2023

Exploring Teachers' Use of Computer Devices and Information and Communication Technologies in the Classroom

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COLLEGE OF EDUCATION

EXPLORING TEACHERS' USE OF COMPUTER DEVICES AND INFORMATION AND COMMUNICATION TECHNOLOGIES IN THE CLASSROOM

By

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A Dissertation submitted to the
Department of Educational Leadership and Policy Studies
in partial fulfillment of the
requirements for the degree of
Doctor of Education

2023

Amber N. Demetropoulos defended this dissertation on March 21, 2023.
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ACKNOWLEDGEMENTS

There are several people that I would like to acknowledge for helping to make this dissertation possible. First and foremost, I want to thank my major professor, Dr. Stacey Rutledge, who has been deeply invested in my work and never stopped believing in what I could accomplish. She was always willing to take the time to help and guide me to where I needed to be. She actively worked hard to provide me with academic and personal support. I am forever grateful for her. I would also like to thank the members of my committee who provided me with valuable feedback on my dissertation over the last three years. This dissertation would not be what it is without Dr. Rutledge and my committee.

Next, I would like to thank my husband, David. He never doubted what I was capable of even when I wanted to quit. He picked up the pieces when I could not put them together and had been a source of strength while I was working toward this accomplishment. He was my biggest cheerleader all along the way and got a front row seat to what completing this program and writing a dissertation entails. I would like to acknowledge my children, Raegan, Rowan, and Reid. While they were young during this process and may not fully understand the sacrifices they endured, they were always patient and inspired me without realizing it.

Last, but certainly not least I would like to thank the members of Cohort 5. We have a bond that is stronger than anything I've ever seen. Day or night this group of people was readily available to help each other, to motivate each other and to encourage each other all the way to the finish line. We shared many laughs and tears through good times and bad. It is bittersweet that this experience must end but I know that we will remain in contact for years to come. I couldn't have walked through this journey without any of the people mentioned above and I'm so grateful for them all.

"Aerodynamically, the bumble bee shouldn't be able to fly, but the bumble bee doesn't know it so it goes on flying anyway. This is what we can all do, fly and prevail in every moment in the face of any difficulty and in any circumstance despite what they say. Let us be bees, no matter the size of our wings, we take flight".
-Unknown

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

In a technology-driven society, computing devices are used more in education to make learning engaging, individualize learning, and enhance instruction. Educators are implementing computing devices and ICTs (Information and Communication Technologies) to access various learning programs and software. Using ICTs, students engage in project-based learning and use tools to further their understanding of content. Studies have found benefits to utilizing technology in the classroom and point to the importance of professional development for teachers to improve the chances of a successful implementation. In 2016, Hamilton Charter School (a pseudonym) in Northeast Florida started a computing technology adoption by implementing Chromebook computers into the teachers' daily instruction. This qualitative case study explores the experiences of 12 elementary educators from Hamilton Charter School and how they describe using computing devices in the classroom and the learning opportunities and support they received while using the devices.

HCS uses digital learning programs in reading and math to create individualized learning paths for each student based on their diagnostic test scores to help them close academic gaps. The study finds that educators used their devices for differentiated learning during center rotations. The teachers did not describe any training on the Chromebook devices and experienced very few learning opportunities for the schools' digital programs. Drawing on prior research, I created a conceptual framework for the characteristics of quality professional development. Based on the framework, I found that the educators at HCS had not been provided with quality training from their school leadership for implementing computing devices. I also found that some teachers reported that the administrator's support for incorporating computing devices in the classroom satisfactory, while others did not. In the implications I discuss the findings from the

study in regard to prior research and the conceptual framework I created. The implications also explore possibilities for inconsistencies amongst the data. The findings from the study will provide leadership at Hamilton Charter School with recommendations on how to begin effectively preparing their teachers for device implementation.

Keywords: training, professional development, learning opportunities, technology, learning programs, support

CHAPTER 1

PROBLEM OF PRACTICE, PURPOSE, AND RESEARCH QUESTIONS

Problem Statement

Computing technology has transformed education and provided educators an innovative way to make learning more purposeful and relevant for this generation of students. Teachers have immediate access to videos, websites, books, pictures, and more that can make instruction more meaningful and engaging. Computer devices and the Information and Communication Technologies (ICTs) provided through computers are a central tool for educators to use to help younger students build the necessary skills to be successful in higher education as well as prepare them for an ever-changing workforce that has incorporated technology (Anthony et al., 2020). The term, ICT, covers a variety of technological equipment, including telephones, cameras, World Wide Web sites, digital learning programs, multimedia, software, and more. Studies conducted in primary classrooms show that using ICTs without a clear approach does not bring improvements, and digital resources need to be matched to the pedagogic intention of the classroom teacher (Kjellsdotter, 2020). To ensure that elementary students in schools learn how to use computing technology and ICTs, studies find that schools should be providing teachers with a variety of learning opportunities that educate them as to how computing devices and ICTs can change the way they deliver instruction (Guven & Yilmaz, 2016; Liu & Hai, 2019; Luo et al., 2021).

While looking at the curriculum and standards to plan their lessons, teachers must decide what content should be taught, why it should be taught, and how they will teach it. Digital technology is one of the many tools teachers have that offer possibilities and limitations in

education. When teachers integrate ICTs into learning, the curriculum serves as a base for planning. Still, the curriculum needs to include pedagogical ways for educators to communicate the content using ICTs in their teaching. Therefore, teachers have the freedom and opportunities to choose how they incorporate ICTs into their instruction. Teachers' decisions on aligning their instruction alongside curriculum guidelines and digital technology requirements are empirical topics to investigate (Kjellsdotter, 2020).

Elementary teachers receive training in many areas related to their pedagogy. However, with an increased emphasis on computing technology in the classroom, have they received or sought targeted and specific training on using computing devices and ICTs effectively? Determining teacher effectiveness using ICTs can be challenging (Tondeur et al., 2016). Various digital learning programs and digital tools make learning more individualized for specific student needs and help teachers close academic gaps (Hover & Wise, 2022). Interactive learning games have the potential to help teachers make topics more exciting and, therefore, more memorable and engaging (Atika et al., 2022). If students are not engaged with using their devices and teachers are not seeing improvements in learning, they may not integrate the devices and ICTs adequately (Luo et al., 2021).

Researchers have studied teachers' use of computing technology and the components that lead to successful computing technology integration for the last twenty years (Kjellsdotter, 2020). Allen and colleagues (2007) have found that appropriate training of teachers in the use of ICTs has helped to predict the success of the integration alongside other factors such as teachers' age and initial knowledge of hardware devices and software programs. Studies have found that the first step in examining teacher perceptions of the integration is determining their previous experience with technology and acknowledging their attitudes and beliefs towards the initiative.

For example, Mourlam and Montgomery (2015) explained that “Providing 1:1 technology immersive experiences supports practicing teachers' ideological affiliations with technology integration, promoting their growth in technology proficiency and a more positive approach to using technology to support engaged learning” (p. 108). By understanding teachers’ backgrounds and beliefs, administrators can work towards promoting computing technology integration positively and productively.

In addition to understanding the teachers’ perceptions and prior experiences with computing technology, the teachers' preparation is another component that affects computing technology integration. In general, professional development aims to strengthen teacher knowledge and skills with the expectation that they use what they learned from the training to impact student achievement positively (McGinnis, 2021). However, school leaders need to ensure that the professional development they provide is adequate for teacher success. Sims & Fletcher-Wood (2021) conducted a study on the characteristics of effective professional development generally. They argue that professional development is more effective if it includes six specific elements. Those elements include that the PD is sustained over time, PD is done as a group, teachers endorse taking part in the PD, the training involves subject knowledge, PD involves outside expertise, and there are opportunities to apply what has been learned (Sims & Fletcher-Wood, 2021). This same approach applies to preparation for using ICTs (Tondeur et al., 2016).

Tondeur and colleagues (2016) described the challenges with professional development for ICT integration. They studied four specific cases of successful technology professional development (TPD). The cases that were analyzed had “varied geographic and economic characteristics, and refer to different emphases, e.g., target population (teachers or teacher

educators), scope (regional, national), focus (ICT tools, educational initiatives) and diffusion patterns (face to face, online or mixed, synchronous or asynchronous)" (Tondeur et al., 2016, p.112). They identified and addressed the challenges of successful TPD and created a model for TPD based on the commonalities between the cases. The challenges that they identified with this type of professional development included the sustainability of professional development, the lack of empowerment of pedagogy using ICTs, the absence of systemic ICT training, and technology discernment as the challenges arise with technology-based professional development (Tondeur et al., 2016). Tondeur and colleagues also presented solutions to the obstacles with ICT-related professional development. Those solutions include facilitating collaboration among teachers, engaging teachers in valuable projects, exposing the teachers to professional development that models pedagogical possibilities, and conducting professional development as a cycle of support rather than stand-alone events (Tondeur et al., 2016).

For professional development to include these in-depth solutions, it could require more time and money to be spent on these trainings. Tettegah and Hunter (2006, p. 132) found "that during the 2004–2005 school year only 9% of most schools' budgets or $12.82 per student was spent on professional development and integrating technology into the curriculum". Budgets may be smaller now more than ever, but educators need the preparation and support from their leadership when the expectations to use computing technology in education are proliferating.

This dissertation examined teachers' experiences, learning opportunities, and support regarding computing devices and ICTs at Hamilton Charter School (HCS) (a pseudonym) in Northeastern Florida. The school provided their students with Chromebook computers for educational use. This research study focused on teachers in grades kindergarten through fifth. At HCS, teachers between kindergarten through third grade were expected to have their students

share a smaller number of Chromebooks amongst the students, while teachers for grades four through eight received one Chromebook per student. Chromebook computers were introduced to the students in August 2016, which was 6 years before this study was conducted. In this study, I explored how teachers and students used their devices daily. I also sought to understand the learning opportunities and support the teachers received from the school's leadership, including the school's principal and the academic coaches. Taken together, it was essential to understand how teachers were incorporating ICTs into student learning and if they were receiving the appropriate training opportunities and support from their school leadership.

To better understand how the teachers used their devices in the Fall of 2022, it was also important to acknowledge how the COVID-19 pandemic may have affected their use of computing technology in the classroom. In March 2020, schools nationwide shut their doors and opened virtual classrooms as the COVID-19 pandemic struck. During the COVID-19 shutdown towards the end of the 2019-2020 school year, teachers had to pivot their instructional styles and learn to manage online learning systems as students used devices to complete schoolwork virtually or remotely.

The pandemic only underscored the importance of computer hardware and ICTs as educational tools. "Students' digital literacy has become as important as reading and writing," according to Baysan & Cetin (2021, p. 477). When teachers were expected to utilize technology for online learning, the technology they used referred to hardware devices and online learning platforms simultaneously. These learning platforms included education management systems such as Canvas, Schoology, and Blackboard, which were used to connect teachers and students during school shutdowns. The research has found that while many teachers were struggling with this new learning platform of online teaching and learning, some had also embraced the

opportunity and made their instruction more personalized and unique for each student's needs (Midcalf & Boatwright, 2020). Furthermore, another study also found that educators benefitted from learning opportunities and support, whether provided by their school or sought out on their own, and support that would allow more of them to embrace the opportunities that they have been given and to see these new struggles as pathways into what could be a different approach to education (Kalioldanovna et al., 2022).

For Hamilton Charter School, before the pandemic, all grade levels used computer devices for various classroom tasks, including online testing, creating digital projects, and completing paperless assignments (personal communication, 2022). During the last quarter of the 2019-2020 academic year, like all schools, HCS was fully online. During the 2020-2021 school year, they were back entirely face-to-face. As part of this dissertation, I explored how the pandemic shaped their technology use.

Purpose, Research Questions, Model Overview

In addition to learning how to use different forms of technology, teachers are expected to teach students targeted standards, skills, and content. Computers are not meant to remove that foundational instruction (Šerić, 2020). The devices and ICTs are intended to assist teachers with making learning more innovative, creative, and individualized with the existing subject matter. However, "the challenge for school districts is to provide adequate training for the instructors enabling them to utilize the computer as an instructional tool that can improve academic achievement as a whole rather than as an additional subject added to the curriculum" (Tettegah & Hunter, 2006, p.132). Ensuring that resources are available to use computing devices and ICTs effectively will enable teachers to use them efficiently to enhance instruction.

This study aimed to explore the learning opportunities available for elementary teachers using computing devices and ICTs at Hamilton Charter School during the Fall of 2022. Throughout this dissertation, the term *professional development (PD)* is used interchangeably with *training* and may include other *learning opportunities* that teachers had participated in outside of their school requirements. This qualitative single case study used interviews with teachers at Hamilton Charter School to examine the teachers' perceptions and reflections on their own experiences with training, instruction, and support that they had received since the initiative began in 2016 or since they joined the school. The goal of the study was to provide the administrators and coaches with information on how they could potentially and, if necessary, improve and strengthen training and support for teachers as they implement computing technology into their instruction.

The research questions that guided this study were the following:

1. How do teachers use computing devices in the classroom?
2. How do teachers describe the learning opportunities for using computing devices in their instruction?
3. How do teachers describe the support that they have received while implementing computing devices in their instruction?

Part of the study was to analyze how teachers used computing technology in the classroom and explore ways the administrators at Hamilton Charter School prepared and supported their elementary educators to use the devices and ICTs in the future. Teachers were given the opportunity to speak on the preparation that they received and their perspectives on the support they were provided by their leadership while integrating computing devices into student learning. Through this study, I gained insight into how the teachers and the administrators implemented

ICTs into daily instruction. By contextualizing my findings with the extant research and my professional development framework, I can provide concrete recommendations to the school on how to provide strong technology integration.

Study Site Overview and Feasibility

This study focused on elementary teachers at Hamilton Charter School (pseudonym) in Northeastern Florida. HCS is part of a charter network that supports approximately 50 campuses across the United States. Hamilton Charter School was the only charter in its district. While the school did receive support from the district there was a greater sense of autonomy in the day-to-day operation of the school. For example, the districts' professional development opportunities that were provided to the public-school teachers were also open to HCS teachers. HCS received their support and funding from the charter network. For example, the technology staff that was assigned to the school was directly hired through the charter network to work with this campus. The school's overall theme and focus is on character development for students. The principal of Hamilton Charter School explained, "We intentionally utilize rich literature that facilitates a high-quality discussion related to character as a part of the learning process. Additionally, we empower our students to be leaders both on our campus as well as in the community, seeking their input on key decisions to be made on campus, utilizing them as peer mentors, etc." (personal communication 2022). The schools' mission statement included building relationships and delivering quality instruction to meet the academic needs of each student.

Hamilton Charter School opened its doors close to 15 years ago with approximately 200 students as a Pre-K – 8 school. Since then, HCS had built additions to the building and STEAM labs and had grown from about 200 students to nearly 900 students, with approximately 600 students in grades K-5.The student demographics showed a diverse student body, with about

70% of students being white, about 10% African American, about 5% Asian, approximately 1% American Indian, and 20% mixed race. Hamilton Charter School supported a very small percentage of English Language Learner students, and about 10% of the student population were ESE students. According to the principal, HCS had been a B school each year since they opened (personal communication, 2022). HCS was a Community Eligibility Provision (CEP) School; therefore, all students received free lunch. For the 2021-2022 school year, the school employed close to 60 teachers. About 10% of those teachers were new to the school, less than 50% had 1-5 years of experience, a little over 50% had 6 or more years of experience, and about 30% held an advanced degree. (These percentages have been rounded to conceal the schools' identity further.)

Technology and computing device implementation were not specifically included in Hamilton Charter Schools' improvement plan, mission, or vision statements. However, in an interview with the school principal, she explained that HCS' vision for utilizing technology was "to use technology as a supplement to assist with enhancing instruction and not to erase the responsibilities and duties of the teachers" (personal communication, 2022). As previously mentioned, Hamilton Charter Schools' focus for improvement lies within student character development. For 5 consecutive years, HCS was presented with a developing character award by Chracter.org, a non-partisan organization that advocates for character. The school took pride in its inclusive school culture that was fostered by the staff.

