (Clarke & Hollingsworth, 2002).

Garthwait and Weller’s (2005) qualitative examination of the Maine one-to-one computing initiative reinforced Ertmer’s (1999, 2005) findings that technology itself can be a barrier to implementation which then impacts teacher beliefs. Echoing the findings of prior research (Hill et al., 2003; Ringstaff, 1991), time taken by teachers to solve technological issues reduced time for planning or teaching. These technological issues could often be attributed to school and district policies that failed to anticipate the needs of students and teachers. This failure to address technological needs occurred despite a

leadership team that was supportive of integration and was receiving its own professional development (Garthwait & Weller, 2005).

In the same study in which Garthwait and Weller (2005) noted that poor performing one-to-one technology interfered with teaching, they also reported that the relationship between first and second order barriers are perhaps more complex than previously thought. Specifically, they found that the two teachers examined in their phenomenological case study integrated technology differently arguing that, “It is tempting to suggest that Rick’s computer integration stage was more advanced than Susan’s only because of his graduate degree [in technology]. However, their teaching philosophies sit on different foundations” (Garthwait & Weller, 2006, p. 374). This hypothesis is further examined by Lowther et al. (2014) who concluded that teachers with higher technical skills demonstrate more positive beliefs about technology and are more likely to integrate technology into their classrooms.

Negative perceptions of experiences, including negative experiences with first-order barriers like poorly functioning technology, can influence intrinsic barriers to technology, such as teacher beliefs (Ertmer, 2005). This creates a chicken-egg dilemma: do pre-supposed negative beliefs impact technology use or do actual technology issues create negative beliefs? Perhaps negative experiences with technology confirm negative beliefs about technology, and instead of a chicken and egg, there is a confirmation bias dilemma. Donovan, Hartley, and Strudler (2007) reported that these negative beliefs begin immediately upon hearing about the imminent one-to-one program. Teachers indicated significant concerns about the ways in which they would be personally impacted by one-to-one technology and the ways that learners would be impacted by the

initiative (Donovan, Hartley, & Strudler, 2007). The researchers (Donovan, Hartley, & Strudler, 2007) propose that to counteract these negative beliefs, teachers should have a voice in the process of one-to-one initiatives from conception through implementation.

Similarly, Swallow's (2015) research on factors and attitudes in the second year of a one-to-one initiative found that teachers' and students' negative experiences with technology "notably influenced the perspectives of using technology" (p. 132).

Teachers perceived a lack of interpersonal interaction and social learning when students used technology for collaborative learning. Teachers felt this was due, in large part, to students' focus being consumed by the technology in front of them instead of on the learners around them (Swallow, 2015). They perceived the technology as interrupting communication instead of facilitating communication (Swallow, 2015).

Penuel (2006) asserted that there is a complex relationship between perceptions – including beliefs about technology and learning, pedagogy, and technology integration. Garthwait and Weller (2005) confirm this and noted "pedagogy was significantly impacted by technical issues" (p. 369). Consistent with Penuel (2006) and Garthwait and Weller (2005), Storz and Hoffman (2013) reported that "Teachers' repertoire of teaching ideas was stretched...What was less evident was the use of the laptops by teachers to teach content by extending their use beyond the creation of student-made products to their integration as a key instructional tool" (p. 14). They concluded that this lack of full integration corresponded to teachers feeling "unprepared, frustrated, and out of their comfort zone" (p. 14). Oliver and Corn (2008) similarly noted that direct instruction was the most common method of teaching pre- and post- implementation of a one-to-one program.

Context, as understood through content, can also influence implementation of technology. Different content disciplines use technology in varying ways (Inserra & Short, 2012). Disciplines that use constructivist techniques more frequently also use technology in more fully integrated and constructivist ways (Inserra & Short, 2012; Lowther et. al, 2012), and different disciplines approach pedagogy in content specific ways (Hammond & Manfra, 2009). Thus, when examining technology integration, it is also important to consider the curricular context of the integration.

Context also refers to the forces acting upon a teacher in her classroom. These external forces may be examined using an ecological model (Bronfenbrenner, 1999) which considers micro, mezzo, and macro context which impact a classroom (Porras-Hernandez & Salinas-Amescua, 2013). Sincar (2013) noted that principals and school leaders, considered part of the mezzo level of context (Porras-Hernandez & Salinas-Amescua, 2013), significantly impact technology initiatives within their schools. Principals themselves experience challenges to technology integration, and they perceive bureaucracy to be the most significant (Sincar, 2013). Principals reported frustration navigating state level and local level bureaucracy which impacted funding, policy decisions, and ultimately, the technology in their schools (Sincar, 2013).

TPACK as a Framework to Understand Technology Integration

While the field of technology education has continually recognized that complex relationship exists between pedagogy, technology, and content, the field has not had a coherent framework for analysis. In 2005, Koehler and Mishra introduced the term technological pedagogical content knowledge (TPCK) as an elaboration of Shulman's

(1987) theory of pedagogical content knowledge (PCK), and then further clarified the theory and renamed it TPACK for ease of reference (Koehler, Mishra, & Yahya, 2007; Koehler & Mishra, 2009). This theory has rapidly become a standard for technology integration research, pre-service teacher preparation, and in-service teacher professional development.

As Shulman (1987) suggested that a transformation of knowledge occurs at the intersection of the two circles of content knowledge and pedagogical knowledge, the theory of TPACK adds a third circle of knowledge essential to effective teaching. These circles overlap in a triple Venn diagram. The three core bodies of knowledge - Content Knowledge (CK), Pedagogical Knowledge (PK), and Technological Knowledge (TK) - overlap across three boundary areas: Pedagogical Content (PC), Pedagogical Technology (PT), and Pedagogical Content (PC). Finally, in the center, all three core bodies of knowledge overlap and interact to make TPACK. The Venn diagram is circumscribed by a circle representing “contexts” (Koehler & Mishra, 2009) (see Figure 2).

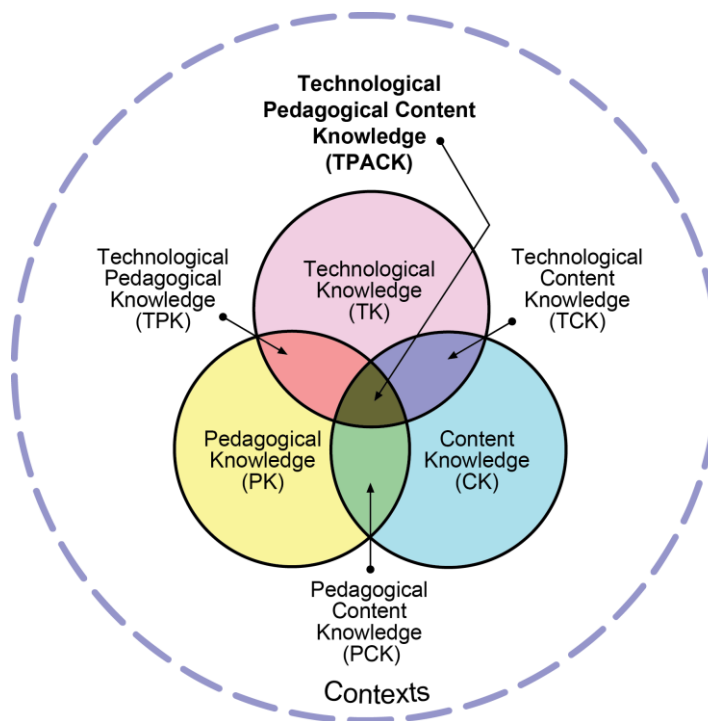


Figure 2. TPACK Model

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For Shulman (1987), Pedagogical Content Knowledge (PCK), referred to a teacher's unique and transformative knowledge which combines what to teach with how to teach. Kohler and Mishra (2005, 2009) extended this to argue that the “ideal” locus of decision making and knowledge is at the intersection of all three domains, hence, the Technological Pedagogical Content Knowledge (TPACK).

Koehler and Mishra (2007, 2009) refer to TPACK as a unique body of knowledge possessed by teachers

that goes beyond all three “core” components (content, pedagogy, and technology). Technological pedagogical content knowledge is an understanding that emerges from interactions among content, pedagogy, and technology

knowledge. Underlying truly meaningful and deeply skilled teaching with technology, TPACK is different from knowledge of all three concepts individually. (2009, p. 66)

Described as such, the underlying epistemology of TPACK is transformative; it represents a new way of knowing and doing which is informed by, but greater than, the sum of its component parts.

Two different understandings of TPACK have emerged in the literature: transformative and integrative (Angeli & Valanides, 2009; Archambault & Barnett, 2010; Graham, 2011; Voogt et al., 2012). A transformative epistemology of TPACK presumes that TPACK represents a wholly new and unique body of knowledge that occurs at the intersection of content knowledge, pedagogical knowledge, and technological knowledge. The knowledge itself is transformative, greater than the sum of its parts; in addition, in this new knowledge space, through pedagogy and technology, teachers transform content knowledge into knowledge that can be effectively constructed by their students (Angeli & Valanides, 2009; Archambault & Barnett, 2010; Graham, 2011; Voogt et al., 2012). The opposing epistemology presumes TPACK is integrative knowledge which is composed of its component parts, but not transcendent in its form (Graham, 2011; Voogt et al., 2012). It can be described relationally as opposed to transformatively; in this space teachers may extend knowledge, but do not transform it.

It should be noted that a teacher's perceptions about pedagogy and technology do not exist in a vacuum, and neither do one-to-one initiatives. Just as there seems to be a complex relationship between a teacher's perceptions of technology, content, and

pedagogy, there is a complex relationship between teachers, students, schools, districts, and the larger government (Porrás-Hernández & Salinas-Amescua, 2013). In fact, justification for research studies often rests on the assertion that policy makers are initiating large scale implementation of one-to-one programs and this implementation outpaces research (Garthwait & Weller, 2005; Swallow, 2015; Traxler, 2007; Zucker, 2004).

To account for this more complex understanding of “context” in TPACK, Porrás-Hernández and Salinas-Amescua (2013) suggested a new TPACK diagram, influenced by Bronfenbrenner’s (1999) ecological development model, which includes concentric context rings which acknowledge the micro, mezzo, and macro level of support and influence on technology integration (see Figure 3). The authors grounded this new conceptualization in the extant body of TPACK research as well as their own research on teachers in Latin American, and specifically in Mexican, schools (Porrás-Hernández & Salinas-Amescua, 2013). They suggested that this version of TPACK should be used for phenomenological research, particularly by their claim that:

...the application of TPACK guide both teacher training and research on teacher knowledge for technology integration, moving to a broader conceptual perspective linked with the local sociocultural realities and subjectivity, in line with phenomenological and postmodern approaches. For this purpose, we explained how TPACK can serve the systematization of teachers’ experiences in integrating ICT in their practices by using narratives as a methodology for knowledge construction. (Porrás-Hernández & Salinas-Amescua, 2013, p. 241)

Porras-Hernandez and Salinas-Amescua (2013) describe the macro context as including global and national forces influences and trends on teaching and technology. The mezzo level represents the local communities and governments, as well as the school's relationship with those forces. Finally, the micro context telescopes in on the teacher's immediate world of her classroom and students. The peripheries of each of these contexts bump up against the next and concerns from one context bleed into and affect the others (Porras-Hernandez & Salinas-Amescua, 2013).

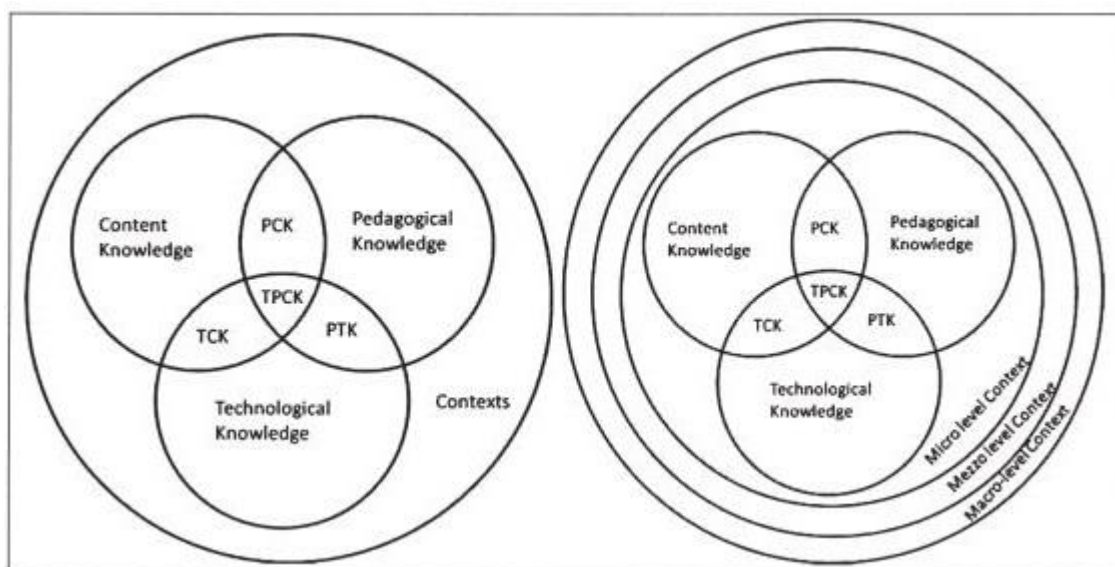


Figure 3. Traditional TPACK model compared with proposed TPACK model

Since Mishra and Koehler (2005, 2009) suggested the theory, TPACK has grown in popularity, and its influence has reached the discipline of Social Studies. However, most of the studies utilizing TPACK in social studies tend to water the framework down to laundry lists of different technological tools that replace, but fail to fundamentally change, analog tools. Harris and Hofer (2009, 2011) remain the biggest TPACK

proponents in social studies. They maintain a list of TPACK activities organized by taxonomy (Harris & Hofer, 2009; 2011). This, by its very definition, fails to be transformative knowledge crafted by intentional pedagogical and technological choices made by a teacher, as it eliminates any need for a teacher to consider context, affordances, or pedagogy. In contrast, Lee (2008) suggested that examples of social studies TPACK included:

1. Locating and adapting digital resources for use in the classroom,
2. Facilitating students' work in non-linear environments, requiring students to make critical decisions about how to select their own resources and navigate through a wide variety of interfaces,
3. Working to develop critical media literacy skills among students,
4. Providing students with opportunities to utilize the presentational capabilities of the web to motivate and encourage students,
5. Using the internet to extend collaboration and communication among students, and
6. Extending and promoting active and authentic forms of human interaction in technology enabled social networks (p. 130).

Additionally, Lee (2008) recognized the following social studies practices which align with TPACK:

1. Making use of historical source materials available through online sources,
2. Promoting understandings of spatial, human, and physical systems as aided by technology,
3. Expanding social experiences using technology, and

4. Encouraging economic literacy through the use of technology. (p. 131)

In actuality, the technological knowledge (TK) component of TPACK refers to an instructor's consideration of the affordances of emerging technology (Koehler & Mishra, 2005, 2009). This definition echoes Selwyn's (2011) proposition that technology is not simply a neutral tool used in benign ways, but instead is "intrinsically linked with the social, cultural, economic and political aspects of society" (p. 17). Similarly, Bijker, Hughes, and Pinch (1987) tried to evolve the understanding of technology from "science discovers, technology applies" to something more fluid and defined by the social construct applied to the technology. Understanding affordances, as opposed to substituting the digital for the analog, is in keeping with Diem's (2000) request that research consider a more holistic effect of technology.

Besides a clear focus on the definition of TK, an additional and necessary consideration when applying TPACK is the focus on "CK" or the "Content Knowledge" domain. The National Council for Social Studies (NCSS) provides a set of ten standards used to design defensible social studies curricula (NCSS, 2014). These standards should be considered in a conversation or application of TPACK in social studies.

If TPACK genuinely describes a transformation of knowledge through intentional pedagogical, content, and technology choices, then it serves as an effective framework to analyze technology integration. In fact, it could serve as the answer to Martorella's (1997), Diem's (2006), Friedman's (2014), Friedman and Hick's (2006), and Doolittle and Hick's (2003) calls for an intentional framework grounded in pedagogy, content, and technology. This potentially unifying framework for discussing

the complex relationship of influences on underlying epistemologies of knowledge should be matched with an epistemologically appropriate research methodology.

Phenomenology as a Methodology for Research

Transcendental phenomenology is both a philosophy for understanding the essence of experiences and a methodology for human science inquiry (Moustakas, 1994). Essence, in phenomenology, is the reality of an experience. It is what makes an experience what it is; without that essence, the experience would not be that particular experience (Husserl, 1969). Essence manifests itself in the experiences of a phenomenon. To uncover the essence, researchers examine descriptions of experience to find the manifestations of essence present within the descriptions (Moustakas, 1994). Phenomenology inquires into the “beliefs, feelings and desires which shape (an) experience (Moustakas, p. 91, 1994).” It is a study of reality, and in phenomenology, reality is how people experiencing a phenomenon experience the manifestations of the essence of the phenomenon.

Moustakas (1994) suggests interviews as the primary source for data in a phenomenological study; however, research in technology education literature combines interviews with other data collection techniques in order to complete phenomenological studies. Adams and Thompson (2009) offer heuristics which could provide useful when researching technology in education. They suggest including non-human entities, such as technology through observation, in a phenomenological study, and they argue that observation of technologies-in-use can facilitate an understanding of the artifacts non-neutral influence over a user. Opening up the possibility of interviewing objects allows

that observation, particularly observation focused upon untangling the relationship of humans and objects, has a place in phenomenological methodology (Adams & Thompson, 2009).

The exploration of beliefs and their relationship to the essence of a phenomenon, as well as an exploration of the relationships between objects and humans, makes phenomenology an attractive methodology for researching teacher beliefs and perceptions of technology. Despite this epistemological and methodological match, few phenomenological studies of technology integration in education exist, and even fewer phenomenological studies of one-to-one technology are present in the literature. The few phenomenological studies of technology integration are examined here in order to understand why certain research questions utilized phenomenology and to understand the specific ways phenomenological methodology was used in these studies.

Ottenbreit-Leftwich et al. (2010) intentionally chose phenomenology to examine teacher attitudes and beliefs toward technology because the researchers wished to examine teacher beliefs without pre-suppositions. That is to say, they “abandoned the typical expectations and definitions of technology best practice to view teachers’ practice from their unique, individual perspectives (Ottenbreit-Leftwich et al., 2010, p. 1323).” Within their study, they utilized hermeneutical phenomenology as an “interpretive lens to describe the experiences of the teachers (Ottenbreit-Leftwich et al., 2010, p. 1324).” This interpretive lens described the experiences and essence of the phenomenon of teachers using technology; however, the lens was situated within a multiple case study design. The researchers gathered data from interviews and observations, data was coded using a hermeneutical phenomenological approach.

Lim (2011) utilized a similar methodological approach to research what a tablet-personal computer meant to engineering instructors. Lim gathered data from interviews, observation, and an online discussion board in order to utilize phenomenological methods of data analysis. Lim (2011) did not situate the study in the context of case study; however, like the Ottenbreit-Leftwich (2010) study, Lim (2011) used multiple types of data. Like Lim (2011), Baytak, Tarman, and Ayas (2011) grounded their study on children's perception of technology integration in data gathered from observation, interview, and field notes. Garthwait and Weller (2005) describe their study of two middle school teachers in a one-to-one laptop initiative as a "phenomenological inquiry" (p. 364). In their study, they present the teachers implementing the one-to-one technology as a case, and they analyze data acquired from interview, observation, and artifacts such as emails and handouts.

In the study of technology and education, phenomenology can help answer questions about teacher experience in technology adoption and integration (Cilesiz, 2010). It can extend research which has established a connection between teacher's beliefs about technology and teacher's implementation of technology (Ertmer, 2005). Phenomenology is also well suited to examine the essence of experiences of effective technology integration (Cilesiz, 2010; Ottenbreit-Leftwich et al., 2011). New technologies in the classroom change the ecosystem of a classroom (Garthwait & Weller, 2005), and using phenomenology to understand this new experience could help explicate changes in culture, pedagogy, beliefs, and teacher identity (Cilesiz, 2010).

Discussion

In synthesizing the research on one-to-one mobile initiatives both broadly and specific to social studies, social studies technology integration, and the methodology of phenomenology, several needs and gaps become apparent. First, there is a repeated call for research on one-to-one initiatives in the social studies. Second, a need exists for a cohesive framework of analysis that can capture the complex relationship between teacher beliefs which undergird pedagogy, content, technology integration, and micro, mezzo, and macro factors of context. Third, there is a need to more deeply explore teacher perceptions and attitudes, as the literature demonstrated an established link between them and technology integration. In particular, while there is a robust body of literature identifying barriers to technology integration, fewer studies have examined successful technology integration (Ertmer, 2005; Ertmer, Ottenbreit-Leftwich, & York, 2006). Finally, missing almost entirely from the literature on one-to-one initiatives are examples of integration that have been conceived and implemented from the ground up, by teachers, instead of from the top down, by administrators or districts.

Gap in Research of One-to-One Technology Integration in Social Studies

Findings from this review demonstrate the necessity of studying technology integration within a discipline specific context. Context and content can influence perception of technology and implementation of technology (Koehler & Mishra, 2005, 2009; Porras-Hernandez & Salinas-Amescua, 2013). Disciplines that use constructivist techniques more frequently also use technology in more fully integrated and constructivist ways (Inserra & Short, 2012; Lowther et. al, 2012), and different

disciplines approach pedagogy in content specific ways (Hammond & Manfra, 2009). Social studies has a demonstrated history of struggle in trying to shift pedagogy from teacher transmitted to constructivist (Diem, 2000; Doolittle & Hicks, 2003).

These findings imply that the field of social studies may encounter discipline specific issues of technology integration, including the possibility that technology becomes another way to perpetuate transmission methods of teaching. This is particularly dangerous for the field, as literature cautions that using technology in traditional methods of social studies instruction damages the learner's capacity for agency, and ultimately damages democracy (Diem, 2006). Thus, findings from this review suggest that the context of social studies content is relevant to understanding technology integration. This further suggests the need for research to explore the ways technology is utilized within social studies classrooms.

A growing trend in technology integration is the increase in one-to-one technology initiatives (New Media Consortium, 2015). Findings from this study demonstrate that research of one-to-one initiatives in social studies education is thin. Currently, only seven studies exist which examine one-to-one research in social studies. This absence of research continues despite calls from scholars in the field of social studies and technology to explore the use of one-to-one technology in social studies classrooms (Friedman, 2014; Friedman & Hicks, 2006; Penuel, 2006; van Hover, Berson, Bolick & Swan, 2004).

Findings from this review indicate that there has been a particular request in social studies technology research to proactively examine one-to-one initiatives in their

implementation phase (Friedman & Hicks, 2006; Friedman, 2014). Without proactive research, practice fails to be influenced by scholarship and results in fragmented efforts at effective technology integration. As Doolittle and Hicks (2003) explain, “Social studies educators are at play in the fields of technology, which results in a disjointed collection of technological integration efforts” (p. 96). Findings from this review suggest that the field needs to know and understand more about one-to-one technology initiatives in social studies. The absence of research, despite the direct call for research demonstrate a clear gap in the field’s understanding of one-to-one initiatives in social studies.

Teacher Beliefs and Perceptions of Teaching with Technology

Because of the established link between teacher perceptions and beliefs and teacher behavior and sense of identity (Ertmer 1999, 2005; Ertmer et al., 2006), it is critical that research better understand what shapes teacher perception of technology. Parsing out the nuances of the ways in which beliefs and values impact teacher identity and choices have proved difficult (Ottenbreit-Leftwich et al., 2010). However, findings from this review indicate that parsing out these nuances is critical because teachers are major stakeholders in technology initiatives (Ertmer, Ottenbreit-Leftwich, & York, 2006; Fullan, 2007), and there is a growing link between the success of the initiative and teacher perceptions about teaching with technology. Findings from this review suggest that exploring teacher beliefs and perceptions of technology are essential to understanding the experience of teaching with one-to-one technology. In particular, this review concludes that examining an initiative through the lens of teacher beliefs about

technology would serve as a useful framework for analysis to examine technology initiatives.

There is a trend in research to marginalize teacher voice (Hargreaves, 1996; Porras-Hernandez & Salinas-Amescua, 2013; Swallow, 2015), which runs counter to better understanding the relationship between teacher beliefs and technology integration. Findings from this review indicate that perceptions of teaching and learning permeate all actions that teachers make. Thus, beliefs need to be explored and given voice.

Gap in Phenomenological Methods to Analyze One-to-One Technology

Theorists continue to argue for meaningful technology integration and demand research which correctly captures and analyzes data in keeping with a constructivist approach to knowledge creation (Clark, 1983; Friedman & Hicks, 2006); however, research continues to examine education using a quasi-experimental design model, hoping to find correlations between some specific technology treatment and learner performance. Findings from this review suggest that the goal of one-to-one research should not only be to study one specific technology and its impact on learning.

The ever-evolving nature of technologies and their affordances provides a challenge to researchers, but it also suggests the need for new methodologies of research that account for the ever present “work-in-progress” nature of rapidly changing technologies and initiatives (Zucker, 2004). This call for new methodologies mirrors similar movements across technology integration research (i.e., Clark, 1983; Cuban, 2001; Kozma, 1991). Though the ultimate goals of one-to-one initiatives are often noted as student performance outcomes (Zucker, 2004), Zucker (2004) also noted that:

...Research that focuses on the ultimate outcomes of 1:1 computing is not the only high priority. Proponents of the most rigorous, experimental studies focusing on student achievement agree that understanding *why* certain outcomes occur is important... In other words, research needs to focus on *how* teachers and students work with computers, not just the results of their efforts. (p. 375)

This emphasis on the understanding the how and why of one-to-one initiatives translates particularly well into qualitative research which is designed with these questions in mind (Creswell, 2013).

If scholars and researchers subscribe to an epistemology which believes that teaching and learning are highly contextualized, then research questions need to change. Findings from this review suggest that research should draw more nuanced portraits of technology integration. Besides the fact that the tools become obsolete before a study may be published, research that does not consider context fails to capture the essential relationship between affordances of technology, a teacher's intentional pedagogical choice grounded in teacher beliefs, and the content itself. The result is a series of "dissociated research" (Friedman & Hicks, 2006, p. 251) which fails to cohere as part of a larger and more meaningful research agenda.

The calls for a cohesive research agenda also point to a need for research which examines the "how" and "why" of technology integration (Zucker, 2004; Friedman, 2014). In order to give voice to teacher experience and make visible underlying epistemologies, researchers must ask questions which seek out the "how" and "why" and use an appropriate corresponding methodology to answer those questions.

Teaching with technology is a unique phenomenon, and perceptions and beliefs are difficult to quantify (Cilesiz, 2010). More qualitative research which explores the phenomenon of teaching in a one-to-one mobile learning environment will help to fill this gap in understanding (Cilesiz, 2010).

Phenomenology also provides the opportunity to examine teacher belief without imposing expectations of best practice on teachers (Ottenbreit-Leftwich et al., 2010). Teachers are major stakeholders in educational change (Fullan, 2007), but their voices have been repeatedly silenced in the change process (Hargreaves, 1996). Because of its focus on returning to “the things themselves” from a pre-supposition state (Moustakas, 1994), phenomenology as methodology is well suited to giving voice to its participants. Phenomenology is beginning to be utilized by researchers both as a sole methodology and as an interpretive lens for case study (i.e. Baytak, Tarman, & Ayas, 2011; Lim, 2011; Ottenbreit-Leftwich et al., 2010); however, findings from this review demonstrate it is still an under-represented methodological choice in the literature on technology integration and in particular, on one-to-one initiatives (Cilesiz, 2010). This review suggests that phenomenology is an appropriate and necessary methodological choice for exploring teacher perspectives in one-to-one initiatives.

TPACK as a Framework for Analysis

Technology, particularly mobile technology, outpaces our ability to research the technology itself (Traxler, 2007). Thus, we must relinquish techno-centric tendencies and spend less time studying precise technologies and instead acknowledge that mobile technology has particular affordances. It is these affordances and user decisions of if,

when, and how to utilize these affordances, that are relevant to study. Additionally, the act of teaching is a complex and highly contextualized endeavor (Koehler & Mishra, 2005, 2009; Shulman 1987). Findings from this study indicate that TPACK is a useful framework for examining the complex nature of teaching and the continuing evolutions of technology.

The technological knowledge (TK) component of TPACK refers to an instructor's consideration of the affordances of emerging technology (Koehler & Mishra, 2005, 2009). Understanding affordances, as opposed to substituting the digital for the analog, is in keeping with Diem's (2000) request that research consider a more holistic effect of technology. Friedman (2014) takes this a step further by penning a retrospective critique of research up through the emergence of mobile, digital, one-to-one technology. With frustration, he noted that the field was too slow to implement a meaningful research agenda to analyze the affordances of the computer and the internet. He asked that the field not miss the current opportunity to be proactive in its research of the newest movement in technology, the ever present access represented by personal and school supplied mobile one-to-one devices (Friedman, 2014).

Besides a clear focus on the definition of TK, an additional and necessary consideration when applying TPACK is the focus on "CK" or the "Content Knowledge" domain. The National Council for Social Studies (NCSS) provides a set of ten standards used to design defensible social studies curricula (NCSS, 2014). This finding suggests that content should be considered in any conversation or application of TPACK in social studies. Additionally, pedagogical practices impact technology integration (Inserra & Short, 2012; Lowther et. al, 2012). Teachers who use constructivist techniques more

frequently also use technology in more fully integrated and constructivist ways (Inserra & Short, 2012; Lowther et. al, 2012). Thus, teacher “pedagogical knowledge” or “PK” is also an essential component to understanding teacher technology integration.

Findings from this review suggest that the framework of TPACK would benefit if the “context” of TPACK were more clearly defined. Many of the studies reviewed found that teachers’ underlying epistemologies and perceptions of technology are intimately tied to technology integration (Ertmer, 1999; Garthwait & Weller, 2005; Inserra & Short, 2012; Penuel, 2006). It becomes imperative that researchers include underlying teacher epistemologies when discussing PK and TPACK. Porras-Hernandez & Salinas-Amescua (2013) summarize the argument:

In practice, the philosophy of education that the teacher has permeates all of the decisions that she makes for the educational experiences that she designs. Thus, what we perceive as the ultimate aims of education – what an educated human being is, how one comes to know and to learn, and what the role of each intervening actor and tool in the process should be – becomes a filter that influences all of the spheres and intersections in the TPACK framework. (p. 233)

Teacher perceptions *and* the interaction with administration and district goals impact technology integration (Garthwait & Weller, 2005; Porras-Hernandez & Salinas-Amescua, 2013). It is suggested that a modified version of TPACK, meant to more fully capture those synergies, be used as a framework for analysis of technology integration research. This will both facilitate a more nuanced understanding of social studies’

teachers' perspectives teaching with one-to-one technology and contribute to the growing body of TPACK research.

Atypical Cases of One-to-One Mobile Technology Initiatives

The initiatives studied in the literature have been instituted in a top down approach to change. The administration of the state or local districts initiated the change and instituted the one-to-one program (i.e., Crompton & Keane, 2012; Donovan, Hartley, & Strudler, 2007; Inserra & Short, 2012). Findings from this review demonstrate there are no examples in the literature of teacher initiated and implemented one-to-one programs. Perhaps because research is always examining people who are being told to change, the existing body of literature frequently reports on the significant barriers to affecting change through technology integration and the barriers to affecting change in pedagogy towards a more constructivist instructional practice. Garthwait and Weller (2005) concluded that access to one-to-one technology did not “automatically shift instructional styles” (p. 373). Oliver and Corn (2008) similarly noted that direct instruction was the most common method of teaching pre- and post- the top down initiative of a one-to-one program.

Often, the literature refers to a lack of effective professional development to support integration (Dunleavy et al., 2007; Oliver & Corn, 2008; Storz & Hoffman, 2013). Additionally, this top down research follows early implementation but fails to follow an initiative through till it becomes established practice (Looi & Wong, 2014). There is also little research which examines the unique affordances of mobile technologies in a one-to-one initiative. Mobile technology supports easier access to

knowledge and communities, which suggest a potentially new epistemology of knowledge (Traxler, 2007). Exploration of this potentially new epistemology, as well as its implications on pedagogical choices, needs to occur in research.

The existing research paints a picture of the initial stages of top-down one-to-one initiatives, but fails to capture rarer perspectives on technology integration.

Highlighting a unique case and specific phenomena can help draw a more nuanced and detailed understanding, offering counterpoints to the growing body of research on large scale, one-to-one initiatives. The experience of self-actualized teachers, who initiate and implement bottom-up change represent a contrasting experience to the more typical, top-down approach to technology integration. A rich portrait of an atypical case, one which does not conform to the typical phenomenon, can help illuminate unknown or atypical experiences (Stake, 2000; Yin, 2008) and may help spotlight non-obvious, but essential, experiences (Abramson, 1992) of one-to-one initiatives.

Conclusion

This review explored literature examining one-to-one technology initiatives in social studies. The small number of studies specifically examining one-to-one technology in social studies required the review to more broadly explore technology initiatives in social studies and more broadly explore one-to-one initiatives in education. The review found a significant gap in research on one-to-one technology in social studies. Additionally, the review identified a growing connection between teacher perceptions of technology and teacher integration of technology which should be more deeply explored. Further, the review identified a gap in phenomenological methods as a

means to examine teacher perceptions, despite phenomenology's utility in giving voice to teacher beliefs and perceptions. In addition, the review determined that an atypical case, which considers teacher self-actualization, could serve as a useful counterpoint to the established narrative of top-down change. It would provide an opportunity to "elucidate the upper and lower bounds of the experience" (Abramson, 1992, p. 140) of teaching with one-to-one technology. Finally, the review found that teaching, and in particular, teaching with technology, is a complex and highly contextualized endeavor. The review determined that "barrier thresholds" and first-order and second-order barriers to technology implementation, as suggested by Ertmer (1999) and Ertmer et al. (2012), is a useful framework to begin to analyze the process of implementation of one-to-one technology. This review also suggests TPACK is a useful framework to begin to discuss and analyze the complex experience of teaching with technology. This review indicated there is a specific need to explore teacher perspectives in one-to-one initiatives in social studies. Further research which examines the lived experience of middle school social studies teachers who self-initiate a one-to-one technology program in their classrooms will address the gaps in the existing literature identified above.

Chapter Three

Methodology

The purpose of the study was to acquire a better understanding of the lived experiences of middle school social studies teachers who integrated one-to-one tablet based technology into their classrooms. This study identified teacher perceptions of the process of technology integration in the social studies classroom, from conception of the project through the first two years of integration. The research used case study design to identify the parameters of the setting of the research and used phenomenology as an interpretive lens to analyze the data.

The following chapter poses the research questions that focus the study. It also proposes case study design with a phenomenological lens for data analysis as the appropriate methodological match to the research questions. To ensure the alignment of research questions and methodology, this chapter examines the underlying epistemologies of case study and phenomenology. Next, the chapter explains how case study and phenomenology were used to fully answer the research questions via methods of data collection and analysis. The research setting and participants are fully described, and the researcher's positionality and ethical implications are considered.

Research Questions

The study's purpose yielded the following question:

How do selected middle school social studies teachers perceive and describe the experience of conceptualizing and implementing a one-to-one program for tablet technology in their classrooms?

The sub-questions addressed in this study were:

- a. How do selected middle school social studies teachers perceive and describe their experiences initiating a one-to-one program in their classrooms?
- b. How do selected middle school social studies teachers perceive and describe their experiences in integrating the technology into their classrooms?

Epistemological Assumptions

The research questions do not attempt to determine cause and effect, but rather, they seek to uncover meaning. Specifically, the research questions examine *how* teachers experience a phenomenon of teaching with one-to-one technology.

Additionally, the research questions are concerned with the participants' *perception* and *description* of their experience. The questions' focus on perception and description imply an epistemology which believes participants construct their understanding of their lives through their perceptions of their experiences. Questions about lived experiences call for qualitative methods in research (Merriam, 2009).

These questions center around a specific, particular, and bounded phenomenon under study, that of social studies teachers who self-initiated and implemented a one-to-one program in their classrooms. The research questions are also specifically interested in participants' perception and description of this experience. The most appropriate epistemological match to this bounded phenomenon and research questions is case study design with phenomenological methodology as an interpretive lens. The following

section of the chapter analyzes the epistemology of case study and phenomenology to demonstrate the epistemological match between research questions and research method.

Epistemology of Case Study

There exist two prevailing epistemologies of case study, both grounded in an interpretivist paradigm. One understanding of case study considers case study as its own methodology for human science inquiry, while the other believes that case study is more a design for identifying the units of research rather than a methodology in its own right. Yin (2008), proposed that case study itself is a methodology for human inquiry when a phenomenon and its relationship to its boundaries and context is not readily evident. Yin (2008) suggested case study as the method for inquiry and suggested an analysis of case data following a prescribed methodological data collection and analysis. On the other hand, Stake (2000) argued that case study is an “interest in individual cases, not...the methods of inquiry used” (Stake, 2000, p. 435).

This study situates itself in Stake’s (2000) underlying assumptions of case study, which is a belief that something particular can be learned from a particular case, thus case study serves to bound and identify the case. Stake (2000) suggested that a case represents a system, comprised of interrelated and component parts, all bounded by the specific phenomenon of the case. He asked, “What can be learned from the single case?” (Stake, 2000, p. 436). Because something concrete can be learned from a case, the underlying epistemology of case study believes that case study knowledge is concrete (Merriam, 2009). Knowledge is grounded in the thick and vivid description of

the case under study. Finally, the knowledge is co-constructed between participant and researcher, as well as by the reader of the research.

Since Stake (1995; 2000) is concerned with what can be learned from a single case, identifying the type of case and unit of study is essential to effective case study design. Within case study, Stake (1995) identifies three types of cases: *intrinsic*, *instrumental*, and *collective*. *Intrinsic case study* is undertaken when the researcher seeks to better understand a phenomenon unique to the case. The researcher's goal is to describe the lived experience of the participants in order to understand a very particular and specific phenomenon. *Intrinsic case study* is not used for the purpose of understanding a generic and abstract concept, nor is the purpose to use *intrinsic case study* for theory building. An *instrumental case study* is used if the primary purpose of research is to clarify an understanding of something more general outside of the case. While some *intrinsic case studies* may share qualities and purposes with *instrumental case studies*, the clear difference lies in the primary purpose of each. Finally, a *collective case study* may be utilized to better understand a larger and more general phenomenon. The purpose of *collective case study* is a belief that an understanding of the cases as a collective, will lead to a better understanding of other collective cases and phenomena.

Additionally, cases may be understood through their features. Merriam (2009) identified three different characterizations of case study: particularistic, descriptive, and heuristic. Particularistic case study is useful for program evaluation and self-study, as it examines practical problems which stem from everyday practice (Merriam, 2009). Descriptive case study is rooted in anthropology's emphasis on thick and rich

description of a phenomenon. They are “holistic, lifelike, grounded, and exploratory” (Merriam, p.44, 2009). Heuristic case studies attempt to help the reader draw transferable understandings from the case (Merriam, 2009).

The teachers in this study represent a specific case: teachers who self-initiate a one-to-one tablet program without the directive of a district or administrator. This is atypical of the usual experience of teachers implementing one-to-one technology in their classrooms. In the extant literature, each one-to-one program studied was initiated through top-down approaches to change. The purpose of understanding this case is to richly describe the particulars of that which make the lived experience of these teachers so essentially unique. Abramson (1992) explains the value of an atypical case by noting that

...since such data are rare, they can help elucidate the upper and lower boundaries of experience. Second, such data can facilitate... prediction by demonstrating infrequent, non-obvious, or counterintuitive occurrences that may be missed by standard...approaches. (p. 140)

Since the intent of this study is to understand their experience in this atypical and specific case, the type of case study used is that of an *intrinsic case* (Stake, 2000). When considered in Stake’s (2000) and Abramson’s (1992) understandings of case study, a system comprised of interrelated parts, from which we can learn something to elucidate boundaries of experience, case study serves as an effective epistemological match with this study’s research questions.

