

**UNDERSTANDING THE LIVED EXPERIENCES OF SECONDARY TEACHERS
INSTRUCTING IN ONE-TO-ONE COMPUTING CLASSROOMS**

by

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DEDICATION

To my husband, Todd, who has inspired me to accomplish goals that I had never thought attainable. “You have supported me throughout our lives together as a wife, mother, student, and professional. All that I have and have accomplished is because of your love and support. You are the love of my life, and I am the person I have become because of your partnership. I will love you forever.

To my children, Haiden and Gable, who have accommodated their lives when their mother had class or had to accomplish her work. I hope you feel that in some, simple way, I’ve provided a role model for both of you and have demonstrated the importance of advancing your education, working hard, balancing life, and achieving your goals. Haiden, you will accomplish all the goals that you set for yourself, and I am so proud of how you’ve grown to support the family throughout my journey in accomplishing this goal. Gable, you have always been the one to bring laughter to any situation. You have made me see stressful situations from a different viewpoint filled with laughter. I am so proud to have the both of you and am privileged to be your mother. I love you both very much.

To my mother, father, and brother. Thank you all for being such a supportive system throughout this process. Education has been a strong theme throughout my life growing up, and I owe that to my mother. Mom, thank you for being such a role model in education and pushing me beyond the limits I had set for myself. If I am half of the mother, wife, sister, and career woman that you were, I will be honored. Dad, thank you for giving me the ability to look at life through the lens of laughter. Without it, I would not have been able to accomplish all that I have in life. I know in your own way that you are very proud of me and admire my accomplishments as a dad. I love you both very much.

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ABSTRACT

The educational system is changing to meet the needs of 21st century learners, technology integration has become critical in meeting that need. One-to-one computing may close the digital gap that exists and equips students with the skills necessary for success in the 21st century workplace (Lemke & Martin, 2004). While much research exists on the implementation of one-to-one initiatives, further research is needed to explain the teacher's experiences and perspectives in teaching in such environments in order to investigate effective and successful learning in the classroom. Using a phenomenological methodology, I explored teachers' lived experiences (Moustakas, 1994) in teaching in a one-to-one computing environment. Analyses of the data revealed six definitive key themes from the teachers' perspectives of teaching in a one-to-one environment. Those six themes were as follows: 1. Comfort Level with Technological Knowledge. 2. Importance of the Internet. 3. Student Social Skills and Communication. 4. Student Behavior and Classroom Management. 5. Student Accountability and Work Completion. 6. Assessment Practices. Teacher participants revealed that they lacked the knowledge and experience to use technology effectively to enhance the learning process of students. Teachers expressed appreciation for accessibility to information, student accountability, and customization of assessments and grading practices. Classroom management and student communication and social skills were deemed to be impacted negatively by some teacher participants. Further research should look at the implications of differentiated professional development, gender differences among teachers when implementing one-to-one computing, and research in technology integration using the Puentedura's (2012) SAMR Model would benefit educational institutions as well as educators in setting the goal of attaining the "redefinition" phase of technology integration.

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Chapter 1

INTRODUCTION

Background of Study

Because technology has impacted the economic, social, and cultural shifts of the 21st century, it also has begun to impact the educational system in United States and around the globe. Apple Classrooms of Tomorrow (ACOT) have done in-depth research studies on technology integration in educational classrooms, most significantly studying classrooms that provide one computer for every student. According to Costa (2012):

Currently, what passes for basic skills must be redefined in the context of what is needed for successful participation in an information-saturated and hyper-adaptive digital world. Certainly, some skills are timeless in their necessity, but anyone who believes that the skills required for the 19th and 20th centuries will be adequate in 2025 or beyond needs to think carefully about what has recently unfolded in the world around us (p. 4).

The job market, once dominated by agriculture and manufacturing, has drastically changed to require professional and technical skills due to globalization. Many jobs that exist today will cease while others not yet in existence will emerge (Schrum & Levin, 2009). The evolving job market, continuing advancements in technology, and changing federal and state mandated laws, such as No Child Left Behind, over the last several decades have affected education, causing educators to contemplate how technology can best be used to influence the teaching and learning environment. Technology integration in education's classrooms is also increasing due to the increasing disengagement of students and declining student achievement scores across the nation. Prensky (2010) states, "There is a huge paradox for educators: the place where the

biggest educational changes have come is not our schools; it is everywhere else but our schools. The same young people we see bored and resistant in our schools are often hard at work learning after school” (p. 1).

Students of the 21st century are disengaged because the school environment, many times void of technology, does not mimic the environment that exists for students outside of the classroom (ACOT, 2006). According to Green and Hannon (2007), “Children are establishing a relationship to knowledge gathering which is alien to their parents and teachers” (p. 38). Therefore, in order to prepare students for the 21st century, school systems have begun to implement one-to-one computing programs known to educators as the existence of one computer for every student and teacher, which may be in the form of a desktop, laptop, tablet, I-pad, or mobile device. One of these devices in the hands of students or teachers allows for immediate access to information, communication and collaboration with technology, and its expansion is being seen internationally (Penuel, 2006). Students value problem solving, communication, creation and collaboration just as adults do in the real world (Barrios, 2004). This expansion of technology as a tool for learning in the classroom is due to students’ exposure to technology since birth; therefore, they expect to learn by using technology.

In order to prepare students for an environment that is constantly changing and adapting, Costa (2012) states that “Educators must be able to replicate or introduce them to learning experiences that prepare them for it. To be fluent with problem solving and adaptability, to be digitally literate adults, learners must practice and use these skills consistently over time” (p. 13). One-to-one computing closes the digital divide and equips students with the skills necessary for success in the 21st century workplace (Lemke & Martin, 2004). Costa (2012) found that “without 1:1 access to the tools that form the foundation of 21st century learning and work,

students cannot be properly prepared for life in this environment. Facing this is no less than a matter of survival for public schools” (p. 15).

Due to the advancement of technology in society and the increasing number of schools systems implementing one-to-one computing, much research has been done to study its effects on professional development, the role of the teacher and the student, and the impact on teaching and learning (Barrios, 2004; Bielefeldt, 2006; Cengiz, Gulek, & Demirtas, 2005; Costa, 2012; Dawson & Cavanaugh, 2006; Drayton, Falk, Stroud, Hobbs, & Hammerman, 2010; Dunleavy, Dextert, & Heinecket, 2007; Efaw, Hampton, Martinez, & Smith, 2004; Friedrich & Hron, 2010; Green & Hannon, 2007; Hew & Brush, 2007; Lei & Zhao, 2008; Lemke & Martin, 2004; Maninger & Holden, 2009; Moran, Hawkes, & Gayar, 2010; Mouza, 2008; Mouza, Cavalier, & Nadolny, 2008; Niederhauser & Lindstrom, 2006; Oliver, 2010; Penuel, 2006; Prensky, 2001; Prensky, 2010, Shrum & Levin, 2009, Shapley, Sheehan, Maloney, & Caranikas-Walker, 2010; Subramaniam, 2007; Venkatesh, Morris, Davis, & Davis, 2003). In this study, I will focus on the phenomenon of one-to-one computing environments and its impact on instruction from a teacher’s perspective.

Statement of the Problem

According to Creswell (2007), the research problem provides the justification for studying a particular issue. This problem provides the need for why a study is conducted and researched. “As long as schools remain primarily paper and textbook based, the gulf between the appropriateness of the preparation system we provide and the learning and work environment that our students will enter continues to grow” (Costa, 2012, p. 15). School systems must adapt to learners in an ever-changing world. Because today’s adolescents have grown up using various technologies outside of school, they have become disengaged with the traditional school

environment that either lacks or forbids technology (ACOT, 2006). In addition, employers today value skills such as creativity, communication, presentation expertise and team-building, and schools must be at the forefront in preparing young people for the future workplace (Green & Hannon, 2007). Therefore, education must begin to integrate technology in classrooms for learning purposes in order to allow students to create, communicate and present effectively, and collaborate. Thus, the need to understand a teacher's perspective of teaching in a one-to-one environment and its impact on instruction is critical in developing an exceptional 21st century learning environment for students.

Statement of Purpose

The purpose of this study was to understand the phenomenon (Moustakas, 1994; van Manen, 1984) of teaching in a "one-to-one" computing environment and its impact in the classroom from a secondary teacher's perspective. I was seeking to understand the lived experience the teachers encountered when teaching in one-to-one computing environments (Moustakas, 1994). Because one-to-one environments in education have become increasingly popular due to an ever-changing world, more research must be done that focuses on technology's effects on transforming the teaching and learning atmosphere in order to better prepare teachers and students for the 21st century (ACOT, 2006). For this study, I focused on three Midwest schools who have implemented one-to-one environments. I interviewed eight teachers teaching in a one-to-one environment because saturation had occurred (Bogdan & Biklen, 2007). In addition to conducting teacher interviews, I also had each teacher participant complete an online survey aligned to the research questions asked in the interview. The online survey was conducted in order to triangulate all data. It was critical to understand the role teachers and students played in the one-to-one environment in order to understand how technology helped

to transform the teaching and learning into that of a 21st century classroom. In addition, I was seeking to understand the long and short-term benefits of teaching in one-to-one environment as well as the challenges involved in this environment.

Research Questions

According to Creswell (2007), qualitative research questions should begin with the “grand tour” question that is more general in terms and eventually create more specific questions. Research questions also begin with “how” or “what,” allow the researcher to state what is to be studied in more specific terms, and also allows for open-ended, evolving answers to the questions. Furthermore, “[k]eeping in mind that research questions provide the scaffolding for the investigation and the cornerstone for the analysis of the data, researchers should form interview questions on the basis of what truly needs to be known” (Anfara, Brown, & Mangione, 2002, p. 31).

Grand Tour Research Question

The following research grand tour (Bogdan & Biklen, 2007) research question guided my study: What is it like to be a high school teacher using one-to-one technology in the classroom?

Significance of the Study

The significance of this study was due to the fact that the world has abundant digital resources and content for learning and work, thus, the demands on schools to offer 21st century learning continues to grow (Costa, 2012). Costa further explicates, “one would think that public schools, the institution with the greatest burden of preparing students for this reality, would aggressively shift resources to get every learner a digital device” (2012, p. xv). In addition, many of today’s students are bored and disengaged with learning while at school; their learning truly

begins through the use of digital access and content when they leave the school environment (Prensky, 2010). Apple Classrooms of Tomorrow (ACOT) has done in-depth research on technology integration in educational classrooms, most significantly, studying classrooms that have provided one computer for every student. Because technology has impacted the economic, social, geopolitical, and cultural shifts of the 21st century, it has profoundly impacted life in the United States and around the globe (2006). This same driving force has been infiltrating the education system. According to Costa (2012), “anyone who believes that the skills required for the 19th and 20th centuries will be adequate in 2025 or beyond needs to think carefully about what has recently unfolded in the world around us (p. 4).

The job market, once dominated by agriculture and manufacturing, has drastically changed to require professional and technical skills due to globalization. Many jobs that exist today will cease to exist while others not yet in existence will emerge (Schrum & Levin, 2009). The evolving job market, continuing advancements in technology, and changing federal and state mandated laws over the last several decades have now permeated into education, causing educators to consider how technology can impact teaching. Technology integration into the education realm began partially because of the increasing disengagement of students who enter the educational system daily and declining achievement scores across the nation. Prensky (2010) argues, “there is a huge paradox for educators: the place where the biggest educational changes have come is not our schools; it is everywhere else but our schools. The same young people we see bored and resistant in our schools are often hard at work learning after school” (p. 1).

Students of the 21st century have become disengaged because the school environment, many times void of technology, has not mimicked the environment that currently exists for students outside of the classroom (ACOT, 2006). According to Green and Hannon (2007),

“children are establishing a relationship to knowledge gathering which is alien to their parents and teachers” (p. 38). Therefore, in order to prepare students for the 21st century, school systems have begun to implement one-to-one computing programs, known to educators as the existence of one computer for every student and teacher, which may be in the form of a desktop, laptop, tablet, iPad, or mobile device. One of these devices in the hands of students or teachers has allowed for immediate access to information, communication and collaboration with technology and its expansion is being seen internationally (Penuel, 2006). This expansion has come about because of students’ exposure to technology since birth; therefore, they expect to learn by using technology. They value problem solving, communication, creation and collaboration, just as adults do in the real world (Barrios, 2004).

Costa (2012) states “educators must be able to replicate or introduce them [students] to learning experiences that prepare them for it [the world]. To be fluent with problem solving and adaptability, to be digitally literate adults, learners must practice and use these skills consistently over time” (p. 13). One-to-one computing is closing the digital divide and equipping students with the skills necessary for success in the 21st century workplace (Lemke & Martin, 2004). Costa (2012) found that “without 1:1 access to the tools that form the foundation of 21st century learning and work, students cannot be properly prepared for life in this environment. Facing this is no less than a matter of survival for public schools” (p. 15).

Due to the advancement of technology in society and the increasing number of school systems implementing one-to-one computing, much research has been done to study its effects on professional development, the role of the teacher and the student, and the impact on teaching and learning (Barrios, 2004; Bielefeldt, 2006; Cengiz, Gulek, & Demirtas, 2005; Costa, 2012; Dawson & Cavanaugh, 2006; Drayton, Falk, Stroud, Hobbs, & Hammerman, 2010; Dunleavy,

Dextert, & Heinecket, 2007; Efaw, Hampton, Martinez, & Smith, 2004; Friedrich & Hron, 2010; Green & Hannon, 2007; Hew & Brush, 2007; Lei & Zhao, 2008; Lemke & Martin, 2004; Maninger & Holden, 2009; Moran, Hawkes, & Gayar, 2010; Mouza, 2008; Mouza, Cavalier, & Nadolny, 2008; Niederhauser & Lindstrom, 2006; Oliver, 2010; Penuel, 2006; Prensky, 2001; Prensky, 2010; Shrum & Levin, 2009; Shapley et al., 2010; Subramaniam, 2007; Venkatesh, Morris, Davis, & Davis, 2003). However, the need for understanding the phenomenon (Moustakas, 1994; van Manen, 1984) of one-to-one computing from the teacher's perspective and his or her beliefs about the influence it has on teaching remains unclear. Therefore, in this study, I focused on the phenomenon of one-to-one classrooms, based on teachers' perspectives, about the impact technology has had on instruction.

Conceptual Framework

Miles and Huberman (1994) stated that the conceptual framework of a study involves the “systems of concepts, assumptions, expectations, beliefs, and theories that support and inform your research” (p. 33). This conceptual framework provides a concept for what is to be studied, what already exists in research on the topic to be researched, and informs your study (Miles & Huberman, 1994). The conceptual framework used for this study was the SAMR model. The SAMR model was created by Dr. Ruben Puentedura (2012) which is a technological integration framework that helps teachers understand the level of integration of technology in their classrooms. The SAMR acronym stands for Substitution, Augmentation, Modification, and Redefinition which consists of four levels of integration with Redefinition being the highest level of integration in classrooms to Substitution being the lowest level of integration. I chose the SAMR model for this study because of its simplicity allowing teachers to clearly understand the

differences in implementation levels and the activities that could be used for the various implementation levels.

Definitions of Terms

One-to One Computing Environments: These environments typically mean one computer for every student and teacher, and students usually take the computeres home each day. These environments provide, “adequate preparation for a 21st century digital work and learning environment [that] demands students have ready 1:1 access to technology and aligned instructional practices so that they may invest the time needed to become fluent users of these tools” (Costa, p. 13). According to Prensky (2010), students want and often demand technological access to the world; they want to problem-solve instead of being lectured to; they want their opinions and values respected; they want to collaborate with peers to create projects and solutions to real problems; and lastly, they want their education to be about real-world work, not fictitious scenarios and irrelevant work. Prensky (2012) states, “our students see a new world coming-their world-in which what they think should be important actually is. The world they are headed for is different and important to them, and they already know more about some aspects of it than we do” (p. 3).

Pedagogy: Any activity that enhances the learning of another person (Watkins & Mortimer, 1999). Furthermore, pedagogy encompasses what a teacher believes, the skills he or she needs to be successful, as well as collaborating and having discourse with adults (Adams, 2003).

21st century learning: Although 21st century skills have been defined differently by many researchers and institutes, much of the research contains similar themes. Those themes consist of the following: access to digital learning; financial literacy; communication; problem-

solving; independent and collaborative work; demonstrating creative, innovative, and adaptable skills; applying analysis, synthesis, and the higher level of Bloom's Taxonomy to work; and valuing and demonstrating responsibility, character, and ethical behavior (Costa, 2012). The similarities amongst themes can also be seen in Joyce and Calhoun's (2010) work. They note that 21st century skills include global awareness; financial, economic, and entrepreneurial literacy; as well as literacy, which is similar to other research findings; however, they also express the importance of the Common Core as well.

21st century teaching: Educators generate richer, more creative learning experiences for students where students become the leaders in their own exploratory learning while the teacher becomes a facilitator of their learning. 21st century teaching also requires teaching in newly invented ways where the teacher is no longer the purveyor of knowledge because the Internet now provides much of that knowledge. Today's teachers must become facilitators of thinking and problem solving. They must integrate technology into the learning environment as much as possible because that is the world in which our students are accustomed to learning (Prensky, 2012).

21st century learning environments: Forms a "partnership" between teacher and student to explore concepts, problems, and issues in order to create solutions, answers, or innovative products to demonstrate the understanding of the aforementioned, all while the teacher guides the learning experience to ensure understanding occurs. The teacher also must ensure that the learning is meaningful, rigorous, and most importantly, quality (Prensky, 2012). Because information is so easily accessible to everyone, finding the knowledge and remembering it is not what's important anymore, it's what the students do with the knowledge they have discovered that is important (Costa, 2012).

Professional development: The ultimate goal in improving student learning; therefore, professional development must stimulate adult learning in helping those transfer what is learned in professional development to real-world situations in the classroom (Mooney & Mausbach, 2008).

