IMPROVING DIGITAL LITERACY THROUGH A 1:1 DIGITAL DEVICE IMPLEMENTATION: AN APPLIED STUDY

by

Sherry Watts

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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APPROVED BY:

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ABSTRACT

The purpose of this applied study was to solve the problem of the need to improve digital literacy for students on an urban middle school campus in South Texas and to design a solution to address this problem. I collected data using both qualitative and quantitative approaches. Teachers and instructional coaches were interviewed via the Zoom video conferencing online platform to explore how teachers and instructional coaches described the relationship between the deployment of a 1:1 digital device program and the improvement of students' digital literacy on their middle school campus. I collected quantitative and qualitative survey data from teachers on the South Texas middle school campus being researched to inform the problem of improving students' digital through a 1:1 digital device deployment on their middle school campus. All surveys were designed using the Google Forms online platform and then distributed electronically. I then combined all data retrieved from participants to devise research-based guidance and developed a solution to address this problem. Based on the findings, this applied study identified several recommendations for solving the problem of improving the digital literacy skills for students. These recommendations included providing a better 1:1 digital device, stronger Wi-Fi connections, and robust digital training for students and teachers.

Keywords: digital literacy, 1:1 digital device, middle school, technology

Dedication

This dissertation is dedicated to my family, who has encouraged, supported, and pushed me to complete a journey I had dreamed about for most of my adult years. My husband, Tony, has been my listening ear when I complained about how hard it was to handle the many roles that life had given me efficiently. Thanks for attempting to lighten my load. To my children Willie III, William, Faith, Majesty, and my bonus daughter Charmaine, thanks for being my inspiration. Whenever I want to quit, I remember that each of you is my "Why." I pray that you will believe in yourself as you have believed in me.

To my siblings Tammi, Jason, and Shemel, you are so special to me. Your belief in me is something I treasure and will never take for granted. I pray that you know that I believe in your dreams and visions.

To my parents, Barbara and Bobby Hennington, although you are no longer with me physically, your guidance and hope for a better future for me motivated me to complete this task. Mom, I know you were concerned that I would not finish my degree after becoming your caregiver. I just want you to know that taking a break from writing to take care of you in your last days was worth it. We did it, mom!

I also dedicate this degree to all the future students of Harmony Empowerment College and Career Academy, Harmony University, and Harmony Head Start Academy (future schools).

Acknowledgments

First, I would like to thank all of my professors for getting me this far. I remember taking night courses at Dallas County Community College and working during the day to finish my college basics. When Dallas Baptist University (DBU) accepted me into their business college, I knew the Lord was ordering my steps. After graduation from DBU, I pursued a career in business but knew God had a bigger plan for me. I enrolled in Arlington Baptist University and earned my M.Ed. Finally, my journey led me to Liberty University online school. At first, online college was overwhelming. But my understanding, motivating, and innovative professors helped me succeed in this journey.

Special thanks to Dr. D. Bradshaw. Your prayers, encouragement, correction, and gentle pushing kept me on track to complete this journey. I am thankful for you holding me accountable to finish this dissertation. I have learned so many lessons about being a compassionate yet firm professor. Your example of a Godly professor will be duplicated for all students assigned to me. Thanks, Dr. Parks, for helping me to understand quantitative methods. You challenged me to understand research methods and to present them academically. Thanks also to Dr. Rebecca Lunde, your precise edits helped this dissertation convey my passion to solve the problem of improving the digital literacy of marginalized students. My experience with all of you has improved my writing skills and academic confidence.

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List of Abbreviations

1:1 - One to One

DL - Digital Literacy

ICT - Information and Communications Technology

IRB - Institutional Review Board

ISTE - International Society for Technology in Education

LEA - Local Educational Agency

OECD - Organization for Economic Cooperation and Development

PLC - Professional Learning Community

TEA - Texas Education Association

CHAPTER ONE: INTRODUCTION

Overview

The purpose of this applied study was to solve the problem of improving the digital literacy skills of middle school students in a large, urban public school district, purposefully focusing on student access to a 1:1 digital device and designing an intervention to address the problem. The problem was the need to improve students' digital literacy skills on an urban middle school campus in south Texas through a 1:1 digital device deployment. This chapter provides the background, historical context, social context, and theoretical context for this research study. It also introduces the problem and purpose of this applied research study. This chapter will explain the significance of this study. The central and three sub-question research questions are included in this chapter. Finally, this chapter will provide definitions of terms used throughout this research.

Background

In their research study, Luo and Murray (2018) noted that teachers supported strategic student technology use and empowerment in student and educator digital literacy. The transformation of education to learner self-development can be achieved when the teaching-learning digital classroom works closely together (Mudure-Iacob, 2019). In a blended classroom, teachers are no longer considered the all-knowing individual but instead share the learning responsibility with the student (Hallman, 2019; Lindqvist, 2016; Raman et al., 2019). Digital literacy allows students to increase their funds of knowledge by combining a teacher-led curriculum and digital information (Lara et al., 2017; Mirra et al., 2018).

In this applied research study, the urban middle school is located in Texas's socioeconomically disadvantaged metropolitan city area. Before the 1:1 digital device

deployment in the 2019 – 2020 school year, the school computer labs and the limited number of computers available in classrooms were generally the only access students had to online resources. Since technological competencies are an integral factor in becoming gainfully employed in a career that will move them from poverty to a better financial position after K-12 education, these students must develop their digital literacy skills before graduation (Bejakovic & Mrnjavac, 2020; Samsudin & Hasan, 2017; Saputra & Siddiq, 2020). Anthonysamy (2019) and Dolan (2016) recognized the need to lessen the digital divide by providing a 1:1 digital device to all students. The school district that governs this middle school approved a 1:1 digital device deployment for each secondary education student in the 2019-2020 school year.

Research has found that in a 1:1 program, students have access to the benefits of the Internet and the wealth of information it provides to support their educational endeavors (Delacruz, 2018; Lara et al., 2017; Tomczyk, 2020). This study will explore teachers' and instructional coaches' perspectives on improving digital literacy through the 1:1 digital device deployment executed by the urban school district. This understanding will be beneficial in devising a plan to improve the students' digital literacy by implementing a 1:1 digital device program. Consistent recommendations emerged during this study regarding the connection between improved digital literacy and the deployment of a 1:1 digital device, which will provide research-based guidance for the use and practices of educational leaders on this middle school campus.

Historical Context

Literacy development has grown from reading and writing from traditional text to learning from computers and other mobile digital devices (Schatteman & Liu, 2020). Historically, teachers guided students in developing literacy by granting students many

opportunities throughout the day for daily writing, reading books, chants, rhymes, and memorization (Strickland et al., 1990). Researchers Abrams et al. (2019) noted that digital and nondigital methods inform each other. Research has found that learners also develop critical literacy through improved Internet communication and integration, which provides the emergence of voice and control for the learner (Abrams et al., 2019; Mnyanda & Mbelani, 2018).

Personal computers became popular in households in the early 1980s. Since their inception, families and businesses have used them for tasks previously performed at a slower rate by humans (Bhatt & MacKenzie, 2019; Schatteman & Liu, 2020). Computers were also being used in the classroom to supplement lessons, motivate students, and develop software competence (Willing & Girard, 1990). Amarel (1983) noted that classrooms were not prepared for the advance of computers. With a limited number of computer terminals, teachers were tasked with allocating time for each student to interact with digital technology in the classroom (Hallman, 2019; Warschauer et al., 2012). This practice is as unproductive as requiring students to share pencils (Amarel, 1983).

Social Context

The earlier a child is exposed to digital technologies, the greater their chances of developing the robust digital skills that are needed in today's workforce (Hughes & Read, 2018; Lindqvist, 2015). Researchers have noted that the socioeconomic background of learners, lack of resources, and teachers' poor pedagogical content knowledge all contribute to students' low digital literacy (Dolan, 2016; Hughes & Read, 2018; Mnyanda & Mbelani, 2018). In addition, Amarel (1983) found that when teachers did not employ strict schedules for using the limited computer terminals in the classroom, students who possessed advanced digital literacy dominated the terminals, thereby benefitting from the designated assignment and gaining more

advanced computer skills. Amarel (1983) also noted that this disparity usually left girls, students who were less interested in learning computers, and physically weaker students with low digital literacy skills.

Digital literacy means more than just using computers or technologies for a task (Anthonysamy, 2019; Kim, 2019). It also includes engaging in research, participating in the high-level analysis, thinking critically, collaborating effectively, and synthesizing information gained using digital technology (Hughes & Read, 2018; Kim, 2019; Zahorec et al., 2019). Digital literacy is also defined as finding, evaluating, sharing, and communicating information using cognitive and technical skills (Heitin, 2016; Lynch, 2017).

Whenever new technologies are introduced to society, education leaders attempt to incorporate those technologies into the classroom (Brill & Park, 2008; Harrell & Bynum, 2018). Empirical research has shown that young people engage with technology in many ways, but more often, they do not gain viable digital literacy in their interactions (Creer, 2018; Wilkin et al., 2017). A substantial amount of research has been conducted on educational technology in the classroom (Creer, 2018; Saavedra & Opfer, 2012; Warschauer et al., 2012). When students are given access to digital technology daily, they use it for more productive, educational purposes and thereby improve their digital literacy skills (Lamb & Weiner, 2018; Warschauer et al., 2012). School districts would benefit from focusing on the best pedagogical discipline approach to teaching and learning digital literacies for the 21st-century student (Brill & Park, 2008; Harrell & Bynum, 2018).

Theoretical Context

In the United States, like other developed nations, technology is deeply embedded in students' lives in K-12 (Lamb & Weiner, 2018; Molin & Lantz-Anderson, 2016). Cutting-edge

technology with the discipline of sound pedagogical theory can provide a robust learning experience for all students (Brill & Park, 2008; van Laar et al., 2017). The first theory applied in this research was Siemens' theory of connectivism (Siemens & Downes, 2009). Connectivism is an emergent theory that explains the learner's natural ability to self-teach with improved digital literacy (Goldie, 2016; Mnyanda & Mbelani, 2018). This theory describes how people gain knowledge and its connection with the rapid growth of the Internet (Siemens & Downes, 2009). The learner interacts with information from the Internet and then connects the new learning with previous learning (Karunanayaka & Weerakoon, 2020; Mirra et al., 2018; Samsudin & Hasan, 2017). Goldie (2016) explained that connectivism's starting point for learning occurs when learners connect their participation in the learning community and their present knowledge. By working closely with teachers and instructional coaches on the urban middle school campus, this research study could to add to research by Sadaf and Gezer (2020) on teachers' beliefs concerning the practice of integrating digital literacy into the classroom.

The second theory applied to this research was Piaget's (1936) theory of constructivism. The constructivist theory states that students are not blank slates waiting for someone to build on them; instead, they possess knowledge they build upon during active learning engagement (Brill & Park, 2008). Piaget (1936), the chief theorist of constructivist learning, focused on the process by which children gained knowledge. An essential premise of this theory is that students must actively construct knowledge in their own minds, and teachers cannot simply transmit knowledge to the students (Bada, 2015; Hallman, 2019). Digital literacy grants the learner the ability to reflect upon his or her own way of knowing and doing things, allowing them to build upon their ecology of resources (Abrams et al., 2019; Luckin, 2008). This research broadens the research of Dolan (2016), which focuses on narrowing the digital literacy bridge to transform

marginalized students from digital consumers to digital producers. It examined the benefits of personalized learning through 1:1 technology initiatives, as discussed in Hallman's (2019) research.

Problem Statement

The problem is the need to improve students' digital literacy skills on an urban middle school campus in south Texas through a 1:1 digital device deployment. This study's primary goal was to explore teachers' and instructional coaches' perspectives on the relationship between improved digital literacy and access to a 1:1 digital technology device. The existing literature provides a mixed set of results for the relationship between improved digital literacy and granting students a 1:1 digital device (Abrams et al., 2019; Warschauer et al., 2012; Zahorec et al., 2019).

I have been the computer technology instructor on the campus being researched for five school years. My responsibility as their educator is to increase students' digital literacy from just being digital consumers to being proficient digital producers. Before the 1:1 digital device deployment in the 2019 – 2020 school year, the school computer labs and the limited number of computers available in classrooms were generally the only access these students had to online resources. Also, most students on this campus had limited access to the Internet via their parents' cellphones due to the data limits imposed by their cellphone plans. Due to the aforementioned limitations, students' digital literacy could be classified as beginning. The classification of beginning means that students can search and access content in the online space (Mudure-Iacob, 2019). With the increased availability of internet content, students will need to gain skills to navigate and understand the information which they access via the Internet (Saavedra & Opfer, 2012; van Laar et al., 2017). Since technological competencies are an integral factor in becoming

gainfully employed in a career that will move them from poverty to a better financial position after K-12, these students must develop their digital literacy skills before graduation (Bejakovic & Mrnjavac, 2020; Samsudin & Hasan, 2017; Saputra & Siddiq, 2020).

Clarke (2020) stated that digital literacy could generate opportunities to develop multimodal expressions for students. Granting students equal access to learning methods, such as the digital world, prepares them to understand and compete in a global market (Creer, 2017; van Laar et al., 2017). The major obstacle for students who attend the middle school campus in south Texas being studied is their inability to navigate the Internet to gain subject-matter knowledge. Granting students access to technology will allow them to become producers and consumers of their funds of knowledge (Dolan, 2016; Lamb & Weiner, 2018; Mirra et al., 2018).

Purpose Statement

The purpose of this applied study was to solve the problem of improving the digital literacy skills of middle school students in a large, urban, public school district, focusing purposefully on having access to a 1:1 digital device and designing an intervention to address the problem. I used a multimethod design for this study, comprising both qualitative and quantitative approaches. The first approach was structured interviews with campus classroom teachers and instructional coaches to understand how they describe the relationship between the deployment of a 1:1 digital device program and the improvement of students' digital literacy on their middle school campus. The second approach was an online quantitative survey taken by campus classroom teachers to discover to what degree teachers perceive the usefulness of a 1:1 digital device for improving the digital literacy of their middle school students. Finally, the third approach was an online, qualitative survey taken by teachers to examine their commitment to improving digital literacy through a 1:1 digital device deployment on their middle school

campus. All surveys were designed using the Google Forms online platform and were then distributed electronically.

Significance of the Study

A better understanding of the relationship between improved digital literacy and a 1:1 technology device for students could contribute to the growing body of research to guide stakeholders, district administrators, and curriculum writers in preparing students in this middle school for careers after K-12 (Bejakovic & Mrnjavac, 2020; Lara et al., 2017). The benefits and challenges of improving digital literacy in the classroom using a 1:1 technology device provide implications for other K-12 professionals considering incorporating a 1:1 technology device in their classrooms (Hughes & Read, 2018). In this respect, Mudure-Iacob (2019) noted that improved digital literacy will grant students who have not been exposed to technology the means of matching the digital supply and demand required throughout their lives.

Given the rapid rate of change in technology, students and teachers must develop a relationship in which they work together to increase students' knowledge base in the classroom (Sadaf & Gezer, 2020; Zahorec et al., 2019). One manner in which this can be accomplished is by improving digital literacy skills, which will integrate 21st-century skills and classroom instruction (van Laar et al., 2017). Learners are often more skilled at navigating the digital world as consumers (Wilkin et al., 2017). However, integrating a 1:1 digital device technology program will grant them access to instruction and systems that may increase their ability to become producers in the digital world (Hughes & Read, 2018; Mirra et al., 2018).

Research Questions

Central Question: How can the problem of the need to improve digital literacy be solved at an urban middle school in south Texas?

Sub-question 1: How would teachers and instructional coaches in an interview solve the problem of improving students' digital literacy through a 1:1 digital device deployment at an urban middle school in south Texas?

Sub-question 2: How would quantitative survey data from current middle school teachers inform the problem of improving students' digital literacy through a 1:1 digital device deployment at an urban middle school in south Texas?

Sub-question 3: How would qualitative survey data from current middle school teachers inform the problem of improving students' digital literacy through a 1:1 digital device deployment at an urban middle school in south Texas?

Definitions

1. *1:1 digital device* - A 1:1 digital device provides a laptop or other personal digital device to every student, expecting teachers to apply modern instructional processes. Students will benefit from greater access to knowledge, tools, and collaborative and individualized instruction (Stone, 2017).
2. *Adaptively literate* - Adaptively literate is to develop new skills while using information and communications technologies (Samsudin & Hasan, 2017).
3. *Educational technology* – Education technology is the method of using technology to enrich all stages of education and make the work of those involved in education easier (Sezer, 2017).
4. *Digital literacy* - Digital literacy is the (shared) capacity to search and access content in the online space, but, just as important, it includes other features that, depending on the specificity of the educational context, must be performed by the trainer, by the trainee(s) or by both/all participants (Mudure-Iacob, 2019, p. 60).

5. *Digital engagement* - Digital engagement is the process that involves learning the skills necessary for online interaction and fostering the motivation to use the internet (Samsudin & Hasan, 2017).
6. *21st-century skills* - 21st-century skills include collaboration, communication, digital literacy, citizenship, problem-solving, critical thinking, creativity, and productivity (van Laar et al., 2017, p. 577).
7. *Digital intelligence* - Digital intelligence is the ability to understand and use digital/online concepts and solve technological, informational, and communicational online problems (Cismaru et al., 2018).
8. *Information age* - The information age is the period of time when fewer goods are produced and more innovations are made (On, 2019).
9. *Interaction age* - The interaction age is the period of time where the role of digital content is broadened as something around which people engage and interact (Brill & Park, 2008).
10. *Information literate* - Information literate is the ability to discern the quality of content (Samsudin & Hasan, 2017).
11. *Digital natives* - Digital natives are children who have had access to technology during their short lives and have developed high levels of digital literacy (Ledesma & Izquierdo, 2020).
12. *Digital immigrants* - Digital immigrants are adolescents or adults with limited knowledge of information and communication technologies (Ledesma & Izquierdo, 2020).
13. *Digital underclass* - The digital underclass are people who rely on government services that are now becoming digital by default (Samsudin & Hasan, 2017).

14. *Digital exclusion* - Digital exclusion is the lack of technology resources and access for poor or marginalized people, mainly related to a lack of digital literacy and competence rather than access to technology and services (Bejakovic & Mrnjavac, 2020).
15. *Occupationally literate* - Occupationally literate is the ability to apply information and communication technology skills in business, education, and domestic environments (Samsudin & Hasan, 2017).
16. *Personalized learning* - Personalized learning is a concept that aims to tailor instruction to individuals' learning needs (Hallman, 2019)

Summary

Assuming that students are well prepared for life after K-12 without consistent digital literacy skills in this technology-driven society is an educational disservice to many low socio-economic schools and their students (Dolan, 2016; Lara et al., 2017; Samsudin & Hasan, 2017). Thieman and Cevallos (2017) discovered that the digital divide is exacerbated by the lack of access to the Internet and the Internet's knowledge base, which is a severe equity issue for these students. However, by positioning students in the classroom with a 1:1 device and extending the curriculum to integrate technology and quality pedagogy, students may be granted the ability to master digital literacy (Abrams et al., 2019; Bejakovic & Mrnjavac, 2020; Mirra et al., 2018).

The proposed study addresses the problem of improving digital literacy through a 1:1 digital device implementation. Chapter One provides the background of the study. The problem to be addressed is introduced, and the purpose of the research and its significance. The chapter then continues with the study's research questions and a list of key terms in the study with definitions relevant to the context of the study. This information supports the research and its intentions to explore teachers' and instructional coaches' perspectives on the relationship between

improved digital literacy and access to a 1:1 digital technology device.

CHAPTER TWO: LITERATURE REVIEW

Overview

This literature review provides a synthesis of current related literature on the benefits of improving digital literacy through one-to-one (1:1) digital device deployment in middle school (Abrams et al., 2019; Hughes & Read, 2018; Lindqvist, 2015). The term 1:1 digital device refers to granting students personal use of digital devices by a school district or community organization to have immediate access to digital information. This body of knowledge focuses on adding to the current understanding of the need to decrease the growing digital gap of students who possess the required 21st-century skills to gain future employment by improving digital literacy. In the first section, the theories relevant to the development of improved digital literacy, the connection between learning and technological integration, and the theory of progressive education, which involves constructing new ideas based on present knowledge, are discussed. Lastly, a synthesis of recent literature surrounding the factors that lead to digital literacy development, the student's beliefs about improving digital literacy, and the benefits and barriers of improved digital literacy from a teacher's perspective. In the end, the need to add to existing literature was identified, presenting a viable need for the current study.

Theoretical Framework

The theoretical framework of this literature review is grounded in the work of George Siemens and Stephen Downes' (2009) theory of connectivism, which explains the learning connection that occurs when students access the Internet (Siemens & Downes, 2009). It also considers the theoretical work of philosopher John Dewey (1938), whose research led to the theory that students build upon their knowledge as they experience life lessons.

Siemens and Downes' Theory of Connectivism

Connectivism theory is a theoretical framework for understanding the connection between improved digital literacy through implementing a 1:1 digital device for students on an urban, middle school campus in south Texas. George Siemens and Stephen Downes (2009) developed this theory to explain how knowledge is gained and connected with the rapid growth of the Internet. The connectivism theory connects learning with technological integration. Since the advent of web 2.0, knowledge can result from conversations, images, and other multimedia resources (Chandrappa, 2018; Goldie, 2016). In addition, connectivism allows students to actively control their learning (Siemens & Downes, 2009). Siemen's connectivism learning theory consists of eight principles:

1. Learning and knowledge rest in diversity of opinions.
2. Learning is a process of connecting specialized nodes or information sources.
3. Learning may reside in non-human appliances.
4. Capacity to know more is more critical than what is currently known.
5. Nurturing and maintaining connections are needed to facilitate continual learning.
6. Ability to see connections between fields, ideas, and concepts is a core skill.
7. Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.
8. Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a correct answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision (Siemens, 2005; Utecht & Keller, 2019).

Since the Internet is available 24 hours a day and can be accessed from anywhere at any time, knowledge is no longer contained only in textbooks or through the more learned individuals to which students have access (Creer, 2017; Samsudin & Hasan, 2017). The Internet allows students to enlarge their learning community to include people and places they otherwise would not be able to access, enabling them to learn from individuals and text that were once unavailable (Clarke, 2020; Mirra et al., 2018). Today's learners can use the Internet for connected and collaborative learning across time and space and to build upon existing knowledge among multiple data sources (Kaeophanuek & Na-Songkhla, 2019; Utecht & Keller, 2019). Utecht and Keller's (2019) research of Siemen's eight principles of connectivism learning theory concluded that it is essential for teachers to model connected learning to students to engage them in knowing how to learn something new at the moment that they want to learn.