Epistemology of Phenomenology

Phenomenology is both a philosophy and a method for human science inquiry. The philosophy of phenomenology attempts to describe the essential experiences of phenomena. Phenomenologists understand the essential nature of a phenomenon to be that which makes one phenomenon distinguishable from another, different, phenomenon (Moustakas, 1994). Phenomenology refers to this as the “essence” of the experience, or “the condition or quality without which a thing would not be what it is” (Moustakas, 1994, p. 100). Description, not explication, of that essence is the goal of phenomenology (Moustakas, 1994).

Transcendental phenomenologists believe that essence of an experience is found in the relationship between the “thing itself” and the meaning we ascribe to that thing. Transcendental phenomenologists refer to the thing as it is presented as the *noema*. My perception of the “thing itself” as it is presented is called the *noesis* (Moustakas, 1994). These are not two independent experiences. For transcendental phenomenologists, there is no objective reality which exists outside of our perception of that reality. Instead, the constantly negotiated reality consists of the ever changing relationship between the *noema* and *noesis*. *Noema* and *noesis* exist together. It is difficult to discuss one without referencing the other (Moustakas, 1994).

There is an intentional consciousness in the relationship between *noema* and *noesis*. When I become aware of the “thing,” I become conscious of it, and I begin to make meaning of it (Moustakas, 1994). I construct the *noesis* by making meaning of the *noema* through judging, perceiving, feeling, and considering memories (Moustakas,

1994). The consciousness binds the *noema* and the *noesis* into an inseparable connection (Van Manen, 1990). As I become conscious of something, I intentionally guide myself to make meaning of it. My intentionality is my consciousness and creates the relationship between the *noema* and the *noesis*. The negotiation and understanding of this relationship between *noema* and *noesis* is an essential function of intentionality. In this integration and correlation of the two, we find the essences of the experience (Moustakas, 1994).

To allow the essence of the experience to show itself, it becomes necessary to describe, free from pre-supposition or judgment, the phenomenon as perceived by those who are experiencing it. In order to allow the essence of the experience to show itself, the researcher must first set aside her own pre-conceptions and understandings in an *Epoche*. This statement of her own suppositions and biases is acknowledged and then bracketed, or set aside, in order to view the phenomenon with fresh and naïve eyes (Moustakas, 1994). It allows the researcher to surrender to “what is essentially given” (Moustakas, 1994, p. 30), so that the perception may then be faithfully described. *Epoche* is more than a simple statement of bias; instead, it is a practice, revisited and re-worked, each time the researcher approaches the research question. The practice of *Epoche* is almost never perfectly achieved; however, the rigorous practice of *Epoche* allows a researcher to “Increas[e] one’s competency in achieving a presuppositionless state” (Moustakas, 1994, p. 90).

In order to use phenomenological methods to understand the essence of an experience as explained by phenomenology, the researcher must look at the *noema* and *noesis*, reflect, and look again. In this looking, reflecting, and re-looking, the researcher

begins to parse out the many *noemata* that comprise the experience. This shifting from the phenomenon, to a perception of the phenomenon, to a reflection on the phenomenon, is iterative and occurs throughout the phenomenological research (Moustakas, 1994).

I chose phenomenology as the interpretive lens for case study research because of my interest in the lived experiences of middle school social studies teachers as they conceptualized and implemented one-to-one tablet technology into their classrooms. Furthermore, I want to understand the teachers' perceptions of the process of implementation of the technology in their classrooms, particularly as related to their perception of their motivation to initially implement the technology, and their perception of the technology integration and instruction using the technology.

Methodological Approach

Case study, Stake (2000) argued, is more a "choice of what is to be studied" (p. 435) than a methodological choice for analysis. Research within a clearly bounded case can improve understanding of a very specific phenomenon. It can also develop an understanding of how the phenomenon under study fits into what is known about abstract concepts surrounding that phenomenon. To support this end, a clearly defined and bounded case yields more clear and rich data (Stake, 2000). What was examined in this study's case was bounded by the experience of those middle school social studies teachers who conceived of and implemented a one-to-one tablet initiative for their program of study. Thus, this research used case study as defined by Miles and Huberman (1994) as "a phenomenon of some sort occurring in a bounded context" (p. 25).

The phenomenon under study was analyzed utilizing the lens of phenomenological methodology. Phenomenological research is a qualitative methodological approach that rests on the epistemological understanding that “perception is the primary source of knowledge” (Moustakas, 1994, p. 52). Grounded in the philosophy of transcendental phenomenology, description, not evaluation, of perception becomes the objective in order to understand the essence of phenomena. Eventual understanding of phenomena evolves through reflection in order to uncover the essences of the phenomenon itself. Thus, phenomenology seeks to describe the essential reality of an experience. The epistemological match between phenomenology’s grounding of understanding in perception, and the research questions asked in this study regarding perceptions and lived experiences of teachers, made phenomenology the appropriate method for interpreting this case study. This portion of the chapter examines the methodological approach of case study design coupled with a phenomenological method of data analysis.

Case Study Design

Case study researchers seek to describe what is typical and what is atypical about a bounded phenomenon. Grounded in a belief that cases are systematic, contextualized, and representative of the lived experience of the participants in the case, case study is a method for gathering data to represent this rich and bounded system (Stake, 2000). Case study is not a method for analysis, but it instead provides a conceptual structure for understanding the specific and contextualized nature of the case. The researcher’s purpose is to describe the situative and interrelated nature of the phenomenon by using thick and holistic descriptions of the case (Merriam, 2009).

The following elements are necessary to understand the typical and unique features of a case:

1. The nature of the case;
2. The case's historical background
3. The physical setting;
4. Other contexts (e.g., economic, political, legal, and aesthetic);
5. Other cases through which this case is recognized;
6. Those informants through whom the case can be known (Stake, 2000, p. 436).

The data used to address these elements is extensive and came from varied sources including interviews, documents, and artifacts (Creswell, 2013).

Data collection for a case is iterative and reflective (Merriam, 2009; Stake, 2000). As a researcher considers and reflects on data, it will direct further collection. The researcher codes, reflects, re-interprets, and member-checks with participants to ensure that the lived experience of the participants is described in thick detail (Merriam, 2009). As gaps in the story are revealed, the researcher gathers new data in order to fully tell the story of the participants in the case (Creswell, 2013). To reduce the possibility of a misinterpretation of the lived experience, the researcher engages in an analysis of data through reflection, member checking, and triangulation, a comparison of one data source to another data sources (Stake, 2000). All of these procedures encourage a teasing out of meaning as each piece of data is compared against itself, and

then against other pieces of data, issues, theory, and literature, in order to make complex meaning of the story (Stake, 2000).

Ultimately, the purpose of case study is to answer: “What can be learned from the single case?” (Stake, 2000, p. 436). The researcher is left to determine when enough information has been gathered to answer this question. Stake (2000) suggests that this occurs when the researcher is able to understand the case deeply enough to write a concise, finite, and yet still complex report of the case. He cautions the researcher to remain wary of grand generalizations superseding the central purpose of case study, which is to understand the case itself. In maintaining this vigilance, the researcher should remain focused on gathering rich data until the complexities of the case can be understood (Stake, 2000). While re-interpretations and new-interpretations will always remain a possibility, the researcher must make a strategic decision as to when the data has reached saturation and the complex nature of the case is understood (Creswell, 2013; Stake, 2000). Once the researcher and participants are satisfied that the lived experiences and complexities of the case are understood, the researcher reports the case. Typically, case study is reported through narrative that includes the direct voices of the participants (Creswell, 2013).

For this particular study, I identified the nature of the case as an intrinsic case describing an atypical phenomenon, that of teachers who self-initiate a one-to-one program in their classroom. The historical background of the case was established through interview and artifacts which illuminated the nature of the one-to-one program and the personal histories of the participants. The physical setting was established through observational visits and descriptions from artifacts including public records

describing the school and its demographics and was accessible through the internet. Similarly, contextual factors of the case were described via interview, observation, and artifacts provided by the participants and accessible online. This case was understood and recognized through other cases found in the extant literature which examined one-to-one initiatives in schools. Finally, the participants through whom the case could be known were identified and asked to participate in the research.

Phenomenology Methodology

This research utilized transcendental phenomenology as the interpretive lens to analyze a case study bounded by middle school social studies teachers who conceived of and implemented a one-to-one tablet initiative in the program. Since phenomenological research is grounded in the philosophy of phenomenology, the methodology is meant to help uncover “the things themselves” as understood through the *noema*, *noesis*, and their relationship to intentionality and consciousness. Moustakas (1994) proposed the methodology of phenomenological research to guide the researcher toward this uncovering of essences of an experience.

The first step in the research methodology of phenomenology is to work to free the self from pre-suppositions to allow the essences to show themselves. To do this the researcher engages in the practice of *Epoche*, which is:

A preparation for deriving new knowledge but also [an]
experience in itself, a process of setting aside predilections,
prejudices, predispositions, and allowing things, events,
and people to enter anew into consciousness, and to look

and see them again, as if for the first time. (Moustakas, 1994, p. 85)

To encourage this naïve approach to the data, I engaged in a process of reflection in which I acknowledged, and then put to paper, all previous beliefs, values, and experiences related to the research question. This process demanded thoughtful attention and a concentrated awareness of internal and external influences in order to create a mindset of receptiveness. I continued in this process throughout the entire phenomenological research. This intensive practice of *Epoche* allowed me to work toward bracketing out prejudices in order to allow the essences of the phenomenon to be seen from a pre-suppositionless state.

In phenomenological research, the practice of *Epoche* is the first step in helping the researcher to return to the essences of the experience. Next, I collected data through interview, observation, and artifacts. The data were reduced to the essence of their phenomenal experiential parts in order to describe the textural qualities of the phenomenon. In this distillation of the data, called Phenomenological Reduction, I looked at the data, described the data, reflected on this description, and looked at the data again. With each new look, I saw a new perspective, or horizon, of the phenomenon under study. My ability to see the new horizons stemmed from the constant reflection and explication of the phenomenon. These explications and understandings relate to each other, working together to provide me with a deeper understanding of the phenomenon.

Each of these horizons was examined alone and in relation to the whole until I found that I had exhausted all perspectives in that particular time and place. While it is impossible to ever fully cease to discover new perceptions of the experience, when I found that I began to enter the next phase of analysis in which my reflections became more thematic, the evidence of the phenomenon existed (Moustakas, 1994). At this stage in the process of phenomenological research, the horizons were all examined and granted equal value. I examined each horizon and began to look for those that are irrelevant or repetitive. Those horizons were deleted and the remaining horizons were examined for themes. This clustering of the horizons into themes allowed the phenomenon to enter into my consciousness so that she I could begin to understand the rich textural description of a phenomenon.

After completing the Phenomenological Reduction, I began Imaginative Variation. This transitioned my research from describing the textural elements of a phenomenon to describing the structural elements of a phenomenon. This shift began to ascribe meaning to the phenomenon through intuition. I considered structures such as “time, space, materiality, causality, and relationship to self and to others” (Moustakas, 1994, p. 99). Moustakas (1994) identifies the following steps for Imaginative Variation:

1. Systematic varying of the possible structural meanings that underlie the textural meanings;
2. Recognizing the underlying themes or contexts that account for the emergence of the phenomenon;

3. Considering the universal structures that precipitate feelings and thoughts with reference to the phenomenon, such as the structure of time, space, bodily concerns, materiality, causality, relation to self, or relations to others;
4. Searching for exemplifications that vividly illustrate the invariant structural themes and facilitate the development of a structural description of the phenomenon. (p. 99)

The final phase of the phenomenological research process synthesized the textural and structural description into an understanding of the essences of the phenomenon. The essence means that thing, without which, the phenomenon would not be what it is.

Conceptual Frameworks for Analysis

Transcendental phenomenology asks the researcher to examine the data from a pre-suppositionless state. Thus, the data is analyzed free from imposition of judgment. However, in order to discuss the analysis of data in the larger literature, the research will frame discussion of final analysis using two lenses. First, the first sub-research question on teacher initiation of technology is examined through Ertmer's (1999, 2012) work on the impact of teacher beliefs on first and second order barriers to technology integration. Specifically, Ertmer et al.'s (2012) suggestion that teacher beliefs in the value of technology are not always sufficient to overcome "barrier thresholds" is used to frame discussion. The "barrier thresholds" are created by first order barriers which become too overwhelming to overcome, even for teachers who demonstrate strong beliefs in technology. A second framework, the modified version of TPACK created by Porras-Hernandez and Salinas-Amescua (2013), frames the discussion of the second sub-

research question which considers technology integration. TPACK asserts that teaching is a complex endeavor, but that underlying the complexity, three essential types of knowledge exist that work in concert with each other to create effective teaching (Koehler & Mishra, 2009). The modified version of TPACK further clarifies “context” in terms of micro, mezzo, and macro influences on technology integration (Porras-Hernandez & Salinas-Amescua, 2013) (Figure 4).

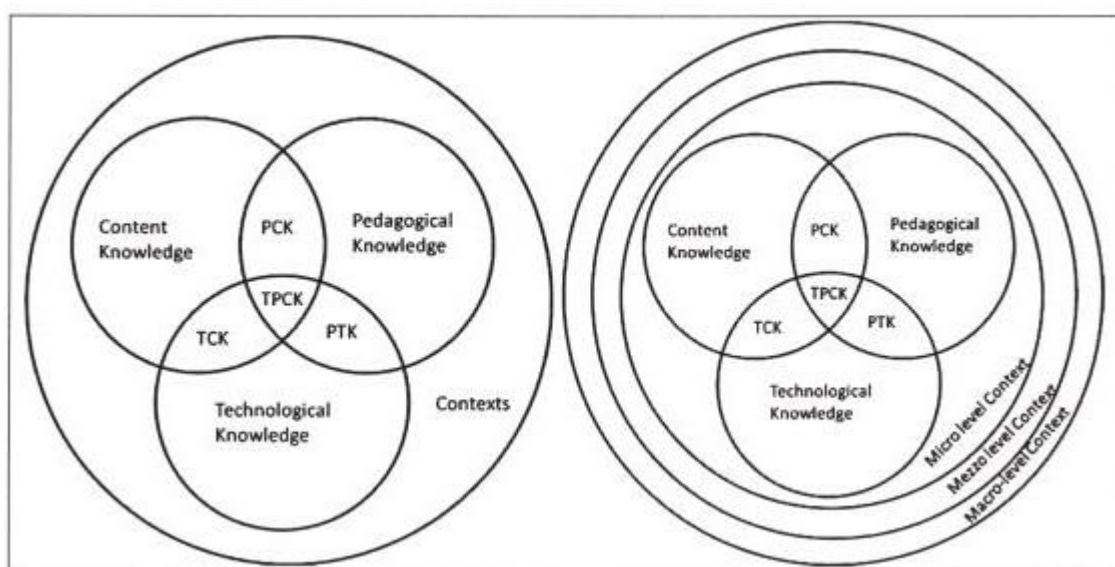


Figure 4. Traditional TPACK model compared with ecological TPACK model

Methods of Preparation

Participants and Setting

Case study requires two steps of sampling (Merriam, 2009). The first step identifies the sample *case*, while the second step identifies the sample *participants*. Stake (2000) argues some cases have given boundaries, particularly those of the *intrinsic case study* nature. This study, an intrinsic case, has its own clear and specific boundaries, because it examines a unique and bounded phenomenon. The phenomenon for this

research, teachers who conceive and implement mobile one-to-one technology in a middle school social studies classroom, provided a clear boundary to the case.

After identifying the case, the next step was to identify participants. In order to assure that all participants experienced the phenomenon under study, that of conceiving and implementing mobile one-to-one technology in a middle school social studies classroom, this research used purposeful selection to select participants. Purposive sampling requires that the researcher consider the selection criteria by listing the essential attributes of the study (Merriam, 2009, p.77). Thus participants in this study must have all experienced the phenomenon of conceiving of and implementing one-to-one technology in their classroom. Additionally, the participants represent a unique sample “based on unique, atypical, perhaps rare attributes or occurrences of the phenomenon of interest” (Merriam, 2009, p. 78). The participants represented a rare and atypical attribute in that they self-initiated a one-to-one program in their classrooms.

The participants for this study taught in the social studies department at Sherwood Middle School (pseudonym). The social studies department at Sherwood included seven teachers. Anne (pseudonym) and Steve (pseudonym) were the only teachers in the school’s law and finance magnet program, housed within the social studies department. Anne and Steve wanted to develop a one-to-one program in their classrooms. Because of their affiliation with the law and finance magnet program, they were able to apply for and receive the resources necessary to implement a one-to-one program in the law and finance program. They were the invited participants in this study because they are the only two social studies teachers in the school to meet the selection criteria, which was that they conceived of and implemented a one-to-one program in their classrooms. The

other social studies teachers at the school were not included in the sample, because they were not part of the magnet program and not part of the teacher led one-to-one initiative.

Anne was the social studies department chair and taught middle school social studies for 21 years. Steve was the school's technology liaison as well as a full time social studies teacher. Steve was a teacher for 14 years and a technology liaison for 11 years. Prior to his full time teaching experience, he was a para-educator for four years while he earned his teaching degree.

Sherwood is located in a large urban-suburban district which serves more than 100,000 students in the mid-Atlantic region. While located in a suburban county, Sherwood shares a boundary with a large mid-Atlantic city. In the 2014-2015 school year, Sherwood had a faculty of about 55 teachers and a student population of just fewer than 780 students with a mobility rate of 10.6 percent. Sixty-eight percent of Sherwood's students were on a free and reduced lunch plan. Sixty-six percent of Sherwood's students identified as Black, six percent identified as Latino, two percent identified as two or more races, five percent identified as Asian, and twenty percent identified as White or Caucasian.

Data Collection

Data for this study were collected over the period of a year, from September, 2014, through June, 2015. The data included field observations, interviews, and artifacts. The interviews and artifacts captured retrospective data from the conception of the program in 2011 through its implementation in January, 2013. The observations and

artifacts collected data representing implementation of the program from September, 2014 through June, 2015. A summary of data for each participant is noted in Table 2.

	Anne	Steve
Interviews (Collected Fall 2014-Spring 2015)	Three 60 minute interviews to collect data about conception and implementation Four 30 minute interviews to explicate data collected in lesson plan artifacts Three 20 minute interviews to member-check	Three 60 minute interviews to collect data about conception and implementation Four 30 minute interviews to explicate data collected in lesson plan artifacts Three 20 minute interviews to member-check
Artifacts (Collected Fall 2014-Spring 2015)	12 lesson plans which reflect four lessons taught over three years Anne's proposal for the initiative; Anne and Steve's annual report about the initiative; Funding and purchasing requests Online apps and sites hosting Anne's lessons and cloud based computing activities	12 lesson plans which reflect four lessons taught over three years Online apps and sties hosting Steve's lessons and cloud based computing activities Newspaper articles written about the one-to-one initiative at Sherwood Newspaper articles written about the magnet program at Sherwood

	Newspaper articles written about the one-to-one initiative at Sherwood Newspaper articles written about the magnet program at Sherwood	State and local school system website which included data about demographics, magnet program, and technology initiative Anne's and Steve's year one and year two assessments of the initiative
Observations (Collected Fall 2014-Spring 2015)	Four, 45 minute observations Ten site visits to Sherwood	Four, 45 minute observations Ten site visits to Sherwood

Table 2. Summary of data collection

Role of *Epoche* and Positionality in Data Collection

The goal of transcendental phenomenology is to understand reality by a return to “the things themselves.” In order to do this, the researcher engages in a continuous process of acknowledging her own biases in an attempt to separate her experience from the experience of the participants. I wrote my own *Epoche*, and I revisited the *Epoche* and its sentiments before, and sometimes during, each piece of data collection and analysis.

Additionally, I recognized the role of positionality in qualitative research. Though phenomenology demands the practice of acknowledging bias in an attempt to disentangle the researcher's experiences from the participants' experiences, it is

recognized that this is not a perfect process (Moustakas, 1996). I had a prior relationship with the participants because of my role as university instructor of a social studies methods course. We worked together as professionals and colleagues prior to the start of this study. My relationship with the participants in this study was one of doctoral student seeking to illuminate their lived experiences, but our other, professional relationship, was also acknowledged.

Further, I have extensively studied technology integration in education. I do not believe that technology can solve all of the problems of education, but I also do not believe that technology is an evil which prevents meaningful and authentic education. Instead, I position myself more as technological pragmatist: I believe that technology has great potential in education, especially when its affordances of constant connections to our larger, global, community are considered. However, I do not always believe that technology is essential to powerful teaching and learning, and I believe that it is often implemented ineffectively.

I am also a former social studies teacher in the same district as Sherwood, which means that I brought certain perceptions and experiences to the study, as I have experienced the role of classroom social studies teacher in that district. I position myself as a strong proponent of social studies education. I believe fostering student agency and illuminating the need for social justice and active citizens are the essential goals of social studies education and are critical to sustaining our democratic republic. I also have lived the experience of teaching in public schools. I believe that teaching is one of the most rewarding and challenging professions, and the challenges mostly stem from external

forces acting on a teacher in her classroom, not from the students and parents with whom she works.

My relationships and experiences have provided me access to the participants, which I otherwise would most likely not have had. In qualitative research, the researcher is the instrument through which the data is analyzed. Recognizing my own perceptions and experiences is critical to being an effective instrument.

Entry to the Field

I had a three-year relationship with the participants through a school-university partnership known as a Professional Development School (PDS). Prior to the study, I worked with the participants to instruct pre-service teachers in social studies methods. Because of this established relationship and because the participants represent a unique case of teachers conceiving of and implementing technology in their classrooms, I invited the participants to participate in the case study.

Interviews

In phenomenological research, interviews serve as the primary data collection tool used to understand the experience of a participant (Creswell, 2013; Merriam, 2009; Moustakas, 1994). This research used open-ended, semi-structured interviews to help understand the lived experience of middle school social studies teachers who conceived of and implemented a one-to-one mobile program in their classrooms. The interviews took place during, or immediately after the school day in an on-site location convenient to the participants. Each participant was interviewed three times regarding their experiences conceiving and implementing technology, and then they were interviewed

another four times to help explicate their lesson plans which changed during the integration of technology. The participants also participated in three member-checking conversations during the course of data collection.

Of the three interviews designed to facilitate description of experiences conceiving and implementing technology, the first interview addressed the participant's background in education and what led to the conception of the one-to-one initiative. The second interview gathered data regarding the participant's experience in implementing the technology. The third interview re-visited, extended, and clarified questions which emerged from the first two interviews. Each interview lasted approximately 60 minutes. The possible question prompts are included in the appendix (Appendix A) of this document.

I also used informal, open-ended interviews with the participants as they reviewed lesson plans from before and after tablets were introduced to the classroom. These interviews asked the participants to explain their decision making processes as they planned their analogue and digital lessons. The participants choose four lesson topics that they taught before integration, in the first year of integration, and in the second year of integration. Thus, each lesson topic yielded three different lessons, for a total of 12 lessons per participant, in order to illustrate the process of integration over time. See Table 3 for a graphical explication of this process. These interviews lasted approximately 45 minutes. There were four of these open-ended interviews per participant.

	Pre-Integration	Year One – Integration				Year Two – Integration			
	Q1, Q2, Q3, Q4	Quarter One	Quarter Two	Quarter Three	Quarter Four	Quarter One	Quarter Two	Quarter Three	Quarter Four
Anne	A1, A2, A3, A4	A1.1	A2.1	A3.1	A4.1	A1.2	A2.2	A3.2	A4.2
Steve	S1, S2, S3, S4	S1.1	S2.1	S3.1	S4.1	S1.2	S2.2	S3.2	S4.2

Table 3. Data collection of lesson plans

Observation

In addition to interviews, this research utilized data collected from observation of classroom teaching. These observations included descriptions of the physical setting, the participants, activities and interactions, conversation, subtle and unplanned factors, as well as the researcher's own behavior (Merriam, 2009). I observed in the role of non-participant as observer as I was an outsider of the group and took notes without direct involvement; however, I was observed by and noticed by those under study (Creswell, 2013).

I used the observational protocol of field notes taken in a chronological order utilizing the technique of observing for five minutes and recording notes for five minutes. The notes were descriptive (Creswell, 2013). The observations lasted approximately 45 minutes. Each participant was observed four times.

Artifacts and Documents

In order to describe and understand the situative and textural nature of this atypical case, I analyzed artifacts and documents relevant to the case. The artifacts included the original proposal for Anne and Steve's one-to-one program, their annual

reports of the program which they sent to the district, their purchasing requests and logs which they kept regarding technology issues, newspaper reports describing the program, the Edmodo site which Anne and Steve used to communicate with their students, and lesson plans and digital applications with which Anne and Steve used to teach. I met with participants as they described and analyzed four different lesson plans per participant that were written before tablet technology was introduced to the social studies program and after tablet technology was introduced in year one, and again in year two of implementation (See Table 2). This yielded 12 lesson plans per participant, for a total of 24 lessons analyzed and explicated for the data collection. In this comparison of lessons, I utilized informal interview techniques to ask participants to elaborate decision making processes while planning each lesson. Data in documents was used in the same manner as that from interviews and observations (Merriam, 2009). The documents assisted in triangulation, making comparative analyses, tracking changes, and illuminating the process of technology implementation.

Data Analysis

This research used Moustakas' (1994) modified Van Kaam method of phenomenological research to analyze all of the data, including the observations, interviews, and artifacts. The modified Van Kaam method applies the principles of Phenomenological Reduction, Imaginative Variation, and Synthesis of Meaning and Essences, into a rigorous and clear method for data analysis. Using the data and transcription of each participant:

1. *Listing and Preliminary Grouping*

List every expression relevant to the experience (Horizontilization)

2. *Reduction and Elimination:* To determine the Invariant

Constituents: test each expression for two requirements:

a. Does it contain a moment of the experience that is a necessary and sufficient constituent for understanding it?

b. is it possible to abstract and label it? If so, it is a horizon of the experience. Expressions not meeting the above requirements are eliminated or presented in more exact descriptive terms. The horizons that remain are the invariant constituents of the experience.

3. *Clustering and Thematizing the Invariant Constituents:* Cluster the invariant constituents of the experience that are related into a thematic label. The clustered and labeled constituents are the core themes of the experience.

4. *Final Identification of the Invariant Constituents and Themes by*

Application: Validation

Check the invariant constituents and their accompanying theme against the complete record of the research participant. (1) Are they expressed explicitly in the complete transcription? (2) Are they compatible if not explicitly expressed? (3) If they are not explicit or

compatible, they are not relevant to the co-researcher's experience and should be deleted.

5. Using the relevant, validated invariant constituents and themes, construct for each co-researcher an *Individual Textural Description* of the experience. Include verbatim examples from the transcribed interview.
6. Construct for each co-researcher an *Individual Structural Description* of the experience based on the Individual Textural Description and Imaginative Variation.
7. Construct *for each participant a Textural-Structural Description* of the meanings and essences of the experience, incorporating the invariant constituents and themes.

From the Individual Textural-Structural Descriptions, develop a Composite Description of the meanings and essences of the experience, representing the group as a whole. (pp. 120-121)

This research occurred within a case study design, and interviews, as well as the other data collection methods were used to add context and rich description to the case. An example of the ways that data were analyzed is included in Figure 5, below.

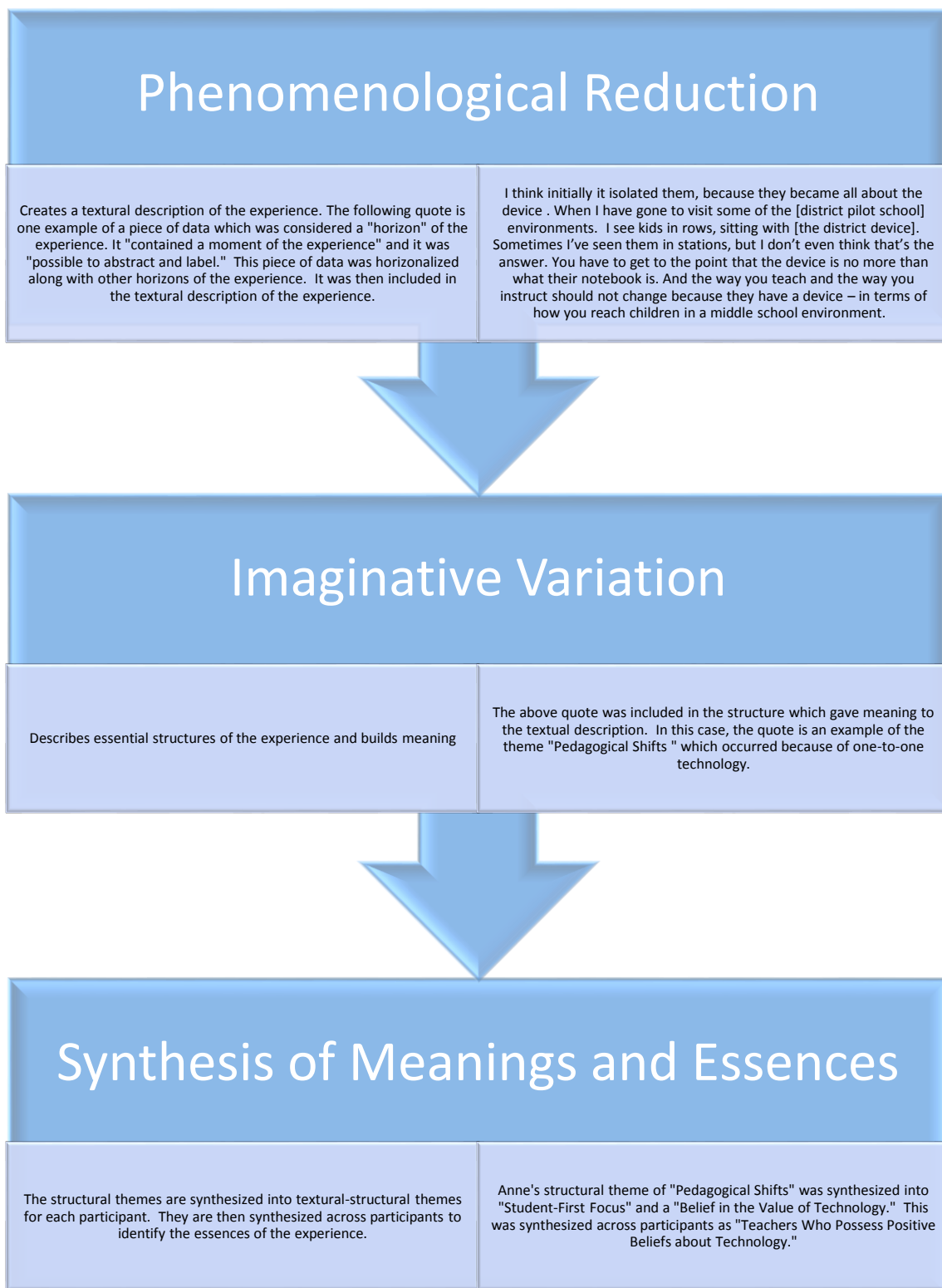


Figure 5. The modified Van Kaam Method

Specifically, I began analysis of the data using Nvivo, but felt that the layers of Nvivo prevented me from remaining close to the data. I then returned to a more traditional technique of printing out each transcribed interview, the observations, and the artifacts. Each participant's data was printed on color coded paper, so that it was immediately apparent which data was associated with each participant. I used the practice of phenomenological reduction by literally cutting apart the printed data. Each piece that contained a moment of the experience and could be abstracted and labeled was cut out from the printed data.

I then began the practice of horizontalizing the data. Using imaginative variation, I sorted the data into structural themes. As I played with the data and imagined potential themes, I created a large file card with the title of each possible theme. I sorted data into those possible structures and continued the imaginative variation of allowing themes to emerge from a pre-suppositionless state. All of the data, including observation, interview, and artifacts, were horizontalized. This practice also allowed for the triangulation of data across the different data sources, as they were sorted into different possible structural themes. Finally, after the process of imaginative variation was concluded, I was able to see the themes which supported the structure of each participant's narrative.

The data is presented in Chapter Four using the design of case study and the method of phenomenological analysis. The results begin with a description of the setting for the case. The case is bounded by the experience of two teachers, Anne and Steve (pseudonyms), who teach in the social studies department at Sherwood Middle School (pseudonym) and who initiated a one-to-one technology program in their classrooms.

Using case study design, the setting describes the nature of the case through the case's historical background, physical settings, and context (Stake, 2000). This study examines setting through description of the community surrounding the school, the school district, the school itself, the classrooms, the law and finance magnet program housed within Sherwood, and an overview of the one-to-one program.

Each participant's experience is described in narrative form. The narrative is a thick textural description of the participant's experience initiating and implementing a one-to-one program in his or her classroom. The narrative is a textural description of "the what," or *noema*, of the experience, based on interviews, observations, and artifacts, including lesson plans and digitally archived activities, which were shared by the participants. Using case study methodology, the multiple sources of data were triangulated to corroborate evidence of the experiences of the participants. Then, using phenomenological reduction, the data were examined for the two requirements that the modified Van Kaam method (Moustakas, 1994) indicates: "Does it contain a moment of the experience that is a necessary and sufficient constituent for understanding it?" and "Is it possible to abstract and label it?" (p. 120). The participants reviewed the description as part of the member checking process in order to help ensure the narrative reflected their voices and lived experiences.

Chapter four also reports the findings of themes, or underlying structures, that organize and give support to the textural experiences of the phenomenon. These themes reflect "the how," or *noesis*, of the experience. The core themes were identified using the modified Van Kaam method (Moustakas, 1994) which instructs the researcher to "Cluster the invariant constituents of the experience that are related into a thematic label.

The clustered and labeled constituents are the core themes of the experience” (p. 120). These structures were organized and analyzed as themes relevant to the experience.

For each participant, textural-structural themes were synthesized from the participant’s textural narrative and the narrative’s initial structural themes. Textural-structural themes weave through the entire narrative and are made manifest in experiences of the narrative. These textural-structural themes were analyzed in Chapter Four. After the initial analysis of both participants’ experiences with the phenomenon, these individual textural-structural themes were synthesized into a composite textural-structural analysis to identify the meanings and essences of the experience.

Ethics

To protect the social and emotional welfare of the participants, the researcher obtained approval from both Towson University’s International Review Board (IRB) and from the Baltimore County Public School’s IRB. Participants signed a consent form that notifies them of the research, the amount of time requested for interviews and observations, and their ability to participate or withdraw from participation at any time.

In addition to the standard protective measures of the IRB process, I also considered the ethical implications stemming from implicit roles of power dynamics between university researcher and partner PDS teachers. This dynamic is also complicated by my former role as social studies teacher within the same county as Sherwood, which means that the participants and I have shared acquaintances and colleagues. Additionally, I am a student in an educational technology program, which means that I have preconceived notions of what effective technology integration should

include. It is neither ethical nor possible to ignore these relationships and the ways that they may influence the research (Christians, 2000). These dynamics were acknowledged by me in the positionality statement and were considered in the *Epoche* and in the collection, analysis, and presentation of the data (Christians, 2000; Moustakas, 1996).

Credibility and Transferability

Qualitative research grounds itself in different assumptions about reality than quantitative research, thus different methods are used to ensure credibility (Merriam, 2009). First, the conceptualization of the study and procedures should match the question. This study concerns itself with perceptions and experiences, and the attendant case study design and phenomenological methodology fit with overall qualitative questions of “how” and “why” (Moustakas, 1994; Yin, 2008).

Additionally, qualitative research attempts to describe the reality and lived experience of participants. While it is impossible to fully capture an objective reality, member checking, returning to the participants and seeking to ensure that what is written fully represents the participants’ experiences, is a useful method to ensure credibility. For this study, I returned to the members after each interview, confirming that what I heard does accurately represent the lived experience of the participants. Additionally, as the data is in the iterative stages of analysis, I returned to the participants and member check again, to ensure that the themes and conclusions accurately represented the lived experience of the participants. In case study, it is traditional to also use triangulation to compare and cross-check data (Stake, 2000). I also engaged in reflexivity, particularly by practicing *Epoche* throughout the research study. This serves to make clear the role of

the researcher and allows fellow scholars to evaluate the work with a full understanding of the researcher's position (Merriam, 2009).

Qualitative research does not generalize; however, some can be transferrable. The responsibility of transferability does not rest with the researcher, but rather with those reading the research for application (Merriam, 2009). The researcher cannot know the ways in which ways others may try to transfer her work; instead, her responsibility is to make the work as detailed as possible so as to make transferability possible. The more clear the case and the more rich and thick the description of the findings, the more likely it is that a fellow scholar finds the case transferrable (Creswell, 2013; Merriam, 2009).

Limitations

It is necessary to consider the limitations of this study, both in terms of logistics and philosophy. Logistically, the study was limited by time with the participants. Their one-to-one initiative began before the research was approved. Some of the interview questions asked participants to recall events. Though this is not unusual in phenomenological research, it remains a limitation of the study. The study was also limited by the number of participants. In the case of this research, there were no other participants who experienced the phenomenon of initiating and implementing their own one-to-one program. The study was limited by location. The school environment in this study represents a magnet school contained within a public middle school in a majority-minority, high poverty location. This school is not representative of all schools across the region or the country.

The study was also limited by philosophy. Qualitative research must be comfortable with some forms of ambiguity. Case study and phenomenology lead to a narrative that is, by its nature, incomplete. Case study research describes a particular case bounded by specific experiences specific to its participants. Phenomenology recognizes that no experience can be perfectly understood. Data within this analysis is co-constructed by researcher and participant. The reader also participates in this co-construction and may understand the data through a different set of perceptions, feelings, and values.

Chapter Four

Findings

The results of this study are presented in terms of the participants' lived experiences as they relate to the phenomenon of initiating and implementing a one-to-one technology program in their social studies classrooms. The experience of the phenomenon, occurring in a bounded context, provided the clear borders of the case (Miles & Huberman, 1994). Within these borders, data, including observations, interviews, and artifacts, provided context for the phenomenon. The data from the case was analyzed through the lens of phenomenological analysis using the modified Van Kaam method (Moustakas, 1994).

The results begin with a description of the setting for the case. The case is bounded by the experience of two teachers, Anne and Steve¹ who teach in the social studies department at Sherwood Middle School² and who initiated a one-to-one technology program in their classrooms. Using case study design, the setting describes the nature of the case through the case's historical background, physical settings, and context (Stake, 2000). This study examines setting through description of the community surrounding the school, the school district, the school itself, the classrooms, the law and finance magnet program housed within Sherwood, and an overview of the one-to-one program. It explicitly examines context through the description of the

¹ The names of all participants, students, and the school have all been changed to pseudonyms.

² Pseudonym

genesis of the one-to-one initiative, as well as the programmatic changes made to the initiative because of the larger school district's directives.

Each participant's experience is described in narrative form, then the next section of the chapter reports the findings of themes, or underlying structures, that organize and give support to the textural experiences of the phenomenon. For each participant, textural-structural themes were synthesized from the participant's textural narrative and the narrative's initial structural themes. These textural-structural themes are analyzed in this chapter. The individual textural-structural themes were synthesized into a composite textural-structural analysis to identify the meanings and essences of the experience. This study analyzed the essence of their experiences initiating and implementing this program from the spring of 2011 through the spring of 2015. The results of the analysis are presented in this chapter.

The following research question is addressed throughout the narrative, analysis, and composite textural-structural synthesis: How do selected middle school social studies teachers perceive and describe the experience of conceptualizing and implementing a one-to-one program for tablet technology in their classrooms?

The sub-questions addressed throughout the narrative, analysis, and composite textural-structural synthesis are:

- a. How do selected middle school social studies teachers perceive and describe their experiences initiating a one-to-one program in their classrooms?

- b. How do selected middle school social studies teachers perceive and describe their experiences in integrating the technology into their classrooms?

Setting

To enter Sherwood Middle School, as when entering all schools within this district, visitors buzz in and are admitted directly to the office to register. While waiting for the doors to be remotely unlocked, visitors stand next to a three-foot-tall student-made sculpture of the school mascot. On the other side of the walkway is a long ramp, and when the weather is nice it is not unusual to see student bikes anchored to the railing on the ramp. Inside the front doors is a prominent display of student artwork, which is rotated throughout the year. On the brief walk to the office, visitors pass a glass-enclosed courtyard which surrounds a student-maintained sculpture garden and a six-foot-tall cascading waterfall that empties into a ten-foot-long pond. The courtyard connects to the cafeteria, and students may earn the privilege of accessing it during lunch. The space provides a relaxing and green view at the heart of the school and a location to host special events, like the eighth grade ice cream social.

