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# "This Is New To Me": The Importance of Coaching For First- Time Technology Use In Primary Grades

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“THIS IS NEW TO ME”:  
THE IMPORTANCE OF COACHING FOR FIRST-TIME TECHNOLOGY USE IN  
PRIMARY GRADES

by  
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Presented to the Doctoral Department  
and College of Education, George Fox University  
In partial fulfillment of the requirements for the degree of  
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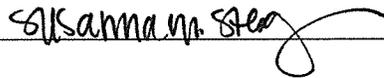
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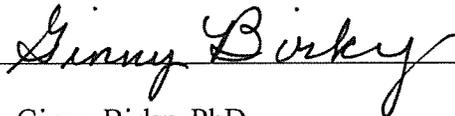
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## ABSTRACT

This exploratory, qualitative case study conducted in an urban elementary school examined a second-grade teacher's experience of first-time Chromebook use. The teacher implemented Chromebooks with the support of a technology coach, using them with her students for reading responses during guided reading. Students comprised a mixed group of twenty-five students from four second-grade classrooms. This study explored the teacher's perspective as to possible advantages and disadvantages of Chromebook use through teacher interviews, lesson observations and debriefs, and classroom observations. Findings included: a) Despite her limited experience with Chromebooks, the teacher was willing to implement new technology, b) The technology coach was key to implementation of Chromebooks for teacher support and student use, c) Establishing clear expectations was important for sustained Chromebook use when only one teacher was in the room, and d) Students gained skills from Chromebook use that went beyond typing and familiarity with a single reading response form. This study affirmed the importance of the teacher's beliefs and perceptions on the success of implementing new technology. The study also demonstrated the importance of a technology coach and how this teacher needed more than technology for her students; she also needed knowledge and skills in how to use technology with her students in meaningful ways. The need for mentoring was one of the strongest findings in this study in connection with teacher beliefs impacting their implementation of technology. Implications include that teachers need continued support at their level of competence, confidence, and experience in order to accomplish technology integration.

## ACKNOWLEDGEMENTS

John Ortberg (2010) speaks of asking God for a mountain, or something bigger than ourselves which requires the best we have to give while leaving some room for God to work. This doctorate has been one such mountain for me as it has taken the prayers and support of many people to help me succeed. First, I am thankful for Christ giving me the strength and wisdom as this dissertation was truly greater than something I could have done on my own. I am grateful for my mom, dad, and family who has continued to support me the past three years while completing this dissertation. My beautiful and talented wife, Kelli, has been a constant support, encourager, and listener. Carter, son, your giggles and smiles motivated me to finish and get out of the office. My in-laws, Janet and Robert, thanks for cheering me on every step of the way and for the many things you do for our growing family.

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This has been just one mountain and there will be more in the future as the adventures of teaching and lifelong learning continue.

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## CHAPTER 1

As a first-grade teacher for the past ten years at Peak Elementary School (pseudonym) in an urban school district in Multnomah County, Oregon, I have personally seen a shift in technology integration in the elementary classroom. At my school, the use of technology for student learning varies with teacher knowledge and access to technology. In my own experience with technology integration, I have gradually added technology to my literacy instruction over the past ten years, but I have noticed other teachers around me not necessarily doing the same thing. The addition of Chromebook carts at my school made me curious about the advantages of using Chromebooks in primary classrooms, particularly during reading instruction in conjunction with specific learning targets and goals. Although I had yet to use Chromebooks in my own classroom, I was particularly interested in how teachers might use Chromebooks for literacy instruction during independent reading time, with a special focus on reading response skills. Through research and reading, I decided to explore reading response skills using Chromebooks. With this research interest in mind, I approached several second-grade teachers to gauge their interest in participating in this study.

One second-grade teacher who agreed to be a part of this study decided to try out technology integration in a brand new way (for her) during the course of this study. Research reveals how difficult technology integration can be for teachers without training and support (An & Reigeluth, 2011; Bauer & Kenton, 2005; Inan & Lowther, 2010; Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010), which this study provided for her. This introduction provides a brief explanation of digital literacy and 21<sup>st</sup> century skills for young children, technology integration frameworks for teaching, and barriers to technology integration. I

conclude with a detailed look at my own school setting and explain how this study addresses an existing lack of technology integration in primary grades in this study's research setting.

### **Digital Literacy and 21<sup>st</sup> Century Skills**

Digital technologies are changing the learning landscape, affording multiple opportunities for teachers and students. In today's classrooms, students have increased access to a variety of Information and Communications Technologies (ICTs) (Besnoy & Clarke, 2010). Many of these ICTs did not exist when today's teachers were students. The use of wireless multimedia devices and the Internet are also transforming learning (Garland, 2010). Prensky (2009) used the term "digital natives" to explain how today's students are born into a world of ICTs and have easy access to these ICTs. Digital natives expect teachers to allow them to complete assignments with the aid of technology (Besnoy & Clarke, 2010). In the United States, technology integration in education continues to increase, as do the learning opportunities they provide, particularly in reading instruction (An & Reigeluth, 2011; Hutchison, Beschoner, & Schmidt-Crawford, 2012).

With increased technology use in classrooms, students need to learn new 21<sup>st</sup> century skills of communication and collaboration, technology integration, problem-solving, and creative thinking (Larson & Miller, 2011). Students also are being exposed to digital literacies, which are defined as using digital technology and communication to access and use information (Borawski, 2009). In a world of increasing technology use, students need both 21<sup>st</sup> century skills and experiences with digital literacies. Technology is being added to literacy instruction and ICTs provide new ways of teaching literacy (Lankshear, Snyder, & Green, 2000). These new literacies provide engaging and exciting learning opportunities for both teachers and students. However, literacy teachers continue "using old skills, but applying them in new ways via new technology and new media" (Lankshear et al., 2000, p. 25). This is a particular challenge of

technology integration; digital literacies provide teachers with new opportunities to teach the basic skills of reading instruction, including phonics, phonemic awareness, vocabulary, fluency, and reading comprehension, yet not every teacher is taking up this challenge.

These opportunities include learning the differences between nonlinear electronic text and linear traditional text (Karchmer-Klein & Shinas, 2012). Teachers also need to teach their students about multimodal literacy or multimodal reading which includes the use of printed text, audio recordings, visual images, colors and shapes, and visual recordings (Bearne, 2003; Larson, 2013; O'Brien & Voss, 2011). Multimodal reading requires interaction with text resulting in greater reader engagement (O'Brien & Voss, 2011). Since multimodal reading involves more than reading a text, it must be taught explicitly with students having multiple opportunities for practice and engagement. Students also need to develop both listening skills (audio literacy) and visual skills (visual literacy) while reading digital texts (Borawski, 2009). These examples demonstrate how technology provides many uses for students beyond the traditional desktop computer. For example, students can use handheld devices to not only research, but also to create projects for publishing their work including papers, presentations, and even movies. These new opportunities challenge teachers to teach literacy skills of communication, information retrieval, and critical thinking using current technology (Kinzer, 2010; Larson, 2010). As discussed in the next section, a variety of handheld devices can support schools and educators in the work of teaching and learning.

### **Handheld Devices**

In the spring of 2010, the first Apple iPad was introduced, followed by the first Samsung Galaxy tablet in the fall of 2010. With the introduction of these new tablet computers, handheld computing emerged in a convenient, mainstream way. In the six years since the first tablets were

introduced, they can now be found in classrooms across the United States ranging from one-to-one (1:1) technology adoptions where each student has a device, to a few devices that are shared by the teacher and students. Most recently, affordable laptops such as Chromebooks and netbooks have been introduced, offering more opportunities for technology integration in classrooms than ever before.

Given the requirements for publishing writing using technology and keyboarding skills in the Common Core State Standards (CCSS), I believe that laptops such as a Chromebook appear to be a better option for handheld technology in the classroom than even the Apple iPad. In the English Language Arts sections of the CCSS, there are standards that explicitly address keyboarding skills (CCSS, 2015), which an iPad does not easily afford. A Chromebook is an inexpensive (less than \$200) laptop computer that uses the Google Chrome operating system. In a review of seven school districts' technology use, Demski (2012) describes the Chromebook as a tool that allows teaching and learning to occur seamlessly such that there is no barrier between the learning and the technology. Across the Google Chrome operating system, users are provided easier access with less need for technical support. A Chromebook allows students to log in and have access to all Google Apps including word processing, spreadsheets, and email. It is for these reasons that Chromebooks took center stage as the technology integration under study in this research. Yet quality technology integration requires not only an understanding of the devices available, but also consideration of the various frameworks for implementation that can support teachers in conceptualizing technology use.

### **Technology Integration Frameworks**

Several frameworks for technology integration are available in the literature to guide school districts and teachers in the use of technology in classrooms. Mishra and Koehler (2006)

developed one framework focusing on teacher content knowledge using technology.

Technological Pedagogical Content Knowledge (TPACK) describes how teachers combine their knowledge of content, pedagogy, and technology to further student learning (Mishra & Koehler, 2006). Viewing technology as media, Bruce and Levin (1997) developed a taxonomy that included four categories: media for inquiry, media for communication, media for construction, and media for expression. Taking into account the multi-purpose use of technologies by students, Lei and Zhao (2008) modified Bruce and Levin's taxonomy into four categories specifically for the use of laptops. These categories are: laptop use for specific learning tasks with explicit learning goals, laptop use for communication, laptop use for expression, and laptop use for exploration (Lei & Zhao, 2008). This taxonomy was most applicable to this study as it concentrates on student laptop use. Although their taxonomy covers four categories, the first category was most related to this study because clear learning targets were important to the participating teacher in this study. Clear learning targets are defined as short-term goals that clearly state what students are expected to know and be able to do at the end of the lesson (Essential Questions and Clear Learning Targets, 2015). Further, clear targets allow for assessing if students met the target or lesson objective (Chappuis, Stiggins, Chappuis, & Arter, 2011). Within this first category of specific learning tasks with distinct learning targets, I was able to study one teacher's implementation of technology lessons by keeping the lessons centered on a specific use of Chromebooks. These learning targets served to illuminate whether students would be able to use the Chromebooks for reading responses during their independent reading time. This allowed for a measure of the implementation of lesson activities during the study.

## **Barriers to Technology Integration**

Although both students and teachers are afforded opportunities for technology integration and 21<sup>st</sup> century skills through the use of ICTs such as handheld devices, it is still difficult for teachers to successfully use new technologies for teaching "old skills" (Lankshear et al., 2000). Barriers to technology integration for teachers were identified by Ertmer (1999) as first-order, or external barriers of resources, training, and support, and second-order, or internal barriers relating to teachers' confidence, beliefs about student learning, and the value of technology. Other identified barriers to technology integration include hardware malfunctions or out-of-date computers, lack of time to prepare lessons, lack of student skill level, and computer-related technical problems (Bauer & Kenton, 2005).

As a second-order barrier, teacher beliefs about technology have a significant impact on technology use in teaching. Studies have shown that teacher beliefs about technology are connected to a teacher's knowledge of effective teaching and their use of technology through their competency, confidence, and practice (Hermans, Tondeur, van Braak, & Valcke, 2008; Inan & Lowther, 2010; Kim, Kim, Lee, Spector, & DeMeester, 2013; Prestridge, 2012). Instructing with technology is different than simply adding technology to teaching; challenges exist for teachers to use technology in their teaching and learning in meaningful ways. School districts can work through the challenging process of implementing technology in classrooms through consideration of teachers' beliefs, experiences, and attitudes with technology (An & Reigeluth, 2011; Ertmer & Ottenbreit-Leftwich, 2010; Hermans et al., 2008; Inan & Lowther, 2010; Kim et al., 2013; Ottenbreit-Leftwich, Glazewski, Newby, and Ertmer, 2010; Prestridge, 2012). These challenges can also be met through developing communities of practice (Ertmer, 2005; Kopcha, 2010). Communities of practice allow learning to happen in a group through a gradual process

of increased engagement (Lave & Wenger, 1991) and with a common interest for increasing technology use with their students (Wenger & Wenger-Trayner, 2015). Providing technology coaches or mentor teachers to assist teachers using technology in their teaching for the first time is yet another way to meet these challenges (Bauer & Kenton, 2005; Kopcha, 2012; Muller, Wood, Willoughby, Ross, & Specht, 2008).

### **Background of Technology Integration in the Highlands School District**

At the time of this study, there was not a formal 1:1 technology adoption in the school comprising the research site for this study; neither was there one across its school district. Technology integration in the district ranged with teacher comfort level and experience with whatever form of technology was available (i.e., iPad or Chromebook). Some teachers had accessed technology through programs such as Donors Choose and others had not. Individual schools had district-funded technology that included computer lab classrooms with desktop computers and iPad, MacBook, and Chromebook carts that provided class sets of technology to be shared throughout a school. Fir Elementary School had gained grant funds to support a technology coach to work with teachers on implementing technology. At Peak Elementary, the school in this study, the district provided four class sets of Chromebooks on carts for shared use throughout the school in grades K-5 beginning in the 2014-15 school year.

### **Statement of the Problem**

At the time of the study, the technology carts at Peak Elementary were underused in the primary grades, which is a phenomenon I sought to explore in this study. In particular, teachers had made no efforts toward technology integration in second grade, which is the grade level this study investigated. Research confirms this lack of technology use; the majority of teachers in the United States are not using computers, nor are high levels of effective technology use being

achieved (Bauer & Kenton, 2005; Ertmer & Ottenbreit-Leftwich, 2010; Mueller et al., 2008). I suspected that without formal training from the district, teachers did not know where or how to begin to implement and use technology in their classrooms. Studies also suggest the importance of mentor teachers or technology coaches to coordinate lessons with classroom teachers (Bauer & Kenton, 2005; Kopcha, 2012; Mueller et al., 2008). In addition, teachers need continued training in the implementation of digital devices (Karchmer-Klein & Shinas, 2011) so they can view themselves as facilitators of learning in literacy environments using technology (Larson, 2013). There is also a need to help teachers understand how to use technology for meaningful learning (Ertmer & Ottenbreit-Leftwich, 2010). But what about teachers who do not have access to formal or ongoing training? Can a teacher view herself as a facilitator of learning through technology? That is what this study is about. I wanted to know what happens when a teacher implements and uses Chromebooks for the first time with support in lesson creation and device implementation. This research sought to understand whether she could teach her students to use laptops with specific learning targets and goals focused on independent reading and sustain the use of technology in her classroom after the coach was gone. I also wanted to know whether second-grade students could meet learning targets for using Chromebooks, based on the teacher's perspective of her students' learning when using Chromebooks for reading response.

### **Purpose of the Study**

During the study, I examined the second-order barriers of a teacher's beliefs about technology and the impact of technology use on her teaching, a topic discussed further in Chapter 2. Operating from a theoretical perspective of interpretivism (Butin, 2010), this study attempted to accurately and thoroughly document the teacher's perspective regarding the process of technology integration (Rossman & Rallis, 2012). Interpretivism allows for construction of

truth and a search for patterns of meaning told through a story (Butin, 2010) or thick description of a particular individual's experience (Geertz, 1973). This study concentrated on the area of laptop use for specific learning tasks with explicit goals (Lei & Zhao, 2008) in a second-grade classroom, as expressed by a teacher who was not using technology in her literacy instruction prior to the study. The purpose of this exploratory case study was to understand and explain what happens when a second-grade teacher receives support in implementing Chromebooks into her reading instruction for the first time.

I helped lend one form of assistance to the teacher by crafting a plan of support for her to initiate the use of Chromebooks into her instruction. This included the creation of implementation lessons with her input and that of a technology coach who taught the first lesson and assisted during the rest of the lessons. I designed this study based on research stating the importance of mentor teachers for those implementing technology for the first time (Bauer & Kenton, 2005; Kopcha, 2012; Mueller et al., 2008). I incorporated lesson observations, lesson debriefs, classroom observations, and interviews to investigate the ways this teacher integrated technology, and the ways young learners used it. The objective of the investigation was to provide greater understanding of the advantages and disadvantages of using Chromebooks in developing one teacher's ability to incorporate technology into her reading instruction.

### **Research Questions**

The following research questions were the focus of the study:

- 1 How does a second-grade teacher who does not presently use technology describe her experience of supported Chromebook use during her students' independent reading time?

- 2 What does the teacher observe about students' responses when Chromebooks are implemented?
- 3 What does the teacher identify as the advantages, disadvantages, and potential barriers of Chromebook use?

### **Definition of Key Terms**

This section includes definitions for key terms used in this study. These terms were selected based on their relevance to the problem statement and research questions.

*21<sup>st</sup> Century Skills* – Communication and collaboration, technology integration, problem solving, and creative thinking using technology (Larson & Miller, 2011). With increased technology integration, students need to know and be fluent in these skills.

*Chromebook* – An inexpensive laptop computer using a Google cloud-based Chrome operating system with access to Google Docs including Gmail. As a laptop, these devices allow for integration and use across multiple subjects in a school setting.

*Digital Literacy* - Digital technology and communication to access and use information (Borawski, 2009). The use of digital literacies can enhance 21<sup>st</sup> century skills.

*Handheld device* – Portable technology including tablets such as iPads and laptops, such as a Chromebook. Handheld devices are being found more frequently in classrooms as technology integration shifts to more portable access compared to traditional desktop computers.

*iPad* – A handheld tablet computer using the Apple iOS operating system. As a tablet computer, users are able to access a variety of applications (apps) for integration across multiple subjects in a school-based setting.

*Information Communication Technology (ICT)* - Technology that allows for communicating information (i.e., computer, laptop, tablet) (Besnoy & Clarke, 2010). ICTs such as handheld devices are increasing in classrooms as they provide opportunities for students to gain and use 21<sup>st</sup> century skills and digital literacies.

*One-to-one (1:1) computing* ó Implementation of computer technology where there is one device per student. This is one model for technology integration and is often hindered by the cost associated with providing technology for each student as opposed to sharing devices on carts throughout a school.

### **Limitations**

Limitations specify the weaknesses of a study (Rossman & Rallis, 2012) and there were several with this study. The first limitation is that the findings are not generalizable to a larger population. This case study focused on the experiences of one teacher in a single second-grade classroom at a specific elementary school. However, case study description enables readers to think about and determine what findings are applicable in their settings. As a first-grade teacher in this school, I selected the site for access and convenience, particularly because I had already established trust not only with the administrator and classroom teacher, but also with the second-grade students. With limited technology implementation and use of Chromebooks in the primary grades of this school; second grade was an appropriate choice for this study.