Constructivism Theory

The constructivism theory was also used as part of the theoretical framework for this research to show how information students access from the Internet has the potential to add to their present fund of knowledge. John Dewey (1938) is often cited as the founder of the constructivist theory. Dewey's (1938) philosophy grew from the belief that students were being miseducated because they were not expected to use their real-life experiences as a part of the traditional education model. Progressive education involves the participation of students in the learning process (Luo & Murray, 2018; Varier et al., 2017). Constructivist theorists believe that learning is when individuals construct new ideas or concepts based on prior knowledge and/or experience (Dewey, 1938; Kelly, 2012). This theory's premise is built upon the belief that students' knowledge is constantly being constructed by their personal experiences (Dewey, 1938).

Constructivists do not believe students are blank slates waiting for someone to build upon it, but they possess knowledge they build upon during active learning engagement (Bada, 2015; Clark, 2018). Piaget (1936), a chief theorist of constructivist learning, focused on the process by which children gained knowledge. Bada (2015) stated that Piaget's (1936) research on learning is the foundation of many learning theories and education reform. Constructivism and technology allow computers to expand students' knowledge to construct their future knowledge (Lunenberg, 1998). Digital literacy engages students to construct mental knowledge by adding what they can learn from using technology to their present knowledge (Sun et al., 2017).

Related Literature

Learning has grown from textbooks to television to computers and now to mobile digital devices in a relatively short time (Brill & Park, 2008). People have believed that granting new technology to students will automatically improve digital literacy and transform academic outcomes (Lamb & Weiner, 2018; Warschauer, 2012; Wilkin et al., 2017). Digital literacy is essential because it enables students to use the Internet to gain knowledge in the digital environment (Kaeophanuek & Na-Songkhla, 2019). According to current research by Varier et al. (2017), school districts and community stakeholders state that integrating 1:1 technology in the classroom will increase the potential digital literacy gained by students. School districts must address improving digital literacy by developing technology-enhanced learning, improving teacher and student digital self-efficacy, deploying a 1:1 student digital device program (Molin & Lantz-Anderson, 2016), and upgrading building infrastructure to meet the demand for Internet availability (Lara et al., 2017).

Digital Literacy

Much attention has been given to the need to diagnose and facilitate the development of digital literacy skills in K-12 learning environments to prepare students with 21st-century job skills (Tomczyk, 2020; van Laar et al., 2017). According to Schatteman and Liu (2020), to leverage the power of technology and the necessary skills for future success, students will need to improve digital literacy during their primary and secondary years in school. Samsudin and Hasan (2017) argued that learners must have three types of literacy to fully integrate Internet usage: information literacy, adaptive literacy, and occupational literacy. Digital literacy involves the ability to use the Internet to browse websites for information, secure data, update one's knowledge about e-threats (Tomczyk, 2020), read on a mobile device, gauge the validity of a website, and create and share videos (Powers et al., 2020). With the increased availability of Internet content, students will need to gain skills to navigate and understand the information which they access via the Internet (Saavedra & Opfer, 2012; van Laar et al., 2017). The 1:1 digital technology initiative in the United States aims to provide an internet-connected device for students to use in and outside the classroom to improve digital literacy and engagement (Hallman, 2019; Powers & Musgrove, 2020). When students' digital literacy level is high, it can make it easier for students to participate in the learning process, giving them a more positive feeling about their educational experience (Anthonysamy, 2019; Samsudin & Hasan, 2017).

Mudure-Iacob (2019) defined digital literacy as the ability to search and access content in the online space. Furthermore, digital literacy requires the ability to access, navigate, and disseminate the information gained from using digital technology in the digital environment (Mudure-Iacob, 2019). Digital technologies (Molin & Lantz-Anderson, 2016) and the teaching of media and digital literacies are becoming a new norm for many schools (Mirra et al., 2018). The

current age of information in which K-12 students live requires that they possess emerging digital literacy (Creer, 2018). Since learning has expanded from printed textbooks to computers and other mobile devices, students are expected to interact with digital information (ISTE, 2020). Regarding the development of knowing and learning, Brill and Park (2008) suggested learning moves toward self-directed, contextualized, and engaging learning environments that can be accomplished through proficient digital intelligence.

Schools are tasked with improving the digital intelligence of students using digital technology (Sadaf & Gezer, 2020). Digital intelligence involves having access to internet content and understanding and applying the knowledge gained from the web (Cismaru et al., 2018). A precursor to university admission in the 21st-century and gainful employment is a student's or potential employees' ability to prove digital intelligence (Bejakovic & Mrnjavac, 2020; Mirra et al., 2018).

Education Liberation

Digitalization is a term used to describe the current digital dynamic that today's students must navigate (Mirra et al., 2018). It has changed how information is transmitted and disseminated (Bejakovic & Mrnjavac, 2020). Digitalization encompasses four types of digital engagement: consumption, production, distribution, and invention (Mirra et al., 2018). Digital and mobile technology have changed how students learn and communicate daily (Molin & Lantz-Anderson, 2016). The Internet allows a high volume of information to be accessible to digitally-literate users. Technologies are valuable commodities capable of improving the lives and well-being of their users (Bejakovic & Mrnjavac, 2020; Samsudin & Hasan, 2017) as well as the use of text in the classroom (Molin & Lantz-Anderson, 2016) and the promoting of personalized learning (Hallman, 2019). Unfortunately, according to research (Bejakovic &

Mrnjavac, 2020; Lahpai, 2019; Samsudin & Hasan, 2017), marginalized students are less likely to have the digital literacy skills necessary to take advantage of the high volume of information to improve their lives and wellbeing. In particular, students with limited or no access to digital devices or reliable internet services cannot engage in the meaningful use of digital technology; therefore, they have limited digital literacy (Sadaf & Gezer, 2020; Saputra & Siddiq, 2020).

Education liberation occurs when marginalized students gain the fundamental knowledge and skills to confidently navigate the digitalized world they live in (Lahpai, 2019; Sadaf & Gezer, 2020; Zahorec et al., 2019). According to researchers Kervin et al. (2019), often, these students do not possess the freedom to engage in the digitization society or compete with students from higher socioeconomic schools because they are digitally non-literate (Samsudin & Hasan, 2017). Studies have found that students in low socioeconomic schools use computers for drills and practices (Powers et al., 2020). In contrast, students who attend higher socioeconomic schools use technology to develop higher-order thinking and analyzing skills (Powers et al., 2020). Innovative learning approaches (Kervin et al., 2019), positive attitudes toward the Internet (Samsudin & Hasan, 2017), time commitment, meaningful teacher professional development, access to successful models for integrating technology in instruction, and access to technology (Sadaf & Gezer, 2020) are necessary to remove the limits imposed upon students in low socioeconomic schools because of their limited digital literacy.

Ecology of Resources

Vygotsky's (1978) research proposed the zone of proximal development to measure teaching and learning interaction. The zone of proximal development has two aspects; first, it measures the child's potential, then calculates the child's connection to the learning experience. Researcher Luckin (2008) broadened the use of this framework to develop learner-centric

ecology of resources. This design framework aims to support identifying the forms of assistance available to a learner that makes up the resource elements with which that learner interacts (Gros & Lopez, 2016). With the push to improve digital literacy, many schools and teachers are expected to develop ways in which to engage students in learning via digital resources (Brill & Park, 2008; Zahorec et al., 2019).

Research cited the positive impact of the deployment of a 1:1 computer device program included: increased engagement and motivation, improved quality of work and achievement, improved independent learning, improved attendance among at-risk or low-achieving students (Islam & Gronlund, 2016), narrowed the equity gap, supported effective teaching, and enhanced teacher productivity (Lara et al., 2017). Therefore, school districts invest school funds to purchase digital devices for their students (Warschauer et al., 2012). Hashemi and Cederlund's (2017) research found that the digital age leads down the path of transferring information from textbooks to more accessible digital formats. According to Lamb and Weiner (2018) and Powers et al. (2020), a digital 1:1 device program is gaining prevalence in schools.

Internet technology has changed the way people learn. Having access to digital resources allows students to improve their digital literacy inside and outside the classroom (Hughes & Read, 2018; Lindqvist, 2015). The meta-analysis and research synthesis of Zheng et al. (2016) reported positive results in learning academic content such as English language arts, which improves 21st-century job skills for students with access to laptop computers. With access to online education, new opportunities for increasing knowledge have become available for more people (Creer, 2018; Eagleton, 2017).

There is an ongoing need to improve digital literacy for today's digital-age learners (Clarke, 2020; Oliver & Williams-Duncan, 2019). Ultimately, teachers are responsible for

planning class assignments that allow students to use laptops to increase digital literacy and lesson engagement (Powers & Musgrove, 2020; Sadaf & Gezer, 2020). Lamb and Weiner (2018) stated that middle school students' lives are deeply embedded in technology outside of school. Rarely do they have an opportunity to assess their digital literacy and the social justice of access to technology or social media for civic engagement (Schatteman & Liu, 2020). They often use digital devices for gaming, social media connections, and taking photos (Dolan, 2016; Hughes & Read, 2018). Their use largely depends on cell phones and personal tablets (Mirra et al., 2018; Stone, 2017). While this limited use of technology is an excellent introduction to the benefits of technology for improving their personal lives, students have minimal hands-on experience with the purposeful and effective use of technology (Hughes & Read, 2018). Their enhanced knowledge and skills in using digital technologies should be positively applied for academic purposes (Karunanayaka & Weerakoon, 2020).

Evolving Digital Divide

All students should be equipped with skills to improve their digital literacy intelligence (Bejakovic & Mrnjavac, 2020; Samsudin & Hasan, 2017; Schatteman & Liu, 2020). A study conducted by Anthonysamy (2019) revealed that socioeconomically disadvantaged students do not have the required digital literacy skills necessary for accessing, navigating, and analyzing digital content. According to Samsudin and Hasan (2017), the existing digital gap between the poor and rich, between urban and rural areas, and between developed and underdeveloped regions is widening. Decreased funding has made it difficult to close this gap for many rural districts (Powers et al., 2020). Dolan's (2016) research revealed that improving this digital literacy disparity begins with having 1:1 access to a computer device and extends to having internet connectivity, sufficient digital knowledge, and access to digitally-knowledgeable

teachers. Studies performed by Hughes and Read (2018), Spires (2008), and Zahorec et al. (2019) stated that the over-filtering of the Internet at schools widens the existing divide of digital literacy since socioeconomically students do not have access to digital content outside of school due to the aforementioned barriers while their economically advantaged peers have access to the Internet outside of school. These factors have expanded the digital gap between the students who are considered the haves and those who are the have-nots (Dolan, 2016; Hughes & Read, 2018; Luckin, 2008). The term "haves" applies to students with consistent access to a computer, reliable internet service, and knowledgeable teachers who regularly use digital resources in their classroom instruction (Hughes & Read, 2018). Conversely, the term "have-nots" applies to students who do not have regular access to a digital device, have limited or no internet service, and whose teachers sparingly or never use digital content in their classroom instruction (Creer, 2018; Wilkin et al., 2017).

Understanding the digital disconnect experienced by socioeconomically-disadvantaged students (Powers et al., 2020) is essential. Dolan's (2016) research pointed out that students who attend socioeconomically-disadvantaged schools have limited access to digital material because of the limited exposure to technology in their classrooms. These students also have limited access to digital technology at home (Stone, 2017). Many students from socioeconomically-disadvantaged homes use the Internet via free Wi-Fi connections in public places (Powers et al., 2020; van Deursen & van Dijk, 2019). Creer (2018) stated that their use of the Internet could be categorized as consumption of entertainment or social networking (Cho & Littenberg-Tobias, 2016).

Technology-Enhanced Classroom

Public schools have been introducing computers in the classroom for over 20 years (Lara et al., 2017; Mirra et al., 2018). Current research studies have mentioned the effectiveness of

integrating digital technology into the classroom to increase student engagement and motivation (Lindqvist, 2015) and broaden access to interest-driven, academic learning experiences that encourage shared purpose among learners (Mirra et al., 2018). A computer 1:1 initiative can potentially shift how the teacher and knowledge are positioned in a personalized learning classroom (Hallman, 2019). According to Sadaf and Gezer (2020), “It is necessary to equip students with skills to tackle and solve digital tasks” (p.124). Student involvement in subject matters in the classroom is imperative to their retention of the curriculum (Gros & Lopez, 2016). Research states that technology integration in the classroom can create an environment where the teacher can more easily individualize student learning (Powers & Musgrove, 2020). Zheng et al.'s (2016) study of selected literature found that students exposed to digital environments in core subjects such as math and English demonstrated greater academic achievement.

The current deficiencies in improving student academic achievement in science have brought about a learning-teaching method that encourages students to take responsibility for their learning and positions the teacher as more of a guide rather than a leader (Sezer, 2017)**.** When students connect their home use of technology with their school technology use, it improves their understanding of the content and academic performance (Hughes & Read, 2018; Zahorec et al., 2019). Students who took part in a study conducted by Sezer (2017) expressed that their digital lessons were more relatable to their lives outside of the classroom, making the knowledge more valuable.

The uptake and use of digital technologies have gained much interest from school districts and community stakeholders (Lara et al., 2017). Lindqvist (2015) stated there is a need for the modernization of education, including a 1:1 digital device for all students. Research says that the Internet can increase educational opportunities and economic advantages (Samsudin &

Hasan, 2017; Saputra & Siddiq, 2020). Many countries include technology-enhanced learning as part of mainstream education to increase student learning opportunities through technology (Lindqvist, 2015). The technology-enhanced classroom is aware of the consistent change in technology and the need to apply disciplined and quality pedagogical theory to the digital learning environment (Kim, 2019), increase computer devices and connectivity in schools and infrastructure improvements, lower price points for devices, and develop digital content (Lara et al., 2017).

Many K-12 classrooms are moving toward a 1:1 digital device for all students (Lindqvist, 2016). This move will affect how students learn and how teachers deliver curriculum material (Hughes & Read, 2018; Karunanayaka & Weerakoon, 2020). In the last few years, the Internet has become more accessible to students with technology devices (Lara et al., 2017). However, students' successful use of technology requires digital knowledge (Anthonysamy, 2019; Schatteman & Liu, 2020). Simply put, students must be equipped to manage the knowledge they will gain from the Internet (Lara et al., 2017). Researchers Harrell and Bynum (2018) found that supporting students with a strong technology foundation is essential to learning anytime and anywhere. Anytime, anywhere learning allows students to manage their knowledge. It also allows students to access their curriculum and complete assignments at their own pace (Zheng et al., 2016).

Policies to Support Digital Literacy

The old paradigm of including technology in classroom instruction dates back to about 30 years ago and comprised of expensive and relatively fixed computers in a computer lab or computers at the back of a designated classroom (Hallman, 2019; Stevenson & Hedberg, 2017). However, central to being a fully functioning student in the 21st century is the ability to gain new

literacies that include the ability to acquire technology skills, which marks a departure from fixed computer usage to students having access to a 1:1 digital device (Delacruz, 2018; Stevenson & Hedberg, 2017).

The Organization for Economic Cooperation and Development (OECD) and other government entities accept the importance of digital literacy and skills within knowledge societies and economies (OECD, 2016). While policy emphasizes the need for students to gain digital literacy as they prepare for life after K-12, the literacy gains are somewhat exclusive (Lindqvist, 2016). The challenge for improving digital literacy and technological hardware lies in formulating strategies that include the marginalized, digitally-excluded populations (Bejakovic & Mrnjavac, 2020; Samsudin & Hasan, 2017). The current approach to improving digital literacy through implementing a 1:1 digital technology program depends on the perception of the good value of such an implementation to the schools and teachers (Hallman, 2019; Raman et al., 2019).

Presently, the International Society for Technology in Education (ISTE) standards emphasize the need for students to possess digital literacy skills to engage in the meaningful use of technology within the classroom (ISTE, 2020). Therefore, stakeholders in the digital arena face the challenge of ensuring that digitally excluded students have digital literacy and technology skills that connect them to modern society (Bejakovic & Mrnjavac, 2020). Furthermore, technological solutions, such as distributing a 1:1 digital device, must be driven by an approach to include marginalized students (Samsudin & Hasan, 2017).

Digital literacy is more than working with technology (Sadaf & Gezer, 2020). It is a process that involves learning the skills necessary for online interaction (Samsudin & Hasan, 2017). Given the digital demand on students' lives, policies that support digital literacy inclusion

for all people should include more than digital devices and an investment in a robust technological infrastructure (Samsudin & Hasan, 2017); they should also have quality digital competencies which would motivate students to engage in online interactions and conversations (Samsudin & Hasan, 2017; Saputra & Siddiq, 2020).

The digital migration to online platforms by many businesses and governments presents significant digital challenges for the digitally non-literate public (Fang et al., 2019; Samsudin & Hasan, 2017). Therefore, digital inclusion policies need to include marginalized people who are excluded from civic engagement and participation in democracy (Samsudin & Hasan, 2017). Furthermore, digital inclusion policies and strategies to bridge the digital landscape are needed to incorporate technology as an integral part of everyday life (Hashemi & Cederlund, 2017). Researchers Olofsson et al. (2019) argued that it is essential for children and students to participate in and contribute to a highly digitalized society.

Teachers' Digital Classroom Technology Beliefs

A teacher's digital readiness is the highest total effect upon integrating technology in the classroom (Harrell & Bynum, 2018). When teachers perceive themselves as digitally literate, they are more apt to include technology in their daily lessons (Cho & Littenberg-Tobias, 2016; Karunanayaka & Weerakoon, 2020). In contrast, researchers Hughes and Read (2018) found that if a teacher's digital self-efficacy is low, they will resist integrating technology into their daily lesson delivery. In general, a teacher's self-efficacy (Sadaf & Johnson, 2017), perceived ease of use, and perceived usefulness of a 1:1 computing device (Powers et al., 2020) are significant predictors of how much or little digital technology integration students will encounter during their school day**.**

Digital Inclusive Classroom

The teaching and learning practice in the classroom environment must make a tandem shift to blending technology and quality pedagogical framework (Raman et al., 2019), which understands the impact of technology on society and education (Sadaf & Gezer, 2020). In fact, including technology in education is being driven by a set of broad educational policy goals pushed by education stakeholders (Lara et al., 2017) and is constantly developing to encompass the broad range of skills in the connected world (Powers et al., 2020). Teachers believe that there is a potential value in improving digital literacy by implementing a 1:1 digital device program (Sadaf & Gezer, 2020). Research reported that the underlying skills necessary for developing digital literacy are digital tool usage, transforming and incorporating digital content, and gathering/analyzing digital information (Kaeophanuek & Na-Songkhla, 2019).

The current approach of providing digital literacy and technology to students in marginalized communities is through public facilities such as schools (Powers et al., 2020). In many instances, the infrastructure of these facilities provides slow, unpredictable internet service and needs improvement to engender digital inclusiveness (Samsudin & Hasan, 2017). Being guided by the teacher-learning model in which relevant digital technology is embraced to align the digital literacy of marginalized students with the ever-transforming digital era, most teachers intend to integrate technology into their digitally-inclusive classroom environment (Raman et al., 2019; Sadaf & Gezer, 2020).

Barriers to Improved Digital Literacy

Technology use in schools can be categorized as productivity, instruction, creation (Hughes & Read, 2018), promotion of project-based instruction, and better relationships between students and teachers (Lara et al., 2017). However, several studies have found that teachers used

minimal technology in class for these reasons: slow or no internet connection, students not bringing digital devices to class, blocked commonly-used websites (Hughes & Read, 2018; Spires, 2008; Zahorec et al., 2019), high concentration of low socioeconomic students, students living in small and often geographically-isolated communities (Powers et al., 2020), overload of digital applications, insufficient guidance, unclear digital policies, the lack of technology professional development (Hughes & Read, 2018; Stevenson & Hedberg, 2017), and the lack of designated planning time to locate and gather resources to integrate technology into instruction (Powers & Musgrove, 2020). Hughes and Read (2018) further noted that teachers in schools with higher economically-disadvantaged students feel pressured to teach only the standardized curriculum to prepare the students to pass the state-mandated standardized test.

Integrating innovative technology with traditional pedagogical strategies has proven to be a difficult transition for some teachers (Cho & Littenberg-Tobias, 2016). This integration will inevitably demand teachers acquire new professional development training (Sadaf & Gezer, 2020). Zahorec et al. (2019) reported that teacher training programs should respond to this need by offering teacher training to integrate digital literacy into their pre-graduate training. Unfortunately, some teachers face the "one-size-fits-all" professional training barrier, which is inadequate in preparing them for incorporating digital literacy into their specific subject (Lindqvist, 2015). Therefore, digital technologies are often underutilized, and their capabilities for improving learning are never explored (Molin & Lantz-Anderson, 2016). Research has suggested that it is important that the need for teachers to provide innovative and modernized curriculum delivery requires teachers to overcome the information and communication technology barriers (Eagleton, 2017), be granted instructional planning time to locate resources and materials to integrate technology successfully into their classroom instruction (Powers &

Musgrove, 2020), and be provided technical support and resources, example lesson plans, and meaningful professional development (Sadaf & Gezer, 2020).

Teachers also face the barrier of student ownership of laptop devices. A classroom observation by Lindqvist (2015) found that students were using laptops for activities other than the task at hand. These activities included playing games, playing music, and social media, balancing the laptops on their heads, using them to hit each other for fun, and accidentally dropping them on the floor (Hughes & Read, 2018). Researchers Sadaf and Gezer (2020) also noted access to harmful sites, digital bullying, laziness, radiation, and access to non-age-appropriate information as disadvantages of providing students with a 1:1 digital device to improve digital literacy. In addition, when the students are not on task, they miss the teacher's instruction, which results in the teacher needing to repeat instructions (Lindqvist, 2015). As a result, teachers must negotiate the use or continued use of the digital device because of students being off task. Teachers also said they had to double prepare each lesson to have an alternative assignment for students who did not bring their digital devices to class (Zahorec et al., 2019).

Benefits of Improved Digital Literacy

Teachers are motivated to integrate digital literacy into the classroom to help prepare students for life after K-12 (Sadaf & Gezer, 2020). Schools in the United States can provide personalized learning in the classroom because of the availability of the 1:1 digital technology initiative (Hallman, 2019; Powers & Musgrove, 2020). The prominent theme of improving digital literacy skills is it strengthens learners' capabilities to interpret meaning from information retrieved from the Internet (Bejakovic & Mrnjavac, 2020), improves collaboration, increases engagement and interaction with the lesson, develops co-created content (Sadaf & Gezer, 2020), and promotes individualization and differentiation (Powers et al., 2020) as it gives teachers the

important opportunity to embrace the students' experiences and initiatives (Molin & Lantz-Anderson, 2016). Teachers can expand the digital literacy of students from daily entertainment to producing, analyzing, and creating on multiple digital platforms (Anthonysamy, 2019; Cho & Littenberg-Tobias, 2016), promote high-order thought skills, break down the walls of learning and information, and prepare students for life after K-12 (Sadaf & Gezer, 2020).