Built in the early 1960s, the school is a one level building arranged in a long rectangular grid. One side of the school houses the cafeteria, art and music wing, audio visual (AV) lab, and the gymnasium. The courtyard at the center of the school is mirrored two more times down the opposite side of the grid. The additional courtyards do not include gardens or student work, but instead are slightly unkempt, grassy patches of green, each with an old tree stump rotting at its perimeter. Sidewalks through the courtyards suggest that the courtyards were once meant to be used as hallways, but now

access to these courtyards is restricted to the grounds crew who maintains them. Each grade level, from sixth through eighth, has its own hallway and corresponding courtyard. Sets of classroom windows open into the courtyards as well as along the front and back of the school. This is necessary, as the school has only recently been upgraded to include air conditioning units throughout.

The air conditioning and heat are less than consistent, despite the infrastructural upgrade, and teachers cannot control the temperatures in their classrooms. Often, the windows are open to cool off the classrooms once the weather warms up. Though each classroom includes a long bank of windows, the blinds usually need to be kept drawn in order for teachers to utilize the projectors for their laptops. Morning and afternoon glare makes it difficult for students to see the whiteboards when teachers are projecting lessons.

During classes, the halls are mostly quiet and empty of students. Students who are in the halls during class are usually there for a purpose, either to visit the nurse, the office, or the lavatory. This is not always the case, as sometimes a student is wandering somewhat aimlessly and sluggishly. The students who are wandering in the hall have a chronic tendency to be there, as the teachers who interrupt their wanderings almost always know the student's name and where he or she should be. Teachers are a regular presence in the hallways, especially department chairs who, like administrators, carry walkie-talkies. These teachers serve as seconds to the administrators, often acting in the role of disciplinarian when administrators are occupied elsewhere.

An example of this administrative role is illustrated on one of my visits to Sherwood. A large eighth grade boy, Tayvon³ was aimlessly running his hand down the bay of lockers while ambling down the hallway. The science department chair stopped Tayvon by saying, “Tayvon, I know Ms. Hinkley is missing you in math class right now.” Tayvon stopped and shifted his eyes up to the science chair, then he turned around. The teacher replied, “C’mon. I’ll walk you back down there.” The chair then accompanied Tayvon back to class. The entire interaction was calm and served to gently redirect the student back to his learning environment. This illustrates the general method for discipline and the greater school climate which treats students with respect, clear expectations, and kindness.

At the five-minute change of classes, the students stream into the hallway. Hallways are full, but not overcrowded at Sherwood. Teachers stand in the middle of the river of students, often calling out kudos to the kids as they push by. One of the social studies teachers, Mr. Hawkins⁴, offers fist bumps to students as they maneuver to their next class. Occasionally he interrupts the fist bumps to correct student behavior with a voice that booms across the entire hallway. “Althena leave Greg’s shirt alone!” “Ladies! Off to class!” Then he is back to fist bumps: “Honor, nice work on the homework today!” “Sheldon, I’m digging that (local professional football team) shirt!”

Classes at Sherwood are 90 minutes long, with four classes a day. The schedule rotates between “A” days and “B” days, so that over the course of two days, students take eight different classes. The school feels orderly, but not rigid. Classroom doors are

³ All names are pseudonyms

⁴ All names are pseudonyms

usually open, and it is easy to hear the students engaged with each other while they are learning. Occasionally, noise from an open classroom feels loud or disruptive instead of productive, but this is not a consistent nor a persistent problem. More often than not, students smile at me and greet me with “hello” and “what’s your name?” when I walk through the halls or into their classrooms. Because of the open doors, visible teachers and staff, and the usually positive attitudes of the students, Sherwood emanates a positive climate grounded in a commitment to the community of the school.

This overall sense of community is important, not least because the children at Sherwood represent the shifting demographics of the larger district, which has experienced an overall decrease in economic well-being. Pockets of the district remain well above the state and federal poverty level, but overall, families throughout the district are becoming poorer. Ten years ago, thirty-seven percent of students at Sherwood, and thirty-three percent of children in the district, received Free and Reduced Meals (FARMS). In 2015, sixty-eight percent of Sherwood’s students received FARMS, and forty-nine percent of the district’s students received FARMS (see Figure 6). The district and Sherwood have experienced challenges meeting the needs of their students while navigating rapid changes in socio-economic demographics. Local news reports regularly suggest that not all schools within the district have been able to maintain the positive school climate which I have observed at Sherwood.

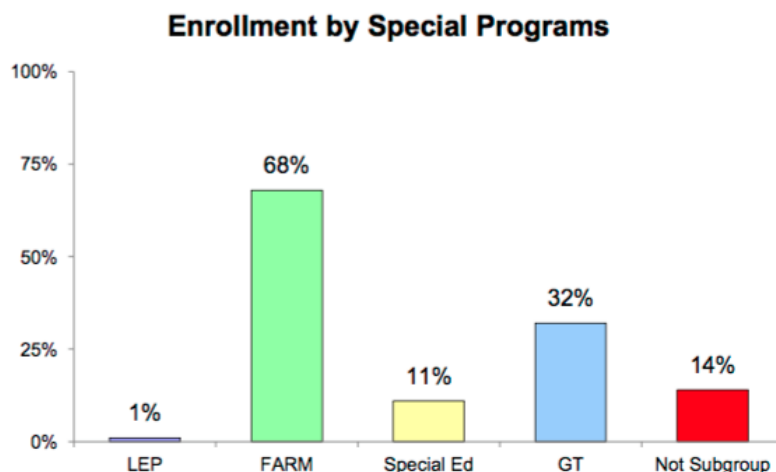


Figure 6. Enrollment of special programs at Sherwood Middle School

The demographics of race and ethnicity also impact Sherwood and its district. Sherwood is a majority-minority school, with sixty-six percent of Sherwood's students identifying as Black, six percent identifying as Latino, three percent identifying as two or more races, five percent identifying as Asian, and twenty percent identifying as White or Caucasian. Within the larger district, thirty-nine percent of students identify as Black, eight percent identify as Hispanic, and forty-two percent identify as White (See Figure 7). While most of the students at Sherwood identify as minority races, the majority of the teachers at Sherwood are Caucasian. In addition to students of diverse races and socio-economic conditions, Sherwood serves a special education population of ten percent. The numbers of Limited English Proficiency learners (LEP) at Sherwood is one percent of the population. A large portion of Sherwood's immigrant population is from Nigeria. These students are often bi-lingual in English and their native language and do not qualify as LEPs.

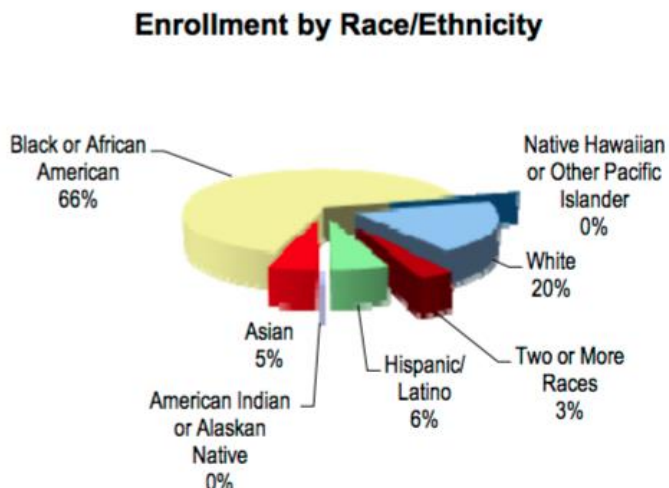


Figure 7. Enrollment demographics at Sherwood Middle School

Sherwood is part of a large suburban district which borders a major mid-Atlantic city, and Sherwood's school boundaries directly border the city. A row home community borders the school grounds that often serve as an unofficial back yard and park to the neighborhood. Many students walk to school, and a few bike, but Sherwood is also a magnet school for the district. The district awarded Sherwood its magnet status in the mid-1990s, partly to increase student enrollment. At the time, Sherwood was under-enrolled by about 350 students. Sherwood still serves its "home" population, but it also includes students attending one of its four magnet programs. The first three magnet programs awarded to Sherwood were its environmental science program, its performing arts program, and its visual arts program. The environmental science students are responsible for maintaining the green space by the office, while the visual arts students created the sculptures displayed at the entrance to Sherwood and in its sculpture garden.

Another result of Sherwood's magnet programs has been a significant increase in scores on state mandated assessments. The magnet students consistently performed in

the highest categories of success on the tests mandated by No Child Left Behind (NCLB) which increased Sherwood's overall performance rankings within the district and the state. One of the challenges of the magnet programs is that, despite the enrollment increase, the school only receives one extra staffing position per magnet program. This puts particular strain on departments which host programs, including the arts departments which are traditionally understaffed disciplines.

The law and finance magnet was added about three years after the initial magnet programs. It was originally titled "Life Skills." Within the district, "Life Skills" often connotes the content of self-contained special education classes. This led to confusion and misconceptions about the nature of the magnet program. In the late-1990s, the district decided every student at Sherwood should be enrolled in one of the magnet tracks, including the students who were districted to attend Sherwood. Students who did not apply to other programs were shuffled into the Life Skills magnet program, which led to a problem of "haves and have-nots." The program was rebranded as "Healthy, Wealthy, and Wise" with a focus on health management skills, finance, and law. The program rebranding occurred just as Sherwood underwent a tumultuous few years of constant turn-over in the administrative team. During this time, the administrator in charge of scheduling for the school left, and the scheduling codes for the entire program were inadvertently deleted from the computer.

The social studies department chair, Anne, used this as an opportunity to re-write all of the courses. The physical education department shared that it no longer wished to be part of the new program, but Anne and her department liked the social studies piece of the "Healthy, Wealthy, and Wise" magnet. Anne examined the high school magnet

programs around the district and decided to create a middle school program that could help students earn high school credit and prepare them for a high school social studies magnet. She then decided to create the only juvenile justice program for middle school students in her district. She wrote the proposal for each course and received approval from the Magnet Office and the Office of Social Studies. The sequence of courses which she created was: Grade Six Law and Finance, Grade Seven Law and Finance, and Grade Eight Juvenile Justice (1/2 credit) and Grade Eight Finance (1/2 credit). Each grade builds upon the skills and content of the former, with a focus on concepts in political science and economics. Upon completion of all of the courses, students may choose to take an exam which awards the student a half credit for high school juvenile justice. Additionally, the law and finance magnet prepares students to successfully enter a high school law magnet program.

After Anne re-wrote and re-branded the law and finance magnet program, the district realized that not all students at Sherwood preferred being in the magnet track. In the current iteration of Sherwood's magnet program, students from across the district may apply to any of Sherwood's four magnet programs. Students in Sherwood's home population may apply for a magnet track, or they may remain in a traditional middle school program. Application to the program is a blind process in which each student is awarded a random lottery number. In addition to the lottery number, students can earn points which give them a more advantageous lottery position. Points are earned based on grades in elementary school in addition to student performance on a reading comprehension test.

Currently, 70 total students are enrolled in the law and finance magnet program at Sherwood. Students eligible for transportation to Sherwood's magnet must live within the boundaries of six neighboring schools. The farthest eligible school is about 20 miles away, or about 40 minutes by school bus. Students who live in farther corners of the district must provide their own transportation. This has become an issue for the district, because the law and finance program is the only magnet of its kind in the district. In the 2014 school year, almost 200 students applied for the 20 available spots in the law and magnet program. Many of those students live outside the boundaries of district provided transportation, and finding an alternate means of transportation is difficult for these families.

A banner hanging in the hallway at Sherwood indicates that the school is a professional development partnership school with a local university. This partnership is the reason that I have a relationship with the school and the participants. In fall 2013, Sherwood agreed to allow my university to teach field-based methods courses in their school. I first met Anne in August of 2013 to discuss the course and the partnership between Sherwood and my university. While discussing the logistics of the partnership, we also talked about my own experiences as a former social studies teacher in Anne's district and my current doctoral studies in Educational Technology. Anne immediately grew excited and shared that she and her colleague, Steve, had started their own one-to-one program for social studies. She explained that the program was in the beginning stages and she often referred to it as an attempt at a paperless classroom. Anne indicated that they both were finding the struggles and the rewards to be interesting and meaningful for the students. Anne also volunteered that if I ever wanted to learn more about the

initiative at Sherwood, that she and Steve would be excited to share what they were learning and experiencing.

Every fall since 2013, I have taught the methods course at Sherwood. The course meets in a different social studies teacher's classroom each week. The pre-service teachers and I observe the in-service teachers and their students. Anne and I communicate in person and via email about the structure and organization of the methods classes as well as the observation schedule for the course. For the past three years, my university students and I have spent one and half hours a week each fall semester, in the classrooms of Anne's department. Because of this, I have developed a relationship with Anne and Steve (pseudonym), as well as with the larger social studies department.

The social studies department consists of seven full time teachers. Of those seven teachers, two, Anne and Steve, teach all of the Law and Finance magnet courses which are housed within the social studies department. The Law and Finance program consists of elective social studies courses which students take in sixth, seventh, and eighth grade. Students take these courses in addition to the established grade six, seven, and eight social studies curriculum. Upon completion of these courses, students may take an exam which awards them credit for high school courses in juvenile justice. The program also prepares students to enter a district supported law magnet program for high school.

Anne has taught at Sherwood for the past 17 of her 21 years in the profession. She has served as chair of the Sherwood social studies department for those 17 years. She teaches all of the eighth grade magnet students, some of the seventh grade magnet students, and eighth grade US History. Steve is the school's technology liaison as well as

a full time social studies teacher. He teaches the sixth and seventh grade magnet students. Steve has been a teacher for 14 years and a technology liaison for 11 years. Prior to his full time teaching experience, he was a para-educator for four years while he earned his teaching degree.

Before Anne and Steve's technology initiative, Sherwood had four computer labs, with about 30 Dell desktop computers in each and a laptop cart of 28 computers to share between all teachers and students. Each classroom included at least one desktop for the teacher, and about half of the classrooms included three or four desktops in the back of the classroom for student use. In 2013, a little more than half the teachers used school provided laptops instead of the desktop computers. Each classroom included a projector and screen.

Anne is a self-described "techie" and found herself booking the school's computer lab nearly every day for her law and finance magnet students. Likewise, Steve regularly utilized the computer lab for daily assignments and long term projects like the Stock Market Game. As the school district moved toward computer-based assessments for annual testing in Science, and eventually for all students in Partnership for Assessment of Readiness in College and Careers (PARCC), Anne and Steve were finding it difficult to schedule lab time. In the spring of 2011, Anne asked Steve if they could simply schedule their courses to meet in a lab instead of a classroom (see Figure 8). Timeline of Sherwood's one-to-one initiative). Steve countered that this solution probably would not be fair because they would permanently occupy one of the school's labs and make it fully impossible for other teachers to use. As technology liaison, Steve had recently attended the technology and education conference, International Society for

Technology in Education (ISTE), at which he explored the possibility of one-to-one tablets. He suggested to Anne that they should develop a one-to-one program and ask the magnet program for money to fund it.

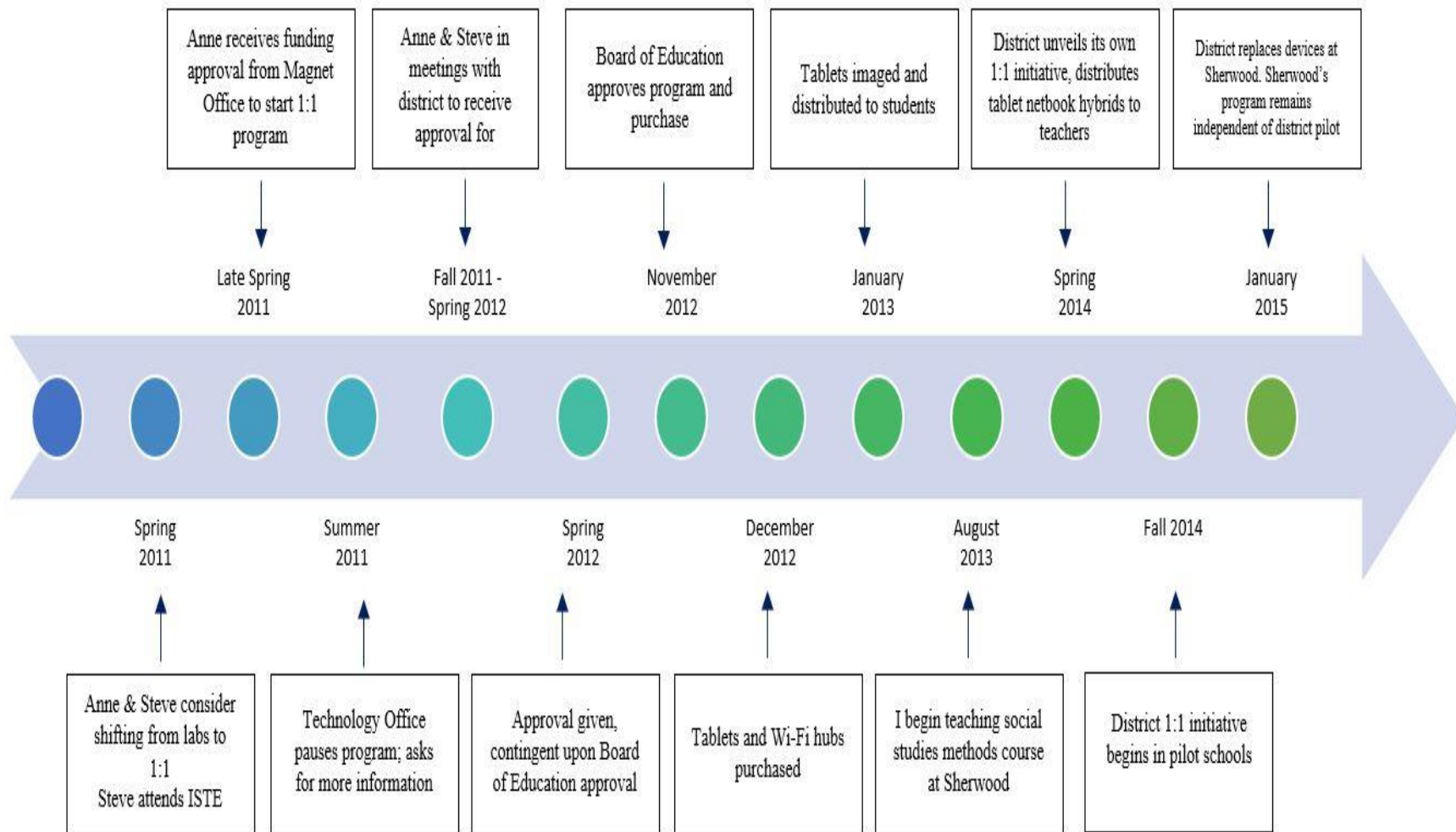


Figure 8. Timeline of Sherwood's one-to-one initiative

Sherwood's One-to-One Program

Anne and Steve's one-to-one program has three phases: (1) conception of the program, including the processes of funding and approval, (2) implementation of the technology, and (3) programmatic changes made as the district established its own one-to-one program. The conception of the program provides context for the ways in which Anne and Steve implemented the program. Additionally, in 2014, the district moved forward with its own one-to-one initiative, which impacts Anne's and Steve's individual experiences of implementation and provides further context to their experiences and programmatic decisions. This section of the narrative describes the program and provides context surrounding conception of the program and the changes to the program due to district initiatives. Anne's specific experiences with the program and in implementing technology and Steve's specific experiences with the program and in implementing technology are examined in the next portion of the narrative.

Conception of Program

Anne felt that she and Steve "were really clogging up the labs" because they were using them almost every day for class. Anne suggested they stop trying to book classes in the labs, and instead, schedule all magnet courses in a lab. Steve countered:

As the person doing the teaching, that sounded very attractive, as the person running the technology for the school, I had to say, "Wait a second. No because then no one else can ever get in there. That's not fair for us to monopolize. And we're already monopolizing!" But now nobody would even have the chance to boot us out.

Anne acknowledged that it was “unfortunately, not too equitable for our other students.” At about this time, iPads and other tablets were emerging as lightweight possibilities for a one-to-one program. Steve suggested that they consider a one-to-one program for the magnet, and Anne and Steve decided to research this possibility.

First, they considered netbooks or laptops. Anne says she kept asking the question, “What’s going to be the best for our kids?” Anne explains they considered whether they would need wireless bases and hubs and if the electricity in the classrooms would need to be updated. Steve researched possible vendors for both hardware and software at the International Society for Technology in Education (ISTE), a conference at which his principal supported his attendance. He proposed to Anne that they purchase tablet hardware which ran Android based software. Steve felt that he and Anne were pre-disposed to the Android software, because they both used Android based phones and had a certain level of familiarity with it. The main reason that they chose this particular Android software was that the software afforded them a great deal of autonomy in management. As Steve explains:

...What really attracted me to their program was the management side of it. Because their software, the tablets themselves are android tablets, but they're locked down so the kids are very limited as to changes they can make on them. We, though, would have the remote ability to add and remove apps, to ... deploy the curriculum directly to the devices, so even when the kids were offline at home or traveling, they would still have everything on there. It really, it looked to be the best of all the worlds out there.

They rejected the idea of iPads because the devices were more expensive and did not allow for the same kind of management and administrator access. They also rejected traditional laptops because of a concern about battery life. They wanted the students to have an all day battery charge, and at the time, laptops and netbooks did not yet have those capabilities. After Anne and Steve settled on a software and hardware program, as well as ensuring that they could purchase any necessary infrastructure to support the program, Anne contacted the Magnet Program Office to see if this was something they would consider funding.

Process of Funding and Approval

The Magnet Office examines the budgets of the magnet programs throughout the district each Spring, and it encourages the programs to create funding requests. Allocation of these requests is dependent upon the purpose and need. Curricular needs receive precedence. The Magnet Office suggested Anne write a proposal for the program, which she and Steve did in the spring of 2011. They called their project, “The Paperless Classroom” and began drafting their proposal.

Anne and Steve priced out the cost of 70 tablet devices plus support for the wireless network at their school and created a detailed spreadsheet itemizing costs for devices, insurance, cases, and wireless upgrades. They asked for \$35,000 to fund the one-to-one Android-tablet program. According to the document Anne and Steve submitted to the Magnet Office, the justification for the program was to engage students. The document proposed that:

Tablets are the next step in the 21st century classroom, and further the goal of

making the student the center of learning. No longer will students have to come to the front of the room to interact, or travel to a lab for computer access. All of their files, programs, and assignments will be located on one device that can travel with them between school and home.

The Magnet Office approved their request for \$35,000 to support student centered learning, and Anne and Steve thought they would be able to implement the devices for the 2011-2012 school year. However, because Anne and Steve were asking for technology, the Office of Technology also needed to approve their request. The Office of Technology is comprised of two offices, the Office of Technology Education, and the Office of Technology Support Services. Both offices needed to approve the purchase. The Office of Technology increased the budget of the project to \$200,000, to “allow for growth of the program.” The Office of Technology Education wanted this program to serve as a one-to-one pilot which could later be implemented across all of Sherwood, and perhaps the larger district.

The new budget of \$200,000 dollars caused significantly more obstacles with other offices within the district. It took Anne and Steve 15 months of meetings to finally receive approval and funding for their program. Anne explained that during these many meetings, her principal was:

Very supportive because she knew that Steve and I – if any two teachers who had the knowledge to be able to run it – she trusted us to be able to say, “Okay, we really understand what we’re doing. We have all the specs, we have all the finances worked out, we have the program support, we think this could be really

beneficial to the kids and we need real time access.”... And that was one of our strongest arguments that we really need real-time access.

During a separate interview, Anne again described her principal as having, “...confidence in us as educators and as tech people. So that’s been powerful.” In a local newspaper article, printed shortly after the program finally began, Anne’s principal echoes these sentiments. In the article, the principal also explained how excited she was for the program to potentially be replicated throughout the entire school, not just for the magnet students.

Steve refers to those months as running up against “the hard wall of policy.” He notes things “just got dragged down or bogged down. That first year, nothing got purchased.” They spent much of that year scheduling meetings with various offices throughout the district and explaining and re-explaining the program. Each person with whom they met offered them some version of, as Steve recalled it, “Yeah! This is a great idea! Now you just have these extra steps you have to do.” Steve examines his feelings on this experience by calling it a:

...complete and utter roller coaster...I mean, it’s amazing I didn’t go on medication through this process (he laughs here) because I had so many ups and downs. I’m not sure there’s a strong enough word I can say (on a recorded interview) about how frustrating it was.

His frustration centered around his issue with the “wall of policy” and what he saw as concerned central office employees. Steve noted that in the meetings all of the attendees would praise the idea of the program and the possibilities of the technology, but then the

district would put up roadblocks to make it more difficult to bring the possibilities to fruition.

By the end of the 2011-2012 school year, Anne and Steve felt sure they had finally jumped through all of the necessary hoops and paperwork, so they re-approached the Magnet Office to ensure they still had money. The Magnet Office assured them funds were still available. With a sense of relief, Steve and Anne moved forward under the assumption the tablets would be purchased over the summer of 2012 and in place for use in the 2012-2013 school year. Steve recalls they “even made the mistake of telling our students... “You’re going to start this next year!”” and notes how excited the students were. They hosted a parent information session to share plans for the program.

Then, they ran into problems with purchasing. In Steve’s words, “Purchasing was a whole other mess of red tape to get through, and that was all summer getting through that.” After purchasing approved the funds, Steve and Anne were told they needed to attend a Board of Education meeting for the final approval, since the project was now large enough to merit the Board’s attention. It took two more months to get on the board’s agenda. In November of 2012, Anne attended the Board meeting to make the request for the money.

Anne presented the proposal before the Board. She and Steve decided she would present because she had experience presenting other agenda items before the Board of Education. Additionally, as Anne explains, Steve is “brutally honest” and less politic than is necessary when meeting with the Board of Education. The Board hesitated to approve the funds because the proposal granted the program up to \$200,000 for five

years, even though Anne and Steve had only requested \$35,000. The increase in funds was added by the Office of Technology in order to support potential expansion of the program to all of Sherwood Middle School. The Board interpreted the statement as a \$200,000 budget every year, for five years, for a total of a one-million-dollar funding request. Anne explained to the Board that the wording of the proposal was misleading, and finally, in November of 2012, the Board approved the funding.

Anne and Steve began to purchase and set up the wireless hubs for the tablets. Despite receiving the Board's approval, Anne and Steve still needed each purchase approved through the Office of Purchasing. At the end of December 2012, the Android-based tablets arrived and the company which sold the software came out for a two-day training. Anne explains this experience:

We brought them [the software people] for a day or two for training. Now that was an interesting process. It was supposed to be really a lot of training and they didn't do any more than we did in terms of how they implement it... So even though we had that as part of our project and program, that was probably one of the weaknesses, but it wasn't due to our lack of preparedness; it was really due to the specialist. They didn't really know how it was implemented. They understood what they provided, but we needed probably... they needed probably real-time teachers to present their software.

Finally, in January of 2013, Anne and Steve were able to distribute the tablets to the students. Their individual experiences integrating the technology into their classrooms are examined in further detail later in this narrative.

Programmatic Changes Due to District-Wide Initiative

Two years into Sherwood's one-to-one initiative, Anne's school system began to prepare for a district-wide one-to-one initiative. Unlike Sherwood's program, the district was not allowing students to take the devices home with them after school. The district initiative was in no way related to Sherwood's initiative. The district did not house this new initiative in its Office of Technology. Instead, it placed this initiative in the Office of Innovative Learning. Staff hired for the new initiative were unaware that Sherwood's pilot was underway and were further unaware that the Office of Technology had hoped to see Sherwood's pilot become a test for larger, district-wide one-to-one programs.

By the spring of 2014, the district had chosen its own one-to-one device, a tablet-netbook hybrid. Every teacher within the district received a device, and the district chose ten elementary schools to pilot the program in first and third grades. In the summer of 2014, the teachers in the chosen pilot schools received a month of professional development to support integration of the devices. The ten elementary schools piloted the new program in 2014-2015.

Sherwood applied to become one of the seven middle school pilot schools slated to begin their programs in 2015-2016. Anne, Steve, and the principal of Sherwood felt sure they would be chosen as a pilot, given their existing program and coupled with encouragement they received from the Office of Innovation. Despite Sherwood's established one-to-one program, it was not chosen to be a pilot school. Anne uses the following words to describe her feelings about this rejection, "You know," here she

pauses for a few moments, then continues, “we’re trying to give our voice so that they allow teachers to be heard in this process.”

The district began to make changes in its wireless infrastructure across the county in order to support the upcoming initiative. It also mandated that all grading be completed through a unified learning management system. This system served as a host for content, a place for students to submit work, and a way to report out student grades. It was an amalgam of several different software programs which all communicated with each other.

When the Sherwood students returned to school in 2014, their devices no longer ran on the district’s wireless service. The changes had once again rendered the firewalls an obstacle to Sherwood’s devices. Steve said:

Everything was extremely slow and painful to the point where it was becoming hard to teach. The technology was keeping us from teaching. The final nail that really got the coffin open <laughter> I guess it was when (the district’s learning management system) stopped working.

The district tweaked the learning management system, so that it needed a google chrome update. Sherwood’s device had Chrome built in to the OS itself, and they could not change it short of reimaging all 75 machines. Steve and Anne found themselves in a situation where they could not use the new tools that the district expected them to use.

During this period, Sherwood’s devices had also aged and slowed. Sherwood tried to replace its tablets, but the district had placed a moratorium on all technology purchases that were not consistent with the tablet-netbook hybrid it had adopted. The

district signed an exclusive contract with a hardware company to provide tablet-netbooks for all teachers and students within the district. Though Anne and Steve and their administrative team applied to be a middle school pilot, the district rejected their application. This meant that Anne and Steve could not purchase a new set of tablets for their students, since the district could only approve purchases with the new hardware company. Sherwood's program used devices that cost about \$450 including insurance and protective cases, while the district's devices cost about \$1500 including insurance. The new cost proved out of reach for Anne and Steve.

Anne recalls that Steve was particularly frustrated by this, and she notes that he is "one of the best people in terms of he will let you know his opinion, especially if he gets frustrated." With the support of their principal, Steve continually tried to schedule meetings with the district to discuss the possibility of upgrading Sherwood's devices. Anne remembers him on the phone with the district offices saying, "Look, we need to talk. We need to show you (the district) what our success has been, what our challenges have been, and while doing so, would you like to switch us over to the (district devices)?" Anne also recounts that their meetings kept getting cancelled. She describes a time when they drove over to the central offices to:

...have a meeting with all the big wigs of techs and the (new district devices), and it was canceled. We were in the parking garage, and they canceled. We were like: is this a sign?

Steve had tried since the spring of 2014 to schedule a meeting with the district about their devices. In the meantime, the district had conducted a survey with several

schools, asking the schools what they thought about several different possible one-to-one devices. Steve, in his wry manner, noted that the final choice of the district was not even among the choices which they brought out to the schools. Finally, district central office staff agreed to meet with Steve, Anne, and the Sherwood principal in November of 2014. At that meeting, one of the district representatives agreed to replace all of Sherwood's old tablets with the new, district approved, tablet-netbook hybrid.

In November of 2014, Steve convinced the district to replace their 70 outdated devices with the new, district approved technology. Sherwood would continue to operate its one-to-one program as it had been, allowing students to transport devices to and from school. The technology office was interested because they wanted a test subject to determine how well the devices were able to be transported and used outside the school building. Sherwood would be the only school in the district which allowed and expected the students to take the devices home with them.

The district agreed to this request, but stipulated Sherwood would not be an official pilot school of the district. What this has come to mean for Sherwood is that it does not receive technology support, and Anne and Steve do not receive the professional development the official pilot schools enjoy. Despite the district's professed desire to learn how the devices responded to the transport to and from school, Anne says, "I have to tell you though, they don't ask us... they really don't ask our opinions. So we often seek them out because we're concerned."

At this point, while the Sherwood program received new devices, Anne and Steve also lost a certain amount of autonomy and access which their initial program

provided. The configuration of the new devices did not allow Anne and Steve to have administrative privileges like their old software allowed. The district controlled all of the software on the devices and did not provide administrative privileges for the teachers. With the district controlled devices, Steve and Anne were no longer free to add apps as long as they were free and had permission from the developer. The district also mandated a particular system for turning in work. All work needed to be submitted through the district learning management system; however, the system was set up to only accept Microsoft documents. Steve and Anne had students completing pdf files, which they were then unable to grade because the district did not allow them to be submitted in the system.

The change-over to the district devices provides an unexpected, but interesting coda to the experience of Anne and Steve as they conceived of and implemented their own one-to-one program in their social studies classrooms. They no longer lead a program which they fully conceived and implemented, instead, they lead a program within the bounds of their district-wide one-to-one initiative. The change in their program yielded descriptions of their experience which differed from the descriptions of their wholly teacher-led initiative. These descriptions are examined in each participant's narrative.

Anne

Whenever I meet with Anne, an 11, 12, or 13 year-olds often pokes their head in the door to say hello, to ask a question about class, or to see if they (and usually several of their friends) can eat lunch with her. Teachers stop by just as frequently, and often

for the same reasons. Anne's classroom is decorated with an American flag the size of her entire classroom side wall, which is made up of individual pieces of red, white, and blue printer paper. Each piece of paper has law, finance, and United States history vocabulary on it. Anne has 138 of these papers which comprise the flag. On the other side of the classroom is a poster which explains that the only way to fail is to never try in the first place. Next to this is a clever cartoon poster of cows demonstrating different forms of governments and economies. The desk arrangement alternates, depending on the day and the content. Sometimes, desks are arranged in tables and sometimes ordered in a discussion shaped "U" formation. During some classes, there are more students than desks, and so students sit at the front board, teacher's station, or at Anne's desk. Occasionally, students prop themselves on the back windowsill if seats are all taken. The general atmosphere of the classroom mirrors Anne's professional personality.

Anne herself is poised, professional, and warm. She refers to her colleagues as Mr. and Ms. Surnames, and often calls her students by the same. She has been named Teacher-of-the-Year by her school system, sponsors several clubs, served as magnet program coordinator, and chairs the social studies department. When asked about her career in teaching, Anne explains that she did not plan on becoming a teacher and began college as a pre-law student. However, she credits several amazing history professors, as well as her love of children, with her career change. Anne also earned a master's degree in technology education, and she describes herself as "having a propensity to use more technology than most teachers."

When Anne first started teaching 21 years ago, she wanted to teach an internet course. She ran a line from her classroom to the library and connected to the state

university's Gopher system in order to teach the course. Anne continues to use technology in her classes. The law and finance program Anne helps teach at Sherwood utilizes real-time case work law, current statistics on juvenile justice, and stock market data. Instead of printing pages of Excel sheets, she prefers students visit the Department of Justice website and access the data themselves. Additionally, she found if she printed data sets or case law, she could not save it from year to year because it immediately became outdated. In order for Anne to access this information, she regularly scheduled her classes to meet in one of Sherwood's computer labs.

Eventually, she realized she was monopolizing the labs, and she and Steve initiated a one-to-one program for their law and finance students (see "Sherwood's One-to-One Program" section above for a detailed examination of the program's description). The one-to-one program utilized Android-based tablets with software that allowed Anne and Steve to easily add and remove apps. The program was named "The Paperless Classroom," and Anne decided to "radically implement" the technology.

Once the devices were formatted and ready for student use, Anne and Steve distributed the tablets to the students. In Anne's words,

The kids got them. And then the kids broke them. Because we only provided the case. And the kids would stick them in their backpacks as we would expect them to do. And the backpacks hit the ground.

She noted that because of the dropped tablets, the corners of the devices were regularly being dented, which made the power switch difficult to manipulate on and off. Almost immediately after the devices were distributed, Anne and Steve were purchasing new,

sturdier cases for the students. The students also had difficulty with certain keys popping off of the keyboard attachment. After multiple reports of broken keyboards, Anne decided to stop sending the keyboards home with the students. In class, if students preferred, they could use the keyboard attachments, but the students needed to leave the keyboards in the classroom after class finished. Anne kept a detailed log of each incident, which she included in her annual report to the Magnet Office.

Anne felt the treatment of the devices was not the greatest difficulty in implementation. She had anticipated that her students would be able to use multiple applications and navigate through different activities. She explains:

The biggest challenge is my kids were not productive natives. We talk about students being digital natives, and that term frustrates me, because they're really not. They're social media natives and they can get around their Snap Chat, their Kik ... you know, they can get around all of those. But when you ask them to have different productive softwares open at the same time and have to manage that, that was not easy.

Anne reflected on her surprise at the students' difficulties in using technology for learning. She also expressed her thoughts on the challenges for her students of navigating different windows and tabs. Anne felt this was a drawback of the software she and Steve chose. The operating system would not allow for split screens, which meant navigation between multiple applications was cumbersome for the students. She felt her students had particular trouble reading and gathering information and then navigating back to an app to organize and analyze the information they had gathered.

Anne re-grouped and changed her approach to instruction. She picked no more than five apps to work on during a unit and began to:

...train (the students) on how to use those, not just the internet, but these apps...because they had never used them in that fashion (to manipulate content and produce educational content).

This entire process took about a month. Anne describes the entire initiation period as “evolutionary process.”

Throughout the experience of integrating one-to-one tablets, Anne says, “There was a war with me going on...I still have to get my curriculum taught.” She recalls the ways that technology could complicate curriculum:

Do they understand these macroeconomic concepts which are challenging to begin with, and then I throw this tech in that I didn’t anticipate to be challenging ... but is.

Anne’s philosophy from the start of the initiative was that she would go “full on tech.” She self-imposed a rule that she would not use paper the first year of the program. In her report to the Magnet Office, she describes her approach as “radical.” There were times that this approach limited her ability to teach.

In the course of our interviews, she often recalls the trouble she had trying to have students complete a digital Venn-diagram to compare command and capitalist economies. She was unable to find any satisfactory technology that allowed students to easily fill in a Venn-diagram. Anne considered crafting a three column chart, but she

realized that it did not provide the same visual map as a Venn-diagram, which clearly shows the overlapping area representing shared traits. She tried to have students draw circles in Word and create their own Venn-diagram, but then students experienced difficulty with the “fill” and “layer” features, which meant that text or portions of the circles would disappear on the screen. Short of having the students take out a pencil and paper and draw the two overlapping circles, she felt stumped and frustrated by the limits of the technology for simple tasks.

After the first year, she says she thought to herself,

What am I doing? Because I didn’t want to use paper, but I wanted to use manipulatives. And I’ve got to understand that I can still do that and still use the devices and that can be a good marriage.

Her expectations were that kids would be, “Toggling back between apps, accessing the information, using apps to disseminate or apply it and showcase their knowledge.” She says that she initially imagined

...they’re going to be in groups. One group’s going to be doing one thing, another group’s going to be doing another thing... I expected to be like this world of differentiation...and that was not my reality. I really wanted it to be my reality, and I really worked hard at it.

Anne felt this could not be the reality because the students did not have the necessary familiarity with technology as an educational tool.

For kids, we had to multitask through different tabs and we had to keep going back, so we found that challenging in terms of when they had to read or gather information at times. I would have on each [PowerPoint] slide, “Okay, we’re going to use this app this minute, and then we’re going to this app...” I didn’t just use one app a day in the beginning; I tried to use like 5. I stopped that. I stopped that rather quickly because I was really surprised that my kids ... I guess I just expected because they use their phones all the time for everything that they knew everything.

She felt she “could only do so much,” but she was still committed to a differentiated and digital classroom. She re-thought what her classroom would look like, including the physical set up.

So, I really had to rethink a lot of times what my classroom looked like how to set up my classroom, because I wanted kids to be fluid, and at the beginning I was really scared because they would drop and then they would get damaged and then ... and that’s a concern. Um... just even physical structure of your room.

She tried to imagine how students might be working once they graduated; she considered what it might look like to be working in a GE lab, and she tried to model her classroom around that. She argued to herself that in a real-world environment, people use a combination of innovative technologies and traditional analogue technologies like paper and pencil. Anne says:

There is a duality in this whole digital medium. I don’t know if we’re at a good place yet. I don’t think we’re at a good blend. Across every article I read, I mean,

there is always one person who takes one real strong viewpoint and another takes the other. I think it's a blended. I think the concept of blended classroom is the ideal.