Although the mission and vision statements did not specifically mention technology use, the school improvement plan did include a variety of ICTs and programs within the action steps to assist them in meeting their yearly goals. Hamilton Charter School began slowly introducing computers into the classrooms in 2016. Each year the school spent a small portion of its budget on adding to its computers. Students in fourth and fifth grade had one-to-one Chromebooks as

well as being the two grade levels that had the new Chromebooks that could also be used as tablets. Students in kindergarten through third grade shared approximately one device per two students. When the school received COVID-19 relief funds, they were able to use a significant portion of that money to equip the school with more technology to increase the student-device ratio in case they ever had to go remote again. The goal for HCS in the future is to eventually have each student in all grade levels one-to-one with Chromebook devices.

Significance

Living in a society infused with computing technology, it seems nearly impossible to avoid integrating computing technology in the brick-and-mortar classroom. Therefore, school leadership is responsible for assisting their teachers in becoming better equipped to effectively incorporate the computing devices they have provided for academic use. It is equally important that as lifelong learners, teachers take the initiative and utilize their responsibility to better equip themselves for the inevitable integration of computing technology in their profession.

The field of education includes a diverse population of teachers from different backgrounds and experiences depending on their age, years of teaching, and educational backgrounds. However, most educators have some form of experience with technology, even if it is limited to cellular phones or basic computer use. The demand is in learning how to adequately teach subject matter and content knowledge using not just the devices but ICTs and other learning programs for instruction. This study will provide leadership at Hamilton Charter School with the information needed to make targeted decisions for training their teachers. They could utilize other staff members and resources to help their teachers learn new and more creative ways to enhance student achievement and learning.

Conclusion

Computer technology in education can improve learning for teachers and students (Westerlin & Vogt, 2022). While there are several benefits to integrating computing devices into the classroom, including individualized learning, technology experience, and engaging instruction, there are obstacles that need to be addressed with the devices and ICTs to ensure proficiency and effectiveness. It may be more important now than ever for schools to ensure that teachers are adequately prepared to teach using different resources and platforms. With more students now having access to devices as technology advances, it is critical that everyone involved is well-equipped to manage these digital technologies to complement effective instruction. This study could help the leadership at Hamilton Charter School provide their educators with quality training to implement computing devices in their instruction. On a broader scale, the recommendations and implications from this study could give other school leaders (private or public schools) with tools to begin addressing concerns with computing technology initiatives.

The remainder of this Dissertation in Practice provides details about the background of the study, the methodological approach and research design, and the findings. In chapter 2, I discuss the issues within the larger educational landscape. I include a literature review that outlines research on the benefits of technology in the classroom, teachers' perceptions of technology in the classroom, professional development for educators, and how the pandemic shaped the use of technology in the classroom. Chapter 3 gives an in-depth description of the study design, including the study type, analytic approach, and limitations. Finally, in chapter 4, I conclude the DiP with the study's findings, implications, recommendations, and dissemination plan.

CHAPTER 2

LITERATURE REVIEW

Introduction

This DiP aimed to understand how teachers used computing devices in the classroom at Hamilton Charter School (pseudonym) and explore the training opportunities the school provided them with to ensure the successful integration of the devices and ICTs (Information and Communication Technologies). Computing devices and tablets only scratch the surface of the different hardware pieces teachers are asked to incorporate into their classrooms. In addition to being given computers or tablets, schools use technology in other ways, including projectors, 3D printers, ICTs, and SMART boards. ICTs that teachers must learn how to navigate include learning programs, websites, software, and more.

Studies from around the globe acknowledge how critical preparing teachers is to a technology integration (Guven & Yilmaz, 2016; Liu & Hai, 2019; Luo et al., 2021). Computing devices and ICTs are important classroom tools for teachers and students. An article on the use of technology to support 21st-century learning explained, "ICT skills should be developed alongside other 21st-century competencies such as critical thinking, problem-solving, communication, and collaboration" (Ertmer et al., 2015, p. 404). Digital learning programs create individualized learning paths for students based on diagnostic test scores to improve their weakest areas. Additionally, teachers dive further into the curriculum and make more meaningful whole-group instruction by using resources that are readily accessible through computing technology.

The studies that describe the importance of preparing teachers to use computing devices and ICTs provide suggestions to make professional development more meaningful and effective for educators. The studies also include challenges that schools may face that hinder them from providing adequate training. Teachers need to be trained on the basics of using the computing devices they are being given and how to effectively modify their pedagogy using ICTs and other software (Canals and Al-Rawashdeh, 2019).

In the following sections, I go more in-depth into the technology-related educational challenges by connecting them to the larger educational landscape and examining previous studies on these topics. From there, I use the local context to provide more details about Hamilton Charter School and the contributions that this qualitative research study could provide to the teachers, administrators, and instructional coaches at HCS.

Orientation within the Larger Educational Landscape

Instructional tools constantly change and evolve, causing educators to change their teaching. In 1930, overhead projectors were introduced into education, followed by videotapes in 1951. Photocopiers appeared in 1959, then handheld calculators in 1972 (Purdue Online, 2021). In 1981, the first portable computer was invented, and The World Wide Web came about in 1990. By 2009, 97% of classrooms had one or more computers, and 93% of classroom computers had access to the Internet (Purdue Online, 2021). In today's classroom, it would be difficult to walk in and find only one computer or technological device. As technology has advanced, so has its purpose in the classroom.

Due to the increase of devices and ICTs being implemented in education, schools across the United States have been spending a notable amount of money on educational technology. Studies have found that schools are highly attuned to their technology spending (Chachkevitch et

al., 2013; Kormos, 2018; Ribeiro, 2018). Johnson (2012) explained that schools had spent around $56 billion, which equates to about $400 per student. Furthermore, “In 2013, school districts spent almost $10 billion on education technology” when public schools provided at least one computer for every five students (Zipke, 2018, p. 342). Due to the COVID-19 pandemic, technology-related spending for schools increased by $7.5 billion from 2019 to 2020 (Cauthen, 2020). Technology funding challenges are even more for charter schools that cannot rely on district resources, such as Hamilton Charter School, the site for my study. While charters may receive state and district funding that is equitable to the public schools, the technology funding and support could be significantly different (Knight & Toenjes, 2020). As technology advances and becomes more prominent, school costs could continue to increase.

Computing devices and ICTs continue to expand into education, especially after a period of device reliance during the COVID-19 pandemic. The pandemic shifted how teachers and students use computer technology, which also created more challenges for schools (Ford et al., 2021). A study on the technology challenges during COVID-19 suggests that teachers experienced student difficulties such as “motivation, learning styles, technology knowledge, literacy expectations, and support” (Ford et al., 2021, p. 2). Researchers Samawi and Al-kreimeen conducted a review study on the technology-related issues and challenges with shifting to remote learning during the COVID-19 pandemic. Samawi and Al-kreimeen (2022, p. 3) found that teachers were concerned with “a lack of funding or resources to keep the technology up-to-date and to build the infrastructure to effectively use the technology.” They also described insufficient training for teachers and technology inaccessibility as challenges they encountered (Samawi & Al-kreimeen, 2022).

Previous Studies on Device Initiatives in the Classroom and Training for Teachers

Introduction

In this section, I review the literature that has been written discussing computing technology and ICTs in education. The first subsection outlines studies that explain the benefits of using technology in the classroom. Various pieces, including computers, tablets, ICTs, or other learning programs, can define technology. The section explains the benefits of digital technologies and programs to make learning more engaging, education more accessible and whether digital technologies improve student achievement. In the second subsection, I describe teachers' perceptions of using computing technology in the classroom. I also review studies that identify obstacles teachers face and how teachers' attitudes and perceptions can affect computing technology integration. In the third subsection, I highlight articles where researchers describe effective professional development for educators and effective technology-related professional development. Also in the third subsection, I describe the conceptual framework I created based on the literature on the qualities of effective professional development. Lastly, in the final subsection, I use recent literature to convey how the COVID-19 pandemic has shifted the use of digital technologies in the classroom. The section broadly articulates what virtual learning looked like across the nation. Researchers also describe what professional development looked like during the pandemic.

Benefits of Technology in the Classroom

The following section includes findings from research studies that outline the benefits of using different forms of technology in education. Educators use various pieces of technology, including computer devices, tablets, ICTs, projectors, and SMART boards. Studies show that students benefit from using digital technology in the classroom. Schmidt and Williamson-Kefu

(2020) conducted a single case study that examined one class of students at a primary school in Australia where students used either a computer or tablet for mathematical inquiry. The data collection and analytic approach was made using a 4D inquiry model that included four phases: "Discover (explore the ambiguities and concepts in the question); Devise (strategize about how the question can be answered); Develop (collect and collate the evidence to prove one's answer); Defend (present one's answer, evidence and justification to the class)" (Schmidt & Williamson-Kefu, 2020, p. 24). They found that using digital technology as a tool for teaching and learning supported and enhanced students' understanding (Schmidt & Williamson-Kefu, 2020). The research also found that for some students, when they used computing technology, it meant they did not have to get caught up in mathematical mechanics; instead, they could move on to high-level problem-based thinking skills. For example, the students did not have to get bogged down by converting milligrams to grams but instead were able to access conversion websites that helped them to be able to do the math quickly and move on to the higher-order problem-solving (Schmidt & Williamson-Kefu, 2020). Rather than working in and out of textbooks that required students to memorize and practice strategies and algorithms, they used different programs and software to dig deeper into their higher-order and critical thinking (Schmidt & Williamson-Kefu, 2020).

Some studies contradict each other on whether computing technology in the classroom improves student achievement. For instance, the United States Military Academy conducted a randomized study with three different control groups to test the effectiveness of computers on students' test scores. The study concluded that students who were able to use computers had exam scores that were significantly lower than the students that did not use computers (Carter et al., 2016). In contrast, another study reported that using computing technology in the classroom

closed the gaps for high-risk students by providing an atmosphere of active learning and allowing them to see content in many different forms (Darling-Hammong et al., 2014).

Computer devices and ICTs allow students to experience learning using different skills and possibly enhance student achievement. It also gives them the opportunity to learn whether they are in a school building or at home (Samawi & Al-kreimeen, 2022). Resources such as textbooks are online and available to students 24/7 and obtainable in different formats, including PowerPoint and audio recordings. Learning management systems, such as Blackboard, enable students to obtain class information, complete class activities, and interact with their teachers and fellow students whenever and wherever needed (Zhuang & Xiao, 2018). The nation saw this benefit unfold when the COVID-19 pandemic affected learning in 2020. Device and software availability during the COVID-19 pandemic proved to be beneficial to both teachers and students during that unprecedented time (Samawi & Al-kreimeen, 2022).

Additionally, the research identifies ways ICTs benefit teachers' instruction, including making learning more engaging, meaningful, and individualized through differentiation. Adams (2011) conducted a study with a class of students in South Carolina to determine if using technology would increase students' engagement during a science project. The students were encouraged to make and test their predictions about what would happen with an aquatic ecosystem. The students generated their own inquiries and tested the findings based on real-time data that they collected. Adams found that through this project, the students could develop a deeper understanding of the topic, take ownership of their research, and apply what they learned to the environment around them (2011). English Language Arts teacher and researcher Dr. Grecu conducted a qualitative descriptive study on differentiating instruction by examining ten teachers' experiences with using EngageNY (a language arts program) as they tried to create fair

learning opportunities for each student (2022). The ten teacher participants for the study were recruited using nonrandom and purposive sampling. To collect data, Grecu conducted in-depth semi-structured interviews and focus groups via Zoom to gain insight into the teachers' experiences with the language arts program. At first, the teachers felt overwhelmed by the program, but once they received adequate training, they "all acknowledged its value in implementing the *EngageNY* modules" (Grecu, 2022, p. 174). The research found that the teachers could adapt the modules to the student's needs, and the students shared an understanding of the content through the differentiated lessons (Grecu, 2022). Teachers can use ICTs to differentiate and individualize learning for students with specific academic needs. The literature from this section further assisted with articulating interview questions that would answer research question 1 regarding how the participants from Hamilton Charter School used computing technology in their classrooms.

Teacher Perceptions of Technology in the Classroom

To understand how to ensure a successful computing device implementation, it is also important to look at studies on teachers' perceptions of computing technology in the classroom. Researchers examine past experiences with technology and the barriers or obstacles that teachers have faced. Qualitative studies have shown that educators' perceptions of devices and ICTs affect the ease of integration. Professor Carver, from Saint Leo University, sought to explore K-12 teachers' perceptions of technology use in the classroom through a qualitative research study. The 68 participants completed an anonymous mixed-methods Qualtrics survey that included quantitative and qualitative questions sent to them via email. The data from the survey found that 74% of the participants indicated that they taught a grade level between kindergarten and fifth grade, 19% of the participants were high school teachers, and the remainder taught elective

courses (Carver, 2016). Carver (2016) found that educators expressed that a few barriers they encountered with technology integration included the amount of instructional time, availability of support personnel, and teacher knowledge and skills. Zipke (2018) conducted a qualitative research study involving eighteen teacher candidates to determine whether participating in an educational technology course would be effective. The research showed that the technology course positively impacted the teacher candidates' confidence in using educational technology, increasing the appropriate usage of computing devices in their instruction (Zipke, 2018). Although attitudes about technology may not be the only aspect that administrators should be concerned about, it is a good place to start when considering computing technology adoption.

Teachers need to feel as though they are confident in their abilities to integrate both devices and ICTs into their instruction for an initiative to be positive and effective. Their attitudes are significantly and positively related to their digital competence (Luo et al., 2021). A causal relationship exists between teachers' attitudes toward technology and their understanding of it. Another study confirmed that teacher attitudes toward technology are crucial to the extent and ease of technology adoption (Canals & Al-Rawashdeh, 2019). When teachers exhibited a positive perception regarding computing devices and ICTs, their reasons for using technology changed from external influences to both intrinsic and extrinsic motivations, and they "sought out ways to promote early learning outcomes, develop children's critical thinking, extend play materials, enhance children's abilities to use ICT, and foster skill development for a future job" (Luo et al., 2021, p. 10). As teachers grow more comfortable with their abilities to utilize computer devices for learning, they can promote those positive attitudes and perceptions in their classrooms and to their students.

Researchers (Lomos et al., 2023) in Luxembourg, a country with one of the highest reported levels of technology-related resources, examined what is important to teachers that would encourage them to increase the use of ICTs in their instruction. Luxembourg has made great strides in incorporating digital education in schools since 2018. The study based its research on teachers' four most common concerns, including ICT infrastructure, digital learning materials, expertise, and vision (Lomos et al., 2023). The infrastructure refers to the availability of devices and a stable Internet connection. The expertise refers to their familiarity with ICTs, level of skills for usage, and general pedagogical ICT skills. The vision refers to the pedagogical vision of using ICTs for knowledge transfer. The findings suggested that teachers reported using ICTs more when participating in collaborative professional development related to ICT usage (Lomos et al., 2023). Furthermore, the educators reported using ICTs more in the classroom when there was greater emphasis by the school leadership on ICT use (Lomos et al., 2023).

Teachers are aware that computing technology is not easy to use, and they are not naïve about the issues it can cause in the classroom environment. Teachers' positive attitudes are not the only factor that can determine the effectiveness of a computer device integration. Other factors, such as administrative support and quality preparation are also aspects to consider. Studies showed that teachers do not believe they can use computing technology independently without guidance, which causes them to be unwilling to learn and hinder them from using it (Liu & Hai, 2019; Grecu, 2022; Lomos et al., 2023). In these studies, teachers expressed what they feel they need to be successful with computing device integrations.

These studies do not examine the types of training teachers want to see from their schools and districts. It would be beneficial to ask teachers what they think they need help with the most. Furthermore, it would also be helpful to know teachers' previous experiences with computing

devices and how often they feel they need training to be effective. Also, educators' experiences and needs vary across grade levels and subject areas. It would be interesting to examine the differences in the needs between elementary versus secondary teachers or math teachers versus social studies teachers.

Professional Development for Educators

In general, professional development for teachers matters and is important in helping teachers improve their instruction and support student achievement. For example, one study on professional development sought to determine if student test scores improved once their teacher attended a PD on reading instruction. Results showed that there were significant gains in fourth-grade reading scores and a moderate gain in fifth-grade writing scores (Gore et al., 2021).

