PERCEPTIONS OF LEARNING DURING A TRANSITION TO A ONE-TO-ONE TECHNOLOGY IN NINTH GRADE: CASE STUDY

by

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ABSTRACT

In a school district located in the northeastern United States, administrators and parents of some ninth graders decided to have their students participate in a program using 1:1 technology (meaning each child has a personal web-enabled device) in the classroom. The purpose of this case study was to gain insight into the way digital tools and information resources in a public high school affect student perceptions of learning. The participants chosen for this study were students entering 9th grade in a public high school. Using an ethical framework that focused on reciprocal benefits for the researcher and community, this study was focused on student perceptions of learning with and without technology. Through this study, the researcher gained insight into equity and gained greater understanding regarding the role of information and communication technology for education from the learner's perspective. The community gained a deep understanding of the need for consistent, reliable technology for their students and staff to use for teaching and learning.

Key terms: *Constructivism, Digital Citizenship, Information and Communication Technology [ICT], Proficiency Based Learning, Social Media, Technologically Disadvantaged*

PREFACE

Conducting research in a community and addressing the needs of a community, can not only add to the literature on a subject, but can provide knowledge that helps a community solve problems (Bacon, 2003; A. Ball, personal communication, August 5, 2014). Researchers have found that one of their main challenges is locating the right participant pool for observations (Lloyd, Kern, & Thompson, 2005). Due to the location of this pool of participants, I had access to data that was not accessible in any other location. Within this study, I explored and evaluated how digital tools and information resources affect the perceptions of learners entering ninth grade. I gathered data that included student perceptions of learning with dyadic experiences, i.e., students attending the same school with different experiences regarding access to technology for learning. Some students had 1:1, participating in a program where they had a web-enabled device for use during the school day and at home, and others had to use shared technology resources. Shared resources include a media lab with 24 computers and a Smart Board, library with a cart of laptops on wheels, and two other labs that are not always occupied.

Administrators within the district where I conducted this research developed this program at the request of their former superintendent of schools. While doing the work that preceded this study, I was frequently asked if this situation was designed by, or for, me. To be clear, it was not. I did not think this situation was equitable. The program was designed so that some students would have access to these tools while others did not. Once district administration had decided to go forward with their plans, there was a clear need for this situation to be studied.

A primary responsibility of a school librarian is to ensure equity of access to learning resources for all community members (American Association of School Librarians, 2010). Not all stakeholders have the same access to resources at home as they do when they are at work or

in school. Public school librarians, working with teachers who are expected to incorporate technology into teaching and learning, recognize the problems with this lack of equal access. While reading studies done on technology in education, I found very few focused on learning with technology from the high school student perspective. Many of those that did focus on the student perspective were quantitative, and lacked the power of human story with their data. Human stories are important to decision makers, because without stories to provide real-world human context, numbers lack meaning. Miles, Huberman, and Saldaña (2014) stated that research must have a clear reason for being conducted and it must be worthy of study. How can student perceptions inform teacher practice? How can they inform policy making decisions about technology in education? As students are stakeholders in education, their perceptions matter. During my preparation to undergo dissertation research, this opportunity arose to study and gain access to a participant pool that would provide a unique perspective on student learning with technology.

Digital tools and information resources are not the same in every school. They are, however, regularly incorporated into assessment, learning, and teaching in today's digital world (Archambault, Kennedy, & Bender, 2013; Baker, 1984; Carnahan & Fulton, 2013; García-Valcárcel, Basilotta, & López, 2014; Gorghiu & Gorghiu, 2014; Kirkscey, 2012; Ozdamli & Uzunboylu, 2015; Pamuk, 2012; Welch, 2013). Therefore, any insight into student perceptions of how these tools and information resources are incorporated into teaching and learning would be an important addition to the literature.

ACKNOWLEDGMENTS

This is written in grateful appreciation to my family for their support during this journey. I would also like to thank the students who have inspired my work. Deep appreciation is extended to the people who believed in me, including Dr. Virginia Barry, Dr. Mark McQuillan, Dr. Irv Richardson, Dr. Margaret Ford, and Dr. Matthew Moehle. Special thanks is given to the following members of my cohort: Paula Stewart, Carol Allen, Lleij Schwartz, and Nathan Greene. Our Thursday night conversations have deepened my thinking. Dr. Donald Altman, Carol Allen, and Holly Ange your help with this work has been invaluable, thank you! Adi Rule is an amazing editor, and I highly recommend her to anyone attempting to see the forest through the trees! To the other members of my cohort: *Damnare, te mollem: id inisti, id peragito!*

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KEY TERMS

Constructivism - *Constructivism* invites the learner to contribute and build on their learning experience. Martens, Bastiaens, and Kirschner, (2007) said, "Constructivism is not an approach to or a model for instructional design, but rather a philosophy of learning based on the idea that knowledge is constructed by the learner through activity" (p. 82). In this type of learning the teacher becomes a facilitator of learning or coach, guiding learners as they construct new knowledge.

Digital Citizenship – A term used to describe the characteristics of behavior expected of students when using digital tools to access and use the Internet. According the *International Society for Technology in Education*, digital citizenship has nine elements. Characteristics include proper communication, using digital tools for learning, understanding and avoiding plagiarism, advocating for others to get access to resources, and treating others with respect (Brichacek, 2014).

Information and Communication Technology [ICT] - A generic term used to describe software, hardware, Internet-based programs, telecommunications, computer applications, course management software, and new technologies as they emerge (García-Valcárcel, Basilotta, & López, 2014; Gorghiu & Gorghiu, 2014; Kirkscey, 2012).

Proficiency-based learning – Proficiency-based learning includes "brief diagnostic tests, which provide information to identify gaps and strengths. No student proceeds to new material until prior or more basic prerequisite material is mastered" (Hattie, 2009, pp. 170-171). Advancement in schools that use proficiency-based learning indicates that a student has mastered prior materials and is ready to move to new material and new learning.

Social Media - *Social media* is defined as a "…socially acceptable way to communicate ideas, thoughts, feelings, and information to a global audience, in an unfiltered forum that can be democratic, chaotic or both" (DePietro, 2013, p. 6). "Social media" in this paper includes social networking applications, online gaming, and constructivist learning spaces with user-created content.

Technologically Disadvantaged - The United States Department of Education, Office of Civil Rights considers students who do not have access to necessary technology outside of school as technologically disadvantaged. How school districts support students who do not have Internet access at home, such as providing a Wi-Fi hotspot at school that is available outside of school hours, is considered when investigating Title VI actions where students may have been denied equal access to educational resources (Lhamen, 2014).

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CHAPTER 1

PROPOSAL

As educators, our primary job is to pass on societal norms and knowledge to develop the next generation of productive citizens (Dewey, 1916/1944). As society's tools change, it is important to be mindful of how those changes affect the education process. Dewey (1916/1944) shared that reflection by educational researchers, "…is the discernment of the relation between what we try to do and what happens in consequence" (pp. 144-145). The purpose of this study was to gain insight into the way digital tools and information resources in a public high school affected student perceptions of learning. The study involved two groups of students - those who had access to those tools all the time and those who did not.

Historically, computers have been used to access distance learning (Danaher, 1994), provide support for students (MacDonald & McAteer, 2003), and engage the disengaged student with new media (Liu, Horton, Olmanson, & Toprac, 2011). Today's administrators deal with cyberbullying (Pelfrey & Weber, 2013) cyber-truancy (Archambault, Kennedy, & Bender, 2013), policy development that can hardly keep up with technology evolution (Davis, 1995), and social media in schools and beyond the classroom walls (McGough & Salomon, 2013). Internal and external pressures have made technology use for teaching and learning an important topic for educational researchers.

External pressure comes from policy makers, some of whom have long worried about education equity and the use of information and communication technology (Attewell, 2001; Blaylock & Newman, 2005; Eamon, 2004; Neel & Ennis, 2012; Overbaugh & Lu, 2008). Educators, administrators, and policy makers are stakeholders in public education. Students are also stakeholders "because without students, there would be no need for schools" (I. Richardson,

personal communication, January 10, 2015). This research focused on student perceptions of learning with and without 1:1 digital tool access.

Dewey (1916/1944) said that the democratic ideal was based on two factors: the coming together of different social factors for mutual interests, and free interaction of social groups. In this study there were multiple students attending school together, but having very different experiences regarding how technology was used for their learning. This research was conducted in a school where teachers were required to teach using information and communication technology and students were expected to develop skills for work or college in a performance-based learning environment. Gaining understanding of these students' perspectives provided unique insight into their lived experiences.

Problem Statement

By providing free public education, our nation has made a commitment to equity (Boykin & Noguera, 2008). With the increased use of technology, both in classrooms and for assignments outside of class time, not all students have the same access to learning opportunities. Educators need to know how students perceive the use of technology in their classrooms because teachers are required to incorporate technology into teaching and learning (Overbaugh & Lu, 2008). Understanding how students' access to technology affects their learning, especially during critical stages in student transition, may provide new insight for educators about how students engage with content area knowledge using digital tools.

Because not all students have the same technology experience in their homes, equity plays a critical role as teachers integrate technology into education. For much of the last two decades the focus of policy makers and educators has been on ensuring that students had equitable access to educational resources at school (Attewell, 2001; Carnahan & Fulton, 2013;

Donlevy, 2000; and Eamon, 2004). Along with equitable access to educational resources there is a notable need to keep students engaged in their education, as boredom was noted by 44% of students in high school surveys (Quaglia & Corso, 2014). Engaging students in their education is critically important to student completion of high school. In some studies, researchers made the connection between using relevant technology and student engagement (Charles, 2012; DePietro, 2012; Gorghiu, & Gorghiu, 2014).

Student home life, the external and internal experiences that help influence how students perceive education, affects knowledge acquisition. Some literature reviewed for this case study pointed to the need for qualitative research with students (Hawkins, Graham, Sudweeks, & Barbour, 2013; Martens, Bastiaens, & Kirschner, 2007; Swain & Pearson, 2002). Qualitative research allows students to give voice to their lived experiences and inform adult stakeholders how to best support the development of young society members.

Society's current focus of preparing high school students for work or college echoes the sentiments of John Dewey, who believed free public education is an important part of this nation's commitment to equity. Close examination of student perceptions on how learning opportunities differ depending on whether or not technology is 1:1 will provide insight for teachers, administrators, and policy makers. Therefore, this case study focuses on student perceptions.

Statement of Purpose

Ozdamli and Uzonboylu (2015) noted that teachers need to "select the best tools for learning activities both inside and outside of the classroom" (p. 161). Today's students have to be critical thinkers. In this world where learning takes place anytime and anywhere, students have to be able to view information presented by other Internet users with a critical eye (Welch,

2013). Technology is evolving so quickly that students will have to approach new machines and problem solve their way into using tools which have not even been invented yet. Understanding how this digital generation adapts and solves problems from their perspective will provide insight to educators and policy makers and inform best practices going forward.

Students need to have teachers who understand how they learn best. Prensky (2001) wrote that: "…today's students think and process information fundamentally differently from their predecessors" (p. 1). His description of "digital natives" sent a message to educators 14 years ago that teachers needed to understand how this new type of student learned and adapt their teaching to students' new ways of thinking. Yet some schools still expect students to discontinue their technology use while in school, and others have teachers and learners who lack the skills to apply web-enabled devices for learning purposes (Prensky, 2001; Ozdamli & Uzunboylu, 2015).

Perception is the "subject's act of receiving data from the outer world" (Ozdamli & Uzunboylu, 2015, p. 161). Interpretation of received data is dependent on the lived experience of each student. Not all students come to school ready to learn. Many deal with external pressures that cause stress and dysfunction in their home lives. In order to be open to knowledge, according to Maslow (1943), students' basic needs must be met before they can fulfill their desires to become what they are capable of becoming. When students come to school from a home without enough food on the table, it is hard to imagine them even having an inclination to deal with the complexities of digital tools. This study focused on student perceptions, in order to facilitate stronger learning outcomes using technology for educative purposes.

Questions

Questions for this study came from the literature, researcher interests, and a community-based need for research on the implementation of 1:1 technology in a public school. The primary

question for this study was, “How does learning with or without 1:1 technology affect student perceptions of their learning experience?”

Sub-questions for this study included the following:

- Even if students have equal access to 1:1 technology during the school day, how is the learning experience of a student without access to digital tools beyond the school day different from a student who has access to those tools both at home and at school?
- How does the difference between having and not having technology at home affect student perceptions of each other?
- How does the widespread use of technology in teaching affect student self-perceptions as learners?
- What can we learn by comparing student stories?

Framework Development

From reading extensively, researchers gain deep understanding of the theories and frameworks that other researchers have used while developing their studies (Charmaz, 2006). This study had a deontological framework, with reciprocity being a key aspect of recruitment of participants (Flinders, 1992 in Miles & Huberman, 1994). In this type of ethical framework, both the researcher and participants must gain something from working with each other. Those conducting fieldwork must avoid doing anything that society would consider wrong. “Reports must be just, fair and honest” (Miles & Huberman, 1994, p. 289). Developing an ethical framework helped me establish a relationship of trust with members of this learning community. Basing research in a community and addressing the needs of a community not only adds to the literature, but can provide knowledge that helps a community solve problems (Bacon, 2003; A.

Ball, personal communication, August 5, 2014). In this case, I provided this community with help evaluating a program and they gave me access to their students. With this ethical framework in mind, I developed a conceptual lens that facilitated data collection and analysis.

Data Analysis and Conceptual Framework

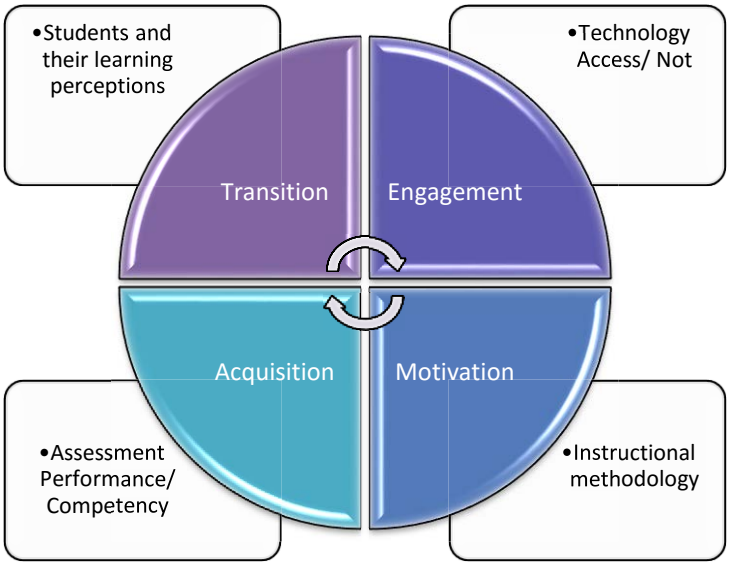
I examined multiple sources of data collected for this study through the lenses of three frameworks: ethical, theoretical, and conceptual. Student learning perceptions with and without web-enabled devices in a high school setting were the focus of this study. Students either belonged to the group with web enabled devices chosen by the district or to the group that either brought their own devices or had none. The number of students changed due to enrollment fluctuations.

The proposed framework, pictured in Figure 1, had components that included student learning perceptions, transition, technology access/not, engagement, teaching methodology, motivation, assessment of performance and competency, and acquisition of new knowledge. Student learning is progressive. Each of these components were thought to be needed for students to become part of this particular community of learners. For the purpose of clarity, the type of data collected and how it aligns with the study are explained through the lens of this framework. As students transition from middle school into high school they also experience a shift in their reality. This framework begins by examining student transition and their perceptions of learning.

I analyzed data collected from interviews and observations using the program Atlas.ti. *In Vivo* coding, where chunks of words are picked out of interviews provided the initial list of codes (Miles, Huberman, & Saldaña, 2013). From there, second level coding was used to deduce themes. I consulted the framework developed for this study to determine if the themes worked

with the framework or fell outside the framework.

Figure 1.1. Ange's framework for digital learning in ninth grade



Transition

According to Allensworth and Easton (2005), the transition from eighth to ninth grade is critical to the success of students, and is a predictor to future completion of high school. Studies about the transition from eighth to ninth grade indicated that this change was a critical time in student development (Bhanot & Jovanovic, 2009; Henry, Cavanaugh, & Oetting, 2011; Li & Lerner, 2012; Somers, Owens, & Pilansky, 2009; Wang & Eccles, 2012). During this change from middle to high school, studies showed that students were influenced by their relationships, how connected they felt to their school, the curriculum used in classrooms, and by parental investment in their education. As the participants in this study were going to be in the ninth grade class, literature focused on this period in student development. Student focus groups were used to identify participants for the study.

Students and their learning perceptions

From the literature, it is clear that learning perceptions of students were affected by their environment, context, and experience. In studies, students are heavily influenced by their community. As they entered high school they are most likely to choose peers who are most like themselves (Berndt & Keefe, 1995). Student perceptions of their learning are influenced by those people they attempt to emulate. To assess learner perceptions, student interviews, surveys, and classroom observations would be evaluated as part of this case study.

Parents have been shown to have a significant influence on the behavior of students (Berndt, Laychak, & Park, 1990). For the purpose of this study, it was important to consider not only how students used technology for learning, but also how parents perceived technology use by students. To this end, a survey instrument developed by the school district's Steering Committee was used to assess student use and parental knowledge of how students use technology for education.

Data from these surveys were important, but not the focus of this study. As supplementary information, the surveys were considered as added value for interpretation of findings in this case study. If the data clarified key findings (provided triangulation) or corrected errors made when interpreting participant's observations (for example, if a student report was inaccurate) I would then incorporate it as a source of essential information for this case study.

Engagement

In studies about technology integration in education, students reported greater engagement with their content (Hawkins, et al., 2013; Charitonous, Blake, Scanlon, & Jones, 2012; Kim, Kim, & Karimi, 2012). Student conversations about classwork continued beyond the

school day which is an indicator of engagement with their learning environment. Therefore this framework considered student engagement with their content.

I found a gap in the literature related to students who did not have access to technology beyond the school day (Thomas & Ortheber, 2011; Charles, 2012; Drijvers, 2013). While it is unclear if there is a connection between technology access and lack of engagement, it is noteworthy that lack of engagement is seen as a primary cause for students to leave school (Koth, Bradshaw, & Leaf, 2008; Ryan & Patrick, 2001). Students who leave school do so because of boredom and disaffection according to data from the National Center for Education Statistics (U.S. Department of Education, 2014). Quaglia and Corso (2014) and Fullan (2013) connected multiple factors, including technology use, to student engagement with content. Questions in the initial interview regarding teacher expectations for learning with technology were to be used to assess engagement with content knowledge.

Technology access or not

In the early part of the 21st century, educators and researchers wrote about a digital divide existing between students with low socioeconomic status (SES) and high SES. At the time some of these authors were examining the digital divide, access to computers was limited to desktop computers in schools and few students with low SES had access to these tools at home (Attewell, 2001; and Blaylock & Newman, 2005). Concern about students with high SES getting greater access to educational resources and support from their teachers (Eamon, 2004) led to national funding of educational technology.

With the increased use of technology both in the classroom and for assignments outside regularly scheduled class time, a greater demand for access to computers as learning tools has arisen. For the purpose of this study, I interviewed students with and without access to 1:1

technology regarding their learning experience. Interviews with the students and their teacher provided much of the data included in Chapters 4 and 5. A question about access to technology was included in the initial interview to determine if students had access to the Internet at home.

Motivation

Motivation is a key factor for keeping students in school. Fullan (2013) wrote that students become disengaged and bored as they enter high school. Research supports this supposition (Koth, et al., 2008; Quaglia & Corso, 2014; Ryan & Patrick, 2001). Teachers often cited motivation and engagement as reasons for using technology in their classrooms (Charitonous, et al., 2012; DePietro, 2012; García-Valcárcel, et al., 2014; Pamuk, 2012). Researchers link certain teaching strategies to increased student motivation and engagement. These include teacher-student relationships, teacher clarity, mastery learning, worked examples, providing formative evaluation, and feedback mechanisms (Hattie, 2009). Data collected from interviews was used to assess how motivated students were regarding content area knowledge.

Instructional methodology

Researchers found that teachers need to know how technology can be integrated into their curriculum (Kirkscey, 2012; Mishra & Koehler, 2007). Song, Hannafin, and Hill (2006) noted that students and teachers have to come together on multiple levels to facilitate learning with information and communication technology. These levels included awareness, motivation, learning strategies, and adaptation of their beliefs to create an environment where learning or epistemic reconciliation happens. Within this study, students were expected to achieve mastery of multiple competencies and had to be offered at least four summative opportunities to prove mastery in each competency.

The faculty at the site where this study took place employs a number of different instructional strategies, and assesses students for competency using common assessments among classes. Students who take common classes are required to take the same assessment regardless of which section they attend. Midterm and final assessments count for 15% of their overall grade each semester.

Proficiency-based learning includes "brief diagnostic tests, which provide information to identify gaps and strengths. No student proceeds to new material until prior or more basic prerequisite material is mastered" (Hattie, 2009, pp. 170-171). At this school, students are expected to show their learning through performance-based assessments and to demonstrate proficiency before they move on to the next learning task. This is a limitation for replicability of this study and added to the uniqueness of this case. Teacher interviews were a data source for this part of the framework and were used as part of the study.

Knowledge Acquisition

Knowledge acquisition, but more importantly, the application of knowledge, is the truest indicator of effective instruction. Learning with technology, or applying new knowledge, requires the student to have assistance from a teacher (Song, et al., 2006). Vygotsky (1978) noted that the zone of proximal development occurs when students can do new things with help. This zone of proximal development relates well to the acquisition stage in this framework for learning with technology.

The tools society uses have a direct effect on how youths learn to be part of a community (Dewey, 1916/1944; Montessori, 1949/1969; Vygotsky, 1978). Montessori (1949/1969) believed educators should provide students with tools that actually work in order for them to apply their knowledge to real world situations. In an era where knowledge is digitized and many businesses

use digital tools, knowing how to use these information and communication technologies is a necessary part of education (U.S. Department of Education, 2015). Knowledge acquisition was assessed by student vocabulary regarding content area knowledge and technology tool integration during student interviews.

Assessment of performance and competency

Performance-based learning activities presume students would meet learning expectations through mastery of specific objectives (Hattie, 2009). Students in recent studies used technology to create presentations, write reports, learn socially, and create videos or blogs about their experiences (DePietro, 2012; Drijvers, 2013; Liu, et al., 2011; Martens, et al., 2010; Thomas & Ortheber, 2011). In this study, students were expected to complete a variety of performance-based and common assessments to prove mastery of learning. Teacher interviews and assessment results provided insight into both instruction and assessment.

Ange's framework was created to provide a lens that would allow me to investigate the learning outcomes of these groups of ninth grade students. The initial proposal for this case study followed the basic format outlined in this chapter. As the study has been completed, some changes were made to address issues in the field. In the next chapter I explore literature regarding adolescence and consider literature related to the domains outlined in the framework.

CHAPTER 2

LITERATURE REVIEW

From studying the writings of Dewey (1916/1944), Montessori (1949/1967), Vygotsky (1978), and from personal observation, I have come to see that learning is grounded in children's cognitive, emotional, and social development. As children develop and grow, they move from crawling, to walking, and then, to running. Similar to their physical development, for most children the brain's social and emotional centers develop over time. These social and emotional centers allow children to become aware of first their family, then other children in their neighborhood or extended family. This development of awareness leads to the need to learn social skills. Children become students because their parents have the intention of their eventually becoming adult members of a shared society (Dewey, 1916/1944). Knowledge acquisition is influenced by the perceptions of the learner. In this study perceptions are defined as a "subject's act of receiving data from the outer world" (Ozdamli & Uzunboylu, 2015, p. 161). These perceptions are affected by the people they associate with, their environmental context, and available tools and how they use them. This literature review examines how student perceptions influence their transition to high school, engagement with a learning community, and how instructional methodology with and without technology affects their overall acquisition of knowledge.

Using the Guided Inquiry Design Process, I began with a broad question of how technology is integrated into secondary curriculum (Kuhlthau, Maniotes, & Caspari, 2007). Large, open-ended inquiry is the first step in the process of guided inquiry. In the second step of the process, *immersion,* I sought out literature in the field regarding all aspects of teaching and learning with technology. The third step is to *explore* areas of interest. These included equity of

access to technology, teaching and learning with technology, instructor and student awareness, motivation, instructional and learning strategies, and student perceptions of learning with technology. Exploration led me to the fourth step, which is *identification* of a specific topic.

For the purpose of this study, I focused on literature that is specific to adolescence and the framework identified for this study in Chapter One. The components of this framework include student learning perceptions, transition, technology access/not, engagement, teaching methodology, motivation, assessment of performance and competency, and acquisition of new knowledge. The guided inquiry process has allowed me to gather resources from a wide variety of researchers and thinkers in order to build a knowledge base that will add to the literature on teaching and learning with technology in high schools.

Adolescence

Adolescence is a turbulent time in the lives of children. Not only are they growing, but their hormones are in a constant state of flux. Teenage bodies change rapidly, and in some cases their environment does, too. Between the ages of fourteen and sixteen, adolescent brains go through a growth spurt (Sprenger, 1999). This growth spurt often coincides with hormonal changes that can make teens uncertain about themselves. Sprenger (1999) suggests that teens need additional support during this time because they want to fit in, but may not be getting enough opportunities to practice social skills with their academics. Specifically adolescents need opportunities to work with others on projects, evaluate their peers, and assess themselves as part of a group of learners.

During formative years, children must learn to relate to others. Socialization and learning are essential for the teen who is becoming an adult. Nakkula (2003) stated that: “Identity is the embodiment of self-understanding. We are who we understand ourselves to be, as that

understanding is shaped and lived out in our everyday experience" (pp. 7-8). These relationships are critical because teens model what they see in others. This modeling is vital to their development as potential members of a larger society.