Often, teachers strive to apply sound learning theories that will integrate technology and pedagogy to increase their students' digital literacy (Brill & Park, 2008) by creating a classroom that offers 1:1 digital technology integrated into the instruction (Powers et al., 2020). In addition, teachers have expressed the uptake of improving digital literacy by incorporating technology in teaching as a tool for delivering quizzes and tests, fostering student collaboration, and increasing active learning (Lindqvist, 2015), which increases the students' engagement with the subject material and causes them to want to learn how to use technology (Sadaf & Gezer, 2020). But ultimately, the critical factor to achieving any benefit from improving digital literacy resulting from the use of technology at school is the intentionality of teachers (Zahorec et al., 2019).

Early deployment of a 1:1 digital device to K-12 students can be the solution needed to improve digital literacy (Dolan, 2016). Along with technology devices, teachers are crucial in assisting these students in developing information and communication technological knowledge, increasing creativity (Hughes & Read, 2018), and understanding the safe and effective use of online technology (Samsudin & Hasan, 2017). For example, in the three-year study conducted by Thieman and Cevallos (2017), they noted that despite all the challenges students faced before receiving their 1:1 digital device, after receiving their 1:1 digital device, their attendance improved and there was a slight increase in their grades.

Teachers' Technology Self-Efficacy

In the past decade, blended learning has been included in the classroom instruction of many teachers (Eagleton, 2017). Blended learning occurs when teachers combine technology with traditional learning approaches (Shamsuddin & Kaur, 2020). As classroom instruction moves toward 21st-century learning environments, teachers must be innovative in integrating technology to engage and motivate students to learn (Brill & Park, 2008; Raman et al., 2019). The teacher's framing of the lesson is crucial in evoking student digital literacy and technology use (Molin & Lantz-Anderson, 2016).

With a push from Washington and policymakers, administrators are attempting to elevate K-12 digital literacy via the deployment of 1:1 digital technology (Zheng et al., 2016). The research found that teachers must consider themselves consumers of knowledge and the prominent figure in shifting from a keeper of knowledge in the classroom to adapting personalized learning strategies that encourage a student-centered learning environment (Hallman, 2019). Further, teachers must be familiar with the available technology tools and possess the ability to integrate them effectively into the curricula to provide opportunities for students to be engaged in the content (Armfield & Blocher, 2019). Adequate technology equipment, reliable internet connection, and sound pedagogy can translate into highly-motivated, engaged, and growing students (Dolan, 2016; Sadaf & Gezer, 2020).

Digital performance and digital capability are linked to teachers' intention to include technology in their classroom instruction (Sadaf & Gezer, 2020). The teachers' attitudes toward digital media, the Internet, and computers (Tomczyk, 2020) and their attitude and perceived usefulness of digital literacy (Sadaf & Gezer, 2020) contribute solid determinants to their willingness to improve the digital literacy of their students. Significant changes in teaching

methods will be needed to properly implement a 1:1 digital technology program (Hineman et al., 2015).

Teachers with a positive outlook and high self-efficacy are more open to using always-on and connected technology to support teaching and learning in the classroom and will use digital technology in instruction (Luo & Murray, 2018; Sadaf & Gezer, 2020). Harrell and Bynum (2018) defined self-efficacy as the belief individuals possess about their ability to perform a task. These teachers are more willing to improve the digital literacy of their students since they believe they have the professional development needed to deliver an engaging and motivating lesson to students (Zahorec et al., 2019) and are willing to recognize the changing roles of teachers and students in a 1:1 digital technology, personal learning environment (Hallman, 2019).

Having low digital self-efficacy and less than a positive outlook on the usefulness of digital literacy usually keeps teachers from integrating technology into their daily lessons (Luo & Murray, 2018). Researchers Sadaf and Johnson (2017) and Sadaf and Gezer (2020) have identified two phenomena concerning the teacher's perception of technology adequacy. First is subjective norms; if the teachers perceive they do not have the support, professional development, and adequate technology, they will resist implementing technology in their instruction. Second is perceived usefulness; if the teacher believes they possess sufficient knowledge and have received efficient digital lesson delivery training, they will more readily integrate digital resources into their daily instruction.

As with any change, the expectation to improve digital literacy by implementing a digital curriculum in the classroom has been met with both enthusiasm and resistance (Warschauer et al., 2012; Zahorec et al., 2019). Cuban (2003) argued that teachers use standard lesson delivery

and not digital lesson delivery; therefore, computers are oversold and underused. Teachers from different subject areas also have stated they have different motivations for their perception of integrating digital literacy and technology in their classrooms (Sadaf & Gezer, 2020). To improve students' digital literacy and technology use, teachers must improve their own digital literacy by attending professional development programs to upskill themselves (Raman et al., 2019).

Resistance to the move to 1:1 computing is teachers not wanting to switch to digital classrooms (Lindqvist, 2015). These resistant teachers site distractions, psychological and physical strains, and over-dependency on computers are factors they consider essential to continue traditional curricula delivery (Luo & Murray, 2018). Another factor in their resistance is their inability to develop technology skills that will help them comprehend specific digital knowledge such as copyright, global awareness, and cultural understandings using the Internet (Armfield & Blocher, 2019).

Students' Classroom Digital Technology Beliefs

The ability to navigate the internet is a skill all students will need to compete in the 21st-century workforce (Abrams et al., 2019; Saavedra & Opfer, 2012; van Laar et al., 2017). Many K-12 districts have provided students with a 1:1 digital device, but some students struggle with digital literacy skills or do not possess the knowledge required to use technology tools (Paterson & Scharber, 2017; Zheng et al., 2016). Improving digital engagement towards the Internet will require a positive digital attitude from youth in marginalized communities (Samsudin & Hasan, 2017). As stated in this review of literature, it is important that teachers consistently integrate digital technology in the classroom to allow students to gain access to knowledge (Bhatt & MacKenzie, 2019; Hallman, 2019; Sadaf & Gezer, 2020). The traditional teacher-fronted

classroom differs from the technology-integrated lesson because it directly engages students in the learning process as they take a leading role in unfolding the intended objectives (Gros & Lopez, 2016; Luckin, 2008). As a result, students do not have to rely on their teachers to accomplish a specific goal (Neokleous, 2019). Active digital learning requires students to take responsibility for their learning objectives and how they deliver the intended learning product (Zahorec et al., 2019).

Students' Technology Self-Efficacy

In some classrooms, students may have limited technology and digital literacy skills, which will cause them to need more assistance from the teacher (Armfield & Blocher, 2019). Students' literate activity in a digital society is a challenge educators face as technology becomes an integral component of digital learning (Bhatt & MacKenzie, 2019). A student is considered literate if they possess the ability to read, write, and use printed text, but in a digitized society being literate includes a different set of competencies which include the ability to interact with digital text and writing (Molin & Lantz-Anderson, 2016), creative thinking, quick access to information, and preparation for life after the classroom (Sadaf & Gezer, 2020). Adapting to a 1:1 digital classroom takes time to improve the students' self-efficacy in using technology (Powers et al., 2020).

Marginalized students' digital literacy is limited to basic Internet activities, communication, uploading and downloading material, and entertainment (Samsudin & Hasan, 2017). They do not possess advanced digital literacy skills, including searching the Internet for educational materials, participating in civic or political causes, and shopping (Hashemi & Cederlund, 2017; Mirra et al., 2018). School districts have begun to provide every student with a 1:1 digital device to encourage digital personalization because digital content and learning

platforms have improved (Lara et al., 2017; Powers & Musgrove, 2020; Samsudin & Hasan, 2017).

When researchers studied Malaysian students, they found that digital exclusion also includes student technology self-efficacy and cultural barriers as factors in their digital choice (Samsudin & Hasan, 2017). In addition, students' digital decisions are often linked to teacher instruction, cultural beliefs, and cognitive ability (Molin & Lantz-Anderson, 2016). Samsudin and Hasan (2017) also indicated that students' attitudes influenced their digital engagement. Therefore, teachers must show students that improving their digital literacy using a 1:1 digital device can be great if they use it correctly (Armfield & Blocher, 2019).

Education Equity

According to researchers Hughes and Read (2018), when students do not have adequate digital intelligence, it widens the existing digital divide. Simply working with technology is not advocating for digital literacy (Sadaf & Gezer, 2020). Similar findings in other studies (Kumi-Yeboah et al., 2018; Wilkin et al., 2017) revealed the need for a robust pedagogical approach to improving digital literacy for economically-disadvantaged students. Hence, the digital literacy gap in terms of the accessibility of digital technology needs to be closed to expand opportunities for low socioeconomic students to create equality (Kaeophanuek & Na-Songkhla, 2019).

Technology improvements are rapidly increasing in society but have moved slowly in many schools (Lindqvist, 2016), especially in rural communities where only 75% of residents have access to the Internet (Powers et al., 2020). The research findings of Hughes and Read (2018) revealed that digital engagement for students from economically-disadvantaged homes is limited to reinforcing skills and remediation rather than the high-level analysis and synthesis of digital content. The digital world has improved rapidly and is consistently improving the delivery

of digital education (Armfield & Blocher, 2019). Providing access to a 1:1 digital device for all students changes the trajectory of educational practices for students, teachers, and schools (Molin & Lantz-Anderson, 2016). A problem perpetuated by the socioeconomic status of youth or their place of residence is that specific segments are digitally included, and other segments are excluded (Samsudin & Hasan, 2017). Digital literacy provides students with the ability to gain technology skills (Bejakovic & Mrnjavac, 2020) and nurture expression to communicate ideas and knowledge creatively (Sadaf & Gezer, 2020), which will help them navigate future careers.

The skills, confidence, and frequency of use of technology among the socioeconomically-disadvantaged population of students and students who are not considered socioeconomically disadvantaged are broadly different (Dolan, 2016; Newman et al., 2012). Socioeconomically-disadvantaged students must be equipped with digital literacy skills to keep up with the ever-changing digital events (Brill & Park, 2008; Schatteman & Liu, 2020) through the meaningful use of digital tools in the classroom (Sadaf & Gezer, 2020), which will help them grow and keep pace with change. Computer proficiency for online learning is the ability to use the computer and the Internet for formal and informal online education (Martin et al., 2016).

Students who attend lower socioeconomic schools digital proficiency can be improved with the deployment of a 1:1 digital device (Lara et al., 2017; Mirra et al., 2018; Zheng et al., 2016) and by offering them participatory literacy programs (Samsudin & Hasan, 2017). In addition, Harrell and Bynum's (2018) research signifies that knowing how to manage technology efficiently and overcoming barriers that come with integrating technology generally leads to students' successful academic use of technology.

Researchers Schatteman and Liu (2020) found that effective pedagogy can increase the digital proficiency of students and expand digital knowledge to include the ability to evaluate,

produce, and communicate information. Classroom opportunities to integrate technology resources in the curriculum and digital support will improve the digital literacy of students (Karunanayaka & Weerakoon, 2020; Samsudin & Hasan, 2017). Zahorec et al. (2019) concluded that synchronizing education with the social and cultural context of the students' present reality provides learners with more time for active learning inside and outside the classroom, time for self-directed learning, and the opportunity to choose the best learning resource to increase their funds of knowledge. Furthermore, by deploying technology tools, students and teachers can determine which device is best suited for any stage in the learning process (Stevenson & Hedberg, 2017).

The strategy of blending digital technology in-class learning with outside-of-school digital usage can potentially increase student cognitive learning retention (Hughes & Read, 2018; Kim, 2019). Marginalized populations should be afforded up-to-date technology to truly create a digitally-inclusive society (Samsudin & Hasan, 2017) and learning opportunities (Bejakovic & Mrnjavac, 2020) that will allow them to migrate from old paradigm processes to processes grounded in cyberspace (Samsudin & Hasan, 2017). Thus, the deployment of a 1:1 digital device has the potential to make learning more relatable to a student's everyday experiences (Hashemi & Cederlund, 2017). Presently, a lightweight 1:1 digital device can allow students to access applications that encompass what was previously only available on laptops or desktops, such as typical office products, file management and storage, and audio/video creating and editing (Stevenson & Hedberg, 2017; Thieman & Cevallos, 2017). In many cases, when formal digital instruction integrates outside computing activities such as gaming, students make valuable connections that improve their digital literacy (Hughes & Read, 2018; Lindqvist, 2015).

Barriers to Improved Digital Literacy

Students' socioeconomic status or place of residence are factors in the gap in how students access technology resources (Samsudin & Hasan, 2017; Thieman & Cevallos, 2017). Despite the widening digital divide gap among K-12 students who experience a socioeconomic disadvantage, they are expected to graduate high school with the ability to enter the technological workforce or university (Saavedra & Opfer, 2012; Stone, 2017). These students will exit K-12 with a potential technological disadvantage, which will make it difficult for them to compete for educational opportunities or career advancements (Dolan, 2016; van Laar et al., 2017).

Everyday teachers and school districts can increase students' digital funds of knowledge by allowing students guided access to the Internet and other digital resources (Abrams et al., 2019; Kim, 2019; Tomczyk, 2020). The teaching and learning processes of digital literacy should include knowing how to stay safe from cyberbullying, image protection, infringement of intellectual property law, many other e-threats, and new digital hybrid threats (Tomczyk, 2020). The effective use of internet access requires K-12 institutes to ensure that students possess adequate digital literacy skills, which will keep them safe from the negative consequences of the use of media (Bejakovic & Mrnjavac, 2020), rather than demonstrating a protectionist approach that blocks commonly-used website because the school district is driven by fear of the world the Internet can open to students (Mirra et al., 2018; Tomczyk, 2020).

Student voice should be included in determining which technology will be suitable to engage them in the learning process (Stevenson & Hedberg, 2017). Creer (2018) stated, "Young people use digital media in their everyday literacy practices, and a failure to embrace new technologies in the classroom may lead to a disjuncture between their everyday and college-

assessed literacy practices" (p. 131). Students' digital competence continues to grow outside of the classroom, which has been reported as a predictor of their information and communications technology (ICT) efficacy in the classroom (Lindqvist, 2016). Therefore, they are frustrated with not using the same technology in school (Hughes & Read, 2018; Kimbell-Lopez et al., 2016), because of school filters that block content on many valuable websites (Mirra et al., 2018; Tomczyk, 2020) that they use outside of school. This premise is based on the assertions of early critics of 1:1 digital technology and mobile devices in the classroom, who have stated that these technology devices are more suited for passive consumption of content rather than genuine pedagogical framework (Mirra et al., 2018; Stevenson & Hedberg, 2017).

Another barrier to students strengthening their digital literacy is their perception that their teachers' do not know enough about technology to provide them with the skills they will need later in life in their future careers (Hughes & Read, 2018; Lahpai, 2019) as a matter of fact, many teaching practices may kill students' motivation to develop their technology skills (Sadaf & Gezer, 2020). Researchers have noted that sometimes teachers will explicitly instruct students to avoid using digital content and only use outdated printed text, which represents a contradiction in relation to instruction, and students will often ground their stance in the fact that digital content is easily updated and readily available (Molin & Lantz-Anderson, 2016). Considering the complex nature of information and communications technology, teachers and schools should integrate formal and informal technology usage in the curricula from the very initial stages of education (Stevenson & Hedberg, 2017; Tomczyk, 2020).

Some school districts require students to share computers with other students in the classroom or in the computer lab (Harrell & Bynum, 2018). Warschauer et al. (2012) stated this practice is unproductive and can be compared with requiring students to share pencils.

Researchers continue to find that digital literacy will be improved more effectively if students are granted daily individual access to school laptops (Lara et al., 2017; Powers & Musgrove, 2020). According to researchers Lindqvist (2015) and Zahorec et al. (2019), schools must invest the time and money into providing active and relatable teacher professional development to support the transition from paper literacy to digital literacy. Researchers also noted that poor information communication technology infrastructures, limited technical support/resources, distraction, misuse of technology, time to plan lessons (Sadaf & Gezer, 2020), and the unequal distribution of a 1:1 digital technology device deny marginalized the access of communities to basic technology usage, further alienating and excluding these students from the digitized society (Powers et al., 2020; Samsudin & Hasan, 2017).

Promotes 21st-Century Skills and Future Employment

High-skilled persons with cognitive and digital skills are increasingly in demand (Bejakovic & Mrnjavac, 2020; Mirra et al., 2018). Studetns, teachers, and school leaders are the stakeholders in the push to prepare students with basic and advanced ICT skills as a way to provide opportunities for technology-enhanced learning (Lindqvist, 2016). Research findings are consistent that the inclusions of a 1:1 computing program in the classroom are important as the pedagogical shift towards a student-centered, project-based, and collaborative learning model is a prominent theme (Hallman, 2019; Powers et al., 2020; Samsudin & Hasan, 2017).

Collaboration, communication, digital literacy, and self-directed learning are skills referred to as 21st-century skills (Varier et al., 2017). Students have better employability odds (Bejakovic & Mrnjavac, 2020) and are college and career ready due to education and training, which teaches them to use digital media and technology strategically (Mirra et al., 2018).

Digitization skills are critical in obtaining completely new jobs and occupations (Bejakovic & Mrnjavac, 2020).

Employers demand that K-12 institutions become more aggressive in preparing students for life after formal education (Harrell & Bynum, 2018). One initiative that school districts in developed countries use to meet this demand is deploying a 1:1 digital device (Paterson & Scharber, 2017; Sadaf & Gezer, 2020; Zheng et al., 2016). The learning environment that fosters 21st-century skills has at its forefront a teacher with knowledge of 21st-century skills and innovative learning equipment (Hineman et al., 2015). A key focus for this initiative is the deployment of a 1:1 digital device for K-12 students to improve digital literacy so that students are prepared to be productive members of the knowledge-based society beyond the K-12 classroom (Kimbell-Lopez et al., 2016; Mirra et al., 2018; Sadaf & Gezer, 2020).

Global Citizenship

Globalization has almost completely removed actual geographical boundaries (Saputra & Siddiq, 2020). Global citizenship promotes future productive leaders by using the knowledge of technology and real-world problems to develop students' digital literacy skills and cultural awareness (Delacruz, 2018). It is becoming easier and easier to interact with others globally, which is why students must learn early the nature of being an effective global citizen (Armfield & Blocher, 2019; Yanzi et al., 2019). In association with important 21st-century skills, research findings indicate that there should be a shift in pedagogical skills to improve the digital literacy skills of students in the 1:1, digitally-inclusive classroom (Hallman, 2019; Powers et al., 2020) and is a transversal for people and organizations who thrive and prosper in the global economy (Bejakovic & Mrnjavac, 2020).

The connected world is becoming one entity, which Saputra and Siddiq (2020) refer to as a global village. Students must be taught to be responsible global digital citizens (Armfield & Blocher, 2019). The global village is helpful because it brings awareness of global citizenship through local wisdom, global morals, and social education through the Internet (Yanzi et al., 2019). Teachers can model effective global citizenship by integrating global awareness, cultural understanding, and legal and ethical responsibility into their classroom technology curricula, which will have the added benefit of improving digital literacy (Armfield & Blocher, 2019).

Ultimately, digital literacy fosters the development of global awareness through active participation, networking, and responding to global issues (Yanzi et al., 2019). It also can be useful in helping students practice global digital citizenship through cross-cultural collaborations with other teachers and their classes (Armfield & Blocher, 2019).

Summary

This literature review adds to the understanding of the relationship between digital literacy and the deployment of a 1:1 digital device in K-12 education. It contributes to the growing body of research to guide stakeholders, administrators, teachers, and students in integrating digital literacy into the classroom's daily academic practices. This study allows for a better understanding of the benefits and challenges of improving digital literacy when students are provided with a 1:1 digital device (Dolan, 2016; Eagleton, 2017; Hallman, 2019).

One thing to count on is that today's technology will continue to grow as additional needs arise (Kim, 2019; Neokleous, 2019). New technologies are becoming available for the learning environment to address the constant demands of today's learners (Armfield & Blocher, 2019). Many educators assume that students are fluent in digital literacy because they are digital natives (Neokleous, 2019). Digital natives have grown up with technology. To improve digital literacy,

digital immigrants (teachers) must learn to integrate traditional learning modes and digital technology to engage digital natives (students) in the learning process (Abrams et al., 2019; Lindqvist, 2015). In a digital world, technology continues to affect the improvement of digital literacy by integrating traditional curricula and technology (Anthonysamy, 2019).

Previous research findings indicate that the freedom to access information anytime, anywhere increases students' opportunity to construct their own learning as they build upon their funds of knowledge (Creer, 2018; Delacruz, 2018; Hashemi & Cederlund, 2017). As a result, digital literacy has become a critical employability competency (Bejakovic & Mrnjavac, 2020; Tomczyk, 2020). Changes in conventional educational thinking and practices are required of contemporary teachers as change-enablers who use digital tools productively in education (Karunanayaka & Weerakoon, 2020; Kimbell-Lopez et al., 2016).

Improving digital literacy has met many challenges, which include infrastructure instability (Dolan, 2016), teacher indifference (Lahpai, 2019; Sadaf & Gezer, 2020), student's inexperience with digital technology (Hashemi & Cederlund, 2017; Samsudin & Hasan, 2017), and availability of devices (Dolan, 2016). This literature review examined the challenges and opportunities inherent in improving digital literacy by deploying a 1:1 student technology program in teaching and learning (Stevenson & Hedberg, 2017). Furthermore, it underlines the need to improve teachers' digital self-efficacy and confidence through professional development (Sadaf & Johnson, 2017). Ultimately, this research may support the need to improve the digital literacy of students, which empowers them in the way they gain knowledge (Fang et al., 2019; Sadaf & Gezer, 2020), search, interpret, evaluate, and share data in a digital environment (Kaeophanuek & Na-Songkhla, 2019) and increase their global awareness (Yanzi et al., 2019). Furthermore, when teachers prepare lessons carefully integrating technology in their subjects in

the classroom, they improve the student's digital literacy and prepare them for 21st-century employment (Abrams et al., 2019; Lindqvist, 2015). Overall, research supports implementing 1:1 computing to improve digital literacy (Fang et al., 2019; Powers et al., 2020; Robinson et al., 2018).