A further limitation is that I was only able to observe the classroom and gather data within the availability of my schedule as a teacher within the school. My current experience as a teacher served as a lens through which I gathered and interpreted data during this study. I acknowledge that this study was written from a teacher's perspective, as one who was currently teaching in this school. This means my own background knowledge of the staff, students, and

school informed my interpretations. Knowing my personal qualities and how they have interacted with this research during the study allows me to share where self and subject became joined (Peshkin, 1988).

Based on my experience and position as a teacher at Peak Elementary, my subjectivity could not be removed and is present throughout the study. I also acknowledge that I conducted this research as a requirement for a doctoral degree through George Fox University. I am interested in the subject of technology integration and I am an advocate for technology integration. As a researcher, I managed my subjectivity through the use of a field journal for reflecting on my learning and biases throughout the data gathering process and as I wrote my findings and conclusions.

### **Summary**

The purpose of this exploratory case study was to investigate the implementation of Chromebooks by a second-grade teacher who had not previously used technology to teach. Through analysis of her technology-based lessons, teacher debriefs, and interviews, this study sought to understand the possible advantages and disadvantages of Chromebook use for reading responses during independent reading in a second-grade classroom, along with the barriers to technology implementation. The next chapter contains a review of existing literature on the use of technology for teaching digital literacies with laptops. Barriers to technology integration and teacher beliefs about technology integration will also be discussed. Additionally, theoretical models for technology integration and professional development for handheld device implementation and literacy instruction will be reviewed.

## CHAPTER 2

### Review of the Literature

Information literacy has shifted to digital literacy as children are being introduced to books in forms other than traditional print (Borawski, 2009; Larson, 2010). Through these new digital literacies, teachers are provided new opportunities for reading instruction. Digital literacy is defined as digital technology and communication to access and use information (Borawski, 2009). Handheld devices such as iPads and laptops are one tool for teaching these new digital literacies. With these new opportunities, teachers are challenged to teach literacy skills of communication, information retrieval, and critical thinking using current technology (Kinzer, 2010; Larson, 2010). Students also need to learn and have experiences with 21<sup>st</sup> century skills, such as communication and collaboration, technology integration, problem solving, and creative thinking (Larson & Miller, 2011). Of these skills, technology integration is an important proficiency as students use technology more often in home and school environments. Through using handheld digital devices, students are able to engage in literacy activities at an individualized pace and instructional level (Larson, 2010). Students and teachers both are afforded opportunities for technology integration and for developing 21<sup>st</sup> century skills by using handheld devices.

In reviewing how young children learn with technology, three factors need to be taken into account: the content on the screen, the context of use, and the age and characteristics of the individual child (Guernsey, 2014). Through these three factors, educators can integrate technology by addressing the learning styles of young children in relation to digital texts.

Students may also need instruction on the differences between nonlinear electronic text and linear traditional text (Karchmer-Klein & Shinas, 2012). Linear text is traditional print that

flows in an orderly sequence such as print books, whereas non-linear text often lacks an orderly sequence and is frequently web-based text with clickable links. It is also important for students to develop multimodal literacy. Multimodal reading is the use of printed text, audio recording, visual images, colors and shapes, and visual recordings (Larson, 2013; O'Brien & Voss, 2011). Multimodal reading requires interaction with text resulting in greater reader engagement (O'Brien & Voss, 2011). Texts are now available to young readers in a variety of modes and media since the text has come to include not only words and images, but also moving images with associated sound tracks (Bearne, 2003). Since multimodal reading involves more than reading a text, it must be taught explicitly with students having multiple opportunities for practice and engagement. Children develop both listening skills (audio literacy) and visual skills (visual literacy) while reading digital texts (Borawski, 2009).

Digital technology used for digital reading also includes the use of computer-based e-books on CD-ROMs, online sources through websites, e-readers such as Kindles, and handheld devices such as iPads, tablet computers, and laptops. Students can use new literacies such as e-books to gain skills and strategies applicable to new communication technologies (Larson, 2008; Larson, 2013). Although access to technology and the Internet affects children's digital literacy (Borawski, 2009), it does not guarantee use or understanding (Karchmer-Klein & Shinas, 2011). In a joint position statement by the National Association for the Education of Young Children (NAEYC) and the Fred Rogers Center for Early Learning and Children's Media at Saint Vincent College (2012), interactive media can promote learning when used intentionally by early childhood educators, within the framework of developmentally appropriate practice to support learning goals for individual children (p. 5). They go on to state the importance of children needing time to explore the functionality of technology before they can be expected to

use the tools to communicate. Further, digital and media literacy for children means having critical viewing, listening, and Web-browsing skills (NAEYC and Fred Rodgers Center for Early Learning and Children's Media, 2012). Hsin, Li, and Tsai (2014) found the influence of technology on children's learning to be conditional upon a relationship between teachers, children, and technology. From this relationship, the use of digital technology can provide opportunities for young children to learn how to use and make sense of print within meaningful contexts (Levy, 2009). Additionally, technology should be integrated within current curriculum and lesson plans and not isolated to a "technology time" (Guernsey, 2014). Students can practice and strengthen these skills when teachers implement digital technologies, which is why it is so important for teachers to thoughtfully implement technologies in ways that support students.

The purpose of this review is to explore the integration and use of digital technology for digital literacy instruction specifically through: (a) technology integration for literacy instruction using laptops, (b) barriers to technology integration, and (c) professional development to support teachers in implementing handheld devices in literacy instruction. Studies on laptop integration focus on reading achievement, writing, and student and teacher attitudes. Barriers to technology integration include resources and infrastructure whereas teacher beliefs about technology are centered on teachers' competence, confidence, and experiences with technology. Professional development research focuses on strategies for integration and implementation of handheld devices including the use of mentor teachers and establishing communities of practice.

### **Integration of Laptops for Literacy Instruction**

This next section discusses literacy instruction with digitally-based resources and instruction using laptops. Digitally-based resources include computer based e-books, tablet computers such as iPads and Kindles, and laptops. Implementation of laptop use varies in terms

of what types of technology and how much technology is available. For this study, laptops include traditional laptops, smaller netbooks, and now Chromebooks.

**Literacy instruction with digitally-based resources.** Literacy instruction is a key component of early childhood education that includes five areas: phonemic awareness, phonics, vocabulary, fluency, and comprehension (National Reading Panel, 2000). Each of these five areas build upon each other and work together. Phonemic awareness and phonics are letter and letter sound recognition that build towards word reading or vocabulary and fluency, which then moves toward comprehension or being able to recall what was read (Armbuster, 2010). As reading instruction shifts to incorporate the use of digitally-based resources, there are different types of technology teachers can use in their classrooms to accomplish literacy instruction. These resources include computer based e-books, tablet computers such as iPads and Kindles, and laptops.

Computer based e-books were some of the first digitally-based literacy resources available. E-books offer many encouraging features for teachers to implement and use in literacy instruction. Multimedia features on e-books include animation, music, sound effects, illuminated text, and narration (Segal-Drori, Korat, Shamir, & Klein, 2010). E-books also provide teachers access to multiple reading levels and individualization for students. They can be personalized in an individualized format, providing benefits for students with special needs (Larson, 2010).

Tablet computers such as Kindles and iPads offer different approaches to literacy instruction than computer-based e-books. These devices are handheld and can store multiple e-books equipped with a variety of tools ranging from note-taking tools, highlighting, text-to-speech or read-aloud options, dictionaries, search features, and text customization. Readers of e-

books using hand-held devices are no longer stuck at desktop computers as today's reading devices are portable, relatively affordable, and have improved battery life and storage capacity (Larson, 2013). As a mobile device, the iPad is more versatile than a computer since it offers a touch screen and a variety of applications depending on the literacy skill being taught and practiced (Hutchison, Beschorner, & Schmidt-Crawford, 2012). With iPads, teachers are afforded a "hands-on" and mobile approach to literacy instruction. However, affordable laptops such as a Chromebook are providing similar benefits, as students are able to use the iPad or a laptop anywhere within the classroom setting, with the added benefit of a keyboard to teach students keyboarding skills.

**Instruction through laptop implementation.** Implementation models vary from laptop carts that are shared between classroom to one-to-one (1:1) programs where each student and teacher has their own laptop. Multiple studies have been completed on 1:1 laptop implementation in schools. According to Lei and Zhao (2008), current studies provide information on "what is used" and "how much" is used, but little information on "how" laptops are being used in teaching and learning. In this section, studies are reviewed that focus on laptop implementation and use, student achievement, student and teacher attitudes, and teaching and learning practices.

Spektor-Levy and Granot-Gilat (2012) investigated the impact of learning through personal laptops (1:1) at a practical and operational level focusing on two middle schools in urban communities with high socio-economic backgrounds. The study included two groups: a comparison group of 81 students at one middle school who had traditional laptop use only several times a year in a computer lab setting and an intervention group of 100 students at a second middle school where each student had their own personal laptop purchased by parents

with aid of financial subsidies. The students were to complete an assessment tool created for the study in 90 minutes. The findings including the intervention group scoring significantly higher than the comparison group, 82.5% to 73.25%. Researchers found significant differences between the actual competencies of students who learn with personal laptops and students who learn with no informational communication technology in their classes. Similarly, Rosen and Beck-Hill (2012) found that students were absent less often, and had increased achievement and improved discipline when they were allowed to use computers in the constructivist one-to-one, Time To Know program. This program includes five components: infrastructure, environment, an interactive yearlong curriculum, a digital teaching platform, and technical support. Through the use of the constructivist technology-enriched technology model, researchers found that differentiated instruction and learning were also promoted.

Larkin and Finger (2012) sought to understand how teacher and student beliefs and values affected netbook usage through analyzing classroom observations, interviews, student forums and surveys, and data logging software on the netbooks. They found a clear indication for the need to increase the teachers' Technological Knowledge component of their teaching practice. From Mishra and Koehler (2006), TPACK focuses on the three domains of teachers' knowledge: knowledge of curriculum content (content), knowledge of age-appropriate ways to teach this knowledge (pedagogical), and knowledge as to how technology may be used in teaching (technological). In addition, it is clear that a teacher's history of computer use and practices influence how netbooks impact student learning. A key finding was the greatest netbook usage was in classrooms with a 1:2 (one device per two students) computer ratio. In classrooms with a 1:2 ratio, teachers accessed the technology more often than in classrooms that had a 1:1 ratio. This is an interesting finding demonstrating that 1:1 technology in this study was

not the most effective. In contrast, a study of 231 students, 28 teachers, and 44 parents in a northeastern middle school in the United States using a taxonomy of technology with four domains found 1:1 laptops greatly increased students' opportunities to work on technology and solve technology-related problems (Lei & Zhao, 2008). The researchers concluded that having 1:1 computers can significantly increase student technology proficiency because of the greater number of opportunities for learning, communication, expression, and exploration (Lei & Zhao, 2008). From these studies, it can be concluded that multiple factors need to be considered when implementing laptops beyond the idea of 1:1 implementation, including the need to strengthen teachers' technological knowledge and history of use.

### **First and Second-Order Barriers to Technology Integration**

Research has also been conducted to explore the barriers to teachers implementing technology in their classrooms. First-order barriers are those factors that are external to the teacher, such as resources, training, and support (Ertmer, 1999; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012). Second-order barriers are those that are internal, such as teachers' confidence, their beliefs about how students learn, and the value they place on technology to teach and learn (Ertmer, 1999; Ertmer et al., 2012; Kim, Kim, Lee, Spector, & DeMeester, 2013). As computer technology used in schools continues to advance and improve, environmental barriers continue to change, even as educators work to address them. These continual changes in technology may result in teachers being perpetual novices in technology integration (Mueller, Wood, Willoughby, Ross, & Specht, 2008).

**External factors to technology integration.** Some of the first-order barriers that create a lack of technology integration for teachers include lack of resources and time, limited skill levels of teachers and students, and technical problems (Bauer & Kenton, 2005; Brinkerhoff,

2006). In an examination of the teaching practices of 30 teachers currently using technology in their instruction, other identified barriers to technology integration included old hardware or out-of-date computers, lack of time to prepare lessons, limited student skill level, and computer-related technical problems (Bauer & Kenton, 2005). Similarly, in a study using a long-duration professional development academy focused on using technology in K-8 instructional settings to increase teacher knowledge, findings determined the academy model was successful at increasing technology skills and removing the barrier of teacher skills (Brinkerhoff, 2006).

Another important consideration in addressing the first-order barrier of teacher knowledge and skills is ensuring that pre- and in-service teachers understand the technology being used combined with the affordances that technology provides when used in the classroom (Ertmer & Ottenbreit-Leftwich, 2010). Teachers need more than just having technology provided to them, they need knowledge and skills in how to use the technology in their teaching. From these studies, first-order barriers can be addressed in meaningful ways, yet second-order barriers may still go unmet.

Prestridge (2012) states the need to look beyond first-order barriers and focus on the second-order barriers of teacher beliefs about technology and examine the ways they influence ICT implementation in the classroom. Ottenbreit-Leftwich, Glazewski, Newby, and Ertmer (2010) view teacher beliefs as value beliefs, stating that the more valuable teachers judge a tool or approach, the more likely they are to use it. However, teachers' values and beliefs are often not included in conversations on best educational technology practices (Ottenbreit-Leftwich et al., 2010).

**Teacher beliefs about technology integration.** Multiple studies have been conducted on second-order barriers, mostly consisting of teacher beliefs about using technology in the

classroom. Measuring teacher beliefs following computer integration is necessary to identifying lasting changes within the classroom (Mueller et al., 2008). Ottenbreit-Leftwich et al. (2010) examined the differences among pedagogical beliefs and technology practices of 12 K-12 teachers and found that in general, teachers were able to enact technology integration that aligned with their beliefs. They suggest not focusing on first-order barriers, but rather increasing teacher knowledge and skills; providing evidence of technology integration practices can result in meaningful learning outcomes. Similarly, Kim et al. (2013) studied teacher beliefs in relation to the nature of knowledge and learning, effective ways of teaching, and technology integration. They found support for connections between teacher beliefs and knowledge of effective teaching or pedagogy related to technology integration, illustrating the importance of ensuring that both knowledge of technology and knowledge of effective teaching are included in training teachers to use technology.

Teacher beliefs and readiness directly influence technology integration, as determined by Inan and Lowther (2010), who explored technology integration as affected by teacher readiness and beliefs about school factors. In examining the relationship between teachers' pedagogical beliefs and their technology practices Ertmer (2005) found three strategies for promoting change in teacher beliefs about technology. These included personal experiences starting with simple technology uses, vicarious experiences by observing others to gain confidence, and social-cultural influences through establishing a social network of computer using teachers (Ertmer, 2005). Hu, Clark, and Ma (2003) conducted a longitudinal study to examine individual teachers' technology acceptance through a training program and found that computer literacy is important for teachers when learning to use technology. Teachers also need to have knowledge of the technology they are implementing with their students. Training should relate to the relevance

and value of technology paired with teacher support to sustain continued usage (Hu et al., 2003). Through seeking to identify a relationship between teachers' ICT competence, confidence, and practice, researchers found that as teachers expressed a greater competency with ICT, they were more confident to use ICT in their classroom (Prestridge, 2012). Finally, investigating the relationship between teachers' educational beliefs and computer use, Hermans, Tondeur, van Braak, and Valcke (2008) found that teacher beliefs about the practice of teaching were a significant determinant in explaining why teachers adopted computers in the classroom. Together these studies highlight the importance of how competency and confidence influence a teacher's beliefs about technology.

### **Professional Development for Literacy Instruction with Digital Devices**

This next section encompasses several technology integration frameworks discussed in this study, along with a communities of practice framework. Teacher professional development for literacy instruction with digital devices, including mentor teachers to train and support teachers, is also investigated.

**Technology integration frameworks.** Integrating handheld devices into classroom instruction requires teaching frameworks and continued training for successful implementation. There are multiple frameworks for improving teacher knowledge and instructional skills with technology and handheld devices. Frameworks reviewed included a taxonomy by Bruce and Levin (1997) based on Dewey's taxonomy of learning; a modification of which takes into account how students use technology for multiple purposes (Lei & Zhao, 2008), Technological Pedagogical and Content Knowledge (TPACK) (Mishra & Koehler, 2006), and a systems-based model (Kopcha, 2010). Bruce and Levin's taxonomy of technology includes four parts: media for inquiry, media for communication, media for construction, and media for expression. Lei

and Zhao (2008) modified this taxonomy to account for the important connections between technology use and its context.

TPACK serves as a framework for integrating digital literacy instruction into teaching practices. Focusing on three domains of a teacher's technological knowledge, knowledge of curriculum content, and knowledge of appropriate teaching methods, TPACK is a tool for teachers to reflect on their level of technology knowledge and integration into their teaching (Mishra & Koehler, 2006). The TPACK framework has been noted as important for integration of iPads in literacy lessons (Hutchison et al., 2012) and Lei and Zhao (2008) have demonstrated the use of their taxonomy of technology for laptop integration. Kopcha's (2010) systems-based model includes four main stages: initial setup, teacher preparation, curricular focus, and community of practice. A system-based approach establishes a teacher-centered process for integrating technology (Kopcha 2010). Through this system-based model, the mentor teacher guides teachers through the process of integrating technology by providing support and modeling in the context of the teacher's classroom. This moves towards establishing communities of practice that are sustained by the teachers themselves when a mentor is no longer available.

Research suggests building communities of practice (Ertmer, 2005; Kopcha, 2010) and supportive networks have the potential to provide ongoing support beyond the initial formal training (An & Reigeluth, 2011). Lave and Wenger (1991) put forth the idea that learning is a process of participating in communities of practice that gradually increases in engagement and complexity. Wenger and Wenger-Trayner (2015) define communities of practice as "groups of people who share a concern or passion for something they do and learn how to do it better as they interact regularly" (p. 1). These communities of practice involve more than technical knowledge or skill but also relationships (Smith, 2003, 2009). From these communities of

practice, teachers can develop relationships and build skills for implementing technology in their classrooms as they learn from each other.