In academics, students' development can be deeply affected by their understanding of who they are in relation to their coursework. For instance, a ninth grade student who has a bad experience in an English class may decide that they are just not good at writing. "What kind of learner we become can be influenced by how we view ourselves in relation to our academic achievements and challenges" (Galley, 2003, p. 58). Teens need opportunities to experience academic success, especially during that all-important "brain growth window" (Sprenger, 1999, p. 95). Teaching an adolescent mind requires educators to create a balance between positive relationships, discipline, and academic achievement. This negotiation takes place in classrooms between the teacher and their adolescent learners. From the literature, teachers need to promote positive relationships while focusing on materials students find relevant to their lives and rigorous enough to challenge growing minds.

Transition

As students transition from the middle school into high school, they also experience a shift in their reality. They go from being the oldest children in the school back to being the youngest. According to Allensworth and Easton (2005), the transition from eighth to ninth grade is critical to the success of students and is a predictor of future completion of high school. Studies examining the transition from eighth to ninth grade show that this is a critical time in student development (Bhanot & Jovanovic, 2009; Henry, Cavanaugh, & Oetting, 2011; Li & Lerner, 2012; Somers, Owens, & Pilansky, 2009; and Wang & Eccles, 2012). At this time in

their lives, students are influenced by their relationships, how connected they feel to their school, the curriculum that is used, and by parental support of/ investment in their education.

Bhanot and Jovanovic (2009) reported that parents of boys believed science was more important for their children's future than parents of girls. From this study, parents appear to play a critical role in student perceptions regarding their aptitude and ability to perform in science. Henry et al. (2010) found:

> …that a strong relationship between these two constructs would exist at each level, where students from lower SES families would report a lower expectation to graduate from high school and school districts in communities where concentrated disadvantage was more prevalent would have lower average high school graduation expectations among 7th to 9th grade students and the overall graduation rate (as defined by the CPI) in the district would be lower. (p. 1173)

A number of factors may have contributed to lack of parental involvement in the education of children in lower SES households. These factors included parents working multiple jobs, lack of resources for their children, and lower personal investment in their own education (Henry et al., 2010).

Wang and Eccles' (2012) results indicated there is a positive correlation between students' behavior in school and the amount of peer, teacher, and parent support they receive regarding their academic career. The only exception the study found was that peer support sometimes leads to lack of school compliance. The researchers found that their predictions of reduced interest in school, compliance, and valuing of learning were accurate. They noted that there is a potential mismatch in the "youth's stage of development and the opportunities provided in the secondary school environment" (Wang & Eccles, 2012, p. 889). This indicates a need to

better understand the correlation between student development and opportunities for learning that students value.

Researchers have used intervention strategies to determine whether offering supplemental tutoring would help with student attitudes and beliefs about education. In one study, researchers discussed student career goals with inner-city students. They found that, with the exception of teaching, "careers that typically involve a four-year college degree [were] rarely mentioned" (Somers, et al., 2009, p. 354). Though their experiment did not appear to improve student engagement or academic achievement as measured by their GPA, the researchers believe it may have helped with retention, as it "may have been helpful in avoiding failure during the transition to high school" (Somers, et al., 2009, p. 356). Somers' study adds to the quality of this literature review by documenting the results of an intervention program with urban, minority students.

From the studies I considered for this section, it is clear that parent involvement plays a role in student perceptions of their learning and affects their transition to high school. Transition to high school from middle school is a critical time of growth for students as learners (Allensworth & Easton, 2005). Student perceptions of their learning also play a critical role as noted by Wang and Eccles (2012), Bhanot and Jovanovic (2009), and Henry et al. (2010).

Since perception is based on information that students receive from the world around them (Ozdamli & Uzunboylu, 2015), then gathering information from students is necessary to understand that perspective. Studies show students are heavily influenced by their communities. As they enter high school, they are most likely to choose peers who are most like themselves (Berndt & Keefe, 1995). Community members, including parents and neighbors, can also have a significant influence on the behavior of students (Berndt, Laychak, & Park, 1990). Since it was noted by Wang and Eccles (2012) that peers and parents can have a negative influence on

engagement with the school community, it is important to consider the role of engagement on student learning. The next section concentrates on student engagement in the classroom and its relationship to student learning. Many of the studies examined for this next section considered the role of technology in student engagement with learning.

Engagement

In each of the studies examined in this section, researchers worked to create a deeper understanding of how instructors and students build awareness of each other through transactional presence (Shin, 2003), online communication (Correia & Davis, 2008; Wade, Fauske, & Thompson, 2008), and social media (Charitonous et al., 2012). There are multiple ways for teachers and students to build awareness of each other, but this knowledge is important as it helps the instructor understand student learning needs. In today's digital world, communication needs to be clear. Email and online chat should be monitored and worded in ways that consider the development and maturity of the students receiving these communications (Zdravkova, Ivanovic, & Putnik, 2012). Teacher clarity is listed by Hattie (2009) as having a significant positive correlation to student achievement.

Wang and Eccles (2012) found a correlation between gender and school engagement. Female students were more likely to feel connected to their schools in seventh grade than male students. The declines in school engagement were similar for both genders as the students aged. Wang & Eccles' work adds to the strength of this literature review by examining multiple factors on a large scale that show student engagement declines over time. Findings in several studies show there are factors that help to retain engagement, including positive parent support and teacher social support (Bhanot & Jovanovic, 2009; Henry et al., 2011; Somers et al., 2009).

Multiple studies and books also cited engagement as a reason for incorporating information and communication technologies into teaching and learning (Charles, 2012; Christiansen, Horn, & Johnson, 2008; DePietro, 2012; Drijvers, 2013; Fullan, 2013; García-Valcárcel et al., 2014; Goos, 2010; Gorghiu & Gorghiu, 2014; Himmele & Himmele, 2011; Kirkscey, 2012; Marino & Beecher, 2010; Neel & Ennis, 2012; Thomas & Orthober, 2011; Williams, 2011). Teachers in many of the studies examined for this section used technology as a tool to support learning and supplement resources available in classrooms. The works of researchers and scholars considered for this section expected technology to be used in transformational ways in order to keep students engaged in their coursework.

The sheer volume of digital tools available in the 21st century is astonishing. Digital tools today include computers, smart phones, tablets, laptops, notebooks, and other web-enabled devices. Information and communication technology is prolific enough that there are international standards for student learning with these tools (International Society for Technology in Education [ISTE], 2015). Changes in policy, an expectation for learners to access technology, and teacher content delivery using digital tools all have implications for learners in public education systems.

The connection between technology and student engagement comes from the way society uses these tools for working, earning a living, and interacting with each other. Children make connections through their education as they learn to become productive members of their social system. The next section focuses on instructional methodology as noted in the literature.

Instructional Methodology

The introduction of computers into education has changed teaching and learning, which is evidenced in the literature. Studies from educational researchers, books on teaching and

learning, and education statistics provide extensive information about how pedagogy has changed due to the incorporation of ICT in classrooms and beyond the walls of schools. Literature from recent years points to the prevalence of digital tools in classrooms (Charles, 2012; DePietro, 2012; Drijvers, 2013; García-Valcárcel, Basilotta, & López, 2014; Goos, 2010; Gorghiu, & Gorghiu, 2014; Kirkscey, 2012; Marino & Beecher, 2010; Neel & Ennis, 2012; Thomas & Orthober, 2011; Williams, 2011). Education technology is a burgeoning field, as companies race to support teachers with the latest software and hardware for their classrooms.

From the reading it is clear that more and more classrooms are implementing digital tools. Teachers use text messaging (Thomas & Orthober, 2011), implement social media, (DePietro, 2012), and use technology to help students collaborate on assignments (García-Valcárcel, Basilotta, & López, 2014). Gaps in the literature included student perceptions of learning in a 1:1 classroom, differences between classrooms that have access and those that do not, how learning differs between students with and without 1:1, and student perceptions of students with and without 1:1 technology access.

I examined several models for teaching with technology as part of this review. The *SAMR* model was developed by Puentedura (2009). In this model, the teacher develops technology-use efficacy in stages: substitution, augmentation, modification, and redefinition. This model focused on how the use of the tools changes tasks, from basic substitution all the way to redefining the way teachers conduct their classes.

I also considered the TPACK model, developed by Mishra and Koehler (2007). In this model, there are seven different areas of knowledge for teaching with technology: technology knowledge, content knowledge, pedagogy knowledge, pedagogical content knowledge, technological content knowledge, technological pedagogical knowledge, and technological

pedagogical content knowledge. The researchers incorporated technology content knowledge into pedagogy to facilitate integration of technology into classrooms. Both the SAMR and TPACK models focused on the teacher, and related to the teaching side of using technology in classrooms, but did not take into account the student's experience.

Song, Hannifin, and Hill (2006) developed an Epistemological Reconciliation Model for teaching and learning. Their model does recognize that the way students approach learning is different from the way teachers approach teaching. Although the researchers noted that both teacher and student needed to come together on multiple levels in order for knowledge to be developed, their model is a general model for teaching and learning that can be used for any type of classroom. It is not grounded in the use of technology in the classroom.

Within the post-modern frame of technology integration in classrooms, the articles reviewed describe various contexts. These studies included teachers with a variety of experience levels ranging from pre-service teaching to teaching with new technology by experienced educators with many years of service. Though the range of teacher experience is vast, the literature points to some commonalities. When implementing new technologies within the classroom, all teachers in this review needed time and opportunities to practice in order to align pedagogy with the available technology (DePietro, 2012; García-Valcárcel et al., 2014; Kirkscey, 2012; Pamuk, 2012; Schneckenberger, Ehlers, & Adelsberger, 2011; Zdravkova et al., 2012). Examples from the literature of how technology is being incorporated in classrooms within this decade show that teachers use everything from handheld devices to interactive learning platforms in order to enhance the learning experience for their students (Charitonos et al., 2012; DePietro, 2013; Scheckenberg et al., 2011).

Holcomb, Brown, and Lima (2010) found that using performance-based assessment with educators suggested significant positive relationships between participant confidence in use of technology and how often technology was implemented into lessons for their students. The researchers conclude by stating that "due to the constant emergence of new technologies … educators may experience fluctuations in self-efficacy levels, which in turn could suggest that educators need to assess both their educational technology competencies and their technology self-efficacy on a regular basis" (Holcomb et al., 2010, p. 128). Because of this, teachers need regular access to professional learning time with new technology tools.

In some schools, teachers are implementing proficiency-based learning. Proficiency-based learning includes "brief diagnostic tests, which provide information to identify gaps and strengths. No student proceeds to new material until prior or more basic prerequisite material is mastered" (Hattie, 2009, pp. 170-171). This type of teaching and learning requires the teacher to understand where students are as learners, which relates to the model developed by Song et al., (2006) regarding teacher and student awareness.

Online learning is expanding learning opportunities for students, but teaching online requires the teacher to learn advanced skills with information technology (DePietro, 2012). Another study found that students need to feel that their teachers were competent with technology integration, and that the integration is relevant to their learning experience, so the technology does not become a distraction (Kirksey, 2012).

Looking at critical shortage lists of educators in several northeastern states, it is clear that access to quality science, math, and other subject area teachers can be difficult to provide for students. From the literature, authors are saying that our current education system is not able to provide access to all learning that students want or need for their future careers (Christiansen,

Horn, & Johnson, 2008; Fullan, 2013). Virtual or online learning allows students to have access to greater course offerings, but as with brick and mortar schools, engagement with both teacher and content is essential for student success (Sorenson, 2012; Hawkins et al., 2013).

Pedagogical philosophies

There are multiple types of pedagogical philosophy which can contribute to how students learn in schools. Two of these are constructivism and behaviorism. Howard Gardner discusses the difference between these two philosophies:

> In a behaviorist class, one focuses on the answers desired and tries to shape responses until they resemble the prototype….In a constructivist classroom, students continually try out ideas and practices for themselves and see where they work and where they prove inadequate. (Scherer, 1999, p. 13)

One researcher linked block scheduling to constructivism. Hackmann (2004) examined the connection between block scheduling and constructivist learning by saying that they "occurred in parallel, yet independent movements" (p. 698). He went on to say that the two movements come together on several levels, and that block scheduling "should logically be considered as a vehicle to promote constructivist practices" (Hackmann, 2004, p. 698). Block scheduling significantly lengthens the time students spend in a single learning environment, allowing the students and teacher more time to develop conversations, leading to a constructed learning experience.

Boghossian (2006) examined three different types of pedagogy including: constructivist, behaviorist, and Socratic. He describes behaviorism as including "conditioning" of students to respond to external stimuli, so that when a student answers a question correctly from material covered in a class, the teacher has successfully conditioned the student (Boghossian, 2006, p. 716). This kind of teaching has the learner reflecting what the teacher models. According to his

work, there is no need for students to be thinking on their own or contributing to the learning in the class.

In the Socratic classroom, students learn through discourse guided and directed by the teacher. The student arrives at new knowledge through discovery of a truth through "directed questions" provided by the teacher (Boghossian, 2006, p. 717). Knowledge acquisition was noted as the essential reason for students to attend school.

According to Maslow (1943) all of a student's basic needs must be met before they are open to knowledge and able to fulfill their desires to become what they are capable of becoming. The studies reviewed in this section considered different instructional strategies and philosophies used with information and communication technology in education. In the next section, the literature focuses on acquisition of knowledge and how teachers know students are learning.

Knowledge Acquisition

Montessori (1949/1969) believed we should provide students with real tools that work in order for them to apply their knowledge to concrete world situations. In an era where knowledge is digitized and digital tools are used in many businesses, knowing how to use information and communication technologies is a necessary part of education (U.S. Department of Education, 2014). Student learning regarding digital tools does not only happen in the classroom. In a recent study, students reported learning how to use technology from their friends, and from watching online tutorials on their own (Scheckenberger et al., 2013). This independent learning has led some students to become more knowledgeable than their teachers in terms of technology application.

Fullan's (2013) examination of the integration of technology into education shows that how some students receive their education is changing. Combining education technology with

changes in pedagogy and development of what we know about how change happens in education points to a future where students can be the drivers of their own learning. Christensen, Horn, and Johnson (2008) discussed the need for different delivery systems of education in order to meet the needs of all learners. Some books and studies indicate that teachers used technology to differentiate instruction for their students (Benjamin, 2005; Casey, 2008; Hannafin & Forshay, 2008; Marino & Beecher, 2010). Multiple studies point to the use of information and communication technology in teaching and learning to facilitate higher engagement with students, leading to greater acquisition of content knowledge for students (Charitonous et al., 2012; DePietro, 2012; Drijvers, 2013; Gorghiu & Gorghiu, 2014; Hawkins et al., 2013; Liu et al., 2011; Kim et al., 2012; Scheckenberger et al., 2013; Thomas & Ortheber, 2011). From the literature, delivery systems for learners are changing, and education is becoming more personalized for each student through the incorporation and use of digital tools.

While attempting to define the term *e-learning 2.0*, Schneckenberg et al. (2013) stated there are five characteristics that are prevalent in this type of learning, which bear repeating in this literature review:

- Learning has become ubiquitous. It is no longer restricted to the classroom but evolves in many different contexts.
- Learners increasingly take on the role of organizers.
- Learning is a lifelong process. It has many episodes, and it is not exclusively linked to educational institutions.
- Learning takes place in communities. Learners participate both in open and restricted learning communities.

- Learning is informal; it takes place at home, at the work place and during leisure time, and it is no longer centered on teachers or institutions. (p. 748)

From the literature, learning strategies include using digital tools to enhance teaching and increase access to information (Gorghiu & Gorghiu, 2014; Welch, 2013). Some studies indicated that teachers needed to have familiarity with technology before it could be integrated into their curriculum (Kirkscey, 2012; Mishra & Koehler, 2007). Teacher efficacy with technology played a strong role in student acquisition of learning within these studies.

Not all studies advocate the use of technology in classrooms. In a study by Wijekumar, Meyer, Wagoner, and Ferguson (2006), students who used technology to record notes in their classrooms were less likely to recall information. Their recall was impaired in part because the students had multiple windows open on their computers and were not necessarily paying attention to the task at hand. The researcher noted, "There was a clear pattern in three of the multitasking users' recalls. All were disjointed and missed many details of the conversations" (Wijekumar, Meyer, Wagoner, & Ferguson, 2006, p. 203). Mueller and Oppenheimer (2014) noted that students who keyboarded their notes instead of writing them out in longhand lacked the ability to retain information they had recorded in class. Many studies considered for this review advocate the use of technology in classrooms to enhance engagement and knowledge acquisition. However, there is a body of literature that suggests how information and communication technologies are used must be constructed with young adults in mind in order for technology to enhance learning.

Summary

From five areas of interest regarding teaching and learning with technology in high schools -- adolescence, transition, teaching methodology, engagement, and acquisition of knowledge -- I developed questions based on perceived gaps in the literature. Specifically, many of these articles and books focus on teaching with technology but not necessarily on the perceptions of learners transitioning to high school and using technology for their education.

Some studies point to the need for qualitative research with students (Hawkins et al., 2013; Martens et al., 2007; Swain & Pearson, 2002). Studies also show that equity plays a critical role as teachers integrate technology into education. For much of the last two decades, the focus has been on ensuring that students have equitable access to education resources, including technology tools (Carnahan & Fulton, 2013; Donlevy, 2000; Eamon, 2004). Along with equity, studies have shown the need to keep students engaged in school (Fullan, 2013; Qualia & Corso, 2014).

Educators frequently cited engagement as a reason to use digital tools in classrooms (Benjamin, 2005; Charles, 2012; DePietro, 2012; Drijvers, 2013; García-Valcárcel et al., 2014; Goos, 2010; Gorghiu, & Gorghiu, 2014; Himmele & Himmele, 2011; Kirkscey, 2012; Marino & Beecher, 2010; Neel & Ennis, 2012; Simkins, Cole, Tavalin & Means, 2002; Thomas & Orthober, 2011; Williams, 2011). Russell Qualia noted that engagement leads students to deeper acquisition of knowledge, according to data collected and analyzed by his institute (R. Quaglia, personal communication, August 2015). The evidence from these studies and books converges on the need for information from the student perspective regarding the use of digital tools in teaching and learning.

Digital tools include an enormous range of devices and software applications. Uniform standards for use in the classroom have been developed by international consortiums of teachers (ISTE, 2015). Government policy has had a profound impact on learning for students (Schwartz & Robinson, 2000). The adoption of industry standards for learning has impacted the need for schools to increase access to technology for students.

The proliferation of digital tools has changed how educators and researchers incorporate information and communication technology into teaching and learning. “Digital age skills are vital for preparing students to work, live and contribute to the social and civic fabric of their communities” (ISTE, 2015). Society is changing; many students now attend virtual schools in addition to their regular high school coursework (Archembault, Kennedy, & Bender, 2013; Martens, et al., 2007; Robyler & Marshall, 2002). With the decreased cost of digital tools, including smart phones and tablets, and increased use of these tools in classrooms and beyond school hours, examination of the effect of this use from the student perspective will add to the literature in this decade.

Implications for Future Research

Study of the literature yields several implications for future research. Educational researchers need more qualitative research focused on students in high schools (Hawkins et al., 2013; Martens et al., 2007; Swain & Pearson, 2002). There is also a need for additional research into how differentiated instruction is being employed for students with disabilities in virtual classrooms (Carnahan & Fulton, 2013; Roblyer & Marshall, 2002). In addition, research on Acceptable Use Policies and their implementation would add to the body of literature that educational leaders need for school and district administration (Davis, 1995; Flowers & Rakes, 2000).

Additional research on the negative impacts of student technology use would also be beneficial as educators try to create a balanced picture of what students need for learning in the 21st century (Mueller & Oppenheimer, 2014; Wijekumar, et al., 2006). Additional literature was added to this study until data collection began. Once data collection was completed literature reviewed for this study was consulted and synthesized with the researcher's findings. As with all literature reviews this one raised more questions than it answered. The literature chosen for this review provided a strong platform to begin the proposed case study on ninth grade students.

CHAPTER 3

METHODOLOGY

This case study was conducted using a single case study design (Yin, 2014). This case was bounded by a situation where some parents, but not all, chose to have their children participate in a 1:1 program during ninth grade. For this study, in particular, I used focus groups, interviews, observations, and some survey data collected by the district for the purpose of understanding student perceptions of the use of technology in their high school setting. Yin (2014) suggested that researchers should collect a vast array of data and then develop analytic strategies that work best.

District administration and parents of some incoming ninth grade students made the decision for their students to participate in a program using 1:1 technology (meaning each child has a personal web-enabled device) in the classroom. The focus of this research was how learning with or without 1:1 technology affected student perceptions of their learning experiences. Sub-questions were:

- Even if students have equal access to 1:1 technology during the school day, how is the learning experience of a student without access to digital tools beyond the school day different from that of a student who has access to those tools both at home and at school?
- How does the difference between having and not having technology at home affect student perceptions of each other?
- How does the widespread use of technology in teaching affect student self-perceptions as learners?
- What can we learn by comparing student stories?

In order to meet the high standards set by the United States for research, I went through extensive training on research ethics. These ethics were stated in a report created by the Department of Health and Human Services called *The Belmont Report* (1979). A portion of the report that pertains specifically to this research states:

> The capacity for self-determination matures during an individual's life, and some individuals lose this capacity wholly or in part because of illness, mental disability, or circumstances that severely restrict liberty. Respect for the immature and the incapacitated may require protecting them as they mature or while they are incapacitated. (para. 12)

Because this study called for the observation and interview of children legally recognized as minors, school district officials and I worked together to minimize the risk to both children and their school regarding participation in this study. Protocols meant to reduce risk and protect identity and privacy are documented in the Procedures section of this study.

Participants and setting

During this case study, freshman high school students were participating in a program through which n=40 students had *Google Samsung 2 Chromebooks* and n=70 others (dependent on student sign-up and enrollment) did not have Chromebooks. The assignment of students to these two conditions was determined arbitrarily by district administration and parent election for their students to be in a classroom that used 1:1 digital tools. Digital tools chosen for this program by a district Steering Committee were the Samsung 2 Chromebook. The classes planned for observation were humanities courses taken by heterogeneously grouped students. Humanities courses at this site include team taught English/social studies courses. There were three sections of this course, with only one having access to 1:1 tools. The humanities courses have common

assessments for all sections. Students who participated in the program were a quota-proportional sample representative of the high school population. Students in the two sections which were not 1:1 could choose, if they wanted, to bring their own devices.

Case studies, by nature, are unique (Yin, 2014). In this situation, there was an opportunity to examine teaching and learning with and without digital tools in a competency-based school environment. This study of student perceptions about their learning with and without digital tools had multiple aspects that limited replicability. These unique qualities added to the distinctiveness of the case and emphasized the need for a single case design. The community where this study took place was semi-rural in nature, with working farms and large open spaces as well as several small businesses. The town is located between two cities, each with populations of over 80,000 people. Many of the children attending this school have parents who work in those cities. The school district consists of three schools, grades Pre-K-12. Student enrollment as of February 2015 totaled 1,302 students (NHDOE, 2015). According to the New Hampshire Department of Employment Security (2015) the students live in a town whose population of 8,790 residents have a median annual household income of over $100,000.

Initially the Principal of the school emailed all parents of students in the humanities classes a consent form. I then asked students whose parents returned the consent forms to participate in a focus group. From the focus group, I chose students who expressed an interest in the study for follow up interviews. Questionnaires given to the focus group were used to select students for the study and are included in Appendix A. The study focused on acquiring three students from a section with devices, and three students from the two sections without devices to interview. The sections were taught with either 1:1 devices or with shared technology resources

including a school-based media lab with 24 computers, or library with a computer cart on wheels.

I chose one teacher at random from the group of teachers with both 1:1 and non-1:1 classes, and requested this teacher's consent to be interviewed. I also interviewed five students after receiving parent permissions and student assent. Interviews were strictly voluntary, there were no known risks to the participants, confidentiality was carefully maintained, and participants received no benefit or negative impact from being part of this study. The total sample for this portion of the case study was n=6.

Instruments

Survey data for the district's program evaluation were considered as a potential source of information for this case study. A matrix (table 4.1 p. 48) was utilized to align the interpretation of data gathered through this case study with research questions. Data for the district program evaluation was collected outside the scope of study. The district's evaluation was not the focus of this dissertation work. A survey instrument developed by the school district's Steering Committee was used to assess student use and parental knowledge of how students use technology for education (See Appendix B). Data from this survey was available to myself, Steering Committee members, and district administration.

My role as an instrument of qualitative research

In this study, I was a participant/researcher. I taught at the school where this study took place. Therefore, I knew most members of this learning community for a long time before becoming a researcher. As an early adopter of technology, I worked closely with the Information Technology Director, and members of the Steering Committee as they were considering starting this program. Members of my doctoral cohort group at the University listened while I talked

about personal concern over the questions of equity raised by this program. They suggested that perhaps I should consider studying this situation. When I talked to faculty at the University about doing this study, they had concerns about having a novice researcher conduct an embedded study. Fortunately, the Chair of my committee Dr. Mark McQuillan, agreed that this was a situation which needed to be studied. After asking for and receiving permission from both the Superintendent of Schools, and Principal, I next gained permission from the faculty to develop a proposal for this study.

To limit potential bias, I first developed my ethical framework. The ethical framework that I chose to use was based on mutual need. The district needed someone to collect data, analyze the results of the program, and create an honest public report. I needed to be able to work while I was doing the research. Because of this agreement I could and did use some personal time to evaluate their 1:1 program, and conduct my research. I worked with Dr. McQuillan to develop a plan to control for personal biases, while acknowledging the core values that are part of my professional identity. Part of the research design also included working with a small group from my doctoral cohort and running findings through these critical friends. Another planned bias check was to write weekly memos to members of my dissertation committee during data collection.