Summary

Because educators prepare students for the world in which they will work and live, it is necessary for classrooms to engage students in their learning with the use of digital technology. Technology has infiltrated the working world and requires workers to have knowledge of different programs; however, employers are also seeking workers who know how to innovate, create, and problem solve when using technology because it creates a better product more quickly. It's the public education system's job to ensure that all students are exposed to technology, use their problem solving and creative skills to create real-world products. The focus of this study was to investigate the impact one-to-one technology has on the teaching and learning environment as well as to understand the teacher and student's role in this transformational environment, and the effects of professional development on teaching and learning.

Chapter 2

LITERATURE REVIEW

Overview

The literature review for this study highlights the current research related to the topic of one-to-one computing and its' effect on the teaching and learning environment. Much research has been conducted in the area of technology integration (Barrios, 2004; Bielefeldt, 2006; Cengiz et al., 2005; Costa, 2012; Dawson et al., 2006; Drayton et al., 2010; Dunleavy et al., 2007; Efaw et al., 2004; Friedrich & Hron, 2010; Green & Hannon, 2007; Hew & Brush, 2007; Lei & Zhao, 2008; Lemke & Martin, 2004; Maninger & Holden, 2009; Moran et al., 2010; Mouza, 2008; Mouza et al., 2008; Niederhauser & Lindstrom, 2006; Oliver, 2010; Penuel, 2006; Prensky, 2001; Prensky, 2010; Shrum & Levin, 2009; Shapley et al., 2010; Subramaniam, 2007; Venkatesh et al., 2003). This literature review contains the most current research on 21st century teaching and learning including teachers' pedagogical beliefs and the changing roles of students and teachers; 21st century professional development and barriers to success are also discussed because of the difficult environment schools encounter when transforming schools to those that mirror 21st century practices. It is important to understand the context of the literature in order to comprehend the importance of the need for change in educational classrooms.

Student Learning

Mouza et al. (2008) states, "In recent years, there has been an exponential growth of laptop program initiatives in K-12 education" (p. 413). Those laptop initiatives have made numerous impacts in the classroom. One impact technology integration has had is on student learning. Student learning is impacted by how students use technology as a tool for learning in the classroom. By infusing technology into the learning process, students have opportunities to

use technology to create, discover, and be innovators of their own learning by involving themselves in the process of producing authentic products. Prensky (2001) states that students have spent their entire lives around technology compared to the adults who teach these students. Those adults have spent far less time with technology; therefore, this creates a dichotomy between students and teachers. Costa (2012) states that traditional teaching and learning involves much direct instruction, pencil and paper work, and involves a distant connection or almost no connection to the real world. Barrios (2004) indicates that, “today’s students expect their school assignments to be relevant, challenging, and related to the real-world. They value problem solving, communication, and the chance to collaborate as adults do in the real world” (p. 5).

Lei and Zhao (2008) indicate in their qualitative research study involving 231 students, 28 teachers, and 44 parents in a northwestern middle school in the United States that the most common uses of laptops by students for learning in the classroom are as follows: searching for information on the Internet, learning subject content with specific software, taking notes, and learning through online discussions which many students felt directly aligned to authentic, real-world work. In addition to the aforesaid uses of technology in the classroom, technology integration also provided students with the ability to work more independently, to communicate with teachers and peers, and to improve technological knowledge and skills and writing skills, all of which produce opportunities to create authentic learning environments that mimic the global, competitive world they will soon enter (Mouza et al., 2008). Niederhauser and Lindstrom’s (2006) mixed-methods research study involving interviews with 1,078 teachers in elementary and secondary schools points to more specificity of students’ use of technology. “Web browsers and widespread Internet availability in schools provides access to inert static information

sources, but also allows students to interact with experts, converse with peers, and share ideas and products with an authentic world-wide audience” (p. 109).

While the aforementioned studies indicate the impact that student use of technology can have on student learning in the classroom, one-to-one computing can have a significant impact on student learning outside of the classroom as well. Shapley et al. (2010) conducted a quantitative research study comprised of middle school students and teacher surveys as well as students’ TAKS scores. Their research indicates that students who had access to laptops “24/7” expanded where and how they learned. In addition, such access also allowed students to produce quality projects and products that required additional time outside of the typical school day. Mouza’s (2008) mixed-methods research study consisted of interviewing teachers, administering student questionnaires, observing classrooms, and interviewing student focus groups. Her study indicates the following added benefit of a one-to-one program that allows students to take the laptops home, especially for students from high minority, high poverty environments. “Providing every student with a laptop, which can also be taken home, can have a tremendous impact on students who are currently left out from the world of technology” (p. 449).

In addition to the impact student use of technology can have on student learning outside of the classroom on students of poverty, one-to-one computing also affects students’ engagement and motivation in the learning process. It is not uncommon for students, especially those at the secondary level, to lack motivation and interest in school. One-to-one computing initiatives implemented in schools help to increase students’ interest and attention in the classroom.

Initial findings indicate positive results of laptop initiatives in student behaviors and dispositions that support learning, such as motivation and increased engagement with school work, positive attitude towards technology and school, and increased classroom

interactions (Mouza et al., 2008, p. 414).

Mouza's (2008) study corroborates how one-to-one computing initiatives offer students the opportunity to engage in 21st century learning, which in turn, increases students' desire to learn and enhances their academic aspirations.

While student motivation and engagement can be directly impacted by technology integration, so too can student achievement. "The use of laptop computers did not only improve student motivation and altered classroom interactions but it also produced academic gains in writing and mathematics" (Mouza, 2008, p. 465). According to Mouza's (2008) research, with the implementation of technology in the classroom, students spend more time practicing revising and editing writing, in addition to practicing problem solving skills needed to analyze and synthesize research. In addition to improved writing and mathematical skills, students who participate in a one-to-one computing program have a higher GPA, higher end of course grades in English and mathematics, and higher scores on norm-referenced state tests. (Cengiz et al., 2005). Efaw et al. (2004) mixed-methods study involving secondary teachers and students where students assessments and surveys were analyzed and observations of teachers were conducted, found in their research that "students whose teachers integrated laptop computers into their classroom strategies scored significantly higher on all exams than students of instructors who used traditional instructional methods. Research indicates that one-to-one computing can have significant effects on student achievement.

Instructional Practices

With the changing learning practices of students over the years, as well as the innovative technology now available to individuals, new demands have been placed on teachers. "Recent reform in teaching and professional education has put great emphasis on the use of computer

technology and teaching” (Subramaniam, 2007). One-to-one computing programs have significant effects on teaching practices. “School leaders need to help digital immigrant teachers, those that didn’t grow up with technology and don’t acclimate as quickly to technology as others, change the ways they teach in order to reach these students, and learn how to get the best of their new digital native teachers without sacrificing achievement and excellence in their schools” (Schrum & Levin, 2009, p. 29). In addition, teachers need to realize that many of the students of today are disengaged and unwilling to read printed text. However, students will read online material or listen to podcasts, and teachers must realize that learning looks differently today than it did in the past (Levin & Schrum, 2009)

How teachers choose to integrate technology into the classroom environment is vital when operating in a one-to-one classroom. Several studies indicated that some teachers still used the laptops for drill and practice; however, many teachers created environments with technology that allowed the teacher and student to create virtual communities that communicate synchronously and asynchronously to share ideas, solicit feedback, or ask relevant questions about the learning task (Dunleavy et al., 2006). The aforementioned invites the student to continue their learning outside of the classroom, eliciting advice from experts in the field in which they’re studying through the use of email, blogging, or video conferencing, all while updating the teacher as to the progress of the students learning via the various mediums discussed. The teacher can also provide continuous feedback to the student through email or other communication venues to ensure the student is successful.

Dunleavy et al. (2006) qualitative research study that included students, teachers, and administrators in two middle schools in the southeastern United States and involved formal and informal interviews, observations, and document reviews, found in their research that when

schools implemented one-to-one computing initiatives, “teachers reported designing lessons that are more student-centered and constructivist, allowing for less lecturing and more facilitating or guiding students in the learning process” (p. 448). These teaching strategies directly align with 21st century teaching and learning practices that are essential to successful schools.

Oliver’s (2010) mixed-methods research study involved students, teachers, technology facilitators, and school leadership teams. Data collection for this study included test scores, surveys, classroom observations, and interviews and focus groups. Oliver’s (2010) research indicated that teachers’ use of technology implementation gradually increased over time and with more frequent use. Many teachers who felt they didn’t know how to integrate technology on a daily basis in their classrooms had, over time, significantly changed their teaching habits from partial integration of laptop learning to full technology integration into their teaching practices. Prensky (2010) insists that the pedagogy in which our students are taught must change within teachers’ minds. He insists through his extensive research in interviewing students that boredom is what many students experience when in school. He states once teachers adopt a belief in no longer being the “sage on the stage” and become a “guide on the side” for students in their own learning, that a transformation to a 21st century teaching and learning environment can occur.

Students’ Attitudes and Pedagogical Beliefs

Students have changed dramatically from prior generations because they are the first generation to have grown up from birth with technology. This has ranged from infant toys that included small computers and music players to iPod’s, iPad’s, and iPhone’s. (Prensky, 2012). “Today’s average college grads have spent less than 5,000 hours of their lives reading, but over 10,000 hours playing video games (not to mention 20,000 hours watching TV). Computer games, email, the Internet, cell phones, and instant messaging are integral parts of their lives”

(Prensky, 2012, p. 68). Students of the 21st century are technologically connected to the world and their peers unlike previous generations (Prensky, 2010). “Much of what they want and need is in their pocket on demand” (Prensky, 2010, p. 2). There is such a gap between how students think compared to how teachers think that the gap must be filled; that is where technology plays a significant role (Prensky, 2010). Students want to collaborate with peers, whether in person or through technology use. They want to compete with others by creating products using technology. They want to be respected and trusted in their learning process while doing the work independently with guidance from the teacher. They want to make decisions and have control of their learning. They also want to use their passion and interests in what and how they learn (Prensky, 2010).

Our students see a new world coming-their world-a world in which what they think should be important actually is. The world they are headed for is different and important to them, and they already know more about some aspects of it than we do. But the world they came from is also important to them, and we know more about that than they do. We need to teach kids to respect the past but live in the future. (Prensky, 2010, p. 3)

According to Alexiou-Ray et al. (2003), their research study also corroborated Prensky’s work; however, their study also revealed some other findings. Their qualitative study comprised of teachers, students, and parents at one school were given questionnaires that included questions about comfort level with technology integration in the classroom. Students indicated that they felt that technology integration made learning more interesting and helped in understanding the learning objectives. These findings were further validated by Holcomb’s (2009) report. “A vast majority of students indicated that the use of laptops facilitated their learning. Students also reported they did more work more quickly and of improved quality” (Holcomb, 2009, p. 50).

Additionally, Mouza et al. (2008), found in their mixed-methods study involving both teachers and students and collecting pre and post-surveys, conducting observations, teacher interviews, student focus groups, and document reviews, that students reported feeling more prepared for their future after using laptops in their learning. Students also indicated that technology allowed them to learn things in new ways unlike traditional learning when technology wasn't used.

However, some studies indicated that students expressed some skepticism and concern for integrating technology into the classroom environment. According to Alexiou-Ray et al. (2003) study, their research discovered that students were hesitant at first because of fear of not knowing how to incorporate technology into their learning. In addition, “students were able to critically analyze the limitations of technology use” (Alexiou-Ray et al., 2003, p. 63). In addition, Mouza et al. (2008) research found that after having access to laptops in their learning, students reported negative feelings towards restrictions imposed on updating software. This caused a nuisance and an inconvenience when many of the students felt comfortable updating the software themselves.

Teachers’ Attitudes and Pedagogical Beliefs

While changes in teaching practices are critical to the success of one-to-one computing programs, teachers’ pedagogical beliefs about technology also directly impact the success of such an initiative. William Penuel (2006) found in his qualitative narrative research that:

Teachers who believe that students are capable of completing complex assignments on their own or in collaboration with peers may be more likely to assign extended projects that require laptop use and allow students to choose the topics for their own research projects. (p. 337)

Penuel (2006) and his researchers analyzed research studies they deemed high quality that analyzed implementation and outcomes of one-to-one initiatives. His research indicated that teachers who view technology as a valuable tool use it more often with students than those who devalue its use. “Many of the teachers reported that their expectations of what their students could do changed after seeing how skilled students were when using multimedia tools” (pg. 338). His findings are further validated in the research conducted by Drayton et al. (2010) in their mixed-methods study that looked at three high schools that implemented one-to-one environments for at least five years in the science curriculum, specifically focusing on year three. This research study confirms the fact that teachers’ beliefs affect teaching practices and technological integration.

“Inquiry-oriented teachers deployed the technology to support and expand inquiry; more traditional teachers likewise use the technology according to their values, in conducting teacher-centered classrooms” (Drayton et al., 2010, p. 48). This research highlights how a teacher’s beliefs and teaching practices prior to the implementation of a one-to-one computing program may not significantly change after adopting a technology initiative.

Maninger and Holden’s (2009) mixed-methods research study also substantiates the fact that teachers’ attitudes, practices and beliefs directly affect the implementation of technology integration. Maninger and Holden studied a private school that implemented a one-to-one environment focusing on fifth through eighth grade students and teachers. Their research indicated that “with additional experience, training and technical support, many teachers have expanded their use of technology to include curricular planning, problem solving and decision making”(p. 15). Due to the aforesaid research findings, attention must be given to teachers’ pedagogical beliefs and attitudes when implementing such a program to ensure success.

Teachers' and Students' Changing Roles

In today's educational world with teachers' beliefs and pedagogies changing due to integrated technology, Prensky (2010) has proposed a radical paradigm of thinking in terms of teaching and learning. He refers to a partnering pedagogy, one in which the students are the main users of the technology while the teacher becomes more of a coach or guide in using the technology for effective learning.

Prensky (2010) advocates that the students' new role must include the following: using whatever technology is available to them at the time, using their passion and interests in their learning, researching information to find solutions to issues or problems, collaborating to find answers and to express opinions, gaming for practice, and creating presentations. By the students' adopting this new role, Prensky (2010) advocates that the students become the individuals doing the rigorous thinking and difficult work.

He also believes that the teachers' role has also changed and should include the following: asking the right questions, "guide on the side," one-to-one coaching, establishing rigorous assignments, ensuring quality of assignments, and making the content applicable to students. When teachers take on this new role, or "partnering" as Prensky (2012) states, "The onus is then completely on the students... it emphasizes that the roles of each group, teachers and students, are different, but equal." (p. 14-15). The student becomes the primary user of technology to solve current and relevant issues, answer problems, or to create products. The teacher ensures the quality of the work while providing guidance and coaching along the journey of learning (Prensky, 2012).

Hennessy et al. (2005) in their qualitative research that involved six eastern state schools and involved teachers interviewed through focus groups found that teachers in their study

changed their pedagogy about their role in the classroom. Their research concluded that teachers acknowledged that designing new approaches to instruction was critical and included attaining a deep understanding of complex issues and concepts in addition to incorporating critical thinking, collaboration, creativeness, and communication as often as deemed appropriate.

Prensky (2012) even advocates that teachers shouldn't use much technology in teaching students. "When it comes to technology, the teacher is the guide, the coach, and the quality controller, not the user" (p. 100). He states that students can use technology more effectively than teachers or will learn how to if they are unable. He promotes the teachers' roles being primarily the generator of questions, the guide for students in exploring all technologies that are available in learning, the quality controller of learning and work, and the coach to provide feedback and assistance to students when they struggle (Prensky, 2012).

Hassel and Hassel's (2011) research study suggests that teachers' roles would vastly change; however, other opportunities would be afforded them due to technology integration. Their research suggests that a teacher's and student's day could significantly change due to instructing a digital classroom. This could be done by replacing a portion of teacher and student's work with digital tools, allowing the teacher to interact with more students due to remote access, thus providing instruction via video which provides students with "anytime" access to instruction, or access to instruction twenty-four hours a day.

Hassel and Hassel (2011) also suggest that digital instruction allows teachers and students more flexibility in their roles as educator and learner. Their research indicates that teachers and students could work remotely from anywhere and at anytime. Additionally, teachers could provide students with more personalized instruction via technology during flexible times throughout the day depending on students' and teachers' schedules. Finally, their research

suggests that teachers would be more able to provide students with ample and timely feedback because more time would be allotted to them with remote access, and students could also reflect and provide self-evaluations of their work to teachers via blogs, email, wikis, or other technological means.

Professional Development for the 21st Century

As research on technology integration into classrooms has been found to impact teaching practices and beliefs and attitudes, much of the research about one-to-one computing also emphasizes the importance of professional development (Penuel, 2006). “Formal professional development has been a critical component of many large-scale and smaller one-to-one programs” (p. 338). No initiative is effective in schools without adequate professional development for teachers, especially when it comes to the use of technology. Professional development must include opportunities for teachers to discuss their values, ways in which to integrate technology, strategies for experimentation, and ways to gain insight into student work using technology (Drayton et al., 2010). “Teacher workshops often focus on providing teachers with skills they need to use technology themselves, but many reported that what was most critical was a focus on helping teachers integrate technology into instruction” (Penuel, 2006, p. 338).

Hew and Brush (2007) focus their empirical research findings by analyzing studies involving technology integration in classrooms from 1995-2006 in elementary and secondary schools. Their research focused on several components necessary for effective technological integration in classrooms; however, their research on professional development when implementing a one-to-one initiative is especially important. According to their research, effective professional development related to technology integration focuses on the following

components: content being taught, opportunities for teachers to engage in “hands on” work, teachers’ needs and beliefs, and classroom management skills.

Although these components are necessary for effective integration of technology in the classroom, other research indicates that professional development must occur over a long period of time. Most traditional professional development occurs infrequently, is sporadic, depending on the initiative, and may not directly correlate to the teachers’ practices in the classroom. Dawson and Cavanaugh (2006) found in their quantitative research study involving the observation of 447 elementary and secondary southern United States classrooms that “professional development for technology integration is most effective when it extends over a long period of time, is immediately relevant to the teachers’ context, and is job-embedded” (p. 148). Dawson and Cavanaugh (2006) also suggest that more longitudinal research studies be conducted in the area of effective professional development when implementing a one-to-one initiative.