**Teacher professional development and mentor teachers.** Teacher training and professional development are also fundamental to successful iPad and laptop implementation for literacy instruction. Without focused and applicable training, teachers will either not implement handheld devices into their instructional practices, or they will have limited student success. Ottenbreit-Leftwich et al. (2010) explain that it may be more beneficial to help teachers use technology to enhance the curriculum in ways they see fit, rather than expecting technology to change the nature of their teaching. By examining common barriers to technology under a program of sustained and situated professional development in the context of an elementary school, it was found that professional development activities can play an important role in shaping teachers' perceptions of and responses to common barriers to technology use (Kopcha, 2012). Including teachers' beliefs in professional development can also help facilitate improved technology integration (Kim et al., 2013). Through professional development activities, teachers have opportunities to gain technical skill and experiences with technology by allowing them the time to develop personal instructional materials (Inan & Lowther, 2010).

Professional development must also focus on pedagogical aspects of technology integration and incorporate technology uses that align with teachers' values and beliefs (An & Riegeluth, 2011; Inan & Lowther, 2010; Ottenbreit-Leftwich et al., 2010). Technology integration requires more than technical skills and teacher training needs to develop teachers' TPACK (An & Riegeluth, 2011). These teaching strategies also need to align with the current instructional practices a teacher is already using to support appropriate technology integration. A mentor or teachers identified as successfully integrating technology can serve to train and expose

teachers to successful integration in practical ways that promote positive beliefs about technology (Bauer & Kenton, 2005; Kopcha, 2012; Mueller et al., 2008). Professional development needs to be tailored to the needs of individual teachers and their beliefs, competency, and confidence to allow incorporating technology in their classrooms. Teachers need to see positive outcomes, successful practice, and have positive experiences with technology (Mueller et al., 2008, NAEYC and Fred Rodgers Center for Early Learning and Children's Media, 2012). Regarding professional development, these studies suggest the importance of having mentor teachers who are successfully integrating technology to train other teachers at their level of need, competency, and confidence.

Studies about how to support technology integration have also been conducted in teacher training programs. A study with 49 pre-service teachers using an e-book reading experience focused on three objectives: to gain firsthand experience in reading an e-book, consider text factors and reader factors that support comprehension, and to learn how to integrate e-book reading into their future classrooms (Larson, 2013). This study concluded that teachers should not only consider students' prior knowledge of a text, but also their previous experiences with technology. Teachers must also know how to use the devices themselves before using them with students. With the introduction of new literacies, a teacher's role shifts to one of a facilitator in these literacy environments (Larson, 2013). As a facilitator, teachers guide the learning of their students through the use of digital technologies and literacies. Northrup and Killeen (2013) argue that for learning and development of early literacy skills, technology integration has to be used deliberately with careful planning and training. Karchmer-Klein and Shinas (2012) list four principles for how teachers can use technology to support reading: (a) keep your eye on the moving target or the continuing changes in technology and its uses, (b) recognize the complexity

of new literacies, (c) recognize that digital natives still have a lot to learn, and (d) reconsider assessment methods. In looking at iPad and laptop integration for literacy instruction, the first point is important as digital literacies are changing as more sophisticated technologies emerge. In general, these studies point to the continued need for pre- and in-service teachers to have ongoing training in the implementation of digital devices and texts, so they can know which strategies to apply and when to apply them.

### **Conclusions**

Handheld devices such as iPads and laptops offer exciting new opportunities for teachers through the development of digital literacies. Digital reading includes computer-based e-book readers, e-book readers such as Kindles, and iPads and tablets that provide e-readers and reading apps. Handheld devices such as iPads and laptops provide more mobility for student use than reading e-books on a computer. In addition, laptops offer additional learning opportunities through use of keyboarding skills for written responses.

In general, studies on laptop implementation demonstrated how having 1:1 computers increased student technology proficiency (Lei & Zhao, 2008) and increased student achievement (Rosen & Beck-Hill, 2012; Spektor-Levy & Granot-Gilat, 2012). Laptop implementation also promoted differentiated instruction (Spektor-Levy & Granot-Gilat) and highlighted the need for teacher training in TPACK (Larkin & Finger, 2012).

First- and second-order barriers to technology implementation demonstrate how much teachers must contend with in order to meaningfully incorporate technology into their teaching (Bauer & Kenton, 2005; Brinkerhoff, 2006; Ertmer, 1999; Ertmer et al., 2012; Kim et al., 2013). Teacher beliefs about technology connect to teachers' knowledge of effective teaching and their use of technology through their competency, confidence, and practice (Ertmer, 2005; Hermans et

al., 2008; Hu et al., 2003; Inan & Lowther, 2010; Kim et al., 2013; Prestridge, 2012).

Frameworks or taxonomies were also shown to be important for successful implementation of technology in teaching (Bruce & Levin, 1997; Lei & Zhao, 2008; Mishra & Koehler, 2006). In addition, building communities of practice (Ertmer, 2005; Kopcha, 2010) and supportive networks have the potential to provide ongoing support beyond initial trainings (An & Reigeluth, 2011). This review also demonstrated the importance of teacher training and professional development, including a need to focus on the pedagogical aspects of technology integration aligning with teachers' values and beliefs (An & Reigeluth, 2011; Inan & Lowther, 2010; Ottenbreit-Leftwich et al., 2010), successful mentor teachers for training (Bauer & Kenton, 2005; Kopcha, 2012; Mueller et al., 2008), and training on using laptops, iPads, and handheld devices (Karchmer-Klein & Shinas, 2012; Larson, 2013).

Studies using laptops focused on students older than the fourth grade and lacked focus on how laptops are being used in teaching and learning, specifically reading. Laptop studies using Chromebooks specifically and the Google cloud-based system using Google Docs in education were absent from the literature. Lei and Zhao (2008) stated current studies provide information on "what is used" and "how much" is used, but little information on "how" laptops are being used in teaching and learning. Further studies need to be conducted on "how" laptops are being used with larger sample sizes such as a whole class of students in younger grades. To keep the study focused and clear, these studies should also center on one component of reading achievement and instruction, i.e., phonemic awareness, phonics, vocabulary, fluency, or comprehension. This study addressed these gaps in the literature by focusing on a single second-grade class using Chromebooks for reading response skills to find out what advantages and disadvantages Chromebooks provide to a teacher who is implementing the technology for the

first time. As technology continues to change and develop, more opportunities will be afforded for research of literacy instruction through integration of handheld devices.

## CHAPTER 3

### Method

This study explored one teacher's supported implementation of Chromebooks in a second-grade classroom in an urban school in Multnomah County, Oregon. I wanted to learn about the advantages and disadvantages of using this handheld technology for reading responses during independent reading time, from the teacher's perspective. I also sought to describe what this experience was like for the teacher and identify any perceived second-order barriers to technology implementation. Given the lack of technology integration in the primary grades at this particular school, I believed this study could be of direct benefit to the school and its teachers as they worked to implement technology.

A theoretical framework by Bruce and Levin (1997) proposes a taxonomy of technology for learning which includes media for inquiry, communication, construction, and expression. Lei and Zhao (2008) modified this taxonomy into the following categories: laptop use for specific learning tasks with explicit learning goals, laptop use for communication, laptop use for expression, and laptop use for exploration. Laptop computers such as a Chromebook provide opportunities for students to access each of these learning categories in a classroom, however, this study centered only on the first category of specific learning tasks with explicit learning goals, or learning targets. Clear learning targets are key to student learning, and can be defined as short-term goals that clearly state what students are expected to know and be able to do at the end of the lesson (Essential Questions and Clear Learning Targets, 2015).

I used the first category, laptop use for specific learning tasks with explicit learning goals as a basis for creating the four lessons used in this study. I made an effort to encapsulate student understanding about a particular use of Chromebooks in a series of lessons that required four

lessons to teach the content. These lessons included specific learning targets related to Chromebook use and reading response skills to be used during independent reading instruction.

The purpose of this exploratory case study was to understand and explain what happens when a second-grade teacher implements Chromebooks into her reading instruction for the first time with support. Based on research, I crafted a plan of support for the teacher to implement Chromebooks into her instruction which included the creation of four technology implementation lessons with her input and that of a technology coach who taught the first lesson and assisted during the rest of the lessons. I designed the study this way because of the research that stated the importance of mentor teachers for those new to implementing technology (Bauer & Kenton, 2005; Kopcha, 2012; Mueller et al., 2008). Teacher interviews, lesson observations and debriefs, and classroom observations facilitated the examination of potential uses of Chromebooks to improve reading response skills of young learners. The objective of the investigation was to provide greater understanding of the advantages and disadvantages of using Chromebooks for developing reading skills, while ascertaining the teacher's perspective on the process of technology integration.

### **Research Questions**

The following research questions were the focus of the study:

- 1        How does a second-grade teacher who does not presently use technology describe her experience of supported Chromebook use during her students' independent reading time?
  
- 2        What does the teacher observe about students' responses when Chromebooks are implemented?

- 3 What does the teacher identify as the advantages, disadvantages, and potential barriers of Chromebook use?

### **Setting**

The school selected for this study was an urban elementary school in Multnomah County, Oregon. Peak Elementary is a kindergarten through fifth grade school that receives Title 1 funding. According to the 2014-15 Oregon Report Card (Oregon Department of Education, 2015), Peak Elementary had approximately 663 students, of which 32% are English Language Learners (ELLs) and 70% of the students are classified as economically disadvantaged. There were 26 different languages spoken and an average class size of 27 students during the 2014-15 school year.

### **Participants and Sampling Strategy**

Purposeful sampling was used to provide an understanding of the research problem as well as the central phenomenon in the study (Creswell, 2013). I purposefully sampled second grade due to the fact that a majority of studies found in the research focused on third grade and above. Additionally, the nature of second-grade students' increased levels of independent reading and learning compared to kindergarten and first-grade students made them an ideal choice for studying Chromebook implementation in literacy instruction.

There were four second-grade classrooms at Peak Elementary. Each of these second-grade teachers collaborate to use a "walk to read" model for the guided reading block. Through this model for differentiated instruction, all second-grade students are grouped based on their reading levels; one above grade-level, two middle groups near or at-grade level, and one below grade-level group. The class used in this study was one of the near or at-grade level groups.

Thus, the group I studied included a combination of students from four different classrooms, grouped according to their similar reading levels.

I used several criteria to purposefully select this class and teacher. Having worked at Peak Elementary with each of the four teachers for over ten years, I identified two teachers to ask directly. These teachers were two who might be willing and available and had not used technology much in their teaching. In these conversations, I presented the nature of the study in as broad of a context as possible in addition to being explicit about what would be expected (Seidman, 2006). Next, I was able to identify if they would be willing to participate. Mrs. Mindy Carter (all names are pseudonyms) was willing to participate and was selected for the study, along with her reading class of 25 students, with 12 boys and 13 girls.

At the time of this study, Mrs. Carter was in her mid-thirties and had taught at Peak Elementary for 12 years with experience in kindergarten and second grade. She is the second-grade representative for the building leadership team in addition to serving as the facilitator for second-grade team meetings. Mrs. Carter has also worked at the district level to write curriculum maps for reading and math. In initial conversations about this research, Mrs. Carter explained to me that there were times during the previous school year the Chromebook carts were stationed in her classroom, yet she did not use them with her students. She said her lack of experiences and knowledge of what to do with the technology resources hindered her from using the Chromebooks with her students. Mrs. Carter expressed that this study could provide her with practical experience and strategies for her students to learn with the Chromebooks. Her experience, leadership, and willingness to try new teaching practices made her classroom a good fit for this research study.

There was also a technology coach, Wilmer Aulin, who taught one technology/literacy implementation lesson and assisted with the next three. After I developed the lessons for this study, Mr. Aulin reviewed them and provided input on changes. Mr. Aulin has worked in the school district for thirteen years teaching in fourth and fifth grade. At the time of this study, he was in his second year as a technology coach at Fir Elementary in the Highlands School District. Mr. Aulin also worked with district leaders in areas of technology deployment across the district in schools outside of his home school. With his background in technology and coaching, he was an ideal fit to assist in the use of technology during this study. Mr. Aulin participated in the study through the co-teaching of the first lesson with Mrs. Carter, so I could observe as the researcher. Research supported the importance of having a mentor teacher assist in the implementation of technology for educators who are new to it (Bauer & Kenton, 2005; Kopcha, 2012; Mueller et al., 2008). He also provided his insights in the lesson debriefs which were included as data in the study.

### **Research Methodology**

This study was a qualitative exploratory case study (Creswell, 2013; Stake, 1995) situated within one bounded case of a second-grade classroom and its teacher. Rossman and Rallis (2012) describe a case study as seeking to understand a larger phenomenon through intensive examination of one specific instance (p. 103). This single-case design incorporated an embedded design with two units of analysis (Yin, 2009). These units of analysis were the experiences of the teacher and the experiences of the students as seen through classroom observations and the teacher's perceptions.

The rationale for this single, representative case was to capture the experiences of a second-grade teacher using Chromebooks for the first time. A case study in one classroom

allowed for a detailed look at the experiences and insights of this teacher. Through direct examination of one classroom of second graders, I sought to understand the advantages and disadvantages of using Chromebooks for reading response skills, in addition to identifying any potential barriers to technology implementation for this particular teacher.

### **Research Protocol**

A major strength of case study research data collection is the opportunity to use multiple and different sources of evidence (Yin, 2009). Triangulation, or collecting multiple sources of evidence, also provided validity to the findings (Creswell, 2013). This study incorporated multiple sources of data during the course of four lessons taught over two weeks, in addition to eight 30-minute classroom observations of students using the technology. I also conducted three classroom teacher interviews and multiple debriefs with both the classroom teacher and technology coach after each of the four lessons. These methods are encapsulated in Table 1, and each of these methods of data collection are explained further in the next section.

Table 1

*Research Procedures*

	Researcher Focus	Data Collection	Data Analysis
Week 1	Initial interview	Review of lessons, observation protocol, and debriefing questions (Appendices A-F). Initial interview questions (Appendix G), audio recording of interview	Coding for themes on transcription of interview audio recording.
Week 2	Lesson observations one and two Lesson debriefs	Lessons one and two (Appendices A, B), video recording of lessons, observation protocols (Appendix E), lesson debrief questions (Appendix F)	Coding for themes of the lesson video recording transcription, lesson debrief audio transcription, and observation protocols.
Week 3	Lesson observations three and four Lesson debriefs	Lessons three and four (Appendices C, D), video recording of lessons, observation protocols (Appendix E), lesson debrief questions (Appendix F)	Coding for themes of the lesson video recording transcription, lesson debrief audio transcription, and observation protocols
Week 4	Second interview Classroom observations one and two	Second interview questions (Appendix H), audio recording of interview, observation protocols (Appendix E)	Coding for themes of the transcription of interview audio recording and observation protocols.
Week 5	Classroom observations three and four	Observation protocols (Appendix E)	Coding for themes of the observation protocols.
Week 6	Classroom observations five and six	Observation protocols (Appendix E)	Coding for themes of the observation protocols.
Week 7	Classroom observations seven and eight	Observation protocols (Appendix E)	Coding for themes of the observation protocols.
Week 8	Conclusion interview	Conclusion interview questions (Appendix I), audio recording of interview	Coding for themes of transcription of interview audio recording.

## Data Collection

The data collection procedures are explained in the next section. These included technology lessons, classroom observations, and teacher debriefs and interviews.

**Technology lessons and classroom observations.** I designed four 45-minute model lessons (see Appendices A, B, C, and D) to work within the schedules of the classroom teacher, the technology coach, and myself as the researcher. Mrs. Carter and Mr. Aulin taught them over two weeks to introduce the Chromebook and teach children how they were to be used for reading responses during independent reading time. The rationale for four lessons was based on a scaffolded instruction or gradual release model which is recognized as a successful model to move from teacher-centered instruction to student-centered independent practice (Fisher & Frey, 2008). Using an “I do” (direct instruction), “We do” (guided instruction), “You do” (independent practice) model for gradual release of responsibility, the four lessons shifted the students towards independent Chromebook use. The reasoning for reading responses was based on Common Core State Standards requiring students to “ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text” (CCSS, 2015).

The first lesson served as an introduction and expectations lesson for Chromebook use. The second lesson was a teacher-led, “I do” modeling of using a Chromebook for a reading response. The third lesson was “We do” with teacher and students completing a reading response together using Chromebooks, followed by the final lesson or “You do” where the students were released to complete their own reading response independently using a Chromebook.

Although I created the lessons, Mr. Aulin and Mrs. Carter provided input on the lessons included in Appendices A, B, C, and D. These lessons were team taught between Mr. Aulin and Mrs. Carter. Mr. Aulin taught the introduction and expectations lesson, which ended up becoming two lessons due to the time it took to explicitly teach the care, expectations, and login procedures. Mrs. Carter taught the remaining three lessons with Mr. Aulin present to offer support to her and the students for two of these three lessons. These lessons were video-recorded with a focus on the teacher's instruction. Videotaping provided accurate records to be analyzed later for interpretation (Stake, 1995). A transcription service was used to transcribe the audio information from these videos as another source of data for triangulation.

I also used an observation protocol during the lessons as part of my field notebook with a form (Appendix E) including the date and time of the lesson observation. This form was adapted from Creswell (2013), and has two columns, one for descriptive notes and one for reflective notes. I made notes on student and teacher interactions during the four video-taped sessions. In addition, I conducted eight thirty-minute observations during the four weeks following the lessons. I observed during Mrs. Carter's independent reading time and used the same observation protocol. The focus of these observations was on student interactions as they used the Chromebooks for reading responses, along with any teacher interactions with students around Chromebooks. These observation notes were useful for uncovering meaning, developing understanding, and discovering insights relevant to the research questions and problem (Merriam, 1988). I reviewed the reading response documents the students completed using Chromebooks to get an idea of how students appropriated the lessons and learning from Mrs. Carter's teaching.

**Teacher debriefs and interviews.** I met with Mrs. Carter and Mr. Aulin to debrief after each of the four lessons in preparation for what needed modification or adjustment before teaching the next lesson. These debriefs were also recorded and transcribed in addition to keeping notes on a debrief sheet (Appendix F). These transcripts and notes were used for data analysis as well. These debrief notes provided insights from Mrs. Carter's and Mr. Aulin's perspectives of how each lesson went.