CHAPTER THREE: PROPOSED METHODS

Overview

The purpose of this applied study was to solve the problem of improving the digital literacy skills of middle school students in a large, urban public school district, focusing purposefully on having access to a 1:1 digital device and designing an intervention to address the problem. This study's primary goal was to explore teachers' and instructional coaches' perspectives on the relationship between improved digital literacy and access to a 1:1 digital technology device.

As society embraces the norm of mobile technology, which can be accessed from nearly everywhere, technology-driven standards continue to emerge in education, and preparing K-12 students for digital media use and information fluency is necessary (Luo & Murray, 2018). This chapter discusses how I collected data and the procedures I used to analyze the data gathered from interviews, an online qualitative survey, and an online quantitative survey. It also explains the criteria for selecting participants. My role and motivation for this research are further discussed in this chapter. Finally, this section discusses how this proposed study can specifically address the problem.

Design

I used a multimethod research design for this applied research study, incorporating both qualitative and quantitative methods. The applied research method is ideal for this doctoral study for two reasons. First, applied research in education is best characterized by the intention to link research with action in a form that generates actionable knowledge to inform real-world problems (APA Dictionary of Psychology, 2020; Bickman & Rog, 2009: Hedrick et al., 1993). Second, the applied research method allows for investigating a current education problem on the

middle school campus (APA Dictionary of Psychology, 2020). Thus, the qualitative component of this study includes face-to-face interviews with structured interview questions. I interviewed six teachers and one instructional coach face-to-face via the Zoom video conferencing online platform. Face-to-face interviews are suitable when the target population can communicate better through face-to-face conversations than through writing or phone conversations (Zarinpoush, 2006). The interview participants were obtained through a convenience sampling of teachers and an instructional coach employed at the urban school campus in south Texas that was being studied. In addition, I emailed a qualitative survey to discuss the impact of access to a 1:1 digital device and the improvement of digital literacy for the current student body of teachers in the urban middle school that was studied. Finally, the quantitative component of this research included a survey using the Likert scale emailed to teachers in the urban middle school that was studied. The quantitative survey questions measure the participants' response to research questions from the Sadaf et al. (2016) study "Exploring Factors That Influence Teachers' Intentions To Integrate Digital Literacy Using The Decomposed Theory Of Planned Behavior (DTPB)" and were used with permission.

Research Questions

Central Question: How can the problem of the need to improve digital literacy be solved at an urban middle school in south Texas?

Sub-question 1: How would teachers and instructional coaches in an interview solve the problem of improving students' digital literacy through a 1:1 digital device implementation at an urban middle school in south Texas?

Sub-question 2: How would quantitative survey data from current middle school teachers inform the problem of improving students' digital literacy at an urban middle school in

south Texas?

Sub-question 3: How would qualitative survey data from current middle school teachers inform the problem of improving digital literacy through a 1:1 digital device implementation at an urban middle school in south Texas?

Setting

I have provided approximate information to protect the privacy of the participants of this study. The site selected for this study was an urban, public middle school in south Texas. The school has approximately 750 students in grades six through eight, of which approximately 90% are economically disadvantaged and 20% are English learners. Approximately 50 teachers serve the students resulting in about a 15:1 student-teacher ratio (Texas Education Agency, 2018). School administrators include a principal, two assistant principals, and two instructional learning coaches.

This setting was ideal for three significant reasons. First, the school population of over 90% socioeconomically-disadvantaged students has been identified in several research studies (Brill & Park, 2008; Dolan, 2016; Thieman & Cevallos, 2017) as having a lack of digital literacy. Second, I selected the setting because of the availability of participants for the study. Third, each student on this campus received a 1:1 digital device for the first time at the beginning of the 2019-2020 school year with the expectation of improving their digital literacy. Finally, because I am an employee on this campus, the ease of access and support for this research within the school makes it an ideal site.

Participants

I chose the participants using a convenience sampling procedure. Convenience sampling can often "capitalize on identifying individuals who are readily available to take part in a study

or individuals for whom some of the needed study data have already been collected" (Bickman & Rog, 2009, p. 81). Convenience sampling is to select whoever is available (Evans & Rooney, 2014). Such sampling allowed me to choose teachers and instructional coaches connected to improving students' digital literacy to understand the central phenomenon.

After I received permission from the Liberty University Institutional Review Board (IRB), five teachers and two instructional coaches who are employed on the middle school campus being researched were interviewed for this study (Appendix A, Interview Questions). I also sent a qualitative and quantitative survey to 30 teachers (Appendix B, Qualitative Survey Questions, Appendix C, Quantitative Survey Questions). I accepted the first 15 completed responses for both surveys. I received approval to approach teachers and instructional coaches via email from the participating school's principal (Appendix K, Site Approval Email). I emailed participants to request their participation (see Appendix H, Teacher Recruitment Email and Appendix J, Instructional Coach Recruitment Email). The email included a copy of the informed consent form (see Appendix F, Survey Consent Form and Appendix I, Interview Consent Form). Teachers and instructional coaches interested in the interview were asked to sign the approved IRB consent form before beginning the interview (see Appendix G, Interview Consent Form).

The Researcher's Role

I, the researcher, am employed on this campus as a Career Technology Education teacher. My motivation for conducting this study is to understand the perception of teachers and instructional coaches regarding the improvement of the digital literacy skills of students through a 1:1 digital device program deployment. I used the information gained from this research to design a solution to address this problem. The participants for this study are my colleagues. I made them aware of my intentions for this study and its importance in improving students' digital

literacy. I provided each participant a copy of the approved IRB consent form, which provides an invitation to participate in the study, what and why the study is being done, what happens in the study, the risk of the study, and the benefits of the study. My role was to interview the participating teachers and instructional coaches and collect the online qualitative and quantitative survey data delivered to participants in the study.

The ethical implication of this study includes my relationship with teachers and instructional coaches, which may affect the teacher's interviews. I do not have evaluation or grading authority over the participants. My biases include the belief that students on this campus would experience better learning outcomes if they were digitally literate. Also, I believe that the technology world has a diversity problem because of the underrepresentation of minorities who would excel in technology if given the tools to improve their digital literacy. I assume that if given the tools and instruction to become computer natives, students on this campus would improve their digital literacy and become better equipped to gain 21st-century employability skills.

Procedures

Before beginning this study, I applied for the Institutional Review Board (IRB) approval using the general IRB application. The proposed data collection methods included interviews, an online qualitative survey, and an online quantitative survey. I conducted teacher and instructional coach interviews face-to-face via the Zoom video conferencing online platform. Face-to-face interviews are suitable when the target population can communicate better through face-to-face conversations than through writing or phone conversations (Zarinpoush, 2006). Online surveys intend to gather information about the participants' perception of improving digital literacy skills by deploying a 1:1 digital device program. Online surveys are an excellent method to engage the

audience and collect valuable feedback (Bickman & Rog, 2009).

I conducted audio- and video-recorded individual teacher and instructional coach interviews at a time convenient for the participants face-to-face via the Zoom video conferencing online platform. I followed a scripted format to ask participants all the interview questions (see Appendix A, Interview Questions). In addition, I emailed 30 teachers, employed at the middle school campus being studied, links to the quantitative and qualitative surveys to complete at their own pace and time within the provided deadline of 15 days (see Appendix B, Qualitative Survey Questions and Appendix C, Quantitative Survey Questions). I accepted the first 15 completed surveys for both surveys. All surveys were designed using the Google Forms online platform and then distributed electronically. Participants received a $10 Amazon gift card via email for each section of the study they completed. In addition, after the interviews, I forwarded a $10 Amazon gift card to the same email address I emailed the recruitment letter. At the end of the survey, participants clicked on a new link to request their compensation (see Appendix F, Survey Compensation Form). All participants had the opportunity to decline the compensation.

Data Collection and Analysis

I used three data collection methods for this applied dissertation. All research questions were reviewed by an expert professor from the Liberty University mathematics department who also serves as a dissertation chairperson. The first approach was the teacher and instructional coaches' interviews. The second approach was an online quantitative survey completed by 15 teachers. The third approach was an online qualitative survey completed by 15 teachers.

Interviews

The first sub-question for this study explored how teachers and instructional coaches in an interview would solve the problem of improving students' digital literacy through a 1:1 digital device implementation at an urban middle school in south Texas. I interviewed six teachers and one instructional coach face-to-face via the Zoom video conferencing online platform. Face-to-face interviews are suitable when the target population can communicate better through face-to-face conversations than through writing or phone conversations (Zarinpoush, 2006).

I emailed 30 teachers and two instructional coaches employed on the campus that was studied an invitation to participate in my research and the interview consent form (see Appendix H, Teacher Recruitment Email, Appendix J, Instructional Coach Recruitment Email, and Appendix G, Interview Consent Form). The interview participants were the first five teachers and two instructional coaches employed at the urban school campus in south Texas that was studied, who contacted me expressing interest in my research. I asked participants to sign a copy of the approved IRB consent form that details the purpose of the interview data collection, how the data is used, and the intended use of data collected to improve students' digital literacy on the school campus through the 1:1 digital device deployment before the interview (see Appendix G, Interview Consent Form). All interviews followed a scripted format. Interviews were audio and video recorded. I asked participants all the interview questions. The interview questions are listed below and can be found in Appendix A.

1. How long have you been teaching at an urban school district in south Texas? This question categorized teaching experience during analysis. In a study conducted by Adeyemi (2008), findings revealed that "teachers' teaching experience was significant for students' learning outcomes as measured by their performance on the senior secondary

certificate (SSC) examinations" (p. 89). This question provided information about the participants' experience with classroom 1:1 digital engagement and the improvement of digital literacy.

2. How would you rate your experience level with laptop computers: beginner, intermediate, or advanced? This question determined if the previous technology experience of participants increased the likelihood that they consistently use digital media in the classroom. In a study conducted by Hineman et al. (2015), teachers' technology self-efficacy significantly affects their actual digital teaching practice. This question provides information about the correlation between a teachers' digital experience and the improvement of students' digital literacy through a 1:1 digital device deployment.
3. What is your self-efficacy toward technology? This question helped me understand the teacher's belief in improving students' digital literacy at an urban school district in south Texas. Zahorec et al. (2019) found that teachers are the critical factor in achieving technology benefits in school and improving the digital literacy of the student body.
4. What is your perspective about students' 1:1 digital technology use in the classroom? This question categorized teacher beliefs during analysis. In addition, it provided me information about the participants' perspective about a 1:1, digitally-enhanced classroom. According to Stone (2017), "A 1:1 digital technology implementation is highly context-dependent and is heavily affected by individual behaviors, attitudes, and perceptions" (p. 2282).
5. In your own words, define digital literacy. This question ensured the participant fully understands the research subject. Digital literacy encompasses having access to robust technology devices and access to the ability and knowledge to gain information digitally.

According to Wilkin et al. (2017), "To own digital equipment is just the beginning: to know how to use it 'meaningfully' and achieve ambitions requires a great deal more application" (p. 333).

6. What is your perspective about the digital literacy gap experienced by students at an urban school district in south Texas? This question determined any bias about the need to improve the digital literacy skills of low socioeconomic students who do not have access to robust digital technology. The findings by Robinson et al. (2018) leave no doubt that "digital disparities can be highly consequential for the academic achievement of economically insecure students who have the most to gain from educational success and the most to lose from educational failure" (p. 1267).
7. What would be three strategies you would implement to improve digital literacy at your school campus through implementing a 1:1 digital device program? This question gathers participants' strategies to affect improving digital literacy on their campus. According to Wilson (2018), "Some educators have moved out of their comfort zone to enhance their methods of course instruction with creative and innovative practices using technologies, content mastery, and effective communication skills to reach those being taught" (p. 41).
8. How would you describe the present digital literacy of most of your students? This question allowed an in-depth understanding of the digital literacy skills the teacher experiences in the classroom. Students use technology daily but rarely test their own digital literacy (Schatteman & Liu, 2020). This question provided information about the participants' present understanding of students' digital literacy and if they think a 1:1 digital device program will improve their students' digital literacy.

9. What do you think about integrating the same technology students use outside of class with the current in-school curriculum instruction? A study conducted by Hughes and Read (2018) found that students are frustrated because they feel a disconnect between the technology they use at home and in the classroom. This question provided information on the teachers' understanding of the benefits of merging the student's current digital funds of knowledge with a 1:1 digital device to improve digital literacy in the classroom.
10. What do you think about a student possessing higher technology skills than you have? Luckin's (2008) learner centric ecology of resources model supports the co-design process of students and teachers working together to transform the traditional learning environment into one that integrates digital technology that will improve digital literacy (Gros & Lopez, 2016). This question provided information about the participants' willingness to co-create learning that will improve the student's current digital knowledge through a 1:1 digital deployment program.
11. What is your perspective about the connection between digital and non-digital instruction methods? Researchers Abrams et al. (2019) noted that digital and nondigital methods inform each other. In addition, research has found that learners also develop critical literacy through improved internet communication and integration, which provides the emergence of voice and control for the learner (Abrams et al., 2019; Mnyanda & Mbelani, 2018). This question provided information about the participants' willingness to integrate digital and non-digital literacies into classroom instruction.
12. What new technology have you included in your classroom lessons or guided teachers on the campus (ex. Google forms, Google sheets, Google documents, Twitter, Snapchat, TikTok, Quizziz, Kahoot, Microsoft Word, Adobe)? Whenever new technologies are

introduced to society, education leaders attempt to incorporate those technologies into the classroom (Brill & Park, 2008; Harrell & Bynum, 2018). This question provided information about the teachers' and instructional coaches' awareness of the benefits of including new instructional technologies to improve students' digital literacy.

13. How does a student gain knowledge? Connectivism theory explains that learners have a natural ability to self-teach by connecting new learning to their funds of knowledge (Siemens & Downes, 2009). The learner interacts with information from the internet and then connects the new learning with previous learning (Karunanayaka & Weerakoon, 2020; Mirra et al., 2018; Samsudin & Hasan, 2017). This question provided information about the participants' understanding of how learners interact with information from the internet and then connects it to create new learning.
14. What do you think the outcome would be if learners were granted equal access to the digital world? Clarke (2020) stated that digital literacy could generate opportunities to develop multimodal expressions for students. Furthermore, giving students equal access to learning methods such as the digital world prepares them to understand and compete in a global market (Creer, 2018; van Laar et al., 2017). This question gained an in-depth understanding of the participant's perception of the need to grant learners equal access to the digital world to be competitive in life after K-12.
15. How would you describe the difference between learners being digital consumers or digital producers? In your opinion, are your students more of digital consumers or digital producers? Learners are often more skilled at navigating the digital world as consumers (Wilkin et al., 2017); however, integrating a 1:1 digital device technology program will grant them access to instruction and systems to increase their ability to become producers

in the digital world (Hughes & Read, 2018; Mirra et al., 2018). This question allowed participants to express their thoughts about their students' use of digital content.

16. How would you solve the problem of the need to improve the digital literacy skills of students on your campus? A teacher's self-efficacy (Sadaf & Johnson, 2017), perceived ease of use, and perceived usefulness of a 1:1 computing device (Powers et al., 2020) are significant predictors of how much or little digital technology integration students will encounter during their school day. This question allowed participants to express their thoughts about the need to improve the digital literacy skills of students on the urban middle school campus being researched.

Interview data was analyzed using NVivo (2020) computer software. This web-based application organizes and manages research data. It also offers intuitive qualitative data analysis to uncover deeper research insights (NVivo, 2020). Using this software for analysis helped me achieve more robust research by identifying themes and organizing data more efficiently. I used NVivo (2020) transcription software to transcribe recorded interviews to code and categorize information into themes. This software is an automated transcription assistant which allowed me to upload the recorded interview into the file. Then it transcribes the recording verbatim. I changed the software transcription as needed, tagged speakers, and formatted the transcription to meet IRB guidelines.

Quantitative Survey

The second sub-question for this study explores quantitative survey data from teachers to discover how quantitative survey data from current middle school teachers inform the problem of improving students' digital literacy at an urban middle school in south Texas. The survey research questions are from the Sadaf et al. (2016) study "Exploring Factors That Influence

Teachers' Intentions To Integrate Digital Literacy Using The Decomposed Theory Of Planned Behavior (DTPB)" and are used with permission (see Appendix K). Researchers used the DTPB scale, which included a series of five-point Likert scale responses. The Likert scale is a four (or seven) point scale used to allow the individual to express how much they agree or disagree with a statement (Creswell & Creswell, 2014). This study survey used the five-point scale: Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, or Strongly Disagree. In addition, Sadaf et al. (2016) used Cronbach's alpha instrument to ensure the internal reliability of the instrument. The reliability of the survey instrument was determined by assessing the instrument's internal consistency, using Cronbach alpha reliability coefficients, during a pilot study with 286 preservice teacher participants. For the DTPB scale's 12 factors, the resulting values ranged from .83 to .96 (Sadaf et al., 2016, p. 45).

I emailed 30 teachers employed on the campus being studied an invitation to complete the qualitative and quantitative study survey (see Appendix I, Survey Consent form). I accepted the first 15 completed surveys. A copy of the approved IRB consent form detailed the purpose of the survey data collection, how the data will be used, and the intended use of data collected to improve students' digital literacy on the school campus was attached to the recruitment email. I instructed participants in the email to read the consent form before clicking the link to complete the survey. I designed all surveys using the Google Forms online platform (see Appendix D, Quantitative Survey Questions). In addition, I included the web links to the survey in the body of the recruitment email. All survey questions followed a scripted format platform. Survey questions are listed below and can be found in Appendix C.

1. The advantage of integrating digital literacy into my classroom outweighs the disadvantages of not integrating. Researchers Dolan (2016) and Wilkin et al. (2017)

noted significant inequalities in students' digital literacy who are socioeconomically disadvantaged. This question revealed the participants' basis for their perception of the usefulness of a 1:1 digital device for improving students' digital literacy on their middle school campus.

5	4	3	2	1
Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree

2. Integrating digital technology into my classroom is useful in my teaching. According to Zheng et al. (2016), "The effects of new technology on teaching and learning are one of the most hotly debated topics in U.S. education" (p. 1052). This question revealed the participants' perception of the usefulness of a 1:1 digital device for improving students' digital literacy on their middle school campus.

5	4	3	2	1
Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree

3. Integrating digital literacy into my classroom will help increase students' engagement. Researchers Paterson and Scharber (2017) and Islam and Gronlund's (2016) found that increased student achievement, increased numbers of student-centered learning environments, increased motivation, and improved attendance for at-risk students were benefits in providing students with a 1:1 digital technology device. This question allowed me to understand the participants' perception of the usefulness of a 1:1 digital device for improving students' digital literacy on their middle school campus.

5	4	3	2	1
Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree

4. Integrating digital literacy into my classroom fits well with the way I teach. According to Sadaf and Johnson (2017), "Teachers' positive attitudes and intentions toward using technologies have been proven to be a major predictor of their successful integration of these technologies in the classroom" (p. 129). This question allowed me to understand the impact of the teachers' digital attitude on their perception of the usefulness of a 1:1 digital device to improve students' digital literacy on their middle school campus.

5	4	3	2	1
Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree

5. Integrating digital literacy into my classroom is a good idea. According to Cho and Littenberg-Tobias (2016), an educator's perspective of the importance of improving students' digital literacy can shape the success or failure of a 1:1 digital device program. This question allowed me to understand the participants' perception of the usefulness of a 1:1 digital device to improve students' digital literacy on their middle school campus.

5	4	3	2	1
Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree

6. Integrating digital literacy into my classroom will prepare my students for college and future careers. High-skilled persons with cognitive and digital skills are increasingly in demand (Bejakovic & Mrnjavac, 2020; Mirra et al., 2018). This question allowed me to understand the participants' perception of the need to prepare students for college and future careers by integrating digital literacy in the classroom on their middle school campus.

5	4	3	2	1
Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree

7. Integrating digital literacy into my classroom will improve my students' 21st century skills. Many students who attend socioeconomically-disadvantaged schools will exit K-12 with a potential technological disadvantage, which will make it difficult to compete for educational opportunities or career advancements (Dolan, 2016; van Laar et al., 2017). This question revealed the participants' basis for their perception of the usefulness of a 1:1 digital device for improving students' digital literacy on their middle school campus.

5	4	3	2	1
Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree

8. Integrating digital literacy into my classroom will improve my students' technical skills. Student voice should be included in determining which technology will be suitable to engage them in the learning process (Stevenson & Hedberg, 2017). This question allowed

me to understand the relationship between potentially increased student engagement and the participant's perception of the usefulness of a 1:1 digital device to improve students' digital literacy on their middle school campus.

5	4	3	2	1
Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree

9. Integrating digital literacy into my classroom will improve my students' critical thinking skills. Studies have found that students in low socioeconomic schools use computers for drills and practices. In contrast, students who attend higher socioeconomic schools use technology to develop higher order thinking and analyzing skills (Powers et al., 2020). This question revealed the participants' perception of the usefulness of a 1:1 digital device for improving students' digital literacy on their middle school campus.

5	4	3	2	1
Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree

10. Integrating digital literacy in my classroom is entirely within my control. A teacher's self-efficacy (Sadaf & Johnson, 2017), perceived ease of use, and perceived usefulness of a 1:1 computing device (Powers et al., 2020) are significant predictors of how much or little digital technology integration students will encounter during their school day. This question allowed me to understand the digital self-efficacy of the participant.

5	4	3	2	1
Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree

Once participants completed the survey, I used the IBM SPSS Modeler online software to analyze the respondents' answers to the survey questions for themes and build a predictive model. This web-based application exposed the patterns and models hidden in the data using a bottom-up, hypothesis-generation approach (Mathur, 2019). I analyzed survey question responses for frequency and provide the mean score for each question.

Qualitative Survey

The third sub-question for this study explored how qualitative survey data from current middle school teachers would inform the problem of improving digital literacy through a 1:1 digital device implementation at an urban middle school in south Texas. The qualitative design model is appropriate for this study because it allowed me to simultaneously reflect through every stage of this research, collect and analyze data, refocus the research questions, and control validity threats (Bickman & Rog, 2009).

I emailed 30 teachers employed on the campus being studied an invitation to complete the qualitative and quantitative study survey (see Appendix I, Survey Consent Form). I accepted the first 15 completed surveys. A copy of the approved IRB consent form detailing the purpose of the survey data collection, how the data will be used, and the intended use of data collected to improve students' digital literacy on the school campus was attached to the recruitment email. I instructed participants in the email to read the consent form before clicking the link to complete the survey. I designed all surveys using the Google Forms online platform (see Appendix E,

Qualitative Survey Questions). In addition, I included the web link to the survey in the body of the recruitment email. All survey questions follow a scripted format platform. Survey questions are explained below and can be found in Appendix B.