The previously stated research provides support for professional development when integrating technology; however, recent research has denounced the term professional development, in lieu of professional support and evaluation. Costa (2012) prefers the unique terms of professional support and evaluation because of the new challenges the digital world provides. “This shift is meant to communicate the need for shared responsibility for learning that must be the expectation in a 21st century school” (p. 131). Professional support and evaluation goes beyond presentations and workshops to include the teacher as an investigator of their own learning and application. This portends that professional support and evaluation becomes more individualized and differentiated (Schrum & Levin, 2009).

Assessment of Learning in a Digital World

Because technology allows students and teachers to create products that would be impossible without technology, assessment of student learning must also transform. Prensky (2010) found that assessment can be categorized as the following types: ipsative, peer, real-world, and self. Ipsative assessments can be described as students setting their own goals and continuing to excel past their previous achievements. However a student may have achieved on a previous assessment, their goal with an ipsative assessment would be to increase their achievement on the next assessment. Prensky (2010) states the importance of peer assessment. This goes beyond students telling each other that the work they created was “fine.” This requires students to truly care about one another’s work and provides students with the sense that their work matters and the audience is authentic.

Although Prensky’s research dictates the positive outcomes of assessing learning in a digital world, other researchers have found that teachers assessing learning in digital classrooms can be problematic. Hennessy et al. (2005) found that teachers felt conflicted between using technology for 21st century instruction and assessment and the external requirements of state and federal mandated traditional examinations.

According to Behrens, Mislevy, DiCerbo, and Levy (2010), building multifaceted simulation environments that mirror or extend real world products offers students opportunities to be authentically assessed. Behrens et al. (2010) found the following was possible for students in a digital era:

In designing simulation and game-based assessments, we want to build features that require the targeted capabilities and provide affordances for students to enact their thinking. These are examples of the fusion of assessment driven tasks and daily-life-

driven-tasks enabled by the recording, storage, and manipulation of digital information. Recording, storage, and manipulation requirements have historically been requirements of assessment inference but they are becoming general standards for many activities in our digital lives. (p. 24)

Real-world assessment allows students to create products and projects that will be required of them when they leave the halls of school and enter the world of work. Creating authentic, real-world products is essential in creating students who will be competitive global citizens (Prensky, 2012). Prensky (2010) claims that self-assessment is the most important. Students will need to be reflective in their professional work as well as meta-cognitive. Self-assessment gives students the opportunity to discover their strengths in addition to their weaknesses. This allows students to excel in areas while continuing to improve in others.

However, Thalheimer (2008) in his research suggests that digital assessment may be more difficult for teachers as opposed to the more traditional assessment and assessing learning in a technologically integrated classroom can be difficult. In traditional learning environments, teachers typically know what and how to assess learning. He suggests the following questions to consider when assessing learning in a technologically integrated classroom:

1. Is it supportive of deep understanding?
2. Is there long-term retrieval?
3. Are their career learning and performance, and organizational results?

Technological Models for Implementation

In reviewing the research around technology integration in schools, many technological models appeared in research journals and articles. The SAMR model, developed by Ruben Puentedura (2012) in the late 1980s and early 1990s, depicts what types of technology are used in the classroom and their effect on student learning. There are four levels of technology use in this model. The lowest level of the model is labeled *substitution*. This level portrays a direct substitution of technology for an earlier technological model and involves doing the same thing one would do even without technology (Puentedura, 2012).

The next level is augmentation. This level is still a direct substitution for an earlier technological model; however, some improvements occur, such as some functionality that now exists that was not present in the earlier technological model. Again, no change in instruction or the assignment occurs. These first two levels lead to enhancement of instruction, not total transformation (Puentedura, 2012). The top two levels of Puentedura's SAMR (2012) model lead to transformation. The first of these top two levels is *modification*. At this level, the user is able to redesign learning tasks and to create an assignment that could not be done without technology. The final level, *redefinition*, allows for transformation in learning by, again, creating an assignment or task that couldn't be conceivable without technology, allows for an authentic audience, and requires formative feedback for the student. The SAMR model, Figure 2.0, is referred to in research articles and journals detailing technology integration in classrooms.

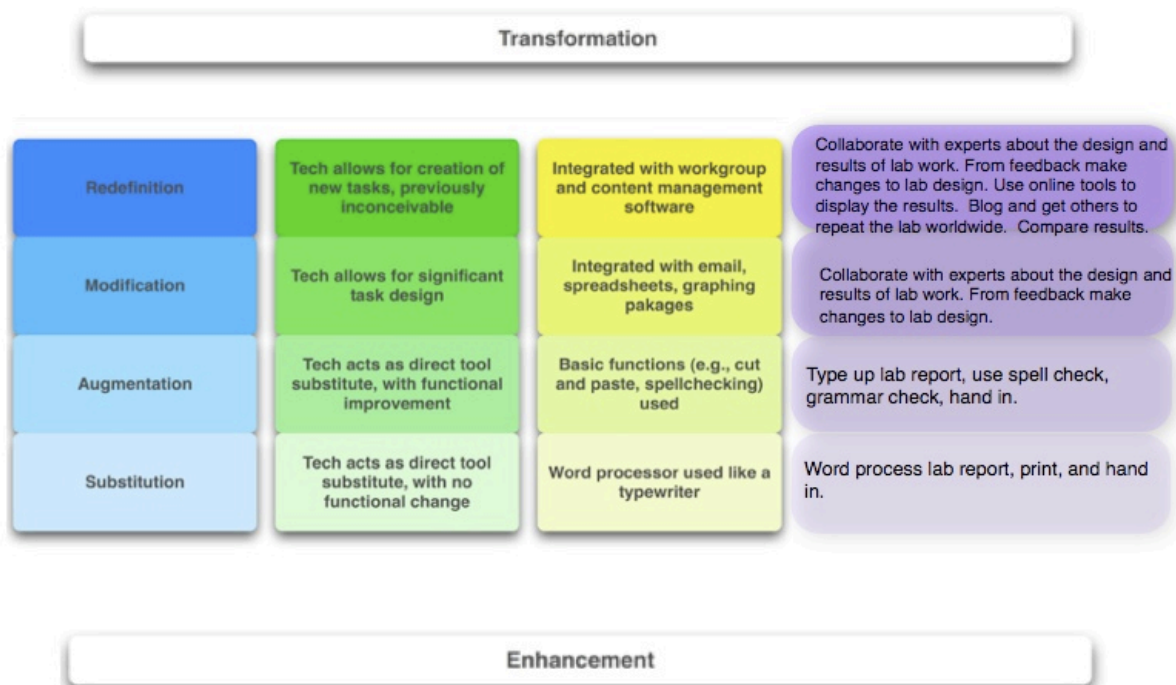


Figure 2.0

The SAMR Integration Model

Another model for implementation of technology is the Technology Integration in Schools (TIIS) model which offers educators a framework for planning and preparation for technology integration in schools. This model allows educators to reflect on what components are necessary before implementation in order for the technological initiative to be successful. Some of the components educators should consider prior to technology integration are the following: finance, equipment, planning and policies, and maintenance and support. Once these aforesaid components of the TIIS model have been considered and proposed, then the TIP model can be used to monitor and evaluate the implementation of technological integration. The TIP model contains five phases to successful integration. These five phases are as follows:

- Determine advantage

- Decide objectives and assessments
- Design integration strategies
- Prepare instructional environment
- Evaluate and revise

The TIis and TIP models in Figure 2.1 are designed to occur in two phases. The TIis model is designed for schools to use when planning for technology integration. The TIP model is intended to be used by educators to assess the implementation of technology in schools.

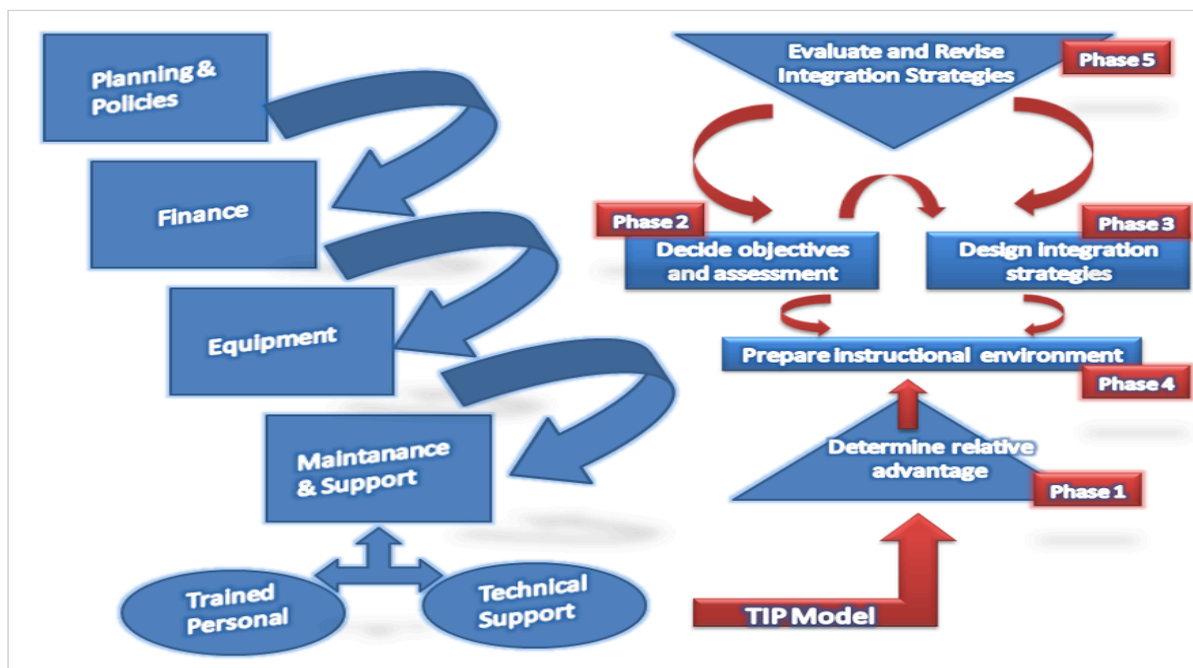


Figure 2.1

The TIis and TIP Integration Models

One additional model, TPACK, was created to help educators implement technology in their classrooms successfully. This model is developed around three concepts necessary for teachers to utilize in order to successfully implement technology in instruction. Pedagogical

knowledge, content knowledge, and technological knowledge are not only independent concepts, but also rely on each other interdependently as well.

Pedagogical knowledge refers to the practices and processes related to teaching and learning. This portion of the model is inclusive of student learning, classroom culture and climate, implementation of instructional practices and assessment. The technological knowledge portion of the model relates to an ever-evolving sense of knowledge about technology. Because technology can quickly become outdated, it is important that educators constantly evolve their thinking and knowledge of technology for implementation. The content knowledge portion of the model is the concept that educators have a deep understanding of the subject matter they teach. This encompasses ideas, concepts, theories, and organizational frameworks within the discipline taught (Koehler & Mishra, 2008). The TPACK model, referenced in Figure 2.2, is used in research to refer to the different aspects of knowledge required for successful technology integration into educational classrooms.

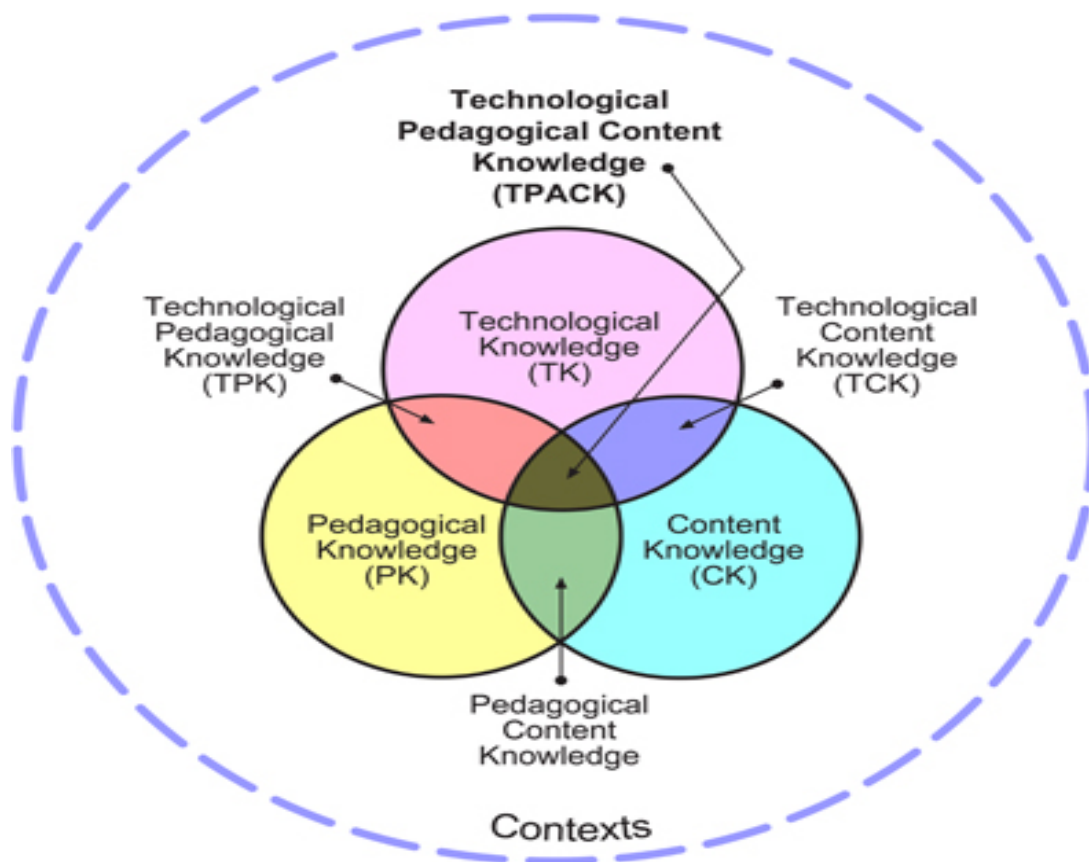


Figure 2.2

The TPACK Integration Model

Finally, The Pedagogy Wheel, Figure 2.3, was developed by Allan Carrington (2012). It combines the New Bloom's Taxonomy which has been revised to reflect the cognitive complexity an individual develops when learning. Bloom's Taxonomy begins with remembering and understanding, then applying and analyzing, and finally evaluating and creating. The wheel then aligns action verbs of the skills that students would demonstrate for each level on the taxonomy. Next the wheel includes student activities aligned to the action verbs and taxonomy levels. Finally, technology applications are aligned to each of the aforementioned. The technology "apps" allow teachers to quickly access resources for each level of learning on the taxonomy, and know the skills the students will demonstrate in activities (Carrington, 2012).



Figure 2.3

The Padagogy Wheel

Students' Communication and Social Skills

As technology becomes more of a seamless part of everyday life, research suggests that students' communication and social skills are changing. According to Anderson and Rainie (2011), their study indicated that people younger than 35 who've been exposed to technology since birth suffer from shorter attention spans, decreased patience with others, and changes in communication. "Communication in all forms will be more direct; fewer of the niceties and supercilious greetings will exist. Idle conversation skills will be mostly lost" (p. 12). However, not all research on this younger generation's social skills and communication is negative.

Schrum and Levin (2009) found that students today multi-task. They communicate online with friends, other students, parents, and teachers. They have a larger group of peers due to chat rooms and social networking sites. Their communication is constant. Prensky (2012), states that “this generation is much better than we adults ever were at communicating, sharing and teaching each other” (p. 113).

Additionally, Trainor (2012) states in his research that technology has impacted people’s technology skills and has also impacted business in using “new social skills” to improve business revenue and marketing. He concludes that technology has allowed individuals to network with many other individuals in less time and to provide for more interactive dialogue. In addition, it allows for co-creation between consumer and creator as well as reaching a global network and receiving feedback. However, Smith found in her study on social aptitude and technology use interesting conclusions regarding gender and race. In her study, in general, males had a higher perception of social aptitude than females. Another interesting finding was that nonwhites had a higher social aptitude than whites (Smith, 2012).

The Philosophy of Technology

Because technology is an omnipresent tool for human use in the 21st century, research on the philosophy of technology has become increasingly important. Inclusive in the research on the philosophy of technology is the following: the definition of the philosophy of technology, the sacrifices and trade-offs of technology, as well as decisions concerning technology (Kruse, 2009). The philosophy of technology is defined not only inclusive of the use and dimensions of technology, but also the human activities, knowledge, creativeness, and systems associated with technology (Kruse, 2009). According to Arthur (2009), technology and science are not one in the same but drive one another- a symbiotic relationship between the two. He claims that

technology evolves based on the recombining of already existing technologies all driven by humans (2009). Humans drive the systems associated with technology. Paredis (2010) states that humans have the potential to use technology to help improving peoples' living conditions and improve economic world problems.

Kruse (2009) argues that although humans may be responsible for the creation new technologies, it is technology itself that has led to problems for humans. He claims that "not only has our definition of knowledge changed due to technology, but also the manner in which we receive information has changed" (2009, p. 5). He argues that humans have become accustomed to "Googling" immense amounts of information, but the depth of their knowledge about concepts, topics, or ideas is lacking. Additionally, Kruse (2009) claims that technology has decreased humans' interaction with diverse populations. He states that technology, "rather than opening people's minds, people have seemingly become more entrenched in the one-sided views" (p. 4). Paredis (2010) also argues that "technology is overwhelmingly interpreted as a tool by the mainstream of the sustainability debate, malleable for human use and employable in every context" (p. 209). However, technology has isolated humans' thinking, opinions, and much more one-sided in debates and arguments (Kruse, 2009). Although Kruse (2009) and Paredis (2010) argue the positive and negative aspects that technology has had on humans, Arthur (2009) asserts that he hopes technology is something that will define humans and their control over various technologies will extend humanity rather than end it.