At one point, Anne tried flipping her classroom, but she said it was "a disaster." She noted that her middle school students do not always do their homework, which meant that she was not "differentiating for instruction," she was, "differentiating for kids not doing their homework." In addition to those students not doing the required work, some were unable to do the required work because they did not have wireless access at home. After the district began to ready itself for its own one-to-one program, it provided Sherwood's students with wireless sticks, so that they could more readily use their devices at home.

Anne also talks about her frustrations with technology in terms of her own beliefs about teaching, instruction, and assessment. She recalls the hours she can spend at night looking for an app to help instruction, and her own personal struggles with knowing "when to say when." She says sometimes she cannot always look for something new. She examines her feelings on this dilemma:

Sometimes I have to settle for what I know. And for me personally and professionally, that is really hard. Because I'm the type of person you know in my career who <pause> I am somewhat of a perfectionist and so <pause> when things don't work in the classroom <sigh> I get very frustrated and I take it on myself. I am very self-critical.

Particularly upsetting to Anne is the possibility that Sherwood's magnet program may have lost students because of low grades, and she worries that some grades reflected a challenges with the technology rather than a difficulty with learning the content. She says,

It wasn't the kid's fault... they did the work and didn't save it properly. And now we're counting it against them grade-wise. I don't want to lose kids because of technology." She describes this as "another professional hurdle that was really hard for me.

Sherwood has a high mobility rate, and Anne feels especially sensitive and committed to serving the students who attend the school. She said, "We can't lose kids because they can't get a certain grade because they can't do the technology or their parents can't."

The affordances of the mobile devices have allowed Anne "different types of creativity" that she feels she could not have done without the one-to-one technology:

I've done different assignments where they take pictures and then have to submit the pictures or create a collage to represent something. So I think it's allowed me some different types of creativity that would have taken me longer before. Like, oh you need to gather pictures at home. You need to bring in magazines or some of that kind of stuff that have been really helpful. Also, I've been able to do QR code assignments or gathering of information.

She will set up scavenger hunts throughout the school building and used QR codes to help students gather information. She says that now she does not feel she needs a

worksheet to provide instruction or content. She compares the technology of the computer lab with the technology affordances of mobile one-to-one devices:

While it was very tech-based before, now I can send them to a variety of things. I can send them to a video. I can send them to a podcast. I can send them in a lot of different ways not only based on their ability level, but based on their learning style...it's opened up this whole cornucopia of resources.

Students not only utilize different modalities for acquiring information, in Anne's classroom, they use different modalities to produce knowledge and demonstrate understanding of knowledge:

The additional thing that I think was very interesting when I started doing it is the way in which kids can present products. It was all paper before. I mean they could draw or they could write, but pretty much that's what they did. Now I have kids who can create something or they can record you know their own information; they don't have to have it in a text fashion.

She follows this up by stating that she tells the students, "This is what you have to prove to me. How you do it is your choice." She says she still receives a lot of PowerPoints, but she also receives collages, videos, and podcasts. Anne also allows the students to take notes in whatever form makes the most sense for them, "as long as it drops into their notebook, and I have a ready place to check it."

Anne explains that she became a social studies teacher because of her passion for history and her love of children. She has been awarded Teacher-of-the-Year by her

district and describes herself as, "...confident in my knowledge of my content, subject matter, and I love a lot of strategies. I never stick with one strategy."

Even so, when we sit down to review changes in her lessons over time, from before the one-to-one program and since the one-to-one program, she explains how shocked she was to see her former reliance on worksheets and more traditional forms of instruction. She says, as she looks back on her lessons from before technology that they were, "...very one- or two-dimensional." If the curriculum called for a resource sheet, she felt she "...had to use that resource sheet," and if it called for a reference to the text book, she "...had to use the textbook." It is not how she remembers herself teaching at the time; at the time, she thought she was being innovative in instruction. However, she says that she has changed so much as a teacher since the one-to-one initiative, that, in her opinion, her old lessons "weren't so great."

When learning about juvenile justice, students now complete a murder investigation using sources from across the internet. The students asked, "Who would be the most likely suspect (in a murder case they were examining)?" and "What would their profile look like?" Students first examined photographs of the crime scene. Anne used the devices as "stations" for a gallery walk activity. The lesson plan describes this as:

Students will break into groups and do a "gallery walk" around the classroom looking at the different crime scene photos. A timer will be posted on the board to keep students on task and give them a time limit to complete the associated chart (Evidence chart Part 1).

What this looked like in action was students accessing photos online, and then using the zoom-in feature on their screens to better view pieces of evidence within the photos. They worked in groups to do this, examining a different photo at each station. There was a drawback to this portion of the lesson. Anne explains:

My gallery walk did not go as expected. Since the students already opened the evidence photos file on [the district learning management system], there was no need to do the gallery walk. It was not my intention for them to be able to have the access until the time was ready after the gallery walk; however, since all of my files were posted, students had the access right away.

After examining evidence through online sources, including interrogation records, crime scene photos, and fingerprint analysis, they work cooperatively via the cloud to analyze the resources and argue over who the murder suspect is and why. Anne noted that some students decided to use the cloud to share information which supported their arguments about suspects.

My kids were completing a murder investigation. And the kids came to me and they said, "Look, we're pressed for time because we were arguing over a particular murder suspect." They said, "Can we divide up the source and share it? You know, share our information?" I said, okay. So that group decided to do that. Now the other groups were working in different ways.

After the group completed its analysis of the crime, they needed to decide how to charge the suspect. The next question they examined was, "What was the degree of murder? Why?" Students drew on their prior content knowledge about degrees of murder, then

utilized evidence from the case to support their claims about the degree of murder with which they should charge the suspect.

In another lesson, students analyzed and evaluated the shift in China's economy from command to capitalist. Eventually, they needed to answer the question "Would the nation or individual be better off in a command or market economy?" Before the lesson started, Anne had copied and pasted the inquiry question on the bottom of every PowerPoint slide and every online activity that she had created for the students. Students found evidence from CNN videos, news articles, and from research through the district's online library media resources. She virtually jigsawed the students so that they worked together to complete a shared resource in the cloud. She differentiated the reading and videos by pre-selecting groups based on student reading ability. Some students utilized more video or different readings. When modeling the activity, Anne not only modeled the content she expected to see as evidence for claims, but also how to use technology to capture that content. She also modeled her metacognitive thought process by saying, "this comment feature is a great way, when you're reading something, to reflect on your reading and put a comment in the reading." Finally, students needed to answer the inquiry question for the day and support their answer with evidentiary claims from the sources they researched online. In Anne's lesson this is completed by:

Part III: Conclusion and Reflection: Go to Today's Meet-

AnneLastNameFinance (No Space)

[https://todaysmeet.com/\[AnneLastNameFinance\]](https://todaysmeet.com/[AnneLastNameFinance])

Enter your Name.

Respond to the following question: China is Better Off with a Capitalist Economy. Explain. (5 points)

Read one of your classmates statements and respond based on evidence gathered in class. (5 points)

Student responses included work that suggested “China is better off with its Command economy for example the GDP has gone up but it's not enough but not enough to sustain life for them” Or “China should go back to its command economy because the factory pollutes the environment and they don't have enough money to stop the pollution.”

Anne describes herself as “not a lecturer” and acknowledges that figuring out ways for students to acquire basic information has always been her challenge. She notes that she has had to grow comfortable allowing students to carry their tablets around the classroom, because she feels station work and collaborative learning are essentially good pedagogy. In the lesson on the economy of China students were given the opportunity to “select an app or program where you can record 9 true/false answers. Title and SAVE the document: *The China I Know*.” Students were given absolute freedom in their choice, and they used this universal design of the lesson to their own learning advantages. Some students chose a paint program; some students created a video of themselves at each station; many students chose Word. Those students who either forgot to charge their devices or experienced technical difficulties used a pen and paper to record their answers.

Anne says that her approach to cooperative learning, with one-to-one devices, did not always look like this. When I ask her if having a device has impacted the way that students work cooperatively, she replied:

I think initially it isolated them, because they became all about the device. When I have gone to visit some of the [district pilot school] environments. I see kids in rows, sitting with [the district device]. Sometimes I've seen them in stations, but I don't even think that's the answer. You have to get to the point that the device is no more than what their notebook is. And the way you teach and the way you instruct should not change because they have a device – in terms of how you reach children in a middle school environment. You know, they need movement they need you know tactile experiences; they need different things happening. So if you are going to do group work and do stations, you should do group work and you should do stations.

Then, Anne continues to talk about the way that cloud computing has changed group work.

I now see them communicating much more efficiently and effectively through Cloud and sharing information. Because once I made that skill a requirement and we worked through that, it became powerful. If a child's not here, being in the Cloud, all they have to do is say, "do you have the notes?" And they can share it with their friend. The friend can do it outside of the environment here. The kid is not here, they can still work with their group, and they can still share. So for me, I still think it's important to have the real-time conversation with groups. But it's also great to have that Cloud conversation, and that's been powerful.

Since the one-to-one program, Anne has also had a self-described "mind shift" in her belief about assessments. Because her pedagogy is now more based on inquiry and

student problem solving, she wants assessments to better align with this learning. She says, “It was hard in the beginning” because she did not want to cede control, so she made multiple rubrics for multiple different types of products. She noted how this became “cumbersome” and the students kept asking if they could create different types of products beyond the several for which she had created rubrics. She recalls, “It was not easy...I had to really come to a mindset.”

To accommodate for both student choice and freedom, as well as her new more inquiry-centered approach, the rubrics are now purely based on social studies content.

Anne says that she has:

...been really trying to use that historical thinking skills rubric. Because it is NOT product driven. It is content driven. And it is ... even like if a child chooses to do a podcast or use Audacity or uses something in a verbal means, I can still see clean evidence and connection. I don't have to have the written word. Even if they decide to do you know an illustration or a graphic or a comic book, I can still see claim evidence and connection. I can still see historical accuracy. Those things I can still see and grade on.

She reflects on her rubrics before the one-to-one integration in social studies and now:

I actually have rubrics that say, you know: Be creative; be colorful; be neat. And I mean I sit there, and I look at them, and I'm like, “well that was really subjective of me because my idea of creativity may have not been the child's creativity.” When I was pulling those (pre-technology initiative) rubrics, I was kind of cracking up. I went, “Ooohh, woah!” I think this is my frustration. I think

with sometimes as we are looking at rubrics being pushed into social studies
 <pause> are we grading content? Or are we grading writing? And what are we
 teaching? And it is kind of a battle ... so I am really focusing on content.

In making this shift toward more a more inquiry-based approach, Anne thinks that her comfort with the content of law, particularly as a former pre-law major, makes it easier for her to teach the law portion of the law and finance magnet curriculum. She knows more precisely what she wants students to learn, and she can more easily set the lesson up as an inquiry and search for apps which support that learning. She explains:

... it also is interesting depending on the subject or the time period of what I'm teaching how fluid it is. Because it also depends on my comfort in a particular area.

She compares this ease of planning with her difficulties planning for finance:

Finance for me is quite a challenge, so I actually think I overcompensate by trying to find simulations to teach... I think if I was more comfortable, I could problem solve a lot of (the technical frustrations) beforehand. But because...I mean, can I do absolute and comparative advantage? Sure, I can...but I haven't figured that out, because I feel like my content knowledge is weak and I'm not exactly sure what I want them to do and I try to problem solve it as I go along. Law – I got! History – I got! The math piece of finance? <pause> Now as we're looking at different economic systems or trying to determine happiness or those kind of things ... I can do that.

The devices Anne was using began to slow and age. At the start of the 2014-2015 school year, the district made a change to its wireless system which rendered Sherwood's devices almost useless in the school. Anne and Steve were ultimately able to convince the district to replace the tablets at Sherwood with devices the district planned to use for its own one-to-one initiative (A detailed explanation of this initiative is provided in the "Context" section, above). While the devices provided more technological affordances in terms of speed, access to the Microsoft cloud, and built in keyboards, they also limited some of Anne's autonomy as an instructor. Anne describes several concerns she has with the new initiative.

One of the concerns was that when the devices disconnected from the system's wifi, the students could no longer log into the district's learning management system. Then, when the students brought the devices back to school, the devices kept dropping the school's wifi. Anne explains that each time a device dropped wifi, it would make a pinging sound. "Ping, ping, ping, ping all through class, and I'm like, oh my God! Stop the pinging because every time it goes off wireless, it pings!" She said students began to anticipate the pings because they could see the wireless lights blink before the pinging would begin. She recalls that they solved this problem in-house because it was difficult for Sherwood, which was not officially a pilot school, to get technology assistance at their school. I asked Anne if the district had a system to provide feedback. She replied that they did not, but on one occasion, before the system began the elementary pilot of its one-to-one initiative,

They asked our opinion and they had us fill out this report. And we presented to the [district's] Office of Tech. It never really went beyond that. We ask all the time...

Since Anne felt she could not get the district to hear her concerns through traditional channels, she tried a different approach. One day, a district technician had been assigned to Sherwood, not to solve the one-to-one wireless issues, but to remove the printers from classrooms and offices. This was part of the preparation for the district's one-to-one initiative. Some of the funds for the district's initiative are to come from the printing and paper budgets. Anne grabbed him because, as she said, "I wanted to say, "Thanks so much for the (new devices). By the way, here are some of my concerns if you push this out." She shared with him that they were grateful to have the new devices, but "the kids hate the cases." She said he was surprised, as he thought they had special backpacks to transport the devices. She explained to him that students in middle schools are not allowed to carry backpacks through the halls, so the students had been assigned bulky cases. Anne says:

I spoke with him. I really wanted to give him input. He obviously enjoyed our conversation and has gone to Steve, and he wants to meet with Steve and I over the summer because he does want this input. I think sometimes the office is far removed, and (the superintendent) has a vision. But because he is up at such a level, he doesn't understand the frustrations of a teacher in the implementation.

Anne wishes she could be included in the training and professional development that the district is providing for the pilot school teachers. The elementary teachers each received a month of professional development the summer before their pilot year. The middle school teachers received just under a week of professional development the summer before their pilot year. Anne is also interested in co-curricular training. She feels if she could attend math teacher training, it would give her perspective on integration across the curriculum and perhaps spark a new understanding of ways for her to integrate in social studies. She says:

Nobody has taught us anything. We have learned on our own in conversation with each other. I would've liked, I would really like, more training.

Anne also finds herself frustrated by the reduction in autonomy she has experienced in managing the software on the new district devices. Whereas she used to be able to seek out apps and add them to student devices, Anne notes that now:

I'm limited by the software that the county has chosen for me. The county has only chosen software in a very general sense. They have not chosen software that is content specific.

She has found the district's learning management system only allows for .doc files to be submitted. Anne has shifted her assessments to allow for a wide range of student choice, but the students cannot submit this work within the confines of the district's system. She has developed an alternative approach using Edmodo, but this is cumbersome to align with the district's online gradebook.

Anne also thinks about innovations for the future of her district. She has learned from her own experiences integrating technology that she cannot expect her students to know and manage all of the different learning tools that exist. She suggests that much like content specific skills are integrated in a vertical spiral from P-12, that technology skills could also be integrated this way. Her proposal is that each content department should,

...pick skills. So don't everybody do Word. If your department is maybe using Geometry sketch pad, then that's what they use as their tech tool. Not that they can't use Word, but that's the one they teach kids about; that's the one they become experts in. And if social studies wants to become experts in, maybe a data base software, then those are skills that we use more frequently. Just like we would for writing skills, just like for geography skills. There should be vertical instruction for tech... There has to be that kind of conversation, and I don't think that conversation is there.

When I remark that this is a fascinating take on technology integration, tied both to content and age and skills, Anne replies, "I had a couple years to think on it! But, especially as I teach it, the kids show me more, the need for that."

Anne also has concerns that a district wide adoption made without teacher input will only lead to a superficial integration of technology. She says that teachers need to feel safe and comfortable first. There have been technology "hiccups and challenges" with every quarter's grades which have been submitted through the district's learning management system. Anne has spent hours consoling students whose grades were

changed or lost due to the “hiccups,” as well as hours fixing the grades. For Anne, this reinforces her belief that “it’s important that (the district) see some of these things from a teacher’s perspective” in order to understand the real impact of this decision.

Anne also wants to see the curricular offices having a more central role in facilitating this comfort and designing technology infused curriculum. She recalls:

When I was writing curriculum, they have all these web 2.0 tools but they are basically throwing everything out at people in the curriculum. People can’t do that. Do a couple things and do them really well. And then let the kids show you other things that they can do.

Anne notes that the curricular offices do not receive enough professional development to write digital curriculum. She describes the curriculum writing process:

The curriculum writers have to go through this rudimentary training to become a curriculum writer. They don’t train them on any of the apps or any of the software that is on the device. So unless you have somebody like myself or Steve, all they’re going to be using is a word processor or the internet. And that’s not what our curriculum should evolve to be... there should be curricular based people in the IT office, because that voice has been lost.

She envisions the curricular offices asking the department chairs to help with content and technology based skills. They should ask questions like:

What skills are our kids coming with? What do we need to work on? What could they do better at?

Anne's final concern is for the teachers who are not as technologically inclined as she is and the ways that will impact meaningful technology integration. She says her greatest concern is that she

...think(s) there are a lot of people who are out there who are either going to say well it's only for internet access. It should not be. It should be so much more than that. It should be a powerful tool. And if it's just for internet access, we've missed the boat.

Expanding on her concerns about the challenges that less technologically advanced teachers will face in the district one-to-one initiative, she says:

But I think it's going to be a real challenge because not everybody's there. And not everybody's going to be there on their own learning because certain teachers, they know PowerPoint, they know Word. That's all they know. And that may be fine. But it's going to take them a lot to be able to let kids have greater choices than what they know. Because kids will come to me with something that I have no idea about and I'm like ... oh okay. And you have to let go of that.

Sometimes I have to learn that skill quickly.

Anne wonders how the district will reach teachers who are not "digitally fluid." She notes that funding for training has already been cut. The ten elementary schools who first piloted the program received a full month of paid professional development during the summer before the pilot began. The next round of pilot schools, the seven middle schools chosen for the 2015-2016 school year, are receiving three days of professional

development in the summer, almost a month less than the first round of pilot schools.

Anne sums up her thoughts:

We are a system of 8000 teachers. I would hope, let's say, 6000 of them are very proficient. But what about the 2000 that are not? Their voice still matters...I just have worries. I love it, but I just have concerns long term. And so I do want my voice heard.

Structural Themes

Throughout Anne's narrative, several themes emerged which provided structure, or the "how" to the "what" of her experience. The first theme was the barriers, both technological and administrative, that emerged in implementation and integration. The second theme to emerge was the supports to implementation and integration, including technological and administrative supports. A third theme that emerged was Anne's shift in social studies pedagogy toward a more inquiry based approach. The last theme which provided structure to Anne's narrative was her desire to share her voice in the change process.

Theme one: Technological and administrative barriers integration. The greatest barriers to integration were bureaucratic and technological. Anne initially believed that once the Magnet Office approved the funds for the one-to-one initiative, it would be a relatively smooth process to implement the program. She did not anticipate barriers stemming from the layers of bureaucracy and the technology issues that both she and the students would face. She also did not anticipate barriers stemming from a lack of student knowledge about technology.

Anne navigated significant bureaucratic and funding issues that complicated the purchase of the devices and infrastructure. In the spring of 2011, the Magnet Office approved Anne and Steve's program. The devices were not able to be purchased until almost two years later, in January of 2013. In those intervening two years, Anne faced meetings with multiple different offices within the district, including the Office of Technology, the Office of Curriculum, the Magnet Office, and Procurement and Purchasing. She recalled how meetings would be cancelled and rescheduled, and she wondered if the initiative would ever come to fruition. Finally, after her attendance at a Board of Education meeting in November of 2012, the purchase and program was approved.

Anne also experienced technological issues. She experienced relatively simple issues, which included difficulties in configuring the devices and difficulty accessing the school's wifi. The vendor flew out a representative to fix these issues and to train Anne and Steve on the software. Anne recalled that this was a relatively useless endeavor, as the vendor had little understanding about the ways in which teachers use technology. Once the technology was ready, Anne distributed the devices to the students, whereupon, the devices began to break through student use. The ways students handled the hardware meant that it was treated like students treat textbooks, tossing them in their backpacks, and less like an adult would treat a tablet. Instead of feeling frustration, Anne understood this when she saw it. She and Steve decided to purchase new carrying cases which were more protective. She also recalled how useful the insurance was as devices needed repair from student use.

The physical use of the devices was not the only technological barrier to implementation. Anne's philosophy from the start of the initiative was that she would go "full on tech." She self-imposed a rule that she would not use paper the first year of the program. While this forced her to find new and interesting ways for students to learn and produce content, there were times that this limited her ability to teach. She assumed that the students would have a certain level of facility with the tablet technology due to their prior instruction in the computer labs and their own personal use of smart phones and tablet technology. Surprisingly, to Anne, the students did not demonstrate a native ease when using tablets for educational use. She found that they had difficulty navigating between apps and difficulty using apps to produce knowledge. She explained:

The biggest challenge is my kids were not productive natives. We talk about students being digital natives, and that term frustrates me, because they're really not. They're social media natives and they can get around their Snap Chat, their Kick ... you know, they can get around all of those. But when you ask them to have different productive softwares open at the same time and have to manage that, that was not easy.

Anne re-grouped and changed her approach to instruction. She picked no more than five apps to work on during a unit and began to

...train (the students) on how to use those, not just the internet, but these apps...because they had never used them in that fashion (to manipulate content and produce educational content).

This entire process took about a month. Anne described the entire initiation period an “evolutionary process.”

She reflected on her vision for her students that kids would be, “Toggling back between apps, accessing the information, using apps to disseminate or apply it and showcase their knowledge.” She said that she initially imagined

...they’re going to be in groups. One group’s going to be doing one thing, another group’s going to be doing another thing... I expected to be like this world of differentiation...and that was not my reality. I really wanted it to be my reality, and I really worked hard at it.

Over time, Sherwood’s devices aged and slowed. In the meantime, the district was preparing for its own one-to-one initiative. Part of that preparation included a district wide update to wifi which rendered Sherwood’s devices useless. They could no longer effectively connect to the wifi and access the learning management system which the district had developed for its one-to-one program. In an effort to solve this problem, Anne and Steve tried to schedule a meeting with the district. Anne also experienced bureaucratic hurdles when she implemented the district’s new technology in her classroom. She scheduled and re-scheduled meetings with different offices to convince them of Sherwood’s need for new devices. After the district finally agreed to replace Sherwood’s aging tablets, Anne faced further bureaucratic challenges. She had difficulty scheduling technology support because Sherwood was not accepted as a pilot school. She tried repeatedly to share her ideas about digital curriculum, and she felt regularly ignored.

This once again put Anne and Steve in a frustrating situation with district bureaucracy. Anne recalled Steve phoning the district and saying, “Look, we need to talk. We need to show you (the district) what our success has been, what our challenges have been, and while doing so, would you like to switch us over to the (district devices)?” The bureaucracy kept getting in its own way. She described a time when they drove over to the central offices to:

...have a meeting with all the big wigs of techs and the (new district devices), and it was canceled. We were in the parking garage, and they canceled. We were like: is this a sign?

Finally, the district agreed to replace Sherwood’s tablets with the district approved tablet-netbook hybrid devices, but once again, Anne faced technological barriers to implementation. The most frustrating was a wifi connection issue. Sherwood was the only school in the district which sent the students home with their new devices. When students returned to school, the devices had trouble reconnecting to the school wifi. This made them difficult to use and also created a distraction in class as the devices continually made a pinging sound when trying to access the school wifi.

A different type of technological barrier emerged during this stage. It came from the reduction in autonomy that Anne had with the new software. When Anne used the devices which she and Steve chose, she could consciously consider affordances of applications and the ways that they worked with her content. Anne used to be able to seek out apps and add them to student devices, Anne noted that since the switch to the district devices:

I'm limited by the software that the county has chosen for me. The county has only chosen software in a very general sense. They have not chosen software that is content specific.

This technological barrier limited Anne's ability to meaningfully integrate technology into her classroom. Without either greater administrative permissions on the devices, or without very content specific curricular considerations at the district level, this technological barrier cannot be overcome.

The technological barriers began to merge with the bureaucratic barriers. Because Sherwood was not an official pilot school, it was difficult to schedule time to have district technology support come out to Sherwood. Anne solved this problem using the same ingenuity she used to navigate technological and bureaucratic barriers from before. She grabbed a technician when he was visiting Sherwood for another reason, and said, "I wanted to say, 'Thanks so much for the (new devices). By the way, here are some of my concerns if you push this out.'" Anne says:

I spoke with him. I really wanted to give him input. He obviously enjoyed our conversation and has gone to Steve, and he wants to meet with Steve and I over the summer because he does want this input. I think sometimes the office is far removed, and (the superintendent) has a vision. But because he is up at such a level, he doesn't understand the frustrations of a teacher in the implementation.

Theme two: Supports to technology integration. Anne experienced several supports to technology integration. The greatest supports to integration were her principal's trust, collaboration with Steve, Anne's confidence in her abilities to use

technology, and a belief that the technology was worth the challenges. She found that the support of her principal, the confidence which she found within her own technological knowledge, and the support of her colleague, Steve, helped her overcome many of these barriers. She also was willing to cede control to the students, which relieved Anne of some of the burden of needing to have or know all of the ways to integrate technology into the classroom.

The support of Anne's principal was an important reason she was able to initiate and integrate the one-to-one program. That trust in Anne's professional knowledge empowered Anne to overcome the obstacles of bureaucracy. Anne explained that during these many meetings, her principal was:

Very supportive because she knew that Steve and I – if any two teachers who had the knowledge to be able to run it – she trusted us to be able to say, “Okay, we really understand what we’re doing. We have all the specs, we have all the finances worked out, we have the program support, we think this could be really beneficial to the kids and we need real time access... And that was one of our strongest arguments that we really need real-time access.

During a separate interview, Anne again described her principal as having, “...confidence in us as educators and as tech people. So that’s been powerful.” In addition to the support of the principal, the support of Steve was essential to Anne's experience. Steve was Anne's student teacher when he first began teaching, and she hired him to teach at Sherwood. They have been friends and colleagues for over 14 years. Together, they began the Law and Finance program at Sherwood, and they co-

planned together for at least 10 years. Anne respected Steve and his forthright nature. She said about Steve, “Steve is one of the best people in terms of he will let you know his opinion, especially if he gets frustrated.” She continued to explain that, because of Steve’s persistence and the principal’s support, Steve and the principal were instrumental in getting the new devices from the district after the tablets stopped working. Here she said:

Over the summer, with the support of our principal, he [Steve] constantly was saying [to the district], “Look, we need to talk. We need to show you what our success has been, what our challenges have been, and while doing so, would you like to switch us over to the [district devices]?”

After the Board’s approval, Anne and Steve needed to purchase the devices and upgrade the school’s wifi. They were able to complete much of that work on their own, because of Anne’s confidence in using technology and Steve’s experience as technology liaison. Anne had a significant history of working with technology in education. She had been integrating technology for her entire 21 years of teaching, even when it was cumbersome or not a mainstream movement in education. She earned an advanced degree in Educational Technology. All of this education and time spent utilizing technology increased her knowledge about how technology works. It also provided her with the confidence to troubleshoot issues as they arose.

Another support to integration of technology was Anne’s belief that technology was worth the obstacles to its integration. She reflected on her vision for technology integration, which she described as “radical” and revised her methods for integration.

She asked herself: “What am I doing? Because I didn’t want to use paper, but I wanted to use manipulatives.” Anne felt this could not be the reality because the students did not have the necessary familiarity with technology as an educational tool. She finally realized, “I’ve got to understand that I can still do that and still use the devices and that can be a good marriage.” She felt she “could only do so much,” but she was still committed to a differentiated and digital classroom. She re-thought what her classroom would look like, including the physical set up. She tried to imagine how students might be working once they graduated; she considered what it might look like to be working in a GE lab, and she tried to model her classroom around that. She argued to herself that in a real-world environment, people use a combination of innovative technologies and traditional analogue technologies like paper and pencil. Anne’s commitment to her students’ technology use and skills and her belief in technology helped overcome the barriers which made technology integration difficult.

Theme three: A shift in social studies pedagogy toward inquiry. Despite Anne’s commitment to technology, she described herself as feeling an internal “war” between teaching students to improve skills in technology and teaching students social studies content. She was torn between a desire to include as much technology as possible and a responsibility to ensure that the curriculum was taught. Anne had a love of social studies that developed in college and strengthened over her time teaching. Anne managed to find a balance between her commitment to technology and her commitment to content by transforming her pedagogical practices through the affordances of one-to-one technology. Her social studies pedagogy became more inquiry based and fostered student autonomy because of the ways in which she

harnessed the affordances of one-to-one technology. The transformation was professionally and personally challenging for Anne, and she often described the experience as an “evolution” and a “mind shift.”

Anne’s social studies lessons always encouraged student participation and engagement with the material. She described herself as “not a lecturer,” and she preferred that the students make meaning of the material. However, she also described herself as shocked at her pre-technology initiative lessons because, despite her student-centered approach to pedagogy, the lessons lacked student ownership of content. After the technology initiative, Anne’s lessons remained student-centered, but they also demonstrated a student ownership of the material.

Before the technology initiative, Anne’s students worked in groups and at stations to access content. She says, as she looks back on her lessons from before technology that they were, “...very one- or two-dimensional.” If the curriculum called for a resource sheet, she felt she “...had to use that resource sheet,” and if it called for a reference to the text book, she “...had to use the textbook.” Her students demonstrated their learning through assessments, which, after the technology initiative, she realized were not assessing content and skills to the extent that she now feels is necessary. She explained:

While it was very tech-based before, now I can send them to a variety of things. I can send them to a video. I can send them to a pod-cast. I can send them in a lot of different ways not only based on their ability level, but based on their learning style...it’s opened up this whole cornucopia of resources.

Students not only utilized different modalities for acquiring information, in Anne's classroom, they used different modalities to produce knowledge and demonstrate understanding of knowledge.

The additional thing that I think was very interesting when I started doing it is the way in which kids can present products. It was all paper before. I mean they could draw or they could write, but pretty much that's what they did. Now I have kids who can create something or they can record you know their own information; they don't have to have it in a text fashion.

After the technology initiative, Anne felt her students own the content and their demonstration of their knowledge. For instance, in the murder investigation lesson, students argued face to face over a particular murder suspect, and then, feeling they were short on time, asked if they could divide up some of the work using the cloud. The students were not required to use their shared cloud to complete the assignment, but in giving them the freedom of inquiry and freedom to search for their own resources, the students took it upon themselves to also use the affordances of the cloud.

Her new lessons increasingly focused on student-led inquiry, discovery, and problem-based learning. She began to dramatically change her assessments to reflect student learning of the content, not student ability to complete a task. This was evident in the ways she allowed the students to generate questions and collaborate via the cloud in her lesson on defending a murderer. It was also evident in her lesson on China's economy which was driven by the investigative question: "Would the nation or individual be better off in a command or market economy?" Students used their

personal access to sources on the internet to gather resources, answer the question, and then defend their answer through their choice of products, such as podcasts, videos, and draw or paint programs utilizing collages.

She described her lessons as much more “three-dimensional” once students asked questions of the content, sought out multiple resources, and sought to answer their questions. When students demonstrated learning on assessments, Anne asked for only two things: that students demonstrated an ability to answer their question, and that the answer is supported with evidentiary warrant. Anne summed this up by describing her assessments as, “This is what you have to prove to me. How you do it is your choice,” and that she has, “...been really trying to use that historical thinking skills rubric. Because it is NOT product driven. It is content driven.”

Anne notes historical inquiry, or inquiry into other issues like economics or juvenile justice, drove her pedagogical practice in a way that it did not before her regular use of technology. Anne reflected that now each student has access to information, right in front of them through their device, and they can find information through multiple means. Then, they can produce and create content in multiple methods. Anne’s comfort with content shaped her ability to integrate technology and craft inquiry-based lessons. She explained it by comparing the ease of planning law versus the challenge of planning finance:

Finance for me is quite a challenge, so I actually think I overcompensate by trying to find simulations to teach... I think if I was more comfortable, I could problem solve a lot of (the technical frustrations) beforehand. But because...I

mean, can I do absolute and comparative advantage? Sure, I can...but I haven't figured that out, because I feel like my content knowledge is weak and I'm not exactly sure what I want them to do and I try to problem solve it as I go along. Law – I got! History – I got! The math piece of finance? <pause> Now as we're looking at different economic systems or trying to determine happiness or those kind of things ... I can do that.

Another interesting shift in Anne's pedagogy was the blurring of the boundaries of "school." She blurred the physical boundaries of the classroom by asking students to take pictures at home, outside of school, and around the school building and then submit them in a collage. In a newspaper interview about the program, Anne said that this new way of teaching was finally catching up with the way that students actually learn, especially because of mobile technology. This blurring of the lines was also what facilitated her inquiry approach, as students could access primary source content across the globe and at any time of day.

Theme three: A desire for more voice in the change process. When this research was first conceived, Anne was the person directing the change. Within the bounds of her budget and project proposal, she had near total control of the project and therefore, a significant voice in the change process. When Anne and I first met in the August of 2013, neither of us was aware of Anne's district's upcoming one-to-one initiative. Throughout that fall, because of my own connections with educational technology and the district, I learned that the district was considering a district wide one-to-one initiative. Anne also became aware of the district's upcoming plans and started to give considerable thought to what she needed and what she believed other, less

technology focused teachers, may have needed as the district transitioned to a fully one-to-one system. As the district demonstrated a lack of receptiveness to Anne's requests for technology support, professional development, and a method for clear feedback, Anne grew more frustrated and felt her voice was being silenced. A theme that emerged, particularly at the end of this narrative, was a desire for her teacher's voice to be heard in the change process.

Anne had not anticipated that she would be using the district's devices during her own one-to-one initiative. In fact, from the initiation of her own pilot program, she was led to believe that her pilot might be used as a test case for a larger one-to-one initiative. This was written into the language of her proposal at the prompting of the Office of Technology. It was the reason why the Office of Technology increased her budget request from \$35,000 to \$200,000. When the district asked middle schools to apply to become pilot schools, Sherwood applied. After conversations with administrators in the Office of Innovation, and because of their own pre-existing one-to-one program, Anne, Steve, and the principal of Sherwood felt confident that they would be accepted as a pilot school. However, the district rejected their application. With the rejection of their application, Anne felt that their hard won experience and wisdom had been passed over by the district. Anne used the following words to describe her feelings about this rejection, "You know," here she pauses for a few moments, then continues, "we're trying to give our voice so that they allow teachers to be heard in this process."

Although the application was rejected, Steve and Anne convinced the district to replace Sherwood's outdated devices with the district's new devices. Anne felt this would be a rare opportunity for the district to learn how the devices behaved when

students transported them to and from school. The district's pilot programs did not allow for students to take the devices home with them, although it was ultimately an end-goal of the district's one-to-one program. Despite the district's professed desire to learn how the devices responded to the transport to and from school, Anne says, 'I have to tell you though, they don't ask us... they really don't ask our opinions. So we often seek them out because we're concerned.'

Anne echoed this frustration at not being heard when I asked her if the district had a system to provide feedback. She replied that they did not, but on one occasion, before the system began the elementary pilot of its one-to-one initiative,

They asked our opinion and they had us fill out this report. And we presented to the Office of Tech. It never really went beyond that. We ask all the time...

Anne used similar language when discussing the district's larger plan for one-to-one technology. This time she expanded beyond her frustrations at not having a voice. She began to believe that the reason her voice was not heard was because the people making the decisions have been away from the daily life of a classroom for too long.

I think sometimes the office is far removed, and (the superintendent) has a vision. But because he is up at such a level, he doesn't understand the frustrations of a teacher in the implementation.

There was also a feeling of exclusion that was evident in Anne's descriptions of this time. It began when the district failed to accept Sherwood as a pilot school, and it continued during the period when Sherwood used district devices, but did not receive pilot school levels of support. Anne would like to have been included in the training and

professional development that the district is providing for the pilot school teachers. She said:

Nobody has taught us anything. We have learned on our own in conversation with each other. I would've liked, I would really like, more training.

Anne also thought about innovations for the future of her district, particularly in terms of social studies and technology, but felt she had no viable outlet for sharing them. She described the curriculum writing process:

The curriculum writers have to go through this rudimentary training to become a curriculum writer. They don't train them on any of the apps or any of the software that is on the device. So unless you have somebody like myself or Steve, all they're going to be using is a word processor or the internet. And that's not what our curriculum should evolve to be... there should be curricular based people in the IT office, because that voice has been lost.

Anne also felt that decisions made without teacher input will only lead to a superficial integration of technology. For Anne, this reinforced her belief that "it's important that (the district) see some of these things from a teacher's perspective" in order to understand the real impact of this decision. She said her greatest concern is that she

...think(s) there are a lot of people who are out there who are either going to say well it's only for internet access. It should not be. It should be so much more than that. It should be a powerful tool. And if it's just for internet access, we've missed the boat.

Anne summed up her thoughts on being heard by the district:

We are a system of 8000 teachers. I would hope, let's say, 6000 of them are very proficient. But what about the 2000 that are not? Their voice still matters...I just have worries. I love it, but I just have concerns long term. And so I do want my voice heard.

Textural-Structural Themes

Manifesting themselves throughout Anne's narrative, the "what," or the noema, of her experience, and the themes, the "how," or the noesis, of her experience, were the textural-structural themes which constitute the essence of Anne's experience. The first textural-structural theme was Anne's commitment and belief in the value of technology in education. This belief manifested in her desire to initiate a one-to-one program and her commitment to meaningfully incorporate technology despite significant barriers to implementation. The second textural-structural theme was Anne's student-first focus. This manifested itself in her reasons for conception of the one-to-one program, as well as through the ways she implemented technology for her students, affording them a high level of trust which fostered their autonomy over their learning. The third textural-structural theme was Anne's professional commitment to growth through reflection and a growing trust in her students. The final textural-structural theme was a tension that existed between Anne, as a classroom teacher and teacher-leader, and the larger district.

A belief in the value of technology. Early on in Anne's narrative, it became clear she had a history and commitment to using technology. In the mid-1990s, she was willing to run cables down the hall each day from her classroom to the library in order to

connect to the pre-World Wide Web internet. This commitment to integrating technology continued throughout her career and was evidenced by her advanced degree in technology in education and her desire to teach her law and finance courses in the computer labs. Anne also articulated this belief throughout her narrative, saying things like, “Well, I’m a techie,” or “That’s why I have an advanced degree in this!” or “technology is a powerful tool.” This belief meant incorporating technology was not just something Anne did daily, but it also drove her desire to conceive of the one-to-one program, to meet the many obstacles to the implementation of the program, and to constantly consider new ways to harness affordances of technology in her classroom.

Anne saw technology as something greater than internet access or a way to teach using PowerPoint. She viewed it as a powerful tool to meet students where they are, as learners in an always on, always connected, world. In a newspaper article about the Sherwood program, Anne said this was the reason that she wanted to try one-to-one tablet computing (the newspaper article is not directly quoted in this document, because it would compromise the anonymity of the participants). Anne saw technology as both a tool that facilitated new ways of teaching but also as a tool that should be as normal to use as their daily notebooks. She expressed this by saying, “You have to get to the point that the device is no more than what their notebook is.” In other words, to Anne, technology is not an add-on but rather a necessary part of effective instruction.

With each new development in technology, Anne considered its affordances and the ways which they can help her students learn. She recalled the reasons that she liked the computer lab – it offered real time access to data which changed every year, like demographic information and case law, as well as allowing students to create

spreadsheets and PowerPoints to organize their findings. Then, when comparing this to one-to-one technology she said:

Now I can send them to a variety of things...I can send them in a lot of different ways not only based on their ability level, but based on their learning style...it's opened up this whole cornucopia of resources.

Anne believed that technology was such a “powerful tool” that she worked to implement a one-to-one program in her classroom. This turned out to be no small feat. Anne's commitment to the students, and her belief that technology could serve them in their learning and their preparation for the world beyond the classroom, helped sustain her as she encountered barriers to integration. She often used words like, “what's going to be best for our kids?” when talking about how she made decisions and why she made decisions about technology.