While professional development, in general, is important to teacher and student success, specifically preparing teachers to utilize devices and ICTs effectively in their pedagogy matters for the successful integration of computing devices. However, when administrators only provide training on technical details about technological devices and not pedagogy, the training is insufficient (Güven & Yılmaz, 2016). Güven and Yilamz (2016) conducted a 15 weeklong case study where 13 mathematics teachers took an in-service course explicitly learning how to implement technology into their pedagogy. The researchers used qualitative and quantitative methods to analyze the data and found that the course they designed positively impacted teacher technology use (Güven & Yılmaz, 2016). A study that was done specifically on teacher-enhanced professional development found that professional learning on computing technology for teachers improved the efficiency and effectiveness of instruction and produced a significant increase in end-of-year student assessments (Blanchard et al., 2016). Teachers need to be taught

explicitly and in detail how to implement the devices into their instruction and pedagogy throughout all subjects and grade levels through interactive and immersive training.

Teachers need to progress through different steps when integrating computing devices. A Technology Integration Model developed by Rieber and Welliver suggests a five-stage hierarchy. Teachers should progress through the steps of familiarization, utilization, integration, reorientation, and evolution while integrating technology into their lessons. If these steps are not followed, the probability of technology misuse increases (Guven & Yilmaz, 2016). By going through different phases or steps, teachers can successfully take in and apply what they are learning. Even teachers familiar with computing technology cannot be fully expected to efficiently implement effective usage in their instruction if they have not been shown how. A study conducted on preservice teachers found that the ones who went through prior training their lessons were more successful than others in using computing technology in truly innovative ways (Zipke, 2018). When teachers are shown how to use computing devices in pedagogical practices, the devices are no longer a simple resource for basic tasks but rather facilitate innovative and meaningful instruction.

To inform my study, I created my own conceptual framework based on the characteristics of effective professional development based on the literature by Guven and Yilmaz (2016), Tondeur (2016), and Sims and Fletcher-Wood (2021). This framework describes four characteristics of effective professional development for educators, including that the training is *interactive, recurring*, *includes pedagogy*, and *includes outside expertise*. This framework allowed me to understand how the participants described the professional development that they had been provided or the learning opportunities they had sought out on their own to incorporate computing technology into their instruction. I used this framework to design the semi-structured

interview questions that would answer research question 2. The table below shows the characteristics that I used to evaluate effective professional development. The following subsections outline additional studies that support each of the characteristics.

Table 1

Characteristics of Effective Professional Development

Characteristic	Description
Interactive	Professional development is interactive allowing teachers to apply what they are learning.
Recurring	Professional development is sustained over time and a cycle of support rather than a one-time event.
Pedagogy	Professional development includes pedagogy.
Expertise	Professional development includes expertise from someone outside the realm of the school.

Interactive

One characteristic of quality professional development is that the training is interactive and immersive for teachers to have the opportunity to practice what they are learning. To examine the effects of professional development on teacher knowledge and ability to implement a program, a qualitative study was conducted using 454 teachers participating in an inquiry science program over 2 years. Penuel and colleagues (2007) collected data through surveys that asked about their perceptions and experiences with a professional development. The researchers used a hierarchal linear modeling framework to analyze the survey results. They found that a common criticism regarding the professional development was that it lacked the opportunity for teachers to use what they learned (Penuel et al., 2007). They reported, “teachers need professional development that is interactive with their teaching practice, allowing for multiple

cycles of presentation and assimilation of, and reflection on, knowledge" (Penuel et al., 2007, p. 929). The findings showed that when the professional development focused on content implementation and engaged teachers in activities integrating the content in their classrooms, the teachers were more likely to feel prepared. In a section discussing the importance of active learning, they claimed, "teachers need firsthand experiences of inquiry as part of their professional development" (Penuel et al., 2007, p. 930).

Professor Desimone, from the University of Pennsylvania, wrote a descriptive article that identified the qualities of effective professional development as well as how to measure the effectiveness of professional development. She explained, "Teachers should have opportunities to get involved, such as observing and receiving feedback, analyzing student work, or making presentations, as opposed to passively sitting through lectures" (Desimone, 2011, p.69).

Recurring

Another characteristic of quality professional development is that the training is done in more than one session or provides quality follow-up opportunities. While professional development can improve student achievement and assist teachers with their instruction, simply having one training session may not be enough for the results to last. The study on effective professional development from Penuel and colleagues also addressed the issue of duration and follow-up of training. "Professional development that is of longer duration and time span is more likely to contain the kinds of learning opportunities necessary for teachers to integrate new knowledge into practice" (Penuel et al., 2007, p. 929). The study found a positive correlation between teacher preparedness when they had meaningful and ongoing professional development experiences consistent with the school and district goals (Penuel et al., 2007). Similarly to Penuel and colleagues, Professor Desimone also included duration as one of the core features of

effective professional development. She explained, “Professional development activities should be spread over a semester and should include 20 hours or more of contact time” (Desimone, 2011, p. 69).

Liu and Phelps (2019) conducted a quantitative research study to determine if teacher knowledge from professional development lasts long-term. The researchers had teachers take pre- and post-tests after attending a professional development training through their school. They wanted to determine if teachers retained their learned information after the professional development. Their findings showed significant knowledge loss after teachers attended a PD program; according to their calculations, the decay rate showed that teachers would lose the knowledge they learned within 37 days of attending the PD (Liu & Phelps, 2019). The findings from their study imply that programs with a greater number of learning sessions and follow-up support resulted in less knowledge decay than the PDs that were one short session with no follow-up support.

A study in northwestern China claims that 90% of 470 teachers were willing to participate in training; it was also reported that teachers who did undergo training had stronger intentions to support children’s digital technology use than teachers who have not undergone training (Luo et al., 2021). China offers several levels of teacher training, including national and city levels. Not only are there different levels, but there are also different training methods, including mobile training, blended training (a fusion of face-to-face and web-based training), and online training (Luo et al., 2021). In addition to multiple methods options for educators, the NFES (National Forum for Education Statistics) suggests that continuous training sessions are offered regularly and that, when possible, teachers should be relieved from their regular duty to attend training (NFES, 2021).

Pedagogy

Another characteristic of quality professional development is that the training incorporates pedagogy and ways for teachers to practice using computing technology to integrate content. The article written by Professor Desimone also included content focus as one of the core features of effective professional development. She explained, "Professional development activities should focus on subject matter content and how students learn that content" (Desimone, 2011, p. 69). A qualitative study on teachers' competence in integrating technology confirmed that despite the different demographics of teachers (gender, age, years of service, etc.), they exhibited that they believed there was a lack of competencies for applying ICT in teaching (Maksimović & Dimić, 2016).

Additionally, a yearlong research study by Gore and colleagues evaluated the effectiveness of pedagogy-based professional development. The study was a randomized controlled trial that included eight teachers at each of 24 schools, totaling 192 participants. All eight teachers from each school participated in the Quality Teaching Rounds intervention, but only four teachers from each school attended the two-day workshop before the intervention that gave them background information on the framework of the intervention. The quantitative data was collected from two observations of each teacher: one at 6 months and one at 12 months post-intervention. Data analysis revealed that the quality of teaching significantly improved from the 6-month baseline to the 12-month post-intervention (Gore et al., 2017). The data also showed that, on average, the interventions produced a meaningful effect for teachers that was sustained at least 6 months post-intervention (Gore et al., 2017).

A systematic literature review by Fernández-Batanero and colleagues explored numerous studies from 2008 to 2018 that described the importance of understanding the use of ICTs in

education. They included a section on the importance of ICT training for teachers and explained that professional development should include ICT skills and competencies (Fernández-Batanero et al., 2022). ICT skills refer to the technical use of ICTs, while ICT competencies encompass the functional use of digital and educational content. The literature suggested that ongoing teacher training incorporating pedagogy is fundamental for providing quality education using technology (Fernández-Batanero et al., 2022).

Expertise

The last characteristic of quality professional development included in the conceptual framework I created is that the training includes outside expertise. In 2015, researchers from Durham University analyzed findings from research studies regarding effective professional development. Cordingley and colleagues analyzed 46 studies to find the commonalities in the characteristics of effective professional development. They found a consistent message amongst all the reviews was that "outside expertise was crucial in bringing about substantial improvements to pupil outcomes" (Cordingley et al., 2015, p. 6).

Furthermore, in an article on how to create professional development that makes a difference, researchers discussed what different characteristics of quality PD looked like in practice. Patton and colleagues used previous literature and their observations to synthesize findings on effective professional development. One of the core features that they named was treating teachers as active learners. This section described that teachers should actively seek information from experts and delve into research (Patton et al., 2015). Another core feature was to facilitate thoughtful professional development. The facilitator of the PD should "guide rather than direct, question rather than show the way, and listen rather than tell" (Patton et al., 2015, p. 34). Additionally, the facilitator should bring in outside experts to provide their input.

How the Pandemic has Shaped Technology in the Classroom

Computing technology was a critical part of helping teachers engage and reach students during the height of the Covid-19 pandemic. During the 2019-2020 school year, when schools were shutting down, and the implementation of online learning began, some teachers copied classroom teaching content to online teaching courses, ignored subjective guidance, lacked teacher-student interaction, and experienced poor teaching results (Zhou et al., 2020). Devices were scarce as schools had tried to provide their students with devices for home usage. Some schools could not send home enough devices, and students used devices they had at home, including but not limited to laptops, tablets, and cellular phones (Hill & Reimer, 2022).

Teachers had to learn how to utilize learning systems, including ICTs such as Blackboard, Schoology, and Canvas. Teachers who had experienced technology integration before the pandemic could have been in less stressful positions than those who did not. Teachers shared with principals that the previous years of PD and access to 1:1 technology made them feel prepared for distance learning (Peterson et al., 2020). Teachers that were initially face-to-face teachers had to move from a brick-and-mortar model to entirely online within a matter of weeks. Most did not receive training or easily accessible technical support; if they did, it was virtual.

One district in Austin, Texas, provided insight into how they prepared their teachers during crisis learning provided through their instructional coaches. They offered a variety of PD, including video tutorials, open office hours, instructional PDFs, and a wide range of support (Peterson et al., 2020). The article concluded with tips to other districts for how to handle crisis learning. One of these practical suggestions was to keep technology integration “learning-first” without throwing new tools at students and teachers (Peterson et al., 2020).

Examining the strategies, techniques, and professional development workshops that teachers endured during virtual learning could provide ideas for training that teachers can obtain during device initiatives in brick-and-mortar settings. School leaders can look back on the pandemic and use what they learned during that time to ensure that their teachers are adequately prepared to use computing technology in their instruction at all grade levels.

Description of the Local Context

Hamilton Charter School, located in Northeast Florida, was the only charter school in its district. This study's participants included teachers employed at HCS, all of whom service grades kindergarten through fifth. Students in grades Kindergarten through third shared devices amongst their peers, while the fourth- and fifth-grade students each had access to a Chromebook computer. Hamilton Charter School was not one-to-one with their devices, which according to the principal was simply because of funding (personal communication, 2022). The devices that teachers and students at Hamilton Charter School utilized daily included Chromebook computers. Both fourth and fifth grade had access to Chromebooks that could serve as tablets with touch screens, whereas the younger students had older devices that served only as laptops. While HCS was flexible with the expectations of how the teachers and students used devices, the teachers were still required to use them for specific learning programs. The ICTs that HCS used regularly included the Lexia reading program, Freckle math program, and Renaissance (STAR) testing. Hamilton Charter School used Renaissance, for their assessments, including the STAR assessment used to measure student growth. Renaissance is a digital platform where students could take diagnostic tests in reading, math, and early literacy. The platform also provided teachers with additional resources based on the diagnostic scores. The reading and math programs differentiated learning for the students and made a portion of their daily instruction

more individualized. Other ICTs, including Zearn, Epic, ReadWorks, and Google Classroom, may have been used at the teachers' discretion.

The following percentages were rounded to aid in concealing the schools' identity. Their improvement plan highlighted student growth from the 2020-2021 school year for the different subject areas. The students showed growth in reading: about 25% of students reached benchmark in the fall, and approximately 30% of students reached benchmark by the end of the year (personal communication, 2022). However, mathematics showed a decrease in the number of students that reached benchmark, starting with approximately 30% in the fall and dropping to about 20% in the Spring (personal communication, 2022). Hamilton Charter School planned to re-implement its Success Time (a time allotted during the day for specific small group instruction) for the 2021-2022 school year, emphasizing math interventions for all students. To improve reading scores even further, the school planned to implement FUNdations and Wit and Wisdom phonics programs for all grades from kindergarten through fifth. Throughout the improvement plan, most of the action steps and resources used to help increase achievement scores included technology-related resources such as different applications and ICTs.

Training and professional development decisions for teachers were made by the principal, the data or instructional coaches, or the teachers themselves (personal communication, November 10, 2022). Hamilton Charter School had different professional development opportunities, some that were mandated, strongly encouraged, or optional. An example of a mandated training was the safety training at the beginning of the year. Other trainings such as Lexia or Freckle training were not required, as in there were no consequences for not attending, but they were strongly encouraged for the teachers to attend. Lastly, teachers could sign

themselves up for training or professional development throughout the year to gain more in-service points or obtain training on something they felt they needed assistance with.

The end of the 2019-2020 school year looked slightly different for Hamilton Charter School as school closures across the nation affected how students learned. At the end of the 2019-20 school year, teachers at HCS hosted virtual lessons via Zoom and assigned coursework via Google Classroom or Seesaw. However, HCS did not send home Chromebooks for each student to use for remote learning since the school was not one-to-one with student devices. Rather, some of the students had their school-provided Chromebooks while the other students had to use devices that they already had at home, whether it had been a tablet, computer, or their guardians' cellular device. Students were only required to be online for short portions of the day during "crisis learning." In August 2020, 70% of Hamilton Charter Schools' students were back face-to-face in the building. The other 30% of students participated in a hybrid remote learning setting. Those students who did not return would use Zoom to virtually "sit in" on the instruction that was happening at the school building. By the following year, in August 2021, all the students were back to face-to-face instruction, and the hybrid remote learning method was no longer an option. Since returning to brick-and-mortar, many teachers had taken resources and ICTs they had used during online learning and continued to apply that to their face-to-face instruction.

Summary and Contributions of this DiP

Teachers worldwide are experiencing barriers and obstacles while integrating computing devices into their daily instruction. Feeling more prepared through quality professional development and training could help teachers integrate computing devices more effectively. Previous studies have explored the effects of inadequately training educators during device

integration. This DiP will inform and shape the nature of professional development that elementary educators within Hamilton Charter School receive. The goal is to show administrators and instructional coaches that teachers potentially would like to see more frequent and meaningful training and professional development on how to incorporate devices and ICTs into their pedagogy. Computing devices in the classroom are an innovative and creative way to help students work through real-world problems and learn in an exciting and new way. However, educators must understand how to initiate this type of culture into their pedagogy to ensure successful integration.

CHAPTER 3

METHODOLOGY AND ANALYTIC APPROACH

Introduction and Study Type

This chapter outlines the research methods for this study on teachers' experiences using computing devices in the classroom and the learning opportunities available to them during the fall of 2022 at Hamilton Charter School (pseudonym). I conducted a qualitative study where I collected "extensive data on the individual(s), program(s), or event(s) on which the investigation is focused" (Leedy & Ormrod, 2019, p. 231). I chose a qualitative approach for this study because it aligned with the purpose of understanding how a group of people perceive a particular circumstance (Creswell, 2013). A qualitative study allowed me to gain an understanding of the participant's perceptions, experiences, and feelings regarding a computing device implementation. In addition, I chose an exploratory case study to conduct interviews for data collection to learn more about a poorly understood situation and record details about the context surrounding the case (Leedy & Ormrod, 2019, p. 231). I analyzed how teachers used computing devices in the classroom, the training they received regarding computing devices, and the support provided by their administration. This approach allowed me to compare teachers' experiences across grade levels and subject areas.

The remainder of the chapter provides additional details about the study organized by research design, including the sample and participants, analytic approach, validity and trustworthiness, and the study's limitations.

The research questions that guided this study were the following:

1. How do teachers use computing devices in the classroom?

2. How do teachers describe the learning opportunities available to them for using computing devices in their instruction?
3. How do teachers describe the support that they have received while implementing computing devices in their instruction?