Barriers to Success

Much of the research also detailed the challenges to implementing a one-to-one computing program. Not only does the cost of implementing a technology program become a major factor for beginning such an initiative, but also other challenges do exist as well. In their research study

detailing recommendations for one-to-one computing programs, Hew and Brush (2007) not only found that sustainability and resources were a barrier to this initiative, but also that teachers' and students' knowledge and skills, attitudes and beliefs of students and teachers, assessment practices, and the culture and climate of the institution could also be obstacles. These barriers posed the greatest threat to a successful one-to-one computing initiative. Bielefeldt's (2006) research supports Hew's and Bush's (2007) findings but adds a few more challenges to the implementation of this initiative. Bielefeldt (2006) contends in her findings that the infrastructure of the school, including the lack of charging stations for computers in buildings and the lack of technology savvy staff to alleviate problems can be a barrier to success, as well as the absence of an evaluation tool to determine the effectiveness of the one-to-one computing program. Overcoming these additional barriers is crucial to the success of such an initiative as one-to-one computing.

Costa (2012) states the most important barrier of all is that of control. He claims that the fear of losing control becomes a barrier when integrating technology.

People [teachers] in these roles could once depend on their control of important information as a guarantee of future employment and status. Those that are still in business have come to realize that to remain viable, they must provide value and service beyond facts. (p. 84)

To address this barrier of control, Costa (2012) proposes that the role of the teacher be redefined to that of a facilitator working in collaboration with students as they explore problems, use innovative ideas to solve the problem, and present their findings in creative ways.

Balanskat et al. (2006) in their qualitative review of studies of technology integration in European classrooms classified three levels of barriers to technology integration in their study

that examined studies of technology integration in European schools. These levels were teacher, school, and system barriers. Balanskat et al. (2006) describes the teacher level barriers as inclusive of the following: lack of technological skills, lack of motivation and confidence, and inadequate training. Pelgrum (2001) corroborates these findings in his quantitative research consisting of a world-wide survey about the obstacles of implementing technology in secondary classrooms. His research also indicates that teachers felt a lack of knowledge and confidence or time when trying to integrate technology into the classroom. Finally, Ertmer (1999) refers to these same levels of barriers but labels them as intrinsic barriers. She cites similar examples such as teachers attitudes, beliefs, practices and resistance to change.

The school level barriers that were cited in Balanskat et al.'s (2006) research included lack of quality technological infrastructure, lack of quality hardware and software, lack of access to technology, and inadequate professional development on integration of technology in classrooms. Pelgrum's (2001) research also identified barriers that indicated a lack of real or physical equipment. In addition to the aforementioned research studies, Ertmer (1999) also refers to barriers that are intrinsic as first order barriers. She indicates the same examples such as lack of time, support, resources and training as do Balanskat et al. (2006) and Pelgrum (2001).

Balanskat et al. (2006), however, added a third barrier which involves the educational system as a whole. This level consists of barriers affecting the educational organization as a whole. These barriers include lack of flexibility in structure due to the traditional school framework, including classroom structure, as well as high stakes state and national testing.

Another barrier that must be overcome is the mentality that "one size fits all." Costa (2012) reports that "[b]orn out of the school-efficiency factory model and then entrenched by an earnest yearning for equitable treatment of all students, this mental model is as set in ideological

cement as any in the public school community” (p. 92) To counter this barrier, Costa (2012) claims that individualized coaching and differentiated learning is critical.

A final barrier that Costa (2012) addresses is the avoidance of risk. He reports that many school districts install such restrictive security on the technology that students are prohibited in what they can learn, create, and problem-solve. He proposes that districts reverse many of the “zero risk” policies that exist stating what students can’t do, to more lenient policies that don’t punish an entire population but a singular person for violating such policy. The focus should be on responsible use of technology, not prohibited use (Costa, 2012).

Summary

The increasing number of one-to-one computing programs has had dramatic impacts in education. Student use of computers as well as motivation and engagement have all been positively affected by technology integration in the classroom. Student achievement has also been impacted due to technology. In addition to the student factors, teaching practices, as well as teachers’ knowledge and attitudes, have been directly impacted by one-to-one programs. Research has found that to impact teaching practices, as well as their pedagogy with technology, professional development is critical. Equally important to the aforementioned, there have been many challenges to consider and overcome when instituting a one-to-one initiative in education.

When discussing the one-to-one computing initiative, further research needs to be conducted. Areas that need to be considered are as follows: longitudinal studies in the area of the professional development of teachers when implementation begins, researching the sustainability of such a program for the purpose of longevity, conducting more studies on the effects on student achievement, especially in high poverty areas, high minority schools, and researching more effective evaluation practices of one-to-one computing programs.

Chapter 3

METHODOLOGY

The Qualitative Research Paradigm

The purpose of this study was to understand the lived experience of a secondary teacher in a one-to-one computing environment (Moutaskas, 1994). My fifteen years in secondary education have always included technology integration. However, in the last several years, more and more schools have initiated a one-to-one computing environment. I have visited several districts and schools that have implemented one-to-one classrooms and was also part of a staff that implemented said initiative. This has fed my interest in seeking to understand other teacher's perspectives with implementing these technological environments. Because I was interested in a teacher's experience and perspective of teaching in a one-to-one environment, the appropriate approach to my study was a qualitative design. Qualitative research occurs in a natural setting, uses multiples sources of data; uses the researcher as the data collector; inductively analyzes data; focuses on the participants' experiences, problems, or encounters; and has a design that emerges as the study is conducted (Creswell, 2009). Because I was interested in understanding the phenomenon of teaching in a one-to-one environment, a phenomenological approach was used.

When using a phenomenological approach, Moustakas (1994) claims that the researcher must be more focused on the descriptions of the experiences as told by the participants rather than on the researcher's own interpretations. Furthermore, Moustakas (1994) also concentrates on epoch or bracketing. This requires "investigators to set aside their experiences, as much as possible, to take a fresh perspective toward the phenomenon under examination" (p. 59-60). Because I have had much experience with one-to-one environments, as well as the extensive

research I had conducted in my literature review, it was imperative that I “bracket” (Creswell, 2007) my own experiences, assumptions, and thoughts throughout this process in order to have an authentic understanding of the participants’ experiences teaching in this technological environment through “rich, thick description” (Geertz, 1973) allowing for the research to be more “trustworthy” (Merriam, 1998).

In order to develop a quality qualitative research design, four basic elements had to be included and aligned in my study in order to justify the appropriate research approach. These elements included an epistemology, theoretical perspective, a methodology, and methods used to collect data (Crotty, 2010). Guba (1990) states the epistemology, or worldview, “is the basic set of beliefs that guide action” (p. 17). The epistemology provided the theory of knowledge and beliefs entrenched in both the theoretical perspective and the methodology (Crotty, 2010). The theoretical perspective provided the philosophy that informs the methodology, justifying its foundation and the processes used. The methodology is the design used, which aligned to the methods implemented in the collection of data (Crotty, 2010).

Epistemology: Constructivism

Constructivism is defined as “focusing exclusively on ‘the meaning-making activity of the individual mind’” (Crotty, 2010, p. 58). Through interactions, observations and experiences, the individual constructs meaning from the aforementioned. The researcher, thus, must look at the complex meanings to inform his or her research. “The goal of the research, then, is to rely on as much as possible on the participants’ views of the situation. Often these subjective meanings are negotiated socially and historically” (Creswell, 2007, p. 21). It is imperative that meaning is formed through interaction with individuals and from the norms in which these people live (Creswell, 2007). Because a constructivist epistemological foundation requires the researcher

and participants to construct meaning of the experiences the participants encountered, this epistemology is appropriate since I sought to understand teachers' experiences with teaching in a one-to-one computing environment.

Theoretical Perspective: Interpretivism

Because the theoretical perspective is embedded in the epistemological approach, it's important to recognize its importance in qualitative research. According to Crotty (2010), the theoretical perspective "is the philosophical stance lying behind a methodology" (p. 66). The assumption is that by having people in their social contexts, the better the opportunity to understand the experiences and perceptions they have of their experiences (Hussey & Hussey, 1997). Interpretivism is an appropriate perspective for this study because I interacted with the participants being studied in their own social contexts through multiple methods in order to better interpret the meaning of their experiences (Crotty, 2010).

Methodology: Phenomenology

A phenomenological approach to research "describes the meaning for several individuals of their lived experiences of a concept or phenomenon" (Creswell, 2007, p. 57). The human experience or phenomenon being studied allows the researcher to collect data from several participants who have had the same experience and develop a common description of the experience from all of the participants to describe the true essence of the experience (Moustakas, 1994). Phenomenology has some common foundations on which it rests. They are "the study of the lived experiences of individuals, the idea that these experiences are conscious experiences, and the description of these experiences at their core, not explanations or analysis of the experiences" (Moustakas, 1994; van Manen, 1990).

Methods

Data Collection

For a phenomenological study, it is imperative that all participants in this study had experienced the phenomenon of being examined and could describe in detail his or her lived experience (Creswell, 2007). “Purposeful sampling” was appropriate for this study because it allowed for particular participants to be studied and provided data towards an evolving theory (Salamon, 2012). It allowed me “to gather descriptive data in the subject’s own words so that the researcher can develop insights on how subjects interpret some piece of the world” (Bogdan & Biklen, 2007, p. 103). Because Creswell (2009) states “the idea behind qualitative research is to purposefully select participants of sites...that will best help the researcher understand the problem and the research question,” specific criteria was developed for the selection of suitable participants. (p. 178).

To find suitable participants for my study, purposeful sampling (Creswell, 2007) was implemented when choosing participants for this study. Purposeful sampling involves selecting participants who can intentionally inform the researcher of the phenomenon being studied to develop a clear understanding of said phenomenon. This sampling began by using the Center for the Advanced Study of Technology Leadership in Education (CASTLE©) website. This website was used as a screening device to locate districts in the Midwest that were currently a one-to-one school and district. Information for CASTLE© is widely distributed at <http://schooltechleadership.org>. The website allowed me to narrow down choices of districts and schools to study and offered me the choice of schools that were closer in proximity to where I live. Additionally, the narrowed list of schools were more easily accessible based on colleagues

with whom I am familiar, because said colleagues were able to assist me in gaining access to teachers and students for this study. After narrowing down my list of accessible, nearby schools from the CASTLE© website, I spoke with three administrators in three different buildings. By using multiple sites with numerous participants in various settings, my study could be transferred to a larger population. In addition, transferability was ensured based on the use of multi-site designs to increase the differences in the selected sites (Merriam, 2002).

By using “snowball” sampling, I used three different administrators as gatekeepers (Creswell, 2007) in order to provide recommendations for and access to teachers in their buildings who might be interested in participating in this study. Snowball sampling “identifies cases of interest from people who know people who know what cases are information-rich” (Creswell, 2007, p. 127). I was seeking to interview eight participants. During the conversations with the administrators, I detailed the criteria for participation in the study, which included at least one year of teaching experience in the secondary classroom, and the fact that the discipline in which the teacher instructed would not be part of the criteria. Participants should believe that one-to-one computing had an influence on their teaching and be willing to participate in an interview and an online survey. I also informed the administrator that participation in the interview and online survey could be stopped at any time if a participant chose to withdraw.

Prior to beginning the data collection process, it was imperative that I set aside my bias and bracket (Moustakas, 1994) my thoughts about the topic at hand. Because I’ve been involved with schools planning to implement the phenomenon of which I speak, I believed I had to explore my own responses to the research interview questions prior to engaging participants in interviews. I also felt it was necessary to take the online survey in order to not only pilot the questions asked, but to ensure that my bias were revealed. Thus, by expelling my responses and

thoughts prior to the data collection process of my participants, I was more able to separate or bracket (Creswell, 2007) my biases from the responses given by those whom I interviewed.

Once recommendations of teachers were received from building administrators, I contacted the recommended thirteen teachers via email and phone calls. During the emails and phone calls, I informed participants of the criteria involved for participation in this study, including outlining the Interview and Online Survey Consent forms (Appendix B) so that participants could clearly understand that the interview would occur prior to taking the online survey. In addition, I explained their options with participation, and assured each participant that their information would be kept anonymous and be stored on a password protected personal laptop. When a teacher agreed to participate, I informed the participant that I would give them the informed consent form, and after each participant's signed consent form was received, a scheduled interview would take place. Following the interviews, each participant would be sent via email the link to the online survey. All hard copies were kept and stored in a locked file cabinet. After contacting the thirteen recommended teachers, eight teachers agreed to participate in this study.

An explanation of the interview and online consent form (Appendix B) for the data collection process included the fact that a participant could withdraw from the study at any time. In addition, I offered a copy of the interview questions (Appendix A) prior to the interview. Once approval to participate was given via email or phone call, I then set up appropriate times to interview each participant outside of the working day at a location of their choice. The participants were provided with a copy of their signed interview and online consent form. For the online survey, the participants kept a copy of their online responses and agreed to consent again when taking the online survey. At the completion of the interview and online survey, the

participants were given a five dollar coffee card as compensation for their participation in the study.

Risk Factors

There were minimal risk factors involved for participating teachers. Possible risks included the time spent by busy teachers to participate in an interview or the potential of reflecting on a lesson that didn't go as expected when using one-to-one technology. The added benefits included adding to the current research on one-to-one computing and its impact on teacher instruction. In addition, this study provided these participating teachers a better understanding of their own teaching with technology in order to improve and enhance their own instruction.

Description of Participants

Although many of the participants had striking similarities in their experiences, each participant's teaching experiences and disciplines were unique. In order to have a clear understanding of the participants involved in the study and their work, it is important to describe said participants. I interviewed eight secondary teachers in three rural and suburban schools in the central Midwest. Of the eight teachers interviewed, two were females and six were males. Four participants teach in schools with enrollments of 101 to 200 students, while five participants teach in buildings comprised of over 200 students.

Five of the teachers have been teaching for as little as two years to as many as ten years. Three teachers have over ten years of teaching experience, and one participant has been teaching for over twenty years in education. The disciplines taught included courses in mathematics, social studies, science, and English. Further participant information will be explained as the recurring themes are discussed.

The interview process, which at first seemed daunting, was very interesting and insightful. After obtaining a suitable sample of participants, I included in my chain of emails to said participants my affiliation to Drake University, my connection to the gatekeepers, and the purpose of my study. I emphasized the anonymity that would be ensured throughout the entire interview and online survey, but I also guaranteed each teacher that pseudonyms would be used in place of his or her real name throughout the process as well to ensure confidentiality. Each participant was emailed Appendices A and B, as well as the link to the survey prior to the interview taking place. I did all of my own transcribing after each interview occurred.

Because of the nature of the phenomenon being studied, I chose to Skype© the interviews with participants and all participants agreed. Online interviews are supported by Salmons' (2010) research in *Online Interviews in Real Time*. Salmon's states, "Online interviews allow researchers to better understand the participant's cyber experience" (para. 3). This finding is also supported by Lester (1999) who pronounces that phenomenological research is a methodological way to understand the human experience from the participant's perspective, thus doing online interviews was appropriate for this study. Additionally, "Researchers may choose online interviews to honor the principle that 'research questions that explore an online phenomenon are strengthened through the use of a method of research that closely mirrors the natural setting under investigation'" (Salmons, 2010, para 3). Each participant, because they were teaching in a one-to-one school, was very familiar with this communication tool. Interviews were conducted at the convenience of each participant outside of the working day. Most interviews took place after the teaching day had ended at their school, but a few interviews were conducted early in the morning before the workday began in the participant's home. Although I was nervous at first and feared the technology we were using might cause a barrier, each interview

went very smoothly, and at the conclusion of each interview, I felt a strong rapport with each teacher and a shared passion for technology integration into the classroom.

As each interview began, I thanked the participant for participating in my study. After such, I once again, explained the purpose of my study and asked if there was any more clarification needed, which no participant needed, and I again went through the clarification of anonymity. I further explained the use and importance of pseudonyms and clarified that each participant would receive a copy of his or her transcribed interview to ensure the comments were, indeed, stated correctly and justly, thus, ensuring member checking (Creswell, 2007). The pseudonyms are as follows: Jim, Deacon, Lonnie, Bob, Carl, Nate, Holly, and Fanny and were provided to ensure confidentiality.

Jim, a thirty-six year old teacher, has taught social studies at three different high schools prior to his current district and has been teaching for 14 years. He has enjoyed his small district and has no plans to change districts. He has taught a range of course including AP History, US History, Economics and Geography. He has also coached track because of his love for the outdoors. Jim's interview took place via Skype© in the morning at his home because inclement weather had canceled school for the day. Jim conducted the interview from his family room, and at times, he needed to pause the interview because his two young children were at home; however, these breaks in the interview didn't inhibit Jim's sharing of his experience or the answers given to the research questions. His interview lasted forty-five minutes.

Deacon, a thirty-eight year old science teacher with fifteen years of experience, has been at his current school for ten years. He spent two years in the genetics field but felt that education was a better fit for him. He teaches various high school science courses and has a range of students from seniors to freshmen. His interest in technology stems from the fact that he

completed his Master's degree in technology. This has added to his experience with teaching in a one-to-one classroom, and he enjoys teaching in a smaller, rural school because he knows the students and can establish relationships with them much easier with smaller classes and fewer students. Deacon's interview took place via Skype© prior to the school day starting. The online interview was done in his classroom and lasted an hour.

Lonnie is thirty-two years old, in his tenth year in the classroom and teaches mathematics in high school. The courses he teaches range from several sections of Algebra I to a few sections of Geometry. This is his first year teaching freshmen and sophomores, and this has provided a challenge for him getting used to younger students. He has been in the same district for the past five years and is content with the rural district and has no plans to change districts anytime in the near future. Lonnie's interview took place mid-morning via Skype© in his classroom at school during his planning period.

Bob is a twenty-seven year old and in his fourth year of teaching. He teaches mathematics in a rural school district. Bob moved from a much more populated state and district four years ago but says he enjoys teaching in his rural district in a small town. He has enjoyed teaching in a one-to-one classroom because he personally uses technology and wanted to integrate it into his instruction. Bob's online interview took place after school in his classroom using Skype© because he wanted to finish teaching for the day before conducting his interview.

Carl is a fifty-two year old science teacher who began his teaching career thirty years ago; however, he left the field of education a few years later to enter the business world. He decided to return to the profession last year. What is unique about Carl's professional career other than beginning in education, taking a break, and returning thirty years later, is that Carl dealt entirely with technology in his business career. He has found teaching in a one-to-one

environment, during his return to education, very familiar and exciting. Carl's interview took place after school in his classroom. He was very familiar with Skype© and very excited to be a part of this study.