I conducted three interviews with Mrs. Carter during the study. Seidman (2006) describes a three-interview series that seeks to place participants' experience into context. The initial interview (Appendix G) took place before the lessons were taught at the beginning of the study. The purpose of this initial interview was to put Mrs. Carter's teaching experience in context by exploring as much about her teaching in regards to the topic of technology use and integration up to that present time (Seidman, 2006). The second interview occurred three weeks later and explored the details of Mrs. Carter's current experiences with technology integration in her teaching and classroom during the study, using the guide questions in Appendix H. The final interview took place at the end of the study and asked Mrs. Carter to reflect on the meaning of her experience in integrating technology in her classroom during this study. This interview was also used to gauge her assessment of ongoing implementation and student use of Chromebooks. All three interviews were pilot tested with a fourth-grade teacher from Peak Elementary before I used them with Mrs. Carter. The goal of these three interviews was to have Mrs. Carter tell the story of her experience with technology integration with a beginning, middle, and end (Seidman, 2006). I used a transcription service to transcribe the voice recordings of the interviews for later analysis.

## **Analytical Procedures**

In this study, qualitative data analysis consisted of three concurrent activities: a) data condensation, b) data display, and c) conclusion drawing and verification (Miles, Huberman, & Saldaña, 2014). I used codes to retrieve and categorize similar data into groups (Miles et al., 2014) and as the first step of data condensation. I coded the video taped lessons, teacher interview transcripts and debriefs, and classroom observations for themes using a three-stage process of initial coding, focused coding, and thematic coding (Creswell, 2013). In the initial coding, I created labels for all significant statements from the teacher interviews, video transcripts, and student observations. Examples of initial codes included coaching/teacher talking, practice/experience, and student confidence. For focused coding, I looked for similarities and connections in the initial coding labels and sought to combine them into larger groups. These groups included teacher background and beliefs, teacher talking, computer skills, and importance of practice. Lastly, in thematic coding I identified themes that connected with theoretical constructs which included teacher experience, coaching, advantages/success, and disadvantages/challenges/barriers.

From these coding efforts, my goal was to create a data display that organized the data and assisted me in drawing justifiable conclusions (Miles et al., 2014). A data display is an organized, compressed assembly of information that permits conclusion drawing (Miles et al., 2014). This coding and data display enabled the integration of the data into a detailed profile of the teacher's perception of Chromebook use during independent reading in this second-grade classroom. This description provided me with an understanding of the themes identified in the case (Creswell, 2013). Further, I used description to move to the final step of data analysis by drawing and verifying conclusions or assertions. Through looking at the themes I identified in

the coding process, I made connections back to the research questions. From these themes, I developed assertions or a declarative statement of synthesis, supported by data (Miles et al., 2014, p. 99). I stayed true to the data by using quotes to support my assertions. I also provided thick description (Geertz, 1973) by using transcript quotes and observation notes. These assertions and conclusions provided answers to the research questions and were verified and supported by the evidence provided by the data. These analytical procedures that occurred within the dissertation timeline for this study adapted from Butin (2010), are listed in Table 2.

Table 2

*Dissertation Timeline*

Action	Anticipated Completion Date	Actual Completion Date
Dissertation Proposal composition, chapters 1-3	August 1 - September 1, 2015	September 15, 2015
Dissertation Proposal meeting	September 15, 2015	September 29, 2015
Submit Institutional Review Board (IRB)	September 15 - 22, 2015	October 5, 2015
School district approval	September 15 - 25, 2015	October 11, 2015
Letters of consent	September 25 - October 5, 2015	October 11 - 19, 2015
Data collection ó lesson observations and debriefs, interviews, and classroom observations, data analysis	October 5 ó December 4, 2015	October 19 ó December 11, 2015
Continued data analysis, coding for themes, drawing and verifying of assertions and conclusions	December 4 -31, 2015	December 11, 2015 ó January 9, 2016
Completion of chapter 4	January 24, 2016	January 25, 2016
Completion of chapter 5	February 14, 2016	February 8, 2016
Completion of backwards revision	March 11, 2016	March 13, 2016
Submit finalized dissertation	March 18, 2016	March 15, 2016
Prepare for dissertation defense	March 21, 2016	March 21, 2016
Dissertation defense	April 4 ó 8, 2016	April 5, 2016
Final revisions	April 15, 2016	April 10, 2016
Submit and upload completed dissertation to Taskstream	May, 2, 2016	April 29, 2016

## **Research Ethics**

In designing this study, I followed the ethical principles established by George Fox University's Institutional Review Board (IRB). In addition, I have taken the online training through Protecting Human Research Participants (PHRP, 2015) and followed the American Educational Research Association's code of ethics within this research study (AERA, 2011). Institutional consent from the school district was acquired on October 11, 2015 following the approval of the dissertation proposal on September 30, 2015. I gained informed consent from Mrs. Carter and Mr. Aulin with a consent letter (Appendix J). Additionally, I gained informed consent from students and their parents, since students were observed both indirectly during the video-taped lessons and directly during classroom observations. This parent consent letter (Appendix K) was translated into Spanish and Russian (Appendices L and M) to accommodate the home languages of the families at Peak Elementary. I gained informed consent from the students themselves (Appendix N), which I read and explained to students before asking them to sign the letter. The signed consent letters, transcripts from interviews and debriefs, and lesson videotapes were secured in a locked file during the duration of the study. After five years, I will destroy the videos, delete the audio interviews, and shred the consent letters. I did not share any information from interviews, debriefs, or video analysis with any other staff members at Peak Elementary or other staff within the school district during the study. I will seek permission from Mrs. Carter to share the research findings with staff and district leaders at the conclusion of the study. It is my hope that sharing of the findings will promote further technology integration within Peak Elementary and the district. In the future, I may also publish and present on this research.

I used member checks (Stake, 1995) and participant validation strategies (Rossman & Rallis, 2012) to ensure I had an honest account of interview transcripts and analysis. I provided Mrs. Carter with transcripts of the interviews and lesson observations at the end of the study to get her feedback on the accuracy of the data. Mrs. Carter and Mr. Aulin were also provided written copies of the case description within four weeks of the conclusion of data collection. I gave them two weeks to read and review the information presented to check if it was accurate to what they shared in interviews and debriefs. Stake (1995) states that participants need not be promised that revisions will be included, but some of the feedback could be useful in the final case description. In the case of this study, I found that Mr. Aulin and Mrs. Carter stated the findings were an accurate and honest reflection of their experience.

### **Role of the Researcher**

During this study, I had several roles. My first role was as a doctoral student at George Fox University. I completed this research in partial fulfillment of the doctoral degree. As a doctoral student, I was invested as a participant in this study to see that it was completed. I committed to following ethical principles throughout the study. These principles included professional competence and integrity (AERA, 2011). As a doctoral student and teacher at the study site, I acknowledge that I was qualified to conduct this research at Peak Elementary. I sought to maintain integrity throughout the study by being honest, fair, and respectful to the participants and the information they shared. I acquired the proper consent from the institution and participants in addition to protecting data gathered in the study. I maintained confidentiality through seeking to keep the participants anonymous in the data collection and sharing of findings.

My second role was that of a colleague at Peak Elementary School. As a teacher and staff member, I acknowledged this relationship and affirmed that I conducted ethical and valid research within the school setting. I understand that my relationships at Peak Elementary allowed me access to the research setting and established a level of trust necessary for successful completion of this study. Allowing Mrs. Carter and Mr. Aulin to complete member checks on the case description and study findings balanced my subjectivity. Their review and input helped to identify if I had shown bias towards the data collected, the findings, or both.

The ways I particularly served as a participant observer were through the creation of the implementation lessons. I then vetted them with Mrs. Carter and Mr. Aulin to incorporate their input regarding any changes. I typed up the students' log-in cards that were used by the students during the implementation lessons and throughout the study. I created Mrs. Carter's paper literacy tickets in Google Docs at her request after the initial implementation lessons. I assisted with a projector issue during the implementation lesson that Mr. Aulin was not present. During classroom observations I interacted with students as they working. I did not co-teach the lessons or re-teach the students during the classroom observations. Thus, as a participant observer during the study I observed, took notes, and worked behind the scenes with Mrs. Carter and Mr. Aulin.

**Bracketing.** In qualitative research bracketing is a method used to identify the biases of the relationship between the researcher and the participants (Creswell, 2013). Peshkin (1988) describes the idea of subjectivity as something all researchers need to acknowledge. Subjectivity can be virtuous if it is the basis for a researcher making a distinct contribution resulting from their personal qualities combined with the data collected (Peshkin, 1988). In this study, I endeavored to monitor my subjectivity and to be aware of biases that were present as I moved

through the data collection process. Peshkin also speaks of seeking out subjectivity during data collection so that it is a mindful part of the whole research process.

To explicate my subjectivity, during this study I was a first-grade teacher at Peak Elementary. I had established relationships with not only the teaching staff, but also the second-grade students in the classroom to be studied. I taught a portion of these students in first grade during the previous year. I was aware of the trust and benefits of these relationships. During the study, I sought to limit my personal biases and remain objective in my observations. I did not observe to judge how the teacher was teaching or how the students were learning (Peshkin, 1988). I was present to document the teacher's experience using technology with her students for the first time and the students' interactions with this new use of technology for reading responses.

I acknowledged that my own comfort level with technology was not the same as other teachers in the building. Having implemented technology through regular use of iPads in my classroom, I have firsthand experiences of the challenges and successes that come with technology use in the classroom. I worked to remain objective during observations and teacher interviews, however my background knowledge and experiences remained present and were a lens through which I interpreted the data. I used a field journal to take notes and reflect on any biases or new learning that arose during the study. This allowed for a formal and systematic monitoring of myself so that I could avoid perceiving and seeking out my own ideas through the data collected (Peshkin, 1988). Member checks also provided a means to examine if the teacher's voice and experience was truly represented by the case description and findings.

### **Potential Contributions of the Research**

One potential contribution of this study was to provide findings related to the advantages and disadvantages of Chromebook use for reading responses in a second-grade classroom. The majority of studies using laptops focus on implementation of one-to-one technology programs and the impact of this implementation (Lei & Zhao, 2008). In contrast, this study examined one specific grade level and one area of literacy instruction. Second, this study had potential to provide information to teachers who may have a similar classroom setting and technology access. At Peak Elementary, where there was currently a lack of technology implementation and use of Chromebooks in primary grades, I hoped this study might promote an increased use of technology through the findings and sharing of the lessons. Through thick, rich descriptions (Geertz, 1973) of the research process and learning, I sought to create a rationale for the usefulness of this technology in other contexts. From this, readers could determine for themselves if the results would be of use in their setting (Rossman & Rallis, 2012).

## CHAPTER 4

### Findings

During this case study, Mrs. Carter implemented Chromebooks for reading responses with her second-grade students. She did this with the support of a technology coach. Over the course of eight weeks, as students learned expectations and how to access their Google student accounts, this study explored three research questions:

- 1 How does a second-grade teacher who does not presently use technology describe her experience of supported Chromebook use during her students' independent reading time?
- 2 What does the teacher observe about students' responses when Chromebooks are implemented?
- 3 What does the teacher identify as the advantages, disadvantages, and potential barriers of Chromebook use?

The study took place in a single second-grade classroom during students' guided reading time with a mixed student group of twenty-five students from four second-grade classrooms. The study lasted eight weeks and included three teacher interviews with Mrs. Carter, the second-grade teacher, along with video recording of the five initial implementation lessons (Table 3) she co-taught with Mr. Aulin, the technology coach. The study also included eight classroom observations of students working independently with the Chromebooks following the implementation lessons. The teacher interviews took place before the first lesson, after the third lesson, and concluded with a final interview after the eighth and final student observation. The initial plan was for Mrs. Carter and Mr. Aulin to co-teach four implementation lessons. This was expanded to five lessons with Mr. Aulin teaching lessons one and two on care, expectations, and

logging in. Mr. Aulin assisted in the creation of index cards that had students' name, identification number, and birthdate for logging into their Google Student account. Mr. Aulin and Mrs. Carter then co-taught lesson three, which reviewed logging in and introduced the Google form for reading response. Mrs. Carter taught lessons four and five with Mr. Aulin assisting students as needed during lesson five. Following my observation of these lessons, I conducted eight class observations over the following six weeks and observed continued use and expansion of Chromebook use by students beyond the initial lessons taught by Mrs. Carter with Mr. Aulin's support. This included additional instruction on multiple reading response sheets in Google Docs. Details of the lessons I observed in this study are contained in Table 3.

Table 3

*Lesson Implementation Sequence*

Lesson	Date	Teachers	Content Taught
Lesson 1	October 20, 2015	Mr. Aulin, Mrs. Carter	Chromebook components, expectations for care and use, and procedures for retrieving from cart. Mrs. Carter led the students in creating the class expectations chart at the end of the lesson.
Lesson 2	October 22, 2015	Mr. Aulin, Mrs. Carter	Review of lesson 1, introduction to Google student accounts, and logging in. Mrs. Carter assisted students with logging into their student accounts.
Lesson 3	October 28, 2015	Mrs. Carter, Mr. Aulin	Review of lesson 2, Google Form for student response with teacher model. Mr. Aulin assisted students with logging in and assisted Mrs. Carter by typing as she modeled answering the 5Ws and 1H question on chart paper.
Lesson 4	October 30, 2015	Mrs. Carter	Review of lesson 3, Google Form for student response with students completing the form with the teacher.
Lesson 5	November 2, 2015	Mrs. Carter, Mr. Aulin	Review of lesson 4, Google Form for student response with students completing the form independently. Mr. Aulin assisted students logging in and provided support with Mrs. Carter as needed for students as they were completing the Google Form independently.

Qualitative data analysis consisted of three concurrent activities: a) data condensation, b) data display, and c) conclusion drawing and verification (Miles, Huberman, & Saldaña, 2014). Through analysis of the interview transcripts, lesson transcripts, and observation notes, key themes emerged that were centered around the teacher's experience, coaching, advantages/successes, and disadvantages/challenges/barriers. These themes were a combination

of both inductive perspectives expressed by Mrs. Carter, and deductive categories developed from the literature (Rossman & Rallis, 2012). As these themes became clear, I created multiple concept maps (Rossman & Rallis, 2012) to provide various perspectives on the data. I decided to present the findings from the teacher's perspective, as the research questions were written from this viewpoint and teacher interviews revealed the depth of the experience for her and her students. The lesson observations, transcripts, and classroom observations provided further triangulation and support for the themes. From these themes, I developed assertions or "a declarative statement of synthesis, supported by data" (Miles et al., 2014, p. 99). I stayed true to the data by using quotes from Mrs. Carter to support the assertions. I also provided thick description (Geertz, 1973) of the data, by using the transcript quotes and observation notes.

From this data analysis process, I organized the chapter around four assertions. In this chapter, I present each assertion before providing an illustrative quote and a vignette. Vignettes are a "focused description of a series of events taken to be representative, typical, or emblematic of the case" (Miles et al., 2014, p. 182). These vignettes provide a story of the action or a narrative description. I composed each vignette by drawing from multiple lessons, interviews, and classroom observations to create a small picture of what happened in the study. After each vignette, I provide evidence and support from the various data sources, including interviews, lesson transcripts and debriefs, and field notes of classroom observations. The four assertions developed through the data analysis process are as follows: a) Despite her limited experience with Chromebooks, Mrs. Carter was willing to implement new technology, b) In this study, the technology coach was key to implementation of Chromebooks for teacher support and student use, c) Establishing clear expectations was important for sustained Chromebook use when only

one teacher was in the room, and d) Students gained skills from Chromebook use that went beyond typing and familiarity with a single reading response form.

**Assertion 1: Despite her limited experience with Chromebooks, Mrs. Carter was willing to implement new technology.**

“This is my first experience with Chromebooks and then as far as obviously teaching it to second graders I was definitely stressed about it at first” (Mrs. Carter, Interview 3).

*The purpose of this research study was to examine a teacher’s experience using Chromebooks with support for reading responses. Before the study began, I had an initial conversation with Mrs. Carter to gauge her interest in participating. I provided an overview of the study and then asked, “Have you ever used a Chromebook?”*

*She replied, “I’ve never used one, but I’ve had the cart in my classroom. Our school achievement specialist worked with a few of my kids last year.”*

*I asked, “Have you seen other teachers use them in their classrooms?”*

*She thought for a moment and answered, “No. I am sure they can be useful, but I have no idea what for other than typing.”*

*“What would you say if I told you a technology coach could help you to implement Chromebook use with your students? Would you be willing to try with that support?”*

*Mrs. Carter perked up, appeared more interested and responded, “If I had the support to show me how and what to do with my students I would be willing to try using Chromebooks with my students.”*

*This first conversation was revealing; although she had basically zero experience using Chromebooks, she expressed a willingness to try something new with the support of a technology coach.*

Once the study began, our first interview together was focused on Mrs. Carter's teaching background and experiences. After some initial questions, I delved deeper regarding her beliefs and perceptions around technology integration. First I asked, "What does technology integration mean to you in your classroom and teaching?" She thought for a moment and responded,

Well, I'm kind of, I'm learning this year and I think that um, I know for second graders that they need to, um, start learning how to type with Microsoft Word and typing our research papers. And so I know, like I'm really trying to integrate more typing skills in my classroom. (Mrs. Carter, Interview 1)

I could tell in her hesitation and limited response that she had not thought of technology integration in her classroom beyond just typing skills for her students. I then asked, "What are your beliefs towards technology integration in schools?"

Again, she thought for a moment and responded,

I think that, um, like how times are now that everything is technology and so kids are really used to it. And as far as like, going at home, most families have computers, their parents have smartphones and so I think in the school it's something that they're really used to. (Mrs. Carter, Interview 1)

From these responses, I could infer that Mrs. Carter had a positive belief toward technology and the benefits Chromebooks could provide, even if at this time it was limited to typing skills. As the interview continued, I reflected on our initial conversation two months ago regarding this research study and her willingness to participate. She had shared then that her lack of experiences and knowledge of what to do with Chromebooks had hindered her from using them with her students. As our conversation in this first interview continued, I gained a sense that Mrs. Carter had a positive perception and belief that using Chromebooks would be beneficial to

her classroom. However, I could tell that she also had insecurities due to her lack of knowledge and experiences using Chromebooks with her students. She explained that her limited technology integration resulted from a lack of time, knowledge, and confidence to know how to teach it.