During the summer before starting research I attended Google Bootcamp in order to get a deeper understanding of the tools these teachers and students would be using in their classrooms. There were times during data collection that it was very difficult to be an objective observer. In classrooms and interviews, I had to set aside my personal expertise with technology so that I did not influence the responses of Mr. Grimes (the teacher selected for this study, see p. 55) or student participants. Occasionally, I had to refrain from intervening in the classes I observed – if

only because I wanted to suggest different ways Mr. Grimes could use technology in his classroom to make his job easier. But in this case, that was not my role during the study. Mr. Grimes did come to me at times outside of interviews and after the observations to talk more about integrating these digital tools into his classes. Those conversations were not part of my planned study, and therefore are not included in the study.

During data collection and analysis I found that at times some information had to be kept confidential. When asking teachers and students about their experiences, I had to omit the names of colleagues. In some cases the data was very sensitive. For instance, when Alice told me about the teacher who would not let her make-up a missing paper, I wanted to have a conversation with that colleague. But the information was part of my research and confidential, so I did not. Data from test results could have been misinterpreted by our local board of education. Because of this one of the teachers asked me not to include it in the public report, even though it would be available to anyone reading this dissertation. These decisions were made based on an agreement to conduct research, the ethical framework developed for the study, and the relationship of trust developed between myself, the district, and participants.

To be a participant/researcher is not a simple undertaking. As a teacher and colleague of these participants, my perspective on their experience cast me in a dual role. That of a trained researcher as well as a member of their learning community. Having the support of my cohort group and dissertation committee made it possible for me to recognize personal biases and avoid overlooking important data. In the next section, I describe the apparatus used in this study.

Apparatus

Students who were in the 1:1 classroom used the Samsung 2 Chromebook. The devices were chosen by a group of teachers who were Steering Committee members. I did not choose the

devices for the participants involved in the program. Instead, I asked administration to have other classroom teachers try out various devices and then make the choice.

The Chromebooks have a high-speed processor, which allows for quick power up, and Internet connection within 10 seconds. This device weighs slightly over three pounds, and is three quarters of an inch thick. Battery life on this device, when powered properly can be eight hours or more. To record audio I used an *Echo LiveScribe SmartPen* for both student and teacher interviews. In addition, interviews were recorded using an iPad mini as a backup.

Interviews

When designing a focus group, Yin (2014) says that a small group or several small groups can be used to "moderate a discussion about some aspect of your case study" (p. 112), so a researcher can solicit views of several people at once. Students who had parents return permission slips were invited to participate in a focus group. The focus group protocol I used is described in Appendix A. Students were asked for background information and answered questions regarding their use of technology for learning. Krueger (2002) suggested using 6-8 people as the optimal number for a focus group; thus, the plan was to recruit this many students from each section for focus group discussions.

Rowan's guiding principles for group discussion were helpful for setting the norms for the group (OMNI, 2013). I planned meeting times that did not inconvenience the students or have an impact on their education. Krueger (2002) suggested small gifts to the participants for their help with the research, a suggestion that I did not employ, but which probably would have increased the number of participants who were willing to commit to a discussion.

Interviews were strictly voluntary. There were no known risks to the participants; confidentiality was carefully maintained. Participants received no benefits, material, financial or

otherwise for agreeing to be part of this study. Student participation in interviews had no effect on their grades or standing in school at any time. Teacher participation had no effect on their employment or participation in the 1:1 program. The total sample for this portion of the case study was n=6: five students and one teacher. Three of the students participate in classes that had 1:1 access to Chromebooks, and two did not.

Direct engagement with students in the classroom was limited to observation and semi-structured interviews (Emerson, Fretz, & Shaw, 2011; Brinkmann & Kvale, 2015; Seidman, 2013; Yin, 2014). Observations helped to validate or invalidate what students and the teacher shared in interviews and added to the richness of data collected for this study. The observation protocol used by the district is in Appendix D.

I employed a modified Seidman (2013) protocol for interviews, and audio recorded each one for analysis. No interview lasted longer than 45 minutes. Seidman's protocol calls for three interviews per participant. The first interview normally focuses on the background of the participant and is largely unstructured. The second focuses on the experience of the participant. The third interview contains follow-up questions regarding prior interviews. I modified the protocol by structuring the first interview, conducting first level coding after each interview, and shortening the length of both students and teacher interviews. During these interviews, students demonstrated what they had learned by their vocabulary use, content area knowledge, and use of technology tools. First interview student questions included:

- Tell me about the technology that you use.
- What do your teachers expect you to do with technology?
- What are you/would you be missing without access to technology?
- What is different between this school and your middle school?

- How do you use technology away from school?
- How do the people you know use technology for learning?
- Do all of your friends have technology tools that they use to learn with?
- What is exciting or intimidating about using technology at the high school?

Subsequent interviews with students followed up with questions that came from initial In Vivo coding of the first interview. I anticipated that questions in the second interview would focus on students' transition to the high school, their experience learning with technology, and their friends' use of technology. Interpretation of the data was intended to provide insight into student perspectives on their use of digital tools in this secondary school setting. As researchers, "we used observational data to investigate teacher regulating activities, and also investigate the relationship between student perceptions and observational data" (van Beek, de Jong, Wubbels, & Minnaert, 2014, p. 207). Observation provides an additional measure of reliability for data gathered from interviews. Student perceptions have been validated as a source of information for reliability regarding teacher pedagogical practices in the classroom. Because student and teacher perceptions rely on their lived experiences, it was important to add observations to student and teacher interviews.

Teacher interviews provided insight into both instruction and assessment of student competencies. Proficiency- based learning includes "brief diagnostic tests, which provide information to identify gaps and strengths. No student proceeds to new material until prior or more basic prerequisite material is mastered" (Hattie, 2009, pp. 170-171). At the high school where the study was conducted, students are expected to show their learning through performance-based assessments and to demonstrate proficiency before they move on to the next

learning task. This was a limitation for replicability of this study and adds to the uniqueness of this case.

Researchers linked certain teaching strategies to increased student motivation and engagement. These strategies included teacher-student relationships, teacher clarity, mastery learning, worked examples, providing formative evaluation, and feedback mechanisms (Hattie, 2009). Questions for the teacher dealt with feedback mechanisms, teacher-student relationships, and differences in preparation between the two sections of class. First interview teacher questions were:

- Tell me how your students provide feedback to you.
- Can you share how you develop relationships with your students?
- Are there differences in how you prepare for Section A and Section B?
- Do you see differences between learner a, and learner b?

Teacher questions were similar to these initial queries in all three interviews.

Procedure

I studied applied research and case study design as part of my doctoral program. In addition to study at the University, I completed IRB training for working with human subjects through Collaborative Institutional Training Initiative (CITI) for Social & Behavioral Research. By using data triangulation, the researcher will be able to support findings with more than one piece of evidence. “By developing convergent evidence, data triangulation helps to strengthen the construct validity of your case study” (Yin, 2014, p. 121).

This case study followed a single case study research design focusing on qualitative data. Data was collected through focus groups, interviews, observations, and technology use surveys. The case here is defined by the ninth grade experience of students with and without direct access

to 1:1 technology attending the same school. I completed specific training with the Seidman (2013) protocol in the course Case Study II. I received training on conducting focus groups in Applied Research II.

For the purpose of this study I interviewed students with and without direct access to 1:1 tools regarding their learning experience. Interviews provided information from the participant's perspective. As stated in the interviews section, students and teachers were interviewed three times using a highly modified Seidman (2013) protocol.

By using the deontological ethical framework developed for this study, I did everything possible to "avoid wrong" while working with human subjects (Flinders, 1992; as quoted in Miles & Huberman, 1994, p. 289). Technology-use surveys taken by students and parents as developed by the district were anonymous, in order to protect participant identities. The names of those interviewed were changed on transcriptions to lower case single letters for students (i.e; a, b, c, d, e), and an upper case letter for the teacher, (i.e; A). This naming protocol was used on the transcripts but is not used in Chapters 4 or 5 where fictitious names are provided instead. No names were used in any reports, either for the district or this study, in order to protect all human subjects involved.

I used a focus group to identify the student participants. Students were identified and invited to participate after receiving parent consent forms. Students provided their assent prior to being scheduled for interviews. The final number of students included in this study was five. For the teacher interview, I chose one teacher at random from a group of seven teachers. Each participant gave consent to be interviewed. Agreements to participate and initial interview scripts are included in Appendix C.

My observations were limited to 90 minutes each in two classes during the fall semester of 2015. These observations helped to validate or invalidate the information collected during interviews (Emerson, Fretz & Shaw, 2011). Observational data were also used in the study as a data point for triangulation purposes (Creswell, 2013). By following the chosen ethical framework I attempted to ensure "fairness" in reporting (Flinders, 1992; as quoted in Miles & Huberman, 1994, p. 289).

Yin (2014) notes that, "Observational evidence is often useful in providing additional information about the topic being studied" (p. 114. Included in my original study design were two sections of humanities classes. An unanticipated increase in enrollment meant the school had to run three sections of humanities courses. This disrupted the matrix developed for my case study. Students in one section had Chromebooks purchased through the district. Students in the other sections did not, and had different teachers. Adjustments in the field included observing Mr. Grimes so I could verify the experience of students in his class and his interviews. For each observation, I avoided moving in and out of the room during class time could have been disruptive to students, so observations were sustained for the entire block period (Emerson, Fretz & Shaw, 2011). I did not interact with students during these observations, in order to minimize the impact of my research on their environment. The matrix was disrupted but still usable and may be helpful for other researchers to see, so it is included in Chapter 4.

I analyzed parent and student surveys using Google Apps for Education forms. This data was used to ascertain how students used technology for their education, and provided additional insight into student interviews. I conducted weekly surveys for students in the 1:1 section and the control section for 10 weeks. Parents of the 1:1 students responded to surveys at the beginning of the semester, the end of the first quarter, and the end of the first semester.

All data collected for the purpose of this case study will be kept for five years and then destroyed according to best practices for researchers (Creswell, 2013). Data for the program evaluation will be kept by the district according to their guidelines.

CHAPTER FOUR

ANALYSIS AND PRESENTATION OF FINDINGS

In this chapter, I will present findings from this single case study as they relate to my conceptual framework. As a guide, I used a matrix developed to align collected data with research questions. Using this framework helped to focus my perspective during analysis.

This case study took place in a school where 40 ninth grade students had 1:1 devices (Chromebooks) and 88 members of their class either did not have them or brought their own device. I did not collect data on students outside of the bounds of this study. Therefore, it is not known how many students outside of the 1:1 program brought their own devices, what devices they owned, or if they had access to the Internet at home. The findings from this study are divided into four parts.

Part I describes setting and technological context of the study, as well as a description of the participants. The technological context as told by the Director of Information Technology for this district, was an important addition to this study. Descriptions of participants are deliberately vague, in order to protect student and teacher identities.

Part II focuses on student perceptions of their learning experience. Data from student interviews and observations were triangulated with teacher interviews. These data were then analyzed to address the question, "How does learning with or without 1:1 technology affect 9th grade student perceptions of their learning experience?" Findings from the data address the following sub-questions:

- Even if students have equal access to 1:1 technology during the school day, how is the learning experience of a student without access to digital tools beyond the school day different from a student who has access to those tools both at home and at school?

- How does the difference between having and not having technology affect student perceptions of each other?
- How does the widespread use of technology in teaching affect student self-perceptions as learners?
- What can we learn by comparing students' stories?

The students' voices provide insight into how transition to high school with or without a device of their own to use in the classroom impacts their learning. They talk about how their teachers expect them to use technology for learning, and how expectations for learning changed between middle and high school. Both groups of students -- those with personal web-enabled devices and those without -- perceive *not* having a device as a disadvantage for the learner in the classroom.

Part III examines teacher perceptions of teaching and learning in this context. Using teacher interviews, classroom observations, and student interviews, this section uses the teacher's viewpoint to provide another lens with which to view how students within this grade differ. Observations from inside the classroom provide additional insight into the student experience. Sub-questions addressed by this part of the study are:

- Even if students have equal access to 1:1 technology during the school, how is the learning experience of a student without access to digital tools beyond the school day different from that of a student who has access to those tools both at home and at school?
- How does the widespread use of technology in teaching affect student self-perceptions as learners?

The teacher provided insight into how students experience the introduction of 1:1 classroom learning, and how that experience differs from classes without direct technology access. Of

interest from these interviews is how the teacher's view changes from seeing the tools as a "distraction" to viewing the students in the 1:1 class as superior critical thinkers.

Part IV focuses on the learning outcomes of students in this study, as well as data collected that falls outside of the framework. In order to gain access to this participant pool, I was required to evaluate the district's 1:1 program. Some of that data provides additional insight into the student experience of learning in a school with both a competence-based learning program and a new 1:1 program. Research questions addressed by this part of the study include:

- How does the difference between having and not having 1:1 technology affect student perceptions of each other?
- What can we learn by comparing students' stories?

Students' voices are present throughout the study and are the focus of this work. Student learning outcomes are represented by the students' words, their test scores, and examples of work from a 1:1 program class and a classroom without 1:1 technology access. The common assessments used for this study indicate a significant difference between the students who had 1:1 technology access and those who did not. As expected from prior studies consulted for the literature review, feedback for both students and teachers was critical to their learning.

The findings indicate these students were experiencing very different educational environments within the same school. They were also experiencing a shift in technology culture as they moved from middle to high school. The students described having very limited technology in middle school, but upon entering high school, they had unprecedented access to technology. The context provided by the IT Director in Part I, is an important aspect of this study. The teacher perspective and the student experience were very different in regard to how they viewed technology in their school. As students and their teacher became more comfortable

using technology, I noticed a phenomenon I will call “technology creep”. Over time, the students and teachers using digital tools began to talk about the experience with those in other classrooms. This led to curiosity and interest; for instance a student participant in one of the non-1:1 classes reported being asked to use a smart phone in her class to participate in online polls.

From the very beginning of data collection for this study the students made valuable contributions. This single case study is not generalizable; however, the data described in this study does add to the literature in regard to how ninth grade students experience learning in this context. I believe the information gathered here will be beneficial for teachers, administrators, parents, and community members. This study provides readers with a better understanding of a few ninth grade students’ experience living and working in a digital world.

Analysis

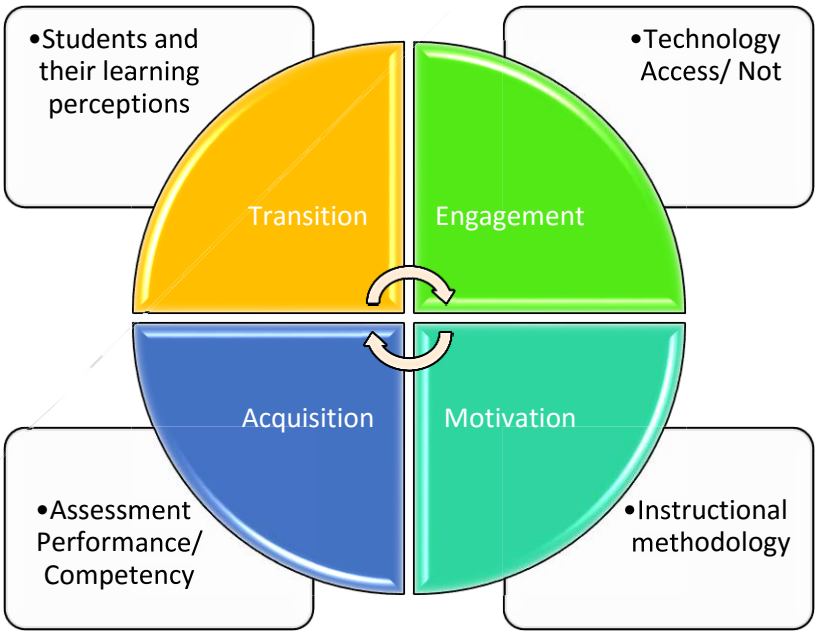
Through the lens of a framework developed for this study, I considered the perspectives of students from several angles.

- Transition: Students were asked for their perceptions of both their current school and prior learning experience.
- Student engagement: Classroom observations, student interviews and teacher interviews provided a rich picture regarding student engagement.
- Technology access or not: Students were asked how they viewed themselves and how they viewed each other with and without 1:1 technology.
- Motivation: Students were asked about content area knowledge, and specifically what motivated their learning.
- Teaching methodology: Teacher interviews, as well as observations, provided a focused view of learning in the classroom.

- Acquisition of new knowledge: Student responses to interview questions were examined for specific vocabulary that students learned while in the ninth grade.
- Assessment of performance and competency: Students in the study attended a school where they had to prove mastery before they could move forward. To evaluate this piece of a complex experience I used midterm exams and a formative assessment provided by the teacher.

Much of what I found fit within this framework; some findings did not, and those are shared later in this chapter. I focused my findings by using this framework as a lens and requesting regular bias-checks with my peer group.

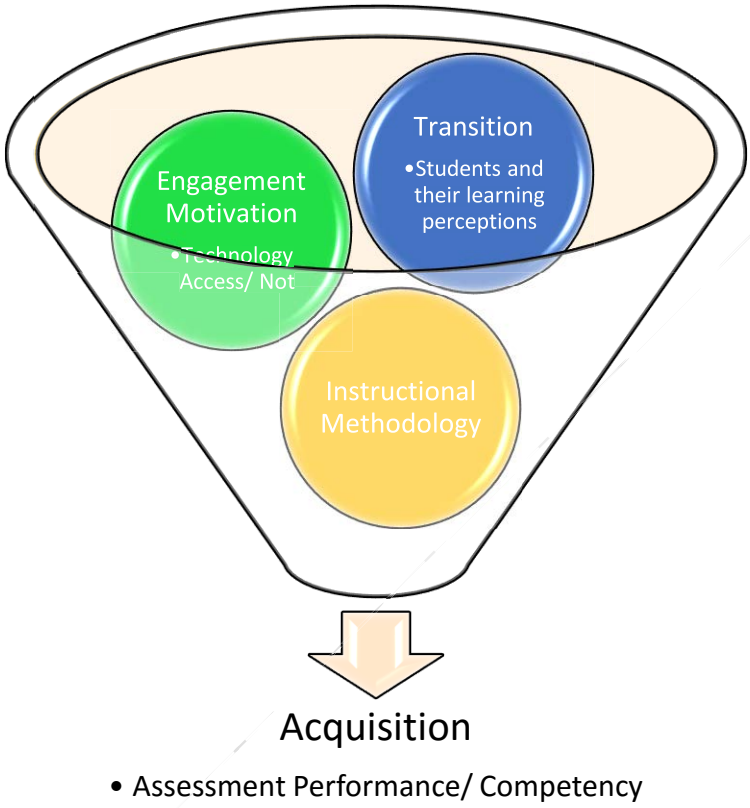
Figure 4.1. Ange's framework for digital learning in ninth grade.



As research was conducted, the lines between motivation and engagement became blurred. There were times when students were clearly motivated to learn by their parents, but completely disengaged with the content of their classes. Other times, engagement with their teacher and each other motivated them to extend their learning about the content. Because of

this, the framework for learning was more of a funnel, with all factors leading to some amount of knowledge acquisition and accountability. As such, the adjusted framework is represented visually in figure 4.2.

Figure 4.2 Ange's revised framework for digital learning



Beginning with student transition, and progressing through the other domains, data collected for this study focused on the question, "How does learning with or without 1:1 technology affect ninth grade student perceptions of their learning experience?" Data collected and used for the purpose of this study included focus group responses, student surveys, observations, interviews, and assessment data provided by the district. Using a framework and matrix helped me minimize personal bias. In addition to bias checking, the matrix aligned data collection with research questions. Organization was vital to analyzing student responses and

moving the work forward.

Aligning research questions with the data facilitated the process of secondary coding. A combination of the matrix and the lens of the framework helped me maintain a tightly focused analysis of the data. This is the matrix as originally intended. Changes in the field, larger enrollments, more student participants, and the need to look at larger populations for statistically significant data meant that I had to adjust my analysis but this matrix is still helpful for understanding the planned for analysis of data and how it aligned with questions.

Table 4.1. Matrix for analysis

Matrix For 1:1 Analysis					
Participants	Technology Access	Observations	Interviews	Surveys	Assessment
Participants	District Device	Observations	Interviews	Survey on Tool Usage	Formative/Summative
Class 1	All students have same device	Class 1		Weekly	Mid Term Exam/Class Results
Student 1	Google Chromebook		Student 1		Formative
Student 2	Google Chromebook		Student 2		
Student 3	Google Chromebook				
Teacher for class 1 & 2	Google Chromebook		Teacher	Parents pre-mid-end of term	
Class 2		Class 2		Weekly	Mid Term Exam/Class Results
Student 1	none		Student 1		Formative
Student 2	none		Student 2		
Researcher questions					
How does learning with or without 1:1 technology affect 9th grade student perceptions of their learning experience?				C4, C8, D5, D6, D7, D9, D10	
How is the learning experience of a student without access to digital tools beyond the school day different from a student with access to those tools in a public high school?				D5, D6, D9, D10, E4, E7, E8, F4, F8	
How does the difference between having technology or not affect student perceptions of each other?				C4, C8, D5, D6, D9, D10	
How does the widespread use of technology in teaching affect student self-perceptions as learners?				C4, C8, D5, D6, D9, D10	
What can we learn by comparing students' stories?		C4, C8, D5, D6, D9, D10, E4, E7, E8			
Question alignment between student interviews and researcher questions					
Tell me about the technology that you use for school.		A12, A13			
What do your teachers expect you to do with technology?		A12, A13, A15			
What are you/would you be missing without access to technology?		A13, A15			
What is different between this school and your middle school?		A16			
How do you use technology away from school?		A12, A13, A16			
How do the people you know use technology for learning?		A14, A15			
Do all of your friends have technology tools that they use to learn with?		A12, A15			
What is exciting or intimidating about using technology at the high school?		A12, A15, A16			

Because of this lens, I expected to see themes of transition, technology access/not, engagement, teaching methodology, motivation, assessment of performance and competency, and acquisition of new knowledge. Data collected from sources in the case study supported this framework. As research progressed there were also unanticipated themes which emerged from the data.

Initial analysis of transcripts was done using *In Vivo* coding methods as described by Saldaña (2013). By using this method, I conveyed the students' voice throughout the study. As

Saldaña (2013) said, "[T]he adolescent voice is often marginalized, and coding with their actual words enhances and deepens an adult's understanding of their cultures and worldviews" (p. 91). I wrote weekly memos to my committee discussing what had transpired during the week. I transcribed audio recordings by hand. I then examined those transcriptions for intriguing responses on which to follow up in subsequent interviews.

After initial coding, I put the raw transcripts into word tables to further delineate possible codes. From In Vivo coding and word table results, I moved next to see how, and if, the collected data aligned with pre-determined themes from the framework. Using *Focused Coding* as described by Saldaña (2013), I examined the data again. According to Saldaña, "…data similarly (not necessarily exactly) coded are clustered together and reviewed to create tentative category names with an emphasis on process…" (pp. 213-214). From these combined coding experiences I developed themes used in this chapter, and then further developed those themes into categories for Chapter Five.

Inquiry was focused on the ninth grade students' experiences as they transitioned into high school. In this new environment, all students were expected to use digital tools and access information electronically to facilitate their learning. Within this study, some students had web-enabled devices that they were able to use all the time, and some did not. Analytic categories developed from the themes of this case study. I used these categories to synthesize participant experience with what was known from the literature.

Observations were conducted using an evaluation protocol designed by the district for peer observation. I consulted Emerson, Fretz, and Shaw (2011) as a guide for taking field notes. Field notes were coded using descriptive codes developed from interview transcripts and predetermined codes from the framework. Observations verified what students and Mr. Grimes

(teacher's pseudonym) shared during interviews, they also provided a way to triangulate primary data collected for this case study (Creswell, 2013).

Mr. Grimes and I examined formative assessments using a rubric he designed. The teacher pointed out differences between the two works for me and explained how instructions for students were different (Burke, 2010). These common formative assessments are used to check for student understanding of content by Mr. Grimes. These assessments were examined using a Critical Friends protocol developed by *National School Reform Faculty* (Thompson-Groves, 2000).

The summative assessments in Mr. Grimes' Spanish classes were taken by small groups of students. His Spanish II classes had either 18 or 20 students in the class, which was too small to generate statistically significant mean data. Two of the 1:1 students who participated in this study were in his Spanish II class. One of the non-1:1 students took his Spanish I class. Mr. Grimes taught two sections of Spanish II, with students of different ages. The average grade on the mid-term for his 1:1 class was a B (83.39), and the average grade in his non-1:1 class was also a B (80.54). Mr. Grimes gave a 200-point midterm. This was divided into three sections addressing his competencies. The three grades were calculated together to create the final grade for the midterm.

In order to get data with statistical significance, I considered common exams which all ninth grade students need to complete. Not all students in the study had Mr. Grimes for a teacher, but all students had common classes they were required to take. Students in this school took different core classes with the exception of social studies and English. Their social studies course had common summative assessments, created by three teachers. These common assessments were based on state standards, which aligned with department competencies. These included:

analysis of primary source documents, communication, and critical thinking about content area knowledge. These competencies aligned with ISTE NETS-S standards for students learning with technology (International Society for Technology in Education, 2015).

The total number of student assessments n=121, from all ninth grade students n=128, in their three sections, were run through the G*Power calculator application. This application calculated that there were enough results to show statistical significance using a mean analysis. The common summative assessment was examined using an unpaired t-test. I chose this test because I was looking for a statistically significant mean difference between sections based on whether or not students had access to 1:1 technology. At the time the results were calculated, only n=121 had taken the assessment.