Research Design

Overview

This qualitative study is a single case study that took place within the bounds of Hamilton Charter School (pseudonym) in Northeast Florida. HCS is home to students in grades kindergarten through eighth, although only the elementary grades are included in the study. A large percentage of the student body was white and primarily English-speaking, but there was still diversity among the students. The educators that were employed at HCS came from a variety of different backgrounds and teaching experiences. The educators that participated in this study ranged from first-year teachers to teachers that had been teaching for over 30 years. The teachers also had differing levels of technology proficiency because of their educational backgrounds and personal lifestyles. The research questions for this study pertained to teacher experiences and perceptions of those experiences with the devices they used in their instruction as well as the learning opportunities provided and support from their administrators. Data to answer the research questions was collected through interviews with school administrators and teachers who taught kindergarten through fifth grade at Hamilton Charter School.

Sample and Participants

The sample was selected using purposeful sampling following a specific criterion. The targeted group of educators to interview were teachers from grades kindergarten through fifth as well as members of the leadership team. The total number of participants included two teachers

from each grade level as well as the principal and the data coach totaling 14 participants. The rationale for selecting these grade levels was that elementary students were more likely to need the most assistance learning how to use computers, especially to enhance their learning. The students shared approximately eight computers per class in grades kindergarten through third. Grades 4 and 5 were the first two grades where the students were one-to-one, and they also had Chromebooks that could function as either a laptop or a touchscreen tablet. Since the students gradually used the devices more in class with each grade level that they advanced to, the teachers were also using them more in their instruction and teaching the students how to use them. Including the principal in the sample was also important to ensure a complete understanding of Hamilton Charter School's vision for using technology and other details regarding funding, training decisions, and other topics the teachers may not have known. The data coach was also included because she assisted with training decisions and instructional aspects the teachers may have needed support with.

In order to recruit participants from HCS, I first reached out to the school's principal to make her aware of my research and the purpose of my study. Once she agreed to give me permission to conduct the study at Hamilton Charter School, I sent her the school research permission form to sign, as seen in Appendix A. The administrators act as "formal gatekeepers" in that they control the access that I have to their teachers (Seidman, 2019). After acquiring permission from the principal to interview her teachers, I was directed to the data coach at the school, who was able to attain 12 elementary teachers (two from each grade, kindergarten through fifth) that volunteered to participate in the study. During this study, I was employed at one of the private schools within the same county and had previously worked with the data coach at Hamilton Charter School. I was able to work alongside her for information and contacts I

needed for the study. Once I received the teachers' school email addresses, I contacted the targeted group of educators with a pre-survey using Qualtrics (seen in Appendix B) that consisted of three questions. The questions asked what grade they taught, how long they had been teaching, and to rate how often they had their students participate in different activities using computing devices. Once they completed the pre-survey, I sent them the consent forms (Appendix C) to sign and email back to me. After receiving the signed consent forms, I emailed the teachers to set up individual interview times with each participant using a Doodle poll.

I conducted the interviews via Zoom since I taught at a different school and knew everyone's availability would be vastly different. I had originally desired at least 10 participants, but I was able to interview 14 participants. Initially, I wanted to keep the data consistent by interviewing teachers that only taught all four subjects. However, each grade level varied with which teachers taught all four subjects versus one or two subjects. These teachers could have been using the Chromebooks differently from one another because of the difference in content and subject area. Since they taught different subjects, they could have also been offered different training. This could be a limitation of my study.

I conducted the semi-structured interviews via Zoom, which lasted approximately 45-60 minutes. The interview for the teacher participants consisted of about 11 open-ended questions in addition to follow-up questions (Appendix D). The interviews for the principal and the data coach included ten questions (Appendix E). The interviews fell into the semi-structured category because of the nature of the questions and the data being collected. Merriam and Tisdell (2016) explain that high-structured interviews are asked in a particular order, the wording is predetermined, and these types of interviews are usually used to collect demographic data. The unstructured interviews are more like a conversation and can be used to formulate questions for

further interviews (Merriam & Tisdell, 2016). Therefore, the interviews for this study fell in between with a mixture of structured and flexible questions and no predetermined order or specific wording. The questions mainly focused on teachers' experiences using computing devices in their instruction, what training they had gone through, the quality of the support they received, and how they perceived their students' attitudes toward using computing devices for learning.

Analytic Approach

The tools used to collect and analyze the data included Zoom, Otter.ai, NVivo, and Microsoft Word. The interviews were video and audio recorded using Zoom. After the interviews concluded, I used the audio recording from each interview and uploaded them to Otter.ai to be transcribed. After each interview was transcribed, I created a document for each participant and read carefully through the transcripts, editing and revising any context that the website transcription may have misinterpreted. From there, the interview transcripts were uploaded into NVivo as separate files. Once the transcripts were in NVivo, I created a profile for each participant and assigned them attributes. The attributes were what grade level they taught, how long they had been teaching, and their level of technology proficiency. Once the attributes and profiles were done, I began the first-cycle coding methods.

The analytic approach involved first- and second-cycle coding methods to analyze the interview data. First-cycle coding was done using an in vivo approach (Saldaña, 2021). According to Saldaña (2021), a code is often-times a word or short phrase that is assigned to language-based or visual data. I chose the in vivo coding method (Saldaña, 2021) to attain an in-depth understanding of the participants' language and preserve the stories they were telling. I read through each transcript one at a time and coded words, phrases, or sentences that

specifically related to the research questions. Each set of transcripts was reread three to four times to ensure that all the information needed to analyze the research questions was coded. Second-cycle coding involved generating categories for the codes created during first-cycle coding. Each code was grouped with others related to the same topic or research question. For instance, all the codes that discussed the topic of 'support' were grouped into one category. From there, they were categorized further into positive support experiences, lack of support, support from administrators, or support from other staff members. Another way to group the codes was by the programs that the students used on the devices. Once all the codes discussing learning programs were together, they were categorized into reading, math, or other programs. Even further, the reading programs were categorized together based on which program it was, such as Lexia, ReadWorks, or other. Similarly, the math programs were also further categorized by name.

To further analyze the data, I created tables and other figures (seen in chapter 4) that would assist in visualizing the data. A table was created to organize the teachers by their attributes to quickly see their proficiency along with their years at the school and recollection of training. The table gives a more efficient visual to quickly compare the educators by their attributes. Other tables I created to analyze the data included information relevant to the research questions. I created two pie charts to visualize the percentages of teachers based on their technology proficiency and the percentage of teachers that recalled technology-related training. Another table highlighted the teachers' descriptions of the professional development they had gone through compared to the conceptual framework that guided research question 2. In the next section, I describe the strategies I used to help ensure the validity and credibility of the study.

Validity, Trustworthiness, and Credibility

Credibility and reliability could have been a concern with qualitative data because I was relying on taking the word of the people being interviewed. There was the possibility that there could have been accidental misinformation provided or left out because of the nature of the questions and answers. I must trust that the interviewees were honest and accurately recalled the support they had or had not received regarding the Chromebook device implementation and/or the training made available to them. If teachers had been at Hamilton Charter School for ten or more years, they might not have remembered the training opportunities presented to them that long ago. If HCS did not keep a record of the professional development provided for the teachers, the principal and data coach might not have remembered all the training offered since the implementation began in 2016.

Furthermore, I wanted to ensure that the transcripts adequately conveyed what the participants said. I used respondent validation by sending the participants their transcripts to check over and ensure everything was said or transcribed correctly. Triangulation was also used by interviewing the school's data coach and principal. These additional interviews gave different perspectives to help produce a more comprehensive set of findings (Noble & Smith, 2015).

One way I ensured trustworthiness was to use pseudo-names for the participants in the study. Furthermore, the school's actual name was not used in the study; instead, I assigned the school a pseudonym to protect the participants' privacy. I did not include any identifying information about the district in which the charter school is located. Lastly, any demographic information about the teachers, students, or school was rounded to conceal the school's identity. The teachers may have been more willing to share their answers honestly since their identities were concealed.

Positionality

My relationship to the study was that I was also an elementary educator in the same county when the study was conducted. I was aware of the training I had received and my personal experiences and perceptions with implementing technology into my instruction. In my own experience, I knew that I needed to receive or be offered more training to use computing technology in my instruction effectively. I attended an optional training on how to use the Seesaw application at the beginning of the pandemic. All the teachers at my school attended a professional development on how to use Zoom when we went completely virtual in March 2020. However, I had not been to specific training for using computing devices for pedagogy in an elementary classroom. In addition, the COVID-19 shutdown did not affect how I used computing devices when we returned to face-to-face instruction. It would have been difficult and time-consuming for me to teach the students how to use some of the specific applications we used during the shutdown. Some other challenges I experienced with student use of devices were the pace they typed, not knowing how to shut down the device, and not keeping up with charging their devices. My classes used their computing devices for the required testing throughout the year and to complete their individualized iReady lessons during the week.

It was important that I remained cognizant of my own personal subjectivities in the study, including the interview questions. I articulated the interview questions so that they asked open-ended questions regarding teachers' experiences versus implying that I already knew their experiences to help remove potential bias.

Limitations

One limitation of this study was that the sample may not have been relevant to the general population of teachers or other charter schools. This study included a small sample size

within the bounds of one case, which raises the questions how transferable the findings would be. For instance, if schools across the nation showed that their demographics consisted of primarily white, female teachers in their 30s-50s, then the sample from Hamilton Charter School reflects those demographics. Another limitation of the study, as previously mentioned, was that the educators interviewed did not all teach the same subjects. Kindergarten through third-grade teachers did teach all four subjects, but fourth- and fifth-grade teachers may only have taught one or two of the subjects. This could have caused differentiation in their responses as different experiences and training could have been available to them.

One challenge was trying to maintain respect for the faculty's time within contract hours. I had set up most of the interviews directly after school, but I also made my lunch breaks and planning periods available in the instance that the teachers could also have scheduled during those times. Another challenge was that a few of the teachers did miss their scheduled interview times, and we had to reschedule.

Summary

In conclusion, this chapter examined the research design and methodology for the qualitative case study conducted at Hamilton Charter School in Northeast Florida. The study sought to understand the experiences of educators at HCS when implementing computing devices and ICTs into their instruction and the preparation they had received to do so. I collected the data through individual semi-structured interviews with teachers from the school. I analyzed the data, using NVivo software, from the 14 participants using first- and second-cycle coding methods related to the research questions. I thoroughly analyzed the interviews to identify themes and patterns that emerged from the data. The study's limitations were few, and there were ways that I ensured the trustworthiness and reliability of the study. The study design and

methodological approach further allowed me to answer the three research questions that guided the study. The findings for this study, implications, and recommendations are presented in chapter 4.

CHAPTER 4

FINDINGS, IMPLICATIONS, RECOMMENDATIONS, AND DISSEMINATION PLAN

Study Summary

The purpose of this study was to understand how teachers at Hamilton Charter School (pseudonym) in Northeast Florida were using Chromebook computers in their classrooms, to explore the learning opportunities provided to prepare them to implement the devices, and to evaluate the support they had received from their school leaders. The local context included one school, Hamilton Charter School, located in Northeast Florida. HCS is part of a larger charter network with campuses spread across the United States. Hamilton Charter School started implementing Chromebooks into their instruction in 2016. The school is comprised of grades kindergarten through eighth, although the study only analyzed elementary teachers for grades kindergarten through fifth. The school enrolled approximately 900 students in grades kindergarten through eighth in the 2021-2022 school year, with approximately 600 students in kindergarten through fifth grade. Students in grades kindergarten through third shared Chromebook devices amongst their peers, while fourth- through eighth-grade students were one-to-one with their Chromebooks.

The study that I conducted was a single exploratory case study that took place within the bounds of Hamilton Charter School. In this study, I examined teachers' perspectives on their proficiency with computing devices, their training for implementing the Chromebooks, and how they used the computing devices and programs in their daily instruction. The research questions were:

1. How do teachers use computing devices in the classroom?
2. How do teachers describe the learning opportunities available to them for using computing devices in their instruction?
3. How do teachers describe the support that they have received while implementing computing devices in their instruction?

The sample included two teachers from each grade level, kindergarten through fifth. Also included in the sample were the principal and data coach at Hamilton Charter School, putting the total number of participants for the study at 14. I collected data for the study through individual semi-structured interviews that asked questions regarding how the teachers used their computing devices, the support they received, and any training the school had offered, or they had sought out on their own. In Table 2, I provide a brief overview of the teacher participants' attributes.

Table 2

Participants' General Attributes

Pseudo Name	Years Teaching	Grade Level	Technology Proficiency	Technology Related Learning Opportunities
Stacey	7 years	Kindergarten	High	No
Jamie	13 years	Kindergarten	Moderate	No
Priscilla	11 years	1st	Low	Yes
Tara	12 years	1st	Moderate	Yes
Darlene	2 years	2nd	High	Yes
Juliet	12 years	2nd	Moderate	Yes
Mary	6 years	3rd	Low	Yes
Tiana	3 years	3rd	High	Yes
Brittany	10 years	4th	High	Yes
Samantha	7 years	4th	High	No
Walter	32 years	5th	High	No
Gabriella	6 years	5th	Low	No

In the following section, I begin with findings from the interviews with the school principal and data coach to provide a general context for technology use at the school. I then provide individual profiles for each of the teacher participants that include important information such as how long they had been teaching, what grade level they taught, and how they had their students use computing devices throughout the school day. From there, I analyzed the findings regarding each research question to articulate the implications of those findings. I conclude the chapter with recommendations on how the leadership at Hamilton Charter School can improve how they prepare their teachers to use computing devices in the classroom.

Findings

Before conducting the interviews, I was aware that only some grade levels had enough devices to allow the students to be one-to-one. Students in grades kindergarten through third shared computer carts amongst the other classes in the grade level. However, during the interviews, some teachers described ways in which they would acquire additional devices on some days. Grades 4 and 5 provided each student with a Chromebook device for academic use during the day. During the interview with the principal, she was asked why the primary grades were not one-to-one, and she answered that it was simply due to funding (personal communication, 2022). HCS had been increasing the number of devices each year as they accumulated more funds.

Separate interviews with the data coach and the principal shed light on the school's vision with technology. Both interviews suggested that the leadership's vision for technology use was to use computing technology as a supplement to assist with enhancing instruction and not to erase the responsibilities and duties of the teachers. The training and professional development opportunities available to the teachers regarding devices and ICTs had been scarce. The

interview with the data coach at the school gave insight into the technology-related learning opportunities available to the teachers within the last 2 years. The teachers had been offered training on two reading programs: Lexia and Wit and Wisdom. Lexia was a computerized phonics program that provided students with independent practice on basic reading skills. Wit and Wisdom was a language arts curriculum built to help students become successful readers.

There was room in the school's budget for professional development each year. However, there were times when specific training opportunities took priority over ones regarding computing technology. For example, in August 2022, the school spent a good amount of the professional development budget on Orton Gillingham training for the primary teachers. Orton Gillingham was a program specifically designed to help struggling readers make a connection between letters and sounds. The program can be used on its own or built into other curricula.

The two administrators explained that teachers were made aware of the training opportunities available to them in different ways. If it were a training at the beginning of the year, they would receive a schedule via email with the training on the schedule. There were also grade-level meetings every Wednesday throughout the year, led by the grade-level chair, where teachers may have been made aware verbally of training opportunities. All the grade levels may not have received the same trainings. For example, the upper grade levels would attend training on Google Classroom, whereas the lower grades would go to something more age-appropriate for their students. There were no consequences for the teachers when they did not attend trainings or professional developments. The safety training was the only training that was "required" or that would have needed to be made up if it were missed. When the teachers did attend training, they acquired in-service points.

The school's principal explained that she would “most definitely” incorporate more technology-related training if the opportunity arose. During the interview, she explained how other subjects took precedence over technology, “we still had other PDs that still exist, yet we have this new creature that we have to figure out how to train the teachers.” She understood that the school had not provided many learning opportunities regarding Chromebooks, and she hoped that the technology staff that she hired would be helpful with training in the future. Before the 2022-2023 school year, Hamilton Charter School was sharing a technology staff member with the school district. Therefore, that staff member was not readily accessible for support or assistance when needed. The 2022-23 school year was the first where this school had its own IT faculty member.

Teachers

There were 12 elementary teachers that I interviewed for the study, two from each grade level from kindergarten to fifth. The teachers came from different professional backgrounds, had differing proficiency levels with computing devices, and may or may not have attended any available learning opportunities related to technology devices or ICTs. One common theme that emerged from the findings was that no matter how long they had been teaching or their level of proficiency with computing devices, the teachers generally appeared to have used the devices in the same ways during day-to-day instruction. To understand research question 1, I included the teacher participants’ profiles below to give in-depth descriptions of the teachers’ backgrounds and how each participant used computing devices in their classroom. After the participant profiles, I report the findings for each research question.