**Barriers to Mrs. Carter's technology integration.** A teacher's beliefs are important to consider when implementing technology in a classroom. Research has identified factors that are external to the teacher, or first-order barriers of resources, training, and support (Ertmer, 1999; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012). Factors that are internal to the teacher or second-order barriers, such as teachers' confidence, their beliefs about how students learn, and the value they place on technology to teach and learn were also evident in the research (Ertmer, 1999; Ertmer et al., 2012; Kim, Kim, Lee, Spector, & DeMeester, 2013). Prior to this study, Mrs. Carter's experiences with using technology were limited by both first- and second-order barriers.

Interviews revealed Mrs. Carter was an experienced teacher with over twelve years teaching in both kindergarten and second grade. She indicated openness to technology integration, however she had limited experiences using technology with her students. Mrs. Carter was honest in her self-assessment during the first interview when she stated, "This is new to me." She had applied what knowledge she had of technology use based on the resources she had, yet her previous experiences were limited. The previous school year, Mrs. Carter had access to technology, but did not use it with her students. This study was the first time she had actually used a Chromebook in her classroom with a whole class of students. She explained,

Last year was my first time actually seeing or using them in a classroom, and I had four students who our student achievement specialist would come in and taught this small

group of students how to log on to the Chromebook and use it for some games or reading activities. (Mrs. Carter, Interview 1)

Mrs. Carter had resources available, yet she had not accessed them with her students. She allowed the student achievement specialist to teach a small group of students, but she did not try technology integration for herself.

When asked to share her thoughts and beliefs on technology in the classroom, Mrs. Carter stated, "Everything is technology, so kids are used to it." This was explained further when she stated that most families have computers or smartphones. She went on to share her beliefs regarding technology and how students need to be confident and know how to use the technology available to them in school. During the first interview, Mrs. Carter also expressed how scary it is to be trying something new by teaching with technology. Before this study, technology-based activities with her students only went as far as her knowledge, experiences, and resources available to her classroom.

**Access, knowledge, and positive beliefs are not enough.** Mrs. Carter indicated her willingness to explore her beliefs and values regarding technology by trying something new in this study. I believe Mrs. Carter chose to participate in this study for two reasons. The first reason was reflected in her belief that she knew the value of technology for her students. She understood the importance and benefit for her students to learn technology skills. The second reason was knowing she would have support with the technology coach, Mr. Aulin. Although she had limited experience, the opportunity to implement technology with a coach who would help her learn and develop skills made it less scary than trying something new on her own.

When asked about her beliefs toward technology integration in school, she said, "I know that it's important that by the time my students get to college that they're going to need to be

really confident and know how to use the technology that we have.ö But these beliefs about the importance of technology were not sufficient in and of themselves to change her teaching practices prior to this study. She needed the support of a coach to assure her that she could implement technology successfully. By learning with her students during this study, Mrs. Carter demonstrated her positive beliefs regarding technology and her readiness to acquire new knowledge. Mrs. Carter shared the emotional aspects of risk in learning during our first interview, saying, öí anything that's new seems a little scary, and just um, trying to feel confident in myself with technologyí ö When asked if her teaching beliefs or methods needed to change to allow for teaching with technology, she echoed again the idea or belief that being willing to try something new and having a positive perception as to the benefits of using technology are important. Mrs. Carter explained in interview three,

I think that I just need to be a little more open with it and be willing to take risks and know that it's okay that my class might struggle at first, that we kind of struggle together and that it is really effective.

Throughout this study, Mrs. Carter was continually honest about her beliefs regarding the value of technology for her students juxtaposed with her feelings of stress, anxiety, and lack of knowledge to teach her students how to use Chromebooks. She felt that it was a risk to try something new in her already crowded instructional day. If using Chromebooks did not work out for her students, then instructional time would have been spent on something that was not valuable. Yet, she was willing to take the risk, even though it would be a struggle and a learning process.

The third and final interview provided insight into both the shifts in Mrs. Carter's beliefs and perceptions of technology as well as her plans for continued technology integration after the

study had concluded. Mrs. Carter stated, “I think it’s definitely something I would not have taken on, um, on my own because I was like I said, a little anxious about introducing Chromebooks to an entire classroom.” Mrs. Carter’s candor in the interviews made known both her perceptions and beliefs towards technology integration, as well as her feelings of stress and anxiety to try something new with students.

Even though Mrs. Carter’s perceptions and beliefs were open to using and trying new technology in her teaching, she was still mindful that it would be a challenge in learning something new without support. In addition to her personal beliefs and access to resources, Mrs. Carter needed to be willing to implement Chromebooks with her students. This finding suggests teachers need to have a positive belief and perception toward the value of technology, coupled with the willingness to take action. Having a technology coach helped to ease the anxiety of trying something new and capitalized on Mrs. Carter’s beliefs, perceptions, and willingness to implement technology with her students.

**Assertion 2: In this study, the technology coach was key to implementation of Chromebooks for student use and teacher support.**

“I think that what Mr. Aulin taught the class at the very beginning is the reason why it became so successful in my classroom” (Mrs. Carter, Interview 2).

*The first implementation lesson began with Mr. Aulin confidently striding into the class of twenty-four second-grade students he had not previously met and instantly capturing their interest and attention. He quickly gauged their familiarity with computers by asking how they use computers at home and having a few students share their ideas. He went on to explain how they would be using computers in their class. Then he said, “The next four lessons and during the next couple of months you guys will be learning tools and things to do on the Chromebooks.*

*Today's objective and today's learning targets are that you will know what a Chromebook does, what it is, and how to care for it."*

*As Mr. Aulin was teaching, I could see how confident and clear he was with the students. There was no hesitation in his presentation, he thoroughly knew a Chromebook and how to present what it does and how to care for it in kid-friendly language. As he proceeded to cover the clear lesson objective and learning targets, I noted how explicit and deliberate he was in his pacing and providing examples of proper use. Mrs. Carter was also engaged as a learner during his teaching. Although she stood to the side and watched him teach, she interacted, participated with students, and contributed to the discussion.*

*Finally, after thirty minutes, the students had a chance to get up and get a Chromebook. Once each of the students had quietly retrieved a Chromebook from the cart, Mr. Aulin demonstrated opening and closing it gently. He then had the students open their Chromebook, close it, open it, close it, open, and close. After multiple times of this, a student asked, "Is this a joke?"*

*Mr. Aulin answered, "The reason why I had you do that a bunch of times was because you have to practice, practice, practice, practice."*

*Although this was a funny exchange to the students and myself as an observer, Mr. Aulin still conveyed a confident, serious tone as to the importance of practicing expectations with a Chromebook. The students were then released by table groups to carefully and quietly return their Chromebook to the cart.*

*It was at this point in the lesson where Mrs. Carter finally stepped forward as the lead teacher and worked with the students to create a class chart for Chromebook expectations. With three headings, "Be Safe, Be Respectful, and Be Responsible," the students worked to fill in the*

*chart with their words what they had been taught regarding the care, expectations, and procedures for using the Chromebooks. As the classroom teacher who would be continuing to work with her students for the rest of the year, I noted the importance of Mrs. Carter leading this closing portion of the lesson. Using his experience and knowledge as a technology coach, Mr. Aulin was able to confidently step in and teach the first lesson on care and expectations to both the students and Mrs. Carter, yet he made sure she took responsibility for working with the students to sustain continued use of the Chromebooks after his support would no longer be available.*

Mr. Aulin provided the catalyst for Mrs. Carter to implement Chromebooks in her teaching with her students. It was during the first lesson that Mr. Aulin explained what a Chromebook was and clearly laid out the expectations for Chromebook use, care, and procedures. As he was explaining how a Chromebook worked and each part of the Chromebook, I noted how Mrs. Carter was watching and learning from him with her students. Sometimes teachers take advantage of having another teacher leading their class and busy themselves with other tasks at their desk. Mrs. Carter was on her feet and active throughout the lesson as she engaged with Mr. Aulin's teaching and the students as they were learning.

As Mr. Aulin worked to meet the lesson objectives, he taught seemingly simple things such as the parts of a Chromebook. Keyboard, track pad, touchpad, screen, microphone, and camera: each part's function and purpose was explained and demonstrated to the students. The students themselves had time to share with a partner what had just been taught before moving to the portion of the lesson on expectations. During this partner-sharing time, Mrs. Carter and Mr. Aulin both circulated among the students to not only listen to their sharing, but to also engage in their ideas with them.

Mr. Aulin was key to the successful implementation and student use of Chromebooks in this study. Being in his second year as a technology coach at Fir Elementary in the Highlands School District, Mr. Aulin had over a year's worth of experience and practice delivering this lesson to students in grades kindergarten through fifth. He knew not only what was important to teach students when first using a Chromebook, but also how to do so in a deliberate and explicit way so that they would understand. In reflecting on my field notes, I noted that in the fifty minutes of lesson one, he only taught the parts of a Chromebook, expectations for their care and use, and the procedures for using the Chromebook cart. Yet, by using this slow and explicit pacing, students were able to recall what they had learned, both at the end of this lesson and in future lessons, as well. As a technology coach, Mr. Aulin was able to not only meet the students where they were, but also meet Mrs. Carter at her levels of competence and confidence, in alignment with her instructional practices.

**Coaching at this teacher's level of competence.** Using his experience from teaching a similar lesson, Mr. Aulin discussed with Mrs. Carter the rationale and logistical plan for teaching the first lesson. He explained how, in lesson one, he would explicitly teach each part of the Chromebook in addition to expectations and care for Chromebooks. Mr. Aulin stressed to Mrs. Carter the importance of students knowing why they would use Chromebooks and explicit expectations for their care. Initially, they thought this would only take one lesson, but during the debrief of the first lesson, they decided to add in an additional lesson to review expectations, along with logging in, before teaching the reading response form in lessons three, four, and five. Mr. Aulin took charge of the first two lessons on expectations, care, and logging in. Mrs. Carter was then able to co-teach the third lesson and teach the last two lessons by herself on how to use a Google Form for answering the 5Ws and 1H for reading response. Mr. Aulin made himself

available at two of three lessons to assist students with logging in and answering questions as needed.

During this study, Mrs. Carter's training on using a Chromebook was hands-on and occurred in real time with the students. I noticed Mr. Aulin and Mrs. Carter talking during the lessons as the students were working. Mrs. Carter explained in interview two about "teacher talking," both talking to the students and with each other as teachers. Although their conversations were not picked up by the video recording, I could infer from watching the videos that sometimes she would ask him a question, and other times he would be telling her something. From these interactions, I could tell that Mr. Aulin was explaining and teaching Mrs. Carter as they taught the students. This coaching in real time seemed more significant and impactful than it might have been for Mrs. Carter to experience a training before the lessons. Synchronous coaching is the idea of providing coaching or feedback to teachers in real time (Hooerman, Kommers, & Jochems, 2008; Kommers & Hooreman, 2009.) One study of synchronous coaching included whispering instructions to trainee teachers in real time through earpieces (Kommers & Hooreman, 2009). In contrast, this synchronous coaching occurred face-to-face between Mr. Aulin and Mrs. Carter during the lessons. In this study, Mr. Aulin not only taught the students many things, but he also taught Mrs. Carter at the same time. As Mrs. Carter's competence to use a Chromebook increased, her confidence also improved throughout the study.

**Coaching to increase this teacher's confidence.** As teachers express a greater competency with information and communication technology (ICT), they are more confident to use ICT in their classroom (Prestridge, 2012). In this study, Mr. Aulin increased Mrs. Carter's competency, which in turn improved her confidence. Although Mrs. Carter expressed a lack of confidence before the study started, as she gained competence and knowledge of how to use a

Chromebook during the study, her confidence grew. After the first two lessons, she stepped forward as the teacher with Mr. Aulin assisting the students as needed. In lesson observations that followed the implementation lessons, I could see her confidence as she was teaching and leading the lessons by herself using the Chromebooks with her students. She taught implementation lesson four completely by herself as Mr. Aulin was not available that day. In reflecting on her experience during the study, she shared, “I was, you know, feeling a little bit anxious and stressed about it but as we got going and after lesson after lesson, and just seeing the students becoming more confident, helped me become more confident.” This phenomenon of a teacher gaining confidence from her students was interesting to note. But her own learning process offered her many opportunities to increase her experience and subsequently, her comfort level.

Mr. Aulin was a key aspect to the support Mrs. Carter needed to teach differently and take the risk to try something new by using Chromebooks. Learning can be viewed as a process of participating in communities of practice that increases gradually in engagement and complexity (Lave & Wenger, 1991; Wenger & Wenger-Trayner, 2015). Mr. Aulin started teaching Mrs. Carter where she was in her levels of competence and confidence. He did not expect her to teach the first two lessons on expectations and routines as she had limited knowledge and no experience teaching these lessons in the context of using a Chromebook. When Mrs. Carter stepped forward to teach, he knew to step to the side and encourage her in her efforts to teach something new to her students. As an expert who had knowledge and experience with Chromebooks, he helped her gain confidence in using the Chromebook with her students and gradually increase her level of knowledge. She explained, “I think this is definitely something I would not have taken on my own because I was, like I said, a little anxious about

introducing Chromebooks to an entire classroom.ö Having a skilled coach in Mr. Aulin provided Mrs. Carter and her students with a positive and successful experience of using Chromebooks for reading responses. By the second interview, I could see that Mrs. Carter's confidence had increased since the beginning of the study. I observed her teaching students how to access literacy responses documents after the implementation lessons without Mr. Aulin. When asked in the second interview how she perceived things were going so far, she responded:

I think so far it's going pretty well, now that I've taught the lessons. I think the number one thing is just like, they're just, having the practice doing all the steps of logging in and going to their email, opening up their documents and getting familiar with the literacy document that I have taught them.

As the students continued to practice and gain confidence, Mrs. Carter also gained confidence in her teaching using the Chromebooks. In the classroom observations, I could see the students successfully logging into their student accounts and accessing the reading response documents. After learning how to complete the initial Google Form, the students learned how to access reading response documents that were the same paper and pencil activities they had already been completing. The lessons and activities were already familiar to the students and Mrs. Carter as they aligned with her current teaching.

**Coaching aligned with this teacher's instructional practices.** In sharing her beliefs on technology integration in the first interview, Mrs. Carter revealed her opinions that "lessons need to be well thought out" and the need for both "planning time" and "knowledge of the resources." She went on to restate the challenge of finding time to integrate technology, "Computers or Chromebooks have to be built into my daily schedule."

Mrs. Carter expressed in the first interview that computer use was important for her students, yet she had not implemented technology for her students to use for reading responses. Prior to this study, her students completed reading responses using paper and pencil literacy tickets. Throughout this study, the lesson creation and pacing took into account Mrs. Carter's input, beliefs, and current instructional practices.

By including instructional practices that Mrs. Carter was already using, such as the paper and pencil literacy tickets, Mr. Aulin was able to teach her how to incorporate technology into her current practice. Mrs. Carter shared in the second interview,

I'm having them do on the Chromebook which is, a literacy ticket about the 5Ws and 1H question and I think that they really understand that because it's something we've taught even before I introduced Chromebooks. It's something familiar, it's something that we're using in reading groups. It definitely applies to what we're doing.

The students were able to take their knowledge of literacy tickets and apply them to completing the documents on Chromebooks. Since they were already familiar with the assignment, students only had to learn a new process and way of completing the document with a Chromebook instead of using paper and pencil.

Initially, Mrs. Carter and Mr. Aulin used a Google Form for teaching the reading response using the 5Ws and 1H. Mr. Aulin suggested this would be easier for students before teaching them how to open a Google Doc. This aligned with Mrs. Carter's pedagogical practices of using a scaffolded instruction or gradual release model which served as a means to move from teacher-centered instruction to student-centered independent practice (Fisher & Frey, 2008). Using an "I do" (direct instruction), "We do" (guided instruction), "You do" (independent practice) model for gradual release of responsibility, the students were able to learn how to first

open and complete the Google Form for reading response together before moving to independent practice in a Google Doc.

In lesson three, Mrs. Carter led the class in filling out a 5W and 1H on chart paper while Mr. Aulin typed the responses on a Chromebook using a projector allowing the students to visually follow along. In lesson four, students typed Mrs. Carter's typed response that was displayed on the screen. Finally, during lesson five, the students were released to complete the story response form independently. After the implementation lessons were completed, Mrs. Carter extended the instruction by teaching the students to open a reading response literacy ticket in their email, save a copy to Google Drive, enter their responses, and submit it to her through email. Using a reading response form that was familiar to students allowed them to be successful with the reading response activities.

By the eighth classroom observation on December 10, 2015, students were accessing and completing a variety of literacy tickets through Google Docs in their student accounts. These included Story Elements (Appendix O), Questions and Answers (Appendix P), Word Collector (Appendix Q), and Weekly Words (Appendix R). Mrs. Carter was able to use existing literacy tickets with her students for reading response. I created these resources as Google Documents and shared them with Mrs. Carter and the students. Mr. Aulin wisely aligned his instruction with Mrs. Carter's current instructional practices, using a gradual release of responsibility model and working with existing resources. I turn now to the third assertion, which discusses how critical it was for students to have clear expectations for successful Chromebook use.

**Assertion 3: Establishing clear expectations was important for sustained Chromebook use with only one teacher in the room.**

“I feel like with Chromebooks overall it's really helping me run my small groups more successfully. All the students seem to be on task and really enjoying what they're doing, so that's really cut down on management issues” (Mrs. Carter, Interview 3).

*When I entered the room for my third observation, students were already reading quietly from their book boxes while Mrs. Carter was reading with a small group of six students. After about five minutes, Mrs. Carter dismissed the students reading at their desks to get a Chromebook from the cart while she continued working with her small group.*

*The students began retrieving Chromebooks and logging into their student accounts. Many of the eighteen students no longer needed the index card with their log-in information. Within minutes the students were logged in, had located the response document they were working on the previous day, and began completing their work. As the students quietly and efficiently worked at their desks on the Chromebooks, Mrs. Carter continued teaching her small reading group. Students were using a variety of books to complete the Story Elements reading response sheet. These stories included picture books such as Arthur's Valentine and Clifford's First Autumn, to chapter books like Junie B. Jones First Grader at Last. The students were typing in the characters, the events leading to the problem, the problem, and the solution to the problem in the story. Over the course of the next thirty minutes, as students finished their reading response sheet, they shared it with Mrs. Carter via email, logged out, returned the Chromebook to the cart, and began silent reading for the final minutes of class. It was clear the students knew not only the expectations for using the Chromebooks, but also for completing the reading*

*response document. The students were efficient at self-managing while Mrs. Carter worked with her small group of students.*

After the first two implementation lessons had been taught, student self-management skills became more evident during classroom observations. From my field notes, the third observation provided a glimpse into the student management that allowed for both Mrs. Carter and her students to be successful. This observation occurred on November 10, twenty-one days after the first implementation lesson. The logistics of managing Chromebook use with just one teacher were important to consider. Three themes emerged from the data pertaining to this assertion: the importance of student patience, the significance of setting clear expectations, and ongoing student practice and experience. Each of these elements were important for sustaining Chromebook use with one classroom teacher. Mrs. Carter continually reminded students of the need for patience as students were learning the process of logging in and how to use the Chromebooks for reading responses. It was critical that she and Mr. Aulin set clear expectations, which allowed for students to successfully gain practice and experience. Once the students knew and understood the expectations, Mrs. Carter could teach her small reading groups because students had ongoing practice and experience with the Chromebooks.