1. Based on your understanding of digital literacy, describe the digital literacy of the students in your classroom. This question ensures that participants understand that "digital literacy basically refers to the (shared) capacity to search and access content in the online space, but, just as important, it includes other features that, depending on the specificity of the educational context, must be performed by the trainer, by the trainee(s) or by both/all participants" (Mudure-Iacob, 2019, p. 60). This question provides information about the relationship between a participant's understanding of the term digital literacy and their commitment to improving a students' digital literacy through the deployment of a 1:1 digital device.
2. Based on your understanding of digital literacy, describe your present digital literacy. This question helped me to understand the participants' attitudes about the importance of improving digital literacy in the classroom. According to Sadaf and Johnson (2017), "Teachers' positive beliefs and intentions toward using technologies have been proven to be a major predictor of their successful integration of these technologies in their classrooms" (p. 129). Therefore, this question provides information about the relationship between teachers' digital self-efficacy and their commitment to improving students' digital literacy through a 1:1 digital device deployment.
3. What types of support do you need to help improve the digital literacy of your students? This question identifies what participants consider essential supports that will improve their ability to improve their students' digital literacy. In a study conducted by Hughes

and Read (2018), teachers noted that barriers to integrating digital literacy in their classrooms included: lack of effective professional development for their subject, blocked commonly used websites, slow internet connection, and the pressure to teach only the standardized curriculum to raise test scores. This question provided information about the participant's opinions of the proper digital support needed to improve student digital literacy and their commitment to using a 1:1 digital device in the classroom environment.

4. Describe some ways you have attempted or been successful in developing a digitally-inclusive classroom. This question allowed me to gain knowledge of the participants' interventions in the classroom to encourage students to improve their digital literacy. Key factors to improved students' digital literacy are the teacher's ability to implement and use technology in the classroom (Zahorec et al., 2019). This question validated participants' commitment to digital interventions to improve digital literacy in the classroom using a 1:1 digital device program in a digitally-inclusive classroom.
5. What do you think is/will be an obstacle to providing a robust digital literacy learning experience for your students? This question screened the participants' opinions about what they consider to be significant challenges to improving students' digital literacy. Researchers Cho and Littenberg-Tobias (2016) noted that an educator's perspective of the importance of digital literacy could shape the success or failure of a 1:1 technology initiative. Therefore, this question provides information about the participants' perception of impending or present obstacles to their commitment to improving digital literacy through a 1:1 digital device deployment.
6. Students become frustrated because teachers do not allow them to use the same technology in school that they use out of school (Hughes & Read, 2018). When you think

about your digital interactions with students, do you think this statement is valid? This question helped the researcher understand the participants' devotion to improving their students' digital literacy. According to Lindqvist (2015), teachers who will take small steps in integrating technologies in the classroom discovered an uptake in student collaboration. This question provided information on the participant's commitment to improving digital literacy by integrating any 1:1 digital device in classroom instruction.

7. How does using the student's preferred digital device integrate their voice in the classroom? Student voice should be included in determining which technology will be suitable to engage them in the learning process (Stevenson & Hedberg, 2017). This question helped me understand the participants' devotion to improving their students' digital literacy.
8. What do you think will be an advantage of providing a robust digital literacy learning experience for your students? This question helped me understand the participants' view of the need for a robust digital literacy learning experience. Research shows that there is a need to conceptualize improved digital literacy practices around ever-changing learning and educational settings (Aguayo et al., 2017). This question provided information about the participants' perception of impending or present advantages to their commitment to improving digital literacy through a 1:1 digital device deployment.
9. Please explain if you think integrating robust digital learning in your classroom would increase or decrease your present workload. This question helped me understand the effects of a perceived increased or reduced workload. If teachers believe that integrating activities that improve digital literacy would help improve student learning outcomes or 21st-century skills, the workload would not be a determining factor in incorporating it in

their present classroom instruction (Sadaf & Johnson, 2017). This question revealed if the workload is a factor in the participant's commitment to improving student digital literacy through a 1:1 digital device deployment.

10. What is the student digital literacy priority of your administration? This question helped me understand the alignment of the participant's perception of the need to improve their students' digital literacy with the administration's priority. It is very beneficial for the pedagogical employee to follow their institution's current educational needs and priorities (Zahorec et al., 2019). This question revealed if administration priority is a factor in the participant's commitment to improving student digital literacy through a 1:1, digital device deployment program.

Once participants completed the survey, I used the qualitative data analysis software online platform NVivo (2020) to analyze the text for themes and then provide automated coding. This web-based application organizes and manages research data. It also offers intuitive qualitative data analysis to uncover deeper research insights (NVivo, 2020). I then manually reviewed and edited the themes and coding made by the software to meet IRB guidelines.

Ethical Considerations

Prior to the study, I secured the approval from the IRB. I then provided each participant with the IRB-approved informed consent form (see Appendix F, Teacher Study Consent Form, and Appendix H, Instructional Coach Consent Form). Since we are co-workers, I ensured they understand there is no pressure to participate in this research study. In addition, I endeavored to protect the privacy of all participants in this study. According to Bickman and Rog (2009), privacy "refers to persons' interest in controlling the access of others to themselves" (p. 117). Each person has a different privacy boundary, and as an ethical researcher, it is my responsibility

to understand their privacy concerns and respect the participants from an invasion of their privacy.

I provided participants with a copy of the interview questions at the beginning of the scheduled interview in order to ensure that participants were not lead or misguided (see Appendix A, Interview Questions). Participants could then decide if they wanted to continue the interview. Since an online web application was used to transcribe and analyze the data, I ensured that the username and password for the account were secure. All data collected is kept on a password-protected computer, and I will destroy all recordings, notes, and transcriptions after three years. Fictitious names were assigned to protect participants' identities.

Summary

In a digital world where technology continues to affect the education sector, changes in literacy are needed (Abrams et al., 2019; Anthonysamy, 2019). Digital literacy encompasses access to robust technology devices and the ability and knowledge to gain information digitally. The transformative potential of a 1:1 digital technology program makes program implementation difficult, given the competing priorities recently faced by the relevant stakeholders (Stone, 2017). It then becomes the teacher's responsibility to integrate digital and non-digital curriculum delivery methods in a way that sustains student motivation and allows students to become active learners (Abrams et al., 2019; Lindqvist, 2015). The most impact is felt by those young people who do not have ready access to and skills to use technology (Wilkin et al., 2017). The proposed study identified the relationship between improving middle school students' digital literacy with the deployment of a 1:1 device program on an urban school campus in south Texas. I used NVivo (2020) online software to analyze and interpret interview data. The information gained from the digital literacy online surveys were given to teachers to identify areas in which they

perceive changes should be made to improve students' digital literacy on campus. I then made recommendations for changes and provided a rationale and support for implementing changes that will equip teachers to merge digital and non-digital instruction in their everyday lesson delivery.

CHAPTER FOUR: FINDINGS

Overview

The purpose of this applied study was to solve the problem of improving the digital literacy skills of middle school students in a large, urban, public school district, focusing purposefully on having access to a 1:1 digital device and designing an intervention to address the problem. The problem is the need to improve students' digital literacy skills on an urban middle school campus in south Texas through a 1:1 digital device deployment. This study's primary goal was to explore teachers' and instructional coaches' perspectives on the relationship between improved digital literacy and access to a 1:1 digital technology device. A multimethod research design for this applied research study incorporated both qualitative and quantitative methods. Chapter Four provides an understanding of the findings from the data collected, identifies themes, and provides evidence of the need for the proposed intervention to address the problem. This chapter includes a description of the participants, the results, a discussion, and a summary.

The following questions guided this research:

Central Question: How can the problem of the need to improve digital literacy be solved at an urban middle school in south Texas?

Sub-question 1: How would teachers and instructional coaches in an interview solve the problem of improving students’ digital literacy through a 1:1 digital device implementation at an urban middle school in south Texas?

Sub-question 2: How would quantitative survey data from current middle school teachers inform the problem of improving students’ digital literacy at an urban middle school in south Texas?

Sub-question 3: How would qualitative survey data from current middle school teachers inform the problem of improving digital literacy through a 1:1 digital device implementation at an urban middle school in south Texas?

Participants

Interview participants

All participants were chosen using a convenience sampling procedure. Thirty teachers and two instructional coaches employed on the campus being studied were invited to participate in this research. Pseudonyms were used to protect the identity of the participants. The participants are noted as Teacher 1, Teacher 2, Teacher 3, Teacher 4, Teacher 5, and Instructional Coach 1. While all of the participants work at the urban middle school in south Texas, they each had a different perspective on improving students' digital literacy on the campus being studied through a 1:1 digital device implementation.

Teacher 1

Teacher 1 has served on the middle school campus for two years. They consider their digital technology skill level as advanced. They also think that technology is essential, especially in today’s world and that technology is involved in almost everything we do now. So, therefore, they believe technology is pretty important to understand.

Teacher 2

Teacher 2 has served on the middle school campus for three years. They have been with the urban school district for eighteen years. Their digital technology skill level is advanced. They also love the use of technology in education. They stated that technology does not do everything, such as replacing human connections, but there is much room for integration into the classroom.

Teacher 3

Teacher 3 has served on the middle school campus for four years. They consider their digital technology skill level as advanced. It does not take them long to understand computer technology without questions. So, they were really excited when the urban district gave students a 1:1 technology devise to use in the classroom. If Teacher 3 could choose a way to teach, they would actually prefer to teach using technology 100 percent of the time.

Teacher 4

Teacher 4 has served on the middle school campus for fourteen years. They consider their digital technology skill level as intermediate. Teacher 4 feels like technology is very important not only for themselves but also for their students to survive in this world.

Teacher 5

Teacher 5 is a new teacher on the middle school campus. They consider their digital technology skill level as advanced. Teacher 5 loves technology and thinks it should be incorporated into everything since it is apps based. They further believe that it is a necessity now and not an option, but they admit that they do not like how the middle school campus handles digital technology.

Instructional Coach

The instructional coach interviewed has been in education for six years. However, this is their first year as an instructional coach on the middle school campus. They rate their digital technology skill level as advanced. They feel confident in utilizing and learning new technology as they enter the classroom. The instructional coach enjoys teaching others how to use the technology in their classroom.

Quantitative Survey Participants

All participants were chosen using a convenience sampling procedure. Thirty teachers employed on the campus being studied were invited via email to participate in this research. Seven teachers responded to the survey (see Table 1). The survey research questions from the Sadaf et al.'s (2016) study "Exploring Factors That Influence Teachers' Intentions To Integrate Digital Literacy Using The Decomposed Theory Of Planned Behavior (DTPB)" were used with permission (see Appendix K). Survey responses were anonymous. The survey used the five-point Likert scale: Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, or Strongly Disagree.

Table 1

Quantitative Survey Participants

Pseudonym	Age	Teaching Experience	Race
Teacher 1	43	Less than 1 yr.	White
Teacher 2	36	10 yrs.	Black or African American
Teacher 3	61	20 yrs.	Black or African American
Teacher 4	33	Did not answer	Black or African American
Teacher 5	53	30 years	Black or African American
Teacher 6	26	2 years	Black or African American
Teacher 7	37	2 years	Black or African American

Qualitative Survey Participants

All participants were chosen using the convenience sampling procedure. Thirty teachers employed on the campus being studied were invited via email to participate in this research. Scripted survey questions were emailed to them. Seven teachers responded to the survey (see

Table 2). Survey responses were anonymous. The qualitative design model was appropriate for this study because it allowed me to simultaneously reflect through every stage of this research, collect and analyze data, refocus the research questions, and control validity threats (Bickman & Rog, 2009).

Table 2

Qualitative Survey Participants

Pseudonym	Age	Teaching Experience	Race
Teacher 1	40	7 years	Black or African American
Teacher 2	43	1 year	White
Teacher 3	61	21 years	Black or African American
Teacher 4	33	Did not answer	Black or African American
Teacher 5	53	30 years	Black or African American
Teacher 6	26	2 years	Black or African American
Teacher 7	37	10 years	Black or African American

Results

Structured interviews were conducted with teachers and instructional coaches from the urban middle school campus being studied to explore how they would solve the problem of improving students' digital literacy through a 1:1 digital device implementation on their campus. Second, quantitative surveys were given to current middle school teachers to measure their experience with digital technology on their campus to inform the problem of improving students' digital literacy at an urban middle school in south Texas. Finally, qualitative surveys were given to current middle school teachers to find themes that inform the problem of improving digital literacy through a 1:1 digital device implementation at an urban middle school in south Texas.

Sub-question 1

Sub-question one for this study was, “How would teachers and instructional coaches in an interview solve the problem of improving students’ digital literacy through a 1:1 digital device deployment at an urban middle school in south Texas?” Interviews were conducted with teachers and an instructional coach at an urban middle school in south Texas to solve the problem of improving digital literacy on their campus. The themes and frequencies are listed in Table 3. The top three themes uncovered in the qualitative analysis were 1:1 digital technology should be integrated into instruction in the classroom, being granted equal access to the digital world is essential for the students on the campus, and students and teachers need to be trained on how to use the technology more efficiently in the learning environment.

Table 3

Frequency of Codes for Sub-question 1

Codes	Frequency
Teachers should use both non-digital and digital instruction methods	6
Participants used technology in the classroom	6
Students using the same technology in class as they do outside the classroom is a good idea but not the best for the campus	6
Improved digital literacy would be an outcome of being granted equal access to the digital world	6
Huge digital gap in digital literacy compared to students in their same grade	5
Strategy #2 to improve digital literacy - Training	5
Digital literacy of most students is low	5
Students on the campus are digital consumers	5
Students gain knowledge through experiences	4
Digital literacy is understanding how to use the computer efficiently (use tasks, tools, and research)	3
Strategy #1 to improve digital literacy – Better equipment	3

Theme #1

The most common theme that emerged throughout the interviews was the importance of integrating 1:1 digital technology in the classroom. Most interviewees stated that since the campus has gone to 1:1 digital devices, students are more adept at using the computer for instruction. Teachers can now integrate new online software applications in their classroom lessons, such as the Google suite, Kahoot, Quizziz, and Microsoft Office suite. These technologies allow students to gain knowledge through hands-on learning and exposure to

information on the Internet. However, all participants agreed that this school campus should not integrate the same technology students use outside of the classroom, such as cellphones within classroom technology. Teacher #3 stated, “I think in our particular campus at this time, we might not be really ready for that. It would take a lot of professional development for teachers about how to use certain social media platforms or things with the students.” Teacher #3 added, “You will have to teach the students how to use the cellphone right and set high expectations. It will take active monitoring to make sure the students stay focused on the task in the classroom and don’t begin scrolling on their social media platforms.”

Theme #2

The second theme that emerged from the interviews was the need for equal access to the digital world is important for the students on the campus. Participants in the interviews perceived that the students on the campus experience a digital literacy gap. Interviewees commented on the inability of many of the students to perform basic tasks on their 1:1 digital device. Teacher #5 said,

> It all comes down to accountability and the knowledge of using the Chromebook. Students from more affluent schools know how to do so many more things with their Chromebooks than my students. Things like how to indent a paragraph and how to use the tab feature on a resume.

All five teachers and the instructional coach agreed that the digital literacy gap is huge. Several participants were surprised by the low level of digital literacy because most of their students have cellphones. A common thread for all participants regarding equal access to the digital world is that they believe it would really level the playing field and increase digital performance and learning opportunities. Teacher #4 stated, “Granting equal access to the digital world would be

awesome, but it just doesn't matter if they don't know how to use it correctly." Teacher #1 added,

> I think our kids honestly would do so much better without a doubt, like if we got the resources and the surplus of technology that is afforded more affluent scholars. We have some amazing scholars who need to be pushed and who need to grow. And so, the outcome would be that our kids would rise and continue to grow in the right direction.

Theme #3

The third theme that emerged from the interviews was that students and teachers need to be trained to use technology more efficiently in the learning environment. Participants gave great insight into how students can improve their digital literacy on the middle school campus. In the interviews, the teachers and the instructional coach discussed how the 1:1 digital equipment given to the students seemed inadequate for the student's success because neither the student nor the teacher received training on how to use and care for the technology. When asked the interview question, "What would be three strategies you would implement to improve digital literacy at your school campus through implementing a 1:1 digital device program?" the number one answer was training. A common problem discussed in the interviews was the students' lack of respect for the technology, as demonstrated in their misuse and destruction of the Chromebook. Teacher #1 suggested,

> It would be beneficial if the school campus would host seminars or have certain classes teach kids the basic skills of the technology they are given. So, if it's a Chromebook, teach them skills like on a Chromebook, this is how you access this, and this is how you do this type of thing. We should spend a couple of days training them. I think losing two

days of instruction time is worth it if that will teach them the right skills they need for the rest of the year.

While participants noted that the students on the middle school campus are digital consumers, Teacher #4 believes that they could quickly become digital producers if they were trained on how to use the technology and the internet properly.

The instructional coach mentioned the need to train teachers on how to embed digital technology use in their lessons to improve student learning. Although all participants rated their digital technology skills as intermediate or advanced, they recognized that some of their peers needed more training to increase their digital skills. Teacher #4 defined digital literacy as "the ability to adapt to the new technology handed to you or mange digital communications in our current world where everything is changing." Several participants agreed that "professional development that addresses the purposeful use of technology in instruction would improve student engagement and learning outcomes." The instructional coach observed that many teachers on the campus would be considered beginners in using digital technology in the classroom, and therefore, should be trained on using the 1:1 device for instruction. Right now, she notices that teachers just use the Chromebook as a resource periodically in instruction rather than as a powerful learning tool.

Sub-question 2

Sub-question two for this study was, "How would quantitative survey data from current middle school teachers inform the problem of improving students' digital literacy at an urban middle school in south Texas?" A survey was sent out using Google Forms to 30 teachers at the urban middle school being studied to find themes related to solving the problem of improving students' digital literacy. There were 13 total questions, with three of them related to

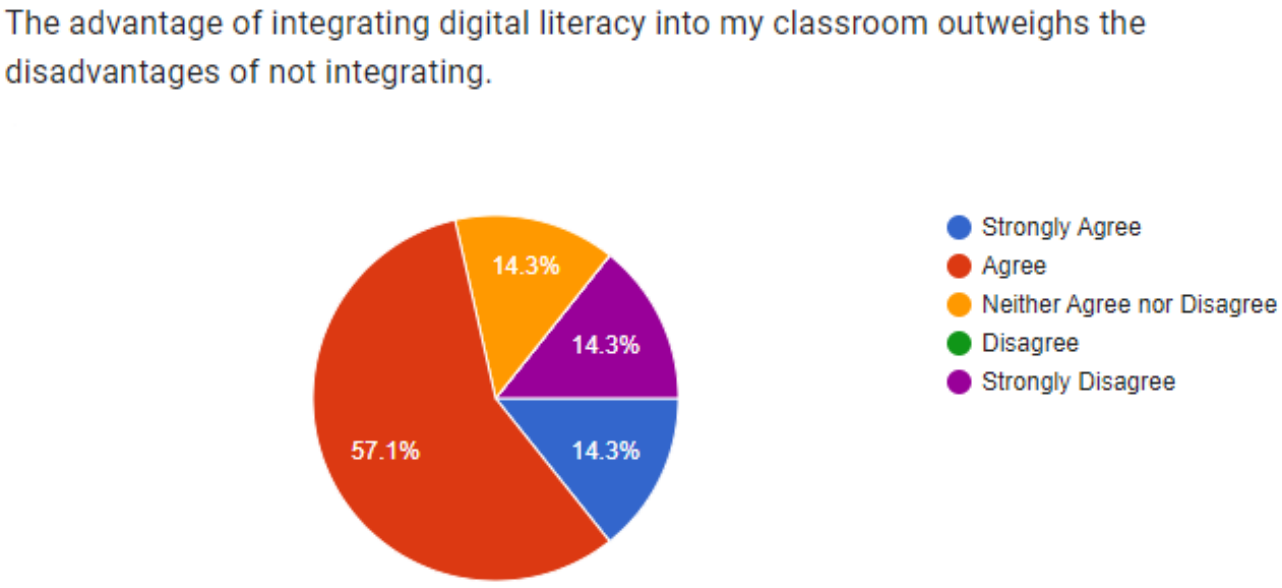
demographics and ten relating to the improvement of the student's digital literacy skills in the urban middle school in south Texas.

Seven participants completed the quantitative survey. The ages of the participants varied from 26 to 61 years. There was a wide range of teaching experience from first year to 30 years. Most of the survey participants describe themselves as Black or African American (85%). The remainder of the survey contained Likert scale statements related to improving digital literacy in the classroom, with responses being strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, and always using a one- to five-point scale.

Question 1 was, “The advantage of integrating digital literacy into my classroom outweighs the disadvantages of not integrating.” Fifty-seven percent of the participants agreed with this statement. These responses suggest that teachers think digital literacy is advantageous for students in their classrooms. Responses are displayed in a pie graph in Figure 1.

Figure 1

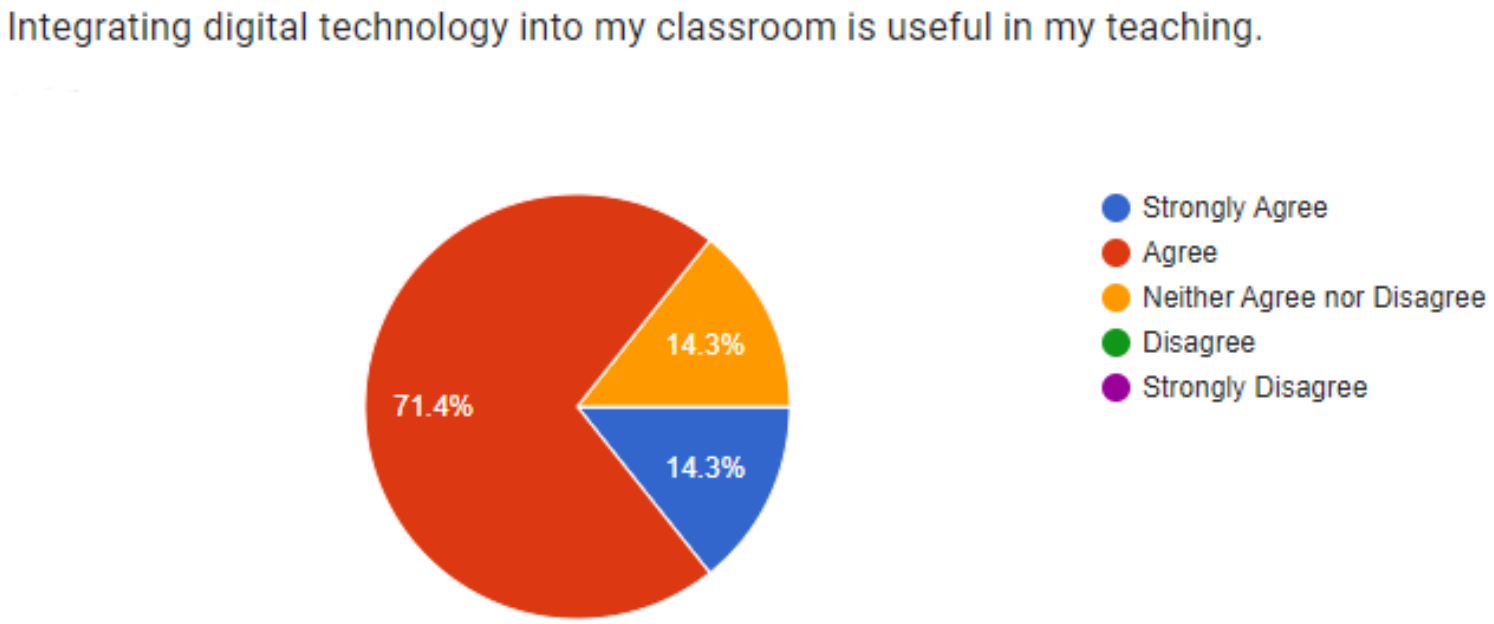
Answer to Survey Question 1



Question 2 was, “Integrating digital technology into my classroom is useful in my teaching.” Seventy-one percent of the participants agreed with this statement. These responses suggest that teachers think integrating technology in their classrooms is useful for students. Responses are displayed in a pie graph in Figure 2.