Participant Profiles

Stacey

Stacey, a kindergarten teacher, had been teaching for 7 years, all of which at Hamilton Charter School. She believed she was highly proficient with technology and could do more than the average person could. In her classroom, her students shared eight Chromebook devices. Throughout the day, her students used their Chromebooks for centers and were allowed to access different learning programs such as Lexia and Freckle. She did not recall training for the devices or the ICTs that the students used. Furthermore, she had not sought out any additional learning opportunities on her own time for using computing technology in her classroom. She explained that using the computers for more complex and in-depth projects would be difficult because of the students' ages, ability levels, and the number of devices she had.

Jamie

Jamie, another kindergarten teacher at Hamilton Charter School, had been teaching for a total of 13 years. In addition to kindergarten, she also taught third-grade and intervention classes. Jamie also served as the gifted consult at HCS. She was in her 11th year teaching at Hamilton Charter School. She explained that she was moderately proficient with technology. If she could not figure something out, she would try to learn on her own. Her students shared Chromebook devices during the day, but Jamie also had five Kindle Fires for the students to use that she had acquired through a Donor's Choose project.

Because each student did not have a device, Jamie used her Chromebooks for STAR testing and center time during the day. Her students used programs including Freckle, Lexia, Zearn, and Epic. She explained that she would also use Starfall to collect student data periodically throughout the year. She did not recall training on the Chromebook devices themselves.

However, she had done some of her own research on how to help the students become more independent on the devices. Because they were kindergarten-aged students, she explained that she did spend a good portion of her time at the beginning of the school year teaching the students certain basic functions on the devices, such as how to use the trackpad.

Priscilla

First-grade teacher, Priscilla, had been teaching for 11 years, all of which at Hamilton Charter School. The 2022-2023 school year was her 6th year teaching first grade. Before teaching elementary, she had taken 10 years off to stay home and raise her children. Her class had eight Chromebooks to share with each other. She described her proficiency as on the lower end of the spectrum. While she was still learning to use computing devices, teaching through the COVID-19 pandemic taught her a lot. Her students used their devices during center time for programs like Lexia and Freckle. She did not recall any training on how to implement or utilize Chromebook devices. However, she did attend professional development for the ICTs the students used, such as Freckle and Lexia. The data coach hosted a training on Freckle, she recalled a 2-hour training via Zoom on how to use Lexia, and she also went through training regarding STAR testing. Other than the school-provided trainings, she had not sought out any learning opportunities on her own for using Chromebooks in her classroom.

Tara

Tara was another first-grade teacher at Hamilton Charter School who had been teaching for 12 years, all of which at HCS. She worked her first year as a kindergarten teacher but had been in first grade every year after. Her class had more Chromebooks than the other first-grade classes. She had eight devices provided by the school and four more that she acquired for her class through a Donors Choose project. She admitted that she was moderately proficient with

technology and figured most things out on her own. She used Google slides to create presentations that went along with reading lessons, and her class used their Chromebooks for centers during both reading and math blocks. Her students used learning programs for reading centers. In math, she spent time with half of the class at one time, teaching the lesson while the other half was on their Chromebooks, and then they would switch. Tara did not recall training on the Chromebook devices but described learning opportunities on the ICTs they used, such as tutorials that came with the programs. She said that she did seek out learning opportunities on her own, but they were not related to technology. Rather, she had finished her reading endorsement and attended webinars on phonics-related programs.

Darlene

Darlene was a second-grade teacher in her second year of teaching. She had been at Hamilton Charter School for both years. Before teaching, she did a lot of administrative work for different businesses. Darlene had 12 Chromebooks for her class to share unless the other second-grade classes were not using theirs; then, she could use 25 devices. She claimed to be highly proficient and "very technology literate" from working in the business world. She would use Google slides throughout the day to keep students on track with their schedule and assignments, as well as use her teacher device for brain breaks and volume control in the classroom. The students used their devices for both reading and math centers. She explained that she had gone through some training on the Renaissance program that the school used but nothing in-depth. She also did not participate in voluntary learning opportunities as she felt that any spare time she had should be used trying to ensure that she had control within her classroom.

Juliet

Juliet had been teaching for 12 years, all of them at Hamilton Charter School. In addition to second grade, she had also taught kindergarten and third grade. She claimed to be moderately proficient with technology. Although the school had limited up-to-date technology, she liked to utilize it daily. Her class shared 10 Chromebooks, but if the other second-grade classes were not using their devices during the day, they may have had more than ten. She used computing devices for PowerPoint presentations and videos, while her students used their computers for centers and STAR testing. For math, the students used programs such as Xtra Math and Freckle. During reading, they used the Lexia reading program. She described going to professional development for Freckle, STAR, and Lexia. However, there was no training for the Chromebook device hardware nor Google Classroom when they switched to using that ICT. She did not usually seek out training on her own, but if needed, she would consult with her teenage daughter for assistance.

Mary

Third-grade teacher, Mary, had been teaching for 6 years. She had been at Hamilton Charter School for 5 of those years but had been teaching third grade for all 6 years. Her class shared between 10-12 Chromebooks daily unless the other third-grade classes did not take their carts; then, her class would have more. Mary felt that she was not very proficient when it came to technology, and she stuck to "just the basics." Her students used Zearn, Xtra Math, and Freckle during math centers. They also used Lexia and Blooket for reading centers. She acknowledged that she did not use the devices for science or social studies. She explained that there had not been any training on the hardware, but there had been trainings for the ICT programs. While she said she had not been to one recently, the school had held a professional development for

Freckle. She did not seek out any training on her own; however, she did research when necessary.

Tiana

Tiana was also a third-grade teacher who had been teaching for 3 years. The 2022-2023 school year was her first year at Hamilton Charter School and her first-year teaching third grade. Before moving to HCS, she taught first grade in another district further North in Florida. She admitted that although she enjoyed third grade, she enjoyed first grade even more. Her class shared 10 Chromebook devices during the day. She claimed that she was highly proficient with technology. At the school she worked at previously, the technology was more updated and advanced compared to what they had at HCS. Her previous school had Promethean SMART boards and other newer devices. She explained that she needed to reacquaint herself with older technology when she started working at Hamilton Charter School.

Her class used their computers for center time and STAR testing. During reading centers, she differentiated the rotations based on the students' ability levels. For example, the students that needed more phonics instruction used programs such as Lexia, while her enrichment group would use ReadWorks to read an article and answer questions. In math, the students used the program Xtra Math. She recalled attending a professional development for the Lexia program but stated that even as a new teacher in her other district, she never received any specific technology training. Tiana had not searched for any learning opportunities on her own, but if she needed help, she would utilize the technology staff at the school. For example, she explained that there were more teachers and staff at her previous school, so the technology staff there was not readily available. At HCS, it was a smaller school, and the technology staff could quickly fix issues or address their concerns.

Brittany

Brittany was a fourth-grade teacher at Hamilton Charter School and had been teaching for a total of 10 years. She had spent her entire teaching career at HCS. For her first 3 years, she was an interventionist for fourth grade, but she had been in the classroom every year after that. In fourth grade, the students were one-to-one with their devices. Therefore, each student in her class had a Chromebook. She claimed to be highly proficient with technology and said she gained much of her technology experience during COVID-19 while teaching virtually. Her students did reading and math rotations using programs like Epic, Freckle, Zearn, and Lexia. For science, the students had access to a program called Stem Scopes. She did not use the devices often for social studies, but when she did, the students would do WebQuests based on the material they were learning at the time. She explained that the teachers had gone through a training for Lexia, and about 4 years prior, the school held a training for Stem Scopes (a science program). She had not sought additional learning opportunities for technology but had completed other certifications, such as her reading endorsement and ESOL certification.

Samantha

Samantha taught fourth grade at Hamilton Charter School and had been teaching for a total of 7 years. She had been teaching at HCS for 4 out of those 7 years. In addition to fourth grade, she taught first grade for 1 year and fifth grade for 2 years. Her students were one-to-one with their devices and had Chromebooks that could be used in tablet mode in addition to being a computer. She said that she was highly proficient with technology. When she lived in New York, she was heavily involved in the technology department and would even train teachers to use different pieces of technology. Moving to Florida, she had to learn to work with fewer resources than she was used to.

Her students used their computers for morning work, centers, and assignments on Google Classroom. They used ICTs, including Quill, Freckle, Flocabulary, Zearn, and Epic. She also used other websites to create her own interactive educational games related to the topics that they were learning. Samantha did not recall any training regarding Chromebook devices or ICTs that they used. She did not look for other learning opportunities on her own, but she tried to get more information on Ellevation, which is an ESOL program. Otherwise, she explained that because of time restraints, she learned the programs as she used them more.

Walter

Walter taught fifth grade at Hamilton Charter School and taught both English Language Arts and Social Studies. He had been in education for 32 years, but this was his first year at HCS. He also spent several years teaching in Massachusetts. He held his gifted endorsement and therefore saw more of the higher-level fifth-graders. His students were one-to-one with their devices, and he believed he was highly proficient with technology. However, he did not enjoy virtual teaching during COVID-19. He described himself as "a chameleon that morphs and changes with technology advancements."

He would use the website formative.com for assessments or exit tickets. He used Google Forms in addition to using Google Classroom. The students used Flipgrid for different projects. He also did several social studies related projects that included a green screen and incorporated the students into different historical scenes. Walter did not recall any training on Chromebooks or the ICTs that the school used, but he did explain that the technology staff at the school had been very helpful when needed. Being a new teacher at a new school, he had not had much additional time to seek out any learning opportunities.

Gabriella

Gabriella also taught fifth grade at Hamilton Charter School. She did not teach all four subjects, but rather she only taught math. She had been teaching for 6 years; the 2022-2023 school year was her first year at HCS. Before Hamilton Charter School, she taught fifth grade in a district south of where HCS is located. Prior to that district, she was a missionary for 12 years. She also had 4 more years of teaching experience as a fourth-grade teacher in New York before she was a missionary. Her students were one-to-one with devices. She stated that she was not proficient with technology and was learning how to use the technology that was new to her that year. Being in the mission field for so long interfered with her experiences with computing technology, and the technology she used in her old school was much different than what she was working with at HCS.

Her students used their computers for centers, small groups, and Google Classroom. She particularly liked for her students to use Freckle, especially for independent work, because it created individualized learning paths for each student. Gabriella said that she did not experience training for Chromebooks or ICTs at HCS but that it was something she would have enjoyed since she had seen the benefits of doing so at her previous schools. She had not participated in any learning opportunities on her own; however, when she needed assistance, her colleagues and team leaders were whom she would utilize for information.

Research Questions

Research Question 1

The first research question guiding the study was, *how do teachers use computing devices in the classroom?* If you look at the participant profiles, you see a narrow approach to how teachers and students used the Chromebooks throughout the day. Both teacher and student use of

the devices can be described as light usage. As previously mentioned, kindergarten through third-grade students were not provided with enough devices from the school to be one-to-one. However, the teachers explained they had accumulated more devices for their classes when possible. Some teachers would borrow another class's computer cart if they were not being used. Other teachers mentioned that they had acquired additional devices through Donors Choose projects. The availability of additional devices was not consistent. The consensus among the 12 teacher participants was that the devices were primarily used for rotation or center time. Kindergarten through third-grade teachers used their computing devices for different math and reading programs during center time that could individualize and differentiate learning for the students. The fourth- and fifth-grade students used their Chromebooks for rotation time as well, but they also used their devices for assignments via Google Classroom in addition to the learning programs.

The teachers named seven specific digital programs or websites that the students would use during their centers or rotations. In Table 3 below, I summarize what each website or program was used for.

Table 3

Digital Programs Students Used

Digital Program/Website	Description
Freckle	An online learning program that allows students to practice math skills by adapting to their ability level.
Lexia	Lexia is an online reading program that offers students individualized reading instruction based on their diagnostic scores in five area of reading.
Renaissance (STAR)	An online platform where students take diagnostic test in reading, math, and early literacy.

Table 3 - Continued

Digital Program/Website	Description
Zearn	An online learning platform that helps students with math concepts through visual models and real-life examples.
Epic	An online reading platform for struggling readers that includes audiobooks and learning videos.
Xtra Math	An online math fact fluency program that helps students with automaticity.
Google Classroom	An online learning platform designed by Google for distributing, creating, and grading student assignments.
Blooket	A gamified learning platform where teachers host questions and students answer questions from their devices.
Flocabulay	A learning program that engages students by using educational hip-hop music.
Quill	A website with learning activities that build reading comprehension, writing, and language skills.
Flipgrid	A social learning platform that allows teachers and students to communicate via audio or video recordings.
STEM Scopes	An online learning resource that has learning activities and digital content based on state science standards.
ReadWorks	A website that offers reading passages for teachers to assign to their students by skill, grade level, or Lexile. The reading passages are followed by comprehension questions the students answer.
Starfall	A website with learning activities, videos, and books for younger or struggling students.
Go Formative	A website used to create questions or assessments for students where teachers get results in real-time.

Ten out of the 12 participants explained that the students used programs on the devices during center or rotation time for both reading and math. In Figure 1 below, I provide a visual for

the number of participants that reported using the websites or programs. Nine out of the 12 teachers specifically named Freckle as one of the math programs their students used during the day. Seven of the 12 participants specifically mentioned that their students used Lexia during their reading block. Four of the 12 participants explained that the students used Renaissance for STAR diagnostic testing. Four teachers named the math program Zearn as one that their students used in centers. Three out of the 12 teachers named the reading program Epic and three teachers named Xtra Math. Two out of the 12 educators specifically mentioned using Google Classroom to assign work to students. The following programs or websites were only mentioned by one out of the 12 teachers: Blooket, Flocabulary, Quill, Flipgrid, STEM Scopes, ReadWorks, Starfall, and Go Formative. Tiana used the websites and programs for centers to differentiate work for her struggling readers and her enrichment group. She explained that her students used Lexia for phonics and that "the high kids will be on ReadWorks, and they'll read an article and have questions." Brittany used the language arts and math programs for centers but also explained, "And then for science at the end of the day, we have a stem scope program, which I believe is also through renaissance that we use for some of our standards, not all of them."

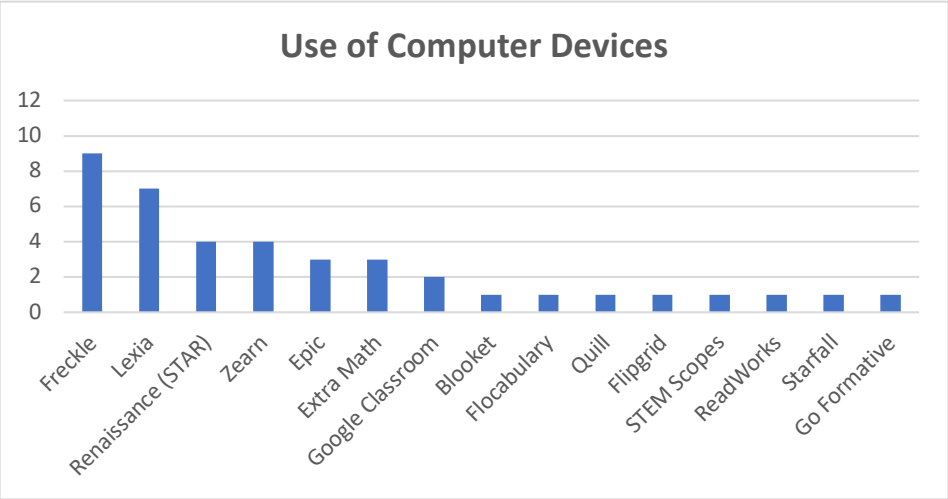

Figure 1. Number of Teachers That Used Each Program

Teachers in the primary grades (K-3) explained that completing projects using the Chromebooks would be difficult and time-consuming because of the students' proficiency with the hardware or software programs and because their students were not one-to-one with the devices. The students at Hamilton Charter School were not using their computing devices during instructional lessons. Instead, they would use them for reinforcing concepts or individualized lessons to close specific academic gaps. When asked if the teachers would still use technology if it were not required, all 12 teacher participants said that they found the technology useful and engaging and would still find a way to use it if devices were not provided.