Part I: Research setting and context

This study took place over a few months of students and their teacher transitioning into a new learning environment. Enrollment shifted several times during this study. The original planned for class of 110 students turned into 128. That number fluctuated as students moved, changed schools, or were absent at different times during the study. This affected the length of time between interviews, and in one case changed the makeup of a class I had planned to observe. In the case of these students' summative assessment, there were only 121 out of 128 possible scores available for my examination.

The district Steering Committee chose the Samsung 2 Chromebook for this program. Both classes that I observed were heterogeneously grouped. The humanities courses these students took had common midterm assessments for all sections. Students participating in the program were a quota-proportional sample representative of the high school population. Students in sections that were not 1:1 could, and often did, choose to bring their own devices. The option

to bring those devices became more important to these students as the semester and their teacher's comfort level with technology progressed – a matter discussed later.

Context of high school technology environment

It is important to clarify the difference between the Chromebooks and what was previously available for students to use in the library and media labs. The IT Director describes the difference here:

> In today's classroom, the need for instant on access to the Internet, educational software, databases, and stored content like documents and pictures is higher than ever. We get complaints every week that the laptops in carts take forever to log on and for the students to actually start working on their task at hand. Then, when we ask the teachers that are using the Chromebooks in 1:1 classes, they say that getting the student into the devices and working is almost immediate…Typically, a Chromebook takes roughly 20-30 seconds from start-up to Internet access, while our Windows devices can take upwards of 15 to 20 minutes depending on the end user profiles. Some of the Windows settings we will be changing over the summer to drastically reduce this time, but we feel that we won't be able to get much better than 2-3 minutes vs. 20-30 seconds with the Chromebooks. (IT Director)

The participants expressed that this time lapse between logging into a computer and being able to use it can be particularly painful when attempting to integrate technology into teaching and learning. As a teacher on the Steering Committee said, "Being able to instantly look something up in the classroom can deepen our conversations and broaden my student's depth of understanding. Isn't that what we are going for? Depth over breadth?" The differences between what students and teachers learned in their computer technology classes included the applications

that they used. Chromebooks utilize cloud-based computing. No software needs to be saved to the device. Everything opens from the web. In the information technology classes students took they used Microsoft Applications. The complexity of Microsoft Tools requires the learner to spend significant time on learning how to use the application. Some of the differences are simply stylistic, but all of the differences required some adjustment by both the teacher and the students in this study. In the next section the setting and participants will be described in more detail.

Participants and setting

The school where this study took place used a modified block schedule, and students had to earn a passing grade in each competency in order to move forward. To begin this study, I asked the principal to send out invitations to all ninth grade parents asking if they would consider having their children be participants. Out of 128 students, eight parents returned permission slips for their students to participate. After the initial focus group, six students wanted to continue on to the interview portion. Krueger (2002) suggested using six to eight people as the optimal number for a focus group, so the original plan was to recruit this many students from each section and hold two focus groups.

Less than 7% of students in the class returned permission slips to participate in the study. I had originally planned to offer small gifts, as suggested by Krueger (2002). This may or may not have increased the number of participants willing to commit to a discussion. The Institutional Review Board at my university refused a request to provide participants with five dollar gift cards. The low rate of return made it possible to hold a single focus group with all interested students who had obtained permission from their parents.

Rowan's guiding principles for group discussion were helpful for setting the norms for the group (OMNI, 2013). The meeting was held after school early in November of 2016. In the

focus group, students responded to questions from a questionnaire that had been submitted as part of the study design. In order to break the ice, I asked students about their personal interests. Results of the focus group showed that five out of eight were athletic with high interest in sports. The other three students were interested in sleep, drama, and Boy Scouts. All students had lived in the district for over nine years, although two of them attended private schools for elementary and middle school.

Two questions focused on the use of educational technology. The first question asked students what kinds of technology they used. Student responses indicated that all students had access to a computer and the Internet either at school or at home. Students also reported that 62% of them had smart phones.

The second question asked students when they thought teachers should use technology to help them learn. Responses varied from, “Only when necessary!” to “Technology is becoming so important. I think someday you might eventually learn everything online.”

Students and their teacher have been given pseudonyms to protect their identities. The letters originally planned for during the study design phase made the data feel stale and cold. The letters were used on the transcripts to keep the raw data from being identifiable.

After the focus group, there were six students who indicated that they were interested in continuing. These students included: Alice, a 14-year-old three sport athlete who was not part of the 1:1 program. Alice had thought that technology should only be used when necessary. Ben, a 15-year-old Boy Scout, who was part of the 1:1 program also felt that teachers should only use technology when it was the “most efficient way to do it”. Chelsea 14-year-old who loved drama, was part of the 1:1 program, and expressed a lot of interest in the study. Chelsea saw technology use in classrooms as “the way of the future". Chelsea took Spanish II with Mr. Grimes. Mike a

14-year-old, also part of the 1:1 program, was a two-sport athlete. His desire to learn with technology turned out to be motivated by his mother. Mike also took Spanish II with Mr. Grimes. Grant, a 15-year-old who was not part of the 1:1 program, had a private school experience, and expressed a desire to help with the study. Grant took Spanish I with Mr. Grimes. Elise had originally wanted to be part of the study, but after reading her transcripts decided to drop out, because she did not like how her responses looked. This left five student participants.

Table 4.2 Student technology access and common subjects

Student	Technology Access	Mr. Grimes	Social Studies Sections A, B, and C.
Chelsea	1:1 Chromebook	Spanish II	A
Ben	1:1 Chromebook	No	A
Mike	1:1 Chromebook	Spanish II	A
Alice	Smart Phone	No	B
Grant	Smart Phone	Spanish I	C

There were seven teachers who were part of the 1:1 program and taught more than one section, some with devices and some without. I used a random name generating software to select one of these teachers. The selected teacher agreed to be interviewed and observed for this study (Mr. Grimes). The teacher who participated in this study had his teaching credentials for two years, was new to the school, and taught Spanish. His responses were verified by student interviews and my observation of his classroom. When I asked similar questions of another teacher with more experience, her responses validated what I had learned from Mr. Grimes. The additional teacher was a Social Studies teacher, with five years of experience in the school who was new to teaching in a 1:1 environment. This teacher's responses to questions were not

transcribed or included in this study. They were, however, used to check for researcher influence on data.

Part II: Student Perceptions

Findings from student interviews, surveys, and classroom observations provided direct insight into student perceptions. Interviews with Mr. Grimes provide another perspective on the student experience. In this section, I use the matrix to examine data I collected which addressed the question, "How does learning with or without 1:1 technology affect ninth grade student perceptions of their learning experience?" Findings also address the sub-questions for this study, which are:

- Even if students have equal access to 1:1 technology during the school day, how is the learning experience of a student without access to digital tools beyond the school day different from a student who has access to those tools both at home and at school?
- How does the difference between having and not having 1:1 technology affect student perceptions of each other?
- How does the widespread use of technology in teaching affect student self-perceptions as learners?
- What can we learn by comparing students' stories?

Students' voices provide insight into how their transition into high school and whether or not having a device of their own to use in the classroom impacts their learning. I had access to students during their study halls, and before and after school. I conducted student interviews in a small office. The door was shut to keep the conversations private, with the exception of one interview, where three students wanted to meet at the same time, in the library.

Through listening to students, I learned that they were most comfortable and more forthcoming when they were asked: about their day, how their games went, how their family was or when they were complimented on a piece of their attire. Some students were excited when I showed them how the Echo LiveScribe SmartPen worked. Ice-breaking was critical to the success of these interviews.

Initial student interviews were semi-structured and questions for students correlated to my inquiry. These questions were submitted as part of the initial IRB application.

- Tell me about the technology that you use for school.
- What do your teachers expect you to do with technology?
- What are you/would you be missing without access to technology?
- What are the differences between this school and your middle school?
- How do you use technology away from school?
- How do the people you know use technology for learning?
- Do all of your friends have technology tools that they use to learn with?
- What is exciting or intimidating about using technology at the high school?

Having a few questions ready was helpful when trying to learn from the student's personal experiences. From those questions I was able to gather data that answered the research question, "How does learning with or without 1:1 technology affect 9th grade student perceptions of their learning experience?" The following pages describe the findings that pertain to this question and the sub-questions for this case study, as bounded by the framework developed from the literature I reviewed.

Finding #1 Transition

Student perceptions of their learning environment changed during the first few months of

school. Over time, student views on who belonged to their learning community changed. These changes were due, in part, to how students communicated with each other about their learning.

From student interviews, it was clear that students found the transition from middle school to high school a big change. These students all indicated that they felt more freedom, and that they were able to complete their homework because they had more time in school to do their work. All students expressed that they felt there was better technology access at the high school, regardless of where they attended middle school and whether or not they had a device. Students in the 1:1 program spoke of the ability to access websites and being able to use the same tools at school and at home.

In order to understand how students perceived their learning environment, I asked about the difference between this school and their middle school. Transition between middle and high school is a critical time for adolescent students. In interviews, students responded to the question, "What is different between this school and your middle school?" Chelsea (a 1:1 student) said:

> A lot! Um, I feel like being in high school you got … a lot more … freedoms and they like trust you more, you're allowed … to do more. And they … for example: even … with the computers they like they don't block every little thing on the Internet and they give us more freedom to … do things. Because they trust that we will use it for and that we'll use it for like the right things. Not abuse our privileges. And like, I don't know … the middle school is just like a lot smaller and … the learning is a lot easier. It's … a big step from eighth grade to freshman year. All the work like changes and it's a lot different. I like it though.

Ben (a student in the 1:1):

> I think that there's lot more like freedom that we have and I think that the learning is a lot easier. I mean the homework load is a lot less because you get two days to do it now. I think that at the middle school the learning is a lot more limited to what we cover in school but at the high school … I don't know, but I think that for some reason it just goes beyond that and then I think that the teachers are nicer here.

Alice (non-1:1) shared that she felt she had more time:

> Umm…the whole like, a lot more … chance for studies. Studies are much more longer so you have … a chance to get stuff done. … in the middle school where we only had … a 30 minute study instead of like an hour which we have for study [here].

I also asked students about their technology use: "Are there a lot of differences between how you guys get to use technology up here versus how you used it down there?"

> Alice: Ummm well … if you, like we had a class. We only had one class using computers, and usually say, if we had to go to the computer lab we would …, they would also be having a study or they would be having class. So there really, we had … two computers in the library too, but there could be a class in there too so we might not be able to use them.

Mike (1:1) shared this insight: "Well this school has a lot more right. You can do more things." To this I responded: "You can do a lot more things here?"

And Mike said:

> Yeah, you're not like, bound to a classroom. If you have a study you can go pretty much wherever you want. If you have …a pass, or you sign out, and you tell your

> teacher. And I think it's a lot better than the middle school. It's just like, I don't know why but I like it a lot better.

I asked students about the differences in how they learned at the high school compared to their middle school experience: "So how is the learning different up here?" Grant (non-1:1) spoke from his private school experience:

> I feel like I think more, because there we learned from [specific name removed] curriculum. They would ask us to define words, and all the definitions were right there. I definitely think when I got here I had to think more. I had to explain my answers and support my answers and maybe my answer would be questioned. You know, so I had to support it in that way.

Another big change for these students had to do with collaboration. In the middle school environment students were strictly grouped by age. Everyone in a grade was the same age and they did not get to associate with either younger or older students. I asked Mike and Chelsea (1:1 students) about how their teachers expected them to use technology for learning, and they talked about collaborating during class. Mike said that in his classes:

> I think that they want that their expectation of us is to do like group work, like collab[orate] with other students and to connect the dots on your own. Instead of them always showing you how to do something, like looking it up.

Chelsea shared that she appreciated being able to share her thoughts with others:

> The teacher puts out a question, and we can all answer it on our computers. Then he puts it up on the board and we can vote which one we think is the best answer. That helps too because we get to see people's opinions on things and we all have

it right in front of us as well as on the board, and everyone is looking at everyone's take on the subject, and I like that.

In this high school, when students are no longer bound to a particular age group, their views on who was a part of their community began to change. Students began to have choices about their learning. Collaboration on assignments, talking to each other about classroom content, being able to use the same tools at school and at home -- these emerged first as codes and then as themes during my analysis of the 1:1 student transcripts. Being able to access information and resources online quickly was a clear advantage for the students with 1:1 devices. All the students who were interviewed described themselves as good students who got things done, and cited organization as critical to making progress.

In interviews, students shared that they had always been grouped with students who were the same age, until they entered high school. They also shared that not all of their peers had been held accountable in the middle school for achieving competency. At the high school, elective classes often have mixed ages and some students who face competency recovery. These students may be in with a group that is learning the material that covers a competency for the first time. These changes affect how they perceived who is in their "community."

Finding #2 Engagement and motivation

Students in both groups reported being engaged and having opportunities to collaborate with others on assignments. Observations and interviews noted that students in the 1:1 classes appeared to be more actively engaged with each other – e.g., interacting more with each other, meeting frequently in a small group, solving problems together, etc. - than in the non-1:1 class. This was verified as the experience of 1:1 students when they were in non-1:1 classes.

Interviews indicated qualitative differences in Mr. Grimes' interactions with his students depending on whether or not they had 1:1 devices in the classroom. Mr. Grimes appeared to be listening more and presenting less. Such connections between Mr. Grimes and his students were confirmed through my observations and interviews. In the observation of his non-1:1 class, I noted that students stayed in their seats until they were told to get white boards. In this class Mr. Grimes did most of the talking, and students, though engaged in learning, were jittery.

During the observation of the 1:1 class, I noticed that students talked with Mr. Grimes about shows they watched. Students moved frequently, changing seats and sharing information. When he asked students questions, they responded. They asked questions about different ways they could use the words and phrases they were learning. When I asked students about this difference, they said they had noticed it too.

In an interview with Mike, I shared what I had observed -- that the students in the 1:1 class seemed relaxed, that they moved around and talked more with the teacher. Mike described Mr. Grimes as being more student-friendly. He said:

> I think that class is like that because we are comfortable with the teacher and he treats us like friends. Almost, kind of, not really. But he's like … He makes us do our work, but he's nice when he does it.

This was not true in every class, because in some of the 1:1 classes, students reported that, while they may have interacted more, they actually talked less. During Chelsea's final interview, I shared that I had noticed a difference and asked Chelsea if she had as well. Chelsea shared that she had also noticed a difference when she walked into one of her other teacher's non-1:1 class:

> I also noticed though that today during the first half of study I had to go up and finish something for one of those teachers and they were in their non-1:1 class.

> And I noticed that they did talk a lot more. And one of the teachers even said it to me. Yeah they do talk a lot more in this class because they're not … I don't know I guess it's because we have our computers we have everything at it, so we don't have to ask our friends about stuff. We're just like, we just do our work.

These students reported that they used their devices for collaboration in that class, so I asked if they used a messaging application. Chelsea responded that they did not have to:

> No but if we need … well when we work on projects we don't even talk out loud. Often because we share the documents with each other so if we have a question, we can just say we don't understand something in the comments.

From prior reading student relationships with their teachers increases student motivation to learn. Relationships between students and their teachers were clear for several of these students. Three students, not all in the 1:1 program, named teachers who were pushing their learning. Grant talked about his science teacher as someone who pushed his thinking and questioned his answers. As he said, "I have to think more here."

Based on the literature, I expected that parent support would influence student motivation for achievement. While talking with Mike, a student in the 1:1 program, I asked what motivated him to do well in his classes. He indicated it was not necessarily his teachers who provided motivation. In his words:

> It's not necessarily my teachers, it's really my mom. Because my mom she doesn't like when I get anything below a B. She's like, "Come on!" I usually get my phone taken away from me for a little bit. My Mom expects me to get A's and B's like all the time. I don't usually get C's.

Data collected from surveys regarding communication and connections between students and teachers fell outside the focus of this study. That data does appear to enhance what I learned about engagement with content for these students. When analyzing data for this study, I included quotes from surveys and statistics about engagement. This data can be found near the beginning of Section IV. Data collected in those surveys did indicate a difference between the learning experiences of students in the 1:1 program when compared to students who did not have access to Chromebooks. These data have, therefore, been included.

Finding #3 1:1 technology access or not

- **All students interviewed uniformly experienced the expectation by their teachers to use technology to find information beyond the school day, even if they did not have access to Chromebooks.**
- **Students and their teacher felt unprepared to integrate technology into their learning. This made additional learning and preparation necessary for both the teacher and the students.**
- **Students in the 1:1 program saw students that were not in the program as having a disadvantage.**
- **Students who were not in the 1:1 program also described feeling at a disadvantage when compared to students with access to a personal device in the classroom.**

Listening to these students made it clear to me that they were not used to having access to technology when in class. Because of this, students indicated they were unprepared to use technology as a learning tool when they got to this high school, and had not received sufficient training in this area. The classes involving technology that they had taken previously were stand-alone classes and not integrated into other core subjects.

In their interviews, all students said they felt technology was more accessible at the high school than it had been in middle school. Through listening to students, I was trying to ascertain how they perceived each other with and without technology. Ben, who was part of the 1:1 program, talked about how limited technology had been in the middle school:

> I think that using technology here is a lot less limited than … at the middle school... Like the only class we had with technology was literally …words … literacy in technology and we really could only use technology in school for like that one class. Um, so like … here, everyone that has technology is in the 1:1 class, so it's like everyone is on equal ground. Like it doesn't make it more difficult for one person, say if they don't have Word or something, so everyone has the tools they need to learn, so it's just a lot more evened out and makes it accessible to learn here.

Grant had stated previously that his teachers expected him to continue to seek information and conduct research outside of school. He was not a 1:1 student and felt that the high school had a high level of technology compared to his previous experience. Grant shared this information in his interview:

> I came from a private school in [location removed] very small, 27 people as of last year. Very low grade technology. Ummm, they started to give us computers and they were these tiny, tiny, little [company name removed] things, and they were so slow. After a while they found out students were playing games and they didn't like that so they took the computers away. We all got paper tests back. We were pretty happy about that, that's how slow the computers were. So a….as a technological difference it's vast. We can use computers here, and there we

> couldn't. Everything 100% had to be done on paper. Everything we wanted to present had to be done on paper. And if you wanted to find something out encyclopedias and dictionaries, you know.

The students that took part in this study all indicated they had technology access through school and after school at home. A question that arose from talking with the students was whether or not they felt prepared to integrate technology into their learning. Alice, a non-1:1 student, said, "In the middle school we had those classes. We had computer classes, they went over the basics. I felt prepared, but not fully. Not fully prepared, I would say." Chelsea (1:1) shared this:

> Yeah I guess, cause at some points ... I guess it was a learning step for the teachers too because they didn't really know what they were getting themselves into either. It's the first year with the program. But at times it was hard to figure out how to do things cause at first the computers started just blank they had nothing with them and we had to figure out how to do things and certain things were blocked by the school, and we had to get them unblocked to make sure we could do certain things. But now that we're into it, it's expanded a lot more and we've gotten to do a lot more activities

Ben, another 1:1 student, said:

> In like Freshman Seminar we don't really have too many assignments with, well we do have a Google Classroom set up but it's kind of split, there are some kids with computers and some that don't have them. They give us an assignment and sometimes there is an option to do it on the Chromebook and sometimes there is not. Sometimes they just give us all paper. And then in Community (Community

> and the Individual is the combined Social Studies and English class all ninth grade students are required to take at this site), we pretty much have used the Chromebooks for everything in English from the start. Then with Mr. [social studies teacher] I think had a little trouble adapting to the Chromebooks, so at the beginning of the year we did pretty much everything with pen and paper, but now we pretty much do everything on the Chromebooks.

During interviews, students gave very different descriptions of how they saw learning with and without technology. Students who were not in the 1:1 class talked about being told to research information for class at home, often with no knowledge of the student's ability to access the information. Students in the 1:1 classes used their devices to look up information in order enhance discussions in class and collaborate with others on assignments in class. This relates well to what Mr. Grimes reported in an interview about his need to spend additional time *learning* how to teach with technology:

> What's been happening and I think this is because I am a new teacher. So, it's I don't have anything right now. I'm making everything for the first time for the most part, this year. So I'm planning every single night. What I have been doing is planning for my non-1:1 first. Because that's the majority of my, I mean, the two thirds of my classes are non-1:1. So I plan for them first. Because I know, according to the curriculum I have to follow I know exactly what needs to happen and planning not for the non-1:1 is easier in my brain for me. That's what I taught last year. That's what I am used to. That's what I learned as a student.

I asked Mr. Grimes and students about their technology classes. Mr. Grimes took technology integration classes prior to teaching in schools, but the classes were largely abstract or simulated, rather than being grounded in genuine classroom experiences with students. This was the same experience the students in the study had with their technology course. Because technology was taught and learned separately from their content, they were unsure of how to apply it in the classroom setting.

Students in the 1:1 program did not necessarily have classes that were entirely 1:1 all day. Mike talked about his non-1:1 classes as being limited because they could not look things up on the Internet. He said sometimes they could not use their devices, because device use was at teacher discretion. Grant, who was not in the 1:1, thought that they were probably an advantage and a convenience:

> Umm … In a way I think that it's an advantage you know because instead of having a stack of paper, you have this thin computer. [holds up his hand in the shape of a C and shows a three-inch gap between his fingers, which he closes down to a half inch] And like um, it's quicker to do things. You could be typing a report and instead of writing the report, and picking up your phone to look something up, you can just open a new tab and look up something quickly. I think it's a convenience.

Mike shared that having the same environment both at school and at home was very helpful for keeping him organized. During his final interview, he shared:

> You can use Google Classroom, I use it in two of my classes … But um, I use it in two of my classes and they post all of the homework on there. So when I get home I can do that, instead of like finding my paper, and doing the work, and then

> maybe losing it before I can turn it in. It's just easier it's more organized. Then at school, you can use Google Classroom it's just easier because everything is right there. And there's like a ton of different things you can do. You can post an assignment, or post a question, instead of like going onto Google Docs you can post like a worksheet you can answer in the blanks or something.

Mike also said he felt his peers were at a disadvantage: "Well… I feel like they are at a disadvantage because they are not learning as fast as us."

Within this section, the student perspective was explored using the researcher's framework as a lens. Data within this section included themes of change/transition, because student participants and Mr. Grimes were experiencing changes on several levels at once. Engagement and motivation were evident from the student perspective. Students having access to technology or not did have an effect on participant learning, according to their interviews. From the beginning of data collection to the mid-point student thoughts on using technology for learning changed drastically. Alice, who was not part of the 1:1 program, initially thought it was possible to have too much technology in the classroom. During her first interview, she shared that sometimes teachers used technology too much. In her words:

> Probably less, because like, we already … today… in this generation we are already using enough technology. So I think … it's okay for teachers to use it … say if they need to show a video for a visual. But kids already…use too much technology in a certain way … school should be … kind of like getting away from technology. I like it when teachers use it sometimes, but I don't like it if say they use it all the time. But if it's … a computer class it's fine.

In our final interview, just a few weeks later, Alice said that she was using her smartphone in class with one of her teachers. I asked, "Weren't you the one who said that you didn't think teachers should use a lot of technology in class?" Alice nodded, so I followed up with, "So does it bother you that they do that?" and Alice replied, "No, it's kind of fun actually."

Student perceptions of each other as friends and community members also changed. The students who were not in 1:1 classes said they did not share too many classes with kids who had the devices. When Grant, who lived in town but had previously attended a small private school, was asked about kids in the 1:1 program, he shared this:

> I think it's pretty cool how we use technology to umm, for school. I don't know what they use it for. I'm not really sure how they are using it for like assignments, and emailing the teacher and stuff, so I think that's cool, but honestly I like paper.

Alice had a similar reaction when asked about students in the program: "I don't really have like, any of them in my classes. I don't really see them working with the computer. I don't actually look at their screens but they are in my study halls." These reactions show that these students were experiencing a disconnection from their peers. They did not really know what the other ninth graders were learning, or how they were using the tools in the classroom.

Part III: Teacher perceptions

Teacher perspective on how these students differ provides additional insight into the student experience. Both observation and Mr. Grimes' interviews about students with and without technology provide another lens through which to view the students' experiences. The sub-questions addressed by this part of the study are:

- Even if students have equal access to 1:1 technology during the school day, how is the learning experience of a student without access to digital tools beyond the school day different from that of a student who has access to those tools both at home and at school?
- How does the widespread use of technology in teaching affect student self-perceptions as learners?

Using the teacher's experience, I learned about factors that influence the student experience in a classroom that is implementing 1:1 learning for the first time. Interviews and observations indicate a difference between the 1:1 and non-1:1 sections.

Finding # 4 Instructional methodology and learning outcomes

Teacher instructional methodology changed according to their comfort level with the technology they were using. The teacher showed concern about students with and without devices getting the "same education."

Initially Mr. Grimes was not certain that his students were learning content knowledge the way that he thought they should. In his first interview, I asked him to compare two students from his 1:1 and non-1:1 sections. He said he was specifically trying to think of students who had the same intelligence.

> [Andrew] is in my non – 1:1. Both of them are average intelligence. They don't really struggle but they don't know everything. Andrew isn't distracted by anything for the most part, he, you know he internalizes what I say. He watches me while I lecture. He fills in his notes correctly because they are right in front of him. He doesn't understand everything but when he goes home he has all of his resources lined up correctly. He knows exactly what I want them to say. I think that's just the nature of that section. He has everything he needs straight

> out of my mouth, whether he can apply it, that is up to him in the end, but he has everything he needs. [Byron] who is in my 1:1 class is of the same intelligence and he often doesn't, or chooses not to hear what I say. He's on the computer, he's doing other things, he's on Facebook, or whatever he's doing I don't even know. Um and he's not listening to what I am saying because of the computer sitting in front of him. He's one of the students who missed key information simply because of the computer. He misses the notes or he doesn't think my notes are as valuable as they are because he has the computer and because he can just Google whatever topic we're talking about.