Nate, a twenty-five year old science teacher in his third year of teaching, was excited to take the one-to-one computing initiative in his classroom. He has enjoyed his three years of teaching in a rural school because he personally feels he knows his students. He felt his youth and excitement about technology would aid in his implementation of said initiative. Nate's interview took place in his classroom during his planning period mid afternoon using Skype©.

Holly, one of two females in this study, is a forty-two year old and a twenty-year veteran of teaching. She has been teaching English in the same classroom, school, and very small rural district for her entire career. She claimed that not many teachers have one experience in one district their entire career, but she feels it has aided her in her teaching because of her knowledge of the students and families. She admitted to being hesitant at first with implementing one-to-one computing because her knowledge of technology was not what younger teachers nor her students have about technology. Holly's interview took place in her classroom after school also using Skype©.

Fanny, second female and final participant in the study, is a forty-two year old social studies teacher and fifteen-year veteran in the classroom, began her career in the business world. She decided to change her occupation when she realized she wanted to be around children and wanted to help them be successful in the world. She has taught in her current district for the last ten years and has no plans of leaving the district for other educational ventures. She had the opportunity to teach in a computer lab for two years prior to her school going one-to-one, so she felt that this change wasn't as difficult for her as it was for some other teachers in her high

school. Fanny's interview took place late morning during her planning period using Skype. She wanted to conduct it during her planning period because before and after school didn't work for her because she had to tend to her children. Table 3.0 provides a description of all participants in this study.

Table 3.0

Description of Participants

Jim	Deacon	Lonnie	Bob	Nate	Nate	Holly	Fanny
36 year old social studies Teacher	38 year old science teacher	32 year old math teacher	27 year old math teacher	52 year old science teacher	25 year old science teacher	42 year old English teacher	42 year old social studies teacher
14 years experience as a teacher	15 years experience as a teacher	10 years of experience	4 years of experience as a teacher	15 years experience as a teacher	3 years experience as a teacher	20 years experience as a teacher	15 years experience as a teacher
Rural district	Rural district	Rural district	Rural district	Rural district	Rural district	Rural district	Rural district

Interview Process

When conducting interviews, it was vital that confidentiality be ensured. According to Bogdan and Biklen (2007), "you briefly inform your subject of your purpose, and make assurances (if they are necessary) that what is said in the interview will be treated confidentially" (p. 103). The interviews conducted for this study were semi-structured (Bogdan & Biklen, 2007) with specific questions and sub-questions around the phenomenon; however, I allowed for

additional responses and information from the participants not related to any question asked when those responses revealed pertinent information supporting and explaining the original information given regarding one-to-one computing in the classroom.

I wanted the participants to feel comfortable in the setting in which they taught and the phenomenon occurs, in order to make the interview process as non-obtrusive and familiar as possible. At the beginning of each interview, I reviewed the Online Consent Form, discussed the interview structure, and online survey format and timeline. I then explained the confidentiality agreement included in the study for each participant and reaffirmed that his or her interview would be kept confidential and omitted and destroyed if said participant chose to withdraw at any time. These statements were made to each interviewee in order to make each one feel comfortable to share his or her experiences freely and factually.

Prior to the start of the interviews, four of the eight participants asked if they could view a copy of my finished dissertation because they were curious about the results. Upon hearing this request, I felt that it provided more legitimacy to my study. Once I had set up Garageband© on my computer to record each interview as a podcast, I secured paper and pen to record my field notes. I planned on capturing significant statements, quotes, behaviors or actions in my fieldnotes to add to the data captured in the interview and online survey. According to Bodgan and Biklen (2007), field notes provide a “written account of what the researcher hears, sees, experiences and thinks in the course of collecting and reflecting on the data in a qualitative study” (p. 118-119). I began each interview by establishing rapport. This entailed having each participant tell me a bit about themselves and their educational career. This helped to curb any nervousness on the part of the participant or myself, and also set the tone for the rest of the interview.

Each interview lasted almost an hour with none of the participants exceeding that time; some interviews concluded earlier than the allotted time period depending on how much probing I had to do to obtain rich, thick descriptions (Guba, 1994). At the conclusion of each interview, I, again, thanked each teacher for his or her participation and time given out of his or her day for my study. Each participant was very gracious at the end of the interview, and many-offered further time, if needed, for additional questions. No further time was needed with the participants. Before ending the interview, I reiterated that the transcribed interview would be sent via email to each of them as part of the “member checking” process. “Member checking” involved sending transcribed interviews data, fieldnotes, and conclusions to the participants in order to assure accuracy and credibility of each participant’s account and the researcher’s interpretations (Creswell, 2007).

Online Survey

Moreover, after each interview was completed, each participant was sent the link to the online survey (Appendix C) via email and asked to complete it within a week. I reiterated via email that participants’ information included in the online survey would be kept confidential or omitted and destroyed if a participant chose to withdraw from the study at any time. These online questions were developed using Qualtrics© and were questions directly aligned to the interview questions but were developed to gather data around additional topics about technology not asked in the interview. The questions were piloted with non-participants to ensure that the questions reflected their intended meaning and made sense and that the technology worked. The piloting of the online survey took on average around fifteen minutes, allowed for data to be displayed figuratively and provided visual representations of the participant’s responses which aided the quoted responses of participants.

Data Analysis Procedures

In qualitative research, data analysis involves organizing all data, which in my study, included transcripts and audio tapes from interviews, and an online survey. Bogdan and Biklen (2007) denote that analyzing data involves categorizing data into subcategories, coding the subcategories based on common themes, and searching for commonalities. Creswell (2007) details a data analysis process that allows researchers to analyze, evaluate, and synthesize data in a manageable and meaningful way. After all data were collected, I looked at interview transcriptions, field notes taken during interviews, and data and notes taken from the online survey in order to begin my data analysis. By using the process of open-coding (Creswell, 2007), where there are no predetermined themes (Esterberg, 2002), themes for this study were identified by using a three iteration coding process. Through examination of the significant statements that individuals made, the commonalities among the participants' experiences were revealed. Because this is a continual process of analyzing and finalizing themes, multiple iterations were necessary to finalize themes that were extracted from the data (Creswell, 2009). These iterations are referred to as constant comparative analysis (Glaser & Strauss, 1967) because the data are compared and categories emerge from the data into themes and eventually condensed into the most essential and important themes (Anfara et al., 2002).

According to Polkinghorne (1989), it is important to detail how the researcher transitions from his or her data collecting to representing the data in descriptions of the experiences. To accomplish the aforementioned, I adhered to what Alvesson and Skoldberg (2000) referred to as having the researcher engage in repetitive, deep reflection with the data allowing for prolonged interaction with the data; furthermore, these processes lead to meaningful interpretations of the data because of reflecting on the written descriptions garnered from the data. Anfara et al.,

(2002) explains, “interpretation requires acute awareness of the data, concentration, and openness to subtle undercurrents of social life”.

To truly capture my participants’ experiences in my written descriptions, I included rich, thick descriptions (Geertz, 1973) of behaviors, actions, phrases, or other important data. Polkinghorne (1989) states that researchers should “produce a research report that gives an accurate, clear, and articulate description of an experience. The reader of this report should come away with the feeling that ‘I understand better what it is like for someone to experience that’” (p. 46). Throughout the entire data analysis process, it was important that I created an audit trail (Creswell, 2007). Carcary (2009) details that, “audit trails document the course of development of the completed analysis. In developing an audit trail, a researcher provides an account of all research decisions and activities throughout the study” (p. 15). In addition to the audit trail, the multiple iteration coding process didn’t involve technology. The data was coded using different colored highlighters when reading the transcribed interviews. Furthermore, different colored sticky notes were used to categorize and condense possible themes during the multiple iterations.

Data Analysis Coding Process

After all interviews were completed, transcribed, and sent to participants, no participant requested any changes to the documented interview; thus, my data analysis could ensue. During each interview, I took copious field notes. In addition, while taking notes, when any participant would make a comment that I felt reiterated other participants’ comments and could develop into a theme, I circled and highlighted it. This process proved helpful in the analysis of the online survey and transcribed interviews. After looking over my field notes, I analyzed the transcribed interviews. On first read, I highlighted portions that I felt exemplified the experiences each

teacher had or any insightful comments made by the participants. After the initial readings, I reread each transcribed interview three more times, each time with a new color of highlighter. This process allowed me to see the comments highlighted multiple times and possible themes emerging. At the completion of the multiple readings, I then used yellow sticky notes to write down all possible themes and categories. I used the yellow sticky notes and reexamined my field notes and transcripts again. However, this time I used new, blue sticky notes that I placed next to each yellow sticky note as I condensed categories and themes. This process occurred two more times with green and then finally pink sticky notes until I condensed and finalized the data into six themes. Each theme was represented by at least one quote from participants (See Appendices D and E).

Data Verification

According to Merriam (2002), qualitative research is about understanding the perspectives of the participants involved and examining the complex nature of human behavior and then presenting the researcher's interpretation of the studied phenomenon. To ensure that my study was trustworthy, I collected several different types of data, which allowed for triangulation. Creswell (2002) argues the following:

Triangulation is the process of corroborating evidence from different individuals, types of data, or methods of data collection....This ensures that the study will be accurate because the information is not drawn from a single source, individual, or process of data collection. In this way, it encourages the researcher to develop a report that is both accurate and credible (p. 280).

Triangulation occurred by using multiple participants, multiple data sources, multiple ways of collecting data, prolonged time spent in the field, and peer review (Merriam, 2002; Bogdan &

Biklen, 2007). In addition, a peer review was conducted by colleagues on my doctoral committee to provide for further, objective interpretations of my findings, and to ensure my study's credibility (Anfara et al., 2002).

In order to guarantee transferability (Anfara et al., 2002) of my study, rich, thick descriptions (Geertz, 1973) were used to describe and inform readers of each participant's experience and the true essence each one had with his or her one-to-one experience.

Dependability in qualitative research refers to whether a study can be replicated and obtain the same findings, and confirmability denotes that the results of a qualitative study can be confirmed by others (Anfara et al., 2002). The dependability and credibility of this study was guaranteed through the audit trail, coding strategies, triangulation of data, reflexive interpretations, and peer debriefing.

Confidentiality and Consent

My data were managed using my computer, which is accessible, only to me. It held my transcriptions, fieldnotes, and survey results. This allowed for access to my data, anytime and anywhere. The data were secured by password protection and backup to "cloud services" with password protection. The computer was kept at my personal home to limit the number of people who had access. In addition, all participants were given pseudonyms to protect their identity (Bogdan & Biklen, 2007). Furthermore, an Informed Consent Form (Appendix B) was given to each participant prior to completion of the interview and online survey, outlining the purpose of the study, criteria for selecting participants, the data collection and analysis methods inclusive of IRB contact information, and my contact information. The IRB document also indicated that any person involved in this study had the right to end their participation in this study at any time with no consequences. His or her data would be excluded from the study and destroyed when the

participant indicated his or her desire to withdraw from the study. In addition, the informed consent form also stated the minimal risks involved and the benefits to participating because of the addition to the research that exists in education around one-to-one research. It was affirmed that all data would remain confidential. After three years of completion of this study, all data from the laptop computer that is password protected will be destroyed along with all hard copies stored in a locked cabinet.

Ethical Considerations

According to Merriam (2002), “a ‘good’ qualitative study is one that has been conducted in an ethical manner.” This ethical process began with getting approval from the Institutional Review Board at Drake University to ensure the safety of all participants in the study. The participants experienced very little, if any, risk. The following are measures that were taken to ensure the study was conducted in an ethical manner:

- Participants were informed that involvement in this study was strictly voluntary, and if at any time, they could withdraw.
- Pseudonyms were used in place of each participant’s name in the dissertation and in any raw data to ensure confidentiality of all participants
- Participants were informed, before and during the interview, that questions could be skipped if the participants did not want to respond to it
- Participants voluntarily provided documents for review but did not have to do so if they didn’t deem it appropriate

Delimitations

With all research studies, delimitations exist. For this study, I narrowed my focus of research based on the locations I chose to study. My teacher participants also helped to control

the focus of my study and the requirements I imposed. For example, I chose not to include first year teachers or those retiring and the end of the year in which this study took place. I also chose to concentrate on secondary high schools because the majority of schools and districts who have implemented one-to-one are at this level, and it also helps to concentrate my research study on a particular population.

Limitations

All researchers are faced with limitations to their studies. It is important to include these limitations in the study because they may restrict the outcome of the study, but these limitations cannot be controlled by the researcher. The limitations to my study included the types of technology used by the teachers and the school building in which they teach. In addition, the amount of professional development time the teachers had with technology and the budget allowed for professional development and money to purchase technological resources cannot be controlled by the researcher. Also, the Midwest location that I have included in my study can not be controlled and may impact the findings in my study.

Summary

This chapter outlined the methodological approach for this study including its constructivist's epistemology, interpretivism's theoretical perspective, and the phenomenological method. In addition, it detailed the methodology that was used in conducting this study which included online interviews and an online survey. The data analysis procedures consisted of open-coding and multiple iteration process that took place in order to determine the significant themes that were divulged from the participants. It was noted that confidentiality was explained and reiterated so each participant knew that he or she could withdraw from the study at any time and his or her data would be excluded from the study and destroyed. Each participant

signed an informed consent form indicating his or her interest in participating in this study as well as outlining the requirements involved for participation. Triangulation was achieved by using multiple sources of data and member checking occurred because each participant received his or her transcribed interview to ensure that the intended meaning of what he or she stated in the interview was captured. The delimitations of this study were the exclusion of first year teachers and those retiring at the end of the year. Additionally, this study focused solely on secondary high school teachers. Finally, the limitations of this study were the types of technology used in the classrooms of the participants, the professional development planned for these schools, and its Midwest location.

CHAPTER FOUR

FINDINGS

The purpose of this study was to investigate one-to-one teaching environments from a teacher's perspective in order to understand the impact a one-to-one environment has on instruction. As more and more schools and districts look to implement one-to-one classrooms, it is important to study the experiences other teachers have had in such environments in order to help future schools and districts improve one-to-one computing by leveraging the beneficial impacts these environments have on instruction, while avoiding the adverse effect such an environment might have on both teachers and students.

The information in this chapter represents my findings of teachers' experiences in a one-to-one environment and said teachers' thoughts about its impact on their instruction. The following data represents transcribed conversations with eight teachers in rural schools in the Midwest acquired through the format of interviews around the grand tour research question: "From a teacher's perspective, how has instructing in a one-to-one environment impacted your teaching?" In addition to interviews, these teacher participants were asked to also complete an anonymous online survey that complements questions asked in the interview. The responses have been carefully analyzed and coded through iterative examinations to produce six common themes.

Eight semi-structured interviews were conducted in a location of each participant's choosing. Interview questions, as well as the link to the online survey, were sent via email to each participant ahead of the scheduled interview. I asked each participant to complete the online survey within a week of receiving the link. Member checking was conducted to ensure that each participant's transcribed interview reflected each person's true experience.

One-to-One Technology and its Impact on Teaching

My findings from my interviews and online surveys with teachers revealed six themes that eight teachers experienced when teaching in a one-to-one environment and the impact that environment had on their teaching. By exploring these six themes, readers of this study will be able to decipher the positive and negative impacts one-to-one classrooms have on instruction. The six themes that developed from my data analysis are referenced in Figure 4.0 below.

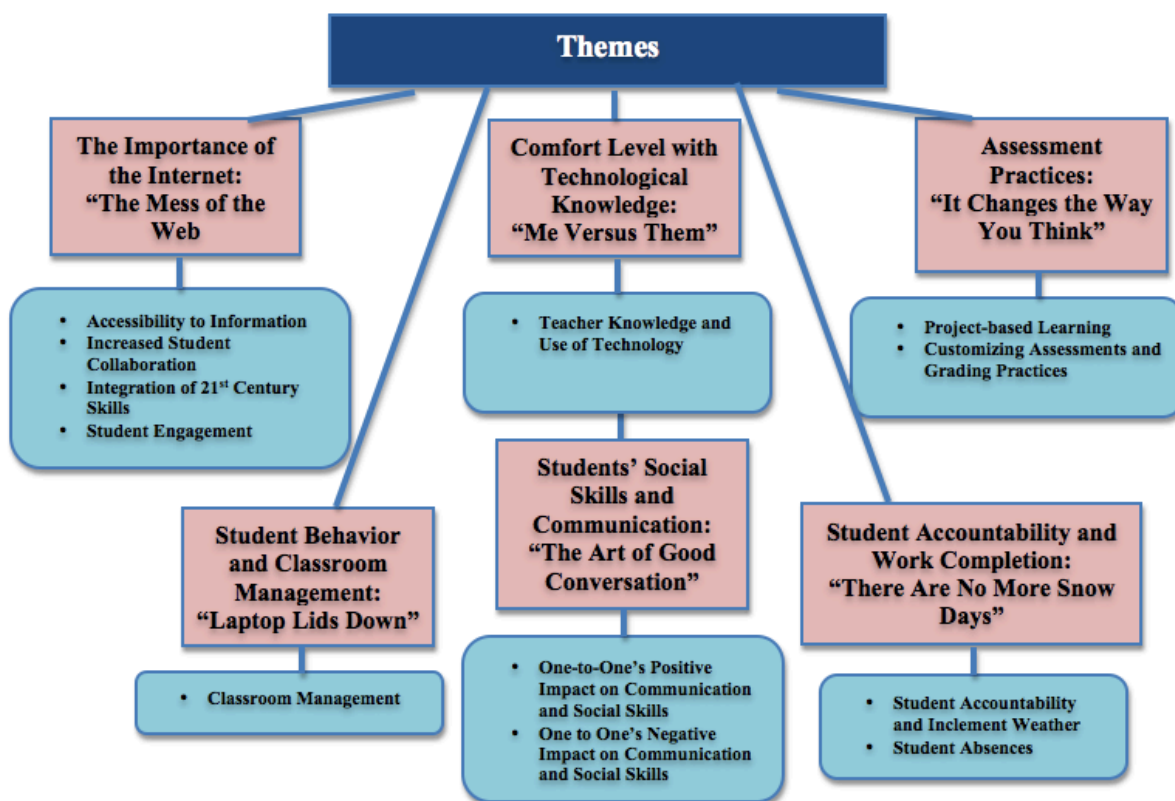


Figure 4.0.