Figure 2 below shows the percentages of technology proficiency levels for the 12 educators. Out of the 12 teacher participants, six of them (50%) claimed to be highly proficient, three (25%) said that they were moderately proficient, and three (25%) of them admitted to having low proficiency with technology. Tara (first-grade teacher), who described herself as moderately proficient, explained, "I wouldn't say that I'm like the newest, latest, greatest always on top of everything, but I can figure most things out." Tiana (third-grade teacher) claimed to be highly proficient because of the advanced technology from her previous county that she worked in. She explained, "We had, like, the Promethean smart boards and things like that. So I'm pretty knowledgeable with that sort of technology". In general, I found that the fourth- and fifth-grade teachers described being highly proficient with technology, whereas the teachers for the primary grades were moderate or low in technology proficiency.

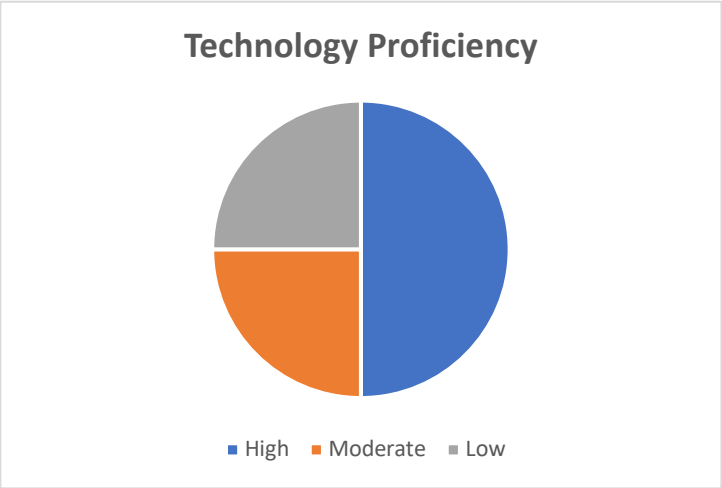

Figure 2. The proficiency levels of the 12 teachers at Hamilton Charter School

In addition to understanding how the educators were using Chromebook devices and ICTs during the Fall of 2022, I was also interested in understanding if the Covid-19 closures of schools in 2020 had influenced how they used computing technology. During the interviews, the teacher participants were asked how the COVID-19 school closures had shaped their subsequent computer use and practice in the classroom. Table 4 below shows the resources teachers started using during COVID-19 shutdowns and continued using when they were back in a brick-and-mortar setting.

Four of the 12 teacher participants specifically named Google Classroom as a tool they started using during the shutdown that they used after they were back to brick-and-mortar. Samantha explained, “it was pretty much Google Classroom was the biggest thing that we took away from it and ran with it because it really helped.” Additionally, Juliet said, “I learned how to use Google Classroom, and now I like it a lot. We started doing our lesson plans online so we could share it a little easier. And we would link all of our stuff into the lesson plan so that everyone had access to it like we still use that now today.” Four of the 12 teacher participants

specifically named Seesaw as a tool they used during COVID-19 that they continued to use upon returning to face-to-face learning. Priscilla explained, “During the lockdown, we started using Seesaw for assignments, and then when we actually came back, we continued that for classroom use, and then all of our homework was on there.” One teacher out of the 12 mentioned a website called Go Formative that he used for quick checks or exit tickets since the students were virtual, and he liked to use the site in the face-to-face setting as well. One teacher did not mention any specific technology but said there were some resources she discovered during COVID-19 that she would continue to reference. (Two of the 12 teacher participants were not teaching during the COVID-19 shutdown.)

Table 4

Programs used during and after COVID-19 school closures

COVID-19 Influence	Number of teachers out of 12
Was not teaching during COVID-19	2
Google Classroom	4
Seesaw	4
Go Formative	1
Other Resources	1

One aspect that all 12 teacher participants unanimously agreed upon was that the students enjoyed using computing devices for learning, and it helped keep the students engaged. One teacher reported that her students were engaged in interactive learning games that she created based on the content they were working on. “I created like a Space Invaders game, but it was based on an idea so they would have to read the passage answer the question, and if it was

correct, and they found the main idea, it would like give them points," explained Samantha. Specifically, Jamie reported that her younger students found the competition of learning games exciting and "the kids are motivated and set goals like I see them wanting to set goals for themselves.". Walter described the amazement his students displayed when he would use a green screen to bring historical settings to life. Each of the 12 teachers, despite grade level or subjects taught, concluded that their students were eager to learn using computing devices.

Research Question 2

The second research question guiding the study was, *how do teachers describe the learning opportunities available to them for using computing devices in their instruction?* Building upon the literature of other researchers (Guven & Yilman, 2016; Tondeur, 2016; Sims & Fletcher-Wood, 2021), I created a conceptual framework that lists four characteristics of effective professional development for educators. These characteristics include ensuring that the training is interactive, recurring, includes pedagogy, and involves outside expertise. The framework helped shape the interview questions regarding research question 2. Utilizing the framework allowed me to better understand the quality of training that the teachers at Hamilton Charter School had experienced.

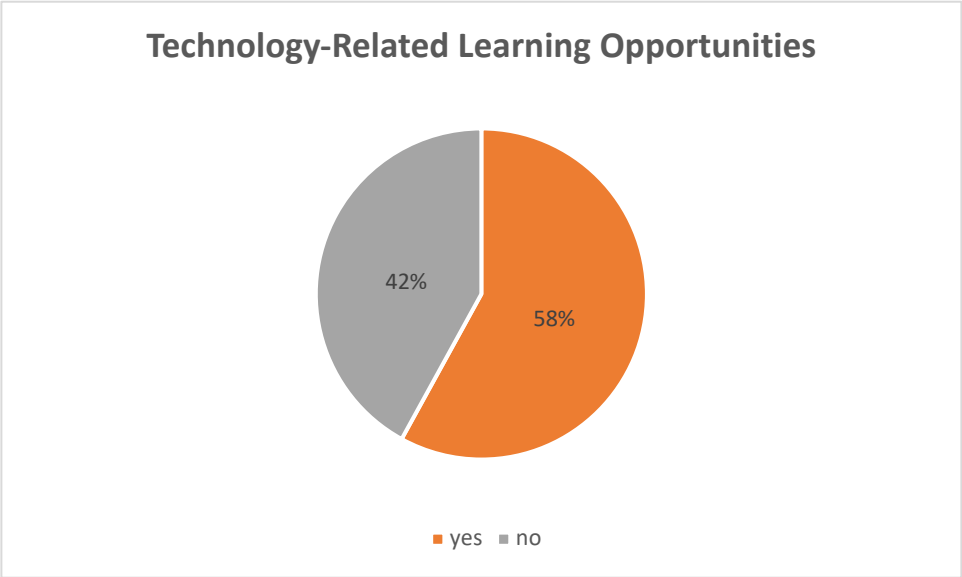

Figure 3. The percentage of teachers that recall training related to technology

During the interviews, I asked the teachers if they could recall any training or professional development regarding the Chromebook devices or the programs they used. Seven out of the 12 teacher participants (58%) recalled at least one professional development related to technology. Five out of the 12 educators (42%) could not recall any training, professional development, or learning opportunities related to computing technology devices or ICTs.

According to the participants' recollections of the training they received regarding computing technology, none of the professional development provided covered all four qualities of effective professional development outlined in the conceptual framework. Table 5 summarizes the findings. Seven out of the 12 educators described at least one training that was interactive, which was the Lexia training. The teachers were able to log in to their own accounts and utilize different tools and resources. None of the teachers described a training that was recurring; all the professional development opportunities described were stand-alone events. Five out of the 12 teachers described at least one training that incorporated pedagogy. The Lexia and Freckle

trainings were described as involving pedagogy. Four out of the 12 teachers described at least one training that incorporated outside expertise. The Lexia training brought in experts from the program, whereas other professional developments were taught by other staff members at HCS.

Table 5

How HCS Teachers Describe Their Professional Development

Characteristic	**Description**
Interactive	7 out of the 12 teachers described at least one learning opportunity that was interactive
Recurring	0 out of the 12 teachers described a training or professional development that was recurring
Pedagogy	5 out of the 12 teachers described at least one learning opportunity that incorporated both computing technology and pedagogy
Expertise	4 out of the 12 teachers described at least one learning opportunity that incorporated outside expertise

One of the trainings incorporated more than one of the characteristics from the framework. The training on the Lexia reading program, for example, was interactive, incorporated pedagogy components, and was hosted by outside experts on the program. When asked to describe the training on Lexia, Priscilla explained, “Lexia did like a zoom training for like an, I think it was almost two hours on how to use Lexia, how to set it up, how to go in and use the dashboard and find like, the resources and things like that.” The training on the STEM Scopes program also brought in outside expertise for the professional development. None of the trainings the participants described were recurring but were stand-alone events. The Freckle training included pedagogy but was presented by the data coach at the school versus bringing in

outside expertise. All three first-year teachers expressed that they would have appreciated some form of training to get familiar with the Chromebook devices. Tiana explained that when she transferred to Hamilton Charter School, she had to learn how to use more outdated technology than what she was used to at her other school. All 12 teachers interviewed could not recall training on using the Chromebook device hardware. The data coach and the principal also said there had been no training on the computers as a device. The teacher participants' answers differed regarding training on the programs and ICTs they used on the Chromebooks.

Walter and Gabriella both taught fifth grade, were in their first year of teaching at Hamilton Charter School and did not recall training on the devices or programs. Gabriella articulated, "I won't call it training, but a lot of my information and knowledge now is based on, like speaking to other colleagues at Hamilton Charter School that are more familiar with the systems." Priscilla and Tara taught first grade, had both been at Hamilton Charter School for 10-plus years, and recalled training on the programs the students used, such as Lexia, Freckle, and Renaissance. Tiana and Mary both taught third grade and had not been teaching at Hamilton Charter School for the same amount of time. Tiana explained that she went through a Lexia training but said, "I never had technology training, even as a new teacher, which is interesting." Mary said, "I can't say I've been to one recently, but I know we did like a little PD with freckle." Brittany, who taught fourth-grade all subjects and had been at Hamilton Charter School for 10 years, was the only participant to mention the STEM Scopes program and the training she had for it. In general, some teachers that had been at the school for longer than 4 years could recall training on Freckle, STEM Scopes, and Lexia. In contrast, the teachers who had been at HCS for less than 4 years recalled training on only Lexia or could not recall any training.

Part of understanding the learning opportunities the teachers had access to was also to determine if they had sought out any training on their own that HCS did not provide. Ten out of the 12 teacher participants said they did not seek additional training on their own, with most of the reasoning being that they did not have the time. During an interview with kindergarten teacher Stacey, she explained, "I would probably have to find training on my own time because I'd imagine like all of our PDs are based on, like, whatever our initiatives are for the year." Two out of the 12 teacher participants said they sought additional learning opportunities elsewhere. However, one of them explained that the trainings she participated in were unrelated to technology use.

Research Question 3

The last research question that guided this study was, *how do teachers describe the support that they have received while implementing computing devices in their instruction?* The participants had varying answers when describing the support they received from their administrative team with utilizing computing devices in the classroom. The interview with the principal revealed that she was not as involved with the technology-related concerns as she would have liked to be. However, the data coach served as a mentor for new teachers, which included being able to help them with basic technology-related needs. The data coach also explained that there were specific times throughout the school year when teachers would meet with the leadership and describe one aspect that was going well for them and one that they needed assistance with. Occasionally, the aspects that the educators needed assistance with were technology-related issues.

Table 6

The varying descriptions of support from Hamilton Charter School's administration for support with computing technology integration

Support from Leadership	Number of teachers out of 12
Lower grades do not get as much support	1
Administrators were hands-off with technology	1
No direct support from administration	1
Teachers did not reach out for support	2
Administration is supportive	7

One of the teachers admitted that she felt that kindergarten was the "low man on the totem pole" when it came to technology support and that the upper grades got more support. Darlene explained, "I'm gonna go ahead and say, our admin is pretty hands-off for technology. Yeah, that's, that's probably the best way I would say from the view that I have. Maybe I just don't go to them with enough". Two of the 12 teacher participants acknowledged that they had not tried reaching out for support from the administrators. Another teacher explained that there was no direct support from the administrators. The other seven teacher participants described the support from their administrative team as 'amazing,' 'improving over the years,' and 'very supportive.' Although Walter was new to Hamilton Charter School for the 2022-2023 school year, when asked about the administrator support, he said, "As far as I can see from day one, it's been amazing."

The teachers were also asked how they perceived the administrators' expectations for the use of computing devices in the classroom. Nine of the 12 teacher participants said the expectations were fair and age-appropriate. Two of the 12 teacher participants explained that they appreciated

the freedom to use the devices how they see fit for their students. One teacher believed the administrators wanted the students to use the computers “more than we actually have the computers to do that for.”

Implications

For this study, I used a qualitative case study approach to explore teachers' experiences with training and support while implementing computing devices in their daily instruction during Fall 2022. However, additional questions arose once the data was analyzed. Why were the primary grades not one-to-one with devices? Why were all the participants not recalling the same training opportunities? What was the school’s vision and purpose for implementing technology? As previously mentioned, an interview with the principal provided insight into why kindergarten through third-grade students were not one-to-one with their devices. The principal explained that the primary grades were not one-to-one because of funding, and they planned on adding more devices each year until each grade level becomes one-to-one. The public schools in the county had one-to-one devices provided by the district, but since HCS was a charter school independent of district resources, they had to acquire their own devices. The principal and data coach also shed light on some of the training decisions that took place at Hamilton Charter School. Some of the trainings for the 2022-2023 school year included the safety training and professional development on Lexia and other phonics programs.

Drawing on the literature from Schmidt and Williamson-Kefu (2020), students in their study were able to better understand mathematical concepts when using digital technologies during learning. Unlike Schmidt and Williamson-Kefu’s study, the Chromebook devices at HCS were mainly used for learning programs where the students were provided individualized learning paths to close academic gaps instead of using them during teacher-led lessons. Grecu

(2022) found that students provided with differentiated learning through EngageNY shared a deeper understanding of the content and subject material. A quantitative study analyzing student achievement before and after using learning programs could determine if the programs improved student learning. The students did not use the devices during instructional lessons, which could have hindered a deeper understanding of the content. Although the teachers at HCS generally expressed light use of Chromebook devices, the teachers with a higher proficiency level and one-to-one devices for their classes used their devices more than those with lower proficiency and fewer devices. Carver's qualitative research study, including 68 teacher participants, found that one of the barriers teachers faced with implementing computing technology in their instruction was the teachers' knowledge and skills with devices or ICTs. This suggests that if teachers obtain more experience and skills in using the devices and programs, they can utilize computing technology more in-depth in their instruction.

All 12 teachers agreed that their students were more engaged in learning when they used the Chromebooks and learning programs during center or rotation time. This suggests that with the proper training, the teachers could be using the Chromebooks for other tasks and learning opportunities throughout the day that would improve student engagement.

The findings also suggest that the students in the higher grades used additional websites other than the basic learning programs, such as Quill, Flocabulary, and Go Formative. This could have been because the older students could navigate the devices and Internet more efficiently than the younger students. The older students would have been the only ones who could have used Flipgrid because the younger students did not have the Chromebooks that could record videos. Device availability was a factor that could have affected the ways that the kindergarten through third-grade teachers used the Chromebooks. Similarly to Carver (2016), I found that the

teachers who had between eight and 12 devices for their classes admitted that it would be challenging to have the students complete projects in a timely manner since they had to share the devices. Another educator said teaching younger students how to use the programs necessary to complete certain projects would be difficult. When students start using Chromebooks at a young age, they could learn as they continue to use the devices. The teachers did not have specific times when they could include teaching the basics of technology into their daily curriculum. The teachers with higher technology proficiency could use their devices for other purposes, such as learning videos, PowerPoint presentations, and assigning coursework and projects.

Gilvan and Yumaz (2016) described a hierarchy of steps when integrating technology into instruction. To obtain successful computing technology integration, the educators should have progressed through the steps of familiarization, utilization, integration, reorientation, and evolution. Since all 12 educators did not describe a training on the Chromebook devices, the steps of familiarization and evolution were automatically exempt from the hierarchy of steps they should have participated in.