In classroom observations, I noted that students in the 1:1 class got up and moved around more. They were actively discussing the content and sharing ideas about how to use their tools to increase their knowledge. Initially, I saw the 1:1 students' movement and talking as disruptive to the flow of learning. But after talking with Mr. Grimes and his students, it became clear that this was an important part of their learning. His students in the 1:1 class were adding to the learning environment through asking questions and taking risks using the language in new ways. In the non-1:1 class, I observed student responses but very little active discussion on the student part. Most of the direction and speaking in that class came from the teacher. This was very different from his 1:1 class. In his section without devices, students responded only when prompted by their teacher. They were learning, too, but were attempting to get at what Mr. Grimes wanted, not necessarily thinking of ways that they could use the language on their own. I perceived different pedagogy in the two sections, constructivism and behaviorism.

After the second quarter began, Mr. Grimes stated that Byron (his 1:1 student) had turned it around, in part because he had conferenced with the boy's parents. Mr. Grimes also shared that he had come up with a system for ensuring that students were using the tool for class.

> Now I have them do a check in on Google Classroom as soon as they arrive. That way they are immediately immersed in the content and I can tell what they are doing on the computer while I take attendance. It's a win-win situation. I know they are learning and I get my attendance in on time.

In my final interview with Mr. Grimes, I asked how his students were doing. He said, "I guess we're about to find out. Midterms are this week!" When I asked him how he thought the midterms would turn out, Mr. Grimes shared this insight:

> It's not necessarily that the groups have a different intelligence, it's how they learn. In the 1:1 class they know where they can go to get answers because I have showed them those sources. But they don't stop there. They take risks, they ask questions. My non-1:1 group doesn't do that. They take in the information and give it back to me.

I followed up with, "They don't ask questions?" Mr. Grimes said, "No, it's like they don't want to push themselves, that what I give them is plenty. They could be learning so much more, and I see that now."

Mr. Grimes told me he thinks that teachers need time to learn about using new technology tools, and opportunities to share what they learn with other teachers. From his interviews, it was also very clear that Mr. Grimes was concerned that students who were not in the 1:1 program were not learning the way that they could be if they had personal devices. As my analysis of the data moved to learning outcomes, it appeared that Mr. Grimes had valid concerns.

Finding # 5 Knowledge acquisition and competence

Common assessments showed that the students in the 1:1 class had a significantly better results on their formative and midterm assessments than their non-1:1 counterparts.

The changes that students in this freshman class were experiencing included learning about accountability. Though the students who were not in the 1:1 group talked about learning from their teachers, the students in the 1:1 group talked about being able to add to information in their classes. When asked about the pros and cons of having a device in the classroom, Chelsea shared this:

> Yeah… if you turned something in late it wasn't …as big of a deal, now it's like it has to be on time or it's no longer available. They're more strict about the work. It helps me keep up with my work, because you don't really get as much of a second chance. Which is good because then you… work harder for it the first time… Yeah it makes it different I guess because I have all my resources right in front of me, unlike other people who might have to wait until they got home to go in depth and find something, where I can go in right there in class while it's fresh in my memory, and when I'm home. Like other kids might have it too, but it might not be directly tied into their school work so they probably don't use it for learning at all. But as for me I'll use it for both.

This supports what Mr. Grimes shared in his second interview about getting students to be accountable for their work.

> So it makes them more accountable just because they have to press submit or that means they didn't do anything. And that's a little bit more … I mean if I was a

> student that would weigh more heavily on me that I didn't press submit and that my teacher doesn't have my work.

From talking with Mr. Grimes and students in the program, I initially thought that perhaps the devices were a distraction and that having them might have a negative effect on student learning outcomes. However, that did not happen.

When starting this study, I wanted to know how the experience of the 1:1 student differed from the non-1:1 student. During our interviews students gave very different descriptions of how they saw learning with and without 1:1 technology. Students who were not in the 1:1 classes talked about being told to research information for class using the Internet at home and come back to school prepared to discuss what they learned. Students in the 1:1 classes described a very different scenario. They used their devices to look up information on the Internet in class. They used what they learned to enhance discussions in class and to collaborate with others on assignments. In interviews with the teacher, Mr. Grimes describes preparing for both classes:

> Sometimes I just take the notes that they are going to handwrite and I put them on the computer and then that's easy for everybody, that's easy for me. I don't have to do any extra planning with that. The kids can just take their notes on the computer, save the file, edit the file. There are some things that at this point that I am not taking advantage of what the computers can do. Because I am planning for the other class first. I don't want to take away from either class. Does that make sense? I don't want anybody to not get the same education, just because I am planning differently.

Mr. Grimes was concerned that some students in his non-1:1 section were not getting the same education. He was also concerned that his 1:1 students were not getting the most out of

their tools because he did not have sufficient technology skills. In one of our interviews Mr. Grimes said:

> Last week, I had students do write, translate, illustrate. And what that is, is the student, um it's pretty basic. The student has a blank piece of paper and they fold it in half twice, so they have four boxes. They have to write a sentence using their grammar or vocab whatever we're working on. They write a sentence in Spanish, they translate it underneath in the same box, and then they draw a picture. That's it and I grade it. It's just like a little quick thing to double check comprehension and I have my non-1:1 class is doing it on paper and then a way that I could apply it to my 1:1 classes that I had them do a collaborative slideshow. So that was different planning for me, it's going to be different when I grade it. I had to come up with different instructions for it so that's kind of how I have differentiated for them. They are learning the same content, still at the same time and I'm still getting the same content out of them, but its more work for me.

Mr. Grimes was told that he would be getting a class with 1:1 technology in August. In an interview, I asked him about his transition into teaching with these tools. Mr. Grimes said: "Well, I just have to do it, don't I? This is something that we are doing here, and I am going to get it done." In his final interview, Mr. Grimes indicated that as he was integrating technology with more efficiency, his students were finding it more interesting. Students shared that sometimes it is the different instructional design that engages them. When Alice, a non-1:1 student, was asked what she found most interesting about her classes, she responded by talking about the design of the learning activities:

> The most interesting parts about my classes, I like…Hmmm. It kind of varies from class to class I guess … some classes I like when we do certain types of projects. Others I like the way we keep a notebook, or like the organization of the class. Or if we have teams with our table groups. I have that in one of my classes and we get points if we get something right or answer a question. So it kind of varies from class to class, which part I find most interesting.

I observed different student behaviors depending on which section they were in. Students in the 1:1 class were more mobile and talked with the teacher about the content. They also talked about their personal interests with the teacher. In the non-1:1 section students stayed in their seats, unless they were retrieving learning tools, and only responded to teacher questions and directions.

Teacher and student interviews, as well as observations, revealed a difference in the way students in the two sections behaved with Mr. Grimes. In the 1:1 class there was more connection regarding content. I observed stronger relationships between Mr. Grimes and the 1:1 students. As the semester passed, Mr. Grimes and his students became more familiar with their tools. Mr. Grimes said in an interview that he thought his students were learning at a deeper level because they were having more in depth discussions. Students in the 1:1 classes shared the same thoughts about other classes. During the final interview with Mike, he talked about using his device both in class and beyond the classroom:

> Well like if you're learning about social studies. You can go and look it up, and learn more information about it, but most of the time that information isn't going to be on the test. Because that is not what he taught you, he basically taught you the information that is going to be on the test. So you are learning more.

From what I observed, and can tell from student work and test results, Mike may have been absolutely correct in his assessment that he was learning more. In the next section, Mr. Grimes and I examined formative work from students in his Spanish class.

Formative assessment comparison

In Mr. Grimes' final interview, I asked about the difference in student products. Mr. Grimes had provided examples of student work, from two students who were both, as he noted, "A" students. Mr. Grimes and I had discussed this assignment during his second interview. At that time he described what he wanted to do:

> So like for example next class, I did it my A block class was my paper Spanish II. My next block, C block, is my 1:1 class, so they're going to be doing the same exact thing but they are going to do it on the computer. I'm having them make their own boarding pass. Then I'm going to ask them questions about it. My A block class was able to just draw it free hand on paper. My C block is going to do it on the computer. I don't have the formatting skills to say, okay this is how you draw a box, this is how you write in a text box.

Mr. Grimes expressed concern about not having the skills himself to show students how to do this work:

> So it's that kind of, that's a huge roadblock is that I don't know how to use the technology. Because then I can't make them do things that I can't, you know if they have a question I can't answer it. If someone doesn't know how to make a word box, um, in the next block, or I mean I can do that, but like if they want to do something I don't know how to do it I can't help them. But at the same time I want them to have the same quality of work that my first block did but it was

> because they did on paper which is why there is no questions about it. You know? So that's kind of like where I'm struggling as I have big plans for them but I don't know how to get to those big plans, because I don't know how to do it.

In his final interview he pointed out the differences between the students' work. In the 1:1 group he described the work he shared as being, "more like what you'd expect to see from someone in a place of work or college" than the work from his student in the non-1:1 group. Mr. Grimes was very pleased with the results of both groups, but particularly pleased with how the work looked from the 1:1 student. He shared that, as time went on, he was finding technology easier to incorporate into his classes. Because of this, he felt that his students were getting more out of their learning because he could use these tools better himself. He said in his final interview:

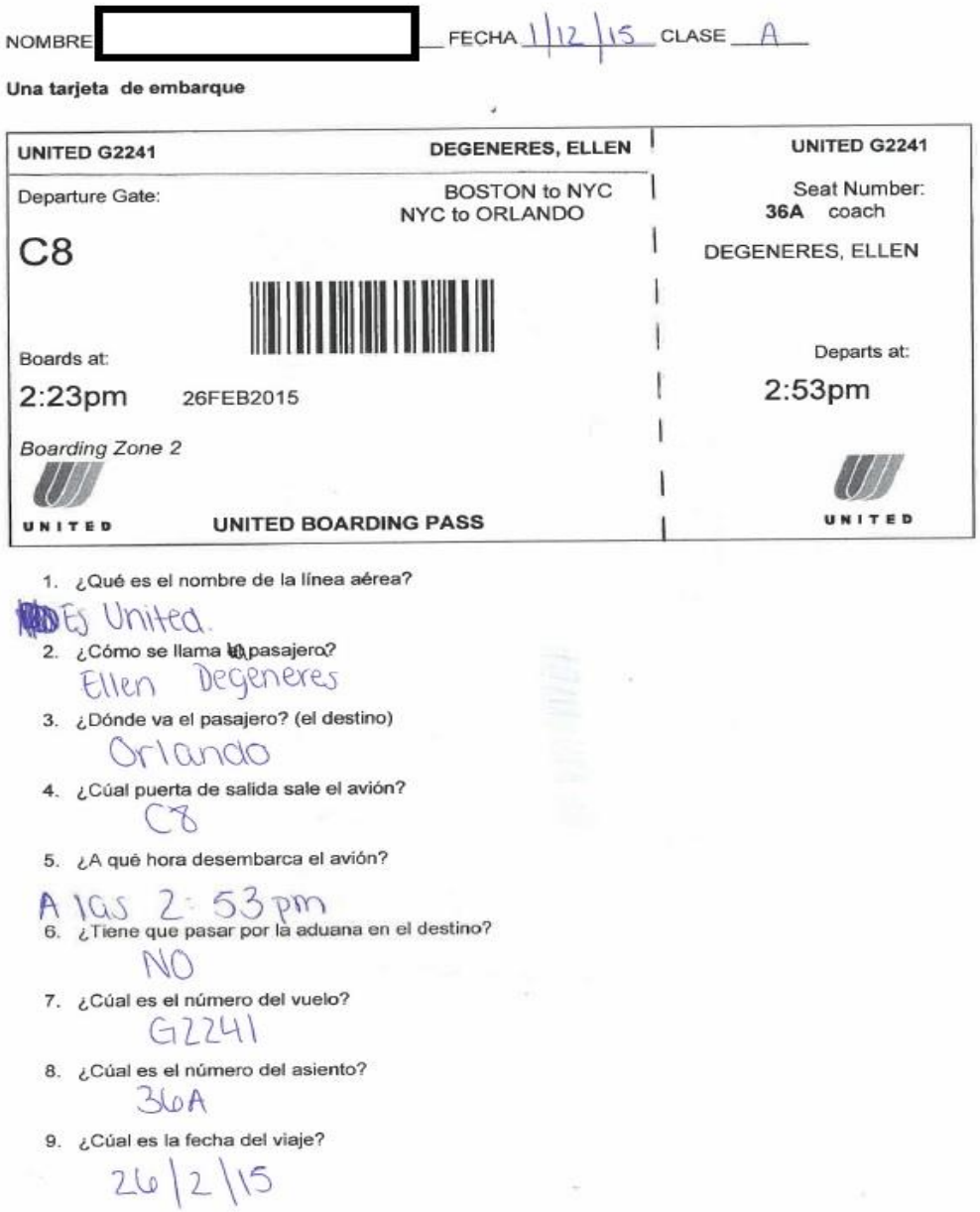
> I hope the program continues and expands. It's hard to be so up in the air. I don't know what I will be teaching, but I know I will find a way to use what I have learned, and it will just continue to get better.

After talking with Mr. Grimes, I, too examined both samples to determine if what he had said was consistent with what I saw. The work sample for the non-1:1 student was good, as Mr. Grimes said. It contained everything he had asked for. But it was simple -- there was no imagination or creativity. The student had basically copied the exemplar that Mr. Grimes provided for the student. In the second sample, the 1:1 student had incorporated graphics, used another student's name, and written a story about going into space. The design was original, as Mr. Grimes had not provided an exemplar or model for students to follow.

Mr. Grimes said he had watched this difference develop between the two groups over the first semester. Students in the 1:1 program learned at an accelerated rate compared to students outside the program. The two formative work samples that were shared, have had the students

names removed and are non-identifiable by adults outside this study. The two students might recognize their work if they saw it within this study. Both classes were tasked with creating boarding passes. In his non 1:1 group, Mr. Grimes provided an example boarding pass. The 1:1 group, had to find a boarding pass exemplar online, and then create a boarding pass based on what they found and what they imagined it would look like for them.

Figure 4.3.a non 1:1 student work sample front



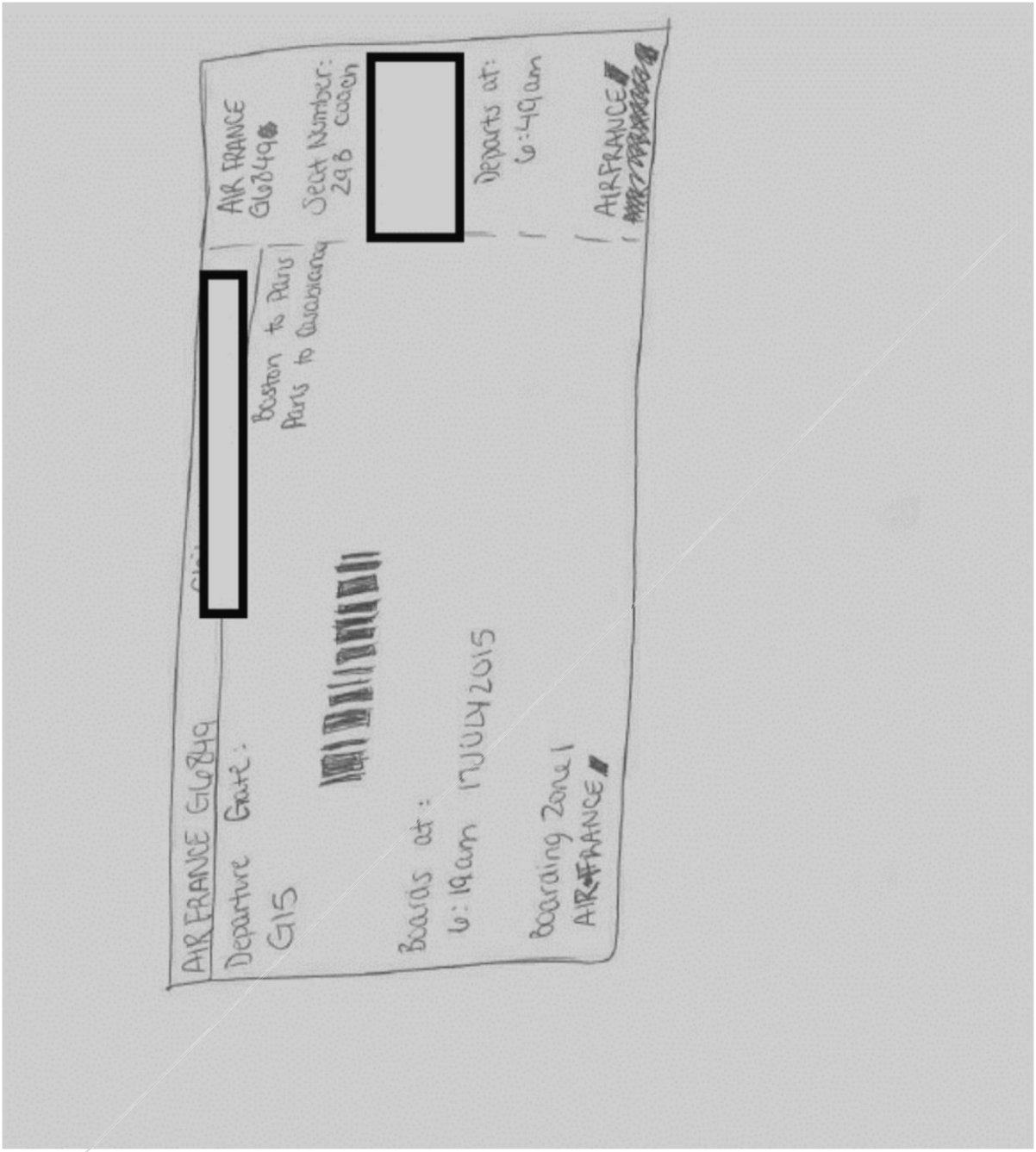
NOMBRE [redacted] FECHA 1/12/15 CLASE A

Una tarjeta de embarque

UNITED G2241	DEGENERES, ELLEN	UNITED G2241
Departure Gate: C8	BOSTON to NYC NYC to ORLANDO	Seat Number: 36A coach DEGENERES, ELLEN
Boards at: 2:23pm 26FEB2015 *Boarding Zone 2*		Departs at: 2:53pm
UNITED	UNITED BOARDING PASS	UNITED

1. ¿Qué es el nombre de la línea aérea?
   Es United.
2. ¿Cómo se llama el pasajero?
   Ellen Degeneres
3. ¿Dónde va el pasajero? (el destino)
   Orlando
4. ¿Cúal puerta de salida sale el avión?
   C8
5. ¿A qué hora desembarca el avión?
   A las 2:53 pm
6. ¿Tiene que pasar por la aduana en el destino?
   NO
7. ¿Cúal es el número del vuelo?
   G2241
8. ¿Cúal es el número del asiento?
   36A
9. ¿Cúal es la fecha del viaje?
   26/2/15

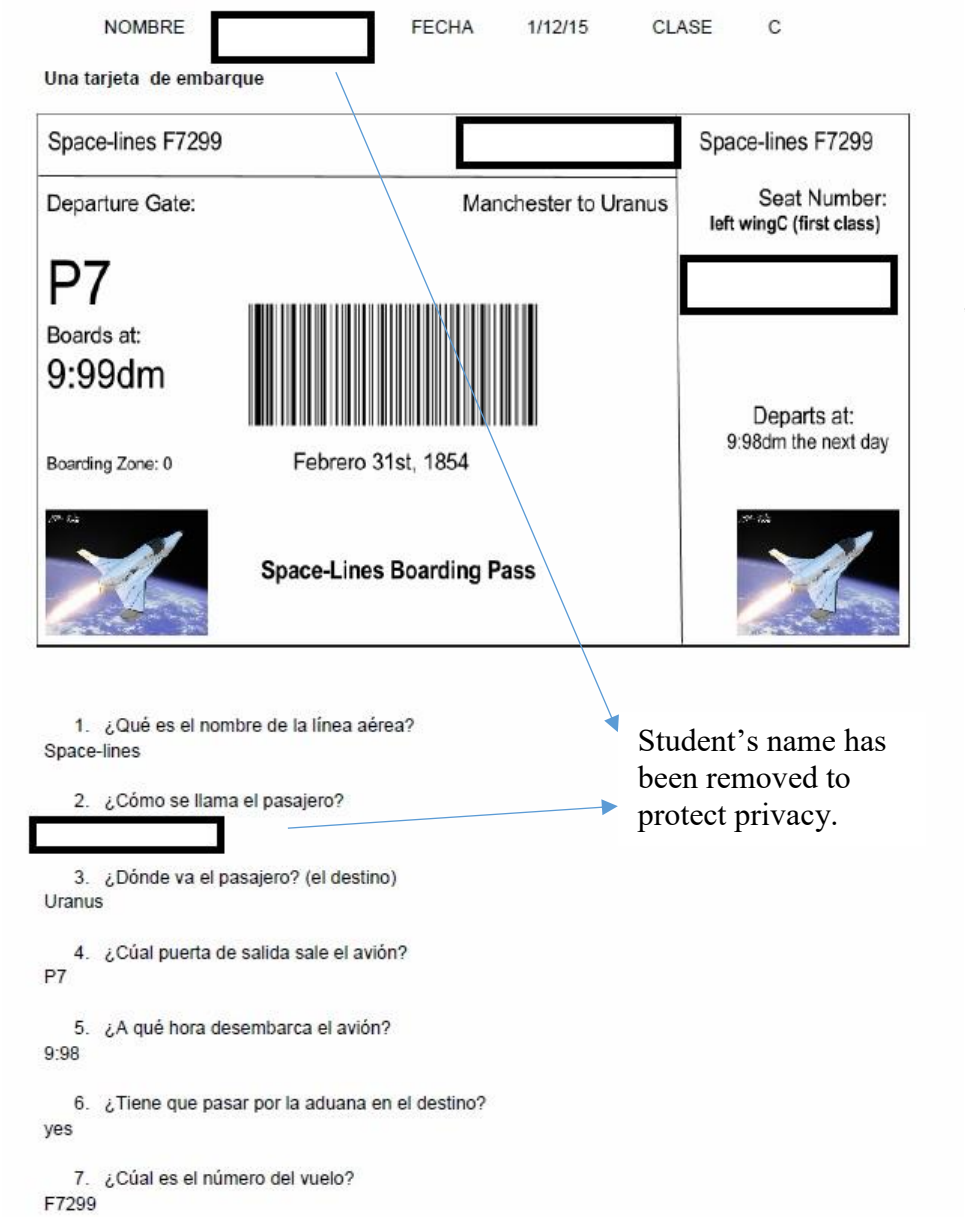
Figure 4.3.b non 1:1 student work sample back



The sample above is drawn from an exemplar provided by Mr. Grimes. There are mistakes that the student has crossed out, and there are no emblems or embellishments. In the following Figure the 1:1 student had significantly more embellishment. Mr. Grimes said that this student's work

looked more professional and polished. My own examination of this work agreed with Mr. Grimes' opinion.

Figure 4.4 1:1 student work sample



For this formative assessment Mr. Grimes indicated that students were encouraged to be creative and had to discuss their work in class. Discussion for the non-1:1 group was limited to answering Mr. Grimes' direct questions. The 1:1 group were forthcoming and told stories about

their trips using significantly more Spanish expressions than their counterparts. In Mr. Grime's opinion his 1:1 students had outperformed the students without access to 1:1 technology in the classroom.

Students in this study felt getting feedback from their teachers was very important. Grant, who was not in the 1:1 program, talked about feedback as being very helpful. In an interview he shared that he had a teacher (not Mr. Grimes) who gave feedback to him right away. Grant felt he learned better in that class:

> Some teachers are quicker and some are slower. Like Mr. [Teacher] he like grades things right then and there. He'll give you feedback right then. He'll like give you the grade and do like a discussion with you about your quiz and stuff.

When asked if all of his teachers did that, he said:

> Yeah just Mr. [Teacher] and I find it helpful. With Mr. [Teacher] he'll confront you about it, but like most teachers, you have to go to them. Whereas Mr. [Teacher] comes to you with what you did.

Based on my reading I expected there to be differences between the work of students depending on which section they were in, and that Mr. Grimes would feel more confident in the use of technology the more he and his students worked with the tools. What I did not expect, was that students with the 1:1 devices would need less direction from Mr. Grimes to produce their work.

Common assessments comparison

When I received assessment scores from the student information system, I first analyzed them simply by looking at the mean and seeing if there was a difference between student learning outcomes in the 1:1 and in other sections without devices. There was a 10-point

difference between the high and low scoring sections. Deeper analysis showed that this was a statistically significant difference between sections.

Using an unpaired t-test for analysis, I took the mid-term assessment scores from three sections of a social studies course taught to all ninth grade students using the same curriculum. I chose this test because each section would have taken the same common assessment and the students taking the test would have either had the 1:1 Chromebook or not. Teaching staff were concerned that students "needed to get the same education." The tables on the following pages present the scores available for calculation. Conventional criteria would indicate significance at anything >.05 for a two-tailed P value.

Table 4.3: Midterm assessment scores in social studies

	Section A	**Section B**	**Section C**
Condition	1 to 1	Non 1:1	Non 1:1
n	38	42	41
Mean	81.39	71	73.85
SD	11.13	13.47	14.02
SEM	1.81	2.08	2.19

Table 4.4: Mean score differences between sections A, B, and C

A compared to B

t=3.7396

df= 78

Standard error of difference= 2.78

Two-tailed P value= 0.0003 at 95% Confidence Level is statistically significant (**p<.05)

A compared to C

t=2.6335

df= 77

Standard error of difference= 2.864

Two-tailed P value= 0.0102 at 95% Confidence Level is statistically significant (**p<.05

B compared to C

t=0.9456

df= 81

Standard error of difference= 2.78

Two-tailed P value= 0.3472 at 95% Confidence Level is not statistically significant (**p>.05)

It should be noted that these sections were taught by different teachers, with different populations. A key component of these assessments was analysis of primary source documents. In order to pass these assessments, students have to think critically about information that is presented to them. But when sections were compared, the students in the 1:1 section had a higher mean score than the students in the non-1:1 sections on their common midterm assessments.