**Student patience.** The word "patience" was mentioned multiple times during the fourth lesson when Mrs. Carter was the only teacher available to the students. Mrs. Carter shared in the second interview, "just having the patience and knowing there is just one teacher, two teachers in here to help them, that they have to wait their turn. And I think then also just building the confidence that they can do it."

Mrs. Carter echoed similar thoughts in the third interview when asked about the barriers to technology integration, “So I guess what I saw just like as barriers would be just having one adult versus like thirty students.” Mrs. Carter also mentioned,

“if there are students who are struggling and they need, and they need adult help if there are students who are struggling with just the basic typing skills and making sure that they’re answering complete sentences, I don’t always have the time to really sit and work with that person as much as I would like to throughout our reading time.”

I noted in both the lessons and observations that students raised their hand and waited for a teacher to assist them when they had problems. Although the students were becoming more independent and experienced at logging in, at the time of the third observation some students still struggled with using the Chromebooks and completing the reading response sheets. This was a challenge for Mrs. Carter as she was still trying to meet with small reading groups while students were working on the Chromebooks independently. I noted that during classroom observations one and two that Mrs. Carter attempted to help struggling students by leaving her reading group. As the study progressed, I noted in observation three and beyond that Mrs. Carter no longer needed to leave her groups. She had students who understood what to do and serve as experts to help students next to them if they were struggling.

**Setting clear expectations.** Student self-management became important for sustaining Chromebook use when only one teacher was in the room. After Mr. Aulin assisted with four of the initial five lessons, having students self-manage without help was important to Mrs. Carter’s ability to teach her reading groups. These findings indicate the importance of establishing clear routines and expectations for successful student self-management. Mrs. Carter explained, “In the very beginning just really laying it out, launching Chromebooks very clearly to the students. I

think that sets up everything in the very beginning. Understanding what the expectations are and just modeling that step-by-step instruction was huge. Once the students clearly understood these expectations and routines after the first five lessons, they were able to continue to practice and improve their skills of logging in and accessing the literacy response documents.

In my field notes, I noted repeatedly how in observations three through eight the students were reading and working quietly on Chromebooks while Mrs. Carter was leading her small reading groups. This lack of interruptions allowed everyone to work efficiently. Students clearly understood the expectations for Chromebook use and were successful at using them for reading responses. Mrs. Carter shared in the third interview,

I've always had to manage the rest of my class and make sure they are on task. I feel like with Chromebooks overall it's really helping me run my small groups more successfully and all the students seem to be really on task. And they really enjoy what they are doing and so that's cut down on management issues.

Beyond being able to work with small groups while the rest of the class was engaged and on task, the use of Chromebooks also brought about an accountability for student work that occurred in real time. Mrs. Carter in the third interview mentioned,

I'm also in the process of showing them with Chromebooks after they're finished with their responses they have to submit to me, so having that accountability. I can see how many responses they've done over the last couple weeks and see who's either taking their time or maybe not using their time as well.

With reading response sheets on Google Docs, Mrs. Carter could electronically track, manage, comment, and gauge the level that students were completing their independent work. Using paper and pencil reading responses, student work has to be managed manually and could be lost.

This management of student responses was made possible by the routines and expectations established at the beginning of the study. The students knew the expectation that their work was to be completed and shared with Mrs. Carter, similar to turning in a paper-and-pencil assignment. By establishing clear expectations for the routines and procedures, the students were able to access, practice, and become successful at using the Chromebook.

**Ongoing student practice and experience.** During the study, student skills improved with each lesson and observation. As students had time to practice and experience using a Chromebook, logging in, and using Google Docs for reading responses, their skills improved. Mrs. Carter stated in the second interview,

I think the number one thing is just like, their just having practice and doing all the steps of logging in and going to their email, and opening their documents and getting familiar with the literacy document that I have. I think they did a great job learning all those different steps because it was a little intimidating and becoming more confident.

The students learned the process of logging in and accessing the response form during five lessons across two weeks. Providing the students with the time to practice logging in was an important part of their success. The initial plan was to only teach one lesson on expectations and logging in, but during the debrief after the first lesson it was decided to expand the expectations and logging in explanations to a second lesson. Mrs. Carter noted the importance of “slowing down” when teaching the students in order to provide for this practice. She noted, “I think slowing down, when I am noticing in any lesson if half the kids are not getting it or are behind it, really like, showing them step by step, really explicit directions.” In the final interview after over eight weeks of using the Chromebooks with her students, Mrs. Carter summed up the idea

of student experience and practice, “just more practice you have the better you get kind of thing.” She followed this by explaining,

It’s not perfect yet, but I feel like as far as I’m able to teach my reading group to the side and know that the rest of the class is able to access their Chromebook, log in, find their reading responses, and they seem to really understand all the steps and lessons that I taught them so far.

As Mrs. Carter shared, the students were understanding what they had been taught through the three ideas of patience, clear expectations, and student practice. These concepts were important for sustained Chromebook use as shown in the data. Students had to be patient during the first lessons on expectations and logging in, yet once they became familiar with the process and expectations, their self-management skills grew and they improved as the study progressed.

Through continued practice of logging in and using Chromebooks for the initial Google Form for reading response, students gained additional skills that became evident throughout the course of the study.

**Assertion 4: Students gained skills from Chromebook use that went beyond typing and familiarity with a single reading response form.**

“I’ve seen it work really effectively in my classroom. I just think there is so much to gain besides typing skills” (Mrs. Carter, Interview 3).

*The eighth and final classroom observation took place on December 10, 2015. When I entered the class, Mrs. Carter was reading with a small group at her reading table. The rest of the students were logged into their Chromebook and working at their desks quietly with a variety of picture and chapter books. There were various reading response documents open on the*

students' Chromebooks including: *Story Elements, Questions and Answers, Word Collector, and Weekly Words.*

*One student was working on her Weekly Words document. She had finished typing her ten weekly words from her sight word list which was laying next to her Chromebook. The assignment for Weekly Words is to type the words and then use them in a sentence. She was working on typing her third sentence. As she was typing, I could see that she was clicking with two fingers to access and use the spell-checker within the Google Doc program. She continued typing her sentences using the appropriate capital letters and periods before clicking on the next box in the document to type the next sentence.*

*A second student was working on the Word Collector document. This student was using a Diary of a Wimpy Kid as his text for selecting words. He was working quietly typing words in each space for each letter of the alphabet. As he worked, he demonstrated his learned computer skills of scrolling within the document and clicking the cursor in a new box to begin typing. Next to him was another student demonstrating similar skills, but working on the Story Elements document. This student was working on typing in the characters from a Junie B. Jones story including: Mr. Scary, Junie B. Jones, Tattletale May, Herb, Lennie, Jose, and Sheldon. After entering the characters, he began to type in the events that led to the problem in the story.*

*As I continued to circulate the room, I saw students were engaged and on task, working on the various reading response documents of their choosing. A few students finished and shared their document via email with Mrs. Carter before logging out, putting their Chromebook away, and reading silently. The students' knowledge of routines, procedures, and computer skills were evident as they worked quietly without interruption. Mrs. Carter proceeded to work the whole time with her small group on their reading task. At the end of the time she asked for*

*the students' attention and directed them to save their work and log out before returning the Chromebook to the cart. The students then demonstrated their mastery of these procedures as they saved their work, logged out, put the Chromebooks away, and lined up to return to their classes.*

Various student skills were evident across my field notes of classroom observation data, including students' ability to type and use Google student accounts for accessing email and documents. But these were not the only skills students acquired; they also demonstrated skills like problem-solving and self-management. Before the study began, Mrs. Carter indicated a limited view of the value of having her students use Chromebooks. To her, the Chromebook could facilitate typing skills and maybe some interactive games if she had time to teach them to her students. She expressed these views in the first interview, emphasizing the importance of typing skills and trying to integrate more typing skills in her classroom. Students did increase their typing skills throughout this study, as Mrs. Carter observed in the second interview,

Well, another advantage is that they're being exposed to technology and are getting that typing practice. So they're working on not just their reading response and their reading comprehension strategy, but also with typing and learning how to do that as well.

Students were able to practice their typing skills by using the Chromebook, but these skills were not a focal point of the study. Mrs. Carter also noted in the third interview, "I see how independent they are and how much easier it is for them to respond to their reading responses on the Chromebooks versus paper and pencil." Even though Mrs. Carter expressed her feelings that using the Chromebook was easier than using paper and pencil, there were skills students gained during the study beyond just typing that led to this perception of Chromebook use being easier.

These skills included that students were able to access their Google student accounts, along with developing problem-solving and self-management skills.

**Accessing Google student accounts.** Accessing their Google student accounts through the Chromebook was a significant skill students gained during this study. In planning the lessons for the students to do reading responses using Chromebooks, Mr. Aulin first suggested using a Google Form as a way to simplify the process for the students rather than having to teach the steps for opening and saving a Google Document. Using a Google Form allowed students to focus on learning and become familiar with the steps of logging in to their student account, open the Google Form through email, complete the form, and then submit it to Mrs. Carter. However, the day after teaching the first lesson which only covered expectations, Mrs. Carter was showing me the paper copies of literacy tickets she was using with her students. She asked, "Can these be made into a Google Doc?" I replied, "Yes," and in the coming weeks, I worked to create them into documents to be shared with her students for future lessons that she would teach.

Once these forms were created and shared with the students, Mrs. Carter taught the students how to open each document, save a copy, complete, and submit it via email to her. Mrs. Carter shared in the second interview how the more reading response documents she integrated and taught, the more choices students had in terms of which Google Document to use for their reading response. This led to both increased student motivation and students being more comfortable using the Chromebook in general. She explained in the second interview,

Besides the one student, all the other students prefer to use a Chromebook and they're really excited about it and I think that, right now they've just been working on one response page and so, the more I integrate and teach them, then they'll have more choices that I think they'll be a bit more, they'll get comfortable.

Field notes from the classroom observations indicated students were successfully using these new reading response documents and utilizing skills of opening, saving, and emailing. Mrs. Carter kept paper copies on the counter for any student who was struggling to use the Chromebook. In the first two observations, I noted one student using paper and pencil. Mrs. Carter explained in the second interview that this student was slowly gaining confidence, and by the third interview, this student was using the Chromebook for reading responses.

Mrs. Carter and I also discussed between lessons the possible future benefits of the students using their email. Initially, Mrs. Carter had not even considered the idea of using email. But Chromebooks allowed for using the Google Student platform and Gmail. Therefore, each student had email through their student account. The student email was set up by the district so that they can only email teachers or parents but not fellow students. Mr. Aulin explained to the students in lesson two the responsibility of using their email correctly. He gave examples of when emailing a teacher would be appropriate and when it would not be appropriate.

Once the study began and students were accessing their student accounts, they used Google Docs and shared their finished work via email with Mrs. Carter. This sparked new thinking for Mrs. Carter around other ways to use the Chromebooks in the future. She shared the idea of possibly adding more accountability such that students could email their completed literacy tickets to both her and their parents. This would allow for parents to see their child's work and know what they are working on at school in reading or other subjects, such as writing.

**Student problem solving and self-management skills.** Students also gained non-computer skills throughout this case study. Mrs. Carter shared in the third interview how this had been a good problem-solving experience for her students, "It's [learning to use the Chromebook] a good problem-solving lesson on patience." She also explained in the second

interview how students were learning to self-manage. She stated, "I have now been pulling a reading group over and there's still some technical problems going on and I can't help them. And they have to learn how to self-manage themselves and fix their own problem." Having students who were successful at logging in and completing the steps for accessing the reading response documents assist students who were still struggling was one such self-management strategy. This idea of student experts was also reiterated in the third interview. Although Mrs. Carter valued the idea of student experts, I did not see students assisting one another very often during their independent work on the Chromebook. I believe this was due to my observations happening two days a week over the eight weeks. On the other days of the week, maybe the students were helping each other more frequently, or maybe they did not need the help as they were motivated and intent on learning to do it themselves instead of giving up too soon.

Student management is the idea that students can work independently without teacher direction and be engaged with the assigned task. These student management skills were noticeable each time I completed a classroom observation. The students consistently worked quietly on the variety of reading response tasks they had been taught. The class was very streamlined in knowing the expectations and procedures for using Chromebooks. Mrs. Carter was able to meet with her small group for reading while the rest of her students were on task. She explained in the third interview, "It's been actually nice. I'm able to still teach groups and then manage the twenty other students who are working independently." She affirmed this later in the same interview when again she mentioned, "I'm managing, being able to manage my small groups and still have the rest of my class on task."

It took time during the first few weeks to teach the initial expectations and procedures for using Chromebooks, but once the students learned these, they extended their computer skills

related to their Google student accounts including email and using documents. They also learned problem-solving skills for how to utilize each other when they had trouble with logging in or opening a document. These problem-solving skills led to self-management skills that allowed Mrs. Carter to meet with her small reading groups while the rest of the class worked effectively and quietly on their assigned reading tasks using the Chromebooks for reading responses.

### **Summary**

In this chapter, the findings have been organized into four assertions that were determined through data analysis of the teacher interviews, lesson observations and debrief notes, and field notes of classroom observations of the students using Chromebooks. These assertions included: a) Despite her limited experience with Chromebooks, Mrs. Carter was willing to implement new technology, b) In this study, the technology coach was key to implementation of Chromebooks for teacher support and student use, c) Establishing clear expectations was important for sustained Chromebook use when only one teacher was in the room, and d) Students gained skills from Chromebook use that went beyond typing and familiarity with a single reading response form. This study sought to understand what this experience of supported Chromebook use was like for the teacher. From interviews and lesson observations, it was evident that Mrs. Carter's beliefs and perceptions of this technology's benefits were important for implementing Chromebook use in this study. As a technology coach ready to assist Mrs. Carter at her level of confidence and competence, Mr. Aulin was also significant for making this a positive experience for Mrs. Carter. This study also asked Mrs. Carter to identify advantages and disadvantages of using Chromebooks for reading responses. She identified advantages of Chromebook use which included access to accounts, email, documents, and self-management skills such as problem-solving. Again, through interviews

with Mrs. Carter, lesson observations, and classroom observations, setting clear expectations and routines for using Chromebooks were found to be important, especially when only one teacher was in the room. Based on these findings, the significance of this research will be explored further in the next chapter.

## CHAPTER 5

### Discussion and Conclusion

In this final chapter, I review the answers to my research questions by discussing the key assertions in this study. I also provide implications, recommendations for future study, and some reflection on the research process.

Through data analysis of teacher interview transcripts, lesson observation transcripts and notes, and student observation notes, themes emerged that I formulated into assertions. These were in answer to the three research questions that were the focus of this study:

- 1 How does a second-grade teacher who does not presently use technology describe her experience of supported Chromebook use during her students' independent reading time?
- 2 What does the teacher observe about students' responses when Chromebooks are implemented?
- 3 What does the teacher identify as the advantages, disadvantages, and potential barriers of Chromebook use?

The first question was answered primarily through the self-described experiences of the classroom teacher, Mrs. Carter. Teacher beliefs about technology are key to implementation (Hermans, Tondeur, van Braak, and Valcke, 2008; Inan & Lowther, 2010; Prestridge, 2012). Mrs. Carter initially talked about being stressed with trying something new to her and her students. As the study progressed, she expressed how she was growing more confident and comfortable with Chromebooks as her students gained more experience and confidence. She demonstrated this confidence by leading lessons with Mr. Aulin, assisting students with logging in, and locating documents. She also taught reading response documents after the

implementation lessons without Mr. Aulin. In the final interview, she described her plan to teach a co-teacher how to implement and use the same resources for reading responses on Chromebooks with her group of second-grade students. She also created additional reading response documents using Google Docs after the study had concluded. Mrs. Carter went from zero experience using Chromebooks to sharing her new knowledge with her coworkers. This increased confidence and experience were significant to not only her teaching, but to the other teachers she is seeking to teach as well.

Through the last two interviews, she began to report a positive experience of implementing Chromebooks with the support of a technology coach. Technology coaches or mentors are important for technology integration (Bauer & Kenton, 2005; Kopcha, 2012; Mueller, Wood, Willoughby, Ross, & Specht, 2008). The technology coach in this study helped teach students expectations for care and use as well as establishing the routines for Chromebook use. He also helped to assist students as Mrs. Carter was teaching the implementation lessons. Once the expectations were established, the students were able to self-manage and work independently to complete the reading response documents on the Chromebooks. The ability to work with her reading groups and have fewer student management issues was one area in which this study created a positive outcome for Mrs. Carter. I also noted an increased level of student interest, which Mrs. Carter confirmed in the interviews when she described students' enthusiasm and motivation when using the Chromebooks.

The second question related to what the teacher observed about students' responses was answered primarily through interviews with the classroom teacher and field notes of classroom observations. Mrs. Carter shared that the students were successful in accessing the reading response documents with Chromebooks. She actually extended the study beyond the initial

Google Form and taught her students to access and use four additional reading response documents through Google Docs. Then the students had the choice as to which response document they used each day. This supported students' motivation and interest, and also provided accountability in the form of finished work submitted to Mrs. Carter. Although a few students struggled with confidence in using a Chromebook, by the end of the study, all students were accessing and using the Chromebook with the reading response documents.

Field notes from observations showed that students were successfully completing the literacy response documents independently based on the expectations for the assignment. If the students were completing the story elements document, they were typing in the characters, problem in the story, and the solution. Students were observed completing the word collector and weekly words documents by typing in words either from the story they were reading or their sight word list. I cannot speak to the quality of the student work, as the responses were submitted to Mrs. Carter and I did not request to view them during the study.