As reported in the findings, some teachers recalled training for different learning programs, and some did not. Some possible reasons for the inconsistency in these answers could be how long they had been working at the school, the grade level they taught, the subject areas they taught, being absent during the training, or missing communication about an available learning opportunity. Existing research highlights the qualities of effective professional development for a successful computing technology integration (Tondeur, 2016; Sims & Fletcher-Wood, 2021). Some of these qualities include pursuing outside expertise, making the training recurring, incorporating interactive opportunities, and involving pedagogy. When professional development is effective, it can impact how teachers use computing devices in their

instruction (Lomos et al., 2023). I created a conceptual framework based on the previous literature to understand the quality of the professional development that the teachers had been provided. None of the professional developments that were described encompassed all four of the characteristics of effective professional development. This leads me to believe that the educators at HCS had not been adequately trained or prepared for a computing device implementation. Lexia was a new program the school was implementing for the first time that year. Therefore, there is potential for training on Lexia to become recurring. The educators at Hamilton Charter school may not have been using computing devices and ICTs to their fullest capacity because their training did not accommodate the four qualities of effective professional development according to my conceptual framework.

Along with inconsistency amongst responses regarding training, there was also incongruity regarding the support the participants received from their administrative team. The discrepancy between the responses regarding support could have been caused by various reasons, from the grade level taught, the number of devices the teacher had, or whether the teacher sought support from leadership. Research shows that when there is a greater emphasis on ICT use from school leadership, integrating computing technology from teachers will be more successful (Lomos et al., 2023). It appeared that the educators at Hamilton Charter School needed more policies and procedures put in place to help them feel better prepared and supported for using computing technology and ICTs.

Recommendations

It can be challenging to address the concerns of the educators when the solutions would include providing more funding and time to the administrators and the schools. However, some

minor changes could be made as a starting point to provide more support and preparation for educators. The following recommendations are based on the findings from this study.

Recommendation 1

First, administration and instructional coaches must be cognizant of the educators entering their first year at the school. They could potentially be entering their first year as an educator or be new to Hamilton Charter School. Administration needs to understand that teachers entering their first year at HCS may have little to no experience with computing devices in general or the specific technology they use, including the Chromebooks. Therefore, it should be prioritized to provide training on Chromebooks and the ICTs that Hamilton Charter School uses to all teachers starting in their first year. There should be time allotted during the first week back, when other professional developments are taking place, or within the first few weeks of school during their planning period. One of the participants from the study expressed that she "would have loved to have gone through a training on the technology as a new teacher."

In addition, administrators can utilize their technologically literate staff members to host voluntary professional development for the other returning faculty members who could use a review of the computing technology. This would involve a staff member such as one of the instructional coaches, the IT staff member, the media specialist, or any other faculty member that is technologically proficient with the Chromebooks. It would also require time allotted during contract hours for the teachers to attend. This could be during the first professional development week for teachers, during their planning period, or for a short amount of time before or after school. If the teachers found this type of refresher training helpful, the administration could arrange to host multiple sessions throughout the school year and utilize different staff to lead each time.

Recommendation 2

Second, in addition to working towards providing professional development throughout the year, another recommendation is to have the technology staff send out recurring emails, potentially weekly, biweekly, or monthly, that include tutorials or tips relating to different aspects regarding the devices or Chromebooks that they think would be beneficial to the teachers. The staff member sending the email could find tutorials online that would give the teachers tips on the programs they use, or they can create their own videos.

Recommendation 3

Lastly, the IT staff member for the school should schedule specific times to visit each classroom during the first month of school. They could start in the primary grades and work their way up. They would help the students log in to their accounts on different programs and show them how to navigate through the device. For the primary grades that share computers, the teachers could arrange to share the computer carts for that allotted time so that each student has a device to use while the IT staff is there. The staff member could also review rules and expectations for using devices with the students, such as what happens when a device is misused or if a device were to be damaged. Having time at the beginning of the year for students to learn their devices and the expectations could save the teachers time and stress for the remainder of the year.

Conclusion

In conclusion, the purpose of this research study was to analyze the learning opportunities available to educators regarding using computing devices in the classroom. It also examined the support that teachers received while implementing devices into their daily instruction. Interviews with teachers at Hamilton Charter School revealed discrepancies between the training and

professional development opportunities they had gone through and the support they received from their administrative team. The educators used their devices for similar purposes day-to-day. This study found that the educators at HCS should be receiving more quality training opportunities from the school or seeking out their own learning opportunities to utilize Chromebook devices for more than the basics. The study also found that the administrative team should find ways to better share their support amongst all the teachers across all grade levels. The educators found computing devices to be an effective resource for learning. Overall, the computing devices and ICTs proved to be a positive tool for differentiating learning and creating a more engaging atmosphere.

Dissemination Plan

The research findings to be presented include qualitative data analyzed from interviews with teachers at Hamilton Charter School (pseudonym) in Northeast Florida. The data does not include any personal information of the teachers. The goal is to share the research findings with the school administrators and instructional coaches. Both positions made decisions regarding the training and professional development the teachers at HCS attended. Also, these stakeholders care if their teachers feel supported and want them to use their resources efficiently. The information that will be presented to them will include the teacher's experiences with their current training opportunities, whether the teachers believe it was sufficient, and their perceptions of the support they received for using computing devices for teaching and learning. The stakeholders would then hopefully consider what the teachers had expressed about their experiences and the recommendations provided and make any necessary changes.

These stakeholders may not have known how their teachers felt regarding their training on effectively incorporating computing devices into their instruction. Therefore, I believe a

PowerPoint presentation would be most effective in showing these stakeholders what their teachers have shared. In this presentation, I will include information from the data and interviews as well as visualizations (from the findings) to help represent the main themes of the data. Furthermore, a PowerPoint presentation is something that I could send out via email, present over Zoom, or present in person. The barriers that could prevent these stakeholders from making any potential changes include funding for professional development and time restraints. The stakeholders may not realize that their educators want or need training on computing technology and ICTs, but they may be able to make that possible once they see the data from their school.

APPENDIX A

IRB APPROVAL LETTER

FLORIDA STATE UNIVERSITY
OFFICE *of the* VICE PRESIDENT *for* RESEARCH

EXEMPTION DETERMINATION

May 9, 2022

Amber Demetropoulos, [redacted]

Dear Amber Demetropoulos:

On 5/9/2022, the IRB staff reviewed the following submission:

Type of Review:	Exempt (2)(ii) Tests, surveys, interviews, or observation (low risk)
Title:	Are Teachers Receiving Adequate Training for Using Technology in Their Instruction?
Investigator:	Amber Demetropoulos
Submission ID:	STUDY00003187
Study ID:	STUDY00003187
Funding:	None
Grant ID:	None
IND, IDE, or HDE:	None
Documents Reviewed:	• consent form.pdf, Category: Consent Form; • DemetropoulosA_503Protocol.pdf, Category: IRB Protocol; • DemetropoulosA_ParticipantSurvey.pdf, Category: Recruitment Materials; • interview.pdf, Category: Survey/Questionnaire; • Recruitment E.pdf, Category: Recruitment Materials;

The IRB staff determined the protocol qualifies for exemption, and where applicable the IRB has determined that the protocol qualifies for approval in accordance with federal regulatory requirements for Limited IRB review, effective on 5/9/2022. Further IRB review and approval by this organization is not required (however, see bolded note below).

COVID-19 Information for Research Involving Human Subjects: Note that the U.S. is operating under the national emergency Proclamation 9994 concerning the COVID-19 pandemic and that this national emergency remains in effect until rescinded or terminated by the President of the U.S. (go here for the Proclamation letter). Conditions are dynamic and related policies or guidance evolve accordingly; as applicable, refer to the U.S. Centers for Disease Control and Prevention website specific for universities or refer to our COVID-19 and Human Research Studies web page to learn more about how you should or may protect persons (whether vaccinated or unvaccinated) involved in any of your in-person research activities.

Other Information:

You are advised that any modification(s) to the protocol for this project that may alter this exemption determination must be reviewed and approved prior to implementation of the proposed modification(s).

Modifications to the research may invalidate the exemption determination (because the research no longer meets the exemption criteria described in HRP-312 – WORKSHEET – Exemption Determination).

Examples of minor changes to exempt research that would *not* alter the exemption determination and should therefore not be submitted to the IRB for further review include the following:

- Making administrative (formatting, grammar, spelling) revisions to the protocol, consent or recruitment materials or other study documents
- Adding or revising non-sensitive questions or non-identifiable response options to a survey, interview, focus group or other data collection instrument
- Increasing or decreasing the number of study subjects—*unless* adding a new study sample such as children or prisoners or adding a new source of data or records
- Making study team/personnel changes—*except* (1) a change in Principal Investigator (PI) or (2) a change in other study personnel for whom regulatory approval of involvement in the study must be documented for purposes of institutional policy, sponsorship or funding, or other administrative purposes (e.g., graduation or manuscript clearance; addition of non-FSU study personnel).

Examples of changes to exempt research that *do require* prospectively submitting a modification to the IRB before implementing changes include the following:

- Making substantive revisions or additions (e.g., change in PI; funding source; sample; source of study subjects or their data; study sites or settings; procedures, interventions or interactions with study subjects; use of any drug, device, supplement or biologic; study subjects' time or duration spent performing or participating in study activities) to the protocol, consent or recruitment materials or other study documents
- Adding or revising sensitive questions or identifiable response options to a survey, interview, focus group or other data collection instrument
- Adding a new study sample such as children or prisoners or adding a new source of data or records
- Obtaining, using, studying, analyzing, generating, storing or maintaining identifiable information or identifiable biospecimens in addition to or in lieu of de-identified or anonymous information or specimens
- Change in study risks (e.g., impact upon study subjects; impact upon students' opportunity to learn educational content or assessment of educators who provide instruction; any disclosure of study subjects' responses outside of the research may place study subjects at risk of criminal or civil liability or be damaging to subjects' financial standing, employability, educational advancement or reputation)
- Change in Principal Investigator (PI) or (for students) faculty advisor
- Any involvement of a non-FSU institution or organization (**IF school permission will be required to email teachers for recruitment, submit a study modification together with a copy of the school's permission**).
- New or change in financial interest

In conducting this protocol, you are required to follow the applicable requirements listed in the Investigator Manual (HRP-103), which can be found by navigating to the Library within the RAMP IRB system.

Sincerely,

Office for Human Subjects Protection (OHSP)
Florida State University Office of Research
2010 Levy Avenue, Building B Suite 276
Tallahassee, FL 32306-2742
Phone: 850-644-7900
Email: humansubjects@fsu.edu
OHSP Web: https://ohsp.fsu.edu

APPENDIX B

SCHOOL PERMISSION TO CONDUCT RESEARCH

Date: _____

Dear Instructional Review Board,

The purpose of this letter is to inform you that I give Amber Demetropoulos permission to conduct the research titled **"***Are Teachers Receiving Adequate Training for Using Technology* in *Their Instruction*?." at *Hamilton Charter School.* This also serves as assurance that this school complies with requirements of the Family Educational Rights and Privacy Act **(**FERPA) and the Protection of Pupil Rights Amendment (PPRA) (see back for specific requirements) and will ensure that these requirements are followed in the conduct of this research.

Sincerely,

- The right of a parent of a student to inspect, upon the request of the parent, a survey created by a third party before the survey is administered or distributed by a school to a student. Any applicable procedures for granting a request by a parent for reasonable access to such survey within a reasonable period of time after the request is received.
- Arrangements to protect student privacy that are provided by the agency in the event of the administration or distribution of a survey to a student containing one or more of the following items (including the right of a parent of a student to inspect, upon the request of the parent, any survey containing one or more of such items): Political affiliations or beliefs of the student or the student's parent. Mental or psychological problems of the student or the student's family. Sex behavior or attitudes. Illegal, anti-social, self-incriminating, or demeaning behavior. Critical appraisals of other individuals with whom respondents have close family relationships. Legally recognized privileged or analogous relationships, such as those of lawyers, physicians, and ministers. Religious practices, affiliations, or beliefs of the student or the student's parent. Income (other than that required by law to determine eligibility for participation in a program or for receiving financial assistance under such program).
- The right of a parent of a student to inspect, upon the request of the parent, any instructional material used as part of the educational curriculum for the student. Any applicable procedures for granting a request by a parent for reasonable access to instructional material received.
- The administration of physical examinations or screenings that the school or agency may administer to a student.
- The collection, disclosure, or use of personal information collected from students for the purpose of marketing or for selling that information (or otherwise providing that information to others for that purpose), including arrangements to protect student privacy that are provided by the agency in the event of such collection, disclosure, or use.
- The right of a parent of a student to inspect, upon the request of the parent, any instrument used in the collection of personal information before the instrument is administered or distributed to a student. Any applicable procedures for granting a request by a parent for reasonable access to such instrument within a reasonable period of time after the request is received.

APPENDIX C

QUALTRICS PRE-SURVEY

Qualtrics Pre-survey sent to teachers via email

1. What grade level do you teach?
    a. Kindergarten
    b. 1st
    c. 2nd
    d. 3rd
    e. 4th
    f. 5th

2. How many years have you been teaching?
    a. Less than 1 year
    b. 2-3 years
    c. 4 or more years

3. How often do your students use their school provided Chromebook devices for these learning activities?

	Very Often	Often	Rarely	Never
Collaborative Projects				
STEM Projects				
Differentiated Learning				
Student-Led Research				
Presentations				

APPENDIX D

PARTICIPANT CONSENT FORM

Title of the Study: *Are Teachers Receiving Adequate Training for Using Technology in Their Instruction?*
Principal Investigator: Amber Demetropoulos, FSU Student
Faculty Advisor: Dr. Stacey Rutledge, FSU Professor

You are being invited to take part in a research study. Please find below information about this research for you to think about before you decide to take part. Ask me if you have any questions about this information or the research before you decide to take part.

Key Information for You to Consider
Statement of the Research Study. You are being invited to volunteer to take part in our research study. It is up to you whether you choose to take part or not. There will be no penalty or loss of benefits to you if you choose not to take part or decide later not to take part. **Purpose**. The reason that I am doing this research is to explore teacher perceptions and experiences with the computing device initiative at a charter school in Northeast Florida. **Duration.** I think that taking part in the study will last approximately 45-60 minutes for the initial interview. If any follow-up is needed for clarification or a review of the interview transcripts, that could take an additional 60 minutes. **Research Activities.** You will be asked to verbally answer interview questions related to the device initiative that has been implemented in your school. Examples of question topics include training you have received, support you have received from administration, student perceptions of using Chromebook devices, and behavioral concerns from using Chromebooks. **Risks:** The risks or discomforts to you of taking part in this study are very minimal. The only discomfort you may experience is how honest you would like to be while answering some of the interview questions. **Benefits:** As a result of taking part in this research, I think that you may find that reflecting on your own experiences could lead to using computing technology more or differently in your instruction. The findings of the study could also benefit teachers and students in the county.

What will happen during this research?
If you agree to be in this research, your participation will include a 45-60 minute interview where you will verbally answer interview questions. Interviews will occur via Zoom and will be recorded for transcription purposes.

What will you do to protect my privacy?
The results of the study may be published or presented, but no information that may identify you will ever be provided or released in publications or presentations. I will take steps to protect your privacy and confidentiality. These steps include using fake names in interview transcripts as well as pseudo names of the participating school.
Individuals and organizations responsible for conducting or monitoring this research may be permitted access to and inspect the research records. This includes the Florida State University Institutional Review Board (FSU IRB), which reviewed this study.
The information collected as part of this research will not be used or distributed for future

research studies, even if all of your identifiers are removed.

What is the compensation for the research?
You will not receive any compensation for your participation in this study.

What will happen if I choose not to participate?
It is your choice to participate or not to participate in this research. Participation is voluntary. Taking part in this research study is your decision. Your participation in this study is voluntary. You do not have to take part in this study, but if you do, you can stop at any time. There are no penalty/consequences/loss of benefits to which you are otherwise entitled, if you do not participate.
If you withdraw from the study, the data collected to the point of withdrawal will be disregarded.

STATEMENT OF CONSENT
I have read and considered the information presented in this form. I confirm that I understand the purpose of the research and the study procedures. I understand that I may ask questions at any time and can withdraw my participation without prejudice. I have read this consent form. My signature below indicates my willingness to participate in this study.