It is unclear whether that difference directly correlated to having the devices, but it is interesting that the section with the devices had a mean score that was 7-10 points higher than the other sections. This raised several questions I had not expected: Why did these sections differ? Was it parent support, teaching and learning styles, having information readily accessible to enhance conversations, or another reason? These questions are implications for future studies and as such will be addressed in Chapter 5. It is likely that a combination of factors contributed to the difference in assessment scores for these students. This is an area that should be followed up on in future study.

For this case study I strove to compare ninth grade students' stories based on whether or not they had access to 1:1 technology, but the test data offers a potential path for a more rigorous quantitative study. The assessments from these courses indicate what appears to be higher achievement in critical thinking and analysis skills for the students in Section A (the 1:1 section). What is not clear from these assessments is why student results were different. Other questions to consider include, did team teaching affect the outcomes? Were there striking differences between the instructional effectiveness of the social studies teachers? These questions remain to be explored through additional study.

Part IV: Data outside Ange's conceptual framework

In order to gain access to this participant pool, I needed to evaluate the district's 1:1 program. Some of that data provides additional insight into the student experience of learning in a school with both competency-based learning and a new 1:1 program happening within the same grade. Data outside the framework is presented toward the end of this section. Research questions addressed by this part of the study include:

- How does the difference between having technology or not affect student perceptions of each other?
- What can we learn by comparing students' stories?

Students' voices are present throughout the study and were the focus of this work.

Student survey results help confirm interview findings

A substantial amount of the data collected during research fell outside the focus of this case study. Observations, interviews, student surveys and assessment results were all part of data collected for this particular case study. Data from the program evaluation, which was my point of entry, included parent surveys, Steering Committee meetings, and conversations with other

teachers and administrators who were observing the classes. These additional data points provided information that added to the wealth of experiences that I was able to draw from.

Data collected from surveys of both students and parents enhances what I found in regards to collaboration and engagement. In the program evaluation, students were surveyed weekly for 10 weeks. In surveys, students in the 1:1 group used technology to collaborate with each other on assignments. So did students who were not in the 1:1 program. Students in the 1:1 program reported collaborating with others on assignments 77.6% of the time, while students without devices reported collaborating 54.2% of the time. The figures were taken from the Google forms used to collect and manage this data. The graphs were created using Google analytics.

Evaluating the program provided me with another way of viewing the data that was being collected. From working in school districts using high stakes assessments, I have learned to never trust a single score. Multiple sources of data need to be considered when looking for a whole picture. Yin (2013) had suggested that a researcher collect as much data as possible in order to get a complete picture.

Survey data showed that students who had the 1:1 computers were using them beyond the school day for school-related work. Students who did not have the 1:1 devices were less likely to use a computer/smart phone/ tablet at home for schoolwork. Their survey results showed that students in the 1:1 program used their devices after school for schoolwork 89.8% of the time. Students not in the program used a device for schoolwork after school 67.3% of the time.

Figure 4.5. Students with 1:1 devices

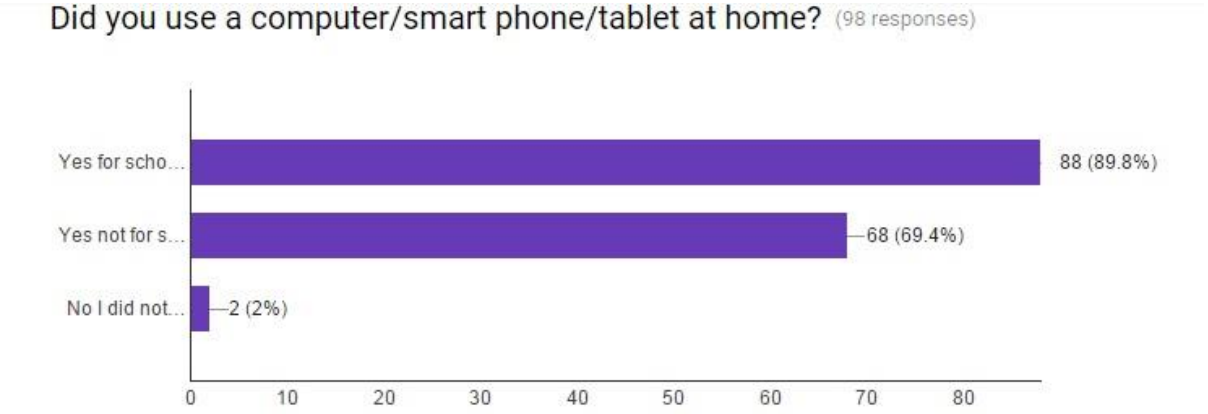
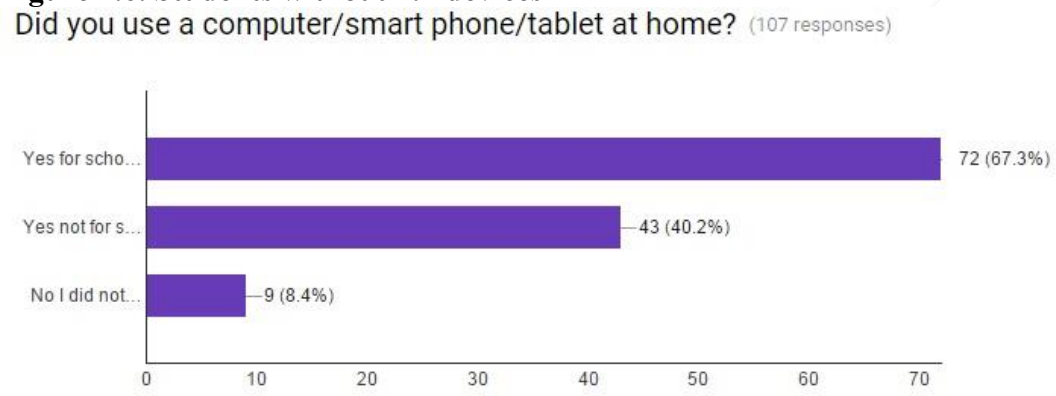


Figure 4.6. Students without 1:1 devices



Parent survey results

Data collected from parent surveys included increased communication and access to collaborative assignments between students. “So far, we have found this an overall positive experience. He has easy access to assignments. We have found that teacher communication is easy and fast.” As one parent noted in their survey response:

> I think that this program has a positive affect (sic) on my child's learning. It helps prepare for the future and it seems that teaching using the device goes faster than with the regular classes. The computer also helps my child excel in honors classes, as it allows for notes to be grouped into one folder for reference. Group

projects are also made easier by allowing the children to send information back and forth to each other. (Parent 1)

Students in the non-1:1 section had at least one person reporting weekly that they did not use a computer at home. The two responses from the 1:1 section that reported no home computer use coincided with Thanksgiving break. The students surveyed in the non-1:1 group indicated that 8.4% of students did not use a computer at home. This does not necessarily mean that they did not have a device available, simply that they did not use one for learning at home.

As analysis of data progressed, it became clear that there was information which did not fit within the Ange conceptual framework originally developed for this study. During interviews with Mr. Grimes and the student participants, there were common experiences and connections which they articulated. In many cases parent surveys provided triangulation of what Mr. Grimes and these students were experiencing. Themes developed from these sources of information offer some additional insight into my research questions developed for the case study.

These insights can be clustered into four broad categories or themes. These include: (1) thinking differently, (2) planning and preparation, (3) organization of materials and resources, and (4) digital citizenship as defined in Key Terms on p. xi. Over the next several pages I present these findings in the order that they came up during the process of analyzing the survey responses.

Thinking differently

In this study both students and their teacher shared that they had to "think differently" about the content of their classes.

During interviews with Mr. Grimes and 1:1 students, the participants frequently referenced having to think differently about how they teach and learn. For students, that included

seeking out the opinion of their classmates and "getting to see what everyone else is thinking". For Mr. Grimes, it was thinking about content differently in order to integrate technology into planning and preparing for classes.

When I interviewed Mr. Grimes the first time, he talked about planning for his classes. Though this was his first year at this school, it was not his first year teaching. He had materials from his last district, but the curriculum and competency expectations were different at this school. He explained what was different for him as far as integrating technology into his teaching practice:

> Um, so it's kind of hard to match up what I am doing in each class. I want to make it as similar as possible. Sometimes it's just here are your notes, but they're on the computer so it's the same exact thing. And sometimes it's completely different.

With students, information about thinking differently about their environment and the context of their learning was sometimes buried in their answers to other questions. In an interview, Chelsea described how when the teacher polls the class about a subject and she gets to see her peers' responses:

> The teacher puts out a question, and we can all answer it on our computers. Then he puts it up on the board and we can vote which one we think is the best answer. That helps too because we get to see people's opinions on things and we all have it right in front of us as well as on the board, and everyone is looking at everyone's take on the subject, and I like that.

For these students, being able to see what their peers thought about content was engaging. This knowledge adds to what the study revealed about student perceptions of their learning

experiences. Being held accountable for their learning had an impact on the students' thinking as well. Alice, who was not in the 1:1 program, talked about trying to balance her workload:

> Yeah well it's challenging because for sports I have it after school we'll have it on the weekends too. So…for basketball I have it on Monday through Saturday so that's kind of it's also there's more work, so it's kind of hard and it might be a little bit stressful at times. Trying to… balance it out, but I get it done.

Ben, who was in the program, talked about how having access to technology and having two days to get his work done had made work easier up at the high school. Students in the 1:1 classes experienced varied levels of stress. Chelsea had talked about accountability and how that had changed at the high school level. She said that she was experiencing stricter expectations for getting her work turned in.

More of this falls under organization of materials and resources, which will be discussed later in this chapter. As for the parents of the 1:1 students, they were concerned with students learning 21st century skills. Parents talked about creating an "anytime, anywhere" learning environment in their survey responses:

> However, my student has used the laptop to complete her assignments. I believe the stigma behind "if you have the technology, there is no reason for missed days of work, you are always connected and can tune in from anywhere, anytime!" Is fitting based on the world we live in. The students need to know this IS how the world works, assignments, projects, meetings still happen even if you are ill, you need to be resourceful and I believe the technology program is doing this for the students enrolled. (Parent 2)

> We live in a technical world; I work as a Statistical Computer Programmer where the office is paperless and my 'group' encompasses three continents -- he sees me do this. When [name removed] does bring his Chromebook out at home (there are days when he does, but more often it stays in his bag), I believe he is learning responsibility and computer skills, including collaboration skills, that will last well into his future. (Parent 3)

Interviews with Mr. Grimes, students in this school, and parents of 1:1 students who responded to surveys from the district indicated that students were thinking differently about school in the ninth grade. For some students, this was learning to balance their workload, both with and without technology. For others, including Mr. Grimes, it was learning to apply knowledge in different ways.

Planning and preparation

Teachers in the 1:1 program had to plan and prepare differently for classes with direct technology integration.

Steering Committee minutes included references to increased professional learning in the area of technology integration, and committee members wanting to share that learning with other teachers in the building. Teachers on this committee frequently shared the names of add-ons to Google Chrome and online applications in meetings. As new tools were included and tested by other teachers, members of the Steering Committee shared that they felt more confident using the Chromebooks and other digital tools in their classes. Mr. Grimes said it was more difficult to plan for the 1:1:

> I’m making everything for the first time for the most part, this year. So I’m planning every single night. What I have been doing is planning for my non-1:1

> first. Because that's the majority of my…I mean, two thirds of my classes are non-1:1. So I plan for them first. Because I know, according to the curriculum I have to follow, I know exactly what needs to happen and planning not for the non1:1 is easier in my brain for me. That's what I taught last year. That's what I am used to. That's what I am used to as a student. So I do that first and then I do the 1:1 second.

For Mr. Grimes, planning and preparation included having to think differently. He was concerned that this led to students not getting the same education in his classes. During his first interview he shared this about his planning:

> Sometimes I just take the notes that they are going to handwrite and I put them on the computer and then that's easy for everybody, that's easy for me. I don't have to do any extra planning with that…There are some things that at this point that I am not taking advantage of what the computers can do. Because I am planning for the other class first. I don't want to take away from either class. Does that make sense? I don't want anybody to not get the same education, just because I am planning differently.

Other teachers in the program confirmed this experience during their monthly Steering Committee meetings. They shared that they planned for their non-1:1 groups first because that was how they had learned to teach. As they found more resources, however, they reported that it became easier to plan. Mr. Grimes shared this insight in his second interview:

> [T]he more resources that I find either from other teachers or since last time I talked to you we went to a workshop, the easier it is for me to prepare. I mean I

guess last time I talked about how do I prepare for my paper classes and then how do I make what I already prepared digital.

Administrators also had to think differently about evaluation of the 1:1 program. For evaluation of how teachers were integrating technology into learning, they used a model developed by Puentedura (2009). The four-phase model includes technology integration enhancement phases, at a basic tool substitution and a functional improvement on tool substitution phase. The next phases are transformative: significant task redesign using technology, and redefinition of a task that would have been previously inconceivable without the available technology. As I developed this study, it seemed pertinent to consider technology's impact on student engagement, and teacher instructional methods. I asked for administrators to conduct walk-through observations, but there were not enough walkthroughs to substantiate findings. Only seven were finished in the first term and they were not all done by the same administrator. However the ones that were finished did indicate high levels of student engagement. This would be something to follow up on in a future study.

Organization of materials and resources

Planning and organization were positively affected for students in the 1:1 program because of their continuous access to Chromebooks.

Parents, Mr. Grimes, and students both in the program and outside of it, saw having a device with them in the classroom as important for organization of materials and resources. Alice was very anti-technology when she first joined the study. She had said in her focus group response that she thought "teachers should only use technology when it's necessary." During her final interview, I asked her if she thought having a personal device in class would be helpful or not. She said:

> It would help me because … if we were … writing something. Because … today in English we were writing a personal narrative. So that would help me, because I could get my ideas down. It would just help me just get the whole writing piece down. Like it would keep all my notes organized.

That was a big change for her. Using technology in her classes to answer questions, and communicate with her teachers had changed her thinking. Mr. Grimes, who at first had seen the tool as a distraction, later noted that students could use it to organize their thoughts: "The kids can just take their notes on the computer, save the file, edit the file." For students in the 1:1 program, this adjustment to having the technology in class helped them keep their work organized. Chelsea shared this:

> Yeah, like now that I have it, it's a lot easier, because I am using the same thing in class as I have at home. It's a lot easier. I can work on the same thing at home, I don't have to try and retrieve it off some website online, I don't have to go into my student email and email it to myself I just have it right there, ready to continue.

Parents talked about organization in multiple responses to the survey. As one parent responded, "Seems more organized with everything in one place. More likely to work with or reach out to others in the program as well." There were several parent responses which centered on organization as being critical for their child's success in school. I have selected quotes from parent surveys which highlight parents' thoughts on organization and materials access:

> Class time seems to be more productive. They are able to cover a great deal of material in the time available. The program helps my child organize assignments, keep track of homework and her calendar. There are also study materials/quizlets

> available to help her study for quizzes and tests. (Parent 4)
>
> My son struggles with organization and with notetaking, and the use of the Chromebook has helped tremendously with both of these issues. The ability to access course materials at any time has helped him to stay on track with his assignments. Also, with the the ability to type notes in class (which is quicker than handwriting for him) and then easily reorganize them later, I have already seen an improvement in notetaking skills. I wish that all of his classes were incorporating the use of the device. (Parent 5)

Students, Mr. Grimes, and parents all cite organization as being critical to the success of students at this school. Having access to these tools increased students' ability to be organized and manage their resources efficiently. The convenience of not having to search for a paper, or figure out what assignment was due, was a great benefit for students in the 1:1 program.

Digital Citizenship

Students in the 1:1 program and outside of the program expressed concern about citizenship because of access to digital tools in the classroom.

Parents, students, and their teacher all expressed concerns at different times during interviews and surveys about the way technology could be used or how it might become a distraction from learning. Students in this school uniformly expressed appreciation for being able to have more access to websites at the high school than in their middle school experience. From the definition of digital citizenship provided by Brichacek (2014), students need to be responsible when using digital tools. Characteristics of digital citizenship include proper communication, using digital tools for learning purposes, understanding and avoiding plagiarism, and treating others with respect.

Ben shared that he really enjoyed the freedom he and the other 1:1 students had on their Chromebooks. During his second interview, he shared this:

> [I]t's just kind of changes the attitude of people when I go, I can't get on YouTube. Whereas like on the Chromebooks you can pretty much go anywhere and in some cases, that's not always ideal because some people like to play games on there and they had a little trouble with that. Umm and I feel like the first, I would say month or two. Umm but I think that I like having no restrictions on where you can go on the Internet.

Mike and Chelsea shared similar thoughts. Students who were not in the program had experienced a disconnection from their peers, which was explored earlier in the chapter within student perceptions.

Parents expressed some concerns about citizenship in their survey responses, which revolved around the amount of time their children spent on activities other than school work. This was similar to what Alice and Grant had talked about in their interviews. Here are selected responses from parents:

> It seems to keep him interested in getting to his school work, but I'm not sure I can tell that his work has improved or he is learning more because of the interaction with the computer. He also has a way of wasting A LOT of time on the computer without getting any work done, so the net effect might be negative. (Parent 6)

Yet another parent responded this way: "[B]eneficial with the ease of access to information and assignments. Can also allow distractions accessing other websites and non-school related things." These parent responses show that this was a uniform concern expressed

by people viewing the program from the outside. Mr. Grimes had also expressed concern earlier that students were distracted by the tool, talking about his 1:1 student this way:

> [Student] who is in my 1:1 class … He's on the computer, he's doing other things, he's on Facebook, or whatever he's doing I don't even know. Um and he's not listening to what I am saying because of the computer sitting in front of him. He's one of the students who missed key information simply because of the computer. He misses the notes or he doesn't think my notes are as valuable as they are because he has the computer and because he can just Google whatever topic we're talking about.

When asked what her teachers wanted her to be able to do with technology, Alice, who was not in the 1:1 program, responded: "To…They want you to actually like search for what you are… looking for instead of… playing games, or not doing school stuff. Like doing what you are supposed to and not fooling around." This response indicates Alice was concerned about students not using technology as a learning tool. When I asked Alice about how she saw herself as a learner in a school where some of the students had technology and others did not, she responded:

> Either way, if like I have a computer or not, I feel like I always get my work done. And like my work, I'm always … I don't know how to say it but … basically my work comes first. Because … if my work can't get done I can't do other things. So when I have work … I'm a hard, I don't want to sound cocky…

To which I responded, "Go ahead, sound cocky!" This made Alice grin and then laugh, before saying, "Like basically everything I do I try my best at, and I have high expectations for me."

Students who participated in this study were all high-achieving and unlikely to get into trouble either academically or due to their behavior. As Mike shared during his final interview,

“I’m not one of those kids that sets off fireworks in the bathroom or anything.” The best part of this process has been getting to know these students and having time to be with them while they are going through this transitory time in their lives.

Chapter Summary

In this chapter I presented findings from a study that used a data analysis matrix and conceptual framework developed from a review of literature in order to maintain a focused investigation of ninth grade student learning experiences as they transitioned into high school. This single case study design was based on this central question: How does learning with or without 1:1 technology affect ninth grade student perceptions of their learning experience?

Sub-questions for this study included:

- How is the learning experience of a student without access to digital tools beyond the school day different from that of a student with access to those tools in a public high school?
- How does the difference between having and not having technology affect student perceptions of each other?
- How does the widespread use of technology in teaching affect student self-perceptions as learners?
- What can we learn by comparing students' stories?

Findings from this case study include:

- Student perceptions of their learning environment changed during the first few months of school. Over time, student views on who belonged to their learning community changed. This was due, in part, to changes in how students communicated with each other about their learning.

- Students in both groups reported being engaged and having opportunities to collaborate with others on assignments. Observations and interviews noted that students in the 1:1 classes appeared to be more engaged with each other than those in the non-1:1 class. This was verified as the experience of 1:1 students when they were in non-1:1 classes.
- Students uniformly experienced the expectation by their teachers that they would use technology to find information beyond the school day.
- Students and their teacher felt unprepared to integrate technology into their learning. This made additional learning and preparation necessary for both the teacher and the students.
- Students in the 1:1 program saw students that were not in the program as having a disadvantage.
- Students who were not in the 1:1 program also described feeling at a disadvantage when compared to students with access to a personal device in the classroom.
- Teacher instructional methodology changed according to his comfort level with the technology he was using. The teacher showed concern about students with and without devices getting the "same education."
- Common assessments showed that the students in the 1:1 classes had significantly better results on their formative and midterm assessments than their non-1:1 counterparts.

Multiple sources of data were collected for this case study. Because of this, there were bound to be some findings that fell outside of the framework for this study. Case studies, by their nature, are unique; in this situation there was an opportunity to examine teaching and learning with and without digital tools (Yin, 2014). Themes developed outside the conceptual framework included:

- In this study, both students and their teacher shared that they had to think differently

about the content of their classes when learning and teaching with personal web-enabled devices.

- Teachers in the 1:1 program had to plan and prepare differently for classes with direct technology integration.
- Planning and organization were positively affected by participation of students in the 1:1 program because they had access to personal web-enabled devices.
- Students and their teacher in the 1:1 program, as well as people outside of the program, expressed concern about citizenship because of access to digital tools in the classroom.

In Chapter 5, I present my conclusion and discussion, limitations, and recommendations generated from this study.

CHAPTER 5
OBSERVATIONS, DISCUSSION, AND RECOMMENDATIONS

"The shrill whistle of a steamboat echoes eerily across the little moonlit, fog shrouded lake" (Stansfield, 2007, p. 49).

In this chapter, I synthesize the story of the participants in this study. Though lacking the drama of a ghost story written by Stansfield, this study did require me to check sources, go back to the literature, and then form recommendations from the synthesis of what I had observed, gleaned from the literature and the participants' perceptions. The purpose of this single case study was to explore the experience of ninth grade students and understand their perceptions of learning in a digital world. I hoped that better understanding of their experience would provide educators with information they need to make transition to high school and a technology-rich learning environment better for students.

This research was conducted using a qualitative case study design, which included multiple sources of data. The primary sources of data for this study were student and teacher interviews, classroom observations, and student assessments. Secondary sources of data for this study included surveys from students and parents of children in the 1:1 program and minutes from Steering Committee meetings. In this single case study, I sought to get greater understanding of what a ninth grade student experiences when they enter a high school either with or without 1:1 technology.

Using Bloom and Volpe (2012) as a guide, I first answered the study's questions, then developed the themes and findings into analytic categories for synthesis of information. The previous chapter presented findings from this study as they pertained first to student perceptions,

then teacher perceptions, then learning outcomes, and finally data that was outside of the framework, including survey results from the district's evaluation study which added to the study's other findings. Where Chapter 4 examined the pieces of this case study analytically and without synthesis to prior studies, in this chapter, data will be synthesized with my prior learning to tell the story of these participants. Bloom and Volpe (2012) suggest that researchers set aside the data for a few days and think about analytic categories while not looking at their findings. I found this advice particularly helpful when writing this chapter.

This study was based on the following research question: How does learning with or without 1:1 technology affect student perceptions of their learning experience? Sub-questions considered by the study included:

- Even if students have equal access to 1:1 technology during the school day, how is the learning experience of a student without access to digital tools beyond the school day different from a student who has access to those tools both at home and at school?
- How does the difference between having and not having technology affect student perceptions of each other?
- How does the widespread use of technology in teaching affect student self-perceptions as learners?
- What can we learn by comparing student stories?

Themes were generated using Ange's conceptual framework, created for this study, and the analytic matrix developed to align research questions with interviews. I anticipated discovering themes regarding: transition, technology access/not, engagement, teaching methodology, motivation, assessment of performance and competency, and acquisition of new

knowledge. Through the process of analyzing all of my data sources and organizing my findings into four categories, I uncovered several unanticipated but related themes: thinking differently, planning and preparation, organization of materials and resources, and digital citizenship. A final analysis of these thems and how they relate to relevant research findings is presented below.

Observations

Data from this research fell into three major observations which will be analyzed in further detail within this section. These categories were (1) *Community and communication patterns differed for students depending on whether or not they had access to digital tools in their classrooms*; (2) *Teaching and learning differed depending on access to digital tools in the classroom;* and (3) *In this case, students became thinkers or doers depending on the nature and extent of their access to technology.*

These three observations integrate the central findings described in Chapter 4 and helped clarify the themes underlying student experience in a ninth grade where parents could opt in to a district program using 1:1 digital tools in the classroom. The findings and themes from this case study are reiterated here:

- Student perceptions of their learning environment changed during the first few months of school. Over time, student views on who belonged to their learning community changed. Changes were due, in part, to how students communicated with each other and their teacher about their learning.
- Students in both groups reported being engaged and having opportunities to collaborate with others on assignments. Classroom observations and interviews revealed that students in the 1:1 classes appeared to be more engaged with each other than in the non-1:1 class. This was verified as the experience of 1:1 students when they were in non-1:1 classes.

- Students uniformly experienced an expectation from their teachers to use technology to find information beyond the school day.
- Students and their teacher felt unprepared to integrate technology into their learning. This made additional learning and preparation necessary for both the teacher and the students.
- Students in the 1:1 program saw students that were not in the program as having a disadvantage.
- Students who were not in the 1:1 program also described feeling at a disadvantage when compared to students with access to a personal device in the classroom.
- Teacher instructional methodology changed according to his comfort level with the technology he was using. The teacher showed concern about students with and without devices getting the "same education."
- Common assessments showed that the students in the 1:1 class had significantly better results on their formative and midterm assessments than their non-1:1 counterparts.
- Other findings, described at the end of Chapter 4, outside of the conceptual framework for this study.