Final Iteration of Coding Results

1. Comfort Level with Technological Knowledge: “Me Versus Them”
2. Importance of the Internet: “The Mess of the Web”
3. Students’ Social Skills and Communication: “The Art of Good Conversation”

4. Student Behavior and Classroom Management: “Laptop Lids Down”
5. Student Accountability and Work Completion: “There are No More Snow Days”
6. Assessment Practices: “It Changes the Way You Think”

These themes provided an understanding of the experiences teachers encountered when teaching in a one-to-one environment and the impact this environment had on instruction.

Comfort Level with Technological Knowledge: “Me Versus Them”

A clear theme that was revealed by all eight participants was the knowledge and comfort level with technology that each teacher had was far surpassed by that of their students. Although all participants acknowledged the aforementioned, some were comfortable with their students having more experience and knowledge about technology, while others expressed their discomfort with students’ technological knowledge.

Teacher Knowledge and Use of Technology

All of the teachers corroborated what research has stated for years. Prensky, back in 2001, claimed that students processed information and thoughts differently than prior generations. This change in thinking and processing patterns is all due to the students’ exposure to technology since birth. Of the eight teachers interviewed, six expressed that they understand that today’s students know more about technology than they do, and they were comfortable asking their students for help in using technology. This has impacted their teaching by having a more collaborative relationship with their students because they understand they won’t be the experts in technology use. Lonnie stated:

Yeah, I wasn’t as scared of the technology. You know, some teachers were worried that the kids would know more about the technology than they knew. I think that you just

have to accept that. These kids are more tech savvy than even some adults who are pretty good at the technology. And you have to let the kids teach you.

This is further supported in Mouza's (2008) research that indicated teachers stated in interviews, "over time, we learned to rely on our students for technical support since they were frequently very much quicker in picking up technology skills" (p. 464).

Deacon expressed comfort with his students' knowledge of technology far exceeding his own, and the impact it's had on his teaching. Deacon stated, "I don't spend time with the 'sit and listen to me' approach any more: I'm the expert, and you need to learn from me. There has been more collaboration because of what they know about technology, and what I know about science." In addition, Deacon expressed his acceptance of students' knowledge of technology.

You know, kids are always going to be ahead of the technological curve instead of us knowing more than them. They will always be able to do more than I can and quicker, regardless of how well trained I am. That's just the nature of the kids. I don't mind asking them for help. That's the world we live in now.

This sentiment is further supported in Lei and Zhao's (2008) research findings. They state that when teachers began acknowledging students' superior knowledge about technology, the teachers' comfort level with asking for help in using the technology increased.

Although all eight participants stated they knew students' knowledge of technology is greater than their own, two participants expressed some intimidation regarding their daily reality. This feeling of intimidation has impacted their instruction by pushing their flexibility and adaptability, which at times, causes them to feel uncomfortable. It should be noted that the two participants that expressed intimidation, were the only female participants. The first female, Holly, detailed her hesitation of teaching in this type of environment.

Well, I think as far as instruction, I find that I'm teaching outside of my comfort zone a lot more because, rather than teaching about English. I sometimes feel as if it's me versus them. You know, before you- - the teacher always is sort of the authority and knows stuff and things. And, you know, if I didn't know something, I would tell them, I don't- - I don't know, you guys. But with this technology, you don't want to seem like you don't know how to do something because- - well, if you don't know how to do that, how can you know anything about English? So I- - it made me uncomfortable, but in an uncomfortable I-don't-want-to-give-away-that-kind-of-control sort of thing.

Fanny, the other female in this study, expressed the same intimidation and lack of comfort with the students knowing more about technology than she. She states:

It can be really intimidating, and I have to even admit, when I had to ask students for help, that was uncomfortable at first because we are supposed to be the experts. And so, to have to ask a kid, okay, I need help editing this iMovie, you know, that's tough. I had to get used to it, but now it doesn't bother me, and now, I have a greater respect for them, I mean, now I go to them and say, 'I don't know how to do this, will you help me out?' because I know they have more knowledge about the technology piece than I do.

As participants detailed their familiarity with Holly's "me versus them" mentality about lacking knowledge about technology versus their students, it was interesting to see that all six of the male participants acknowledged the knowledge gap but didn't feel uncomfortable about that gap. However, the two female participants stated an intimidation and lack of comfort with asking students for help because they both felt their expertise in their discipline might be questioned.

Importance of the Internet: “The Mess of the Web”

The second theme that evolved through my data analysis was how the “Mess of the Web” and its importance has impacted their teaching practices. This theme materialized when Deacon used this phrase to describe all of the opportunities technology offers teachers. The “Mess of the Web” became a theme that involved participants’ discussion about the importance of technology’s impact in the classroom. That importance included the following: accessibility, collaboration, 21st century skills, and student engagement.

Accessibility to Information

According to Penuel’s (2006) research, many of the students involved in their study indicated they used their laptops to study discipline-related topics, visiting websites for information because of the ease and efficiency of the Internet, and collecting and analyzing data. Many participants referred to the convenience of accessibility with technology. Deacon admitted, “I do less direct instruction because they have access to global information. And, so lecture really moves to more discussion and conversation as opposed to ‘sit and get.’”

Bielefeldt (2006) corroborates in her study that students were able to access much more information and many more resources because of one-to-one technology than was capable prior to this initiative. Carl shared such sentiment. He stated, “So recently, I haven’t had to do much of what you and I know as lecturing at all because the kids have the access to the information. I just have to help them understand and synthesize that information.” Jim has really used one-to-one computing to go paperless in the classroom. He stated how he has used the site Edmodo for his classes:

My biggest site is Edmodo, Edmodo.com. It's a huge resource for me where I can post online, kind of like a Facebook, where I can post online projects, assignments, quizzes, tests. I can post documents, my PowerPoint notes, my study.

Deacon also stated how he takes advantage of “The Mess of the Web” in terms of accessibility to information.

Because we all have Google accounts, gmail, and Google drive and Google sites, it's much easier for me to get the information out to students. Usually, I just email homework and notes out to kids cause I tweak it from class to class, and it's just easier for me to email it out. I do use a Google site for my classes for other information like other sites that have information about what we are studying or videos for the kids, but most of my assignments, I email it out.

Increased Student Collaboration

In addition to accessibility, many participants mentioned the importance of student collaboration and its impact on instruction. In the anonymous online survey that all eight participants took, many felt that collaboration was definitely enhanced during instruction with technology in the classroom. All participants were asked the following question on the survey: “On a scale of 1-10 with 10 being the highest impact, how do you feel technology has affected the amount of collaboration among your students?” Figure 4.1 displays the results.

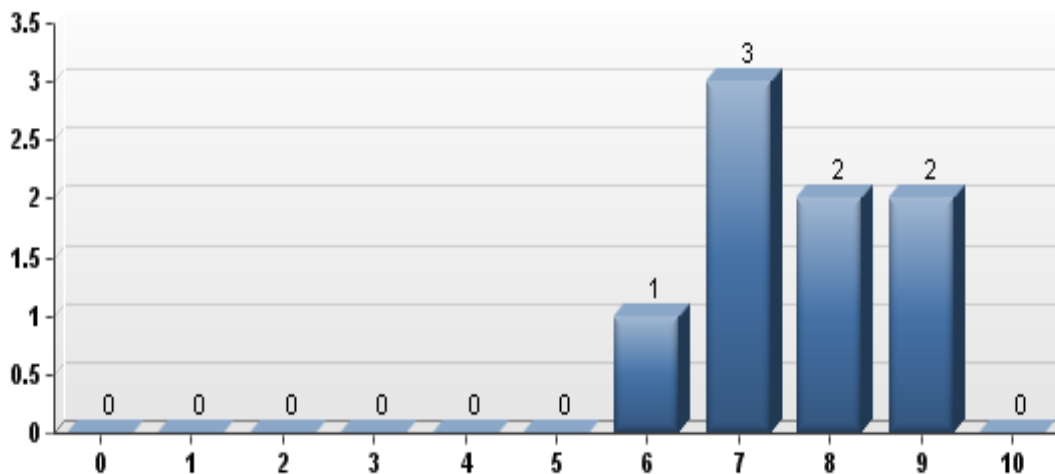


Figure 4.1

One-to-One Technology and its Impact on Student Collaboration

Out of the eight teachers surveyed, all of them felt that one-to-one technology had a positive impact on the instructional environment with half of the participants indicating that technology had a significant impact on collaboration when instructing. According to Mouza's (2008) study, "students frequently traded skills with other students, shared technology-related tips, and served as peer tutors for both technology and non-technology related topics" (p. 464).

Such collaboration was experienced and observed by several of the teacher participants. Nate states, "student collaboration has gone through the roof," and that in turn has impacted his instruction. "When students work together, I'm more facilitator than lecturer." Fanny also agrees. She discusses how one-to-one technology has impacted her instruction and collaboration in her classroom. "We use Gdocs so much where they all have access to it, and they put me on as one of the people, so I can see what they're doing, I can see who's in what part."

Bob saw the impact one-to-one technology not only had in his classroom in regards to collaboration, but also outside of the classroom.

Yes, I think Google Drive for collaborative purposes has been great. For school-related things, for class-related things I've seen it. But I'm also the PROM advisor, and we've been broken up into committees, and they are using Google Drive. They have one core Google doc that's shared for decoration ideas. There are six people who have access to edit that page, and we gave the entire class access to that as well, but they can only view it. So it's also creating a hierarchy of working and chain of command. If you aren't on one of those committees, then you have to go to one of those committee members with their idea, and get their okay.

Holly reiterated the increase in student collaboration in her classroom as well. She corroborated the aforementioned participants' sentiments. "They could collaborate across town, across the state, whatever, so, yeah, collaboration is huge now in class and outside of it." Maninger and Holden (2009), support the aforementioned participants' experience of increased student collaboration. Their research found that teachers acknowledged an increase in student collaboration due to the one-to-one environment. The "Mess of the Web" clearly impacted instruction by increasing collaboration among students as indicated by all participants involved in this study.

Integration of 21st Century Skills

A third issue revealed through teacher interviews including the theme "The Mess of the Web" involved teachers stating that 21st century skills integration improved with the use of one-to-one technology. According to the online survey data, participants were asked to rate the impact of one-to-one technology in increasing 21st century skills in the classroom. Figure 4.4

displays the aforesaid data based on the following question: “To what degree, with 100 being the highest percentage, has one-to-one computing affected the integration of the other 21st Century Skills besides collaboration, communication, critical thinking, and creativity?” The results of this question are represented in Figure 4.2.

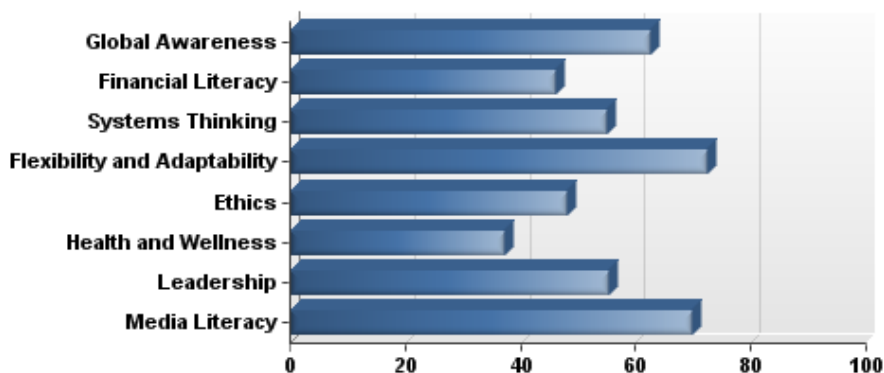


Figure 4.2

One-to-One Technology and Its Impact on 21st Century Skills

According to the above-mentioned data, the teacher participants felt that the 21st century skills of Global Awareness, Systems Thinking, Flexibility and Adaptability, Leadership and Media Literacy were most impacted by the one-to-one environment.

Based on each teacher participants’ experience and perspective, they each confirmed that the one-to-one environment impacted 21st century skills. According to Prensky (2012), teachers must teach and integrate 21st century skills in their classroom in order for students to be successful. According to Fanny, she indicated a direct correlation between the impact on 21st century skills and technology integration. She stated, “I think 21st century skills. Our kids are going to have to be able to do these amazing things when they leave here beyond content knowledge.” Jim validated Fanny’s experience as well. He disclosed, “My teaching has always

been to grow with the times. If we want students up-to-date and to be 21st century learners, we just kind of have to adapt to the times and teach that way.” In addition, Jim expressed how he integrates 21st century skills in his classes:

And they have to take the units that we study, and they have to create their own website-geography website. They have a rubric, they have requirements, all those kind of things. As we are learning about parts of the world, or learning about the geographer's craft, they are creating a website, and then at the end, I partner up with elementary classes, and my Geography students make a scavenger hunt through their website, and then they buddy up, and those younger kids come in, and they use that website to learn about Geography. Stuff like that is the big turning moment. So now the kids not only have learned about Geography, and I have them do an evaluation and reflection, and they always say, "I got more out of this because I actually had to work with the material versus memorizing the material."

Student Engagement

A final area impacted by “the mess of the web” and technology access was student engagement. Holmes (2008), found that technology engages students and that engagement is the key to successful learning and teaching. According to Figure 4.3, all participants indicated that one-to-one technology had somewhat improved or greatly improved the instructional climate.

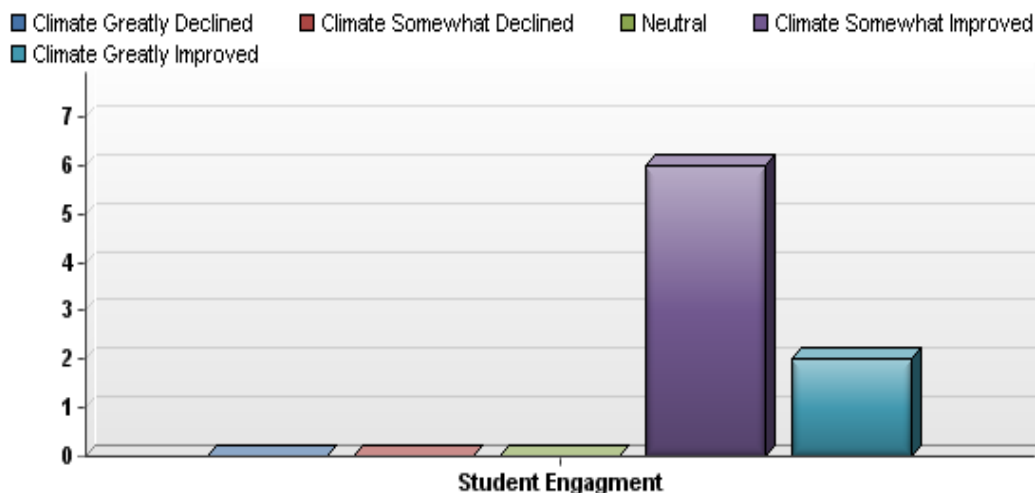


Figure 4.3

One-to-One Technology and its Impact on Student Engagement

Jim indicated that he had seen student engagement improve. “I would have to say yes. I think, you know, it’s-- I think it’s a slow progress right now. I think I’ll see it grow into something better, especially when my instruction improves, and I can see it a little bit better.

Lonnie states how he saw student engagement increase due to one-to-one technology.

Sure. I think it's opening some doors for those who have struggled and don't consider themselves good math students. I can set up online practice and some things like that where really it's about giving them some ownership and making them responsible for it.

I've seen a lot kids that maybe in the past wouldn't have taken that opportunity in a traditional classroom to come get help. Now because of the technology, they can do it on their time and their convenience. We are seeing some benefit of putting that time in.

While all participants found that one-to-one technology either somewhat or greatly impacted student engagement, at least two participants indicated some setback to student engagement.

According to Holly, she believes one-to-one technology has impacted student engagement but

also caused other problems. She indicated the following, “I mean, its yes and no. Some are very engaged while others, those that are distracted, are even more distracted now.” Nate also stated, “I see a little improvement, but I’m not sure many of them are listening at times.” Fanny felt that student engagement had increased due to student’s ability to multi-task. She replied with the following:

I have this study hall and this girl is a really good student. She had the PDF of the English assignment, and she had to, you know, cite evidence, and find quotes and stuff like that. She had those two things up on her computer. She also had her iPod out and was listening to songs, and she had her cell phone out checking for messages. She was doing the English assignment plus listening to music, looking for quotes, and checking messages. She was engaged while doing all of that. I was really impressed.

Student Behavior and Classroom Management: “Laptop Lids Down”

A theme of “Laptop Lids Down” that dominated each interview was that of classroom management. “Laptop Lids Down” was a quote spoken by Fanny as to the phrase she uses to indicate to her students that the lids of the laptops need to be closed in order to gain all students attention. All eight participants indicated this as an issue that negatively impacted instruction teaching in a one-to-one environment.

Classroom Management

In addition to all eight participants, Efew, Hampton, Martinez, and Smith (2004) indicate in their study that managing and monitoring the use of computers among students was deemed difficult by teachers. Bob indicated his experience in teaching in a one-to-one classroom was impacted by classroom management and stated it as a clear disadvantage.

A disadvantage- classroom management. For some teachers I have seen, this has been a very, very difficult thing. With technology, with one-to-one computing, students can multi-task, and you have to ask yourself, is that multi-tasking is it good, is it bad. If they can do two things, should you let them do two things? I think monitoring the students- I've seen a lot of teachers have difficulty doing that, and students have gotten away with a lot of things not good for learning.

Carl also shared the aforementioned statement. "Monitoring is the biggest problem with this. I've got twenty kids in class, and you know, and trying to stay on top of all twenty kids to make sure they are doing what they are supposed to is hard."