Besides considering affordances of technology and believing that it can support student learning, Anne was willing to both build a vast personal knowledge of technology and tap into that knowledge base when planning and trouble-shooting technology. In order to plan the one-to-one initiative, Anne accessed her own technological knowledge and expertise to determine whether the school had the necessary infrastructure to host a program's worth of devices. She was unafraid to trouble-shoot on her own, and this led to a level of confidence in her technology use. From small things like trying to make a device stop “pinging” to removing and replacing a battery, to larger issues like navigating wifi firewalls, Anne saw these as surmountable issues that could be solved with a bit of ingenuity. However, she was also reflective

enough to realize that not all teachers innately possess the desire, ingenuity, or confidence with technology to problem solve as Anne does. For this, Anne recommended a quick database of “how to” videos which address the most common failings of the technology within a classroom.

Anne’s belief in the value of technology also caused her worry about failed technology initiatives, or teachers who are “turned off” or only use it to access internet. This belief has also led Anne to brainstorm ways that her district can more effectively integrate technology into its social studies curriculum. She imagined a vertical integration of technological skills which marry well with content specific skills. Over time, she believed students would develop a fluidity with content skills, technology skills, and cross-curricular technology and content skills.

Student-first focus and trust in students drives integration. For Anne, this entire initiative was centered around the student experience. Throughout each of Anne’s themes from the barriers and supports of integration, through her shifting social studies pedagogy, and in her desire to have a greater voice in the technology initiative, Anne regularly considered student needs, student feedback, and student learning. Anne also demonstrated a growing trust in her students, which allowed them a large measure of control in the classroom, fostering their sense of agency and autonomy.

In the conception phase of the initiative, she wanted to permanently book a computer lab for her classes. Then she realized, “That, unfortunately, wouldn’t be too equitable to the other students.” It was this consideration of the entire student population of the school that convinced her of the need for a new approach to

technology integration for the law and finance magnet program. During that conception phase, she described the standard she and Steve used to choose a device as “What would be best for the kids?” They settled on the android tablet device because they felt it would afford students the most ease of navigability and the most access to different types of applications.

This student-first focus also manifested itself throughout the barriers and supports in integration. For Anne, one of the guiding principles of the program was its benefit for students. She used this focus to build support from the principal and the district. When she drafted the proposal for the Magnet Office, she justified the technology as a method to increase student engagement in a 21st century learning environment. As she encountered obstacles with the student use and treatment of the devices, she never blamed the students. She recalls that when devices were breaking because students put the devices in their backpacks “as we would expect them to do,” that she and Steve problem solved by purchasing cases which could stand up to student use. When the students were unable to navigate the devices way that she had anticipated they would, she reflected that it was drawback of the software that she and Steve had chosen. She felt they should have provided more thought as to the ways that students would be able, or not be able, to utilize the software.

Anne also allowed the students more control over the technology. She learned to trust them to carry the expensive and fragile devices around the room and around the school. She also learned to trust them to find and use the technology in ways she had not considered. Anne refers to all of these things as “letting go” or “giving up control”. Often she will say thing like, “And giving up control, you know, that’s hard for

teachers!” For example, she says about students, “Kids will come to me with something that I have no idea about and I’m like ... oh okay. And you have to let go of that. Sometimes I have to learn that skill quickly.” In giving up control to the students, Anne was trusting them with and entrusting to them, their learning.

Anne remained focused on the learning she wanted for her students throughout the implementation of technology. She described the “war” in her heart between a desire to teach students skills for technology and to teach the curriculum. She was torn between the many best practices she wanted for her students. For Anne, this program was an opportunity to revolutionize instruction and learning. Even with this ambitious goal from the beginning, she could not fully anticipate the ways this would eventually influence children. She had always had a hope that the technology could deepen learning, but she did not expect the ways it would reshape her entire understanding of the role of children, learning, and assessment in her classroom. When her initial ideas of “full on” technology did not work, she re-evaluated the ways that she could incorporate the one-to-one in a more blended environment. She took time to picture her students, out in the world in a tech-centered career environment, and re-designed her classroom from this inspiration. This focus on students also began to gradually shift her beliefs about instruction further toward student autonomy and agency in their learning. She wanted to be sure that she was always focused on differentiating for instructional need, not for work completed. She wanted to be sure that she assessed content and skill mastery, not creativity or neatness or a prescribed product.

Anne’s biggest concern in this theme was that students would leave the magnet program. “I don’t want to lose kids because of technology.” Anne notes that 50% of the

students who were in Sherwood's magnet program were on Free and Reduced Meal Services (FARMS). Anne demonstrated a sensitivity and level of care for her students in the program. "We can't lose kids because they can't get a certain grade because they can't do the technology or their parents can't." Despite her beliefs in technology, she would have rather changed the program than feel she disadvantaged children.

The student-first focus also permeated Anne's shift toward a more inquiry-style of pedagogy in social studies instruction. Anne described a "mind shift" that occurred in her teaching since the one-to-one integration. This mind shift was reflected in her pedagogy that, after the technology initiative, evolved to become almost wholly student-centered and student-driven. Students developed questions, and then used their access to the district's online research databases as well as news sites like CNN and videos on YouTube, to answer their inquiry questions. Finally, Anne used the cloud capabilities to help students synthesize the disparate sources into a cohesive answer to their inquiry question. Anne completely changed her rubrics for assessment in order to better measure what she was asking students to do and learn. She permitted the students to use any type of representation they wish, as long as they made an "evidentiary claim."

Anne's student-first approach was also evident in her desire for more of a voice in the change process. Ultimately, she believed in the power of effective technology integration to shift teachers in a student-centered direction. She suggested these questions be asked by curricular leaders: "What skills are our kids coming with? What do we need to work on? What could they do better at?" She wanted to see the district's one-to-one initiative succeed, because she believed it is best for students. In order for it

to succeed, she believed the district needed to better understand the daily life of a teacher.

An evolution in professional identity grounded in reflection and trust in students. Anne exhibited an ability for professional growth that permeated her textural description of the experience of initiating and implementing a one-to-one program in her classroom. It manifested itself as a deeply reflective process in which she both took control and accepted responsibilities for her choices. This allowed her to evolve as a professional; in fact, “evolve” is a word that she regularly uses to describe this entire experience. This willingness to be open to new possibilities, based on reflection of student needs and obstacles presented by technology or bureaucracy, fundamentally shifted who she was as a teacher.

In the conception phase of the initiative, Anne initially imagined a class taught in a lab. Steve argued that it would be better if they developed a one-to-one program for their students. Anne was willing to hear arguments for this and change her mind. She then used this same attitude of openness to be flexible as she considered different one-to-one technologies for their program. Anne and Steve ultimately chose tablets and the software on the tablets because it afforded them flexibility in choosing applications for student learning.

Anne’s reflective nature manifested itself as a willingness to problem solve when facing barriers to implementation, including the hindrances of technology. At each obstacle, Anne considered a new way to problem solve. She wrote to the Magnet Office, relied on her principal’s support, and attended Board of Education meetings, all

so that she could bring her vision of one-to-one to fruition. Once she and Steve had the devices, Anne was willing to seek help from the company that provided the devices in order to solve configuration issues. She reflected on the ways the students used the devices and was open to changing and problem solving. She decided that they needed new cases, so she bought new cases. Anne had envisioned students being savvy enough to navigate multiple applications in a lesson. When she discovered that they could not, she reflected, regrouped, and approached the problem with a new solution. Her willingness to change and evolve allowed her to seek new avenues and solutions to barriers during implementation.

Anne's reflective nature was necessary for her pedagogical shifts toward student autonomy. In Anne's teaching before the one-to-one program she felt confident that she was using student-centered pedagogy. She often utilized collaborative learning and station activities for students to gather information. When Anne compared her lessons from before and after the technology integration, she was stunned at what she calls her "one-dimensional lessons" from before integration. For Anne, her teaching, and her students' learning, now empowered students to ask questions of the social studies content, and then seek out answers from multiple primary and secondary sources. Her ability to be reflective about this change, and acknowledge it, speaks to her level of confidence in her identity as a professional. This was a hard-won confidence, and it was rooted in her ability to be self-reflective and self-critical. Anne did not like to settle for less than her best:

Sometimes I have to settle for what I know. And for me personally and professionally, that is really hard. Because I'm the type of person you know in

my career who <pause> I am somewhat of a perfectionist and so <pause> when things don't work in the classroom <sigh> I get very frustrated and I take it on myself. I am very self-critical.

Anne's growth occurred because of her willingness to make pedagogical changes over time which ceded control of the classroom to her students. She described the change she made to the layout of her classroom. After the technology initiative, students chose their own seats based on their own choices about how to learn and how to demonstrate their learning for the day. This change was predicated upon an initial failure, as Anne perceived it, to implement the one-to-one technology as she had envisioned – as a completely paperless “full on tech” classroom. Anne also allowed the students complete choice in how they made meaning of content and how they demonstrated that meaning. She became much more concerned with assessing student knowledge of social studies content and skills and much less concerned with the way that students choose to demonstrate that knowledge.

Anne wanted to have a voice in the process of the new, district-wide initiative because she wanted other teachers to be able to change. She believed that they need to feel comfortable to be able to change. The way that they will feel comfortable is if the district acknowledges their initial discomfort. To recognize discomfort, the district must open up channels of communication that allows it to hear teacher voices. Anne also had a growing list of innovative suggestions that she has synthesized from her own hard earned wisdom about change and technology. She would like to see fundamental shifts in curriculum design for the social studies and a vertical integration of technology skills which align with the vertical integration of social studies skills. Anne's concern for her

fellow professionals and her constant reflection of ways to improve their experience demonstrate the manifestation of her penchant for professional reflection and growth.

A tension between the experiences of a classroom teacher and the experiences of a district. Anne's teaching and decisions did not exist in a vacuum of her classroom, or even her school, Sherwood. Her daily experiences of teaching with technology, as well as her broader experiences conceiving of and implementing a one-to-one program, all existed in relationship with the experiences of her school community and her district. Anne's school community lent support to her integration of technology, while she had a more dissonant relationship with her district.

Anne found support in her relationship with her principal and with Steve. Anne's principal trusted Anne to act in the best interests of the students at Sherwood. The principal provided Anne with the administrative support which Anne needed to write a proposal for the one-to-one program. She then provided Anne with the emotional and administrative support to overcome the numerous bureaucratic obstacles involved in initiating the program. Anne describes this support as "very powerful." Additionally, the principal shared Anne's hope that the school would become a pilot for the district initiative, and she shared Anne's disappointment that Sherwood was not selected.

Steve also provided support to Anne in her classroom. Anne and Steve have worked together since Steve was a pre-service teacher. Anne described him as "really great at sharing his frustrations," and she appreciated his wry sense of humor and straightforward nature. Anne recognized that she and Steve had very different teaching

styles and technology integration styles. In her annual report to the Magnet Office, Anne described her integration as a “radical approach” and Steve’s as a “traditional approach.” Nevertheless, she credited Steve as a strong support to her during this process.

Anne experienced a tension with her greater district which manifested itself throughout her narrative. The Magnet Office was ready and willing to provide Anne and Steve with the funds they needed for their program, but the other Offices within the district were less willing to support the initiative. This led to 15 months of meetings, outside of Anne’s regular work as a classroom teacher and department chairperson, in order to secure the funds and permission for Sherwood’s initiative. In a particularly egregious disregard for Anne’s time, an office cancelled a meeting minutes before the meeting was to occur.

Later, when the district began its own one-to-one initiative, it did not seek input from Anne and Steve. Anne and Steve were the only teachers in the entire district who were implementing one-to-one technology at that time, and Anne felt this oversight disregarded her hard earned professional knowledge and experience. The district finally updated Sherwood’s devices, but that also came at a cost to Anne. She wanted to purchase new tablets on her own, but because the district issued a moratorium on all purchases not associated with their one-to-one initiative, she was unable to do so. Anne also encouraged Sherwood to apply to become a pilot school for the one-to-one initiative, believing that their existing program would position them well for pilot school status. The district encouraged Anne, Steve, and the principal of Sherwood in this endeavor, but ultimately, it did not choose Sherwood as a pilot school. Even after

Sherwood received the new devices, they could not receive the technology support nor the professional development support of the pilot schools. Ultimately, this experience left Anne feeling concerned that the district leaders had forgotten what the day to day life of a teacher was like. Anne's greater concern, stemming from this tension between the choices of the district and those choices' impact on Anne, was that other teachers in the district would find the technology initiative so frustrating and overwhelming that the teachers would give up on effective integration.

Steve

Steve sports a pony tail, booming classroom voice, and a ready, wry, smile. He has been a teacher at Sherwood for 11 years, and was Anne's student teacher when he was earning his degree. Steve describes himself as one of those kids who "should not have gone straight into college from high school," but who, since his high school years, thought teaching would be a great career since teachers "don't do the same thing every year." After a series of life events including: ROTC, attending and leaving university, and then working in an outdoor store, Steve fell into an opportunity to work as an outdoor para-educator at an alternative high school. While working as a para-educator, he returned to school and finished his degree, and then earned his teaching certification. He served as the technology liaison at the alternative school, and then, upon being hired at Sherwood as a full time teacher, he became Sherwood's technology liaison. He enrolled in and completed a master's program in technology education at an internationally renowned university, and describes himself as "always be(ing) the techy person...whenever new things come out, I just love playing with them and seeing what can we actually do with it and how can we make it work with the kids."

As the technology liaison, Steve's office is housed in an Audio Visual (AV) control room off of the school's TV lab. It is filled with computers, blinking AV equipment, and wires. His classroom is located on the other side of the building from his technology office, and the technology there includes a desktop, a laptop, and a projector for the laptop. When Steve teaches non-magnet program social studies classes, he often has a laptop cart, or more recently, a cart of 28 tablet-netbook hybrid devices, in his room. When he teaches the magnet courses, each student brings his or her own, district supplied, device. The desks are arranged in partner pairs in a rough "U" shape for discussion. Like most rooms at Sherwood, it is a tight fit in the class once 35 desks and students are added to the classroom.

As Steve tells the story of the conception of the program, he explains he and Anne had always looked for ways to bring more technology into the law and finance program. They spent a lot of class time in the computer labs. Steve uses the example of the stock market game, which the students played throughout their time in the magnet program. The students kept a spreadsheet in excel that tracked their earnings and created an electronic log in Word. Steve explains:

I did that because I'm so into technology. Anne and I have always looked for ways to bring more tech into the law and finance program. A perfect example is with the 7th grade. One of the things we do is the stock market game, and while they play that several times throughout their time in the magnet program, the 7th grade is the big graded experience that. They have to keep a log, an electronic log of everything that they do. They have a spread sheet that tracks everything. So they're doing excel, they're doing word, and then in the end they

make presentations. So they do a whole bunch over the 10 weeks with that. That was one activity that would get us in the lab at least once a week.

Steve recalls that when his classes were in the lab, he was thinking about other lessons that could also utilize the technology of the desktop computer environment and internet access. He said, "...and more often as I'm doing it, I'm like, oh and these other lessons, we can do these things in it. So this meant I was in the lab nearly all the time with the students." He explains that the program evolved such that he was in the lab far more frequently than he was not. He indicates the frustration that he would feel when he was unable to schedule the lab, noting that, "If someone else needed to get in there one day, then we had to go back to the classroom and we were like, "This is so much harder to do without the computers!""

Steve also noted state mandated performance assessments in Science and the upcoming PARCC tests were trending toward a more online presence, which meant that they would still have to vacate the labs when it was testing time. As a potential solution to this dilemma, Steve suggested to Anne that they consider one-to-one tablets or laptops for their classes. He argued that this would be even better than the lab because "then we can stay in our rooms, have our regular resources, AND still have the technology."

When Steve describes the one-to-one program that he and Anne initiated, he often uses emotional words like "roller coaster of emotions," "exciting," "loving the program," "great possibilities," and "headaches." After deciding that a tablet one-to-one program would be a good fit for their law and finance magnet program, Steve and Anne approached the Magnet Office in their school district to ask for financial support. The

Magnet Office replied that they had the money and would approve the program, so in Steve's words, they decided, "let's roll with it!" At this juncture, Steve felt that the program was ready and would be implemented by the following school year. He and Anne had made decisions about software and hardware and had approval for funds and programming from the Magnet Office. Steve remembers his feelings at the time, "We thought, "Great! The school system's going to write a check and everything's going to be happy.'""

Unfortunately, it took 15 more months of meetings, culminating in a formal presentation to the Board of Education, to receive the funding and approval for their program. Steve did not attend the Board meeting, but he watched the live-streamed board meeting from his office in the AV lab. He was worried when the Board began to question Anne, claiming that she was asking for a million-dollar authorization. The contract had been written to authorize up to \$200,000 a year for five years, though Steve and Anne had only asked for about \$35,000 total. Finally, the Board approved Anne's request. Steve describes himself watching the meeting: "I'm sitting here screaming like my team had just won the Super Bowl! It was great!" Two weeks after the Board meeting, the Superintendent of the school system signed the contract, and the program was finally, officially, approved.

The devices arrived just before winter break, and Steve spent most of January setting up the technology and working through logistical issues. The devices needed to be imaged and student accounts configured. Federal guidelines mandate that student used devices must filter web access in order to prevent student exposure to lewd or

inappropriate content. Steve described his challenges in trouble shooting and how he determined what the problem was and solved it:

When you first take the tablets out of the box, they need to be configured, and then the kids need to be registered, because each student is registered to a specific device, so that their stuff's on there. The tablets were unable to navigate through two layers of [school system's filtering software] in order to talk and do that configuration. What we eventually had to do was they flew out one of their reps who brought his own personal myfi. We took all of them off the county network, configured them, and then when we - but this was an extra time consuming - first it took a while to figure out what the problem was. Then we had to go through the process and solve it.

During that month, and even later as Steve and Anne would run into hiccups with technology and software, Steve found that the company which sold the software was extremely willing to trouble shoot. Steve explains that the company was aware that Sherwood was part of a 100,000 student sized school district and was also aware that the district was considering a district-wide one-to-one program. Steve noted that once his district signed a contract with another company in late 2013, the support from the company for Sherwood's program cut off assistance. He says he understands it from a business perspective, but that it was still frustrating from his teacher perspective.

After January of 2013, Steve and Anne were more than ready to get the technology in the hands of the students. In Steve's words, this is when:

Anne and I ran into our first big surprise. Everything up to this point had been logistical and headachy and annoying, and we had always had the assumption, based on how much we were dealing with the kids and the computers already, ‘cause we still, because of course throughout this whole thing we're still taking our classes to the lab. That they were digital natives and they were going take to this like a fish in water. And then reality hit.

Steve was shocked at how difficult it was for his students to utilize the tablet technology. Steve said:

Tech at some points was definitely more of a challenge, so while we were forging ahead with the instruction, throughout the whole process, we still definitely spent a good deal of time dealing with tech issues.

He says he mistakenly assumed students would easily translate their abilities to use computers and smart phones into using tablets in a classroom environment.

We ended up spending a lot more time in those first few weeks teaching them tech, than we thought we were going to have to. Part of it was, learning again quirks. While they, when one of us, was holding them, it would be perfectly fine, when 20 of them were holding them and each doing their own individual thing, we ran into more difficulty.

Steve describes this in another interviewing saying, “... now instead of helping the kids understand the content basics, I’m helping them understand the tech basics, and honestly that’s a little frustrating.”

Students encountered individual issues, including: battery life, difficulty navigating a new platform, and difficulty switching between applications. Student chargers would break easily. Students handled the devices differently than adults. Prior to Sherwood's adoption of the tablets, the hardware had mostly been used by adult professionals. The company was not used to the ways that students used and wore out the devices more quickly than adults. The initial set of carrying cases were not sufficient to protect against a hard drop, so Steve and Anne bought newer and sturdier carrying cases. Steve explained:

We had insurance. So it wasn't like it was costing big money when all this was happening, but it was still, it was a headache. And it was more things that we didn't want to have to deal with.

It took until the end of February, or about a month of daily use, until Steve felt that he and the students were able to work through the initial kinks and began to meaningfully integrate technology. Steve explained that:

Over time we learned the quirks, the kids started getting used to them, and probably by the end of February, we were really truly integrating the technology with the one to one. The kids were doing it. Taking it home, getting everything working, and by the end of that school year, things were feeling smoother, better, and we're like, ok, this is going to work.

During the initial phases of integration, Steve decided to try to remain as faithful to traditional instruction as possible, while still using technology. He describes his reasoning:

I could give you a list of five names of teachers that I think, 10 years from now, will still be saying, “This is the way I’ve always done it, and this is the way I’m always going to do it...” But it’s going to look essentially the same as it does right now. And that’s a challenge that I have personally is, how do I motivate them?

Steve planned to digitize his analogue curriculum, but continue to try and teach in a rather traditional model. He and Anne included this information in their proposal, indicating that Anne would model “radical” adoption of technology, and Steve would model “traditional” adoption of technology.

Within the first several months of the initiative, Steve’s approach to technology integration changed. In one of our conversations, I asked him to elaborate on this change. I used the following language in my questioning, “You said the first couple of months you were digitizing what you had and seeing how that worked, and then you said about a couple of months in you pushed it aside and started...” At this point, Steve clarified this experience for me. He said, “Well, I didn’t push it aside, I migrated away from it.”

Steve explained in the evenings he would prepare for the following day’s lesson. He referred to the pages which the students would be reading in the digital version of the text; he uploaded digital versions of worksheets, and he uploaded the digital version of the homework. At night, he started getting emails from his students asking questions about the next day’s reading. He realized that students were working ahead and completing assignments before the next class. This created a problem as not all students

were working ahead, but this also created an opportunity, as Steve began to feel that he might be able to flip his classroom. He explains:

I had already heard the concept of flipping, but when we were planning this, I hadn't envisioned, "Oh I'm going to flip the classroom." Well, the kids did. So then I did. Fine. We'll do all the readings at home, and now we can do other stuff here.

Steve described the effect of flipping on his daily instruction:

So we probably spent, on a weekly basis, 10-20% of the time doing nothing but reading the textbook in class. Well that totally went away. Cause now I can give them the textbook on the device, I still had my class set so if they wanted to be here in the classroom reading it while we were doing something, that was fine. But they could actually do the classic example of flipping: do the initial learning at home. Now we can get much more in depth in the classroom. And that was really fun, to be able to do so much more elaborate things.

In addition to reflecting on the desires and pacing of his students, Steve said he was inspired by what Anne was doing in her classroom with the technology. His impression of this was that, in his words, "I (was) still limiting myself in this box, and if I get outside this box, the world is so much cooler out here." He wanted to find new ways to engage the students and to "maximize the tool" of technology. Steve said the original name of the program was simply "The Paperless Classroom," but he says he began to "realize that's not all this is about." He talks about the way that students have changed, and the way that he still wants students to change, in his classroom:

What I would love if somebody could help me find the magic bullet. How do I teach them the self-confidence to just do it? And to remember those steps. One thing I do have in mind for next year, especially since I'm likely to be all 6th grade next year, is a lot of posters. I'm thinking, put up directions posters: Take the Risk; Submit the Assignment. Having trouble submitting the assignment? Just go over and read those directions and just go through that. And that's not something I've needed before, but I'm just feeling more frustrated with it and thinking I just need to have more of that --- a way to take where they need to be and make it self-guided. Unfortunately, some of them are probably still going to want me to hold their hands...

In recalling a lesson on careers, Steve shared a PowerPoint lecture which he used pre-one-to-one. It was a teacher centered lecture, supported with bulleted slides, which he used to teach about different career possibilities. He still used interactive technology, but it was a hand-held response system to text in answers. He used it for a quick informal assessment, but says that it was all "very teacher centered." Later, the students would have read from the textbook while completing a worksheet. When talking about the same lesson as he teaches it now, he explains, "It's going to be very little of me, and it's all going to be on them."

In the one-to-one lesson, the students used an online career interest assessment to identify potential career matches. After they had their matches, they were pointed to several sites where they could research their career. That morning, Steve saw a CNN piece about careers which were trending upward and careers that faced the possibility of being replaced with technological algorithms. He added that site to the Edmodo page

and said, “That’s the fun thing ... when you find that perfect article that just happens to pop up on the day you made the lesson.” Additionally, students could research the career on their own. Students posted useful sites to the class Edmodo site and shared resources with each other. Sometimes students had questions like, “How do I spell entrepreneur?” To which Steve wryly reminded the student, “You have this wonderful device in front of you with a built in dictionary in it!” Steve offered a similar reply when asked about the meaning of “median.” After the student looked up median, Steve walked over to the student’s desk to ensure that the student understood the concept.

In a lesson on supply and demand, Steve decided to use a simulation game. With the ability to push out apps onto the students’ tablets, Steve found a lemonade stand app and had his students compete in a lemonade stand game. The students were instructed to create an excel spreadsheet in the cloud in which they recorded their lemonade recipes, the price of lemonade, and how much lemonade they sold each day. The students became competitive with each other, saying things like, “I made so much money today!” or “Why don’t my customers like me?” Then they began swapping lemonade recipes and strategies to increase demand for the product. They started posting their recipes on the class Edmodo site, in order to help each other be more successful with sales. Steve said the technology and the app allowed him to do something more “authentic and realistic and – something fun!”

Steve assigned a homework lesson on capitalism and finance which was to go home, watch 30 minutes of television, and record the commercials that aired during the show. In class the next day, the students played the commercials and then tied the advertising to demographics, capitalism, and the economy. He explains:

We'd be doing research on commercialism and finance, and maybe that was the first time I saw this: one of the kids would find a site other than the one I had given them [on the topic] and they'd say "Hey look! This is a site! This has got even more information than Mr. SteveSurname's site" And they would just post it in Edmodo, so they could start sharing their own findings with each other. And it was like, I could step back and almost let them teach themselves. But the technology is what allowed that to happen. Could it have happened without the tech? Yes, but it would be a lot more difficult to do. Them having the freedom to go pretty much anywhere, to research pretty much anything, just made it that much easier to get to that student centered environment.

Steve also considers the specific affordances of the tablet technology. He appreciates that he can search for tools that he specifically needs and then can upload them to the tablet. He describes the ways that the software afforded him high levels of access and control:

I...absolutely love their software system and the management piece. We had the ability, when we were using the android, that I could bring up on my laptop computer all 20 kids who were in the classroom. I could see exactly what they were doing. If I wanted to share one of their screens, all I had to do was click on it. It was now full screen on MY computer which was connected to the projector, so I could project it. They could control it from their seats. Things like that were great. The ability for us to add and remove apps... When we put [an app] up into the web based system, it would then automatically push out to all the kids. They had it within minutes, literally. And so that was what we

loved. The software management and also the file management. Because I could just put their curriculum, I could just put their materials organize by folders, it all went to them in there.

Steve also talks about the ways he could exercise incredible autonomy in purchasing software:

We even had some great experiences with some of the app companies. We were looking for a pdf editor one time that would let the kids actually manipulate on the pdf so that they'd be able to give us feedback or write on it like a typical worksheet. The adobe stuff that was free and the other stuff that we could find that was free wasn't quite doing it for us. We found an app called Repligo, and we're like, 'Ok, this is a great one.' It's actually the only time that I've ever paid for an android app. And I forget, it was like two or three dollars. That's ok for an individual, but when we're talking about ok, but we need 70 copies of this. So I sent an email to the Repligo guy and said can you cut us a break? And he said, 'Eh, have it for free, and here's the files that you would need to load in.'

One of Steve's laments is that he cannot always find the "perfect" app that he needs. He said that he used to create a lot of his own materials, but now, the materials are digital. He realizes he would need more "hard tech" skills like programing in order to create the perfect materials for his course. Steve noted that he can spend hours "down the rabbit hole" of the internet and apps when looking for materials for his classes. He talks about this experience:

Well before the tech, I was creating the materials. So the materials were already being created with the 6th grader or 7th grader in mind. And yeah, I probably did it and just didn't realize it as much because it was just part of that creation process. Since now I don't create as much, I am more curating, I'm going out and finding some tool that is out there ... I'm more conscious of it [what a 6th or 7th grader needs in a tool].

Before the one-to-one initiative, he would ask himself, "Is what I want my students to have here in this text? If it isn't, then I would go out and get it for them." Now he lets the students find the information. He says,

One of the nice things about tech is we can be much more open ended with our types of projects and what they are actually going to do this this. They don't have to just write us answers. They can build, they can show us, they can create.

Steve also talked about a shift in the way that he graded student work. He found that electronic grading is more difficult for him than pen and paper grading. Most of this is due to logistics, which require that if he is grading, he must have wifi in order to access student work. Gone are the days of lugging around folders full of essays, but Steve notes that this also means he can no longer grade anywhere at any time. He prefers to grade in front of his large computer monitor, and he really prefers to have two screens up, one with the rubric and one with student assignment in front of him. Steve appreciates the anonymity of online grading, because he can easily remove a student's name from the work, and handwriting is no longer a "give away." He also appreciates the automation of some grading like selected response questions. Another change that

Steve talks about is the reporting of grades. With online access to grades, parents are more aware of what students are learning and doing, and they are also more interested in immediate communication of grades. He explains that on several occasions, parents have emailed him immediately after a class test to ask when the grades from the test will be posted.

In January, 2015, the district replaced Sherwood's devices with tablet-netbook hybrid devices (See the "Sherwood's One-to-One Program" section of this chapter for details of the program). The new technology was provided, but support for the new technology was not as easy to ensure. Steve recalled a time when one of his students was having difficulty with the keyboard on her device. After his own attempts at trouble shooting, Steve sent the device out to the technology office for repair. The technology office repaired the device and returned it. After the student took the device home, she came in the next day and complained to Steve that she could not find any of her work, and she could not access any of his assignments. He examined her device, and similarly, could not find the necessary information. After several calls to the technology office, he discovered that the technology repairman had switched out hard drives and re-imaged the student's machine. Steve noted that if the technology repairman had made either Steve or the student aware of the re-imaging, they could have anticipated many of the problems. Steve's frustration lay with technology department's lack of understanding of how schools, classrooms, and students operate on a daily basis.

In another example of Steve's frustration, he complains about how he feels the district is out of touch with itself, its technology, and its teachers. He tried to have

students submit a file to the learning management system that was in a pdf form, and the students were unable to submit it. He recalls sharing this with the district:

... well actually it turns out that was a surprise to [The District]. When I sent the district team a question saying, 'Are you guys going to open this up outside of the traditional office file types in PDF?' They replied back, 'It's not?

Steve contextualizes this problem and explains how this will limit the district's one-to-one initiative.

It was the (learning management software) company which set this policy and hadn't even considered the fact that as we move more past Office and into other tools, we are going to need other kinds of things. So that's a missing link at this point in the toolset of how do they give us some of these creative things. ... the county is encouraging the teachers to be all creative, and yet at the same time, the logistics aren't there because some people above us haven't thought this through yet. Until you have done this, you can't imagine some of the things that you're actually going to encounter and do with it.

However, Steve manages to develop a work-around so that he can still provide his students with meaningful work:

And the closest thing I've come up with so far, and I'm probably going to have to resort to this because now we're running out of time in the quarter: they'll open up the file on their computer, they'll take a screenshot of it, and then they'll paste it into word and send it to me. But then that is taking a dynamic and making it into a static.

Steve was asked his opinion about the new devices, but he had a sense that the people making decisions were too far removed from day to day classroom experiences. Several members of the district central office asked to observe Steve and Anne teaching. The first dates that the district team suggested were a day one week before the end of the school year and another two days before the end of the school year. Steve told the team that he and Anne would be collecting devices from the students at that point. The district members were shocked that he and Anne would not be allowing the students to keep the devices with them until the very last day of school. Steve reminded them of the logistics of collecting materials at the end of the school year; the devices needed to be inventoried and checked and students may or may not be present on the last day, or even during the last week, of school. Steve reflects:

These things are just not part of their mentality, and we need to get them thinking.... Hopefully, they will become a closer part of the school community, and they'll start to realize these things.

Structural Themes

Structure is given to Steve's narrative through several themes. The first theme which emerged from the narrative was the barriers, both bureaucratic and technological, to the integration and implementation of the one-to-one program. Another theme to emerge was the supports to technology integration. The third theme which provided structure to the textual narrative was Steve's shifting approach to technology integration. This shift in approach revealed another theme, which was that Steve's pedagogical practices shifted toward a more student centered approach. Finally, the last theme to

emerge was the tension surrounding the change from school control to district control of the program.

Theme one: Bureaucratic and technological barriers to initiation and implementation. A significant theme in Steve's narrative was the bureaucratic and technological barriers to the initiation and implementation of the technology initiative. After the Magnet Office approved the program in the spring of 2011, Steve presumed that the students would start the 2011-2012 school year with tablets. Instead, Steve entered a frustrating period of almost 15 months filled with red tape, bureaucracy, and many meetings. After the red tape was cleared, Steve faced unanticipated barriers in the technology that he and Anne had chosen.

One of the greatest barriers for the implementation was the "hard wall of policy" that Steve described. The central offices agreed that the program was innovative and important, but no office seemed to be able to fully approve the program. If an office did approve it, they approved it conditionally, telling Steve that he needed permission from another office as well. Steve summed up the central office's attitudes as: "Yeah! This is a great idea! Now you just have these extra steps you have to do."

Steve often used the term "headache" in his description of this time. It was as if every group was afraid to be the one to approve the funding and autonomy of the teachers. Steve relied on the trust of his principal and the support of Anne to help him meet with each of these obstacles. Steve also demonstrated a remarkable level of personal perseverance against substantial bureaucratic barriers. He took the time to make phone calls, schedule meetings, attend meetings, and argue for the usefulness of

the program, all while continuing in his role as teacher and technology liaison for the school.

Once Steve and Anne were finally able to purchase the tablets, they realized that the technology could be its own barrier. They experienced relatively straightforward problems of access, like incompatible wifi, as well as more nuanced issues, such as students who had difficulty navigating the new technology. Certainly, had the access issues not been fairly easily resolved, the program would have been even more frustrating to implement. Fortunately, the representative from the software company was willing to fly out and assist with the incompatible wifi and device configuration. This support ended when Steve's district decided to initiate its own one-to-one program and chose another company for its software and hardware support. This was frustrating for Steve, because it meant that when he and Anne encountered larger technology issues beyond their own scope of abilities, he no longer had support.

When the technology issues were addressed, Steve and Anne were ready to use the devices in their classrooms. The next technological barrier was the lack of facility which the students demonstrated when utilizing the tablets. In Steve's words, this is when:

Anne and I ran into our first big surprise. Everything up to this point had been logistical and headachy and annoying, and we had always had the assumption, based on how much we were dealing with the kids and the computers already, cause we still, because of course throughout this whole thing we're still taking

our classes to the lab. That they were digital natives and they were going take to this like a fish in water. And then reality hit.

Steve was shocked at how difficult it was for his students to utilize the tablet technology. He says that he mistakenly assumed that students would easily translate their abilities to use computers and smart phones into using tablets in a classroom environment.

Steve recalled that when he taught in the lab, he would project his screen and lead the students through an activity. When each student held his or her own device, they tended to have more autonomy, but they also did not understand directions as clearly. When 25 students were all holding tablets, different issues arose than when it was only Steve trying to navigate through a lesson on his tablet. Students encountered individual issues, including: battery life, difficulty navigating a new platform, and difficulty switching between applications.

As Steve and the students learned to navigate the new technology, Steve began to encounter another technological barrier after a year into the program. The tablets were getting old and were slowing down. Here, the barriers of technology and bureaucracy begin to overlap. Steve's district had started its own one-to-one initiative and had signed a deal with a chosen technology company which stated the district would only purchase technology through that particular company. Steve was unable to purchase new devices because the tablets he used were not sold through the district's company. The devices available for purchase through the district's company were \$1500 as compared to the tablets which were about \$450. Steve's budget could not support the new price of technology.

In an effort to solve the problem, Anne and Steve began lobbying the district to purchase them the new, district approved devices. Here, the bureaucracy once again became a barrier. While some offices, including the Office of Technology, seemed sympathetic to the problems at Sherwood, the new office in charge of the district-wide one-to-one initiative, the Office of Innovation, was occupied with its own initiative. The administrators within that office cancelled and rescheduled meetings with Anne and Steve for the entire spring and fall of 2014. Finally, in November of 2014, Steve, with the help of his principal, was able to convince several members of that office to visit Sherwood for a meeting. At the meeting, the district agreed to replace Sherwood's devices; however, despite Sherwood's experience with one-to-one and its application to become a pilot school, the district rejected Sherwood's application to become a pilot.

The new devices led to new technological barriers. Sherwood was the only school in the district sending the new devices home with the students, and mirroring the early technological difficulties that Sherwood faced, the devices began to break through student use. Additionally, the devices had trouble accessing wifi outside of the school, and then reconnecting to the school's wifi upon returning to school.

In the past, Steve would have relied upon his own expertise and the software company's support to help problem solve these issues. However, the new devices would not allow Steve all of the administrative privileges that he needed and utilized with the old devices. Additionally, the district was slow to support Steve because Sherwood was not a pilot school, and the district had focused its energy and priorities on supporting the pilot schools. Steve slowly navigated the hurdles of this new challenge, but he felt frustrated that the district seemingly ignored his hard won experience. He was

concerned that the people making the decisions about technology integration were too far removed from the community of the school and the day-to-day lives of a teacher. For Steve, this was also a barrier to technology integration.

Theme two: Supports to technology integration. Steve overcame the barriers to technology integration by accessing his own considerable store of technological knowledge as well as relying on the technology support provided by the company from which he bought the technology. In addition, Steve relied on his collegial relationship with Anne in order to more effectively integrate technology into his classroom. Steve described himself as always enjoying “tech stuff.” He liked to play with technology for his personal use and in education. Steve gave the impression of enjoying technology for its own sake, in that he could derive pleasure simply from playing with a device or technology just to see how it works. For Steve, proximity and access to technology served to generate ideas for technology integration. As technology liaison, the school supported Steve’s continuing professional development through attendance and presentations at local and national technology and education conferences.

The confidence in his technological abilities, which he built over time through education, access, and a positive attitude toward risk taking and problem solving, allowed Steve to take initiative when technology did not work. He understood problems with firewalls and configuration of machines, as well as with imaging and re-imaging machines with the district’s image. He was easily conversant and could readily explain problems to the software company. In addition to Steve’s knowledge came a willingness to take risks. If he could not immediately identify a problem, he was willing to take batteries out, take a machine apart, re-image machines, and ultimately, call for

support as needed. Steve described the support from the software company as extremely valuable in helping him identify issues. Steve was particularly impressed with the company's willingness to fly a representative out to Sherwood in order to fix wireless issues.

Steve also demonstrated a willingness to take risks and take initiative in addressing technological gaps and needs. When he was unable to find a pdf reader which did precisely what he needed – a certain amount of editing and drawing on the pdf – he scoured the app store and internet until he found what he wanted. When that app turned out to be costly to buy, Steve had the self-confidence and assurance to email the developer and ask if he would provide the app at a lower cost. This risk taking also was supported by Anne, who modeled more constructivist approaches to integration. When he saw her integration techniques, and in his words “how much fun the kids were having over there,” he began to shift his own practices.

Theme three: Shift in approach toward technology integration. Despite Steve's self-described love of technology and technology in education, he remained aware and understanding that many teachers exist who choose not to use technology in their classrooms. Steve was not critical of this approach, even though it did not align with his own beliefs that technology is inherently fun. In fact, one of his greatest concerns as his district moves to a fully one-to-one environment was that effective and seasoned teachers might feel pushed out of the classroom if they failed to embrace the initiative. This awareness and understanding led Steve to pursue a particular agenda in the one-to-one program. He wanted to figure out how to motivate a seasoned teacher to use technology. He saw the one-to-one program at Sherwood as an opportunity to build

insight into a traditional educator's approach. This understanding could in turn, help Steve support teachers in a move toward a fully digital curriculum. Steve planned to digitize his analogue curriculum, but continued to try and teach in a rather traditional model. He wanted to gain an understanding of how a more traditional teacher might approach one-to-one technology.