Figure 2

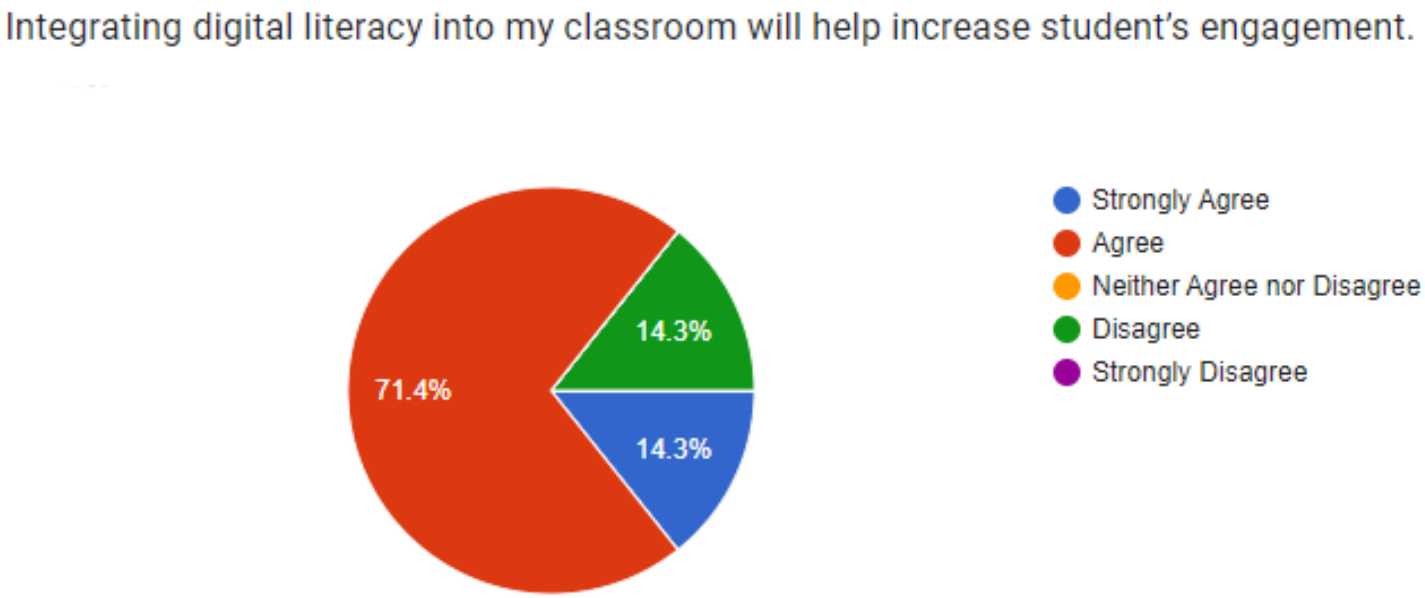
Answer to Survey Question 2



Question 3 was “Integrating digital literacy into my classroom will help increase student engagement.” Seventy-one percent of the participants agreed with this statement. These responses suggest that teachers think integrating digital literacy in their classrooms impacts their students' engagement. Responses are displayed in a pie graph in Figure 3.

Figure 3

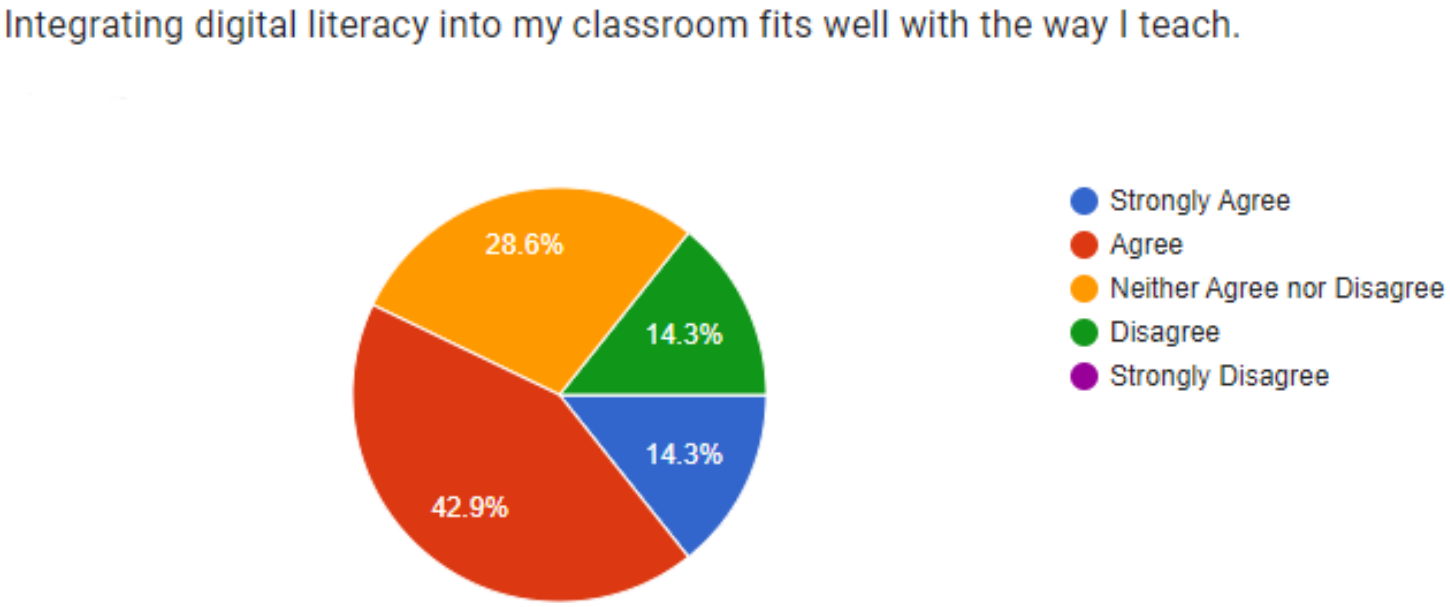
Answer to Survey Question 3



Question 4 was, “Integrating digital literacy into my classroom fits well with the way I teach.” Forty-two percent of participants agreed with this statement, 14 percent strongly agreed, 28 percent neither agreed nor disagreed with this statement, and 14 percent disagreed with this statement. These responses suggest that teachers think integrating digital literacy into their classrooms fits well with how they teach. Responses are displayed in a pie graph in Figure 4.

Figure 4

Answer to Survey Question 4



Question 5 was, “Integrating digital literacy into my classroom is a good idea.” Seventy-one percent of the participants agreed with this statement. These responses suggest that teachers think integrating digital literacy in their classrooms is a good idea. Responses are displayed in a pie graph in Figure 5.

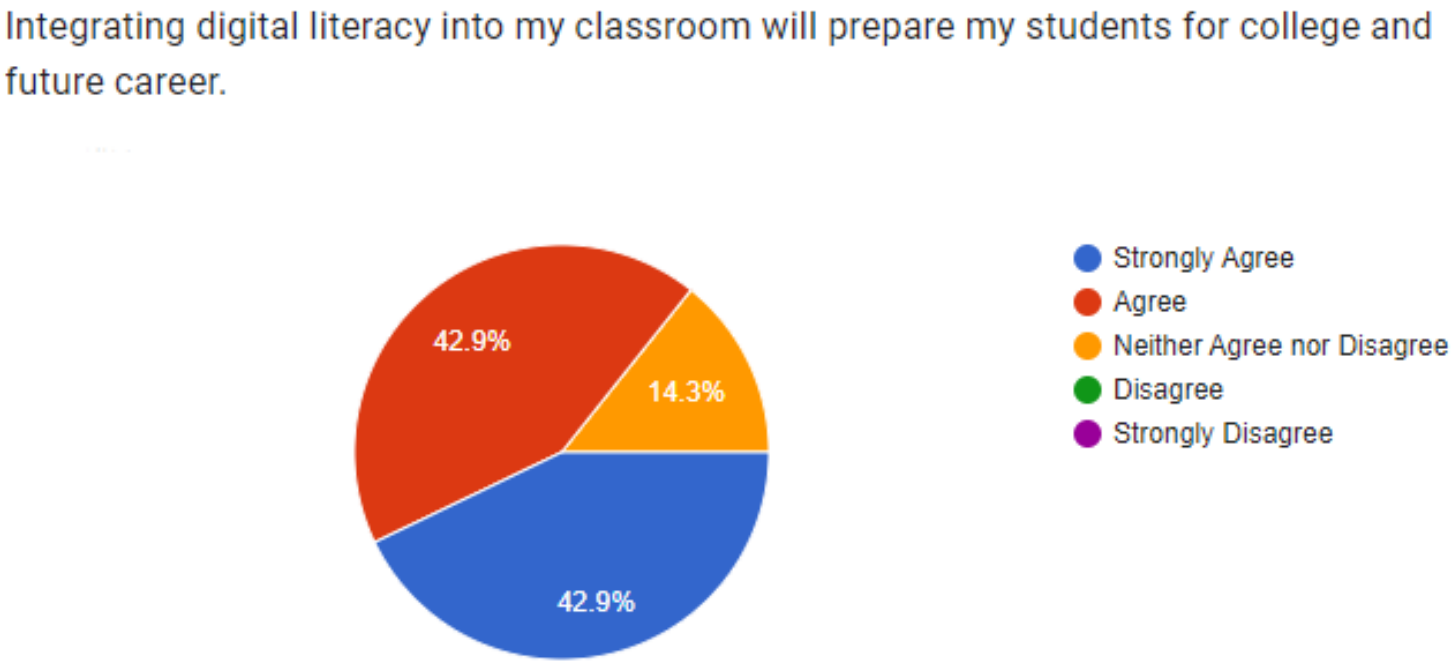
Figure 5

Answer to Survey Question 5

Question 6 was, “Integrating digital literacy into my classroom will prepare my students for college and future careers.” Forty-two percent of the participants strongly agreed with this statement, and forty percent of the participants agreed with this statement. These responses suggest that teachers agree that integrating digital literacy in their classrooms will prepare their students for college and future careers. Responses are displayed in a pie graph in Figure 6.

Figure 6

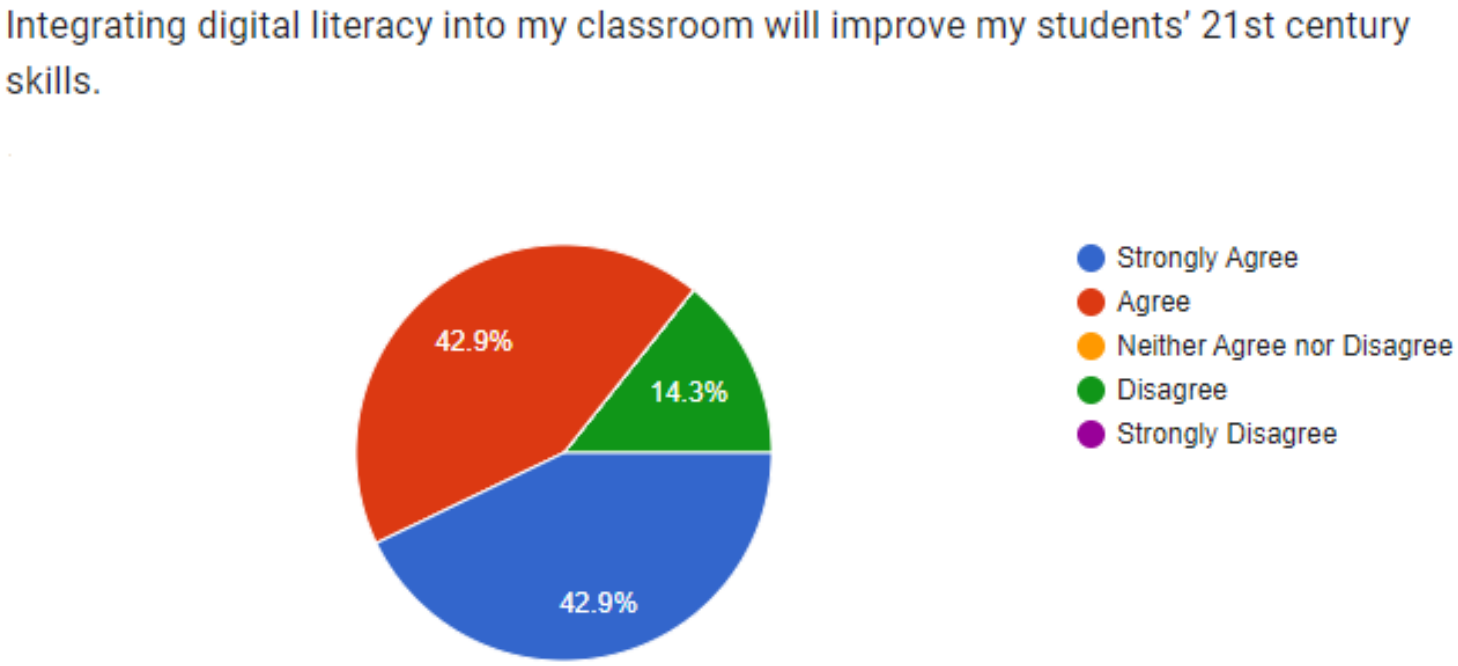
Answer to Survey Question 6



Question 7 was, “Integrating digital literacy into my classroom will improve my students’ 21st century skills.” Forty-two percent of the participants strongly agreed with this statement, and 40 percent of the participants agreed with this statement. These responses suggest that teachers agree that integrating digital literacy in their classrooms will improve their students’ 21st-century skills. Responses are displayed in a pie graph in Figure 7.

Figure 7

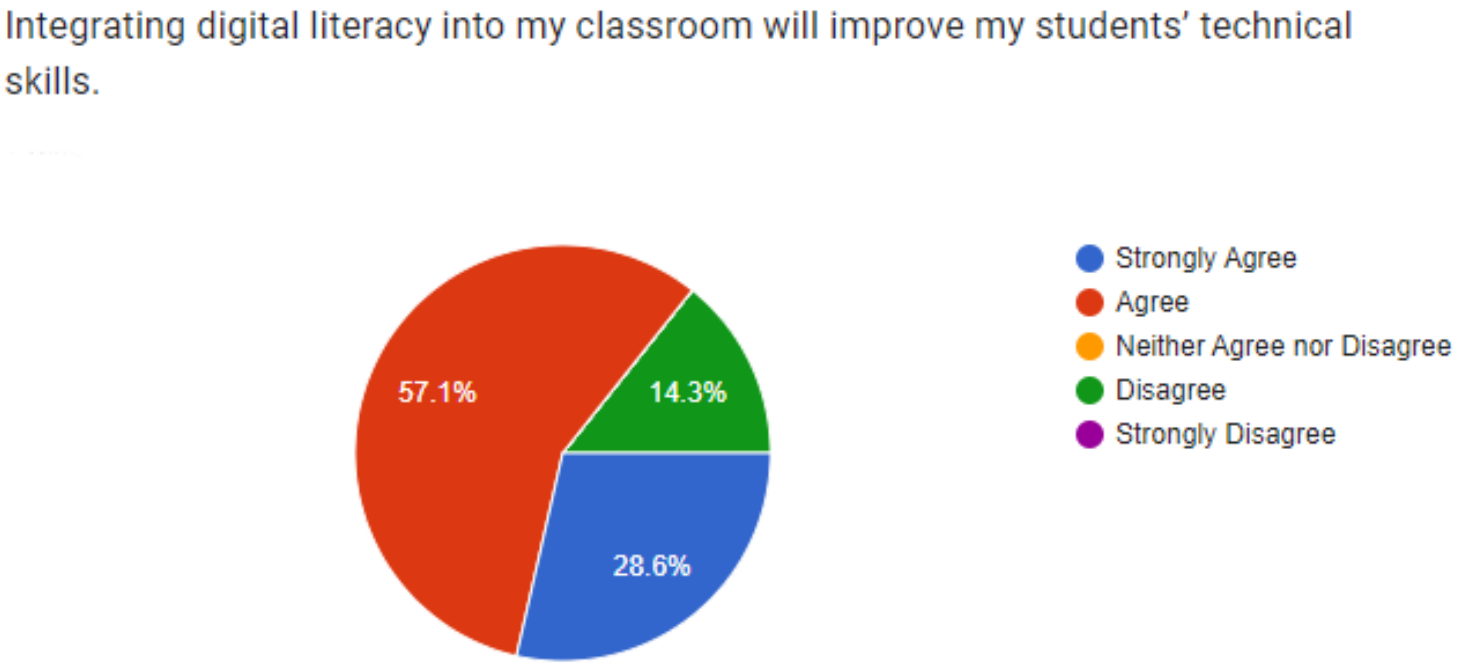
Answer to Survey Question 7



Question 8 was, “Integrating digital literacy into my classroom will improve my students’ technical skills.” Fifty-seven percent of the participants agreed. These responses suggest that teachers agree that integrating digital literacy in their classrooms will improve their students’ technical skills. Responses are displayed in a pie graph in Figure 8.

Figure 8

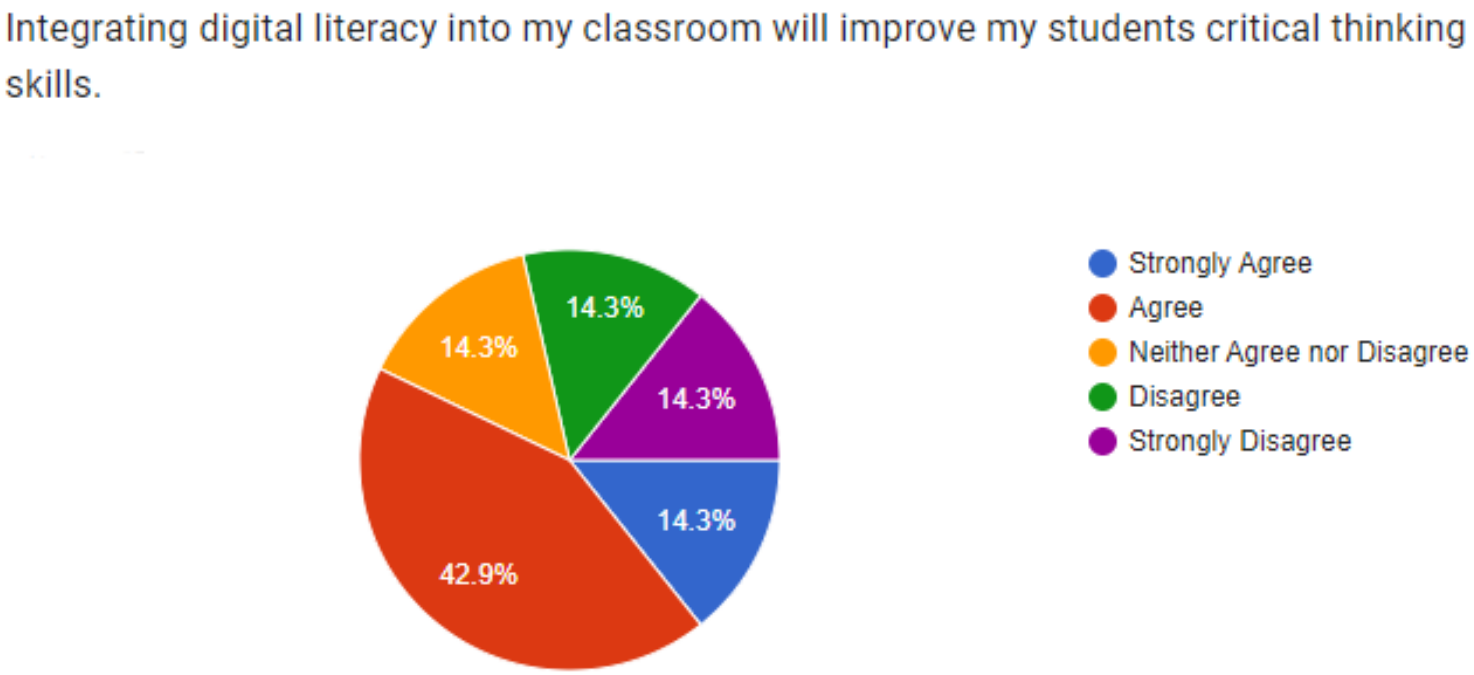
Answer to Survey Question 8



Question 9 was, “Integrating digital literacy into my classroom will improve my students' critical thinking skills.” Fourteen percent of the participants strongly agreed with this statement, and forty-two percent of the participants agreed with this statement. These responses suggest that teachers agree that integrating digital literacy in their classrooms will improve their students’ critical thinking skills. Responses are displayed in a pie graph in Figure 9.