Observation Category 1: Community and communication patterns differed for students depending on whether or not they had access to digital tools in their classrooms.

Student perceptions of their learning experience changed during the first few months of school. Student views on who belonged to their community changed too. These changes stemmed from how they communicated with each other, their relationship to teachers, and having opportunities for collaboration on assignments. I observed students in the 1:1 class sharing resources, responding to each other, and talking with the teacher. In the non-1:1 class, however, students took in information and gave it back but did not talk to each other or share

their personal thoughts with the instructor. Both sets of students, the 1:1 and non-1:1 told me they felt engaged by the content of their courses, but this engagement was qualitatively different.

How students connected with their community members had a direct impact on how they learned and acquired new knowledge. Based on the review of literature (see Chapter 2), I understood that community support would directly affect the learning outcomes of these students. Students generally choose who they want to be with and emulate during this period in their lives (Berndt & Keefe, 1995). In interviews, it became clear that teachers, parents, and their peers directly impacted student learning outcomes; this was also expected from the literature (Berndt, Laychak, & Park, 1990; Bhanot & Jovanovic, 2009; Henry et al., 2011; Somers et al., 2009; Wang & Eccles, 2012). Within this case study, communication between students took place on several levels. Students without 1:1 devices were unclear about exactly what it was that their peers were doing with their devices. I found this to be evidence of a disconnection between these students.

All students in this study talked about their parents providing support for their learning. When students were specifically asked about what motivated them to learn they cited their parents as the reason they wanted to do "good" in school. Prior studies indicate students who have parent support and connect to their teachers achieve more academically (Berndt & Keefe, 1995; Henry et al., 2011; Wang & Eccles, 2012). I asked students about how their teachers provide them with feedback in class. Grant shared that it took some of his teachers a while to get him feedback about how he did on assignments. Hattie (2009) found that feedback is one of the more important interventions that teachers and students need to increase academic achievement. In classes with the 1:1 devices, students used Google Classroom and Google Apps for Education. These tools allowed students to get feedback from their peers and teachers much faster than

traditional methods. Parents cited increased communication between the teacher and their children in their district's survey responses as having a positive correlation with student engagement.

I observed the interactions between students in the 1:1 class and their teacher. Both Mr. Grimes and students in his class talked about these interactions during interviews. The strong social connection between this teacher and his students was not dependent on technology. Mr. Grime's classroom climate was positive for all of the students he taught, 1:1 users and non-users alike. But students in the 1:1 program had a clear edge over their peers without the devices: *They were learning how to use the technology alongside their teacher.* This added another dimension to their relationship and created opportunities for students to contribute to learning conversations. Students who were not in the 1:1 program were more likely to see the teacher as a "sage on the stage" (Alley, 1996, p. 49). Therefore, they did not develop the same kind of reciprocal learning relationship with their teacher.

In interviews, students talked about finding tools, contributing knowledge to class discussions, and having their teachers "trust" them. The literature reviewed for this study, indicated that teacher-student relationships that are respectful and engender trust would lead to increased student engagement with their content (Hawkins et al., 2013; Sorenson, 2012). Prior studies showed engagement increases student achievement (Charitonous et al., 2012; DePietro, 2013; Drijvers, 2013; Gorghiu & Gorghiu, 2014; Liu et al., 2011; Kim et al., 2012; Scheckenberger et al., 2013; Thomas & Ortheber, 2011). In this case, it was clear that the students, and Mr. Grimes were developing a positive relationship built on a mutual learning experience. From the literature, and this study, creating this kind of environment is not necessarily dependent on technology -- it is reliant on pedagogical practices.

Observational Category 2: Teaching and learning differed depending on access to digital tools in the classroom.

All of the data in this study indicated that each student who was interviewed had access to digital tools beyond the school day. Differences developed between those who had devices *both* in class and outside school and those who did not. Both groups, as well as their teacher, felt unprepared to integrate technology into their learning. This made additional learning and preparation necessary for both the teacher and the students. Over the first few months of school, teacher instructional methodology changed according to his comfort level with the technology he was using, this was expected based on prior studies (Kirksey, 2012; Mishra & Koehler, 2007; Puentedura, 2009). In addition, the teacher in this study showed concern about students with and without devices getting the "same education." From interviewing Mr. Grimes and observing his class, I found that, during the first semester, tool use became less of a novelty for him and he integrated technology deeper into his curriculum.

The widespread use of technology in teaching did have an effect on student self-perceptions as learners in this case. Toward the end of data collection, the 1:1 Chromebook use had begun to change the way that students in this case viewed each other. Within the study, students uniformly experienced the expectation by their teachers to use technology to find information beyond the school day. In observations, the two classrooms were very different from each other. Students in the 1:1 class, at least in the two classes observed, were more likely to be active, and more prone to using technology as a direct accompaniment to their learning. Students in the non-1:1 class, however, were more subdued and conducted themselves – through their behavior and manner of interacting with their teacher – as consumers rather than creators of information. Teacher interviews supported this observation. Howard Gardner and Katie Davis

(2013) describe these differences generally as differences between a constructivist and behaviorist classroom. “Of course,” they note, “ the acquisition of precision can be done in many ways, ranging from the strict behaviorist regimen to the flexible, exploring constructivist tack” (p. 187). Gardner and Davis go on to describe how knowledge when it is learned must be then used in different ways in order to be integrated into broader contexts.

I observed some of these hallmarks in Mr. Grimes’ two different classes. In his class without 1:1 technology students were attempting to get to the desired answers. In the class with 1:1, students were attempting to use both their devices and the language in new ways *with* their teacher. In the classroom where students received content from the teacher and responded to instructions but did not talk to each other or their teacher, their outcomes were, as Mr. Grimes said, “exactly what I had taught them and no more.” These students were used to receiving information from Mr. Grimes and responded the way that they had been taught to do. In the classroom where students were encouraged to share their learning, to talk about personal connections to the content, and to share those connections with Mr. Grimes, students appeared to have better learning outcomes.

As noted earlier, the school where this study took place, used a modified block schedule. Mondays were “skinny,” with all eight blocks taking place during the day, each block being 45 minutes long. Tuesdays and Thursdays are always a Day 1, blocks A – D schedule with 90 minute blocks, and a 10 minute advisory period. Wednesdays and Fridays are a Day 2 schedule, blocks E – H, with a 22 minute advisory on Wednesday with 87 minute blocks and a 10 minute advisory on Friday with 90 minute blocks. When examining literature about constructivism, I came across an article that linked it to this style of scheduling. Hackmann (2004) examined the connection between block scheduling and constructivist learning by saying that they “…occurred

in parallel, yet independent movements" (p. 698). He went on to say that the two movements come together on several levels and that block scheduling "should logically be considered as a vehicle to promote constructivist practices" (Hackmann, 2004, p. 698). In the classroom without devices the teacher ran a series of activities that filled the time from bell to bell. This left very little time for discussion and gave students no opportunities to add to the class content.

In the classrooms I observed Mr. Grimes evidenced some qualities of two different pedagogical practices. In the non-1:1 class I observed hallmarks of behaviorism. Students were specifically attempting to get to what Mr. Grimes had modeled for them. In the 1:1 class, students were trying out new ideas and sharing those with their teacher. So when Mr. Grimes said to me, "[T]his is what I did as a student," he was pointing to learning in a behaviorist class. Students in the non-1:1 sections, saw their teachers as the sole source of information in the classroom. Grant talked about how his teacher (Mr. Grimes) would give notes in class and how they had to follow those notes exactly in order to "…get a good grade on my test."

In the class with the 1:1 devices I observed hallmarks of constructivism. While Mr. Grimes had planned activities that were to go from bell to bell for that class too, those activities were frequently "disrupted." These disruptions, however, were in fact conversations about the content, or about technology tools, and benefitted the class. The students were contributing to their learning environment.

The literature I considered for this study indicated it was clear to others that our current educational delivery system is not working for all learners (Christiansen et al., 2008; Fullan, 2013). In the class without personal devices, learners saw themselves as consumers of information. Students with the devices saw themselves as contributors to learning. With the 1:1 students I heard one of them say, "Usually we can just look it up if there is something that is

confusing you, usually there's tutorials on YouTube or something" (Mike). These students were not passive learners, in the broad sense of that term, and, as their other teachers get to know them, it is not likely that they will become passive receivers of information.

Student perceptions about each other changed, too. Students in the 1:1 program saw peers that were not in the program as having a disadvantage. Students who were not in the 1:1 program also described feeling at a disadvantage when compared to their peers with access to a personal device in the classroom. What is notable about this is the fact that the students without the devices began to see themselves as disadvantaged when compared to their peers with the devices. At a time in their lives when they are attempting to figure out where they fit into society, this type of separation may have long-term effects on student maturation as learners.

Adolescence is when youth figure out how they fit within society. Dewey (1916/1944), Montessori (1949/1967), Vygotsky (1978) and Csikszentmihalyi and Larson (1986), all presented work that indicates youth need to question and push boundaries in order to figure out where they fit into their society. Csikszentmihalyi and Larson found that students are happiest when they are with their friends, which supports teachers' efforts to provide collaborative learning opportunities. Nakkula (2003) stated that: "Identity is the embodiment of self-understanding. We are who we understand ourselves to be, as that understanding is shaped and lived out in our everyday experience" (pp. 7-8). As these students figure out who they are and how they fit within this school, there will be fewer opportunities for the adult members of this community to help shape what they know about themselves and each other.

In her final interview, Alice shared some insight about herself as a student. With all the technology that her teachers were using, I specifically wanted to know how she saw herself as a learner. Alice said she saw herself as a hard worker and that it did not matter whether she had a

computer or not as long as her work gets completed. She also shared she had high expectations for herself. These high expectations, and the need to perform well in school, speaks to her motivation and drive. All of the students who participated in this case study saw themselves as "good" students -- people who are active members of their learning community. Yet, both groups said that students without personal devices were disadvantaged. Their teacher worried about whether students who were not in the program were getting the "same" education, and both teachers and administrators on the Steering Committee worried about equity, too.

These students did not have equal access to 1:1 technology during the school day. Students were assigned to either a 1:1 class or a class that used technology sparingly, if at all. Some of the 1:1 students only had one or two classes that were fully 1:1. Teachers in the program had classes that were both 1:1 and classes lacking personal devices for the students.

I built observation into the case study and developed a comfortable relationship with Mr. Grimes and these students. Because of this, I was able observe regular student behavior in both sections, not the "best" behavior one would expect if a stranger or administrator walked into the classroom.

I found that open dialogue and a willingness to share responsibility for the learning experience were essential to the development of critical thinking and communication skills in the student participants. In the class where Mr. Grimes was the only source of expertise, students listened and learned, but did not stretch learning beyond what was asked of them, at least in the limited number of classes I observed for this case study.

Students need opportunities to explore the subject and contribute to class discussions of the content. Allowing students to make personal connections to the content and talk about personal interests, is important to the development of critical thinking skills. Having a personal device and being able to use it in the moment allowed students to contribute to learning discussions in real time, unlike the situation that Grant described:

> Like for example Mr. [Teacher] he gave us this little paper that said Kepler's Law. He gave us a boiled down explanation of his three laws and he said I want you to go home and research this. So if you understand, expanding our bounds of knowledge with technology.

Grant was the kind of student who followed up, so, in his case, he was able to deepen his learning. While that was a great idea, all too often today's students are inundated with homework from other teachers, sports, and other external commitments, or working at a job beyond the school day (Heeter, Raney, & Compton, 2007). This leaves high school students little time or inclination for additional study, if they remember.

As suggested, on the few days I observed students not in the 1:1 program, I was struck by their passivity as "traditional" learners. Even when they were most engaged I the class they were not contributing new knowledge, but merely giving back what their teacher had taught them. All students were engaged with their learning, but in the classes with 1:1, the learning was a construct of both the learner and their teacher. In the non-1:1 classes students would simply ask, "Is this going to be on the test?" and Mr. Grimes responded "Yes, this will be on the test." This had to be difficult to hear, as it, too, made me cringe.

By the time midterms were given in classes all students in the ninth grade at this school

share, those common assessments showed that the students in the 1:1 class had better statistically significantly results than their non-1:1 counterparts. When the assessment results came back, one of the teachers on the Steering Committee asked me not to share those results with administration. When I asked why, he said, “In our current environment, where they are looking to cut our budget by $700,000, they might see the problem as being the teachers and not as being the lack of access to information by students without technology.” He did say that it was fine to include it in this dissertation, because by then, decisions about teachers would have already been made.

Observational Category 3: In this case, students became thinkers or doers depending on the nature and extent of their access to technology.

Category three speaks to how these students’ experience differs. These findings pertain to the sub-question, “What can we learn by comparing their stories?” From the data collected through this study, I identified themes that include:

- Students and Mr. Grimes who participated in the 1:1 program shared that they had to think differently about the content of their classes when learning and teaching with personal web-enabled devices.
- Mr. Grimes had to plan and prepare differently for classes with direct technology integration.
- Planning and organization were positively affected by participation of students in the 1:1 program because they had access to personal web-enabled devices. Students in the non-1:1 classes perceived themselves as good students because of behavior in the classroom and "getting things done."
- Students in the 1:1 program, Mr. Grimes, and people outside of this program

expressed concern about digital citizenship because of access to web-enabled tools in the classroom.

Galley (2003) said, “What kind of learner we become can be influenced by how we view ourselves in relation to our academic achievements and challenges” (p. 58). In this study, students in the 1:1 program saw themselves as contributors to their learning environment. When they found a computer application they could share that would help their teacher and other students, they were encouraged to explain how it would be helpful. When they discovered information on the web that contributed to the conversation, it did not matter to them that it would not be on the test, because they “were learning more” (Mike). For students in the 1:1 program thinking differently about their learning was obvious. For students outside of the program, it was more a matter of making sure they “get everything done” (Alice).

For teachers who had sections both with 1:1 technology and without, this was a learning experience. From Puentedura (2009), teachers on the Steering Committee and I understood that there would be a progression for technology integration in teacher classrooms. Initially, teachers would have knowledge of pedagogy, learning strategies, and methodology that they had learned from their preparation programs. Mr. Grimes shared that his preparation program had included a class on technology integration, but that class was separate from his subject of expertise, with specific projects unrelated to this subject area. Mishra and Koehler (2007) developed their framework taking into account that teachers would need not only their content area knowledge and pedagogy knowledge, but specific knowledge about the technology they were able to access. Mr. Grimes found out in August that he would be teaching sections with and without 1:1 technology with a tool that he did not know how to use. His description of teaching this class during his first interview was very different from what he shared in his last interview:

> I've been putting discussion questions up on Classroom [a Google application]. I know where everything goes when it's submitted and I understand how to use the tools now. What I was learning how to do, I do really well now…I still think there is a lot of stuff I need to learn, but the more I know, the more the students benefit from it. There is so much more that I could be doing, I think…it's probably going to take me another year to learn more, but it's exciting for me, it's exciting for them!

As the literature led me to expect, the more Mr. Grimes knew about technology, the more he integrated it into his curriculum. What I did not expect -- and this is helpful information for districts planning 1:1 initiatives -- was that this teacher would have to plan twice for the same class. This additional planning increased Mr. Grimes' stress levels during the first few months of school.

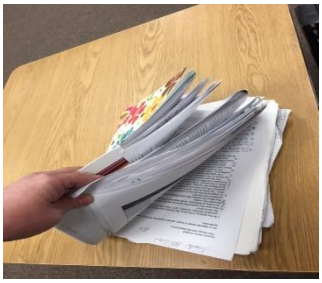
Students in the program were positively affected in terms of planning and organization. Students outside the program spoke of heavy backpacks, weighed down with books and papers that they had to carry. One young lady attended a school board meeting and spoke eloquently about how being able to use a computer had helped her with organization. She said that in middle school she had frequently lost papers and her grades had been adversely affected by this. Now, with her computer, she never loses things because it is all backed up to the cloud. The literature I reviewed for this study, made some mention of students using devices for organization but not in connection with transition from middle to high school (Swan, van't Hooft, Kratcoski, & Unger, 2005). From reading Montessori (1949/1967) and Vygotsky (1978) the researcher learned that when students have opportunities to apply their learning in real-world situations, they are more

likely to internalize the learning. This means that if children learn organization and efficiency with real tools that work, they have a better chance of carrying those skills into adulthood.

Alice was not in the 1:1 program and spoke to me about the weight of her backpack. She said she usually had to carry her books in her arms, because with her notebooks and binders she did not have room in her bag for books too. Alice allowed the researcher to take a picture of one of her folders. She shared that she has to carry those papers around "in case there is an open note quiz." Alice's folder was at least three inches thick and she said she had one of these for science and math as well.

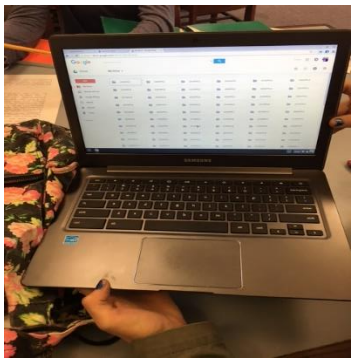
As part of her last interview she was asked if she ever lost papers. Alice said: "I have and it was terrible. Mrs. [Teacher] would not give me a break…she said that I had to be more responsible and that it would help me…remember for next time." I followed up by asking if losing the paper had made her change the way she carried her papers. Alice said, "Yeah…now I try to keep everything I might need in my bag." This conversation with Alice was difficult for me to hear with any sense of objectivity, since I could immediately see what the disadvantages were for this student who could not use a technical device even if she had wanted one. When I shared that students in the program had said that they were more organized and did not lose their work anymore. Alice said that she could see how having a personal device would be an advantage. This was from a student who initially had said that, in her experience, teachers sometimes use too much technology.

Figure 5.1 Alice's folder



Chelsea, a student in the 1:1 program explained that with her computer she has a specific naming protocol for her files and when her teachers use Classroom, the files are named automatically. She allowed me to take a picture of her files as well. Her backpack is pictured next to the computer; she said, “It’s very light, I don’t have to worry about breaking my back every day now!”

Figure 5.2 Chelsea’s files



Chelsea was a dancer and always worried about her feet and back. If they hurt too badly practice would not go well. One of the things that she came to appreciate during her time with the 1:1 classes was that light backpack.

In the parent surveys the district collected, 22% of parents cited organization and efficiency as a positive aspect of their child’s learning. Parents said that they believed organization was essential to their children’s success in school and that having the devices had positively affected their ability to find and turn in their homework. Parent support for this program was very positive. For students like Chelsea, being able to access the tool helped to increase her productivity and efficiency in class.

Studies I consulted for the literature review indicated that administrators have concerns about digital citizenship (Davis, 1995; Flowers & Rakes, 2000). In this study, students, Mr. Grimes, and parents all shared concerns about what students with the devices might be doing

without the oversight of adults in the room. These concerns were not unfounded, as I observed at least one student on Tumblr during class.

Students in the program, however, appreciated having the freedom to look things up on YouTube and other sites which had previously been blocked in their middle school. Ben had talked about the district having used a blanket filter at the middle school, which had blocked some sites with good information. Chelsea, in her last interview, spoke about how her teachers had asked to have some sites unblocked, allowing students to do more with their tools. In the United States, schools which receive E-Rate funding must use filters on their networks in order to protect children from explicit materials. This study indicates that students in this district who were getting ready to go into 1:1 classrooms would have benefitted from specific information on how to guard their privacy, instruction on intellectual freedom and plagiarism, and how to be a good digital citizen.

To summarize, the following themes emerged from these data:

- Both students and their teacher shared that they had to think differently about the content of their classes when learning and teaching with personal web-enabled devices.
- Mr. Grimes had to plan and prepare differently for classes with direct technology integration.
- Planning and organization were positively affected by participation of students in the 1:1 program because they had access to personal web-enabled devices.
- Students in the non-1:1 classes perceived themselves as good students because of behavior in the classroom and "getting things done."
- Students in the 1:1 program, Mr. Grimes, and people outside of the program

expressed concern about digital citizenship because of access to 1:1 devices in the classroom.

Category 1 (Community and communication differed for students depending on whether or not they had access to digital tools in their classrooms.) speaks to the first two findings bulleted above. These findings also address the research question, "How does learning with or without 1:1 technology affect 9th grade student perceptions of their learning experience?" Their connection to community members has a direct impact on how they learned in this case. Learning with and without technology looked very different in observations and in student interviews depending on whether or not students had access to technology in the classroom. Student engagement was obvious in observations and interviews, and was not specifically linked to whether or not students had 1:1 devices.

Category 2 (Teaching and learning differed depending on access to digital tools in the classroom.) focused on teaching and learning with and without 1:1 technology. This speaks to bulleted findings three, four, and five, which address the following sub-questions: Even if students have equal access to 1:1 technology during the school day, how is the learning experience of a student without access to digital tools beyond the school day different from that of a student who has access to those tools both at home and at school? How does the widespread use of technology in teaching affect student self-perceptions as learners? How does the difference between having and not having technology affect student perceptions of each other?

Student perceptions of their learning experience developed during their first few months in their school. All students in this study shared that their ninth grade experience was very different from middle school. This was, in part, due to changes in the way teachers used digital tools and information resources with their students.

Category 3 (In this case, students became thinkers or doers depending on their access to technology.) speaks to the specific themes highlighted in this study pertaining to the sub-question, "What can we learn by comparing students' stories?" Themes generated by this study indicate that the students and their teacher had a shared learning experience. This learning experience helped them develop a relationship that was different than the classes without direct access to technology in the classroom. In this study, students shared details about their classes and teachers that I believe will be helpful to schools who are adopting 1:1 programs.

Central Observation of this Study

After careful examination of the data, and presentation of the findings, the over-arching finding for this study can be summarized as follows: Ninth grade students need to see themselves as valued contributors in a learning community, and being a contributor to this community or not significantly affects 9th grade students' perceptions of who they are as learners. One-to-one technologies can be, and often are, determining factors behind whether or not students look upon themselves positively, are self-aware of their academic strengths and weaknesses, and are actively involved in their own learning.

DISCUSSION

Conceptual limitations and faulty assumptions

In Chapter 1, I assumed that students would have experiences that started with transition and neatly moved through the original conceptual framework (Transition – Acquisition) developed for this study. Below, I discuss some of the limitations to this framework, which helped me organize the various domains and sources of data collected. Those domains are:

- Transition: Students were asked for their perceptions of both their current school and prior learning experience.

- Student engagement: Classroom observations, student interviews and teacher interviews provided a rich picture of student engagement.
- Technology access or not: Students were asked how they viewed themselves and how they viewed each other with and without technology.
- Motivation: Students were asked about content area knowledge, and specifically what motivated their learning.
- Teaching methodology: Teacher interviews and observations were meant to provide a focused view of learning in the classroom.
- Acquisition of new knowledge: Student responses to interview questions were examined for specific vocabulary, which students learned while in the ninth grade.
- Assessment of performance and competency: Students in this study attended a school where they must prove mastery before they can move forward. To evaluate this piece of the student experience, I used midterm exams scores and a formative assessment provided by the teacher.

Within the study, some of these domains, in particular engagement and motivation became hard to separate into neat pockets. In reality, students were funneled into this environment. The domains outlined for Ange's conceptual framework still pertained, but they often swirled together and overlapped, much like the balls pictured in figure 4.2. Based on the literature I studied for this case, I assumed that student transitions would be critical to their success in high school (Allensworth & Easton, 2005; Berndt, Laychak, & Park, 1990; Berndt & Keefe, 1995; Wang & Eccles, 2012). I assumed students would define their community based on the environment, relationships that they developed, and how connected they felt to their school

(Bhanot & Jovanovic, 2009; Henry, et al., 2011; Li & Lerner, 2012; Somers, et al., 2009). These assumptions were based on what I had learned about transition and adolescence.

When developing the framework, I assumed that some students would require access to technology tools in order to be motivated and engaged in their learning (Charles, 2012; Christiansen, et al., 2008; DePietro, 2012; Drijvers, 2013; Fullan, 2013; García-Valcárcel et al., 2014; Goos, 2010; Gorghiu, & Gorghiu, 2014; Himmele & Himmele, 2011; Kirkscey, 2012; Marino & Beecher, 2010; Neel & Ennis, 2012; Thomas & Orthober, 2011; Williams, 2011). This was not a finding in this case, as interviews indicated that engagement with their peers and teacher around content turned out to be more important to the students than access to a web-enabled device. I also assumed that boredom and disaffection would be visible and apparent (Christiansen, et al., 2008; Fullan, 2013; Quaglia & Corso, 2014). Though I observed some blank expressions in the non-1:1 class, I did not perceive apathy to be a major problem, and it was not reported in student interviews.

Based on my reading and personal experience I assumed that some of these students: would have a difficult home life, be unsupported by their parents in their academic aspirations, and possibly not have the tools they needed to access the Internet at home (Carnahan & Fulton, 2013; Donlevy, 2000; Eamon, 2004; Lhamen, 2014). However, none of the students in this case shared those experiences in their interviews.

In preparation for this study, I considered different kinds of instructional methodology, including constructivist and behaviorist teaching (Boghossian, 2006; Burke, 2010; Howard Gardener in Scherer, 1999; Hackman, 2004; Zemelman, Daniels, & Hyde, 2005). I assumed the students would be exposed to a variety of teaching methodologies. Although I observed several teaching strategies, classes in this study involved two types of pedagogy: constructivist and

behaviorist. Both of these classes were taught by the same teacher, and the different pedagogies were not employed purposefully. The constructivist classroom developed organically from the shared learning experience of Mr. Grimes and his students.

Some assumptions were incorrect, others fit into the framework. Students did use language learned during their classes and apply it to regular conversation during our interviews. Formative and summative assessments did show a difference between students in 1:1 and non-1:1 sections.