Eventually, Steve's approach to technology changed within the first several months of the initiative, and he began to more fully utilize the affordances of the technology. In explaining this he said, "Well, I didn't push it aside, I migrated away from it." This distinction was important, both that he took the time to make the distinction, and also, the way that this distinction pointed to a difference between *pushing aside* traditional instruction and *migrating away from* traditional instruction. For Steve, his motivation to change his approach from technology use to technology integration was triggered by seeing what the students were doing, on their own, with technology, and what his colleague, Anne, was doing with technology. His relationship with Anne, and the time that each took to support the other, allowed him the opportunity to shift his own practices.

The students started working ahead and flipping the classroom on their own. This possibility excited Steve, and so he pursued it. He was also influenced by Anne's innovation and success with the tablets. He often described Anne's teaching as "cool" and "fun," both of which he found attractive and wished to emulate. For Steve, he did not necessarily see technology as transformative, but he saw it as a cool and fun tool. When he intentionally limited himself to re-doing his fairly traditional lessons in a digitized state, it provided the perspective he needed to see how interesting integration

could be for him and for his students. This perspective allowed Steve to shift his understandings of technology and to eventually shift pedagogical practices.

Theme three: Pedagogical shifts related to technology. Steve's shift in pedagogy was related to his shift in the ways that he integrated technology. Steve always thought technology was fun, but that did not necessarily mean that he transformed pedagogy by using technology in his classroom. Describing his teaching style before the initiative, Steve felt he was innovative when using technology, but also still fairly traditional in his delivery of content. For example, Steve used interactive technology, but it was a hand-held response system to text in answers. He used it for a quick informal assessment, but said that it was all "very teacher centered." Eventually, Steve began to take greater advantage of the affordances of the mobile technology. Instruction evolved. It became more student centered, utilized more student choice, and utilized an inquiry approach to social studies instruction. Additionally, he began to expect more student autonomy in student work:

One of the nice things about tech is we can be much more open ended with our types of projects and what they are actually going to do this this. They don't have to just write us answers. They can build, they can show us, they can create.

Once Steve realized the students could take control of their own learning through his inadvertent flipping of the classroom, Steve looked for more ways to cede them control. He personalized learning and began to trust the students to gather information and draw conclusions on their own. One of his methods to support student agency was to allow the students more autonomy and choice in their materials. Before the one-to-one

initiative, he would ask himself, “Is what I want my students to have here in this text? If it isn’t, then I would go out and get it for them.” He also describes his experience realizing that students are capable of autonomy:

And it was like, I could step back and almost let them teach themselves. But the technology is what allowed that to happen. Could it have happened without the tech? Yes, but it would be a lot more difficult to do. Them having the freedom to go pretty much anywhere, to research pretty much anything, just made it that much easier to get to that student centered environment.

For example, instead of reading about different careers in their textbook, or the digital version of their textbooks, the students used an online career interest assessment to identify potential career matches. After they had their matches, they were pointed to several sites where they could research their career. Additionally, students could research the career on their own. Students posted useful sites to the class Edmodo site and shared resources with each other. Similarly, when teaching supply and demand, Steve used a simulation game to help students uncover the relationship between supply and demand. They started posting their recipes on the class Edmodo site, in order to help each other be more successful with sales. Steve said the technology and the app allowed him to do something more “authentic and realistic and – something fun!” In his lesson on commercialism and the economy, Steve recognized the affordance of tablet one-to-one technology, its mobility and the facility with which a user can capture the world around herself. He accessed that affordance by asking students to watch TV for half an hour and record all of the commercials for analysis the next day. If Steve had failed to consider the possibilities of the technology, or had only utilized a digital version of his

pen and paper curriculum, these types of more immersive learning activities would not be possible.

Theme four: Tension surrounding the transition from local control to district control. When I began this research, I was unaware that Sherwood's district would eventually be implementing its own one-to-one district-wide initiative. Even after I learned of the district-wide initiative, it did not seem immediately apparent that the district initiative would disrupt Sherwood's initiative in any substantial way. However, once the district committed to the technology for its initiative, it placed a moratorium on technology purchases which did not align with the district initiative. Additionally, the district started to make upgrades to its wifi as well as create its own learning management system that all teachers were required to utilize. Each of these changes proved to be a barrier for Sherwood's existing one-to-one program.

The central reason that Steve chose the original software was the freedom that it allowed for the teacher to add apps, view student screens, and share student screens. The lack of autonomy that Steve experienced when he tried to add software or fixed software issues frustrated Steve. He no longer had the same administrator privileges on the district provided software, which made him far more reliant on district technology support. Steve found this support lacking, particularly frustrating was the district's lack of understanding of how schools, classrooms, and students operate on a daily basis. He gives a specific example of these frustration when he shared with the district that its learning management system was not accepting pdf files:

... well actually it turns out that was a surprise to [The District]. When I sent the district team a question saying, ‘Are you guys going to open this up outside of the traditional office file types in PDF?’ They replied back, ‘It’s not?’

Steve further examined how the district’s decisions impact classroom teachers:

It was the (learning management software) company which set this policy and hadn’t even considered the fact that as we move more past Office and into other tools, we are going to need other kinds of things. So that’s a missing link at this point in the toolset of how do they give us some of these creative things. ... the county is encouraging the teachers to be all creative, and yet at the same time, the logistics aren’t there because some people above us haven’t thought this through yet. Until you have done this, you can’t imagine some of the things that you’re actually going to encounter and do with it.

Steve managed to develop a work-around, but in his words, it was something he was “going to have to resort to.” It was not the best solution, and it took his time and energy to problem solve the solution:

And the closest thing I’ve come up with so far, and I’m probably going to have to resort to this because now we’re running out of time in the quarter: they’ll open up the file on their computer, they’ll take a screenshot of it, and then they’ll paste it into word and send it to me. But then that is taking a dynamic and making it into a static.

Coupled with the growing feelings of frustration over the devices was another emerging feeling that the district was failing to acknowledge the knowledge and hard

won expertise of Anne and Steve's program. Beyond technological changes, the district also started pilot programs in selected elementary schools and then, in selected middle schools. Despite what they presumed to be a competitive application, Sherwood was rejected as a pilot school. Steve felt that for the district to be successful, it needed to realize that, "Until you have done this, you can't imagine some of the things that you're actually going to encounter and do with it."

Textural-Structural Themes

Several textural-structural themes permeated Steve's experience in initiating and implementing a one-to-one mobile technology program. These textural-structural themes wove themselves throughout each structural theme and manifested themselves in experiences within the textural narrative. They constituted the essence of Steve's experience implementing and integrating one-to-one technology in his classroom. Steve's positive beliefs about the teaching and the possibilities of technology drove each step of the project. Steve also retained a strong sense of his professional identity as a teacher and a technology liaison for the school, which translated to a level of commitment to the profession, his colleagues within his school community, and his peers across the district. Finally, Steve experienced a tension, throughout his narrative surrounding his relationship with the larger district.

Positive beliefs about teaching and technology. Steve's positive beliefs about teaching and technology ran throughout his narrative. From the moment he considered teaching as a career option, he recalled his reasoning for this: teaching, "looks like a fun job! They don't do the same thing every year!" His delight in new experiences and his

eventual pull toward innovation were evident in that sentiment. Similarly, he described his master's program in technology education at a distinguished and notoriously rigorous university as:

A lot of fun. I enjoyed it a lot. Didn't learn as much as everyone else in the cohort cause a lot of the stuff, the tech side, was stuff I already knew. The teaching stuff was certainly new to me and the research and all that. It was a fun program.

The delight Steve sees in his students when he utilized more student centered practice served as the impetus for Steve to shift his teaching style from more teaching centered to student centered. When he described his and his students' discovery that they could flip the classroom, he said:

The classic example of flipping: do the initial learning at home. Now we can get much more in depth in the classroom. And that was really fun, to be able to do so many more elaborate things.

Another example of his delight in the possibilities of technology and pedagogy was evident in his explanation of students engaging in game-based learning.

We could find all these apps out there....Teaching them supply and demand and the basics of running a business and setting up a price point - there is a lemonade stand app. So we could give them the lemonade stand game, and in addition to playing the game, they of course had work and record keeping to do so they understood the process a little bit more. But it just became, it allowed us to do things that were so much more authentic and realistic for them. And - fun. I

mean, they just, they sat there and they got competitive with each other, I made so much today! And, why don't my customers like me? No one will buy my stuff? and they would start swapping lemonade recipes and try to figure out why these people would buy lemonade and these people wouldn't. It was fun.

Even in a retrospective look encompassing all of the challenges that he and Anne faced, Steve remained positive overall. This positivity helped him overcome the numerous obstacles which he and Anne faced, including the following themes from his narrative: barriers and supports to technology, shifts in technology integration and shifts in pedagogical practices, and then a feeling that the district ignored his hard won wisdom and tried to inadvertently hijack some of the program's autonomy. He summarized his overall experience:

As frustrating as it has been at times, as much as it's added to my gray hair, as much as Anne and I have wanted to smash the devices at times, it's been a great experience and I would certainly go even, even knowing what I know now, I would go back and do it all over again. Though I would make changes if I knew everything that I do know now. Because we have learned so much from what we thought it would be to what reality would be.

Strong professional identity. Throughout Steve's textural description of the "what" of the phenomenon was the consistent underlying structure about the "who" of Steve, in particular, the "who" of Steve as a professional teacher who felt a sense of agency and power and as a technology liaison for his colleagues at Sherwood. He recognized his own love of technology and beliefs about technology, but he also was

able to empathize with those who do not feel the same. He felt a duty to support them without paternalism or rejecting who they were as professionals. At the same time, Steve's identity as a technology liaison allowed him to revel in, and always push for more, effective technology integration. This dual identity provided a level of confidence that allowed for a sense of agency and autonomy, which manifested itself throughout Steve's experience in conceiving of and implementing a one-to-one program at his school. Steve's identity as teacher and technology liaison frequently permeated and influenced his decisions about integrating technology and supporting his colleagues to do the same.

Steve's reaction to Anne's suggestion that they commandeer a lab for their classes was indicative of this grounding of his self in his beliefs about teaching and identity as technology liaison. He explained his feelings about the request:

As the person doing the teaching, that sounded very attractive, as the person running the technology for the school, I had to say, "Wait a second. No because then no one else can ever get in there. That's not fair for us to monopolize. And we're already monopolizing!" But now nobody would even have the chance to boot us out.

Steve regularly re-framed the essences of his experience within the context of his professional identity as one who should support teachers to integrate technology. He often thought about impact of technology on teachers, both those within his school and those within the entire district. He pondered how he could help other teachers adopt technology into their classrooms, and despite his own love of technology, he was

empathetic to their reluctance to adopt technology. This re-framing of the problem in terms of his professional identity as technology liaison and teacher is evident in his thoughts here (emphasis mine):

For me, it wasn't as much of a transition as it will be for other people, but even I greatly felt that transition and that's what really scares me is: I thought I knew. I thought I'd be able to just come in here and breeze through, and even I had a huge hill to climb here. So if it was a big hill for me, it's Mount Everest for these other people! *And putting on my hat as the tech person who has to do the PD with them...* I'm still struggling to even find where to begin with some people. Because, as I mentioned earlier, I'm the one who plays with everything new. Oh, that looks like a cool website; let me see what that is. How do I get the people who ... have their device sitting in the closet for a year because they don't want to touch it; how do I get them to begin this process? So that maybe in five years it's comfortable for them? Because it's going to take them a while.

He remained committed to his identity, grounded in beliefs about technology and education. That identity allowed him to recognize the value of educators who choose not to use technology.

So, how do I get these other people started on this path and steer them and not frustrate them so much that they say... that's it. I'm done with teaching; I'm out of here? Or at least going to (another district) that's not doing what (Steve's district) is doing? Because I do fear that. As much as I would like to say tech is essential and you must do it, we have some great teachers who are not techy.

And we are going to lose some of those great teachers either to the profession all together or to other places that just aren't far enough along. So, I don't want to lose them.

In fact, when Steve began integrating the one-to-one technology in his program, he assumed the role of a technology-shy teacher. His initial approach to the integration was to try and integrate technology through a simple digitization of his materials, instead of a fundamental shift in pedagogical choices. He hoped to mirror what a technology-shy teacher might do in his or her classroom, so that he could be even more empathetic and understanding of their experiences. Here he described this approach:

There are going to be a lot of people who do simply do what I did originally. I have this worksheet, let me recreate this worksheet in Word, and give them the worksheet in Word, and they are just basically doing the same exact thing they have always done, just without paper. It's going to start there for some people. I can hope that as we move on and they keep seeing some of the things, and they realize the kids are so excited over there, why aren't they excited over here. They'll want to learn that.

That lack of empathy toward the daily life of a teacher remained one of his largest critiques of the district wide initiative to move toward a fully one-to-one program. This critique was also grounded in his dual identities of technology liaison and teacher. He saw the district leaders as disconnected from the classroom and not part of each individual school's community. When he talks about the technology support from the district he says:

Hopefully when they're fully assigned to a building, they will become a closer part of that community and they'll start to realize how those things (teacher's daily lives) work.

Recalling the district's assumption that the students would be taking their tablets home through the very last day of the school year, Steve noted, "the people making the decisions have totally lost touch with what operating a school is like."

Steve's confidence about who he was as a teacher provided him with a sense of autonomy and agency which was evident throughout his narrative. He attended and presented at national conferences on technology education. He called companies and asked for education discounts and permissions to use apps. He was not afraid to troubleshoot devices, wireless hubs, or software concerns. The only time in his narrative that he did not feel a sense of agency or autonomy was when he felt that "his voice is not heard" by the district. This is clear in his frustrations when he says:

The county is encouraging the teachers to be all creative, and yet at the same time, the logistics aren't there because some people above us haven't thought this through yet. Until you have done this, you can't imagine some of the things that you're actually going to encounter and do with it.

From his approach to integrating technology, to his fears about the upcoming one-to-one district wide initiative, Steve's strong sense of who he was and what he believed as a professional was evident. Though he had one foot in the "support" or administration world, he remained very grounded in his "teacher" identity.

Tensions between teacher and larger district. Steve demonstrated a strong sense of identity as a teacher and a significant capacity for risk taking and initiative that positioned him as a capable professional. This strength also caused him to experience frustration with the barriers to technology integration, which originated with decisions made by his district. From the outset of the program, Steve expressed frustration with the “hard wall of policy” which obstructed Sherwood’s implementation of the one-to-one initiative. Later, he felt frustration over the district’s dismissal of Sherwood as a pilot school, and finally, there was frustration with the district’s lack of support and understanding of the day to day lives of teachers.

Steve believed that after the Magnet Office approved the program at Sherwood, the district would “write a check and everything would be happy.” When the initial approval turned into a 15-month slog of red-tape, Steve became extremely frustrated. In fact, he did not attend the Board Meeting, because he knew he might say something impolitic which could threaten the entire program. Later, when the district started its own program, Steve felt that Sherwood would have been an ideal pilot school; however, the district did not accept Sherwood’s application.

The district began to make changes to its infrastructure to support its own upcoming initiative. The changes rendered Sherwood’s devices functionally useless. Steve again experienced frustration with the district because he could not purchase new devices, and he could not convince the district to supply his program with devices. A particular point of contention was that Steve could not even get the district to commit to a meeting time for over five months. When the district finally agreed to replace the devices, Steve was delighted. Then the devices would not work properly, and once

again, Steve could not readily receive technology support. Finally, the district implemented restrictions and software which did not support the creative and dynamic learning which had become necessary to Steve's teaching. Steve felt the district was out of touch with the daily lives of teachers and the community of schools.

The Essence of the Experience

Anne and Steve both conceived, implemented, and integrated a one-to-one technology program in their classrooms. Throughout both of their experiences, they shared several themes which gave structure to the "what" of their narrative. In both experiences, Anne and Steve encountered barriers to technology. The most noticeable of these were the bureaucracy of their district and the technology itself, both in terms of access and in the ways that students had difficulty in manipulating the technology. They both experienced supports to technology integration, including confidence in their own abilities to use technology and the trust of their principal in permitting Anne and Steve to create their own technology initiative. Additionally, both Anne and Steve experienced a shift in pedagogy toward a more student centered approach to learning social studies. Anne already implemented many student-centered strategies, but she came to realize that they were not strategies which provided autonomy and fostered agency to her students. Steve was a more traditional teacher; however, his pedagogical choices still shifted toward a more student-centered and student-driven approach. Finally, both Anne and Steve expressed a desire for the larger school district to value their hard won knowledge and experiences with one-to-one technology. For Anne, this manifested as a wish to have a greater voice in the change process, while Steve felt conflict and tension regarding the approach of the larger district.

The essence of Anne's experience with one-to-one technology consisted of her positive beliefs about the value of technology, her trust and valuing of her students, a strong professional identity rooted in a willingness to reflect and change as a professional, and a running thread of tension with the larger district. The essence of Steve's experience with one-to-one technology integration consisted of a belief that teaching and technology were both fun and enjoyable enterprises and this was coupled with a strong sense of himself as a professional educator and technology liaison. Similar to Anne, running throughout his narrative was a thread of tension with the larger district. To understand the essence of the full experience of conceiving and implementing a one-to-one technology initiative in their classrooms, Anne and Steve's essences were synthesized into a composite picture of the essences of the experience.

Drawing directly from Anne and Steve's textural-structural themes, the essence of the composite experience consisted of teachers who value technology and who experience a strong and evolving sense of themselves as agentic professionals, but who also exist in a relationship with the larger district. The support of their administration supported their sense of autonomous professionals. Synthesizing those composite themes leads to another theme contributing to the essence of the experience. This theme is that the teachers' sense of agency, coupled with teacher technological knowledge and pedagogical shifts, contributed to student autonomy. The one theme present in Anne's experience, but missing from Steve's was Anne's commitment to student-first education. This is not to imply that Steve did not value his students, but this did not emerge as part of the essence of Steve's experience in the way that it did for Anne. This portion of the chapter examines the shared and synthesized composite themes.

Teachers Who Possess Positive Beliefs About Technology

One of the themes at the heart of this experience of implementing and integrating a one-to-one technology program was teachers who hold long standing positive beliefs about technology. This was a shared textural-structural theme for Anne and Steve. They did not necessarily share the exact same beliefs about technology, and they expressed their beliefs differently, but both Anne and Steve held overall positive beliefs about technology. For Anne, this value was rooted in the ways that technology could transform learning for students, while for Steve, the value in technology was more inherent. Steve found technology interesting and enjoyable, and he enjoyed implementing it in his life and his classroom.

Anne's positive beliefs centered around the ways that technology could meet a student's needs. This is not surprising, given Anne's student-first approach to education. Additionally, Anne's positive beliefs about technology were long-standing and constantly evolving. She utilized technology 20 years ago, at the start of her teaching career, despite the obstacles to its integration at that time. Over her career, Anne built up a vast store of technological knowledge which was further augmented through her own advanced degree in Educational Technology.

Anne came to believe that students learn in an always connected, anytime and anywhere, learning environment. For Anne, the affordances of one-to-one mobile technology allowed her to help engage students anytime, anywhere. Sometimes that integration looked rather straightforward, for example, when she used the cloud based computing to help absent students remain caught up on work. Other times, the

affordances were more nuanced. This was evident through her tendency to blur the lines of the school building as students physically moved about the school and their homes using the devices to capture ideas and to correspond with each other. It was also evident through Anne's choice to allow students to access information across the globe and in real time.

Steve shared Anne's positive beliefs about technology. For Steve, technology was an inherently enjoyable tool. He surrounded himself with technology in his office, which overflowed with AV equipment; in his classroom, where, before the technology initiative, he almost always housed the school's laptop cart, and in his personal life where he was a self-described "techie guy." The challenges of technology were an enjoyable puzzle to Steve, which was one of the reasons that he served as the school technology liaison. Troubleshooting was a pleasant brain-teaser, even when it was, in Steve's words, a "headache."

Like Anne, Steve's positive associations with technology were long-standing. He served as the school's technology liaison since he arrived at the school, over 10 years ago. Steve earned his advanced degree in Educational Technology, just as Anne did. He says that "...any time a new technology came out," he "was the guy playing with it." Like Anne, this positive belief about technology allowed Steve to build up a vast store of technological knowledge and a confidence in trouble shooting and using technology. For both Anne and Steve, this positive belief about technology facilitated their regular use of technology and their commitment to stick with the integration, even when they encountered barriers to the program.

Teachers' Strong and Evolving Belief in Themselves as Agentic Professionals

Throughout Anne and Steve's experience, a running composite textural-structural theme was their sense of agency as teachers. This sense of agency was grounded in their confidence with which they negotiated their professional identities of "teacher." While neither Anne nor Steve wholly shared the same definition of what it is to be a teacher – Anne tended to ground her identity in her student-first beliefs, while Steve grounded his in positive beliefs about technology and the joys that came from innovation and the new experiences in teaching – they both felt empowered to make choices with confidence and felt a willingness to accept responsibility for those choices. The support they received from their administration helped them feel empowered to make changes in their program.

For Anne, her reflective process shaped her ability to take control of, and responsibility for, her choices. She rarely blamed someone else if a choice did not work as intended. Instead, she accepted responsibility and then considered how to modify choices to problem solve. Anne acknowledged that her willingness to make these changes has fundamentally changed her as a teacher. She saw herself with a new identity. She thought she was a student-centered teacher before the one-to-one initiative. In fact, she was a student-centered teacher in that she allowed students to work collaboratively on assignments, or produce "creative" assessments. What she realized, post-technology integration, was that she tended toward a "one-dimensional" veneer of student centered instruction. After the technology initiative, her students were empowered by her student centered instruction. The students drove their own knowledge creation and production, as opposed to the earlier student-centered work

which was driven by Anne's worksheets or information in the textbook. A result of her reflection and willingness to change has produced in Anne a deeper understanding of her beliefs about teaching, and teaching social studies. This has led to profound changes in her practice of pedagogy.

Just as Anne accepted responsibility for challenges, she accepted responsibility for successes. Because of her sense of agency as a professional, she was willing to accept that success came directly from her decisions and actions. This hard earned wisdom had personal and professional value for her, and she wanted her voice heard by her district. She believed that she possessed knowledge, skills, and experience of value, and she wanted to share this professional wisdom with other colleagues and leaders in her district. Her frustration at failing to be able to do so was peppered throughout her last theme in her textural narrative.

Like Anne, Steve demonstrated tremendous agency and confidence when overcoming obstacle after obstacle from his district and from technology itself. Anne described him as being "really good about sharing his ideas when frustrated." Steve's confidence and problem solving rested securely in his strong sense of self as a professional teacher. The support of his administration helped develop this sense of identity. Steve's principal demonstrated a commitment to growing his professional identity by supporting Steve's attendance and presentation at national conferences. The principal also supported Steve by extending him a significant level of trust when he wanted to arrange meetings with central offices to effect changes within his school and classroom. The district also inadvertently supported Steve's growth by policies which subsidized his advanced degree in technology. Steve's belief in his professional identity

as teacher and technology liaison was reinforced when he saw a technology problem, be it a software issue or a teacher who is reticent to use technology, fiddled with the problem, solved it, and met with success.

Steve and Anne's confidence in their professional identities was also evident in their willingness to re-negotiate their identities while remaining true to their beliefs about students. They were unafraid of self-reflection and change, even when it was challenging. Overtime, Anne and Steve evolved into stronger versions of their professional selves. Anne remained student-centered in her beliefs, but she allowed herself the freedom to change her pedagogy to empower students. Steve was willing to shift his identity of teacher while remaining true to his beliefs about his role as technology support within the school.

Tension in Teacher Relationship With the Larger District

Anne and Steve's program did not exist in a vacuum. It existed within the confines of the larger district, and it existed because of the support, and in spite of the barriers, of the district. This meant that the technology integration which occurred in Anne and Steve's classrooms was dependent upon more than Anne and Steve and their desire and ability to integrate technology. District support was essential to the creation of their program. Likewise, district choices negatively impacted their program.

From the outset, the fact that the Magnet Office in the district planned to support the program, meant that Anne and Steve were provided with funds essential to a one-to-one endeavor. Without this district provided support, Sherwood would not have been able to fund its own program. The principal at Sherwood also provided much needed

emotional and administrative support to Anne and Steve. She extended a high level of trust and empowerment to Anne and to Steve, allowing them to request and allocate funds as they believed it necessary.

The Magnet Office initially thought that it could act unilaterally to authorize and provide funds for Sherwood's program, but unfortunately for Anne and Steve, this was not the case. The district had multiple measures in place to ensure spending is appropriate, according to the district rules. It also had multiple offices in its central administration which are responsible for technology, curriculum, innovation, purchasing, and funding. Anne and Steve felt these offices did not understand what the other offices had approved and had not approved. The many layers of bureaucracy challenged Anne and Steve and prevented the program from moving from conception to implementation for over a year and half.

The district had very little interaction with Sherwood once the technology was implemented. Anne and Steve served as each other's support and mentor while they were integrating the technology. The district then began to implement its own initiative, and in so doing interrupted the program at Sherwood. Once again, Anne and Steve were engaged in navigating the bureaucracy of the district, this time to implement the district approved technology. After five months of scheduling, Anne and Steve were finally able to meet with district representatives and secure new devices for their students.

The new devices came with new challenges. The district utilized what Anne called "general" software, instead of affording the teachers the opportunity to customize with software relevant to their discipline. Anne found herself needing to re-write

lessons and re-navigate the tools which she used to teach. This time, Anne knew that some teachers were receiving professional development to support the integration, and she felt frustrated that she was not included in this. Steve was frustrated by his inability to access the software with the same administrator privileges he enjoyed on the software which he had purchased. This meant he could not trouble shoot problem as readily and was more reliant on the district to provide support.

Even the district support frustrated Anne and Steve. They were not part of the pilot program, which made it difficult for the district to prioritize support for Sherwood. Additionally, Steve felt that the technologists hired to support the one-to-one initiative failed to understand the daily lives of students and teachers. It led to complications in his classroom when he received devices back from technology support.

Finally, both Anne and Steve felt frustration that their voices were not being heard. They both believed in the value of technology, and they both supported Sherwood's one-to-one initiative, and the district's one-to-one initiative. However, they both expressed concern and frustration that their voices were being ignored. For Anne, this manifested as a concern that the district would fail in its one-to-one initiative because it would not create teacher buy-in. For Steve, this manifested as a concern that the district initiative would fail because its leaders failed to understand what teachers experienced in their daily lives, which in turn would lead to the district not fully anticipating barriers to effective integration.

Teacher Agency, Technological Knowledge, and Pedagogical Shifts Contribute to Student Autonomy in Learning

Empowered by the freedom and trust that their principal allowed them, Anne and Steve made curricular, technological, and funding decisions. They chose their own learning applications, problem solved, and ultimately evolved into powerfully effective teachers who understood the importance of their work. They knew the work they were doing was innovative and exceptional.

With this confidence, they changed their classrooms. Anne's classroom became a place that empowered students. Just as Anne's principal trusted Anne and empowered Anne to make meaningful programmatic decisions, Anne passed along this trust to her students. Anne ceded control of knowledge acquisition, production, and demonstration, to her students. Her grasp of the content of law and history intersected with her strong technological body of knowledge and the new-found pedagogies afforded by it.

Anne opened the physical classroom to her students and allowed them to rearrange the physical setting and their seats as they felt they needed. This opening of the classroom served as a physical metaphor for Anne's eventual approach to student learning. She allowed the students to seek out sources to acquire knowledge, while guiding them by modeling her own metacognitive practices as she utilized multi-media, web 2.0, and the free-web to discover and vet sources. She allowed the students freedom in their production of knowledge and demonstration of knowledge. This process led Anne to make her assessment rubrics more purely reliant on social studies content and skills and less on nebulous constructs like "neat" or "creative." Without a strong grasp

of content and skills, she would have been unable to grasp her own metacognitive practices, much less model them for students, nor have the confidence to allow such freedoms to her students. Anne's classroom really was the students' classroom, in metaphor and actuality.

Steve also shifted toward a more student-centered approach to teaching and learning. He built constructivist pedagogy through technology. Like Anne, Steve ultimately relied less on prescribed methods of knowledge acquisition and production for the students. He used traditional methods of instruction more frequently than Anne, but ultimately, he still could not resist the potentialities of technology to transform teaching and learning in his classroom. For Steve, his impetus for change was observing Anne. No one forced him to change, instead he observed Anne's successes and migrated away from his more traditional approaches. Steve's students also began demonstrating their own initiatives in finding materials, sources, and useful applications. In both classrooms, teacher shifts led to student autonomy in learning.

Chapter Five

Discussion

This study addressed the gap in research on one-to-one technology in social studies (Friedman, 2014). The study also explored teacher perceptions and attitudes toward technology, as the literature demonstrated an established link between these beliefs and technology integration (Ertmer, 1999, 2005; Ottenbreit-Lefwich et al., 2010). It utilized phenomenological reduction (Moustakas, 1994) to explore teacher perceptions and examine teacher voice in change initiatives and education reform (Fullan, 2007; Giroux, 2005; Hargreaves, 1996; Storz & Hoffman, 2013). Finally, while a significant body of research exists which examines top-down one-to-one initiatives (i.e., Crompton & Keane, 2012; Donovan, Hartley, & Strudler, 2007; Inserra & Short, 2012-2013), missing almost entirely from the literature on one-to-one initiatives are examples of integration that have been conceived and implemented from the ground-up, by teachers. This study addressed that gap by using case study design to examine the atypical experience of middle school social studies teachers who initiate a one-to-one technology program in their classrooms.

This study explored the experiences of teachers who integrated one-to-one technology into their classrooms. The purpose of this research study was to acquire a better understanding of the lived experiences of middle school social studies teachers who integrated one-to-one tablet based technology into their classrooms. Specifically, it examined participants' experiences conceiving of and implementing their own one-to-one technology initiative in their classrooms. This research was framed in literature on

one-to-one integration in social studies; the role of technology in social studies; broader one-to-one initiatives; the complex relationship between context, teacher beliefs and TPACK, and the importance of teacher voice and phenomenological research in educational technology studies. The selected method, case study with an interpretive lens of phenomenology, provided participants an opportunity to share their experiences without the researcher's imposed expectations of beliefs or pedagogical practice. As a method, it gave voice to teacher experience and helped make underlying beliefs and perceptions more visible. This chapter answers the research questions using support and discussion of the findings. It contextualizes the findings and the answers to the research question using the relevant literature. Finally, the chapter makes recommendations for research, policy, and practice.

Discussion of the Research Questions

The atypical case of a teacher-initiated and teacher-led technology initiative, coupled with the voices of the teachers, provided a perspective for understanding teacher-led one-to-one initiatives in middle schools and in social studies. The phenomenological research attempted to answer how middle school social studies teachers perceive and describe their experiences initiating and integrating a one-to-one program. Using phenomenological reduction (Moustakas, 1994), the data were analyzed to understand the essence of the experience of teacher-led technology integration in social studies. The findings reinforce and deepen prior research findings about one-to-one technology and technology in social studies, as well as offer counterpoints and new insight into the narratives established in the literature.

Summary of Findings

The guiding research question for this study was: How do selected middle school social studies teachers perceive and describe the experience of conceptualizing and implementing a one-to-one program for tablet technology in their classrooms? In this study, Anne and Steve both experienced the conception and implementation of a one-to-one technology program in their classrooms. Central to their shared experiences during conception and implementation were: their positive beliefs about technology; their belief in themselves as agentic professionals, and a tension in their relationship with the larger district. In addition, central to their shared experiences were ways in which their own empowerment, technological knowledge, and pedagogical shifts led to student autonomy in learning.

Throughout both of their experiences, Anne and Steve shared several themes which provided structure for their narrative. Anne and Steve both encountered barriers to technology. The most noticeable of these were the bureaucracy of their district and the technology itself, both in terms of access and in the ways that students had difficulty in manipulating the technology. They both experienced supports to technology integration, including confidence in their own abilities to use technology and the trust of their principal who encouraged Anne and Steve to create their own technology initiative. Additionally, both Anne and Steve experienced a shift in pedagogy toward a more student centered approach to learning social studies. Anne already implemented many student-centered strategies, but through reflection, she came to realize that they were not strategies which provided autonomy and fostered agency to her students. Steve was a more traditional teacher; however, his pedagogical choices still shifted toward a more

student-centered and inquiry-driven approach. Finally, both Anne and Steve expressed a desire for the larger school district to value their hard won knowledge and experiences with one-to-one technology. For Anne, this manifested as a wish to have a greater voice in the change process, while Steve felt conflict and tension regarding the increased control of the larger district.

The themes and essences of each participant's individual and shared experience are further explored and analyzed in the sub-research questions. The first of these questions was: How do selected middle school social studies teachers perceive and describe their experiences initiating a one-to-one program in their classrooms? The second was: How do selected middle school social studies teachers perceive and describe their experiences in integrating the technology into their classrooms?

Discussion of One-to-One Program Initiation

Examined here is the answer to the first part of the research question: How do selected middle school social studies teachers perceive and describe their experiences initiating a one-to-one program in their classrooms? An examination of teacher-initiated one-to-one programs is absent from the literature. However, existing literature does provide context for understanding teacher perspectives and experiences when local or state school districts implement these initiatives. This study's findings are framed within that larger body of literature and in particular will be discussed within the theoretical framework of Ertmer's (1999) and Ertmer et al.'s (2012) work on first and second order barriers to technology integration. Specifically, used to frame the discussion is Ertmer et al.'s (2012) suggestion that despite second order supports to technology integration,

and in particular teacher beliefs in the value of technology, these beliefs are not always sufficient to overcome “barrier thresholds.” The “barrier thresholds” are created by first order barriers which become too overwhelming to breach, even for teachers who demonstrate strong beliefs in technology.

The teachers in this study described the experience of initiating a one-to-one program as challenging, yet rewarding. They experienced several significant barriers to initiating one-to-one technology in their classrooms. In fact, barriers to technology initiation and early implementation emerged as a structural theme for each participant. The barriers to conception and early implementation included bureaucracy and the technology itself. Each of these barriers represent first-order barriers as defined by Ertmer (1999) which could at some point become have become barrier thresholds (Ertmer et al., 2012) to initiation.

However, supports to initiation and implementation also emerged as a theme for Anne and for Steve. Both participants perceived their strong technological knowledge as a support to integration. Additionally, Steve found technological support from the software company as useful to helping him overcome barriers to initiation. Anne found support in administrative trust, her confidence in her abilities to use technology, and a belief that the technology was worth the challenges. These positive beliefs helped Anne and Steve overcome the first-order barriers (Ertmer, 1999) to initiation and early implementation.

An important shift in Anne and Steve’s narrative emerged during the school district’s pursuit of a one-to-one initiative. The district’s initiative began after Anne and

Steve had implemented their own program in their classrooms. This meant that two years after Anne and Steve navigated the initial barriers to integration for their own program, they had to re-integrate new technology from the district-led initiative. This time, the barriers to technology integration looked slightly different than the initial barriers to integration. The new technology afforded them far less autonomy, because the district controlled the administrative rights and software on the devices. Additionally, because Sherwood was not an official district pilot school, Anne and Steve did not receive the same level of support for technology integration as compared to the teachers in the pilot schools

Underlying the experience of initiation of one-to-one technology in their classrooms, was the essence of the experience, that which is the “common and universal condition or quality, without which the thing would not be what it is” (Moustakas, 1994, p. 100). For Anne and Steve, this essence, their positive beliefs about technology and themselves as agentic professionals, permeated their decisions and the manner in which they overcame the barriers to the program’s initiation. They remained largely positive about technology, despite the frustrations and barriers that they experienced. They also remained dogged in their commitment to pursue the initiative despite overwhelming bureaucratic obstacles to initiation and implementation. This supports Ertmer et al.’s (2012) assertion that second-order supports including positive beliefs about technology can help overcome first-order barriers. It extends Ertmer et al.’s (2012) research to suggest that positive beliefs about technology *and* positive beliefs in their own agency may allow teachers to overcome “barrier thresholds.”

As a result of this process, their beliefs in their professional capabilities grew. This represented and reinforced one of the essences of their experience, that of a sense of themselves as agentic professionals. The following section contextualizes these experiences within the larger body of literature on one-to-one initiatives, and pays particular attention to the role of teacher beliefs, first- and second-order barriers to implementation, and ecological context as it impacts teacher TPACK.

Purpose for one-to-one initiative. Explicitly stating the goals of the one-to-one initiatives under study is relevant and necessary information to include in a discussion of the findings (Penuel, 2006). Policymakers and practitioners rely on this to contextualize their own initiatives (Penuel, 2006). The participants in this study describe the purpose for their initiative somewhat differently than the rationales that are identified within the literature. Typically, the rationale for district or state-wide one-to-one initiatives includes one or more of four overarching goals: (1) improving student achievement through technology, (2) reducing the digital divide, (3) increasing the economic competitiveness of a region, and (4) transforming instruction to a more constructivist approach (Penuel, 2006). These broad and far reaching goals of large districts are reasonable when considering impacts on technology use through an ecological perspective. This perspective delineates and considers the influences of local, regional, and national/global contexts when discussing teachers' technological, pedagogical, and content knowledge (TPACK) (Porrás-Hernández & Salinas-Amescua, 2013), and district decision makers consider a large body of stakeholders as they set a vision for change.

Contextualizing the experience of teachers within this ecological framework, it follows that when teachers wish to implement a program in their own local school or

classroom, their goals for the program might look different than the goals of a district-wide or state-wide initiative. At Sherwood, the teachers implicitly believed in the value of technology in transforming education. In fact, they explicitly described their own transformative experiences when they discussed the integration stage of the initiative. However, Anne and Steve described the explicit reason for initiating a one-to-one program in their classrooms as a way to address practical issues in their classrooms and in their school building. This issue affected the day to day lives of students and teachers in the school community. The issue, for Anne and Steve, was that they were monopolizing a school computer lab. They wanted to allow more students in the school to have access to the desktops in the lab, while still ensuring that their own students had regular access to technology. The teachers specifically sought to address issues that impacted their micro-ecological (Porras-Hernandez & Salinas-Amescua, 2013) level of teaching, their classroom and their school. When they reflected more on the purposes for their initiative, and when they wrote the proposal to receive the funds, they described the initiative as a method for increasing student engagement in the 21st century. The teachers articulated their goals differently when they contextualized them in a more mezzo-ecological (Porras-Hernandez & Salinas-Amescua, 2013) context.

A confluence of factors led the teachers to choose a mobile one-to-one initiative as a solution to the practical issue of lab-time within the school. The first factor contributing to the conception of the initiative was described by Anne and Steve as a need to solve a practical, school-based issue. The practical consideration spurred them to consider other alternatives to integrating technology besides scheduling computer lab time on an almost daily basis. This finding offers valuable insight into the priorities of

teachers. While district leaders tend to make decisions based on broad visions for many students and teachers (Penuel, 2006), the teachers in this study had a vision for their more immediate community. The teachers' priority was the equitable treatment of their students and the students of their school community. This supports conclusions of Porras-Hernandez and Salinas-Amescua's (2013) research on the impact of ecosystems on teacher technology use. It extends these conclusions by suggesting that when studying one-to-one initiatives, researchers should consider the ways in which teacher motivations and beliefs are rooted in their immediate ecosystem of students, parents, teachers, and the school facility.

The second factor influencing conception and implementation of the initiative was the teachers' perception of a high level of professional trust afforded to them by their principal. This trust manifested itself as autonomy and support of professional goals. The principal of the school supported Steve's professional development by allowing him time and funds to attend technology conferences. The principal also supported Anne with trust and near total autonomy when Anne asked for permission to run a one-to-one program at the school. This suggests that beliefs, particularly beliefs in teacher agency, may help teachers cross the "barrier threshold" as defined by Ertmer et al. (2012).

The third factor influencing the initiative was timing of technological innovations. The timing of this initiative coincided with technological innovations of tablet technology. Tablets were becoming mass produced by multiple companies, making the initiative far more affordable than a one-to-one laptop program. When Anne and Steve started the program, tablets were one-third the cost of a laptop and could hold

a battery charge for the entire day. At the time of the program, laptops could not keep a battery charge for a full school day. This choice of technologies echoes Selwyn's (2011) proposition that technology is not simply a neutral tool used in benign ways, but instead is "intrinsically linked with the social, cultural, economic and political aspects of society" (p. 17). Similarly, Bijker, Hughes, and Pinch (1987) tried to evolve the understanding of technology from "science discovers, technology applies" to something more fluid and defined by the social construct applied to the technology.