Figure 9

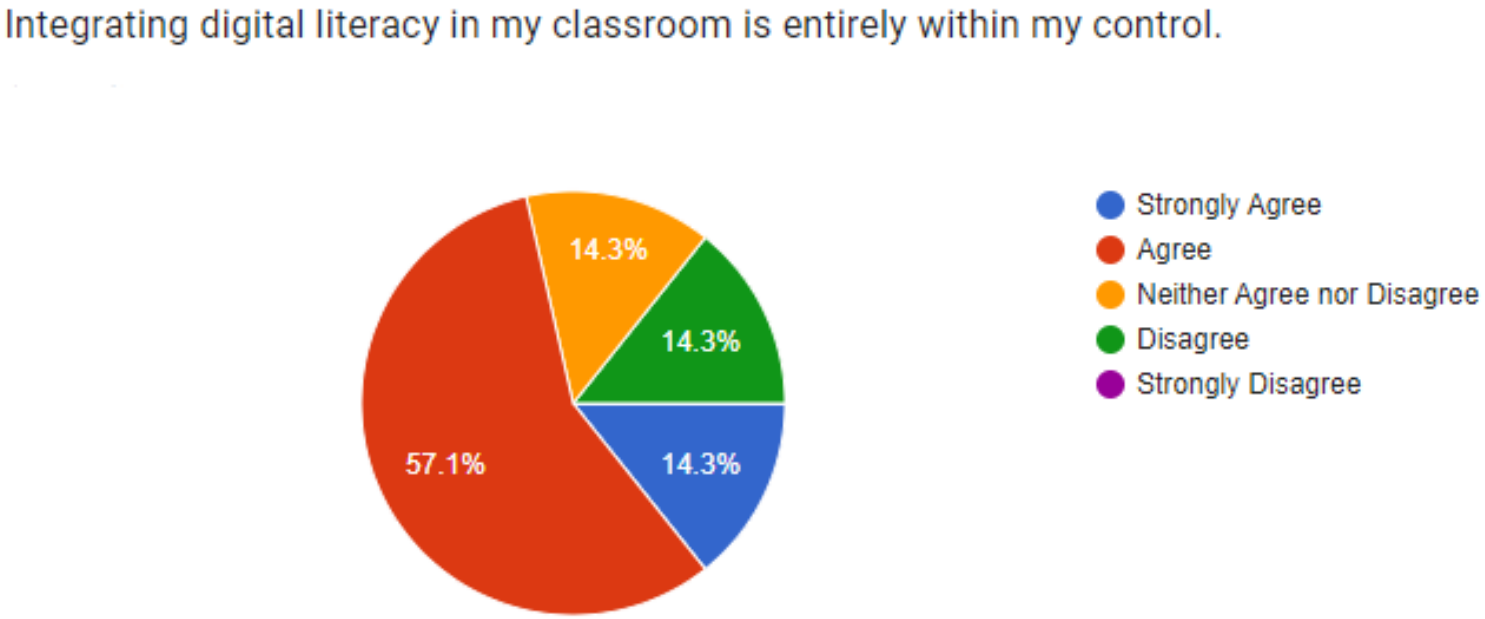
Answer to Survey Question 9



Question 10 was, “Integrating digital literacy in my classroom is entirely within my control.” Fifty-seven percent of the participants agreed with this statement. These responses suggest that teachers agree that integrating digital literacy in their classrooms is entirely within their control. Responses are displayed in a pie graph in Figure 10.

Figure 10

Answer to Survey Question 10



Theme #1

The first theme that emerged from the survey is that teachers think integrating digital literacy in their classrooms would improve critical thinking and classroom engagement. In the survey, teachers noted that improved digital literacy could increase students' instruction engagement and critical thinking. Responses to questions three and nine support this theme. When asked if integrating digital literacy into the classroom would help increase student engagement, 14 percent indicated strongly agree, 71 percent agreed, and only 14 percent disagreed. When asked if integrating digital literacy into the classroom would help increase students' critical thinking, 42 percent responded agree, 14 percent responded strongly agree, 14 percent responded neither agree nor disagree, 14 percent responded disagree, and 14 percent responded strongly disagree. Overall, teachers at the site being studied thought digital literacy would help increase student engagement and critical thinking.

Theme #2

The second theme that emerged from the survey was that integrating digital literacy into the classroom would prepare students for life after K-12. This theme emerged from the survey responses for questions 6, 7, and 8. Question 6 asked if integrating digital literacy into the classroom would prepare students for college and future careers; 42 percent strongly agreed, and 42 percent agreed. No participant chose to disagree or strongly disagree. Also, when asked if integrating digital literacy into the classroom would improve students' 21st-century skills (Question 7), 42 percent strongly agreed, and 42 percent agreed. Again, no participant chose to disagree or strongly disagree.

Additionally, when asked if integrating digital literacy into the classroom would improve students' technical skills, 57 percent agreed, and 28 percent strongly agreed. No participant

chose to disagree or strongly disagree. Given this information, teachers thought integrating digital literacy into the classroom would help prepare students for life after K-12.

Theme #3

The third theme that emerged from the survey was that teachers think that integrating digital literacy into the classroom is a good idea. This theme emerged from survey questions 1, 2, 4, 5, and 10. Over 50 percent of teachers responded that the advantages of integrating digital literacy into the classroom outweigh the disadvantages of not integrating digital literacy. Seventy-one percent of teachers responded that integrating digital literacy into the classroom is useful in teaching. Forty-two percent responded that integrating digital literacy fits well with the way they teach. Seventy-one percent responded that integrating digital literacy is a good idea. Fifty-seven percent responded that integrating digital literacy in the classroom is entirely within their control. Overall, participants noted that integrating digital literacy would positively affect their classroom.

Sub-question 3

Sub question three for this study was, "How would qualitative survey data from current middle school teachers inform the problem of improving digital literacy through a 1:1 digital device implementation at an urban middle school in south Texas?" A survey was sent out using Google Forms to 30 teachers at the urban middle school being studied to find themes related to solving the problem of improving students' digital literacy. There were 13 total questions, with three of them related to demographics and 10 relating to the improvement of the student's digital literacy skills in the urban middle school in south Texas.

Eight participants completed the quantitative survey. The ages of the participants varied from 26 to 61 years. There was a wide range of teaching experience from one year to 30 years of

teaching experience. Most of the survey participants described themselves as Black or African American (85%). The remainder of the survey contained qualitative statements related to improving digital literacy in the classroom. Content analysis methodology was utilized to analyze the data, identify recurring statements, and determine themes' presence and frequency. The emerging themes were the need for better technology, stronger Wi-Fi connections, robust student digital literacy education, and integrating digital literacy professional development for teachers.

Table 4

Final Themes with Recurring Statements

Themes	Recurring Statements
Better technology	Many were given Chromebook through the District- they often - if almost daily. They are broken, misused, or missing. If students have reliable access to technology, digital literacy is an effective form of instruction. I need more support at the campus level for expectations about proper care and use of technology that students have checked out, a more streamlined monitoring system for tracking issues with repair and replacement of broken devices, and more accountability on families for the proper storage, use, and care of the technology. They "never work," so they use their phones. Obstacles for our campus as a whole would be ensuring sufficient access to all learners and addressing the issue of damaged/missing devices, especially in cases where students intentionally break device after device to avoid having to do their work. Maybe lack of technology in the classroom or at home. Every student has a device. Without the funds can't purchase the technology needed. I moved to an entirely paper classroom.
Stronger Wi-Fi connections	Students need to bring their technology every day and have access to a strong Wi-Fi connection. Access to quality internet services or technology will be the main obstacle to providing robust digital literacy. The issue would be upgrading the network and bandwidth in the building to allow for heavy use in most/all classrooms at once without slowdown. Stronger Wi-Fi connections
Robust student digital literacy education	Most students don't have a full understanding of digital literacy. Students use basic Google Classroom activities. I would say the digital literacy of my current students is developing. They do well with informal digital communication, but in terms of accessing information to use in an academic or professional setting, they struggle. They lack an understanding of the importance of digital literacy and the true need for it. Additional classes teaching them the basic of computer and technology use. Their lack of basic digital knowledge. They struggle to type 20 words a minute or insert a picture into a document.
Integrating digital literacy professional development for teachers	The only type of support is to help implement digital literacy. More training. There should be a PD. Limited training. My perception is that some use of digital learning does increase the present workload, especially if I'm a new user of the tool or application. However, some use of digital learning does make certain tasks faster or more efficient, which could reduce the workload slightly. It would increase the workload at the beginning due to having to learn new systems, but eventually, it would decrease the workload.

Theme #1

The first theme that emerged from the qualitative survey responses was the need for better technology. Participants repeatedly said that the technology students had access to at the time of the survey was insufficient due to many students not having access to a 1:1 digital device because it was not available or broken. Several teachers said this problem has caused them to revert to only using paper assignments in their classrooms. According to several respondents, "Obstacles for our campus as a whole would be ensuring sufficient Wi-Fi access to all learners and addressing the issue of damaged/missing devices, especially in cases where students intentionally break device after device to avoid having to do their work." Another respondent noted, "Often the computers in school are outdated and doesn't give the student's experience with the level of technology that is being used in society. Which makes it hard for them to be able to compete for jobs in the future."

Theme #2

The second theme that emerged from the qualitative survey was the need for stronger wi-fi connections. When asked, "What do you think is/will be an obstacle to providing a robust digital literacy learning experience for your students?" over half the responses were stronger wi-fi. Participants noted that the wi-fi in the building was insufficient for the number of students. Because of this issue participants stated that students become frustrated and unengaged in lessons delivered using their digital devices. One participant offered the idea that one way to improve digital literacy of the students would be by "upgrading the network and bandwidth in the building to allow for heavy use in most/all classrooms at once without slowdown."

Theme #3

Another predominant theme that emerged from the qualitative survey was the need for robust student digital literacy education. Respondents consistently mentioned the limited digital literacy of the students in their classrooms. Participants noted that most students have common knowledge about how to use technology, which consists of accessing the district portal, complete assignments in Google Classroom, and social media like Tik-Tok. According to one respondent, "Most of the students have some knowledge of digital literacy. But they lack the understanding of the importance of digital literacy and the true need for it." Another respondent noted that, "They do well with informal digital communication, but in terms of accessing information to use in an academic or professional setting they struggle." The survey revealed that most students need additional classes teaching them the basic of computer and technology use. One respondent mentioned that when teachers attempt to integrate digital literacy into their instruction, not having technology or connection is a problem. When asked, "What do you think is/ will be an advantage of providing a robust digital literacy learning experience for your students?" over half the respondents noted that it would equip them with the current knowledge to navigate the world, better prepare them for the workforce and college, and make them competitive for the opportunities that await them in life.

Theme #4

The fourth theme that emerged from the qualitative survey responses was the need to integrate digital literacy professional development for teachers. Most respondents described their present digital literacy as having a good command of basic computer operations and software programs such as Google Classroom as well as the ability to allow students to complete assignments and submit them through the use of technology. Respondents have attempted to

develop a digitally-inclusive classroom in spite of the previously mention obstacles by integrating simple routine tasks into instructions such as adding online reading, math, and gamified learning. When asked, “What types of support do you need in order to help improve the digital literacy of your students?” participants responded with the need for more training. The need for more training was also a common response in both the interviews and the quantitative survey. Respondents thought that more professional development training on efficiently integrating digital literacy in their instruction is necessary. Several of the respondents noted that integrating digital literacy into their classroom would increase the workload at the beginning due to having to learn new systems, but eventually, it would decrease the workload.

Discussion

Themes from the study, including better technology, improved wi-fi connection, student training, and teacher professional development were apparent in the empirical literature as well as throughout the triangulation data from interviews and quantitative and qualitative survey responses. The information drawn from this study shows the importance of improving digital literacy through a 1:1 digital device implementation at an urban middle school in south Texas being studied.

Empirical Discussion

Current research contains many important factors that impact the digital literacy of K-12 students that can be used to improve students’ digital literacy through a 1:1 digital device implementation at the middle school being studied. After reviewing the empirical literature in Chapter Two, I identified three main themes across all methodologies that corresponded with the research findings. This study helps corroborate previous research by confirming the importance of a 1:1 digital device for students and the need for upgrading campus wi-fi connection to meet

the demand of its student body. In addition, the findings of this study extend previous research by showing the importance of robust digital literacy training for students and teachers. These three themes were found throughout the methodologies in this study and the current research.

Theme #1: Importance of a 1:1 Digital Device for Students

Empirical research indicates the importance of integrating 1:1 technology in the classroom to increase the potential digital literacy gained by students (Varier et al., 2017). School districts must address improving digital literacy by deploying a 1:1 student digital device program (Molin & Lantz-Anderson, 2016). Participants in this study noted issues with the limited number of working 1:1 digital device for students on their campus. For example, Teacher #1 in the interview stated that students should have access to technology on a 1:1 basis. Still, according to Teacher # 4 in the interview, there are not enough 1:1 devices for students on their campus. Furthermore, when asked the interview question, “What would be three strategies you would implement to improve digital literacy at your school campus through implementing a 1:1 digital device program?” one common strategy to all the teachers interviewed was improved and updated technology.

Lindqvist (2015) stated there is a need for the modernization of education, including a 1:1 digital device for all students. School leaders with technology-enhanced classrooms are aware of the consistent change of technology and the need to increase computer devices (Lara et al., 2017). However, according to several teachers interviewed, the process for students to deal with concerns and issues with their 1:1 digital device needs to be streamlined, and the wait for repairs of devices or the issuance of new devices is too long and further limits the student’s ability to access digital learning. One participant in the survey stated, "Often the computers in school are very outdated and doesn’t give the student the experience with the technology that is being used

in society, which makes it hard for them to be able to compete for jobs in the future." Additionally, over 70 percent of participants responded that integrating digital technologies into the classroom is useful in teaching. These findings corroborate the previous research indicating the need to provide students with an up-to-date, functioning 1:1 digital device to improve their digital literacy.

Theme # 2: Upgrading Campus Wi-Fi Connection

Lara et al. (2017) mentioned that school districts must address the need to improve their digital literacy program by upgrading building infrastructure to meet the demand for internet availability. Teachers in the qualitative survey agreed that the slow and sometimes non-existing wi-fi connection on their school campus is an obstacle to improving their students' digital literacy. As a matter of fact, when asked, "What do you think is/will be an obstacle to providing a robust digital literacy learning experience for your students?" one survey participant responded, "An obstacle for our campus as a whole would be upgrading the network and bandwidth in the building to allow for heavy use in most/all classrooms at once without slowing down." Over half the participants mentioned the need to improve the internet connection on the school campus. Schools with technology-enhanced classrooms are aware of the consistent change of technology , the need to increase connectivity in schools and provide infrastructure improvements (Lara et al., 2017). Almost all study participants agreed or strongly agreed with the question, "Integrating digital literacy into my classroom is a good idea." These findings corroborate the previous research indicating that schools should invest in improving their digital infrastructure to improve their students' digital literacy through a 1:1 digital device deployment.

Theme #3: Robust Digital Literacy Training for Students and Teachers

A computer 1:1 initiative can potentially shift how the teacher and knowledge are positioned in a personalized learning classroom (Hallman, 2019). This study's findings supported literature associated with the interview and survey participant data. Teacher #1 stated that one strategy to improve the students' digital literacy would be to have seminars or certain classes that would teach just kids the basic skills of the technology they are given. Researchers Sadaf & Gezer (2020) stated that, "It is necessary to equip students with skills to tackle and solve digital tasks (Sadaf & Gezer, 2020)." Schools with technology-enhanced classrooms are aware of the consistent change of technology and the need to apply disciplined and quality pedagogical theory to the digital learning environment (Kim, 2019). Teachers believe that there is a potential value in improving digital literacy by implementing a 1:1 digital device program (Sadaf & Gezer, 2020). In the interview, Teacher #4 stated that one strategy they would use to improve students' digital literacy in the classroom would be "to start educating teachers on one way a day they can use technology in their classroom." Several studies have found that teachers used minimal technology in class because of insufficient guidance, unclear digital policies, the lack of technology professional development (Hughes & Read, 2018; Stevenson & Hedberg, 2017), and the lack of designated planning time to locate and gather resources to integrate technology into instruction (Powers & Musgrove, 2020). This sentiment was echoed throughout the study data in the interviews and surveys and corroborated previous research findings. More specifically, participants stated that there is a need to have more professional development training dedicated to effectively integrating technology into curriculum instruction. They understood that improving students' digital literacy through 1:1 digital device use would increase their workload at the beginning due to having to learn new systems but would eventually decrease their workload.

Theoretical Literature

The theoretical framework this study was based upon is grounded in the work of Siemens and Downes' (2009) theory of connectivism, which explains the learning connection that occurs when students access the Internet (Siemens & Downes, 2009). It also considers the theoretical work of philosopher Dewey (1938), whose research led to the theory that students build upon their knowledge as they experience life lessons, as discussed in Chapter Two. The findings of this study support the theoretical literature related to improving students' digital literacy through 1:1 digital device. In addition, this study contributes to theoretical literature by providing potential solutions for improving students' digital literacy through a 1:1 digital device.

Theoretical literature affirmed that today's learners could use the Internet for connected and collaborative learning across time and space and to build upon existing knowledge among multiple data sources (Kaeophanuek & Na-Songkhla, 2019; Utecht & Keller, 2019). Utecht and Keller's (2019) research of Siemen's eight principles of connectivism learning theory concluded that it is essential for teachers to model connected learning to students to engage them in knowing how to learn something new at the moment that they want to learn (Utecht & Keller, 2019). Piaget (1936), a chief theorist of constructivist learning, focused on the process by which children gained knowledge. Constructivism and technology allow computers to expand students' knowledge to construct their future knowledge (Lunenberg, 1998). Digital literacy engages students to construct mental knowledge by adding what they can learn from using technology with their present knowledge (Sun et al., 2017). These understandings affirm the importance of improving students' digital literacy through 1:1 digital devices. While this research did not seek to validate these findings, it contributes to the literature base by shedding light on the need to

improve digital literacy for students on the urban middle school campus being studied as well as by providing solutions to improve the digital literacy for students on the school campus.

Summary

For this applied research study, data were collected from teachers and an instructional coach from an urban middle school in school in South Texas. Qualitative data from teachers and an instructional coach including interviews and qualitative survey responses from teachers indicated the need to improve the digital literacy skills of their students through a 1:1 digital device deployment. In addition, the data collected suggested supports that would help address these needs. Quantitative data from the Likert survey provided teacher perceptions on their students' digital literacy and obstacles to improving student digital literacy. Based on the findings of this study, three themes were revealed that situated this study within current empirical and theoretical literature extended previous research to address the problem of improving students' digital literacy skills on the campus being studied. Using the findings presented in Chapter Four, Chapter Five presents a proposed solution to address the problem of improving improve digital literacy for students on an urban middle school campus in South Texas.

CHAPTER FIVE: CONCLUSION

Overview

The purpose of this applied study is to solve the problem of improving the digital literacy skills of middle school students in a large, urban public school district, focusing purposefully on having access to a 1:1 digital device and designing an intervention to address the problem. I used a multimethod design for this study, comprising both qualitative and quantitative approaches. The first approach was structured interviews with campus classroom teachers and an instructional coach to understand how they describe the relationship between the deployment of a 1:1 digital device program and the improvement of students' digital literacy on their middle school campus. The second approach was an online quantitative survey taken by campus classroom teachers to discover to what degree teachers perceive the usefulness of a 1:1 digital device for improving the digital literacy of their middle school students. The third approach was an online qualitative survey taken by teachers to examine their commitment to improving digital literacy through a 1:1 digital device deployment on their middle school campus. This chapter restates the problem, a proposed solution to the central research questions, the resources and funds needed to solve the problem, roles and responsibilities, a timeline, solution implications, an evaluation plan, and a summary.

Restatement of the Problem

The problem is that there is a need to improve students' digital literacy skills on an urban middle school campus in south Texas through a 1:1 digital device deployment. This study's primary goal was to explore teachers' and instructional coaches' perspectives on the relationship between improved digital literacy and access to a 1:1 digital technology device. The existing literature provides a mixed set of results for the relationship between improved digital literacy

and granting students a 1:1 digital device (Abrams et al., 2019; Warschauer et al., 2012; Zahorec et al., 2019). The problem is based on students' limited digital literacy after the school district deployed a limited number of 1:1 digital devices to students on the campus being studied. Before the 1:1 digital device deployment in the 2019 – 2020 school year, the school computer labs and the limited number of computers available in classrooms were generally the only access these students had to online resources. With the increased availability of internet content, students will need to gain skills to navigate and understand the information which they access via the Internet (Saavedra & Opfer, 2012; van Laar et al., 2017). Clarke (2020) stated that digital literacy could generate opportunities to develop multimodal expressions for students. Granting students equal access to learning methods, such as the digital world, prepares them to understand and compete in a global market (Creer, 2018; van Laar et al., 2017).

Interviews with teachers and an instructional coach and survey responses from teachers indicated three methods that should be addressed to improve the student's digital literacy on the campus being studied. This study can provide stakeholders with solutions to solving the problem of improving the student's digital literacy on the urban middle school campus being studied.

Proposed Solutions to the Central Question

Triangulation of data from the interviews and survey data indicated several solutions to address the central research question guiding this study. The most prominent solutions gleaned from the data analysis of the research findings were a better 1:1 digital device, stronger wi-fi connections, and robust digital training for students and teachers. The goal of the suggested solutions is to improve the digital literacy of students on the campus being studied through a 1:1 digital device implementation.

Better 1:1 Digital Devices

Goal 1 addresses the theme that emerged from the interview question, “What would be three strategies you would implement to improve digital literacy at your school campus through implementing a 1:1 digital device program?” Participants repeatedly said that the technology students had access to at the time of the survey was insufficient due to many students not having access to a 1:1 digital device because it was not available or broken. Goal 1 is to ensure that all students have access to a properly-functioning, updated, 1:1 digital device. According to the “Frequently Asked Questions” document updated December 7, 2022, by the Department of Education, Elementary and Secondary School Education Emergency Relief Program funds can be used to purchase educational technology (including hardware, software, and connectivity) for students who are served by the LEA that aids in regular and substantive educational interaction between students and their classroom instructors, including low-income students and students with disabilities, which may include assistive technology or adaptive equipment (U.S. Department of Education, 2022). The school district has received the money from this grant to purchase the technology needed to improve digital literacy for all learners.

The district's present distribution system is to purchase a 1:1 digital device for students in the district. Then purchasing sends the new devices to all high school campuses. The high school technology coordinator exchanges the old 1:1 student digital device for a new one. Once all used high school digital devices are returned to the campus technology coordinator, they are then shipped to middle school campus coordinators to distribute to students on their campus. The problem with this system is that the devices are not correctly inspected. Therefore, students on the middle school campus receive outdated, broken devices or devices that will not connect to the school's wi-fi.