Mrs. Carter reported in the interviews that although the students were completing the reading response documents on Chromebooks, some students needed more teaching on complete sentences and what a quality finished assignment should look like. She mentioned that she planned in the future to show examples of student work that met her expectations for high-quality assignments and to work with struggling students to improve their reading responses. It was also noted in interviews and field notes that students would need continued practice with typing skills. This was reflected in that typing the response documents took some students longer than others to complete.

In regards to the third question about the teacher's identified advantages, disadvantages and potential barriers of Chromebook use, it was ascertained that there were both disadvantages

and advantages to using Chromebooks with second-grade students for reading responses. The major disadvantage or barrier reported by Mrs. Carter was the need for more than one adult when initially teaching students the expectations and procedures for Chromebook use. I noted in observations that after the first five lessons had been taught and students had gained more practice and experience logging in, this need for an extra adult for student support was not as great. She also identified students' initial patience, confidence, and experience as disadvantages. Through the study these challenges were met as the student increased their experience using Chromebooks. From observations, the students were more confident and patient using the Chromebooks.

The advantages of Chromebook use increased student computer skills beyond typing, such as being able to log in to their Google student accounts and access email and documents. Lei and Zhao's (2008) research affirms that having 1:1 computers can increase student technology proficiency and student achievement (Rosen & Beck-Hill, 2012; Spektor-Levy & Granot-Gilat, 2012). Students in this study also became familiar with using a laptop computer and its components, such as using the track pad and touch pad for scrolling and clicking on links and the keyboard for typing, although they could have already had these skills prior to the study. Additionally, students learned how to problem-solve and self-manage, as evidenced by increased patience to wait on their teacher, and how to share their expertise to assist struggling students while the teacher was busy with other students or reading groups. The benefits of student management were reflected in Mrs. Carter's ability to meet with her small reading groups while the rest of the students worked independently on the Chromebooks. Mrs. Carter knew from her previous experiences that her students could work independently with paper and pencil response sheets. However, students were able to self-manage and use technology for the same tasks by

completing the reading response documents. This also improved Mrs. Carter's management systems as the students were submitting their finished work to her via email. She mentioned in the second interview how nice it was to no longer manage papers, both copying them for the students and collecting them when students were finished.

### **Implications**

One contribution of this study was to provide findings regarding the advantages and disadvantages of Chromebook use for reading responses in a second-grade classroom. The majority of studies related to student laptop use focus on implementation of one-to-one technology programs and the impact of this implementation (Lei & Zhao, 2008). In contrast, this study focused on one specific grade level and one area of literacy instruction. This study has potential to provide information to teachers who are using similar literacy activities for reading responses and have access to Chromebooks.

Research identifies factors that are external to the teacher, or first-order barriers of resources, training, and support (Ertmer, 1999; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012). Factors that are internal to the teacher or second-order barriers, such as teachers' confidence, their beliefs about how students learn, and the value they place on technology to teach and learn were also found in the research (Ertmer, 1999; Ertmer et al., 2012; Kim, Kim, Lee, Spector, & DeMeester, 2013). Prior to this study, Mrs. Carter's experiences with using technology were limited by both first- and second-order barriers. Her training and experiences with technology before the study were limited, which suggests that neither she nor others in her educational world addressed these first-order barriers. Although she had access to a Chromebook cart, she did not have training on how to use it. Ertmer and Ottenbreit-Leftwich (2010) speak to the importance of ensuring that pre- and in-service teachers understand the

technology being used combined with the benefits that technology provides. In contexts where resources are available to teachers, districts need to be proactive in providing training on how to use these resources.

Although the first-order barriers of training and support were lacking, Mrs. Carter was willing to explore her beliefs and values regarding technology by trying something new during this study. Research highlights the importance of a teacher's technology beliefs connecting to their knowledge of effective teaching and use of technology in relation to their competency, confidence, and practice (Hermans et al., 2008; Inan & Lowther, 2010; Kim et al., 2013; Prestridge, 2012). Mrs. Carter's beliefs about the benefits of technology helped her have a positive perception and a willingness to try something new in her teaching. The second-order barrier of a lack of confidence was present at the beginning of the study. But the encouragement and support she received from Mr. Aulin and myself was a major factor in increasing Mrs. Carter's confidence, which helped her overcome this second-order barrier.

Ottenbreit-Leftwich, Glazewski, Newby, and Ertmer (2010) state that the more valuable teachers judge a tool or approach, the more likely they are to use it. During our first interview, Mrs. Carter's response supported this finding when she was asked about her beliefs toward technology integration in school. She recognized the importance of student technology use for their success in future endeavors and wanted them to be confident and competent with the technology available to them. Despite this, she resisted technology use until she had opportunity for someone to assist her. Research also suggests that teachers are more likely to use technology on a regular basis if they perceive it is easy to use, which improves their belief that the technology is useful (Hu, Clark, & Ma, 2003). In this study, the first lesson was the impetus Mrs. Carter needed to perceive the benefits of Chromebook use. It led her to ask in what ways

other aspects of her current teaching with literacy tickets could be applied to take advantage of the technology.

Another important finding by Inan and Lowther (2010) indicate that teachers need to have positive beliefs about technology and a readiness to integrate technology to be successful in integrating it into their teaching. By learning with her students during this study, Mrs. Carter demonstrated her positive beliefs regarding technology and her readiness to learn something new with her students. Not all teachers will be at the same place in their willingness and readiness to implement new technology, but as Mrs. Carter demonstrated, there is potential for teachers to perceive and experience the benefits personally in ways that support their readiness.

As demonstrated by this research, a key to moving from readiness to actual integration is having the assistance of a mentor or coach to help with the planning and implementation of technology. Research points to the importance of offering teachers professional development in technology and providing coaches or mentors for teachers who are implementing technology. This includes the need for developing successful mentor teachers for training (Bauer & Kenton, 2005; Kopcha, 2012; Mueller et al., 2008), training on using laptops, iPads, and handheld devices (Karchmer-Klein & Shinas, 2012; Larson, 2013), and a need to focus on the pedagogical aspects of technology integration aligning with teachers' values and beliefs (Inan & Lowther, 2010; Ottenbreit-Leftwich et al., 2010). In this study, the technology coach was available during the teaching of the first five lessons implementation lessons which were important for establishing expectations for care and use. He was also able to help students learn the steps for logging in and accessing Google Docs through their student accounts. Based on the research and this study's findings, ongoing training and support would be beneficial for teachers like Mrs. Carter who are using technology with their students for the first time. Had Mr. Aulin been

available, he could have provided ongoing training and assistance to maintain the implementation and use of the technology for Mrs. Carter.

Research also shows the importance of having mentor teachers who are successfully integrating technology to train other teachers at their level of need, competency, and confidence (Bauer & Kenton, 2005; Kopcha, 2012; Mueller et al., 2008). In this study, the coach was able to meet Mrs. Carter at her levels of need, competence, and confidence. As the study progressed, her competence and confidence increased to a point that she shared in the final interview that she wanted to share what she had experienced and learned with another second-grade teacher. Her plan was to not only assist the teacher in how to teach expectations and routines, but to also use her students as experts to help the other teacher's students through the steps of logging in and accessing Google Docs. This aligns with research on communities of practice (Ertmer, 2005; Kopcha, 2010) in which teachers share and explore new teaching methods and tools.

These communities of practice are different than a professional learning community (PLC) in that they are not another required meeting for teachers to attend. Lave and Wenger (1991) describe legitimate peripheral participation as a means for newcomers to a community of practice to become experienced members. Teachers who are new to technology integration can linger on the edges until they grow comfortable to participate fully and become experienced members of the community. With teachers sharing and modeling successes, in addition to viewing students as experts, communities of practice can be more organic in K-12 settings. Teachers' sharing of success and struggles can occur in quick five-minute conversations. It is in this way that teachers can see positive outcomes, experience successful practice, and enjoy positive experiences with technology (Mueller et al., 2008, NAEYC and Fred Rodgers Center for Early Learning and Children's Media, 2012). Sharing positive experiences and success can

occur in these communities of practice. In this study, having an experienced coach in Mr. Aulin provided Mrs. Carter and her students with a positive experience and successful practice using Chromebooks for reading responses as a community of practice was not yet established.

Research also points to a need to focus on the pedagogical aspects of technology integration aligning with teachers' values and beliefs (Ertmer, 2005; Hu et al., 2003; Inan & Lowther, 2010; Ottenbreit-Leftwich et al., 2010). Mrs. Carter was already using literacy tickets and a gradual release of responsibility model in her teaching, so aligning the technology integration lessons within these frameworks allowed for her and her students to be successful. This study demonstrates that it may be more beneficial to help teachers use technology to enhance the curriculum in ways they see fit, rather than expecting technology to change the nature of their teaching (Ottenbreit-Leftwich et al., 2010). This was evident in the way Mrs. Carter was able to use her existing literacy tickets for reading responses. She had assistance to create these resources as Google Documents and share them with her students. In this way, technology integration was not too much of a stretch for her, because it fit the existing frameworks of her literacy instruction. Thus, this study reinforced the idea of using existing resources and creating them to be used with the technology available.

Even though this study provided a limited sample of one second-grade classroom during one subject, it showed similar results to what research on laptop implementation demonstrated regarding the way 1:1 computers can increase student technology proficiency (Lei & Zhao, 2008) and student achievement (Rosen & Beck-Hill, 2012; Spektor-Levy & Granot-Gilat, 2012). However, with only twenty-five students, the need for 1:1 Chromebooks may not be necessary for student success when used for reading responses. Students needed 1:1 access for learning the expectations and routines established by Mrs. Carter. Once students were proficient in the

routines, she was able to meet with small groups while students were at different stages--reading quietly or completing a literacy document, leaving some Chromebooks unused. It was noted in classroom observations that even though there was 1:1 access for students, not every device was used during each lesson by each student, yet the students still had access to their own Chromebook when needed. Student access to resources is important, however, with the cost of technology, devices not being used could be of value in another classroom that does not have resources. In this type of use and setting, the idea of 1:2 access, or sharing a cart of devices with a second class could be a possibility, as shown by Larkin and Finger (2012) in which classrooms with 1:2 ratio had teachers using technology more often with their students.

Increased student achievement was also evident in the data through students' skills of typing, using Google Docs, and accessing email. Along with this, students also learned problem-solving and self-management. This study supports the importance of differentiated instruction through laptop use, since students used different types of response sheets on the Chromebook (Spektor-Levy & Granot-Gilat, 2012). Providing students with different activities increased student engagement as noted through classroom observations and fewer classroom management issues as reported by Mrs. Carter in the final interview.

### **Recommendations for Future Study**

The theoretical framework by Bruce and Levin (1997) proposed a taxonomy of technology for learning which includes media for inquiry, communication, construction, and expression. Lei and Zhao (2008) modified this into the following categories: laptop use for specific learning tasks with explicit learning goals, laptop use for communication, laptop use for expression, and laptop use for exploration. This study focused on the first category of specific learning tasks with explicit learning goals for the second-grade students using Chromebooks.

Through this teacher's experience of supported technology implementation, advantages and disadvantages could be identified. For future research, I recommend an exploration of the systems-based approach to technology integration developed by Kopcha (2010) across a wider range of classrooms.

From this study, findings suggest that teachers not only need mentors to take up new technology practices, but it is important to take into account a teacher's beliefs and perceptions when initiating technology integration efforts. Kopcha (2010) advocates using a systems-based approach to facilitate technology integration and promote student-centered learning since this can help the mentor assist and individualize each teacher's process of learning to integrate technology. This model includes four main stages of technology integration: initial setup (stage one), teacher preparation (stage two), curricular focus (stage three), and community of practice (stage four) (Kopcha, 2010). Within each of these stages, there are areas of mechanics, systems, culture, and curriculum which build upon each other.

In reflection, this study worked through stages one and two. In stage one, Mr. Aulin as the mentor and myself as a participant observer worked to limit barriers of resources, planning time, and training for Mrs. Carter. While the training in this study was informal, it focused on the skills Mrs. Carter needed to be successful in teaching a specific set of skills to a specific student population. Additionally, technology integration efforts were related to the pedagogy and methods that were easy to incorporate and took less time to implement. In stage two, Mrs. Carter continued to receive training on the Chromebooks in real-time with her students. Consistent with Kopcha's (2010) model, we used practices that aligned with Mrs. Carter's beliefs and skill level by having students use the Chromebook to produce documents previously created by hand or with paper and pencil. These enabled her to integrate technology into

existing curriculum. Stages three and four were never reached in this study due to the limited scope, timeline, and focus of this study.

A future study using Kopcha's (2010) model across a broader range of classrooms in a single grade level could provide understanding beyond the findings of this study regarding the importance of mentors. Moving beyond the first two stages and into stage three of focusing on curriculum and stage four of communities of practice would provide insight into the feasibility of building communities of practice within a school for sustaining technology integration efforts once a mentor is no longer available. This would be an important area of study because limited budgets prohibit school districts from hiring a technology coach or mentor in every school. This type of study could be successful in providing a mentor for 1-2 years to work with teachers and build sustained communities of practice to promote long-term technology integration. Research suggests building communities of practice (Ertmer, 2005; Kopcha, 2010) which beyond initial trainings have the potential to provide ongoing support for teachers (An & Reigeluth, 2011). Once established, communities of practice can be self-sustaining as teachers continue to develop, implement, and share technology integration strategies that fit within their comfort level and teaching style.

### **Reflection on this Research Process**

Similar to Mrs. Carter, this case study research was my first experience using Chromebooks with children. As a participant observer, I too learned valuable information regarding skills needed for explicitly teaching initial expectations and procedures for using a Chromebook. Early on, I made the mistake of allowing editing on the first document I shared with Mrs. Carter and the students. This led to confusion as the whole class of 25 students attempted to type in the same document. Once Mrs. Carter and I realized this, I resent the

document as “view only” and the students were then taught the process to open the document, save a copy, and work to complete the document before submitting it to Mrs. Carter.

It was important to tighten the alignment of this study to one form of technology in one grade level and only one activity or subject. Going from a “dissertation as a blob” to “dissertation as a path” (Butin, 2010) aided in this focusing work. After reading and researching, I was able to pinpoint one grade level, one subject area, and one technology type. Lei and Zhao’s taxonomy also assisted in this process by providing one of the four domains as a structure for the Chromebook lessons.

Even with this focus, I would do two things differently if I could do this research again. First, even though this was a case study of a single teacher, I found myself wondering about Mr. Aulin’s perspective as the coach. If I could go back and do this study again, I would interview the technology coach to get his perspective on the study, lessons, and effectiveness of the students using the Chromebooks. With a different level of confidence and competence, this perspective would have been interesting to compare to Mrs. Carter’s experience.

Secondly, if I had the time and ability, as well as the technology resources, it would have been interesting to expand this study to the whole second grade. Interviewing and comparing the experiences of four different teachers would have enhanced the findings. I wonder if the perceptions and beliefs of the other three teachers are similar or different to those of Mrs. Carter? I wonder if those students would have learned similar or different skills than those acquired by children in this study? Would all four classes have had the same rate of success even though they would have been taught by four different teachers under the same mentoring and coaching of Mr. Aulin? This study highlighted the importance of Mrs. Carter’s beliefs and perspectives,

so seeing a larger sample of different teacher perspectives and beliefs would have provided additional insight.

## **Conclusion**

Although this study affirmed the importance of Mrs. Carter's beliefs and perceptions on the success of implementing new technology with her students, it also demonstrated the benefits of having a mentor or coach to assist in technology integration lessons. The need for mentoring was one of the strongest findings in this study in concert with teacher beliefs impacting their implementation of technology. This study demonstrates how necessary it is to meet teachers where they are in their competence and confidence with technology in order to take them further with technology integration.

Teachers need more than just having the technology for their students, they need knowledge and skills in how to use the technology with their students in meaningful ways. Areas of teacher training and professional development continue to improve, yet teachers still need training at their level of knowledge. Not every school district or school has a technology coach or mentor to train and guide teachers in using technology in their teaching and classroom. However, there are creative ways teachers can integrate technology without a formal coach, including sharing ideas informally and establishing communities of practice (Kopcha, 2010). Through these communities of practice, teachers can share new learning and ideas in addition to positive experiences using technology with students to encourage and strengthen each other's skills with using technology in their classrooms.

As first-order barriers of resources are becoming less evident, it is important to focus on the second-order barriers of teacher beliefs about technology and understand how they affect technology integration (Prestridge, 2012). This study had similar findings to Hermans et al.,

(2008) in that teacher beliefs about the practice of teaching were a significant determinant in explaining why a teacher adopted computers in the classroom. Taking into account and focusing on second-order barriers of a teacher's beliefs and perceptions related to technology is important for shifting teaching practices. Mentor teachers are able to provide support through communities of practice once teachers are ready to begin integrating technology. This readiness comes from seeing how valuable a particular technology can be, what successes are possible with it, and understanding the small steps leading to broader use of the technology.

From this study, the value of technology use was evident in the way it helped students become comfortable using Chromebooks. Students learned the login process and how to use Google docs for assignments which created less paper for the teacher to manage and enabled her to quickly check which students had completed and submitted their assignments. Email could also be used to increase family participation through students sharing completed assignments with parents. Collaborative engagement with families could be explored further through use of Chromebooks for not only sharing assignments, but also announcements, or notes on student progress.

In this study, one-on-one coaching worked well to support a teacher who had anxiety about incorporating technology. Mr. Aulin was able to work with Mrs. Carter directly by meeting her needs and providing support as she integrated Chromebooks with her students for the first time. This study demonstrated the value of coaching in real time and working with teachers directly as they implement technology. This model enables the coach to answer teachers' questions as they occur and provide support to ensure the success of the lessons.

Through this study, Mrs. Carter's beliefs about the importance of technology allowed her to begin the small steps of integrating technology. Mrs. Carter embraced the stress of new

learning and alongside her students. She has started the technology integration process and plans to further explore other methods and subjects to integrate their use. As she continues to grow in competence and confidence using technology, her positive experiences will be examples for her to share with not only her co-teachers, but with other teachers, as well.

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**APPENDICES**

## **Appendix A**

### **Lesson 1 – Introduction to Chromebooks and Google Docs – Expectations and Use**

## 2<sup>nd</sup> Grade Chromebook for Independent Reading Responses – Lesson 1

### Common Core State Standard:

#### CCSS.ELA-LITERACY.RL.2.1

Ask and answer such questions as *who*, *what*, *where*, *when*, *why*, and *how* to demonstrate understanding of key details in a text.