The fourth factor was the teachers' access to funding resources from the outside, instead of from the school's budget. Anne and Steve taught in a magnet program housed within their social studies department. This program was willing to provide the resources necessary for the teachers to purchase and maintain the tablets. Without the access to outside financial support, the budget of Sherwood could not have supported Anne and Steve's initiative.

The last factor influencing the teacher-led conception and implementation of the one-to-one program was teacher beliefs and attitudes about technology and education. Anne and Steve faced hurdle after hurdle of bureaucratic red tape and difficult technology infrastructure upgrades. The stamina and will power to meet these obstacles existed because they believed that a one-to-one program would be good for their students. Teacher beliefs have been linked to teacher integration of technology (Ertmer, 1999, 2005), and this study suggests that teacher beliefs may also be inform teacher-led programmatic technology change and assist teachers in overcoming first-order "barrier thresholds" to technology implementation.

Barriers during the initiation phase. The teachers in this study described encountering several barriers to initiation of their program. Typical barriers faced during initiation of one-to-one programs include: the technology itself as its own barrier (Hill et al., 2003; Garthwait & Weller, 2005; Ringstaff, 1991), a lack of effective teacher professional development (Dunleavy et al., 2007; Oliver & Corn, 2008; Storz & Hoffman, 2013), and negative teacher perceptions about technology (Donovan, Hartley, & Strudler, 2007; Swallow, 2015). Findings from this study support the established narrative in the literature that technology can be its own barrier to program initiation. Findings add dimension to the growing body of literature on professional development for technology initiatives. This study provides depth and context to that assertion that teachers should have a voice in initiatives from conception through implementation in order to minimize negative perceptions (Donovan, Hartley, & Strudler, 2007). Finally, this study extends understanding of the impact of bureaucracy on technology initiatives (Sincar, 2013). Teacher perceptions about this barrier may serve as a way to re-contextualize some established assumptions about TPACK and the role of context as it influences TPACK. Additionally, these findings about teacher perceptions extend understanding of the role of teacher beliefs in the role of technology initiatives (Ertmer, 1999; Ertmer et al., 2012).

Technology. As in other studies (Hill et al., 2003; Garthwait & Weller, 2005; Ringstaff, 1991) and as suggested by Ertmer et al. (2012), technology as a barrier to integration emerged as a theme in this study. Technology was a barrier because of its own functionality and because the students were underprepared to utilize technology as a learning tool instead of a social media tool. Overcoming the functionality issues of the

technology was the first barrier that Anne and Steve faced. They had difficulty configuring the devices to work within the federally required firewalls. The devices needed to be imaged and digitally assigned to each student. There were other, more practical equipment barriers as well. Anne and Steve did not fully anticipate the differences in student treatment of hardware versus adult treatment of hardware. The students dropped the devices more frequently, and they treated the tablets like they would treat their notebooks. This led to a need for more protective cases.

The students in this study did not initially understand how to use mobile tablet technology in efficient and meaningful ways for learning, despite their facility in navigating their social media. This finding is supported in the broader literature on one-to-one research which indicates teachers are frequently surprised at how little transfer occurs from student personal use of technology to student academic use of technology (Donovan, Hartley, & Strudler, 2007; Shifflet & Weilbacher, 2015). Anne and Steve both expressed surprise at the inability of the students to use the devices immediately and with relative ease. Steve noted that the students had been using technology regularly in the classes, it was just that the technology was desktop computers in a lab instead of personal tablets. He recalled that he assumed they would be able to transfer those skills to tablet use, which turned out to be incorrect. Anne recalled her frustration with the term “digital native,” saying that is not an apt description of students using technology for education. Both Anne and Steve noted the ways that students had trouble transferring their ability to use their computers or phones to the ways that Anne and Steve expected the students to utilize the tablets.

Professional development. Unlike many teachers studied in the larger literature, the teachers in this study did not have formal school or district-sponsored professional development to help them learn best practices for technology integration. They report that they mostly learned how to use the technology on their own, from talking with each other, and from allowing the students to take the lead in exploring the devices. In particular, the participants' support of each other, as colleagues, served as a form of professional development and support. They acted as a small, personal learning community (Fullan, 2007) and provided support on technology issues as well as advice and modeling on technology integration and pedagogical practices.

While not precisely professional development, the teachers did ask for assistance from the company who developed the software which they used on their devices. The company provided a training representative. Anne wryly described the experience as “interesting.” She noted that the training would have been much more useful had the trainer understood the profession of teaching. This sentiment echoes findings in from literature that teachers benefit from professional development that is relevant to their needs as a teacher (Oliver & Corn, 2008; Storz & Hoffman, 2013).

When the district began its own one-to-one pilot, Anne expressed dismay and frustration that she was not invited to attend the accompanying professional development. She also described feeling troubled that the district reduced funds for professional development from the first year of its pilot to the second year. For her, this was another oversight on the part of the district in their implementation of a one-to-one initiative.

Initial perceptions about technology. Negative teacher perceptions of technology, some of which are formed at the outset of a district proposal for a one-to-one initiative, have been a barrier to effective early implementation of the program (Donovan, Hartley, & Strudler, 2007; Swallow, 2015). Ertmer (1999, 2005; Ertmer et al. 2012) provides a framework for analysis for beliefs by suggesting that beliefs impact technology implementation, particularly in the ways that they inform teacher reaction to first-order barriers to implementation. Teachers in this study had neither initial, nor persistent, negative beliefs about technology. Certainly, they have fleeting moments of frustration with malfunctioning technology. Anne once noted, “Were there times that I wanted to throw the device out the window? Oh, yes!” but overall, both Anne and Steve regularly described their positive feelings and beliefs about technology and the possibility of technology during the initiation phase of the program. This study found that participants’ positive beliefs about technology were an essential part of their larger experience initiating and implementing a one-to-one initiative. This finding is supported and framed by Ertmer’s (1999, 2012) analysis of beliefs, which suggests that positive beliefs can help overcome first-order barriers to implementation.

It has been suggested that teachers should have a voice in initiatives from conception through implementation in order to minimize these negative perceptions (Donovan, Hartley, & Strudler, 2007). This study supports that assertion. These teachers not only had a voice, they had full control over the initiative, and they demonstrated positive perceptions of technology. Interestingly, an essential theme of their experience was the underlying tension they experienced with their district, not with technology itself. Especially frustrating to both Anne and Steve was their perception

that the district was dismissive of their technological knowledge and experience, as well as dismissive of their needs with the new, district mandated, technology. After the district involvement in Sherwood's program, Anne and Steve both shared an increasing level of frustration with a lack of support for technology integration. This lack of support manifested itself through poor communication with the teachers, limited and slow technology support, and limited professional development. Findings from this study suggest that, if teachers hold positive beliefs about technology, but are deprived of a voice in a technology initiative, they develop a tension in their relationship with the district. The teachers' beliefs about technology remained positive, but their beliefs about the district's technology initiative grew increasingly negative. Framed within Ertmer's (1999) and Ertmer et al.'s (2012) research on beliefs in technology integration, this study extends the research to suggest that a potential relationship exists between teacher voice and teacher beliefs.

Sherwood's district started to pilot its own initiative during year two of Sherwood's initiative. An important finding of this study is the increased frustration with technology *after* the district became more involved in Sherwood's one-to-one initiative. The district provided much needed updated devices to Anne and Steve's program. Anne and Steve described a loss of autonomy and control over the technology after this shift. It frustrated them that they could no longer choose apps for their students. They encountered technological difficulties that proved impossible for them to troubleshoot in-house because of district control over access to software. Anne and Steve described their most frustrating feeling as not being "heard" by the district. They could not schedule timely technology repairs at their school; they had no clear method of

effectively communicating their challenges and successes. The district's failure to hear the teachers' voices and address the teachers' needs limited the teachers' abilities to integrate technology. Steve specifically referred to the ways that he needed to develop solutions which worked around district technology because the district failed to anticipate creative uses of technology by Steve and his students. This reinforces Garthwait and Weller's (2005) assertion that time taken by teachers to solve technological issues reduced time for planning or teaching. It also supports Ertmer et al.'s (2012) assertion that first-order barriers can still prevent effective technology integration, despite teacher belief in the value of technology. These technological issues could often be attributed to school and district policies that failed to anticipate the needs of students and teachers.

Bureaucracy. Bureaucracy is noted in leadership literature as a potential barrier to technology initiatives (Sincar, 2013). This study found that bureaucracy was a significant barrier for the teachers initiating their own one-to-one program. Steve joked that he would not be surprised if he needed medication after the year and a half of meetings and red-tape, which he and Anne encountered as they implemented their program. Although the principal of Sherwood trusted Anne and Steve to lead the initiative, Steve felt that the district administrators were afraid to extend that trust. He described them as verbally assuring Anne and Steve of their enthusiasm for the program, but that the administrators were often shielding themselves behind a "hard wall of policy."

Teachers do not implement technology initiatives in a vacuum (Porrás-Hernández & Salinas-Amescua, 2013). There is a complex relationship between

teachers, students, schools, districts, and the larger government (Porrás-Hernández & Salinas-Amescua, 2013). A significant essence of the experience of the teachers in this study was the tension which existed in their relationship with their larger district, and the ways in which this impacted their technology integration. Decisions of the district, including the bureaucracy which leaders used to shield themselves from having to make a decision, prevented the teachers from integrating technology in their classrooms. Framing a barrier to technology implementation within the context of an ecosystem impacting TPACK, (Porrás-Hernández & Salinas-Amescua, 2013) helps contextualize the teachers' frustrations with the system. This finding suggests that understanding TPACK through a lens of ecosystem as context can clarify external pressures influencing teachers' ability, or inability, to implement their TPACK.

Supports during the initiation phase. Supports to the conception and early implementation emerged from both participants' narratives. Supports for implementation included administrative trust, the role of colleagues, and a belief that the technology was worth the challenges. Support of the principal provided Anne and Steve with the encouragement and autonomy they needed to conceive of and implement the one-to-one program. District support of Anne and Steve's continuing education helped develop their skill and ability to use technology effectively in their classrooms. Anne and Steve's support of each other also provided themselves with a built-in support system. Their positive beliefs about the power of technology in education helped them remain committed to navigating the bureaucracy of the district during early conception and implementation. Their strong technological knowledge (TK) (Koehler & Mishra,

2007) also allowed them to address technological issues during the conception and initiation phase of the project.

Administrative support which promotes autonomy. Anne and Steve give credit to their principal for the success of their initiative. Specifically, they referred to the level of trust their principal placed in them as “powerful.” Anne said:

...she knew that Steve and I – if any two teachers who had the knowledge to be able to run it – she trusted us to be able to say, “Okay, we really understand what we’re doing. We have all the specs, we have all the finances worked out, we have the program support, we think this could be really beneficial to the kids and we need real time access.”

The trust from the principal, specifically her trust in her teachers to do what was beneficial for students, allowed Anne and Steve to feel empowered to make programmatic decisions. It also contributed to Anne and Steve’s evolving sense of their professional identity as teachers who could effect change.

Steve received ongoing support from his principal in order to attend technology and education conferences. Additionally, both teachers held master’s degrees in technology education. Steve earned his degree from an internationally respected institution, made financially feasible through a cohort program with his school district. Anne earned her degree while teaching in the district, and her tuition was also subsidized by the district, though not to the same extent as Steve’s. This support occurred well before the conception of the one-to-one initiative. While this development was not targeted to the initiative per se, the teachers employed some of

their learning from these conferences and from their advanced degrees during the initiation and the implementation phase. Additionally, both Anne and Steve's technological knowledge (TK) (Koehler & Mishra, 2007) was built, in part, through their advanced degrees, earned while they were teaching in their district.

Colleagues as support. In addition to the support of the principal, the support of Steve was essential to Anne's experience. Likewise, Anne's support and modeling is what provided Steve the opportunity to evolve in his methods of technology integration. These teachers have a bond grounded in time and collegiality. They have been friends and colleagues for over 14 years. Together, they began the Law and Finance program at Sherwood, and they co-planned together for at least 10 years. Anne respected Steve and his forthright nature. She relied on his technological expertise and his good natured humor to help weather the barriers to technology integration. Similarly, Steve appreciated the radical approach which Anne took toward technology integration. He shifted his approach because he respected Anne as a colleague, and because of their time to co-plan, he noted the successes she was having in her classrooms. Framed within Ertmer et al.'s (2012) research on belief, this suggests that teacher belief may be co-constructed with colleagues. This may occur within informal and organic personal learning communities (Fullan, 2007) like the one that these two teachers shared.

Positive beliefs about technology in education. Anne and Steve both held positive beliefs about technology which were grounded in their long standing positive experiences with technology, their advanced degrees in technology, and a willingness to take risks with technology. These positive associations with technology contributed to confidence in technology implementation and manifested themselves as Anne and

Steve's strong technological knowledge (TK) (Koehler & Mishra, 2007). Anne and Steve both referred to themselves as "techie" people. They also both referred to technology as a "powerful tool" in education.

Anne and Steve believed that technology could transform instruction and that one-to-one tablet technology in particular would meet the needs of 21st century learners and promote student engagement. Their commitment to these beliefs drove their one-to-one program and served as the justification for the program in their proposal to the district. Their commitment to technology integration, grounded in a belief that technology in education was a powerful tool for learners, allowed them to navigate the year and half of bureaucratic obstacles to their initiative. This finding is supported in the broader literature on the power of teacher beliefs in helping to navigate barriers to technology implementation (Ertmer, 2012).

In addition to their personal beliefs in the power of technology in education, Anne and Steve both demonstrated high levels of technological knowledge (TK). They were able to access that TK in order to determine what types of infrastructure supports they would need for their initiative. Steve could easily navigate the vocabulary of technology in order to communicate issues with the tablets. He conversed with the software company about firewalls, imaging machines, and software to add and access applications for students. Anne and Steve used their own considerable technological knowledge to trouble shoot these issues. When an issue was greater than their technological knowledge (TK), or the time they had available to solve an issue, they relied on the support of the company whose software they utilized. An important finding of this study was that the high level of TK, demonstrated by both Anne and

Steve, provided them with both the confidence and the skills necessary to problem solve technological issues as they arose.

Discussion of One-to-One Integration

Explored below is the answer to the second part of the research question: How do selected middle school social studies teachers perceive and describe their experiences integrating one-to-one technology in their classrooms? In order to fully answer this question, the discussion frames the themes from the findings of the study within the framework of TPACK and the larger body of literature on technology integration. The literature examining teacher experiences integrating one-to-one technology in social studies is thin; however, research which broadly examines one-to-one initiatives and literature which examines technology integration in social studies provides some context for understanding one-to-one technology in social studies. This study's findings are framed within both bodies of literature.

The teachers in this study describe their experiences integrating one-to-one technology as a complex phenomenon which ultimately transformed their social studies classrooms. Their experience of integrating one-to-one technology was iterative, interdependent, and interwoven in its component parts. Shared essences of the experience and individual themes emerged from their narrative of their experiences. The shared essences of the experience of integrating one-to-one technology in their classroom were: their positive beliefs about technology; their beliefs about themselves as agentic professionals; their relationship to the larger school district, and ultimately, the ways that their agency, technological knowledge, and pedagogical shifts in social

studies contributed to autonomous student learning. Individual themes also help provide structural understanding to Anne and Steve's experiences implementing technology in their classrooms. Both Anne and Steve experienced a shift in pedagogy toward a more student centered approach to learning social studies. Additionally, both Anne and Steve expressed a desire for the larger school district to value their hard won knowledge and experiences with one-to-one technology. This portion of the chapter will attend to the specifics of the themes and each component of the experience, while connecting and acknowledging the complex whole.

To frame each component, and also to discuss the components as part of a greater whole, a modified version of TPACK (Porrás-Hernández & Salinas-Amescua, 2013), which considers contextual factors as essential to TPACK, is used. This modified version considers micro, mezzo, and macro factors which act on a teacher. Micro factors consider the immediate classroom, the content being learned, teacher beliefs, and the way each of these work together to influence TPACK. Mezzo factors refer to forces acting on the teacher from her administration and the greater community and the ways in which these forces impact the micro factors and ultimately teacher TPACK. Finally, macro factors consider national trends in education which may influence mezzo and micro forces, and ultimately which influence the teacher's TPACK.

This section of the chapter will first examine the micro-level context influencing teacher TPACK. The teachers' personal beliefs about technology, student-centered instruction, and professional agency are examined. In addition, micro-level forces which act on beliefs are discussed within the context of beliefs. Then, teacher social studies TPACK is examined within the context of these forces. Next, this portion of the chapter

examines the impact of mezzo-level factors on micro-level forces and social studies teacher TPACK. Macro-level forces were not explicitly addressed in the findings on teachers' perceptions and descriptions of their experience. Discussion of macro-level forces will be examined in the portion of this chapter which considers impacts of the research on policy.

Micro-level factors influencing TPACK. Micro-level factors consider teacher beliefs, the classroom and school, the content being learned, and the ways that each of these work together to influence TPACK. The composite themes of the participants' experience integrating technology help illustrate the complicated relationship among contextual factors and TPACK. This section will begin with an examination of the findings surrounding participant beliefs about technology. It then examines findings which describe beliefs about student-centered pedagogy, and finally examines the theme of professional agency. Within each of these sections on beliefs, the chapter considers micro-level forces which impact those beliefs. Finally, this portion of the chapter examines how social studies teachers' TPACK was impacted by the micro-level factors.

Beliefs about technology. Both participants demonstrated a strong and longstanding belief in the value of technology. Though Anne and Steve did not necessarily share the exact same beliefs about technology, and they expressed their beliefs differently, both Anne and Steve held overall positive beliefs about technology. For Anne, this value was rooted in the ways that technology could transform learning for students, while for Steve, the value in technology was more inherent. Steve found technology interesting and enjoyable, and he enjoyed implementing it in his life and his classroom.

Anne and Steve's positive beliefs about technology in education were constantly evolving and were formed throughout their professional experiences. Within their classrooms and within their school, Steve and Anne were given the freedom to use technology in ways they believed would most benefit their students. The principal of the school supported Anne and Steve's one-to-one initiative, and she trusted them to manage the technology and instructional choices as they saw fit. This afforded Anne and Steve a safe space to take risks with their instruction and the technology. Findings from this study reveal an iterative relationship between a teacher's beliefs about technology, teacher's technological knowledge (TK), exposure to new technologies, and a teacher's opportunity to "play" with technology.

The teachers in this study already possessed positive beliefs about technology which provided them the confidence to use one-to-one technology in their classrooms. As they used and integrated technology, their technological knowledge (TK) grew and provided them with confidence to more meaningfully integrate new technologies into their classrooms. This reinforced and extended their positive beliefs about technology. These findings support research which claims that effective support for teacher growth should recognize the situative nature of the growth experience, and allow teachers opportunities to take professional risks and make meaning from experiences in the ways each teacher finds most useful (Clarke & Hollingsworth, 2002). In addition, these findings support the conclusions of Lowther et al. (2014) who argue that teachers with higher technical skills demonstrate more positive beliefs about technology and are more likely to integrate technology into their classrooms.

Evolving beliefs about student-centered learning. The participants experienced a shift in beliefs surrounding student-centered learning. Before the integration of one-to-one technology, Anne considered herself student-centered in her approach to social studies instruction. For Anne, her definition of student-centered pedagogy before the one-to-one initiative meant that students worked in groups and used stations around the room. Steve perceived himself as a more traditional teacher, though he did use partner pairs and some collaboration. After integration, the participants' understanding of student-centered had evolved to mean that students were actively involved in their own creation of knowledge through meaning-making and perspective-taking.

Steve described himself as a far more traditional teacher than Anne. He started the one-to-one program trying to actively remain traditional in his instruction; he decided to simply digitize his worksheets. Several months into the initiative, he described himself as “migrating away” from this. The impetus for the migration was the powerful transformations he saw occurring in Anne’s class. This transformation did not occur immediately. There was an evolution over time, facilitated by access to technology, reflective practice, and time for teachers to co-plan and discuss their individual technology integration approaches. This finding of the need for time for reflection is supported by Doppen’s (2004) study which concluded that time was essential for teachers to re-navigate their beliefs about technology in their social studies classroom.

Anne recalled that she had always considered herself a teacher who used student-centered pedagogies. With the benefit of hindsight, she described her pre-one-to-one teaching as merely engaging in a “one- or two-dimensional version” of student-centered

teaching. After integration, she felt her lessons were much more “three-dimensional.” Anne did note that initially, students were more interested in the device than they were in conversation with each other; however, she worked daily to treat the tablet like any other learning tool. Eventually, she found that students could harness the cooperative capabilities of the one-to-one tablet in a blended learning environment. Lin, Wong, and Shao (2012) asserted that in a middle school social studies classroom, one-to-one learning leads to less group collaboration than one-to-many. The findings from this study suggest that if teachers design lessons which utilize the technology as they would another learning tool, and if the teachers utilize one-to-one technology on a daily basis, student collaboration does not suffer.

Beliefs about professional agency. Another theme essential to the experience of integrating one-to-one technology in social studies classroom was the participants’ belief in their sense of agency as teachers. This sense of agency was grounded in their confidence with which they negotiated their professional identities of “teacher.” Neither Anne nor Steve wholly shared the same definition of what it is to be a teacher. Anne tended to ground her identity in her student-first beliefs while Steve grounded his in positive beliefs about technology and the joys that came from innovation and the new experiences in teaching. Yet, they both felt empowered to make choices with confidence and felt a willingness to accept responsibility for those choices. For Anne, her reflective process shaped her sense of agency. Steve’s belief in his professional agency and identity as a teacher and technology liaison was reinforced through risk taking.

Steve and Anne’s confidence in their professional identities was also evident in their willingness to re-negotiate their identities while remaining true to their beliefs

about students. They were unafraid of self-reflection and change, even when it was challenging. Over time, Anne and Steve evolved into stronger versions of their professional selves. Anne remained student-centered in her beliefs, but she allowed herself the freedom to change her pedagogy to empower students. Steve was willing to shift his identity of teacher while remaining true to his beliefs about his role as technology support within the school.

A significant finding of this study was that teacher beliefs can shift, but that fundamentally, the teachers grow into a deeper and more refined sense of their beliefs. At her essence, Anne grounded her identity of “teacher” in a student-oriented and reflective belief system. At his essence, Steve grounded his identity of “teacher” in an innovation-focused belief system. This suggests that their beliefs shifted within a more fixed sense of who they were as professionals.

Evolving beliefs impact social studies teacher TPACK. A theme in both Anne and Steve’s narrative was an overall shift in social studies pedagogy toward a more student-centered and inquiry-based approach. They described the experience of integrating one-to-one technology in their classrooms as transformative for their instruction of social studies, and they both contextualized their experiences implementing technology within their specific content disciplines of social studies. The participants perceived this transformation as personal “evolution(s)” and “migration(s) away” from more traditional methods of instruction and toward a more inquiry-based pedagogical approach, which is emphasized in the C3 Framework (National Council for the Social Studies, 2013). The participants also shifted assessment practice to ensure that social studies content and skill acquisition was the central goal of student

knowledge creation and assessment. The one-to-one technology alone did not cause the shift in practice. Instead, the transformation occurred because of the teachers' belief in themselves as agentic professionals and their beliefs in the power of technology coupled with their knowledge of content (CK), technology (TK), and pedagogy (PK).

Powerful teacher TPACK should transform content through an intersection of CK, TK, and PK (Koehler and Mishra, 2005; 2007). Anne and Steve described the experience of integrating one-to-one technology in their classrooms as transformative for their instruction of social studies. For example, in Anne's lesson on the economy of China, students were given the opportunity to "select an app or program where you can record 9 true/false answers. Title and SAVE the document: *The China I Know*." Students were given extensive freedom in their choice, and they used this universal design of the lesson to their own learning advantages. Some students chose a paint program; some students created a video of themselves at each station; many students chose Word. Steve also experienced a transformation of social studies teaching. He explained the transformation:

We'd be doing research on commercialism and finance, and maybe that was the first time I saw this: one of the kids would find a site other than the one I had given them [on the topic] and they'd say "Hey look! This is a site! This has got even more information than Mr. SteveSurname's site" And they would just post it in Edmodo, so they could start sharing their own findings with each other. And it was like, I could step back and almost let them teach themselves. But the technology is what allowed that to happen. Could it have happened without the tech? Yes, but it would be a lot more difficult to do. Them having the freedom

to go pretty much anywhere, to research pretty much anything, just made it that much easier to get to that student centered environment.

Since Martorella's (1997) sleeping giant metaphor, literature on technology in social studies has suggested that technology has the potential to help bridge the pedagogical gap between transmission based instruction and meaningful inquiry-based strategies (Beck & Eno, 2012; Diem, 2006; Martorella, 1997; Waring, 2006). Findings from this study suggest the affordances of one-to-one technology can help serve as a bridge toward more inquiry based learning as encouraged through the C3 Framework (National Council for the Social Studies, 2013). Lee (2009) proposed that social studies TPACK would include pedagogical actions including "facilitating students' work in non-linear environments, requiring students to make critical decisions about how to select their own resources and navigate through a wide variety of interfaces (p. 130)" and "using the internet to extend collaboration and communication (p. 130)" and "encouraging economic literacy through the use of technology (p. 131)." Findings from this study indicate that teachers who utilize one-to-one technology in their social studies classroom demonstrate multiple examples of social studies specific TPACK.

Both participants contextualized their experiences implementing technology within their specific content disciplines in social studies. This makes sense within the context of TPACK, which suggests that transformation of knowledge cannot occur without a teacher understanding of content (Koehler & Mishra, 2005, 2007). When describing her challenges when lesson planning with technology, Anne referred to her level of comfort with content, "It also is interesting depending on the subject or the time

period of what I'm teaching how fluid it is. Because it also depends on my comfort in a particular area." She continued that thought:

Finance for me is quite a challenge, so I actually think I overcompensate by trying to find simulations to teach... I think if I was more comfortable, I could problem solve a lot of (the technical frustrations) beforehand. But because, I mean, can I do absolute and comparative advantage? Sure, I can, but I haven't figured that out, because I feel like my content knowledge is weak and I'm not exactly sure what I want them to do and I try to problem solve it as I go along. Law – I got! History – I got! The math piece of finance? <pause> Now as we're looking at different economic systems or trying to determine happiness or those kind of things, I can do that.

Steve also contextualized his technological choices within the context of social studies, but he was less explicit than Anne. In this excerpt he shared how difficult it was to find an app that would fit neatly into the skills and content he wanted to develop in his sixth and seventh grade juvenile justice students:

Well before the tech, I was creating the materials. So the materials were already being created with the sixth grader or seventh grader in mind. And yeah, I probably did it and just didn't realize it as much because it was just part of that creation process. Since now I don't create as much, I am more curating, I'm going out and finding some tool that is out there, I'm more conscious of it [what a sixth or seventh grader needs in a tool].

They shifted pedagogical practices of assessment to ensure that social studies content and skill acquisition was the central goal of student knowledge creation and assessment. Anne was very specific in her desire to see assessment accurately capture the inquiry learning occurring in her class. She described her new assessment techniques:

I have been really trying to use that historical thinking skills rubric. Because it is NOT product driven. It is content driven. And it is, even like if a child chooses to do a podcast or use Audacity or uses something in a verbal means, I can still see clean evidence and connection. I don't have to have the written word. Even if they decide to do you know an illustration or a graphic or a comic book, I can still see claim evidence and connection. I can still see historical accuracy. Those things I can still see and grade on.

She reflects on her rubrics before the one-to-one integration in social studies and now:

I actually have rubrics that say, you know: Be creative; be colorful; be neat. And I mean I sit there, and I look at them, and I'm like, "well that was really subjective of me because my idea of creativity may have not been the child's creativity." When I was pulling those (pre-technology initiative) rubrics, I was kind of cracking up. I went, "Ooohh, woah!" I think this is my frustration. I think with sometimes as we are looking at rubrics being pushed into social studies <pause> are we grading content? Or are we grading writing? And what are we teaching? And it is kind of a battle, so I am really focusing on content.

Steve was less clear that his assessment aligned with new instruction; however, he still changed the ways that he assessed student knowledge. Steve said:

One of the nice things about tech is we can be much more open ended with our types of projects and what they are actually going to do this this. They don't have to just write us answers. They can build, they can show us, they can create.

One of the most significant findings of this study is the way that social studies teachers who believe in their own agency and believe in technology can use their TPACK to trust and empower their students to transform knowledge. Beyond encouraging critical citizens, one of the goals of social studies is to foster a sense of agency in learners in order to encourage them to believe that they can be active citizens for change (NCSS, 2014). It is possible that empowered teachers plus one-to-one technology can help meet that goal. Beck and Eno (2012) posited that technology could be “the bridge that makes inquiry a realistic pedagogical approach” (p. 89). This study supports that assertion.

Mezzo-level factors influencing TPACK. Mezzo-level factors include the role of the principal and colleagues, school district policies, and the larger school community which work together to influence teacher TPACK. The composite themes of the participants' experience integrating technology help illustrate the complicated relationship among these contextual factors. This section will begin with an examination of the ways that mezzo-level factors influenced essential themes of the participants' experiences. Specifically, this section of the chapter re-examines the theme of teachers' belief in their professional agency in the context of mezzo-level factors and

tensions between the experiences of a classroom teacher and the experiences of the district. Finally, this portion of the chapter examines how social studies pedagogical practice and technology integration were impacted by the mezzo-level factors.

Belief in professional agency. Mezzo level factors helped both build teacher sense of agency and limit teacher sense of agency. Sherwood's principal provided opportunities for Anne and Steve to build their sense of agency, as did their own professional relationship with each other. The larger district helped subsidize advanced education for both participants which further strengthened their sense of themselves as agentic professionals. However, the district also overlooked Anne and Steve's accomplishments and needs as classroom teachers using technology, which at times left the teachers feeling powerless to effect change.

The support of the principal at Sherwood and the support that Anne and Steve provided to each other helped develop Steve and Anne's sense of themselves as agentic professionals. Steve's principal demonstrated a commitment to growing his professional capacity by supporting Steve's attendance and presentation at national conferences on technology and education. The principal also supported Steve by extending him a significant level of trust when Steve wanted to arrange meetings with central offices to effect changes within his school and classroom. Likewise, the district supported Steve's growth as a professional through policies which subsidized his advanced degree in technology. Similarly, Anne found her principal's support to be "powerful" in helping Anne succeed in implementing technology in her classroom. Anne also used her advanced degree, subsidized by her district, to build her confidence in her abilities to use technology and affect change in her classroom with technology. Anne and Steve also

turned to each other for support. Steve helped trouble shoot technology and demonstrated a willingness to directly address issues with the district. Anne provided pedagogical support and modeling which Steve admired and borrowed in order to implement in his own classes. These findings suggest that administrative trust and organic professional learning communities are essential components of in supporting teacher agency, and teacher self-efficacy has been linked to technology integration in social studies (Doppen, 2004).

Two years into Sherwood's program, their tablets had aged out of use. The district replaced the tablet technology with tablet-netbook hybrids. Replacing the devices helped Sherwood continue its one-to-one program, because the old tablets were so slow that they were preventing effective integration. The replacement of devices began a slow migration of autonomy from Anne and Steve and back to the district. While the focus of the original research oriented data collection and analysis around Anne and Steve's experiences initiating and integrating their own one-to-one program, it became evident that the participants believed this change was integral to their overall experience. This experience also helped clarify mezzo-level factors which influenced teacher TPACK.

Before the district began its own program, Anne and Steve had full control over their own one-to-one initiative. More than a feeling of control, Anne and Steve had developed a feeling of empowerment. From the conception of the program, through the barriers of implementation, and the tremendous professional growth of the integration, Anne and Steve developed strong feelings of agency and a clear sense of their professional identities as "teacher." Once the district provided Anne and Steve their

devices, they lost immediate control of their ability to find and utilize new technological applications. They faced unexpected technology challenges that they were unable to trouble shoot in-house, not for lack of technological ability, but because they did not have the necessary permissions to tweak the software on the devices. Ertmer et al. (2012) suggested that even teachers who possess strong beliefs about the value of technology will reach a “barrier threshold” which their strong beliefs will be unable to breach. Anne and Steve did not reach this barrier threshold, despite the new obstacles created by the district. Findings from this study suggest that, not just a strong belief in the value of technology, but a strong belief in their professional agency helped Anne and Steve overcome these mezzo level barriers to technology integration.

Because of Anne’s sense of agency as a professional, she was willing to accept that success came directly from her decisions and actions. This hard earned wisdom had personal and professional value for her, and she wanted her voice heard by her district. She believed that she possessed unique knowledge, skills, and experience which were valuable to other teachers, and she wanted to share this professional wisdom with other colleagues and leaders in her district. Her frustration at failing to be able to do so was peppered throughout the last theme in her textural narrative. Steve also demonstrated agency and confidence when overcoming obstacle after obstacle from his district. Anne described him as being “really good about sharing his ideas when frustrated.” Like Anne, Steve felt that he had hard-won, valuable experience to share with the district about implementing a one-to-one initiative. However, the district did not seek out their input. This frustrated Anne and Steve as well. They each often commented that they wanted their voices heard, and that they had valuable contributions to share. This, and

other decisions by the district, prompted Anne and Steve to feel that the district leaders were too far removed from the classroom to understand the daily life of a teacher. This supports literature which concludes teachers who have a voice in initiatives are more likely to have positive associations with the initiative (Storz & Hoffman, 2013; Swallow, 2015).

One of the most compelling findings of this study was the relationship between teacher agency and the fostering of student agency through inquiry based pedagogy. Teachers who were supported and empowered were able to shift their pedagogy and allow their students to have control of the classroom. The students of these empowered teachers used meaning-making and perspective-taking through inquiry based learning to build their own sense of autonomy and control in the classroom. This finding leads to a concern that if a district migrates that autonomy away from the teachers, instruction might also suffer.

Tension between the experiences of a classroom teacher and the experiences of the district. The teachers in this study described mezzo-level influences which impacted their ability to integrate technology in their classrooms. An essential theme in their experience was their relationship with the larger district. This relationship experienced tension and sometimes, dissonance, and it ultimately impacted the ways in which the teachers were able to implement technology in their classrooms. Their technology initiative existed within the confines of the larger district, and it existed because of the support, and in spite of the barriers, of the district. District support was essential to the creation of their program. Likewise, district choices negatively impacted their program.

The district had very little interaction with Sherwood after Anne and Steve implemented their one-to-one technology initiative. Anne and Steve served as each other's support and mentor while they were integrating the technology. The district then began to implement its own initiative, and in so doing interrupted the program at Sherwood. Once again, Anne and Steve were engaged in navigating the bureaucracy of the district, this time to implement the district approved technology. After five months of scheduling, Anne and Steve were finally able to meet with district representatives and secure new devices for their students.

Even the district support frustrated Anne and Steve. They were not part of the pilot program, which made it difficult for the district to prioritize support for Sherwood. Additionally, Steve felt that the technologists hired to support the one-to-one initiative failed to understand the daily lives of students and teachers. It led to complications in his classroom when he received devices back from technology support. They were immediately frustrated by these problems, especially because they directly impacted instruction. Lack of technology support has been cited in the extant literature as a significant barrier to effective technology integration (Ringstaff, 1991; Stanhope & Corn, 2014).

Impact on teacher TPACK. It is important to consider the ways that their effective implementation of TPACK was influenced by the context of their ecology at the district level (Porrás-Hernández & Salinas-Amescua, 2013). Before the district initiative, Anne and Steve demonstrated strong and evolving TPACK. After the initiative, they did not lose their TPACK, but they reported barriers to implementation which made technology frustrating to implement. The teachers felt that the apps which

the district put on the devices were chosen very generally and without regard to content or capability. This meant that they could not take advantages of the full affordances of their devices and one-to-one technology. Anne and Steve both felt this negatively impacted their instruction. One of the ways that Anne and Steve were able to transform teaching and learning was by matching technological affordances with content and pedagogical needs. The new software prevented them from making these connections. Given the links between perception and implementation (Ertmer, 1999, 2005; Otterbreit-Leftwich, 2010), and the suggestion that attitudes and mandates from local, district, and national levels of community impact TPACK (Porrás-Hernández & Salinas-Amescua, 2013), this finding suggests an avenue of further study in the synthesis of perception and ecology.

Contributions to Research

The findings from this contribute to the foundation for one-to-one research in social studies by concluding that meaningful integration of one-to-one in social studies occurs at a confluence of complex factors. Specifically, this study found that positive teacher beliefs about technology *and* teacher beliefs about professional agency impact integration. Additionally, this study contributes to an emerging body of research that re-introduced teacher voice into the study of one-to-one initiatives (Storz & Hoffman, 2012). Further, this study suggests that a modified version of TPACK is necessary in order to more fully capture the synergies between teacher beliefs *and* the interaction with administration and district goals research agenda on one-to-one technology integration in social studies. The study made these contributions to research by examining an atypical case which suggested the upper boundaries of the experience of

one-to-one technology integration and provided a point of comparison with more typical top-down initiatives.

Contributions to Emerging Research Agenda on One-to-One Technology in Social Studies

This study situates itself in an emerging and necessary research agenda that considers the complex whole of social studies technology integration (Doppen, 2004; Gulbahar & Guven, 2008; Sheffeld, 2011; Shifflet & Weilbacher, 2015). This study contributes to the emerging research agenda by using case study design to draw a rich narrative of social studies teachers' holistic experience initiating and implementing one-to-one technology in their classrooms. Further, it utilized phenomenological reduction in order to highlight essential experiences of teachers implementing one-to-one technology in social studies.

This study found that central to teacher experience integrating one-to-one technology in a social studies classroom were the ways in which teacher empowerment, teacher technological knowledge, and pedagogical shifts led to student autonomy in learning. Social studies scholars and the National Council for the Social Studies (NCSS) have been arguing for the power of technology to transform instruction since Martorella's (1994) "Sleeping Giant" metaphor (ie. Beck and Eno, 2012; Doolittle & Hicks, 2003; NCSS, 2013). This study supports their assertions that technology can transform social studies education, and it specifically found that one-to-one technology can transform social studies instruction toward a more student-centered, inquiry-based approach. Inquiry-based social studies education is modeled through the C3 Framework

and is the standard for the field (NCSS, 2013) because it ultimately fosters student agency (NCSS, 2013).

However, findings from this study indicate that this transformation did not occur solely because of one-to-one technology. This finding is supported by broader research on one-to-one technology arguing technology cannot serve as a “Trojan horse” for change (Garthwait & Weller, 2005). The transformation occurred at the intersection of multiple complex factors. Not only did these teachers believe in the power of technology to transform social studies, they believed in the power of themselves to effect change in their classrooms. The presence of self-efficacy in teachers who integrated technology was also noted by Doppen (2004) in his study of teachers implementing computer technology in their social studies classroom. The teachers in Doppen’s (2004) study were able to integrate technology, regardless of the resources available, when the teachers demonstrated high levels of self-efficacy.

The findings also point to a need for time: time for reflection, time to experiment, time to observe colleagues, and time to grow teacher belief in themselves as agentic professionals. Teachers used this time to re-negotiate their beliefs about social studies instruction, pedagogy, and technology. This is supported by Doppen’s (2004) research which holistically examined computer technology integration in social studies. Doppen (2004) asserted that:

...social studies teachers need many opportunities to reconcile their beliefs about history pedagogy, history content, and classroom management/discipline issues with technology integration, exploring a variety of ways to integrate technology

in a manner that works best for them and is sustainable in their school setting”
(p. 273).

The teachers at Sherwood experienced both the time to reconcile their beliefs and the time to explore technology, as well as the time to meet with each other and share their experiences with the one-to-one technology.

Further, this study found that essential to the experience of integrating one-to-one technology in a social studies classroom was a recognition that teachers teach and work in a relationship with the larger district. The choices of the district influenced teacher technology integration, specifically by limiting teacher access to software, limiting administrative privileges, and by failing to support the technology. Limiting access to software prevented the social studies teachers from choosing applications which facilitated content-specific social studies learning. This finding is supported through research which indicates technology integration, particularly when considered through the framework of TPACK, should consider external factors influencing a teacher’s daily professional life (Porrás-Hernández & Salinas-Amescua, 2013).