Hembrooke and Gay (2003), who state that laptops can provide the biggest disruption to classroom instruction and the teacher, further validated Carl's experience. Lonnie, too, explains that one-to-one can create management problems in the classroom. "80% of the kids can handle it, and use it when they are supposed to. And then we have the other 20%, it's still a shiny, new toy, and until we can teach them to use it responsibly, we are going to have issues." Deacon reiterated Carl and Lonnie's sentiment. "The biggest challenge, ensuring that kids use the technology with educational purposes in mind. We even have parents who call and ask if we can make the kids leave the computers at school because of the same issue." Finally, Fanny states a similar experience.

But I would say a negative is that it's just another distraction. We were given the ability to make our own policies in each of our rooms dealing with the computers, and um, in the beginning, they were very, very good about it. By third term, I can tell you at least three to five times a day; I have to say, "laptop lids down." Because now it's just a distraction sometimes. And it's not even like I'm instructing, we might be moving into a discussion,

they feel the need to get on it, so I would say if there is one drawback to it is that it sometimes becomes a distraction.

Although all eight participants indicated in their interviews that classroom management was a clear hindrance and disadvantage to teaching in a one-to-one environment, the anonymous online survey data shows differently which is represented in Figure 4.4.

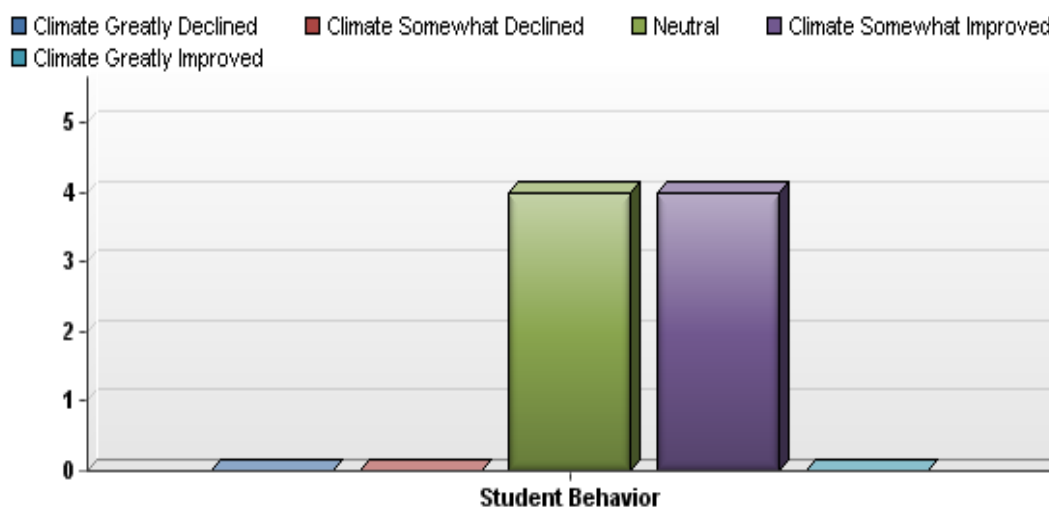


Figure 4.4

One-to-One Technology and its Impact on Student Behavior

Figure 4.4 demonstrates that four out of the eight participants felt that classroom management and student behavior wasn't affected, positively or negatively, by the one-to-one environment in stark contrast to all eight participants indicating classroom management as a problem in the interviews. Additionally, the other four participants felt that the one-to-one environment somewhat improved student behavior and classroom management; a clear dichotomy from the findings from the interviews.

Assessment Practices: “It Changes the Way You Think”

The fourth theme, “It Changes the Way You think” evolved from the questions concerning assessments. The following were stated changes in assessment practices shared by participants. What evolved from the interviews and data from the online survey is as follows: project-based learning, customization of grading and assessments, and instantaneous feedback. Of the eight participants interviewed, half of the participants indicated all of their assessments are project-based. The other half indicated a “hybrid of sorts” when discussing changes in assessments; they described their assessments evolving to fifty percent as project-based and online, while the other fifty percent were still paper and pencil.

Project-based Learning

Due to the vast array of resources available to students, many teachers are offering more projects to students as opposed to more traditional assessments (Costa, 2012). This has become the case for Lonnie. “I use projects a lot more than I ever did before because there are so many resources so readily available. I mean, previously if you wanted a computer lab for a project, you had to fight for it. Now, the kids have the lab at their fingertips.” Fanny shares the same sentiment.

I would say my assessment has changed because I’m moving more and more away from formal test assessment. One-to-one changes the way you think. I still do it, and depending on the class, I might do more of it than others, but I feel students can be better assessed with projects versus regular formal assessment.

However, Fanny does express frustration with trying to change the way she assesses students with the ease of technology.

I have a hard time balancing that [project-based assessment versus traditional assessment] because I'm teaching upperclassmen and a majority of them are going to go to college, and a majority are still going to have to take tests because that's how college rolls.

This balancing act validates how many educators feel when teaching in a one-to-one environment. Schneiderman's (2004) study indicates the trouble traditional testing and high-stakes testing causes teachers when assessing students in a one-to-one environment.

Jim changed his assessment practices in his classes to an all online, paperless format. He stated the following about his shifting paradigm around assessments.

One-to-one teaching has given me more of an insight, I guess, to change rubrics and put more depth into what is being assessed. I learned with group projects to have the kids choose what they want to research about the topic and what each person in the group wants to contribute. Like for our marketing projects, they got to decide what they wanted to market, what role each student would play in the group and what their marketing campaign would be. I wouldn't have done that without technology.

Customizing Assessments and Grading Practices

Another impact one-to-one technology had on assessment for the participants in this study was the ability to customize assessments and grading practices. Bob indicates, although he hasn't had time this year, he has ideas for changes in his assessments for next year. "Because I believe assessment in terms of district or state level benchmarking is going to move to computer-based, I want to steal the format of the ACT. Every answer the students get right, they receive a harder question and this continues until they answer incorrectly. It's customizable.

In addition to customizing assessments, Lonnie expresses how his grading practices have changed due to the impact of technology. He has instituted standards-based grading when assessing students.

I've gone to standards-based grading because I now know exactly what my students are strong in and the areas they need more help. I can send emails out now in a blink of an eye to parents. It [standards-based grading] would be a lot more difficult without technology.

This change in his assessments has also allowed Lonnie to provide more instant feedback to his students. "I think with standards-based grading that I'm doing, kids will submit something, and I can give them instantaneous feedback and push them to the next level that I couldn't do before one-to-one." Nate also shared his increased amount of instant feedback his students receive because of technology. He states, "I would tell you have more and more online assessments, more and more instant feedback. The students know immediately what they did wrong, why and what they did right."

Deacon also changed his grading practices. He, too, implemented standards-based grading as well, which in turn, has impacted the outcomes he had for students.

I've gone away from the unit test where you have a test on photosynthesis and then you put photosynthesis away for the year to, because we can do a lot more with computers, a lot more stuff through their computers, we organize things digitally. I think it's helped support the fact that kids are constantly required to demonstrate mastery in all those subjects or all those units or all those concepts. There is much more, you know, informal assessment that is easy and quick with computers. I do that a lot more now too.

Dunleavy et al. (2007), corroborates what the teacher participants expressed in their interviews about assessment. Their study indicated that one-to-one technology increased formative assessment, increased the ability to provide timely feedback to students, and allowed for individualized grading and assessment practices.

Student Accountability and Work Completion: “There are No More Snow Days”

This theme became apparent when participants expressed that the one-to-one environment impacted student accountability. Participants expressed that one-to-one computing has changed accountability among students. “There are No More Snow Days” included increased work completion due to students’ missing school due to inclement weather and student absences due to illness or other reasons for missing school.

Student Accountability and Inclement Weather

Participants detailed the increase in student accountability because of the ubiquitous access due to one-to-one. Fanny indicated that her instruction has been impacted because she’s able to accomplish more in class each day due to the accountability of her students. She stated the following:

You don’t have excuses. I had a kid come in this morning, and he told me he didn’t know how to interpret the work last night. I said to the whole class, I had one of you contact me with a question, and otherwise, you know, you should have been contacting me because I can talk to you at anytime. I think there is definitely more accountability.

Lonnie reiterated this same sentiment. He states, “There is more accountability. There is not a day off. There are no more “snow days” like, we were getting out early yesterday, so I sent out an email that the deadline was still the same.” They both believed that one-to-one environments offer constant accessibility to information and work completion, which in turn,

impacts their instruction and leads to more student accountability. Joyce and Calhoun (2012) indicate that technology allows for constant access and unlimited online opportunities for educating oneself.

Student Absences

Because of this environment more and more students are learning not only inside the classroom, but also outside as well; this provides helpful to the teacher participants' instruction, especially when the students are ill. Jim stated the following:

If the kids are sick, if they're gone from class, they can always see my assignments online. A lot of times kids do their work, you know, when they're not even in my classroom. The kid might not be here a few days out of a week, and, you know, then they'll get a lot of instruction online.

Carl also shared student absences and accountability for work. He said, "the kids who are gone, they can go can pull their assignments off from online, listen to it at their own pace, and do it on their own time." Mouza et al. (2008), present in their findings that in their study, "a majority of students reported using their laptops at home on a regular basis" (p. 441). Their research states that students use their technology at home for completing schoolwork, "surfing" the Internet, and to buy consumer goods. (Mouza et al., 2004). All participants felt that the one-to-one environment impacted the accountability of students accomplishing their work outside of the classroom.

Nate has noticed a difference in student absences and work completion. Since he has decided to go paperless with all assignments, assessments, videos, handouts and resources for his class, he's noticed a significant change in work completion when students are gone from class.

I have my own Web site where I assign all my projects. All my videos, assignments, and notes and study guides are on my Web site too. So the kids always have access to that. All my kids have their textbooks online too. If a kid is gone, they can always see my assignments online. And a lot of times kids do their work, you know, when they're not even in my classroom. I mean, that's what I see the future kinda becoming, is kinda a blended type of classroom where the kids might not be here the five days out of the week.

Holly paralleled the other participants' sentiments about student absences and work completion. She stated the following:

I have kids that will be gone, and they won't be in school that day, but they know they have a due date for an assignment. They will send the assignment in an email if they go on a college visit or something. Work completion has gone up, especially for my seniors. If they were gone, I didn't always get their assignment. Now, you know the expectations, and they don't have an excuse anymore. They can get it to me electronically.

Students' Social Skills and Communication: "The Art of Good Conversation"

The sixth and final theme that developed from this study was the perception that one-to-one environments impacted student communication and social skills. Although some participants felt that the one-to-one environment had a positive impact on social skills and communication, other participants expressed a negative impact on the communication and social skills of students.

One-to-One's Positive Impact on Communication and Social Skills

Jim felt that not only had his instruction improved with one-to-one, but so had his and his students' communication. He stated an improvement in the communication and social skills of students. Jim indicated the following:

I'm a much better communicator and so are my students because of the technology. I am in constant communication with students and parents. I also "tweet" articles- or anything related to math, and-um... my students choose to follow me-not all-some. They do the same with me. It's all around math. I have a Ning page dedicated to our classes and math.

I would say communication has been one of the biggest improvements.

In comparison, Carl, too, felt that his instruction improved his communication as well as his students. He said, "My communication with them has gotten better, but what it actually does the best is by getting them up here [presenting to others], there are other things under the tables that you don't see that helps. It helps them in their communications skills. Their social skills. It helps them in their selling skills." According to Neiderhauser and Lindstrom (2006), their study indicated improved social skills as well in addition to other skills when using technology.

"Constructivist reforms suggest multiple benefits when students work collaboratively including social skills development (Jonassen's Conversational principle) and enhanced conceptual learning and critical thinking" (p. 105)

One to One's Negative Impact on Communication and Social Skills

Although Carl and Jim indicated the positive impact one-to-one instruction had concerning communication and the social skills of their students, Bargh and McKenna's (2004) study found that technology did have a negative impact on the communication and social skills of its users. They found a decrease in users' social cues and the increase of more self-centered, socially isolated behavior. Holly shared this same perception. She felt her instruction has been impacted, and her instruction has compensated for that; however, she feels her students' socializing skills were negatively impacted by technology. She stated the following:

A roadblock that one-to-one is causing- that I'm seeing in my students is the "art of good conversation. But the whole ability to sit down, and have quality conversations, and be able to read body language, vocal intonation, and react appropriately to it, that is a problem with these kids. My students will tell you that. I worry about them- a lot. If you don't know how to communicate, face-to-face, what does that mean for this generation of kids and their family? Their marriages? Friendships? The suicide rate?

Nate shared the same concern with one-to-one technology and his students. "I mean, you can foster relationships online and talk to people over the Internet. I get that. I think one of the skills our kids are really struggling with are interpersonal skills, and that's my big concern with one-to-one. I make them discuss in class-not online but with me" In accordance with Nate and Holly, Deacon expressed his concern about technology and his students' social skills.

You can have social relationships online with things like Facebook and Twitter and everything else, but at the same time, I mean, there's a teacher across the hall that has everything online. Every time I walk by, he is sitting at this desk and the kids are staring at their computer screens. Is that really fostering relationships? Kids are struggling with social skills and need time to talk face-to-face with other kids and adults. I see it. There's a breakdown of some really important skills that kids aren't going to be getting if we aren't careful.

However, according to the Engelberg and Sjoberg (2004) study, the debate still exists in research as to whether technology has impacted, positively or negatively, students' social skills and communication. This was indicative of my study according to the participants interviewed, but also from the online survey data. The survey asked the following question of the teacher participants: 'On a scale of 1-10 with 10 being the highest, tell me how one-to-one computing

has impacted students' social skills and communication?” The results are displayed in Figure 4.5.

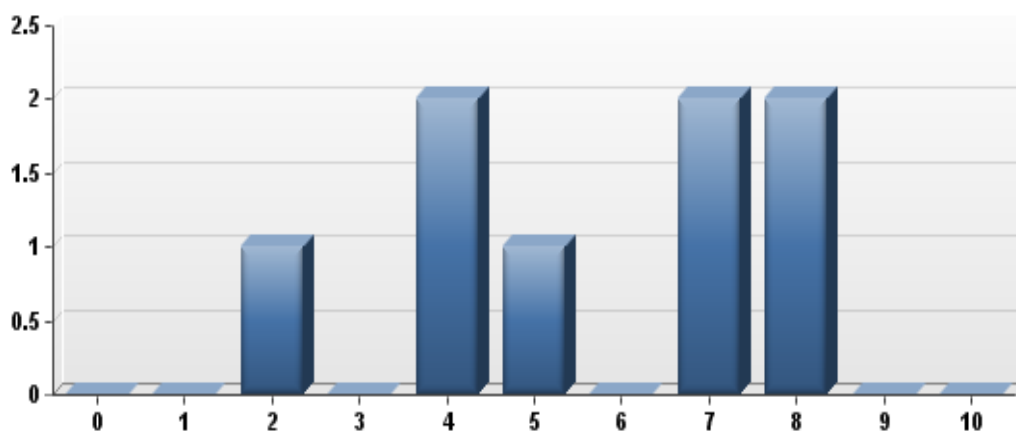


Figure 4.5

Technology's Impact on Students' Social Skills and Communication

According to Figure 4.5, the data displayed by the teachers indicates opposing viewpoints concerning technology's impact on student communication and social skills.

Summary

Through the analysis of teacher interviews and online survey data, it was clear these six themes, as seen from the teachers' perspective, were those reported to have impacted instruction the most from teaching in a one-to-one environment. The first theme, “Me Versus Them,” when dealing with students knowing more about technology than they, themselves, did, was a topic that all teachers were aware of prior to going one-to-one, but some weren't aware of how they would feel when it was demonstrated in the classroom. “The Mess of the Web” was met with gratitude from teachers because it allowed for more flexibility, accessibility, and collaboration,

which improved teaching and learning. Teachers also indicated changes in their instruction in terms of assessment. The theme “It Changes the Way You Think” demonstrated how teachers incorporated more project-based assessments, customization, and changes in grading practices, as well as more instant feedback to students. Student accountability was impacted because of the constant access to technology. “There are No Snow Days” was a theme that teachers felt was a positive impact because weather, illnesses, or absences prevented excuses about work completion. The final two themes were seen as having a possible negative effect on instruction due to technology. The theme, “The Art of Conversation,” had some teacher participants concerned for the well being of students and their communication and social skills due to the impact of technology while other participants felt technology has a positive impact on the aforesaid. Finally, the theme, “Laptop Lids Down,” impacted instruction due to the distraction and classroom management problems the one-to-one environment created. To these participants in this study, these six themes impacted their instruction due to teaching in a one-to-one environment.

CHAPTER 5

CONCLUSIONS

Summary of Study

The educational system in the United States is in a state of reform due to the increased responsibility educators have to produce globally, competitive students to contend for jobs that have yet to be created. One aspect of that reform has been technology integration. One-to-one computing has been increasing in education in order to meet the needs of educating 21st century students. This reform has not only impacted students but has also influenced those who have been at the forefront of learning: teachers.

The purpose of this phenomenological study was to investigate one-to-one classroom environments and their impact on instruction from a teacher's perspective. In order to integrate technology into the classroom and implement one-to-one classrooms effectively, it's imperative that the teacher's experience with this environment be understood in order to ensure that one-to-one environments can be improved and perfected to guarantee a positive impact on instruction and students' learning. The individual accounts obtained in the interviews and the data from the online survey provided the data and necessary detail needed to fully understand the experience of one-to-one computing from the participants' perspective.

Those in the educational profession who read this study need to take note of the specific strengths indicated by each participant from their perspective so that all educators, including Pre-K-12 and post-secondary teaches, can better prepare other educational institutions in planning for the one-to-one initiative. In turn, readers can compare the results of the study to a comparable environment in which they are familiar; however, transferability is dependent on each individual's experiences.

Conclusions

In addition to the themes that were revealed through the data, some of the findings in this study challenged my perceptions and thinking about one-to-one computing environments. I was struck by the fact that professional development had not been emphasized, nor was it revealed to be a significant factor by many of the participants. This was interesting because there is abundant research on the importance of planning for professional development when implementing a one-to-one initiative. According to Mouza (2008), teachers must have high-quality professional development in order to feel secure in working in a one-to-one environment and to be successful with instructing students. Although I probed each interviewee about the professional development offered in their building, this was not an important factor from their perspective and didn't seem to have an impact on their experiences. This subject wasn't indicated as important in the online survey either. The only significant comment concerning professional development was a suggestion of differentiating it in the future.