Another assumption I made in Chapter 1 was that information found in this study would be of value to the education community. All of what I learned is helpful for working with ninth grade students who are adjusting to a new school, and transitioning into an environment using 1:1 technology. For students who are not in an environment utilizing 1:1 technology, I found pedagogical practices that may be helpful for other teachers to use in their classrooms.

Structural limitations

There were several limitations to this study which would make replication of this study difficult if not impossible.

Setting and participants

Additional limitations for this study include the affluence of the students' environment, the small group of participants, the lack of ethnic diversity in the school, and the limited response from the community. This case study was conducted in an upper-middle-class town, with very little poverty. According to the New Hampshire Department of Employment Security (2016), this town had an average family income of over $100,000. If I had an opportunity to conduct a similar study in a large, urban environment with low-income students, the results might have more capacity for replicability. Some of the responses we had from students in surveys indicated

they were not using a computer at home. It would have been helpful for me to know if that correlated with the student's socioeconomic status. The school's free and reduced lunch program participation rate was reported as 13%.

Based on the literature review, I expected that parent support would be pivotal in the development of these students (Bhanot & Jovanovic, 2009; Henry et al., 2010). Clearly, the parents who chose to have their students be in 1:1 classrooms supported the use of technology in teaching and learning. It would have been helpful for me to know why the parents who did not opt to have their children in 1:1 classrooms made that choice.

Once a beginning teacher myself, I remember starting off as a new "hire" with no lessons developed. In Mr. Grimes, I observed a clear level of stress that only a teacher who is new to a school can possibly experience. The added stress of learning new tools did not make this his job easier, it did in fact, frequently make it harder. At the beginning of the study, he spoke often of trying to figure out "easy" ways to use the tools. It would have been beneficial for me to observe and connect with this teacher from the very beginning of their school year.

I conducted this study in a district where I knew the teachers and students. Organizational psychologist Chris Argyris' work on the Ladder of Inference was particularly helpful as I attempted to bracket out personal bias. To control for bias, I used weekly memos, checked findings with participants, and ran my findings through a doctoral cohort study group which met weekly. The memos gave committee members opportunities to ask about personal bias. As a participant researcher, there were times when biases were difficult to check. Keeping a journal about this experience was very helpful. Additional bias checking using an external reader would also have been helpful.

Research design

The original design of the study called for multiple survey sources, including parent and student surveys. The iKnow My Class Survey, a primary source I would have liked to use, was deemed too expensive by the district and I was not able to afford it. It was not necessary for triangulation, but I believe this survey would have provided information about how students perceived their learning experience beyond the direct participants in this study. The small group I was able to connect with limited the scope of this research.

Another data source I had planned for were administrative walkthroughs. The administrator who had agreed to do this, only found time for seven walkthrough observations, and those happened within a month's time. As these were not done over a period of 2 – 3 months, which I had originally intended, there was not enough data collected to be useable for this study. Data collected over a longer period of time, to measure changes in student engagement and teaching strategies seen in the classroom, would be beneficial to administrators.

In this study, I planned to look at the ninth grade students' common assessment results with teachers. For both the teacher and myself it would be beneficial to see multiple common formative assessments from the same two students through a semester in order to better gauge growth of students in the grasp of Spanish or Social Studies. Examination of student work was based on the National School Reform Critical Friends ATLAS protocol (Thompson-Grove, 2000). It would have been helpful to have an external facilitator for this work.

The common summative assessment also had some limitations, as it was given in three different classrooms, at different times during the day, and was taken based on content taught by different teachers, even though the curriculum was the same. Commonalities for students in these three sections included their school, a commonly developed assessment, and shared standards

based curriculum. The unpaired t-test is designed to compare groups based on whether or not there is a treatment (Trochim & Donnelly, 2008). In this case, there was a treatment but the treatment was self-selecting, which limits the validity of the test. To use the test most effectively, groups need to be randomly assigned, and though the population is a representative sample of this school, it was in no way random. Limitations for this study provided some of the implications for my future inquiry pursuits.

Designing a study for the first time was intimidating for a novice researcher. Developing a framework based on prior research and a matrix aligning data with the research questions helped to control for some of the bias problems that inquiry poses. This kind of study produced a mountain of data. Though I included much of the data I collected, there is more that could provide additional avenues for future study.

Implications for future research

Future research on the students in this particular study may provide educators with additional insight into the integration of technology into daily work. Having access to a personal device during the day was clearly beneficial to the students interviewed in this study. What is unclear is how that will affect their future performance on computer-based tests, at work, and in college. It is also unclear how *not* having a device during ninth grade will affect students in these areas in the future. As schools implement SBAC and PARCC, as well as other online assessments to measure student achievement, it will be interesting to see what happens with this particular cohort. In states where these tests have been implemented, there has been some pushback about using computers for testing (Burnette, 2016). One of the avenues of inquiry that I noted for future study was what a student remembers when a teacher will not let them make up

a lost paper. I would like to know if students remember the content of the paper or the teacher's response to the loss.

One of the findings of this study was that Mr. Grimes did not feel his teacher preparation program adequately prepared him to integrate technology into his subject area. This was confirmed by another teacher on the Steering Committee who had a similar experience. For future studies, it would be interesting to go into technology integration classes and observe how students use what they learn with their content area expertise or if their projects are unrelated to their content area.

Students in the study also expressed that they were unsure how to use technology to enhance their learning, even though some of them had taken at least one computer class. In future studies, I would like to see how technology is taught in the middle school environment.

In the future, when designing studies that include common assessments, I would attempt to add additional controls, including randomizing the participants. It would also be beneficial to see what would happen if all the students took the exams at the same time, and with the same environmental conditions. When children were being tested, in order for an assessment to be "common," the teachers in this school had to meet and develop the test together based on the curriculum. In other studies, it would be necessary for me to know how the assessments were developed.

While considering how best to determine the difference between sections, I asked if it was because there was a difference in the teaching or if it was because students had to think differently in the 1:1 section. Another factor that might have made a difference for students in the 1:1 program was parent support. These are possible areas for future inquiry.

Students who self-reported not using a computer did so on a weekly basis in the survey conducted with non-1:1 students. For another study, I would want to follow up on that and see if there was a correlation between student socioeconomic status and access to the Internet. If there is no correlation, I would want to know why that happened. I would also like to talk to parents who opted not to have their child in a 1:1 environment to better understand that decision.

While considering this chapter, I found that additional resources were needed to help explain what I learned from the students in this study. Overall, the limitations from this study, have given me a better understanding of what may be available for avenues of future research when studying high school students and how they learn in a world filled with digital tools and information resources.

Recommendations based on findings

In this study, students shared details about their classes and teachers that I believe will be helpful to schools adopting 1:1 programs. Dewey (1916/1944) said that: "…skill obtained apart from thinking is not connected with any sense of the purposes for which it might be used" (p. 152). In this study, there were three main analytic categories. Those categories were community and communication, teaching and learning, and thinkers and doers. Within those categories, I explored the findings from the research and themes that developed outside of an established framework for inquiry. From this inquiry, the data points to three recommendations based on the perceptions of these students, their teacher, and myself which may benefit other educators and administrators as they transition students into 1:1 technology environments:

Recommendation #1: Ask students to find information about their content while they are in class

In this case, there were clear statements from the 1:1 students and their teachers that they were developing positive relationships built on a mutual learning experience. Students who were not in the 1:1 program did not develop this kind of relationship with their teacher. They were more likely to see the teacher as the sole source of information. The study also showed a disconnection between students with the devices and students without them. From this study, I found that open dialogue and a willingness to share responsibility for the learning experience was essential to the development of critical thinking and communication skills in the student participants.

In the section where their teacher was the only source of expertise, students listened and learned, but did not stretch learning beyond what was asked of them. As a teacher, I know students need opportunities to explore the subject and contribute to class discussions of the content. Allowing students to make personal connections to the content and talk about personal interests is important to their development of critical thinking skills.

Passive learning, where the child is an "empty vessel" waiting for their mind to be filled by their teacher, does not work for these learners. The findings from this study suggest that students be allowed to contribute to the construction of their learning experience in order to increase engagement and improve academic outcomes.

Recommendation #2: Connect the skill with the purpose

I discovered that neither the students nor their teacher were adequately prepared to integrate technology tools into their learning environment. This was, in part, because their technology courses were taught in the abstract. In Mr. Grimes' teacher preparation program he was taught that students needed to be occupied in learning activities from bell to bell. He prepared for his regular class with that idea in mind. With his 1:1 class, Mr. Grimes had to think

differently. This created gaps in time -- not long gaps, but short ones – which Mr. Grimes designated as transitions. In this case study, it was clear that students who were integrating their new technology tools into the content they were learning needed opportunities to share their learning with their classmates and teacher. Being able to play with the tools in connection with the content helped students bond with each other and their teacher.

The technology class Mr. Grimes' had to take as part of his certification program was taught with specific projects that had nothing to do with world languages, his area of expertise. Integrating technology without understanding how it connected to their content area made no sense to the participants, so this teacher preparation class had no lasting impact. Within this study, students and their teacher were using new devices and learning how they worked while integrating them into the content. This looked and sounded more like play than a directed learning activity. The findings from this study indicate that this was an effective way for the school to implement technology and use their block schedule.

Recommendation #3: Provide additional planning and learning time

Within the frame of this study, I would recommend that districts that are getting ready to implement 1:1 classrooms develop learning that prepares teachers *and* students together, with specific instruction on:

- guarding their privacy
- organizing their files
- understanding intellectual freedom and plagiarism
- developing their capacity for being good digital citizens

I believe this kind of learning opportunity would open doors and allow teachers to model academic discussion and inquiry for their students. This negotiated learning experience is an epistemological reconciliation, which recognizes that the ways teachers and students approach

problems are different (Song et al. 2006). Learners (this includes the students and their teachers) implementing new tools would be able to figure out the best ways for them to be utilized in the classroom.

Findings indicate that teachers and their students required additional planning and learning time. Therefore, I would recommend that school districts that are entering into a 1:1 situation, would be to provide teachers with additional preparation and planning time, and structure a professional learning group so teachers can support each other. For teachers implementing the technology in their classrooms, I would recommend planning time for discussions that revolve around the use of new devices. An important part of these discussions would be asking students how they could use this device to enhance their learning.

I recognize that this was a unique situation and recommendations were developed from a single case. Because of this they are not meant to be generalizable. However, these recommendations are built from the perspectives of teachers transitioning into a 1:1 environment, students transitioning into ninth grade with and without 1:1 technology, and a researcher observing, recording, and analyzing their lived experience. From these perspectives, the recommendations developed from this case make sense.

What these students have shown is that, as learners, they need a different kind of teaching than the traditional "stand-and-deliver" classroom experience. Leaders from the community in which this study was completed have repeatedly argued that they want students who are work and college-ready when they graduate from high school. Because of this, I believe some changes are going to be necessary to both teaching and learning. Filling every minute with activity was not the best way to reach these learners. When students do more than take in content, when they

contribute to learning conversations, they learn to take risks. Risk-takers become contributors instead of consumers of knowledge.

John F. Kennedy (1963) said, "Children are the world's most valuable resource and its best hope for the future" (UNICEF, Box 11). Because this statement is recognized as a truth in the United States, society invests in children through public education. Though this statement may seem obvious, it bears repeating: Students need to see themselves as valued contributors in their learning community and being a contributor or not affects ninth grade student perceptions of who they are as learners. These children are the most valuable resource of their community, and as such, they require validation through recognition of their contributions to discussions and learning.

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APPENDIX A: FOCUS GROUP QUESTIONS AND SCRIPT

Introduction: We're going to be talking about using technology in your school. This will help us better understand how you see technology being used in classrooms. It is important to understand how different kinds of students experience the use of technology. That is why we have invited you to participate in these focus groups.

Norms:

One person should speak at a time.

There are no "wrong" answers to any of these questions.

We are interested in hearing your perspectives as students.

We value confidentiality.

No feedback that comes out of this focus group will be credited to a particular person.

Everyone will have a chance to speak.

If you have not had an opportunity to provide your perspective, I may call on you.

Please turn off or silence your cell phones.

Are there additional guidelines the group would like to add?

Disclosure of note-taking: A note-taker is present to make sure that we get all of your feedback. The note-taker will not associate comments with names.

Parking lot: There is a "parking lot" chart/board/area where we can put ideas or thoughts that come up in our discussion that are important but may not be related to the purpose of this group. We want to capture those important thoughts, but we also want to keep focused on the purpose of our meeting.

Communicating results of focus groups: The results of the focus groups will be summarized, and you will receive a summary by September 15th. If we missed any key points you raised during this conversation, please let us know.

Introductory exercise:

How long have you lived in this community?

What kinds of activities are you involved in outside of school?

What do you like to do for fun?

What types of technology do each of you use for learning?

When do you think teachers should use technology to help you learn?

APPENDIX B: PARENT AND STUDENT SURVEYS

Parent Survey

The purpose of this survey is to assess parent satisfaction with the 1:1 pilot. This survey is anonymous and your answers will help the district gain a better understanding of how parents view the program.

Is your daughter/son using their 1:1 device for assignments?

- Yes
- No
- Not sure

What have they used the 1:1 device to do at home?
Check all that apply

- Write an essay
- Look up information for a project
- Create a presentation
- Work with others on assignments
- Use for personal reasons

Did your daughter/son use the help desk?

- Yes
- No
- I don't know

How do you think having a 1:1 classroom affects your daughter/son's learning?

Text response

Would you recommend this program to other parents?

- Yes
- No
- I don't know

Submit Survey

WEEKLY CHECK IN FOR STUDENTS

Please fill in this form every week. Your responses will help our school plan for next year.

* Required

Student # *

How did you use your 1:1 device this week? *

- ☐ Word Processing
- ☐ Create a Presentation
- ☐ Look Up Information
- ☐ Collaborate on an Assignment
- ☐ I Did Not Use a Computer

Did you use a computer/smart phone/tablet at home? *

- ○ Yes for school work
- ○ Yes not for school work
- ○ No I did not use a computer at home

Did you use the help desk? *

- ○ Yes
- ○ No

Submit Survey

APPENDIX C: CONSENT AND ASSENT FORMS

Parent Consent Form

Agreement to Participate in Research with Southern New Hampshire University
Responsible Investigator: Andrea Ange
Title of Protocol: 9th Grade Student Perceptions of Learning in a Digital World

My name is Ms. Andrea Ange and I am a doctoral candidate at Southern New Hampshire University conducting a case study in partial fulfillment of the requirements for the Doctorate of Education. I would like permission from you to ask your daughter/son to be part of a research study investigating the predictors or factors that might influence how students perceive the use of technology for learning.

- This research will involve 1 group discussion and no more than 3 interviews that are 45 minutes long.
- Your son/daughter has been chosen for the group discussions because they are in 9th grade and have either a 1:1 class or a class that does not use 1:1 technology.
- If your child expresses interest in being part of the study they will be considered for further interviews.
- Their participation is strictly voluntary.
- Their grades will not be affected by participation in this study in any way, and will not be jeopardized if they choose to "not participate" in the study.
- You are being asked for your permission to have your child participate in a group discussion.
- You are also being asked for your permission to record your child's interviews, but if you do not wish for them to be recorded, only notes will be taken.
- There are no alternative procedures.
- This study will take place during the first semester of this year. (2015-2016)
- This study will involve minimal risk and discomfort. If your child is uncomfortable at any time talking about learning with technology we can stop.
- They will not directly benefit from participating in this study.
- Indirect benefits will include the promotion of understanding of technology needs for students entering 9th grade.
- Volunteering to participate in an activity has been shown to provide personal satisfaction to participants.
- There is no compensation for your child's participation in this study.
- No one will know of your child's participation in this study, his/her identity and that of their school will be carefully guarded by the researcher.
- The findings of this study will be published as part of the researcher's dissertation work.
- You have the right to refuse your consent for your child to participate and if given, your child may withdraw from this study at any time.
- Questions concerning this research may be addressed to Andrea Ange (603) 361-0827. Complaints about this research may be presented to Margaret Ford, Ph.D., Associate Dean at the School of Education, (603) 668-2211. Questions about research subjects' rights or research-related injury may be presented to Michael Evans, Ph.D., Associate Vice President, Academic Affairs at (603)645-9695.
- When you return this consent form, the researcher will sign a copy and return it to you prior to asking your child to participate in the study.

_____ _____
Parent Signature Date

_____ _____
Investigator's Signature Date

Student Assent Form

Agreement to Participate in Research with Southern New Hampshire University
Responsible Investigator: Andrea Ange
Title of Protocol: 9th Grade Student Perceptions of Learning in a Digital World

- You have been asked to be part of a research study investigating the predictors or factors that might influence how students perceive the use of technology to learn.
- This research will involve 1 group discussion and no more than 3 interviews that are 45 minutes long.
- You have been chosen for the group discussions because you are in 9th grade and entering either a 1:1 class or a class that does not use 1:1 technology.
- If you express interest in being part of the study you will be considered for further interviews.
- Your participation is strictly voluntary.
- Your grades will not be affected by participation in this study in any way, and will not be jeopardized if you choose to "not participate" in the study.
- You are being asked for your permission to record interviews, but if you wish not to be recorded, only notes will be taken.
- There are no alternative procedures.
- This study will take place during the first semester of this year.
- This study will involve minimal risk and discomfort. If you are uncomfortable at any time talking about learning with technology we can stop.
- You will not directly benefit from participating in this study.
- Indirect benefits will include the promotion of technology needs for students entering 9th grade.
- There is no compensation for your participation in this study.
- No one will know of your participation in this study, your identity and that of your school will be carefully guarded by the researcher.
- The findings of this study will be published as part of the researcher's dissertation work.
- You have the right to refuse to participate and may withdraw from this study at any time.
- Questions concerning this research may be addressed to Andrea Ange (603) 361-0827. Complaints about this research may be presented to Margaret Ford, Ph.D., Associate Dean at the School of Education, (603) 668-2211. Questions about research subjects' rights or research-related injury may be presented to Michael Evans, Ph.D., Associate Vice President, Academic Affairs at (603)645-9695.
- At the time that you sign this consent form, you will receive a copy of it for your records, signed and dated by the investigator.

_____ _____

Student Signature Date

_____ _____

Investigator's Signature Date

Teacher Consent Form

Agreement to Participate in Research with Southern New Hampshire University
Responsible Investigator: Andrea Ange
Title of Protocol: 9th Grade Student Perceptions of Learning in a Digital World

- You have been asked to participate in a research study investigating the predictors or factors that might influence how students and teachers perceive learning using technology.
- You have been chosen because you teach 9th grade students with and without 1:1 devices in your classroom.
- If you agree to participate, you will be asked to complete a series of 3 interviews with the investigator.
- The investigator will provide all materials needed for completion of this study.
- Your consent is being given voluntarily.
- You are also being asked for your permission to record interviews, but if you wish not to be recorded, only notes will be taken.
- This study will take place during the first semester of the 2015-2016 school year.
- This study will involve minimal risk and discomfort. The probability of harm and discomfort will not be greater than your daily life encounters. Risks may include emotional discomfort from answering interview questions.
- You will not directly benefit from participating in this study. Indirect benefits will include the promotion of deeper understanding of technology needs for 9th grade students.
- There are no alternative procedures.
- No service of any kind, to which you are otherwise entitled, will be lost or jeopardized if you choose to "not participate" in the study.
- There is no compensation for your participation in this study.
- Your answers to interview questions are confidential, you will be shown the study before it is submitted in order to ensure that nothing you have shared is attributable to you.
- The findings of this study will be published as part of the researcher's dissertation work.
- You may refuse to participate in the entire study or any part of the study. If you choose to participate in the study, you are free to withdraw at any time without any negative effect on your relations with Southern New Hampshire University or any other participating institutions or agencies.
- Questions concerning this research may be addressed to Andrea Ange (603) 361-0827. Complaints about this research may be presented to Margaret Ford, Ph.D., Associate Dean at the School of Education, (603) 668-2211. Questions about research subjects' rights or research-related injury may be presented to Michael Evans, Ph.D., Associate Vice President, Academic Affairs at (603)645-9695.
- At the time that you sign this consent form, you will receive a copy of it for your records, signed and dated by the investigator.

_____ _____

Signature Date

_____ _____

Investigator's Signature Date

Interview #_____

Date_____/_____/_____

Interview Protocol for Students

Script

I would like your permission to record this interview, so I may accurately document the information we discuss. Thank you for allowing me to record! My name is Ms. Ange and I am a doctoral candidate at Southern New Hampshire University conducting a case study in partial fulfillment of the requirements for the Doctorate of Education. Thank you for agreeing to be interviewed using a modified Seidman (2013) protocol. In total there will be 3 interviews. This interview today will take about 45 minutes and may include up to 7 questions regarding your experiences using technology in high school. If at any time during the interview you wish to discontinue the use of the recorder or the interview itself, please feel free to let me know. All of your responses are just between us, no one else will hear what you say. Your responses will remain confidential and will be used to develop a better understanding of student perceptions of learning using technology.

At this time I would like to remind you of your written consent to participate in this study. I am researching *9th Grade Student Perceptions of Learning in a Digital World.* You and I have both signed and dated each copy, certifying that we agree to continue this interview. You will receive a copy of the permission form. I will keep the other under lock and key, separate from your reported responses. If at any time you need to stop, or take a break, please let me know. You may also withdraw your participation at any time without any problems. Do you

have any questions or concerns before we begin? Then with your permission we will begin the interview.

For students:

- Tell me about the technology that you use.
- What do your teachers expect you to do with technology?
- What are you/would you be missing without access to technology?
- What is different between this school and your middle school?
- How do you use technology away from school?
- How do the people you know use technology for learning?
- Do all of your friends have technology tools that they use to learn with?
- What is exciting or intimidating about using technology at the high school?

***** If participant wishes to discontinue study, ask if they would be willing to share why:**

Thank the participant for his/her participation.

Interview #_____

Date_____/_____/_____

Interview Protocol for Teachers

Script

Welcome and thank you for your participation today. My name is Andrea Ange and I am a graduate student at Southern New Hampshire University conducting a case study in partial fulfillment of the requirements for the Doctorate of Education. Thank you for agreeing to be interviewed using a modified Seidman (2013) protocol. In total there will be 3 interviews. This interview today will take about 60 minutes and may include up to 4 questions regarding your experiences working with students in a 1:1 class and in a class where students do not have 1:1 technology. I would like your permission to record this interview, so I may accurately document the information you convey. If at any time during the interview you wish to discontinue the use of the recorder or the interview itself, please feel free to let me know. All of your responses are confidential. Your responses will remain confidential and will be used to develop a better understanding of student and teacher perceptions of teaching in a 1:1 environment.

At this time I would like to remind you of your written consent to participate in this study. I am researching *9th Grade Student Perceptions of Learning in a Digital World*. You and I have both signed and dated each copy, certifying that we agree to continue this interview. You will receive one copy and I will keep the other under lock and key, separate from your reported responses. Thank you.

Your participation in this interview is completely voluntary. If at any time you need to stop, take a break, or return a page, please let me know. You may also withdraw your

participation at any time without consequence. Do you have any questions or concerns before we begin? Then with your permission we will begin the interview.

For teachers:

- Tell me how your students provide feedback to you.
- Can you share how you develop relationships with your students?
- Are there differences in how you prepare for Section A and Section B?
- Do you see differences between learner a, and learner b?

***** If participant wishes to discontinue study, ask if they would be willing to share why:**

Thank the participant for his/her participation.

Appendix D

Peer to Peer Classroom Observation Form

Peer to Peer Classroom Observation Form

Observer: _____ **Teacher Observed:** _____

Date: _____ **Time:** _____ **Subject:** _____

1. Focus on Curriculum

1a. what is the learning objective?

Objective:

1b. Learning objective is evident to the students:

__ Evident ___ Not Evident ___ Unable to determine

1c. learning objective on target for grade-level standards

__Yes No

2. Focus on Instruction

2a. Identify instruction practices

___ Coaching ___Learning Centers ___ Teacher-direct
___ Discussion ___Modeling Presentation ___Q and A Testing
___ Hands-on xp. ___Providing Directions ___ Lecture
___ ___ Providing Practice Opportunities ___ _____

2b. Identify grouping format

___ Whole group ___ Small Group ___ Paired _X__ Individual

2c. Identify research-based instructional strategies

___ Nonlinguistic representations ___
___ Identify similarities and differences ___Cooperative Learning Setting
___ summarizing/note taking ___objectives/feedback
___ Reinforcing effort/recognition ___Generating/testing hypotheses
___ homework/practice ___ Cues/questions/advanced org.

3. Focus on the Learner

3a. Identify student actions

___ Listening ___ Working with hands-on ___ Speaking
___ Reading ___ Writing ___ _____

3b. Identify instructional materials

___ Computer Software ___ Overhead/board/flip chart ___ Video
___ Manipulatives ___ Published print materials ___ Web sites
___ Hand held tech ___ Real-world objects ___ Worksheets
___ Lab/activity sheet ___ Student created material ___ Smart Board
___ Oral ___ Textbook

3c. Determine level of student work

___ Recalling Information (knowledge) ___ Breaking down info into parts (analysis)
___ Understanding info (comprehension) ___ Putting information together in new ways (Synthesis)
___ Using information in a new way (apply) ___ Making judgments and justifying positions (Evaluate)

3d. Determine levels of class engagement

___ Highly engaged __ Most students are authentically engaged
___ Well managed __Students are willingly compliant, ritually engaged
___ Dysfunctional __ Many students actively reject the assigned task or substitute another activity

4. Focus on Classroom Environment

___ Materials are available in the classroom ___ Students interact with classroom environment
___ Models/exemplars of quality work posted ___ Student work displayed
___ Routines and procedures are evident __ Scoring rubrics are displayed/provided

5. Do you see evidence that the teacher is responding to the different learning needs in the classroom?

___ A Lot ___ Some ___ None ___ Unable to determine