#### CCSS.ELA-LITERACY.W.2.6

With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.

#### Learning Targets –

- I can understand the expectations for Chromebook use.
  
- I can log into the Chromebook and open a word processing document in Google Docs.

#### Check for Understanding –

- For example, can a student articulate the expectations for Chromebook use.
  
- For example, can a student log into a Chromebook and open a word processing document.

#### Resources –

- Chart paper
- Markers
- Chromebooks

#### Instructional Suggestions:

##### Open:

- Begin the lesson by introducing the Chromebook and how it is a privilege to have these as a classroom resource.
- Discuss and brainstorm as a class expectations for using and handling the Chromebooks.
- List expectations on chart paper and review.
- Discuss and brainstorm procedures for distributing Chromebooks and returning to cart.
- List on chart paper and review.
- Next, demonstrate how to log into a Chromebook. After modeling practice as a class. Possibly having a few student volunteers demonstrate for the class.
- Distribute Chromebooks and practice logging in as a class together.
- After practicing logging, proceed to model opening a word processing document. Again, have a few students demonstrate or the class how to perform this task.
- Next, have students practice opening and creating a document with typing only their name.

##### Closing:

- Review expectations and procedures for returning Chromebooks to the cart.
- Have a few students at a time model putting their Chromebook away.
- Conclude with a review of the skills learned and practiced during the lesson.

## **Appendix B**

### **Lesson 2 – Review of Expectations and Typing the 5 Ws and 1 H Questions**

## 2<sup>nd</sup> Grade Chromebook for Independent Reading Responses – Lesson 2

### Common Core State Standard:

CCSS.ELA-LITERACY.RL.2.1

Ask and answer such questions as *who*, *what*, *where*, *when*, *why*, and *how* to demonstrate understanding of key details in a text.

CCSS.ELA-LITERACY.W.2.6

With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.

### Learning Targets –

- I can log into the Chromebook and open a word processing document in Google Docs.
- I can type the 5 W and 1 H questions and save my document.

### Check for Understanding –

- For example, can a student log into a Chromebook and open a word processing document.
- For example, can a student type the 5 W and 1 H questions and save their document.

### Resources –

- Chart paper
- Markers
- Chromebooks

### Instructional Suggestions:

#### Open:

- Begin the lesson by reviewing lesson one and the expectations and procedures posters
- Next, do a read aloud of a story, pausing to discuss the 5 W and 1 H questions.
- After reading the story list the 5 W and 1 H question on chart paper and answer the questions whole group based on the story.
- Next, re-teach how to log into a Chromebook and open a word processing document.
- Model typing the class chart for the reading response with 5 Ws and 1 H question into the document.
- Review expectations and distribute Chromebooks.
- Have students login and open a word processing document and then type just the 5 W and 1 H question words; i.e., who, where, when, what, why, and how.
- Teach and model how students are to save their work, then have them save, close, and logout.

#### Closing:

- Review expectations and procedures for returning Chromebooks to the cart.
- Have a few students at a time model putting their Chromebook away.
- Conclude with a review of the skills learned and practiced during the lesson.

**Appendix C**

**Lesson 3 – Google Docs for Reading Response – Creating a Reading Response to a Whole**

**Group Read Aloud Using the 5Ws and 1H Questions**

<p>2<sup>nd</sup> Grade Chromebook for Independent Reading Responses ó Lesson 3</p> <p>Common Core State Standards:  <u>CCSS.ELA-LITERACY.RL.2.1</u>  Ask and answer such questions as <i>who</i>, <i>what</i>, <i>where</i>, <i>when</i>, <i>why</i>, and <i>how</i> to demonstrate understanding of key details in a text.  <u>CCSS.ELA-LITERACY.W.2.6</u>  With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.</p>	
<p>Learning Targets ó</p> <p>I can log into the Chromebook and open a word processing document in Google Docs.</p> <p>I can type the 5W and 1 H questions in a Google document and save my work.</p> <p>Check for Understanding ó</p> <p>For example, can a student log into a Chromebook and open a word processing document.</p> <p>For example, can a student type the answers to the 5 W and 1 H questions in a Google document and save their work.</p>	<p>Resources ó</p> <p>Chart paper  Markers  Chromebooks</p> <p>Instructional Suggestions</p> <p>Open:  Begin the lesson by reviewing lesson one and the expectations and procedures posters and lesson two with the skills for opening a document and typing.  Next, do a read aloud of a story, pausing to discuss the 5 W and 1 H questions. After reading the story list the 5 W and 1 H question on chart paper and answer the questions whole group based on the story.  Next, re-teach how to log into a Chromebook and open a word processing document.  Review expectations and distribute Chromebooks.  Have students login and open their saved document from the previous lesson.  Model and type class chart for the reading response with 5 Ws and 1 H question into the document together as class.  Re-teach saving their work when finished.</p> <p>Closing:  Review expectations and procedures for returning Chromebooks to the cart.  Have a few students at a time model putting their Chromebook away.  Conclude with a review of the skills learned and practiced during the lesson.</p>

## **Appendix D**

### **Lesson 4 – Google Docs for Reading Response – Creating a Reading Response to Story of**

#### **Your Choice**

## 2<sup>nd</sup> Grade Chromebook for Independent Reading Responses – Lesson 4

### Common Core State Standard:

CCSS.ELA-LITERACY.RL.2.1

Ask and answer such questions as *who*, *what*, *where*, *when*, *why*, and *how* to demonstrate understanding of key details in a text.

CCSS.ELA-LITERACY.W.2.6

With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.

### Learning Targets –

- I can log into the Chromebook and open a word processing document in Google Docs.
- I can answer the 5W and 1 H question in a Google document and save my work.

### Check for Understanding –

- For example, can a student log into a Chromebook and open a word processing document.
- For example, can a student type the answers to the 5 W and 1 H questions in a Google document and save their work.

### Resources –

- Chart paper
- Markers
- Chromebooks

### Instructional Suggestions

#### Open:

- Begin the lesson by reviewing lesson one and the expectations and procedures posters.
- Review and list the 5W and 1H questions on chart paper.
- Explain to students that today they will be choosing a story to read and answer the 5W and 1H questions on their own in Google Docs with a Chromebook.
- Briefly review how to log into a Chromebook and open a word processing document.
- Review expectations and distribute Chromebooks.
- Have students login and open Google Docs.
- Students will already have books to choose from in their book box.
- Allow students time to read their story and complete their typed reading response to the 5 W and 1 H questions.
- Early finishers can read quietly when finished
- Re-teach saving their work when finished.

#### Closing:

- Review expectations and procedures for returning Chromebooks to the cart.
- Have a few students at a time model putting their Chromebook away.
- Conclude with a review of the skills learned and practiced during the lesson.

**Appendix E**  
**Observation Protocol**



**Appendix F**

**Lesson Debrief Questions**

1. What went well during the lesson? What worked?
2. What did not work well during the lesson?
3. What needs improving or modifying before the next lesson?
4. Any other suggestions for future lessons?

**Appendix G**

**Initial Interview Guide Questions – Past Teaching Experiences in the Context of  
Technology Integration**

1. What is your teaching background? How many years have you been teaching? What grades?
2. What are your preferred teaching methods or styles?
3. What are your experiences with technology in teaching and student learning in your classroom?
4. What technology are you currently using for student learning in your classroom?
5. What does technology integration mean to you in your classroom and teaching?
6. What are your beliefs towards technology integration in schools?
7. How do you integrate technology in the teaching and student learning in your classroom? What subjects (i.e., reading, writing, math, social studies). Particular lessons?
8. Can you describe your process (time, materials, planning) for preparing a lesson that integrates technology?
9. What do you observe that provides evidence that your students met the lesson objectives and learning targets in your lessons that integrate technology?
10. What do you perceive as limitations to integrating technology in the teaching and learning in your classroom?
11. What experiences have you had using Chromebooks either personally or with students?
12. Describe your best experience integrating technology in your teaching and student learning.

**Appendix H**

**Second Interview Guide Questions – Present Teaching Experiences in the Context of  
Technology Integration**

1. How are things going so far with implementing Chromebook use so far in this study?
2. What have been successes? What have been challenges?
3. What factors are contributing to effective use of technology so far during this study?
4. Are there any advantages or disadvantages of using Chromebooks during independent reading for reading responses that you perceive so far?
5. Are there any barriers to technology integration in your classroom and teaching that you perceive so far?
6. What do you perceive as the attitudes of your students so far during this study in regards to integrating technology in your classroom for teaching and student learning?
7. What are your thoughts about how technology should be used in a second-grade classroom?
8. What other strategies for technology integration outside of this study are you currently using or considering in your classroom?

**Appendix I**

**Conclusion Interview Guide Questions**

1. How do you think this study went in terms of implementing Chromebooks for the first time with your students?
2. Describe what it meant to you to do technology integration in this study. What did it feel like?
3. What factors contributed to effective use of technology during this study?
4. What do you perceive as the attitudes of your students now that you are integrating technology in your classroom for teaching and student learning?
5. What do you perceive as the overall advantages of using Chromebooks during independent reading for reading responses?
6. What do you perceive as the overall disadvantages of using Chromebooks during independent reading for reading responses?
7. What do you perceive currently as barriers to technology integration in your classroom and teaching?
8. What strategies for Chromebook use did you find most beneficial during this study?
9. What will you take away from this experience that will assist you in future technology use in your classroom?
10. What is your overall assessment of this experience using Chromebooks in your teaching and classroom?
11. Have you felt your teaching beliefs or methods need to change to allow for teaching with technology?
12. Describe your best experience integrating technology in your teaching and student learning.

**Appendix J**

**Letter of Consent – Teacher**

Dear Professional Educator,

My name is Randall King and I am a doctoral student at George Fox University in Newberg, Oregon. I am conducting research on the implementation of Chromebooks in primary grade classrooms. You are invited to engage in three hour-long personal interviews. The first will be regarding your past teaching experiences implementing technology in your classroom. The question are general and relate to your background and experiences using technology in your classroom. The second interview will focus on your present experiences using Chromebooks in your classroom. At the end of the research study, a final third interview will be conducted reflecting on the overall experience of implementing Chromebooks in your teaching.

I am also requesting to conduct observations of your teaching and students using Chromebooks in your classroom. You will also be asked for your input on the creation of four lesson that you will be asked to co-teach with a technology coach.

My hope is the findings provide insight into the advantages of implementing Chromebooks for reading responses in primary classes.

The risks associated with this research are minimal. The personal interview questions are non-invasive and are intended to provide you the opportunity to reflect upon and share your perceptions and experiences with Chromebook use in your teaching and classroom. Please be aware your participation is voluntary and you may decline to continue at anytime or decline to answer question(s) at your discretion.

The results of this study will only be used for research purposes, primarily for the dissertation required for completion of my doctoral degree. Information from the interview will be analyzed and present in an anonymous fashion with no individuals personally identified. All personal information will be kept confidential.

All research materials (i.e., audio recordings, transcripts, and signed consent forms) will be locked in separate, secure locations for a period of five years. I will be the only individual who will have access to these materials and after five years, I will personally destroy all relevant materials and delete the audio recordings.

Thank your for considering participation in this study. If you have any questions regarding this research, please contact me at (503) 550-1916. If you have any additional questions you may contact my committee chair, Dr. Susanna Steeg at (503) 554-2839.

If you understand the use of this research and agree to participate, please sign below.

Participant signature \_\_\_\_\_

**Appendix K**

**Letter of Consent – Student - English**

Dear Parent or Guardian,

My name is Mr. King. I am a current teacher at Peak Elementary and a doctoral student at George Fox University in Newberg, Oregon. I am conducting research on the implementation of Chromebooks in primary grade classrooms. Your child's class has been invited to engage in this study through classroom observations of lessons and activities using Chromebooks during independent reading. The study seeks to explore the advantages and disadvantages of using Chromebooks with students during independent reading. There will be four lesson observations with four follow-up classroom observations.

My hope is the findings provide insight into the advantages of implementing Chromebooks for reading responses in primary classes.

The risks associated with this research are minimal. The lesson and classroom observations are non-invasive and are intended to provide the opportunity to observe the students using Chromebooks during their independent reading time. Please be aware your child's participation is voluntary and you may decline their participation at anytime.

The results of this study will only be used for research purposes, primarily for the dissertation required for completion of my doctoral degree. Information from the observations will be analyzed and presented in an anonymous fashion with no individuals personally identified. All personal information will be kept confidential.

All research materials (i.e., observation records, observation notes, and signed consent forms) will be locked in separate, secure locations for a period of five years. I will be the only individual who will have access to these materials and after five years, I will personally destroy all relevant materials and delete the audio recordings.

Thank you for considering participation in this study. If you have any questions regarding this research, please contact me at (503) 550-1916. If you have any additional questions you may contact my committee chair, Dr. Susanna Steeg at (503) 554-2839.

If you understand the use of this research and agree to have your student participate, please sign below.

Participant signature \_\_\_\_\_

Parent of Guardian Signature \_\_\_\_\_

**Appendix L**

**Letter of Consent – Student – Spanish**

Estimado padre o tutor,

Mi nombre es Sr. King. Soy un maestro en Gilbert Park Elementary y soy un estudiante de doctorado en la Universidad George Fox en Newberg, Oregon. Estoy implementando una investigación sobre la aplicación de Chromebooks en los grados primarios. La clase de su niño(a) ha sido invitado a participar en este estudio que incluye observaciones en las clases y actividades utilizando Chromebooks durante la lectura independiente. El estudio intenta explorar las ventajas y desventajas del uso de Chromebooks con los estudiantes durante la lectura independiente. Habrá cuatro observaciones de lecciones y después cuatro observaciones en el aula.

Espero que los resultados mostraran las ventajas de la implementación de Chromebooks para responder a la lectura en las clases de primaria.

Los riesgos asociados a esta investigación son mínimos. Las observaciones de clase y el aula no son invasivas y proporcionaran la oportunidad de observar a los estudiantes utilizando Chromebooks durante su tiempo de lectura independiente. Por favor, tenga en cuenta la participación de su niño(a) es voluntaria y usted puede declinar su participación en cualquier momento.

Los resultados de este estudio sólo se utilizarán para la investigación, específicamente para la disertación requiere para completar mi doctorado. La información de las observaciones se analizan y se presentan en forma anónima, sin individuos identificados personalmente. Toda la información personal será confidencial.

Todos los materiales de investigación (la información de las observaciones, notas de observaciones, y formularios de consentimiento firmados) serán encerrados en lugares separados y seguros para un período de cinco años. Voy a ser la única persona que tendrá acceso a estos materiales y después de cinco años, yo personalmente destruir todos los materiales pertinentes y borrar las grabaciones de audio.

Gracias por considerar participar en este estudio. Si usted tiene alguna pregunta sobre esta investigación, por favor comuníquese conmigo al (503) 550-1916. Si usted tiene alguna pregunta adicional puede comunicarse con mi presidente del comité, el Dr. Susanna Steeg al (503) 554-2839.

Si usted entiende el uso de esta investigación y de acuerdo en participar, por favor firme abajo.

La firma del participante \_\_\_\_\_

Padres/Tutor \_\_\_\_\_

**Appendix M**

**Letter of Consent – Student – Russian**

Chromebooks

childâ p Î

Chromebook

Chromebook

Chromebook

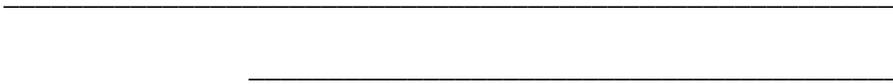
Chromebooks

childâ p Î

Thank Your

(503) 550-1916.

Steeg (503) 554-2839.



**Appendix N**

**Letter of Consent – Student**

Dear Student,

Mr. King needs help with his research study and I am asking if you will join in. I will be in your class observing you work and learn with Chromebooks during your reading time. What I learn from watching you will hopefully help other teachers and students at our school. I will be videotaping you, but you should do everything normally and not pay attention to the camera.

If you understand that I will be videotaping you and say this is OK with you, sign your name below.

Participant signature

---

**Appendix O**

**Reading Response Document - Story Elements**

Name:

# Story Elements

Characters	

Events Leading to Problem	
1.	
2.	
3.	
<b>Problem</b>	

Solution	

**Appendix P**

**Reading Response Document - Questions and Answers**



**Appendix Q**

**Reading Response Document - Word Collector**

Name:

<b>EV</b>	<h2>Word Collector</h2> <p><u>This weeks comprehension learning targets:</u></p> <ol style="list-style-type: none"> <li>3. I can tune in to interesting and content-based words as I read.</li> <li>4. I can enter words into the word collector sheet.</li> <li>5. I can use the words in my writing and speaking during the week. (RI.4, RI.4, L.5)</li> </ol>
-----------	--

**Practice reading and writing the following words.**

1. Enter the words into the word collector sheet.

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>
<b>I</b>	<b>J</b>	<b>K</b>	<b>L</b>
<b>M</b>	<b>N</b>	<b>O</b>	<b>P</b>
<b>Q</b>	<b>R</b>	<b>S</b>	<b>T</b>
<b>U</b>	<b>V</b>	<b>W</b>	<b>X/Y/Z</b>

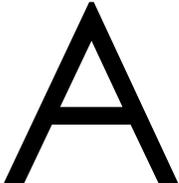
Choose 3 words from the Word Collector. Type in a thoughtful sentence here:

1.	
2.	
3.	

**Appendix R**

**Reading Response Document - Weekly Words**

Name:

	<h2>Weekly Literacy Ticket</h2> <p><u>This weeks comprehension learning targets:</u></p> <ol style="list-style-type: none"> <li>6. I can read accurately and spell common words.</li> <li>7. I can pay close attention to the letters and spelling patterns.</li> <li>8. I can read irregular words without sounding them out.</li> <li>9. I can read the most common words by sight. (RF2.3 &amp; RF2.4)</li> </ol>
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**Practice reading and writing the following words.**

2. Practice words by using them to make 3-5 CLOZE Sentences a day. Trade with a friend to see if they can guess the missing word and write it in.
3. Create a Vocabulary 4-Square to explain your word that includes a *definition, synonyms, antonyms, and a picture to represent the meaning.*

### My Weekly Words

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Type your sentences here:

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	