In addition to the lack of comments made about professional development, I found that although teacher participants indicated they knew students had more knowledge and expertise about technology than they did; it was interesting that two participants, the two females in the study, expressed they initially felt uncomfortable asking students for help when using technology. The female participants felt students might question their professionalism and knowledge if it appeared they weren't the experts on this subject. However, all of the male participants claimed a comfort level with asking students for help. This led me to question whether a gender gap exists among teachers when implementing this initiative.

Furthermore, after analyzing the interviews and online surveys of all teacher participants, it was apparent that teachers expressed an increase or change in assessment practices by moving

to more project-oriented work. Similarly, many participants also claimed to be doing more formative assessments and providing more instant student feedback. However, when looking at Puentedura's (2012) model for technological integration (Figure. 3), it still appears that most of the participants are at either the Substitution or Modification phase. Projects, formative assessment, and student feedback can be done without technology; technology just allows for easier access and efficiency. It appears that these teachers need to concentrate on moving into the two higher tiers of Puentedura's model. The top two phases of this model show examples of what these two tiers require beyond Substitution and Modification phases. Examples given include students working with outside experts on solving problems, collaborating with those experts via media, correcting feedback given, and revising the design developed as a solution, with finally presenting the solution creatively via technology. The aforesaid explanation involves many aspects of a student task that cannot be accomplished without technology which, in turn, Puentedura advocates is the sole purpose of technology integration in classrooms.

A final reflection emanating from teachers were their comments that student accessibility and engagement increased due to the constant access to information, teacher websites, and assignments, in addition to collaborating and communicating with others outside of the classroom. In addition, teacher participants appreciated that kids continued learning even if school was cancelled due to inclement weather or because of a student absence. This situation leads to further thought about the structure of the traditional school day, seat time, and the school calendar year in the future. This thinking could lead to more blended learning classrooms. It could also lead to the extinction of seat time considering students can learn outside of the school's operating hours with teachers. Finally, could such innovative thinking lead to changing

the way schools of the future are designed and built? If so, the concept of constant accessibility due to technology will be important in the future for education.

Additionally, many comments were made about student engagement with some teachers indicating that engagement had increased since teaching in a one-to-one environment, with others expressing that engagement hadn't been impacted by technology. Some teachers felt that engagement increased because students were allowed to access various sites, collaborate with others, and produce assignments with ease and efficiency. However, other teachers felt that technology could disengage students because of the distractions it can cause with access to popular student sites, emailing and chatting with friends, and multitasking. Such activity may lead schools to reconsider the definition of engagement because today's students think differently (Prensky, 2012). Instead of using technology as a "square peg fitting into a round hole," it will be critical in the future to redefine teaching and learning based on research that reveals how different students' thinking, behavior, and actions are today and will be in the future.

Recommendations and Implications for Further Research

Because this study has afforded me the opportunity to reflect on my findings based on the perceptions and experiences of those I interviewed, further research on one-to-one technology needs to focus on the following. First, further research should look at the implications of differentiated professional development pertaining to this initiative. Further research in this area would help districts, schools, and educators excel in the implementation of one-to-one computing and prepare all teachers adequately with learning strategies and knowledge of technology.

Second, I have yet to see research on gender differences and gaps in male and female perceptions, attitudes, beliefs, and knowledge about technology. Further research in the area of gender differences among teachers when implementing one-to-one computing could further

inform districts and schools as to the best practices needed when implementing one-to-one and as to the way in which a school or district could adhere to the differences and similarities that are gender appropriate. In my study, there appeared to be a difference among the perceptions of women and men and their feelings about asking students for technological help. It would behoove researchers to conduct further study in this area to see if my findings are corroborated and validated.

Redefining what the school day, hours, and calendar should look like due to technology access is also an area of further research as well. Schools are still structured as they have been for years, in the areas of school's hours and calendar year. Further research should be done in this area to add to the research that already exists on transforming schools which is inclusive of one-to-one environments. Similarly, further research needs to include redefining student engagement due to the change in student's thinking today. This could aid districts, schools, and teachers in providing teaching strategies appropriate for this generation of learners to help them become successful global citizens.

In conducting this study, I decided to concentrate on schools close in proximity, not only to my house, but also to each other. To meet those two afore-stated criteria, the schools studied are defined as rural schools and districts. One might wonder if the implementation process might be the same or differ in suburban and urban districts. Many factors would cause the implementation process to be the same or differ, but this might be an area for further study.

Finally, further research in the area of technology integration using Puentedura's (2012) SAMR Model would benefit educational institutions as well as educators in setting the goal of attaining the "Modification" and "Redefinition" phases of technology implementation. In my study, it was apparent that most teachers implementing technology in the classroom appeared to

be using it in the “Modification” stage of technology integration. (Puentedura, 2012). Further study in the aforementioned would be beneficial to districts, schools, and educators to use technology in the classroom in the “Redefinition” in order to deepen student learning and prepare students for jobs that have yet to exist. Although this study focused on the SAMR Model, further research using any technological implementation model would benefit districts and schools in regards to the level of fidelity of implementation.

Final Thoughts

The eight participants who very generously dedicated their personal time to this study provided me with new insight into the advantages and drawbacks of teaching in a one-to-one environment from a teacher’s perspective. This afforded me the opportunity to challenge my own biases that already existed concerning the one-to-one initiative. Much research exists detailing the important aspects to consider when schools want to implement one-to-one environments in their school or district.

However, I now realize how imperative it is to learn from teachers who have already experienced one-to-one teaching, so that others (schools and districts) can ascertain the complexities, nuances, and vulnerabilities teachers experience when adapting to this environment. By understanding the aforesaid, schools and districts will be better prepared to leverage the strengths of this initiative but to plan for the groups of teachers that will experience challenges and offer sound professional development, coaching and support to ensure success.

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Appendix A

Interview Questions

Grand Tour Research Question

From a teacher's perspective, how has instructing in a one-to-one environment impacted your teaching?

The following sub-questions and statements will be included to seek more specificity about teaching in a one-to-one environment and state the most pertinent issues and complexities that need to be discovered (Stake, 2007).

Introductory Interview Questions with Each Teacher:

Establishing Rapport

- 1.) Tell me about yourself.
- 2.) Tell me about your teaching career.

Instruction and Learning Questions

- 3.) Tell me about how you use one-to-one technology to plan for instruction.
 - b. How has the experience of using one-to-one technology impacted the way you instruct?
 - c. What have you gained in terms of knowledge and instruction, yourself, through your experience with using one-to-one technology in the classroom?
 - d. How has the use of one-to-one technology in the classroom influenced how your students construct and apply knowledge?
 - e. Tell me how your teaching philosophy has been influenced by the experience of implementing technology in your classroom.

Assessment

- 4.) Has the experience of using technology in the classroom impacted the way you assess learning?
 - a. Tell me how you would assess your instruction now versus when you weren't teaching in a one-to-one environment.
 - b. What changes would you make to assessing students due to the technological environment?

Advantages and Disadvantages

- 5.) Tell me what you believe to be the advantages and disadvantages of one-to-one computing.
 - a. What would the limitations be to using one-to-one computing in your classroom?
 - b. What are the advantages of one-to-one computing in your classroom?
- 6.) Any other information would you like to tell me?

Appendix B

Consent to Participate in Research

And

Authorization to Use and Disclose Information

“Understanding the Lived Experiences of Secondary Teachers Instructing in a One-to-One
Computing Classrooms”

Dana Strother

501 NE 21st Street

Ankeny, Iowa 50021

515-528-6425

dana.strother@drake.edu

INTRODUCTION:

If this document contains words you do not understand, please ask Dana Strother at the
aforementioned phone number or email address for clarification.

The purpose of this form is to provide you with information so that you may decide whether you
would like to participate in this study and to inform you of how the collected information may be
used or disclosed (released to others) both during the study and after the study is completed.

This study will involve secondary education teachers with at least one year of teaching experience teaching in a one-to-one teaching environment.

EXPLANATION OF STUDY:

A. Purpose of Research Study:

The purpose of this study is to gain an understanding of a teacher's experience in teaching in a one-to-one environment. Because you have had this experience, you are invited to participate in this study entitled, "An Investigation of One-to-One Teaching Environments From a Teacher's Perspective." As a researcher, I'm seeking to understand how teaching in a one-to-one environment affects planning, instruction, and assessment as well as student learning all from a teacher's perspective. In addition, I am seeking to understand the long and short-term benefits as well as challenges that are involved in teaching in a one-to-one environment.

B. Interview and Online Survey.

In order to select participants, I will use the CASTLE© website to ascertain the schools and districts that are currently one-to-one in the Midwest. This will allow me to narrow my choices based on convenience and accessibility. Once the list has been narrowed, I will contact administrators for suggestions of possible participants. It is possible that administrators might be able to ascertain who the participants are in this study; however this isn't seen as a foreseeable risk in this study. There are 9 participants in the study. Each participant will undergo an interview and complete an online survey. However, a participant can withdraw from the study at

any time. If you choose to withdraw, all data you provided will be destroyed. The following steps for the interview and online survey are as follows:

Step 1: Introduction

The researcher will meet with the participant to introduce him/her to the study, provide the participant with interview questions and link to the online survey, and introduce the Informed Consent Form and Promise of Confidentiality.

Step 2: Formal Participant Interview

The researcher will interview the participant using the previously provided interview questions at a location convenient for the participant and outside of working hours. The interview will be recorded using an audio and/or video recording device to allow for transcription.

Step 3: Online Survey

Upon completion of the interview, the researcher will ask that each participant complete the online survey, and if the participant has any follow up questions or information needed, to please contact the researcher, Ms. Dana Strother, either through her email address or cell phone number. Participants will be asked complete the survey within one week of receiving the link.

The information gained from the three-step interview process and online survey will be used to report the findings of the study. If you should need to contact me at any point during the research study, please contact me at (515) 528-6425 or by e-mail at dana.strother@drake.edu. Additional questions may be directed to my dissertation advisor, Professor Sally Beisser, PhD. by emailing sally.beisser@drake.edu.

In addition, information and documentation regarding this research study has been filed with the Drake University Institutional Review Board (IRB). If you have any concerns about the conduct of this study, please contact the Drake University Institutional Review Board (IRB) at (515) 271-3472 or by e-mail at irb@drake.edu.

The following are the terms of participating in the interview and online survey:

The information obtained during this study will be used to report the findings of my study, which will be done through an extensive analysis of the data. Study data will be kept on a password-protected computer throughout the study and will not be accessible by anyone except for the researcher herself.

For purposes of this study and the possibility of future publication, the names and identities of all study participants will remain confidential with pseudonyms being used at all times. All electronic and written data will be destroyed three years after the research project has been completed.

Your participation in this study is voluntary. If you should choose not to participate or to withdraw from the study at any time, there will be no penalty and any data collected from your interview will not be included in the study and will be returned to the participant upon request.

There are no foreseeable risks to the participants other than time spent in participating in the interview and an on-line survey and difficulties using technology in teaching practices. The benefit is to add to the research that already exists in education around technology integration and adds to the perspective of the teacher's experience.

Should you choose to participate, you will be compensated with a five dollar coffee card at the day, time, of place of the first interview.

If you agree to participate in this study according to the above terms, please check the appropriate response and sign and date.

Consent to Participate

☐ I give my consent to participate in this study.

☐ I do not give my consent to participate in this study.

Signature of Participant

Date

Signature of Researcher

Date

Please feel free to print a copy for your records if you wish

We request your permission to use the data collected from you. Your data will be pooled with that of all the other participants.

We plan to complete this study within one year.

Appendix C

Online Survey Questions

Phenomenological One-to-One Study

Link to Survey: http://drake.qualtrics.com/SE/?SID=SV_884c4HabJ3uBmPX

Please answer the following questions.

Greetings,

I am conducting a research study on gaining an understanding of teaching in a one-to-one environment from a teacher's perspective. I am interested in your thoughts, opinions, and experiences with teaching in a one-to-one environment. This survey has 21 questions and will take you about 20 minutes to complete the questions. Some questions are multiple choice, while others allow written responses. I appreciate your comments.

By continuing, you will indicate your consent to participate in this survey. All responses will be anonymous (real names will not be used) and confidential. Data collected from the survey will only be accessed by me as the primary researcher. You have the right to leave an answer blank and/or to exit the survey at any time. However, information that has been shared when you leave the survey will be included in the study.

If you have questions or want the results about the research study, please contact me at dana.strother@drake.edu Additional questions may be directed to my dissertation advisor,

Professor Sally Beisser, PhD. by emailing sally.beisser@drake.edu

In addition, information and documentation regarding this research study has been filed with the Drake University Institutional Review Board (IRB). If you have any concerns about the conduct of this study, please contact the Drake University Institutional Review Board (IRB) at (515) 271-3472 or by e-mail at irb@drake.edu.

Please feel free to print a copy for your records

Thank you,

Dana Strother

Doctoral Candidate

School of Education- Drake University

Online Survey Questions

Q1. How many years have you been teaching?

2-10 years

10-20 years

20+ years

Q2. How many students are housed in your building?

50-100 students

101-200 students

201+ students

Q3. How many students are in your district?

300-500 students

501- 700 students

700+ students

Q3B. Please add any additional information about the question above dealing with student

Demographics.

Q4. Your sex

Female

Male

Q5. What best explains your school?

Rural

Suburban

Urban

Q6. How do you feel technology has affected the amount of collaboration among your students?

(One of the 4C's of 21st Century Skills)

Q7. How do you feel technology has affected your students' social skills and communication?

(One of the 4C's of 21st Century Skills)

Q8. How do you feel technology has affected your students' creativity? (One of the 4C's of 21st Century Skills)

Q9. How do you feel technology has affected your students' critical thinking? (One of the 4C's of 21st Century Skills)

Q10. To what degree has one-to-one computing affected the integration of other 21st Century Skills besides the 4 C's?

Q11. To what degree have students become better Digital Citizens?

(A digital citizen commonly refers to a person utilizing information technology (IT) in order to engage in society, politics, and government participation.)

Q12. How has your classroom climate been impacted by one-to-one computing?

Q13. What is the most significant improvement from students you have seen since going to a one-to-one environment?

Q14. What is the most significant improvement as a teacher you've seen since teaching in a one-to-one environment?

Q15. How do you see one-to-one computing transforming education?

Q16. If you had to advise another school that was planning to implement one-to-one computing, what advice would you give them, especially around instruction?

Q17. How do you feel the definition of knowledge changed since technology has become so important to society?

Q18. What effect has technology had on human nature? (Sliding Scale)

Q19. What effect have humans had on technology? (Sliding Scale)

Q20. How do you see technology integration in education impacting the jobs as students graduate and enter the working world?

Final Thoughts. What, if any, are any final comments you'd like to make about your experience with instructing in a one-to-one environment?

Appendix D

First Iteration of Coding

Jm	Carl	Nate	Bob	Lonnie	Deacon	Holly	Fanny
Projects are easier	Love 1:1; Students need to know it	My job has become easier	Ease and efficiency	"There are No More Snow Days"	"The Mess of the Web"	"Me vs. Them"	"It Changes the Way You Think"
							"Laptop Lids Down"
Grading quicker	Kids can do work when gone	Collaboration is high	Grade quicker, faster, customize-grading	Standard's-based grading, quicker, faster	Philosophy hasn't changed	"The Art of Good Conversation"	PD was fine
Computers can cause management problems and behavior problems	Can cause discipline problems	Cause discipline problems	Computers can be a distraction	Computers can cause classroom problems	Laptops can cause classroom management problems	Computers can cause distractions and discipline problems	Computers can cause classroom management problems
21 st century skills are easier to get at	Communication is so much better	More projects	Collaboration has increased. Have kids do it a lot	More projects; more formative assessment	PD should be differentiated	Do more commenting online with papers	
Student management is better	PD was fine. Wouldn't change anything	Communication a problem. Can't talk to each other	Like to customize more next year	Student accountability	Might try more blended	Still learning with technology	Collaboration is huge
Students can do more when gone	I use lots of online sources and cites. I have all of my stuff online	Philosophy hasn't changed	Games are good at times but can be used wrong	Collaboration	Projects more	I'll change more next year.	21 st century skills integration

Appendix E

Color Coding of Iterations

Jim	Carl	Nate	Bob	Lonnie	Deacon	Holly	Fanny
Projects are easier	Love 1:1; Students need to know it	My job has become easier	Ease and efficiency	"There are No More Snow Days"	"The Mess of the Web"	"Me vs. Them"	"It Changes the Way You Think"
Know technology. Kids need to know it.	I know a lot about technology. Kids know more but I can teach them how to use what for what	Know technology. Comfortable with my knowledge. Kids know more. I'm fine with that.	Comfortable with technology	Comfortable with my knowledge of technology. Kids know more. No biggie.	Know a lot about technology but kids know more. That's fine with me. I ask them if I have to	My knowledge of technology is less than kids. Intimidates me	"Laptop Lids Down"
Grading quicker	Kids can do work when gone	Collaboration is high	Grade quicker, faster, customize-grading	Standard's-based grading, quicker, faster	Philosophy hasn't changed	"The Art of Good Conversation"	PD was fine
Computers can cause management problems and behavior problems	Can cause discipline problems	Cause discipline problems	Computers can be a distraction	Computers can cause classroom problems	Laptops can cause classroom management problems	Computers can cause distractions and discipline problems	Computers can cause classroom management problems
21 st century skills are easier to get at	Communication is so much better	More projects	Collaboration has increased. Have kids do it a lot	More projects; more formative assessment	PD should be differentiated	Do more commenting online with papers	Know about technology but the kids knew more and it bothered me at first
Student management is better	PD was fine. Wouldn't change anything	Communication a problem. Can't talk to each other	Like to customize more next year	Student accountability	Might try more blended	Still learning with technology	Collaboration is huge
Students can do more when gone	I use lots of online sources and cites. I have all of my stuff online	Philosophy hasn't changed	Games are good at times but can be used wrong	Collaboration	Projects more	I'll change more next year.	21 st century skills integration