I consent to participate in this study.

_____
Printed Name of Adult Participant

_____
Signature of Adult Participant Date

I agree to be audiotaped
YES (initial) ____ NO (initial) ____

I agree to be videotaped
YES (initial) ____ NO (initial) ____

Researcher's Signature

I have fully explained the research study described by this form. I have answered the participants' questions and will answer any future questions to the best of my ability. I will tell the person taking part in this research of any changes in the procedures or in the possible harms/possible benefits of the study that may affect their willingness to stay in the study.

_____
Printed Name of Research Team Member Obtaining Consent

_____
Signature of Research Team Member Date

APPENDIX E

INTERVIEW PROTOCOL FOR TEACHER PARTICIPANTS

Ice-breaker questions:

- Ask them the pre-survey questions to review their teaching background.
- Ask what their own personal experiences have been with using technology.
- How do they perceive their proficiency with technology?
- What are some of your perceptions on whether you were prepared adequately for the use of one-to-one devices?
- Ask them to provide examples of some lessons they have done using technology devices.
- Ask them to describe or lay out a typical day in their classroom and how technology fits into their day.

1. Describe the specific training/professional development that you undergo specifically for implementing Chromebooks and ICTs into your instruction?

2. Could you describe the PDs that you have participated in that were required?

3. Could you describe the PDs sponsored by Imagine that you have participated in voluntarily?

    a. *How have the PDs you have attended been effective?*
    b. *What could they include to be more effective or vice versa?*

4. Are there any other personal learning opportunities that you have gone through regarding technology and instruction? (i.e. learning from peer teachers, workshops, online tutorials, etc.)

5. How do you hear about any required or voluntary learning opportunities (i.e. emails, flyers, etc.)?

    a) *Do you do your own research to inquire about/participate in learning opportunities related to using technology in the classroom?*
    b) *Do you do your own research to inquire about/participate in learning opportunities that are not specifically related to technology?*

6. How would you describe the support from your administration team with teacher and student use of technology in the classroom?

    a. *How would you describe the support from other staff members (i.e. instructional coaches, technology staff, etc.) with teacher and student use of technology in the classroom?*

7. How does the requirement of utilizing technological devices influence your own instructional methods? If they were not required, would you still use them?

8. How has COVID-19/school shutdowns influenced your use of technology now that students and teachers are back to brick-and-mortar setting?

9. In the time that you have taught in at Imagine, describe some of the successes that you have experienced with implementing technology into daily instruction.

10. Describe some of the challenges that you have experienced with implementing technology into daily instruction.

11. What do you think of your students' use of devices? Do they enjoy using them? Do you experience behavioral issues concerning iPads?

    a. *For example, do you feel as though the students are engaged in learning when they are using the devices?*

Any other comments they would like to add about their experiences before concluding the interview…

*Numbered items are primary questions asked verbatim; italicized items are follow-up questions.

APPENDIX F

INTERVIEW PROTOCOL FOR ADMINISTRATION

* Review background about the school as well as the background of the staff member (including, but not limited to their role at the school, how long they have been in that role, etc)

1. When did Imagine begin implementing Chromebook devices into teacher instruction?

2. Does your role at the school offer any technology support to the staff?

3. What is the school's philosophy regarding the use of technology in education? What is the schools' goals for using technology in the classroom?

4. Which grade levels have access to one-to-one devices?

5. *If there are grade levels that do not have one-to-one devices* What is the reason these grade levels do not have one-to-one devices?

6. What training or professional development has been offered to the teachers in recent years regarding technology?

7. How do the teachers hear about the training? (i.e. emails, flyers, notices, word of mouth, etc)

8. Are the trainings required for teachers to attend? Are there any benefits for attending (i.e. in-service points) or consequences for not attending?

9. Would all grade levels and subject area teachers be offered the same trainings?

10. How are the students expected to use their devices throughout the day? What are they expected to use them for?

*Follow up with any additional questions as needed.

REFERENCES

Adams, L. G. (2011). Engaging middle school students with technology/using real-time data to test predictions in aquatic ecosystems. *Science Scope*. 34(9), 32. http://link.gale.com/apps/doc/A270980154/AONE?u=tall85761&sid=bookmark-AONE&xid=aed3a6ce

Al-kreimeen, R., & Samaw, F. S. (2022). Shifting to remote learning: Students' engagement and anticipating challenges: A review article. *Journal of Educators Online*, *19*(2). https://doi.org/10.9743/jeo.2022.19.2.2

Allen, L. E., Lowther, D. L., & Strahl, J. D. (2007). Differences in technology use based on levels of immersion in a teacher technology training program. *Journal of Educational Technology, 4*(3), 27-38.

Anthony, W., Levine-Brown, P., Finn, N., Gadzekpo, P., & Spinks, M. (2020). Technology considerations and opportunities in higher education. *Journal of College Academic Support Programs*, *3*(1), 31–42. https://doi.org/10.36896/3.1sppfa1

Atika, S., Nadia, N., & Dela, S. (2022). Improving student learning outcomes with educational game-based interactive learning media. *International Journal of Education and Teaching Zone*, *1*(1), 16-19.

Baysan, E., & Çetin, Ş. (2021). Determining the training needs of teachers in ethical use of Information Technologies. *Kuramsal Eğitimbilim*, *14*(3), 476–497. https://doi.org/10.30831/akukeg.885891

Blanchard, M., LePrevost, C., Tolin, A., & Gutierrez, K. (2016). Investigating technology-enhanced teacher professional development in rural, high-poverty middle schools. *Educational Researcher*, *45*(3), 207-220. DOI: 10.3102/0013189X16644602

Canals, L., & Al-Rawashdeh, A. (2019). Teacher training and teachers' attitudes towards educational technology in the deployment of online English language courses in Jordan. *Computer Assisted Language Learning: An International Journal*, *32*(7), 639–664. DOI: 10.1080/09588221.2018.1531033

Carter, S. P., Greenberg, K., & Walker, M. S. (2016). The impact of computer usage on academic performance: Evidence from a randomized trial at the United States Military Academy. *Economics of Education Review*, *56*, 118–132. https://doi.org/10.1016/j.econedurev.2016.12.005

Carver, L. B. (2016). Teacher perception of barriers and benefits in K-12 technology usage. *Turkish Online Journal of Educational Technology, 15*(1), 110-116.

Cauthen, L. (2020). Just how large is the K12 Ed-Tech market.

Chachkevitch, A. (2013, Jun 18). District 225 spending on technology for students. *McClatchy -Tribune Business News* https://www.proquest.com/wire-feeds/district-225-spending-on-technology-students/docview/1368964838/se-2

Cordingley, P., Higgins, S., Greany, T., Buckler, N., Coles-Jordan, D., Crisp, B., & Coe, R. (2015). Developing great teaching: lessons from the international reviews into effective professional development.

Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches.* Sage.

Desimone, L. M. (2011). A primer on effective professional development. *Phi delta kappan*, *92*(6), 68-71.

Ertmer, P. A., Ottenbreit-Leftwich, A. T., & Tondeur, J. (2015). Teachers' beliefs and uses of technology to support 21st-century teaching and learning. *International handbook of research on teacher beliefs*, *403*.

Fernández-Batanero, J. M., Montenegro-Rueda, M., Fernández-Cerero, J., & García-Martínez, I. (2022). Digital competences for teacher professional development. Systematic review. *European Journal of Teacher Education*, *45*(4), 513-531.

Ford, Kwon, K.-A., & Tsotsoros, J. D. (2021). Early childhood distance learning in the U.S. during the COVID pandemic: Challenges and opportunities. *Children And Youth Services Review*, *131*, 106297–. Https://Doi.org/10.1016/J.childyouth.2021.106297

Gore, J. M., Miller, A., Fray, L., Harris, J., & Prieto, E. (2021). Improving student achievement through professional development: Results from a randomized controlled trial of Quality Teaching Rounds. *Teaching and Teacher Education*, *101*. https://doi-org.proxy.lib.fsu.edu/10.1016/j.tate.2021.103297

Grecu, Y. V. (2022). Overcoming obstacles to differentiate instruction when implementing prepared curricula resources in a diverse classroom. *Anatolian Journal of Education,* 7(1), 167-180. https://doi.org/10.29333./aje.2022.7113a

Güven, B., & Yılmaz, G. K. (2016). Effect of designed in-service training to secondary school mathematics teachers technology usage level. *Education & Science*, *41*(188), 35–66.

Hill, J., & Reimer, T. (2022). Crossing the digital divide and the equity expanse: Reaching and teaching all students during the pandemic. *Journal of Leadership, Equity, and Research*.

Hover, A., & Wise, T. (2022). Exploring ways to create 21st century digital learning experiences. *Education 3-13*, *50*(1), 40-53.

Johnson, D. (2012). Stretching your technology dollar. *The Resourceful School, 69*(4), 30-33.

Kalioldanovna, Y. G., Roza, N., Arzanbayeva, B., Roza, L., Azimkhan, Y., & Omarov, N.(2022). Training of primary school teachers in the use of information technology. *World Journal on Educational Technology: Current Issues*, *14*(3), 963–975. https://doi.org/10.18844/wjet.v14i3.7329

Kjellsdotter. (2020). What matters? A didactical analysis of primary school teachers' ICT integration. *Journal Of Curriculum Studies*, *52*(6), 823–839. https://Doi.org/10.1080/00220272.2020.1759144

Knight, & Toenjes, L. A. (2020). Do charter schools receive their fair share of funding? School finance equity for charter and traditional public schools. *Education Policy Analysis Archives*, 28, 51–. https://doi.org/10.14507/epaa.28.4438

Kormos, E. M. (2018). The unseen digital divide: Urban, suburban, and rural teacher use and perceptions of web-based classroom technologies. *Computers in the Schools*, *35*(1), 19-31.

Leedy, P. D., & Ormond, J. E. (2019). *Practical research: planning and design* (12th ed.). New York: Pearson Education, Inc.

Liu, D., & Hai, Z. (2019). A study of correlation between technology knowledge and technology beliefs of EFL teachers in junior middle school. *2019 International Joint Conference on Information, Media and Engineering (IJCIME), Information, Media and Engineering (IJCIME), 2019 International Joint Conference On*, 51–54. doi: 10.1109/IJCIME49369.2019.00020.

Liu, S., & Phelps, G. (2020). Does teacher learning last? Understanding how much teachers retain their knowledge after professional development. *Journal of Teacher Education*, *71*(5), 537. https://doi-org.proxy.lib.fsu.edu/10.1177/0022487119886290

Lomos, C., Luyten, J. W., & Tieck, S. (2023). Implementing ICT in classroom practice: What else matters besides the ICT infrastructure? *Large-Scale Assessments in Education*, *11*(1). https://doi.org/10.1186/s40536-022-00144-6

Luo, W., Berson, I. R., Berson, M. J., & Li, H. (2021). Are early childhood teachers ready for digital transformation of instruction in Mainland China? A systematic literature review. *Children and Youth Services Review*, *120*. https://doi.org/10.1016/j.childyouth.2020.105718

Maksimovic, J., & Dimic, N. (2016). Digital technology and teachers' competence for its application in the classroom. *Research in Pedagogy*, *6*(2), 59–71.

McGinnis, P. (2021). The importance of professional development. *Science Scope*, *45*(2), 1. https://link.gale.com/apps/doc/A682703339/AONE?u=tall85761&sid=bookmark-AONE&xid=7e0ea204

Merriam, S. B. & Tisdell, E. J. (2015). Qualitative research: A guide to design and implementation (4th ed.). *Jossey-Bass*.

Midcalf, L., & Boatwright, P. (2020). Teacher and parent perspectives of the online learning environment due to COVID-19. *Delta Kappa Gamma Bulletin*, *87*(1), 24–34.

Mourlam, D. & Montgomery, S. (2015) iPads and teacher education: Exploring a 1:1 initiative in a professional development school partnership, *Journal of Digital Learning in Teacher Education*, *31*:3, 107-116.

National Forum on Education Statistics. (n.d.). Forum guide to technology management in education. *National Center for Education Statistics (NCES) a part of the U.S. Department of Education*. https://nces.ed.gov/forum/tec_training.asp.

Noble, H., & Smith, J. (2015). Issues of validity and reliability in qualitative research. *Evidence -based nursing*, *18*(2), 34-35.

Patton, K., Parker, M., & Tannehill, D. (2015). Helping teachers help themselves: Professional development that makes a difference. *NASSP bulletin*, *99*(1), 26-42.

Penuel, W. R., Fishman, B. J., Yamaguchi, R., & Gallagher, L. P. (2007). What makes professional development effective? Strategies that foster curriculum implementation. *American educational research journal*, *44*(4), 921-958.

Peterson, L., Scharber, C., Thuesen, A. & Baskin, K. (2020). A rapid response to COVID-19: one district's pivot from technology integration to distance learning. *Information and Learning Sciences*, *121*(5/6), 461–469. https://doi-org.proxy.lib.fsu.edu/10.1108/ILS-04-2020-0131

Purdue University. (2021). The evolution of technology in the classroom.

Ribeiro, J. (2018). Wearable technology spending: A strategic approach to decision-making. In *Wearable Technologies: Concepts, Methodologies, Tools, and Applications* (pp. 517-537). IGI Global.

Saldaña, J. (2021). The coding manual for qualitative researchers (4th). *SAGE*.

Schmidt, A., & Williamson-Kefu, M. (2020). Using digital technology to support mathematical learning outcomes in a primary classroom. *Australian Primary Mathematics Classroom*, *25*(3), 23–28.

Seidman, I. (2019). *Interviewing as qualitative research: A guide for researchers in education and the social sciences* (5th ed.). Teacher's College Press.

Šerić, M. (2020), "The impact of communication technology vs human-related factors on

classroom performance: a cross-cultural study", International Journal of Information and Learning Technology, Vol. 37 No. 4, pp. 139-152. https://doi.org/10.1108/IJILT-03-2020-0037

Sims, & Fletcher-Wood, H. (2021). Identifying the characteristics of effective teacher professional development: A critical review. *School Effectiveness And School Improvement.*, *32*(1), 47–63. Https://Doi.org/10.1080/09243453.2020.1772841

Tettegah, S. & Hunter, R. (2006). Technology and education: Issues in administration, policy and applications in K12 schools. JAI Press Inc.

Tondeur, J., Forkosh-Baruch, A., Prestridge, S., Albion, P., & Edirisinghe, S. (2016). Responding to challenges in teacher professional development for ICT integration in education. *Educational Technology & Society*, *19*(3), 110+. https://link.gale.com/apps/doc/A461608118/AONE?u=tall85761&sid=bookmark-AONE&xid=5dc55dc4

Westerlin, S., & Vogt, S. (2022). Transformative technology in the PK-12 classroom. *Educational Research: Theory and Practice*, *33*(1), 68–72.

Zhou, L., Li, F., Wu, S., & Zhou, M. (2020). “School’s out, but Class’s on”, the largest online education in the world today: Taking China’s practical exploration during the COVID-19 epidemic prevention and control as an example. *Online Submission*, *4*(2), 501–519.

Zhuang, W., & Xiao, Q. (2018). Facilitate active learning: The role of perceived benefits of using technology. *Journal of Education for Business*, *93*(3), 88–96.

Zipke, M. (2018) Preparing teachers to teach with technology: Examining the effectiveness of a course in educational technology. *The New Educator, 14*:4, 342-362.

BIOGRAPHICAL SKETCH

Amber Nicole Demetropoulos completed her doctoral degree in Educational Leadership and Policy Studies at the Florida State University. She attended Daytona State College to obtain her Associate of Science degree before transferring to Liberty University, where she received her bachelor's degree in Psychology. Amber also holds a master's degree in Elementary Education from Grand Canyon University. After receiving her master's degree, Amber accepted a position as an elementary educator in August 2018. Amber served both public and private schools before completing her doctoral degree. Within her first three years of being an educator, Amber obtained her ESOL and Reading K12 endorsements. Amber currently serves as a third-grade teacher at a private school in Flagler County. In her current position she creates appropriate lesson plans for 3rd grade based on Florida benchmarks, differentiates instruction to meet students' needs, creates both student and teacher materials, uses technology for parent communication and student record keeping, reviews all students with 504's, IEP's and EP's to ensure that their academic goals are being met, and create an environment of trust and learning.