A perspective offered in the literature suggests that teachers who use constructivist practices in their technology infused social studies classroom often already used those practices in their pre-technology classrooms (Inserra & Short, 2012; Lowther et. al, 2012). While the findings of this study do not refute that claim, they do challenge and provide nuance for it, suggesting that teacher beliefs regarding technology, student-centered learning, and professional agency also influence technology integration. This supports the findings of another one-to-one study in social studies which concluded that

teachers' beliefs about pedagogy and technology are connected to the ways in which teachers use technology (Beeson, Journell, & Ayers, 2014).

Both Anne and Steve considered the affordances of one-to-one technology in order to transform pedagogy toward a more student-centered approach. In its recent position statement on technology, NCSS (2013) reiterated the importance of participatory use of mobile digital technology. The teachers in this study both shifted pedagogy in this direction by using one-to-one technology. These findings also support the assertion that an immersive one-to-one technology program may help teachers transform social studies learning to “active inquiry, perspective taking, and meaning making” (Doolittle & Hicks, 2003).

For Steve, his impetus for change was observing Anne. No one forced him to change, instead he observed Anne's successes and migrated away from his more traditional approaches.

Current literature suggests that teachers may be more inclined to use constructivist practices when integrating technology in a social studies classroom if they already used those practices in analogue instruction (Inserra & Short, 2012; Lowther et. al, 2012). Additional research proposes that teachers may also shift practices if, in a personal learning community, they observe other, respected colleagues, meeting with success (Fullan, 2007). Findings from this study support those assertions and suggest that there are degrees of student-centered instruction, from more one-dimensional experiences such as group work which examines a required text, to more three-dimensional experiences which allow genuine student ownership of content, process, and product.

These findings suggest that, if a teacher demonstrates a proclivity toward reflective practice, immersion in a one-to-one program can serve as an impetus to facilitate shifts in teacher pedagogical beliefs and practices. The finding may also clarify why some studies report more constructivist practice following a one-to-one initiative (Garthwait & Weller, 2005; Storz and Hoffman, 2013), while others report little to no change in direct instruction before integration and post-integration (Oliver & Corn, 2008). This study proposes that these difference in technology integration may be tied to teacher beliefs about the potentiality of technology, beliefs about student centered instruction, and a teacher's sense of professional agency.

Deeply Explored Teacher Beliefs

Because of the established link between teacher perceptions and beliefs and teacher behavior and sense of identity (Ertmer 1999, 2005, 2006), it is critical that research better understand what shapes teacher perception of technology. Parsing out the nuances of the ways in which beliefs and values impact teacher identity and choices have proved difficult (Ottenbreit-Leftwich et al., 2010), but parsing out these nuances is critical because teachers are major stakeholders in technology initiatives (Ertmer, Ottenbreit-Leftwich, & York, 2006; Fullan, 2007). Exploring teacher beliefs and perceptions of technology are essential to understanding the experience of teaching with one-to-one technology. This study explored those beliefs and determined that at the essence of a one-to-one technology initiative in social studies was teacher belief in the value of technology *but also* teacher belief in themselves as agentic professionals.

Currently, a majority of research on technology initiatives has centered on teacher beliefs about technology and pedagogy (i.e. Ertmer, 1999; Ertmer, 2005; Ertmer, Addison, Lane, Ross, & Woods, 2000; Ertmer, Ottenbreit-Leftwich, & York, 2006; Ertmer, et al., 2012). The findings from this research support the assertions from those studies, that teacher belief in technology is essential to technology integration. Additionally, this study found that as teacher technological knowledge (TK) grew, it provided teachers with confidence to more meaningfully integrate new technologies into their classrooms. This reinforced and extended teacher's positive beliefs about technology. These findings are supported by research which claims that effective professional development for teacher growth should recognize the situative nature of the growth experience, and allow teachers opportunities to take professional risks and make meaning from experiences in the ways each teacher finds most useful (Clarke & Hollingsworth, 2002). In addition, these findings support the conclusions of Lowther et al. (2014) who argue that teachers with higher technical skills demonstrate more positive beliefs about technology and are more likely to integrate technology into their classrooms.

This study extends research on teacher beliefs and the way that they shape technology integration, suggesting that teachers who integrate one-to-one technology believe *both* in the power of technology to impact instruction *and* the power of themselves to effect change. Considering this finding in light of Doppen's (2004) assertion that teacher self-efficacy allowed teachers to overcome technological barriers to integration may help illuminate why the teachers in this study never reached a "barrier threshold (Ertmer et al., p. 433)." Barrier threshold refers to the point at which first order

barriers prevent technology integration, despite deeply held beliefs about the power of technology in education. The teachers in this study faced significant and prolonged first order barriers to integration, but overcame them through their belief in the power of technology *and* their belief in their ability to affect change as professionals.

Teacher Voice in One-to-One Research

Teachers are major stakeholders in educational change (Fullan, 2007), but their voices have been repeatedly silenced in the research (Hargreaves, 1996). Because of its focus on returning to “the things themselves” from a pre-supposition state (Moustakas, 1994), phenomenology as methodology is well suited to giving voice to its participants. Storz and Hoffman’s (2013) phenomenological study of student and teacher experiences in a one-to-one initiative noted that the teacher participants were “generally and genuinely pleased to have a forum to express their personal concerns as well as successes” (p. 14). Likewise, in interviews with the teachers at Sherwood, they repeatedly stated, “we’d just like our voices heard.” Teacher voice is essential to the success of technology initiatives (Donovan, Hartley, & Strudler, 2007), and marginalizing voice threatens the success of the initiative (Fullan, 2007).

In providing teachers a voice this study found that an essential theme of their experience integrating one-to-one technology was the underlying tension they experienced with their district, not with the technology itself. Especially frustrating to both Anne and Steve was their perception that the district was dismissive of their technological knowledge and experience, as well as dismissive of their needs with the new, district-mandated technology. Findings from this study suggest that, if teachers

hold positive beliefs about technology, but are deprived of a voice in a technology initiative, they develop tension in their relationship with the district. The teachers' beliefs about technology remained positive, but their beliefs about the district's technology initiative grew increasingly negative. Perhaps tensions with the district could also be considered as a potential contributor to what Ertmer (2012) describes as a "barrier threshold." Barrier threshold refers to the threshold at which beliefs can no longer overcome barriers.

The district's failure to hear the teachers' voices and address the teachers' needs limited the teachers' abilities to integrate technology. Steve specifically referred to the ways that he needed to develop solutions which worked around district technology because the district failed to anticipate creative uses of technology by Steve and his students. This reinforces Garthwait and Weller's (2005) assertion that time taken by teachers to solve technological issues reduced time for planning or teaching. These technological issues could often be attributed to school and district policies that failed to anticipate the needs of students and teachers.

The teachers growing frustration with their lack of recognition from the district supports the assertion that teachers who have a voice in technology initiatives are more likely to support the initiatives (Donovan, Hartley, & Strudler, 2007). It supports the assertion that teacher perceptions *and* the interaction with administration and district goals impact technology integration (Garthwait & Weller, 2005; Porras-Hernandez & Salinas-Amescua, 2013). Finally, the current study extends this understanding by suggesting that for a technology initiative to meet with success, administration and

district leaders need to ensure teacher voice in the process of initiation *and* they need to ensure teachers feel empowered and trusted in their use of the technology.

TPACK as a Framework for Analysis of Social Studies Technology Integration.

Technology outpaces our ability to research the technology itself (Traxler, 2007). Additionally, the act of teaching is a complex and highly contextualized endeavor (Koehler & Mishra, 2005, 2009; Shulman 1987). Findings from this study indicate that TPACK is a useful framework for examining the complex nature of teaching and the continuing evolutions of technology. The technological knowledge (TK) component of TPACK refers to an instructor's consideration of the affordances of emerging technology (Koehler & Mishra, 2005, 2009). Understanding affordances, as opposed to substituting the digital for the analog, is in keeping with Diem's (2000) request that research consider a more holistic effect of technology.

The framework of TPACK would benefit if the "context" of TPACK were more clearly defined. This study supports research which finds teachers' underlying epistemologies and perceptions of technology are intimately tied to technology integration (Ertmer, 1999; Garthwait & Weller, 2005; Inserra & Short 2012-2013; Penuel, 2006). It becomes imperative that researchers include underlying teacher epistemologies when discussing TPACK. Additionally, this study found that teacher perceptions *and* the interaction with administration and district goals impact technology integration, which is also supported by extant literature (Garthwait & Weller, 2005; Porras-Hernandez & Salinas-Amescua, 2013). These findings suggest that a modified version of TPACK, meant to more fully capture those synergies, be used as a framework

for analysis of technology integration research. This will both facilitate a more nuanced understanding of teacher beliefs and ecological implications of those beliefs when teaching with one-to-one technology.

The findings from this study suggest that social studies teachers themselves view technology holistically. They describe their instruction in terms of a relationship between content, technology, pedagogy, and their beliefs about technology and themselves as agentic professionals. The findings from this study support the theory of TPACK as a possible holistic framework for studying technology in social studies. As it is currently utilized in the literature, TPACK refers to a specific body of teacher knowledge (Koehler & Mishra, 2005, 2009), grounded in a transformative epistemology (Angeli & Valanides, 2009) and influenced by a teacher's PK, CK, TK and by the context in which the teacher accesses his or her specific knowledge (Koehler & Mishra, 2005, 2009). Context has been interpreted to mean the teacher's specific content area (Angeli & Valanides, 2009; Archambault & Barnett, 2010; Hammond & Manfra, 2009), but recently it has been extended to consider the outside forces which are acting upon the teacher's perceptions and influencing teacher's TPACK (Porrás-Hernández & Salinas-Amescua, 2013). Findings from this study support the suggestion that TPACK needs to be refined in order to capture and discuss the complex role of teacher belief, content, and agency within their environment of the classroom, the school, and the larger district.

Before Sherwood's one-to-one initiative began, Anne and Steve demonstrated evidence of strong PK, CK, and TK. The findings of this study suggest that, though their individual PK, CK, and TK components were strong pre-integration, the teachers'

TPACK did not fully evolve until after the one-to-one integration. This evolution was due in large part to an evolution in teacher beliefs about the nature of student-centered instruction and the role of inquiry in this process. While the growth of overall TPACK was facilitated by the teachers' immersion in a one-to-one environment, immersion alone did not increase their TPACK. Findings from this study indicate that essential to this transformative experience are teachers who hold positive beliefs about technology. However, also essential to the transformative experience was the theme that these teachers demonstrated a strong sense of themselves as agentic professionals. This study suggests that without these essential components, this experience of one-to-one technology integration would not be what it was. This is consistent with other research in that acknowledges that technology alone cannot change instruction (Garthwait & Weller, 2005) and it suggests that positive beliefs about technology may also increase teacher TPACK.

None of the individual factors discussed above, on its own, contributed to increased teacher TPACK. Instead, themes in this study point toward a complex relationship among a teacher's pedagogical approach to social studies instruction, content knowledge, and professional identity of teacher, agency within the school and district and the ways that this impacts teacher agency with technology and content. Thus, increased teacher TPACK cannot be understood without examining the other factors, noted throughout this discussion, about teacher identity, agency, beliefs, context within an educational ecosystem, and a teacher command of content. This reinforces research that argues for a holistic approach to researching social studies and technology (Diem, 2000; Doppen, 2004). The shift in teacher beliefs and identity that occurred

during implementation led to the emergence of genuinely transformative TPACK among these teachers.

There has been a debate in the literature over the epistemological nature of TPACK: is it transformative or integrative in epistemology (Angeli & Valanides, 2009)? If TPACK is transformative, it is greater than the sum of its individual PK, TK, and CK parts (Koehler & Mishra, 2005, 2009). This study suggests that the underlying epistemology of TPACK is indeed transformative. Increasing one or more pieces of TPACK, does not necessarily increase TPACK. Instead, growth of TPACK occurs when teachers hold positive beliefs about technology, as well as demonstrate a strong sense of themselves as professional teachers.

Implications for Research, Policy, and Practice

Discussion of the findings, research questions, and contributions to research suggests several important implications of the study on research, practice, and policy. This portion of the chapter examines the implications for research and makes recommendations for further study of one-to-one technology, particularly in the field of social studies. In addition, this portion of the chapter makes recommendations to practitioners and policymakers who are considering the implementation of one-to-one technologies in their schools, districts, or states. Findings from this study indicate that teachers with a positive belief in technology and their own professional agency can effectively implement technology in their classrooms. Thus, it is recommended that policymakers and school leaders should empower teachers by building capacity and supporting development of positive teacher beliefs well in advance of technology

initiatives. Also, professional development is suggested that honors teacher voice, existing beliefs, and offers opportunities to take risks with technology. Finally, findings from this study suggest that limiting the levels of bureaucracy in districts and facilitating trust between the school leaders and teachers within the classroom can help build professional agency.

Implications for Future Research

This study points to a need for further research on one-to-one technology in social studies. This research should be holistic in nature, and TPACK should be considered as a framework for analysis. This study also suggests that teacher beliefs are essential to teacher technology integration. Further exploration and explication of teacher beliefs about technology and agency are essential in order to better understand integration of technology. Finally, student experience is a critical component in teaching and learning which was not fully explored in this study. It is suggested that future work consider the ways in which technology does and does not foster student agency in social studies classrooms.

Holistic research on one-to-one technology in social studies. Given the rapid increase of one-to-one initiatives in public education (New Media Consortium, 2015) and the tendency of implementation to outpace research on these initiatives in social studies (Friedman, 2014; Friedman & Hicks, 2006; Penuel, 2006; van Hover, Berson, Bolick & Swan, 2004), further examination of one-to-one in social studies is still needed. Findings from this research study point to the potential for one-to-one technology to transform teaching and learning; however, the factors influencing this

transformation were complex and interrelated. A conclusion from this study reported that understanding TPACK through a lens of ecosystem as context can clarify external pressures and provide a framework for discussing the influences on teachers' ability, or inability, to implement their TPACK. Future research should continue to clarify and refine TPACK within the understanding of context.

Teachers in this study self-initiated their one-to-one program. They demonstrated a proclivity toward utilizing technology. The field still has not thoroughly examined how less technologically inclined social studies teachers utilize one-to-one technology. Future research should examine holistic practices of social studies teachers who implement one-to-one technology and also who possess varying beliefs about the potential for technology in social studies. These future studies could extend the phenomenological work started here, or they could utilize rich case study analysis to describe the experiences. Additionally, there is a potential for grounded theory to develop insights and explanations into how teachers integrate one-to-one technology in social studies.

Future research on teacher agency. A sense of agency as professionals empowered the teachers in this study to confidently make programmatic and pedagogic changes. This finding, that teacher agency is essential to technology integration, supports Doppen's (2014) study of social studies teachers. Given the importance of agency in technology implementation, further examination of ways to build social studies teacher agency would be useful.

Additionally, findings from this study point to a potential relationship between teacher agency and student agency. There may be a connection between trust afforded to teachers and the resultant trust they afford to their students. This connection should be explored in research, particularly given the goals of social studies education to foster student agency (NCSS, 2013). Research should also explore this relationship through quantitative analysis which might help to establish cause and effect, or through more qualitative research which examines the nature of this relationship.

Future research on teacher beliefs and identity. One finding of this study was that teacher beliefs can shift, but that fundamentally, the teachers grow into a deeper and more refined sense of their established beliefs. At her essence, Anne grounded her identity of teacher in a student-oriented and reflective belief system. At his essence, Steve grounded his identity of teacher in an innovation-focused belief system. This suggests that their beliefs shifted within a more fixed sense of who they were as professionals. Future research should examine the ways in which different teacher beliefs can be acknowledged and honored by one-to-one initiatives.

In addition, this study found that while teachers did not lose their ability to effectively implement TPACK after the district began its own one-to-one initiative, they reported barriers to implementation which made technology frustrating to implement. Given the links between perception and implementation (Ertmer, 1999, 2005; Otterbreit-Leftwich, 2010), and the suggestion that attitudes and mandates from local, district, and national levels of community impact TPACK (Porrás-Hernández & Salinas-Amescua, 2013), this finding suggests an avenue of further study in the synthesis of perception, beliefs and mezzo-level factors influence on those beliefs. When studying one-to-one

initiatives, researchers should consider the ways in which teacher motivations and beliefs are rooted in their immediate ecosystem of students, parents, teachers, the school facility, and broader mezzo- and macro-level forces.

This research should employ long-term quantitative studies to examine the ways in which teacher beliefs and identity are impacted by support from administration and districts. A longitudinal study which examines the specific impact of education, professional development, and administrative support on underlying teacher beliefs is recommended. Also further qualitative research should examine how administrative support impacts teacher beliefs. Specifically, this study demonstrates the need for further phenomenological studies. Phenomenology illustrates the essences of an experience using human science inquiry (Moustakas, 1994) which provides the research with the ability to make powerful claims about the essential “hows” and “whys” of an experience as well as illuminate beliefs, perceptions, and judgments of the participants.

Research on student experience. While this study did not focus attention on student experience, future research should examine student agency in a one-to-one social studies classroom. The major goal of social studies education is fostering student sense of agency as citizens in a democratic republic. Also, the field would benefit from understanding if there are direct connections between teacher pedagogical choices using one-to-one technology and student agency in those classrooms. Quantitative studies which measured agency and determined correlations would be useful to examine this relationship. Additionally, qualitative studies which give voice to students and examine the hows and whys of their learning in one-to-one social studies classrooms could further illuminate student experiences.

Implications for Policy and Practice

The rapid increase in the size and scope of one-to-one technology initiatives has led to policy actions which precede and outpace research (Garthwait & Weller, 2005; Swallow, 2015; Traxler, 2007; Zucker, 2004). Long-term success of these initiatives is dependent on effective teacher adoption of the technology (Fullan, 2007). This research identified supports to effective technology integration by examining the micro, mezzo, and macro contexts which impact a teacher's TPACK. This information may help policymakers to support teachers, those being asked to change, in order to sustain long-term meaningful change. Policymakers can do this by committing to capacity building well in advance of technology initiatives. In addition, they must recognize the situative nature of technology integration when designing professional development. Finally, policy should be created which empowers teachers, specifically by streamlining the bureaucracy with which a teacher must interact and by facilitating principal trust of teachers within the classroom and school community.

Build capacity well in advance of technology initiatives. Findings from this research indicate an iterative process exists between teacher technological knowledge, positive teacher beliefs about technology, and confidence integrating technology. This leads to a recommendation that districts hoping to implement a one-to-one program should strategically build teacher capacity for technological knowledge. Districts can support teachers' advanced degrees in technology in order to build teacher TK. Subsidizing advanced degrees translates to significant expenditure on capacity building; however, the participants in this study used that greater capacity to meaningfully integrate technology in their classrooms. Districts should consider viewing capacity

building as “pay now or pay later” approach. In other words, districts should invest in long-term capacity building well in advance of spending significant money on technology itself. Otherwise, the significant expenditure on technology may lead to ineffective implementation. Anticipating these needs builds positive beliefs and abilities surrounding technology and prepares teachers to view technology through a more positive lens.

Recognize situative nature of technology integration when designing professional development. Support for teacher growth should recognize situative nature of the experience, and allow teachers opportunities to take professional risks and make meaning from experiences in the ways each teacher finds most useful (Clarke & Hollingsworth, 2002). The current study points to an iterative relationship between a teacher’s technological knowledge (TK), exposure to new technologies, and a teacher’s opportunity to “play” with technology. The teachers in this study already possessed positive beliefs about technology which provided them the confidence to use technology in their classrooms. As they used and integrated technology, their TK grew and provided them with confidence to more meaningfully integrate new technologies into their classrooms.

This study supports literature which suggests that teacher beliefs are at the essence of teachers’ lived experiences (Porrás-Hernández & Salinas-Amescua, 2013). Denying teacher beliefs or ignoring teacher beliefs runs the risk of denying the essence of the teacher. Instead of telling teachers that they must or should change to a new epistemological understanding of learning as evidenced through their practice, school and district leaders should create professional development which works to evolve the

existing beliefs into a better, more wholly realized version of themselves. This requires a profoundly individualized approach to professional development. It also requires teacher voices be heard and empowered, so that beliefs can be made known. Leaders should attempt to work within the boundaries of teachers' beliefs to encourage an evolution of beliefs.

Further, while district leaders tend to make decisions based on broad visions for many students and teachers (Penuel, 2006), the teachers in this study had a vision for their more immediate community. The teachers' priority was the equitable treatment of their students and the students of their school community. Taking these findings into consideration, it is recommended that professional development provide teachers the opportunity to build technological knowledge and confidence, while recognizing that teachers' vision for technology integration will mostly consider immediate impacts on themselves and their classrooms.

Empower teachers. Findings from this study suggest that administrative trust and support are essential components of technology integration. These findings also suggest that allowing teachers to have programmatic responsibilities builds their sense of agency, which empowers them as teachers, and contributes to their professional identity of teacher. Steve felt that the district administrators were afraid to extend that trust. He described them as verbally assuring Anne and Steve of their enthusiasm for the program, but that the administrators were often shielding themselves behind a "hard wall of policy." Additionally, the district's insistence on controlling the software on the one-to-one devices limited the teachers' ability to utilize all of the affordances of the one-to-one technology. However, the trust of the principal, specifically her trust in her teachers

to do what was beneficial for students, allowed Anne and Steve to feel empowered to make programmatic decisions. It also contributed to Anne and Steve's evolving sense of their professional identity as teachers who could effect change. Districts should work to minimize bureaucratic hurdles and encourage principals to empower teachers within their school buildings and the larger district. Increased dialogue between teachers and district leaders can facilitate administrators' awareness of teacher leaders who act as change agents within the schools. The level of bureaucracy in Sherwood's district, particularly the redundancy in Offices of Technology, Instructional Technology, and the Office of Innovation, prevented the district from fully appreciating and supporting the teacher leaders at Sherwood. Considering these findings, districts should critically examine their organizational structure to ensure each office has a clear purpose which precludes redundancy with other offices across the district.

Conclusions

This study concluded that successful implementation and integration of a teacher-led one-to-one program in social studies occurred at a confluence of complex factors. At the essence of the experience of teacher-led implementation and integration of one-to-one technology in social studies classrooms was teachers' longstanding positive beliefs about technology, the teachers' belief in themselves as professionals with agency, teachers' relationship with the larger school district, and the transformation of pedagogy through technology which ultimately fostered student agency and autonomy. If technology is to support meaningful pedagogical change in classrooms, teachers need to be given time, support, and trust to build positive beliefs about technology and a strong professional identity.

This study contributed to the emerging research agenda on one-to-one technology in social studies by using case study design to draw a rich narrative of social studies teachers' holistic experience initiating and implementing one-to-one technology in their classrooms. The research found that empowered teachers use their technological knowledge to make pedagogical shifts toward inquiry-based student learning. It extended understanding of the role of teacher belief in technology integration by suggesting that positive teacher beliefs about technology *and* positive teacher beliefs about professional agency are essential to one-to-one technology integration. The study helped re-introduce teacher voice as essential to research on one-to-one technology integration by finding that an essential theme of teachers' experience integrating one-to-one technology was the underlying tension teachers experienced with their district, not with the technology itself. It argued that a modified version of TPACK, meant to more fully capture the synergies between teacher beliefs *and* the interaction with administration and district goals can serve as a holistic framework to analyze technology integration in social studies. Finally, it painted a picture of the upper bounds of what one-to-one technology integration in social studies looks like by examining an atypical case of teachers who demonstrated a proclivity for technology and agency in creating their own programmatic changes.

Building positive beliefs about technology and teacher agency occurs long before a technological initiative is conceived. Policymakers and practitioners can support development of positive teacher beliefs and work to ensure the success of their one-to-one initiatives by committing to capacity building well in advance of technology initiatives. In addition, they must recognize the situative nature of technology

integration when designing professional development. This means professional development should provide teachers with opportunities to take risks with technology, opportunities to work with fellow teachers, and honors teacher voice and existing beliefs. Finally, the district can support teachers' positive beliefs about technology by demonstrating a level of trust with their teachers. Policy should be created which empowers teachers, specifically by limiting the levels of bureaucracy with which a teacher must interact and by facilitating principal trust of teachers within the classroom and school community.

One-to-one integration should be deployed in a way that honors teacher voice, established teacher beliefs, and the realities of their daily lives within the classroom. When integrated under these conditions, teachers ultimately feel empowered because of their experiences with the technology. It is then possible that teachers allow their students the same trust, time, and honor of their voices and daily lives. When that occurs, students are empowered to make their own meaning and perspectives in knowledge creation. In all instruction, but especially in social studies instruction, teachers need to foster a sense of agency in learners in order to encourage them to be active citizens for change (NCSS, 2014). Thoughtful one-to-one integration in social studies classrooms can help achieve this important goal for education in a democracy.

Appendix A

Semi-Structured Interview Prompts

1. Can you share a brief history of your teaching career – how you decided to become a teacher, where you've taught, and for how long?
2. What motivated you to start the one-to-one program? What were you hoping to achieve? Did that change over time?
3. Can you share a few key positive experiences from each stage of the process?
4. Can you share a few key challenges or barriers when you were conceiving and implementing the program?
5. What incidents and people connected with the implementation stand out to you?
6. How did the experience from conception to implementation, until the new devices arrived from the district, affect you? What changes do you associate with the experience?
7. What feelings did this experience generate in you?
8. What thoughts stood out to you?
9. What were you thinking when you planned lessons before the one-to-one program? What about post?
10. Do you believe the devices impacted cooperative learning?
11. Aside from technology, how would you describe your comfort level with innovation in education?

Appendix B

IRB Forms

**APPROVAL NUMBER: 14-A097**

To: William Sadera
8000 York Road
Towson MD 21252

From: Institutional Review Board for the Protection of Human
Subjects Justin Buckingham, Member

Date: Monday, June 30, 2014

RE: Application for Approval of Research Involving the Use of
Human Participants



Office of Sponsored Programs
& Research

Towson University
8000 York Road
Towson, MD 21252-0001

t. 410 704-2236
f. 410 704-4494
www.towson.edu/ospr

Thank you for submitting an Application for Approval of Research Involving the Use of Human Participants to the Institutional Review Board for the Protection of Human Participants (IRB) at Towson University. The IRB hereby approves your proposal titled:

TU-BCPS-STAT: Technology Integration

If you should encounter any new risks, reactions, or injuries while conducting your research, please notify the IRB. Should your research extend beyond one year in duration, or should there be substantive changes in your research protocol, you will need to submit another application for approval at that time.

We wish you every success in your research project. If you have any questions, please call me at (410) 704-2236.

CC: M. Heath, L. Berquist
File

BALTIMORE COUNTY PUBLIC SCHOOLS

S. Dallas Dance, Ph.D., Superintendent

6901 Charles Street Towson, MD • 21204-3711

February 12, 2015

Dr. Marie Heath
Towson State University
College of Education
8000 York Road
Towson, MD 21252

Dear Dr. Heath:

Subject: BCPS Research Project #2344

We have received your request to conduct a research study in Baltimore County Public Schools. The proposal, *Mobile Digital Device Integration*, has been approved as submitted.

Please contact [REDACTED] principal at [REDACTED] to make arrangements. While we have informed personnel of your study, it is your responsibility to contact the appropriate staff and make arrangements to gain access to your subjects.

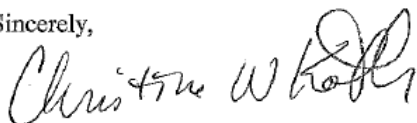
Participation in this study is strictly voluntary and informed consent and assent must be signed for each participant.

This approval is applicable for the 2014-2015 academic year. Any changes to the research protocol or deviation in timeline must be submitted to the Department of Research, Accountability, and Assessment for approval.

Upon completion of the study, you agree to share any written results or videos with Baltimore County Public Schools through the Department of Research, Accountability, and Assessment, 9611 Pulaski Park Drive, Suite 305, Baltimore, Maryland 21220.

We wish you good luck in your research endeavors.

Sincerely,



Christine W. Koth, Ph.D.
Director
Office of Research
Department of Research, Accountability, and Assessment

cwk/bmc

cc: Dr. S. Dallas Dance, Superintendent

Appendix C

Letter of Consent



Department of
Educational Technology
and Literacy

Towson University
8000 York Road
Towson, MD 21252-0001

t. 410 704-2576
f. 410 704-2733

Towson University is currently pursuing research to gain insight and understanding into the ways in which teachers decide to use mobile digital devices in their middle school social studies classrooms. In particular, this study will address pedagogical and methodological decision-making processes of the teachers both in planning and in implementation of mobile digital technology. This research is critical to the field of education and technology integration because it is important to understand how context, particularly in terms of content discipline and teacher driven adoption, influences the pedagogy of mobile digital integration. Moreover, this research will help BCPS by providing descriptive feedback of classroom computer use grounded in accepted and well regarded research to be used to build on the foundation of a 21st century teaching and learning framework.

Data for this study will be collected via observations of classroom instruction as well as interviews and focus groups with educators. Observations will be done during class instruction and during planning time. You may additionally be invited to participate in focus groups or interviews with the researchers. These interviews and focus groups normally last between 30-60 minutes. You may choose to participate in any number of these data collection activities.

Your participation in this research is completely voluntary, but critical. You can choose to stop participation at any time and choose not to respond to any survey item or interview question. Your decision to participate or not participate in this study will have no effect on your employment status at BCPS.

Be assured that all data for this study will be handled with strict confidence. No individual will be identified in any reports. Your responses will be kept confidential; only the principal investigator and the research team at Towson University will have access to your specific data.

If you have any questions about this research, you may contact the Principal Investigator, Marie Heath at (410) 704-3186 or the Chairperson of Towson University's Institutional Review Board for the Protection of Human Participants, Dr. Debi Gartland, at (410) 704-2236.

Thank you for your time and willingness to participate. I will be glad to furnish you with additional information and results if you are interested.

Respectfully,

Marie Heath
Instructional Technology
Doctoral Student
Towson University

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MARIE K. HEATH

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Curriculum Vitae

EDUCATION

Towson University. Baltimore, MD.

Doctor of Education in Instructional Technology, April, 2016.

Dissertation, "Teachers, Trust, and Technology in Social Studies: A Phenomenological Case Study of One-to-One Technology in Middle School Social Studies."

Master of Arts in Secondary Social Studies Education, 2002.

Bachelor of Arts in History, 2000.

APPOINTMENTS AND POSITIONS

Towson University. Baltimore, MD.

Lecturer for Secondary Education. 2012 to present

Designed and led professional learning community for instructors of ethics course. Developed and presented orientation sessions for new ethics instructors. Taught *Ethics and Change in Education*. Aligned ethics course with university learning goals. Developed Towson University signature assessment for ethics course. Chaired Committee for Curriculum Assessment and Development for the Department of

Secondary and Middle School Education. Advised department on policy and procedures for mentoring and intern support. Developed departmental assistance plan template for struggling interns. Supervised pre-service secondary and middle school social studies teachers. Edited and reviewed paper submissions for the National Council of the Social Studies annual conference and for the Society for Information Technology and Teacher Education conference. Designed and instructed field-based middle school social studies methods course. Instructed graduate course on Principles of Education. Developed, designed, and taught online hybrid undergraduate course in adolescent development and diversity. Taught *Secondary Social Studies Methods*.

Professional Development School (PDS) Liaison for Secondary Education. 2011-2012

Coordinated relationship between Baltimore County Public School (BCPS) PDS sites and Towson University. Facilitated student teaching placements for 15 secondary education interns. Supported mentor/intern/supervisor relationships in PDS sites. Provided professional development for PDS sites. Co-planned with PDS school improvement teams in order to support PDS school goals. Instructed seminar course for secondary education interns. Evaluated final portfolios for secondary education graduates.

Supervisor, Maryland Approved Alternative Preparation Program (MAAPP) for MSDE, TU, BCPS. 2010-2011

Coordinated the certification, evaluation process, and data collection between 10 school principals and department chairs, BCPS, TU, and MSDE. Supervised 11 uncertified teachers in secondary math and science. Developed and instructed graduate level principles of education course. Developed and instructed graduate level internship seminar course. Planned and coordinated portfolio reviews and evaluations for 23 graduate level students.

Baltimore County Public Schools. Hereford High School, Hereford, MD.

Social Studies Teacher. 2002-2009

Taught courses in:

- United States History, 11th Grade (Inclusion, Standard, and Honors Sections)
- World History, 10th Grade (Inclusion, Standard, Honors, Gifted and Talented, and AP Sections)

Mentored novice world history teachers across Baltimore County school system. Developed, wrote, and piloted countywide AP world history curriculum. Designed and wrote countywide assessments for world history curriculum. Designed and presented professional development for all Baltimore County world history teachers. Scored AP world history exam essays for ETS. Sponsored the National Honor Society, the Future Educators of America, the Culture and Religion Club, and the Destination Imagination team.

COURSES INSTRUCTED

Graduate Courses

Principles of Learning, Development, and Diversity

Secondary Education Teaching Methods
 Differentiated Instruction and Meaningful Application
 Characteristics of Diverse Learners
 Internship with Seminar

Undergraduate Courses

Ethics, Education, and Change
 Secondary Social Studies Methods
 Middle School Social Studies Methods
 Adolescent Development and Diversity (online hybrid)
 Internship in Secondary Education

PEER REVIEWED PUBLICATIONS

- 2015 Heath, M. P., (Accepted, in press). Transformative epistemology of technological, pedagogical, and content knowledge (TPACK): Implications for research. *Proceedings of the 2014 Teachers College Educational Technology Conference*, New York, NY.

MANUSCRIPTS IN PREPARATION

- 2015 Heath, M. P. & Lohnes-Watulak, S. (AACE Journals Invited Paper, Submitted). A critical review of TPACK literature: Transformative epistemology and implications on education.
- 2015 Heath, M. P. (In Progress). Technology and the shrinking global village: Implications on international and global education.
- 2015 Heath, M. P. (In Progress). Developing the identity of teacher: Identifying core practices and beliefs through field-based methods courses.

PEER REVIEWED PRESENTATIONS

- 2016 Heath, M. P. (2016, March 22). When teachers lead the change: A phenomenological study of a teacher initiated mobile one-to-one program in social studies classrooms. Presentation to Society for Information Technology and Teacher Education (SITE) 27th International Conference. Savannah, GA.
- 2015 Heath, M. P. (2015, November 13). Technology and the shrinking global village: implications on international and global education. Paper Presentation to the International Assembly (IA) of College and University Faculty Assembly (CUFA) at the National Council for the Social Studies (NCSS) Annual Conference, New Orleans, LA.

- 2015 Heath, M. P. (2015, November 13). Texting during an observation? Yes, please! Backchanneling to support metacognition. Presentation at National Council of the Social Studies (NCSS) Annual Conference, New Orleans, LA.
- 2015 Heath, M. P. & Lohnes-Watulak, S. (2015, March 4). A critical review of TPACK: Transformative epistemology and implications on education. Full Paper Presentation to Society for Information Technology and Teacher Education (SITE) 26th International Conference. Las Vegas, NV.
- 2015 Heath, M. P. (2015, March 4). Design research and assessment: Using collaborative concept mapping to develop undergraduates' skills in ethical reasoning. Roundtable Presentation to Society for Information Technology and Teacher Education (SITE) 26th International Conference. Las Vegas, NV.
- 2014 Heath, M. P. & Berkeley, T. (2014, November 21). The Declaration of Independence: Should it influence pre-service teaching philosophies? Presentation at National Council of the Social Studies (NCSS) Annual Conference, Boston, MA.
- 2014 Heath, M. P. (2014, May 18). Transformative epistemology of TPACK: Implications for future research. Paper presentation at Teachers College Educational Technology Conference (TCETC), Teachers College, New York, NY.
- 2013 Heath, M. P. (2013, April). Facilitating collaborative learning in distance education through Google+ and Google Hangouts. Presentation at the Maryland Distance Learning Association Conference, Linthicum Heights, MD.

INVITED PROFESSIONAL DEVELOPMENT PRESENTATIONS

- 2013 Heath, M. P. (2013, November). TPACK as a method for meaningful technology integration. Professional development presentation at Baltimore County Public Schools, Towson, MD.
- 2013 Heath, M. P. (2013, January). Creating an online learning community for your distance education class using Google+. Professional development presentation at Carroll Community College, Westminster, MD.
- 2011 Heath, M. P. (2011, September). What do I need to know about co-teaching and mentoring pre-service teachers?. Professional development presentation at Perry Hall High School, Baltimore, MD.

- 2011 Heath, M. P. (2011, September). What do I need to know about co-teaching and mentoring pre-service teachers?. Professional development presentation at Ridgely Middle School, Lutherville, MD.
- 2009 Heath, M. P. (2009, October). Differentiation in the classroom: A practical approach. Professional development presentation at Hereford High School, Hereford, MD.
- 2005 Heath, M. P. (2005, August). Pedagogy and methods for world history. Professional development presentation for Baltimore County Public Schools social studies teachers, Towson, MD.

GUEST LECTURES

- 2015 Heath, M. P. (2015, July 7). Philosophical Perspectives of Learning Theories. Invited Lecturer at Teacher Academy of Maryland Conference, Towson University, Towson, MD.
- 2014 Heath, M. P. (2014, July 7). Adolescent development and diversity: Assumptions and reality. Invited Lecturer at Teacher Academy of Maryland Conference, Towson University, Towson, MD.

RESEARCH EXPERIENCE

- 2015 *Phenomenological Case Study Research*, Lived experiences of teachers self-initiating one-to-one technology in social studies classrooms.
- 2014 (STAT): A *Program Evaluation*, Students and teachers accessing tomorrow
Baltimore county initiative to fundamentally shift teaching and learning through technology
- 2014 *Quantitative Research*, Factors affecting one-to-one mobile technology integration in K-12 Schools
- 2014 *Qualitative Research*, Cognitive practices and pedagogy utilized by k-12 educators when integrating mobile one-to-one technology
- 2013-2014 *Grant Evaluator*, Race to the Top Partnership between Towson University and Baltimore County Public Schools

2013-2014 *Qualitative Research, Case Study: Mentorship, Identity, and Professional Change in Race to the Top Partnership between Towson University and Baltimore County Public Schools*

AWARDS AND HONORS

2015 Burton, Dietz, Jones, Rosecrans Graduate Fellowship in Instructional Technology

2015 Towson University Graduate Student Association Research Award

2014 Towson University Alumni Association Graduate Fellowship

2014 Towson University Graduate Student Association Research Award

2001-2002 Hope Scholarship Teaching Award, State of Maryland

SERVICE

Discipline

NCSS Conference Presentation Reviewer. 2014, 2015.

Reviewed conference presentation proposals submitted to the National Council of Social Studies.

SITE Conference Presentation Reviewer. 2015, 2016.

Reviewed conference presentation proposals submitted to the Society for Information Technology and Teacher Education.

University

Lecturer Representative to PTRM Committee. 2015 to Present.

Represent non-tenure track faculty in the promotion, tenure, and merit process.

Committee Chair. 2015 to Present.

Chaired departmental committee for curriculum assessment and development. Analyzed needs assessments. Developed revised curricular goals with emphasis on clinical curriculum.

Instructional Program Lead and Mentor. 2013 to 2015.

Designed community Blackboard site for *Ethics, Education, and Change* instructors. Developed and presented orientation sessions for new instructors. Mentored new SCED 304 instructors on development and implementation of course objectives and assessment.

Assessment Designer. 2013.

Developed and piloted Towson University signature assessment for *Ethics, Education, and Change*.

Grant Evaluator. 2013 to 2014.

Evaluated Race to the Top (RTTT) grant supporting partnership between Baltimore County Public Schools and Towson University.

Diversity Committee Member. 2012 to Present.

Contributed to the College of Education's *Tools for Inclusion* and the monthly "Lunch and Learns."

College Representative. 2013.

Assisted with College of Education Open Houses for prospective students.

Institution of Higher Education Liaison. 2011 to 2012.

Professional Development School at Perry Hall High School and Ridgely Middle School in Baltimore County (MD) Public Schools.

Portfolio Evaluator. 2008, 2009, 2010, 2011.

Reviewed and evaluated portfolios for candidates for the degree of Masters of Arts in Teaching.

CERTIFICATIONS

Maryland Advanced Professional 7-12 Social Studies Teacher Certification (2002 to Present)

PROFESSIONAL AFFILIATIONS

National Council for the Social Studies (NCSS)

College and University Faculty Assembly (CUFA)

International Assembly (IA)

American Educational Research Association (AERA)

Association for the Advancement of Computing in Education (AACE)

Phi Alpha Theta History Honor Society