As this study has noted, this distribution system is inadequate in improving students' digital literacy on the middle school campus being studied. A better system should include the inspection of used digital devices before they are shipped to the middle school to determine if they are adequate in improving the digital literacy of the student who will receive them, an inspection of the 1:1 devices that are already assigned to the students on the middle school campus, and finally, requesting new 1:1 digital devices from the district technology department if the middle school did not receive enough for their students from the high school used computer distribution.

The inspection of used digital devices before they are shipped to the middle school should include determining whether the device is still working and whether it is adequate to support student academic growth through digital literacy. The inspection should take place before the devices are shipped to the middle school campus. The first inspection step should determine if the device has any physical damage, such as missing keys, broken screens, broken cases, etc. The second inspection step should determine if the computer model is less than two years old. This inspection step ensures that the computer processors can access all online content without the frustration of lagging or slow upload speeds. Only if the devices are physically operable and the model year is less than two years old should the devices be shipped to the middle school.

During the first few weeks of each new school year, the middle school technology coordinator should send out a questionnaire to one pre-determined class period teacher (ex. second period) to inquire about the condition of all 1:1 devices of students in that class period. This questionnaire should include questions about the physical condition of the device, the model of the device, as well as the functionality of the device. Once the data is collected, the technology

coordinator will use the data to determine which devices need repairing or replacing. They can then begin repairing or replacing devices to equip all students with properly-functioning, 1:1 devices within the first 30 days of the school year.

Stronger Wi-Fi Connections

Internet access is not a luxury, it is a necessity for students on the middle school campus being studied. Goal 2 addresses the theme that emerged from the complaints of many participants about the slow and sometimes non-existant Wi-Fi connection on their school campus as an obstacle to improving their students' digital literacy. When asked, “What do you think is/will be an obstacle to providing a robust digital literacy learning experience for your students?” one survey participant responded, “An obstacle for our campus as a whole would be upgrading the network and bandwidth in the building to allow for heavy use in most/all classrooms at once without slowing down.”

According to the school district website, voters approved a school bond, which allows the school district to develop its Wi-Fi plan that complements one already in the works by the city of the school district. This mutual collaboration effort enhances the district's plan for a permanent Wi-Fi solution. The school campus being studied is a part of Phase Two of this plan, which is both broad and deep. It focuses on targeted households as well as school connectivity.

Robust Digital Training For Students And Teachers

Goal 3 addresses the theme that emerged from the strategies participants believed would improve students' digital literacy in the classroom. For example, several teachers stated that one strategy to improve the students' digital literacy would be to have seminars or certain classes that would teach kids the basic skills of the technology they are given. In addition, in the interview,

Teacher #4 stated that one strategy to improve students' digital literacy in the classroom would be “to start educating teachers on one way a day they can use technology in their classroom.”

One of the ongoing initiatives of the administration of the middle school being studied is student growth and teacher professional development. Since improving students’ digital literacy is an integral part of student growth, one teacher in the interview suggested that the school should host seminars or choose a particular class period at the beginning of the year that would teach the basic skills of the 1:1 digital device that students are assigned. The campus technology teacher could create an interactive presentation that covers the basic care and operation of the 1:1 digital device provided to the students. The completed presentation should then be distributed to teachers to present to their students during the class period designated by campus administration at the beginning of the school year. This presentation should take about two class periods. One teacher in an interview stated, “It may take a couple of days to teach students basic technology skills, but losing two days of instruction time is worth it if that's going to teach them the right skills they need for the rest of the year.” In addition, students who enroll in the school being studied should be required to complete the digital literacy training before being issued a 1:1 digital device.

Professional development and training opportunities should be provided to teachers to address the need to train teachers in ways to incorporate technology in their lessons effectively. Campus administration should invite a representative from the district’s Edtech department to host professional development sessions during the beginning of the school year teacher induction. The sessions should include interactive training on methods to include technology in all subjects. During the training, teachers would be guided in ways to incorporate technology in their specific course. Each session should be specifically designed to address the unique needs of

teachers for the course they teach on the school campus. Campus administration should invite an Edtech representative once a quarter to either refresh teachers on incorporating technology or introducing new ways to integrate technology into their courses. Additionally, teachers should be encouraged to demonstrate their use of technology in the classroom during their weekly professional learning community (PLC) meetings. Providing incentives to teachers who demonstrate their use of technology in the classroom would increase the likelihood of teacher participation. Incentives could be a shout-out to the innovative teacher from an administrator during the announcements, gift cards, or anything the administrators deem appropriate.

Resources Needed

To solve the problem of the need to improve students' digital literacy skills on an urban middle school campus in south Texas through a 1:1 digital device deployment, a few resources are needed. First, campus administrators will need cooperation from the district technology department, the high school technology coordinator, and the middle school campus technology coordinator to develop an inspection process before sending used 1:1 devices to the campus being studied. Second, the campus technology coordinator will need to advise the administration team of the need to request an estimate of about 200 new 1:1 technology devices to be distributed to students from the district technology department. These inspections and subsequent replacements of devices will ensure that all students have access to a quality working device at the beginning of school. Technology devices that are not assigned to students will be kept with the coordinator to exchange with students for broken devices during the school year. This will prevent extended disruptions in education. To incentivize teachers to add technology into their lessons more consistently, the school administrators must set aside a sufficient amount of money to purchase gift cards or other prizes. In addition, time would also need to be set aside during the

opening of the school's teacher induction to host Edtech seminars.

Funds Needed

Funds that may be needed to solve the problem of the need to improve students' digital literacy skills on an urban middle school campus in south Texas through a 1:1 digital device deployment will come primarily from the funds provided by the voter-approved school bond. The funds will be used to increase Wi-Fi access and connectivity and purchase additional 1:1 digital devices. In addition, the funds for training could come from the professional development budget. Finally, since the middle school being studied is a low-wealth district, Title I funds are available to purchase incentives for teachers who consistently incorporate technology in their classroom instruction.

Roles and Responsibilities

To solve the problem of the need to improve students' digital literacy skills on an urban middle school campus in south Texas through a 1:1 digital device deployment, certain district personnel will need to be involved. First, the administration will need to coordinate with the campus district technology department, high school technology coordinator, and the middle school campus technology coordinator to develop an inspection process that will ensure students on the middle school campus receive a quality working 1:1 technology devices. Second, the middle school campus technology coordinator will need to develop a questionnaire that will request information about the condition of the students' current, school-provided technology devices. Once the data has been gathered, the campus technology coordinator will need to retrieve all non-working technology devices. They should then determine if the devices can be repaired or if they should be recycled. Once the correct determination has been made, the technology coordinator should assign new technology to all students who turned in their non-

working devices or who were never issued a device.

The school district and city experts are currently working together on improving digital integration and improving digital infrastructures that will ensure quality internet connections that will greatly serve the students on the middle school campus being studied.

To make time available for teachers' digital literacy improvement training, administrators must add Edtech seminars to the teacher induction week schedule. In addition, time will need to be set aside for teacher digital technology innovation demonstrations during one of their PLC meetings once a week. Ideally, administrators will invite Edtech personnel to demonstrate new technology strategies once a month during the staff meeting. The campus technology teacher will create an interactive basic computer operation and digital literacy presentation to be distributed to all campus teachers. The administrators will determine which class period and day the presentation will be delivered to students at the beginning of the year.

Timeline

The first goal is to improve the quality and reliability of the 1:1 device assigned to students. Since many students have 1:1 devices issued through the school bond approval, the first step would be to assess the quality of the device they already have.

- May
    - The campus technology coordinator creates and sends a questionnaire to teachers to determine the quality of the device students have and if students have a device.
    - From the data received, the technology coordinator will request that all broken devices be returned to the technology office.
    - The technology coordinator will retrieve, replace, or repair broken

devices.

  - Then the technology coordinator will contact the district technology department to request new devices for current students in need of a device, plus an estimate of additional new devices neededfor the upcoming school year.
  - The technology coordinator will retrieve all 1:1 devices from students to be stored at the school campus over the summer

- July
  - The technology coordinator will inspect all incoming 1:1 devices from the district technology department
  - The technology coordinator will plan student 1:1 digital device distribution

The second goal is to improve the quality and reliability of the campus Wi-Fi connection. The middle school being studied is included in Phase Two of the district's internet connectivity plan. The district has scheduled the school digital innovation to begin in December and to continue until the work is complete. There is no projected end date.

The third goal is to provide robust student and teacher digital training.

- July
  - Administrators will plan time for Edtech to conduct interactive seminars with each teacher subject group to provide unique technology training during the back-to-school teacher induction week.
  - Edtech personnel will prepare course-specific technology training for campus teachers.

    - Administrators will select the course and days to present basic computing skills to students
    - The campus technology teachers will create an interactive, basic computer operation and digital literacy presentation to be distributed to all campus teachers.
- Beginning of the school year
    - Teachers will present the digital literacy presentation to students as instructed by administrators.

Solution Implications

The positive implications for solving the problem of improving students' digital literacy skills on an urban middle school campus in south Texas through a 1:1 digital device deployment will be they will be able to use the Internet to browse websites for information, secure data, update one's knowledge about e-threats (Tomczyk, 2020), reading on a mobile device, gauging the validity of a website, and creating and sharing videos (Powers et al., 2020). When students' digital literacy level is high, it can make it easier for students to participate in the learning process, giving them a more positive feeling about their educational experience (Anthonysamy, 2019; Samsudin & Hasan, 2017). Students will receive updated, working technology and basic computer training at the beginning of the school year, which should result in improved interaction with digital information. With increased digital knowledge, the students on the campus being studied will be able to move from just being digital consumers to efficient digital producers.

Another positive implication for solving the problem of improving digital literacy is that teachers can spend time creating innovative interactive digital lessons that will improve student

engagement and learning outcomes. Teachers will be exposed to course-specific digital content, and will increase their digital self-efficacy and confidence in delivering digital lessons. Teachers can use technology to develop higher-order thinking and analysis skills to create education liberation for their students, thereby continuing the work of closing the digital divide gap many of their students experience. Education liberation occurs when marginalized students gain the fundamental knowledge and skills to confidently navigate the digitalized world they live in (Lahpai, 2019; Sadaf & Gezer, 2020; Zahorec et al., 2019).

The negative implications of these solutions are the additional time and commitment that will be required to ensure that this plan is followed with diligence. First, the administration team will need to agree that it is necessary to include more professional specialized training in their already crammed teacher induction sessions. An immense amount of monitoring of teacher lesson delivery will be required to ensure that teachers are integrating digital technology into the classroom to increase student engagement and motivation are met with the ultimate purpose of providing individualized learning for students. They will also need to lead the collaboration effort between the district, high school, and middle school campus technology department to inspect 1:1 devices before they are distributed to the campus or the students. Second, although teachers agree that internet technology has changed the way students learn, teachers are not prepared to give up how they have delivered lessons to learn more innovative, student-focused methods. Many teachers on the middle school campus have attempted to include technology in their lessons in the past, only to be met with student equipment problems or connectivity issues. Teachers must be willing to trust the new plan and to put in the work to integrate technology into their classrooms. Finally, the teacher and school staff shortage will negatively impact this plan. Most teachers and staff members are already being asked to do more than ever before. Although

following this plan will result in less work, in the end, setting up digitally-embedded material in lessons will take much time in the beginning.

Evaluation Plan

For this study, two goal-based surveys will be created to assess whether implementing this plan is improving the digital literacy of the students on the campus being studied. The first quantitative survey will help me gain greater knowledge about the initiative's impact on improving the quality of 1:1 devices assigned to students and the effect of the basic digital skills presentation. This survey will be given at the beginning of the school year, shortly after the deployment of computer devices and the basic digital skills presentation. The second qualitative survey will help me gain greater knowledge about the impact of digital content inclusion in classroom trainings from the teachers' point of view. This survey will be given after the second six-week period of instruction. The information gained from both surveys will be used to propose changes to the initial plan. An additional survey could be given at the end of the school year to assess the progress on the goals of this study.

Summary

This applied study identified various themes that informed recommended solutions for solving the problem of improving students' digital literacy skills on an urban middle school campus in south Texas through a 1:1 digital device deployment. These themes highlighted the need for revamping how students are assigned 1:1 devices, improved professional development that includes course-specific digital content inclusion trainings for teachers, basic computer skills and care for students, and improved campus-wide Wi-Fi connection. The themes and suggestions presented in this study are consistent with the current literature. In addition, this chapter included detailed solutions to the problem and the resources and funds required to implement them.

Most of the proposed solutions can be implemented before the beginning of the next school year and can improve students' digital literacy on the campus being studied. However, the proposed change of inspecting students' current 1:1 digital device can be implemented once the plan is presented to campus administration and their approval. Also, the plan to collect the current 1:1 student digital devices can be implemented at the end of this school year. The time commitment and other negative consequences are minimal compared to the potential for improving the student's digital literacy on the middle school campus. Ultimately, the solution's effectiveness depends on the support of the administration, the collaboration of all technology departments involved, and the time commitment of the teachers.

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APPENDICES

Appendix A

Interview Questions

This interview finds out how teachers and instructional coaches describe the relationship between deploying a 1:1 digital device program and improving students' digital literacy on their school campus.

1. How long have you been teaching at an urban school district in south Texas? This question categorizes their teaching experience during analysis. In a study conducted by Adeyemi (2008), findings revealed that a "teachers' teaching experience was significant for students' learning outcomes as measured by their performance on the senior secondary certificate (SSC) examinations" (p. 89). This question will provide information about the participants' experience with classroom 1:1 digital engagement and the improvement of digital literacy.
2. How would you rate your experience level with laptop computers: beginner, intermediate, or advanced? This question determines if the previous technology experience of participants increases the likelihood that they consistently use digital media in the classroom. In a study conducted by Hineman et al. (2015), teachers' technology self-efficacy significantly affects their actual digital teaching practice. This question will provide information about the correlation between a teachers' digital experience and the improvement of students' digital literacy through a 1:1 digital device deployment.
3. What is your self-efficacy toward technology? This question will help the researcher understand the teacher's belief in improving students' digital literacy at an urban school district in south Texas. Zahorec et al. (2019) found that teachers are the critical factor in

achieving technology benefits in school and improving the digital literacy of the student body.

4. What is your perspective about students' 1:1 digital technology use in the classroom? This question categorizes teacher beliefs during analysis. In addition, it will provide the researcher information about the participants' perspective about a 1:1 digitally enhanced classroom. "A 1:1 digital technology implementation is highly context-dependent and is heavily affected by individual behaviors, attitudes, and perceptions. (Stone, 2017, p. 2282)."
5. In your own words, define digital literacy. This question ensures the participant fully understands the research subject. Digital literacy encompasses having access to robust technology devices and access to the ability and knowledge to gain information digitally. "To own digital equipment is just the beginning: to know how to use it 'meaningfully' and achieve ambitions requires a great deal more application" (Wilkin et al., 2017, p. 333).
6. What is your perspective about the digital literacy gap experienced by students at an urban school district in south Texas? This question determines any bias about the need to improve the digital literacy skills of low socioeconomic students who do not have access to robust digital technology. The findings by Robinson et al. (2018) leave no doubt that "digital disparities can be highly consequential for the academic achievement of economically insecure students who have the most to gain from educational success and the most to lose from educational failure" (Robinson et al., 2018, p. 1267).
7. What would be three strategies you would implement to improve digital literacy at your school campus through implementing a 1:1 digital device program? This question gathers participants' strategies to affect improving digital literacy on their campus. "Some educators have moved out of their comfort zone to enhance their methods of course instruction with

creative and innovative practices using technologies, content mastery, and effective communication skills to reach those being taught" (Wilson, 2018, p. 41).

8. How would you describe the present digital literacy of most of your students? This question gains an in-depth understanding of the digital literacy skills the teacher experiences in the classroom. Students use technology daily, but rarely test their own digital literacy (Schatteman & Liu, 2020). This question will provide information about the participants' present understanding of students' digital literacy and if they think a 1:1 digital device program will improve their students' digital literacy.
9. What do you think about integrating the same technology students use outside of class with the current in-school curriculum instruction? A study conducted by Hughes and Read (2018) found that students are frustrated because they feel a disconnect between the technology they use at home and in the classroom. This question will provide information on the teachers' understanding of the benefits of merging the student's current digital funds of knowledge with a 1:1 digital device to improve digital literacy in the classroom.
10. As a teacher in the classroom, people expect you to have all the answers. What do you think about a student possessing higher technology skills than you have? Luckin's (2008) Learner Centric Ecology of Resources model supports the co-design process of students and teachers working together to transform the traditional learning environment into one that integrates digital technology that will improve digital literacy (Gros & Lopez, 2016). This question will provide information about the participants' willingness to co-create learning that will improve the student's current digital knowledge through a 1:1 digital deployment program.
11. What is your perspective about the connection between digital and non-digital instruction methods? Researchers Abrams et al. (2019) noted that digital and nondigital methods inform

each other. In addition, research has found that learners also develop critical literacy through improved internet communication and integration, which provides the emergence of voice and control for the learner (Abrams et al., 2019; Mnyanda & Mbelani, 2018). This question will provide information about the participants' willingness to integrate digital and non-digital literacies into classroom instruction.

12. What new technology have you included in your classroom lessons or guided teachers on the campus (ex. Google forms, Google sheets, Google documents, Twitter, Snapchat, TikTok, Quizziz, Kahoot, Microsoft Word, Adobe)? Whenever new technologies are introduced to society, education leaders attempt to incorporate those technologies into the classroom (Brill & Park, 2008; Harrell & Bynum, 2018). This question will provide information about the teachers' and instructional coaches' awareness of the benefits of including new instruction technologies to improve students' digital literacy.
13. How does a student gain knowledge? Connectivism theory explains that learners have a natural ability to self-teach by connecting new learning to their funds of knowledge (Siemens & Downes, 2009). The learner interacts with information from the internet and then connects the new learning with previous learning (Karunanayaka & Weerakoon, 2020; Mirra et al., 2018; Samsudin & Hasan, 2017). This question will provide information about the participants' understanding of how learners interact with information from the internet and then connects it to create new learning.
14. What do you think the outcome would be if learners were granted equal access to the digital world? Clarke (2020) stated that digital literacy could generate opportunities to develop multimodal expressions for students. Furthermore, giving students equal access to learning methods such as the digital world prepares them to understand and compete in a global

market (Creer 2018; van Laar et al., 2017). This question gains an in-depth understanding of the participant's perception of the need to grant learners equal access to the digital world to be competitive in life after K-12.

15. How would you describe the difference between learners being digital consumers or digital producers? In your opinion, are your students more of digital consumers or digital producers? Learners are often more skilled at navigating the digital world as consumers (Wilkin et al., 2017); however, integrating a 1:1 digital device technology program will grant them access to instruction and systems to increase their ability to become producers in the digital world (Hughes & Read, 2018; Mirra et al., 2018). This question allows participants to express their thoughts about their students' use of digital content.

Appendix B

Qualitative Survey Questions

These qualitative questions will explore teachers' commitment to improving digital literacy through a 1:1 digital device deployment at an urban school district in south Texas.

1. Based on your understanding of digital literacy, describe the digital literacy of the students in your classroom. This question ensures that participants understand that "digital literacy basically refers to the (shared) capacity to search and access content in the online space, but, just as important, it includes other features that, depending on the specificity of the educational context, must be performed by the trainer, by the trainee(s) or by both/all participants" (Mudure-Iacob, 2019, p. 60). This question will provide information about the relationship between a participant's understanding of the term digital literacy their commitment to improving a students' digital literacy through the deployment of a 1:1 digital device.
2. Based on your understanding of digital literacy, describe your present digital literacy. This question helps the researcher to understand the participants' attitudes about the importance of improving digital literacy in the classroom. "Teachers' positive beliefs and intentions toward using technologies have been proven to be a major predictor of their successful integration of these technologies in their classrooms" (Sadaf & Johnson, 2017, p. 129). Therefore, this question will provide information about the relationship between teachers' digital self-efficacy and their commitment to improving students' digital literacy through a 1:1 digital device deployment.
3. The ecology of resources is a model of learning in which there is a relationship between a learner's context and the learning that occurs because of the relationship (Lindqvist, 2015).

The first element is the environment. Based on this definition of resources' ecology, what is the connection between a digital classroom environment and digital literacy? This question explores the participants' understanding of the importance of extending traditional classroom instruction to include mastering digital literacy. Creer's (2018) research found that it is essential to integrate digital literacy practices and to engage with digital media in the classroom. This question helped the researcher understand the participant's perception of the usefulness of a 1:1 digital device and their commitment to improving digital literacy in their classroom environment.

4. What types of support do you need to help improve the digital literacy of your students? This question identifies what participants consider essential supports that will improve their ability to improve their students' digital literacy. In a study conducted by Hughes and Read (2018), teachers noted that barriers to integrating digital literacy in their classrooms included: lack of effective professional development for their subject, blocked commonly used websites, slow internet connection, and the pressure to teach only the standardized curriculum to raise test scores. This question will provide information about the participant's opinions of the proper digital support needed to improve student digital literacy and their commitment to using a 1:1 digital device in the classroom environment.
5. Describe some ways you have attempted or been successful in developing a digitally inclusive classroom. This question gains knowledge of the participants' interventions in the classroom to encourage students to improve their digital literacy. Key factors to improved students' digital literacy are the teacher's ability to implement and use technology in the classroom (Zahorec et al., 2019). This question will validate participants' commitment to

digital interventions to improve digital literacy in the classroom using a 1:1 digital device program in a digitally inclusive classroom.

6. What do you think is/will be an obstacle to providing a robust digital literacy learning experience for your students? This question screens the participants' opinions about what they consider to be significant challenges to improving students' digital literacy. Researchers Cho and Littenberg-Tobias (2016) noted that an educator's perspective of the importance of digital literacy could shape the success or failure of a 1:1 technology initiative. Therefore, this question will provide information about the participants' perception of impending or present obstacles to their commitment to improving digital literacy through a 1:1 digital device deployment.
7. Students become frustrated because teachers do not allow them to use the same technology in school that they use out of school (Hughes & Read, 2018). When you think about your digital interactions with students, do you think this statement is valid? If so, do you think there is a way to integrate their preferred digital device in the classroom? This question helped the researcher understand the participants' devotion to improving their students' digital literacy. According to Lindqvist (2015), teachers who will take small steps in integrating technologies in the classroom discovered an uptake in student collaboration. This question will provide information on the participant's commitment to improving digital literacy by integrating any 1:1 digital device in classroom instruction.
8. What do you think will be an advantage of providing a robust digital literacy learning experience for your students? This question helped the researcher understand the participants' view of the need for a robust digital literacy learning experience. Research shows that there is a need to conceptualize improved digital literacy practices around ever-changing learning

and educational settings (Aguayo et al., 2017). This question will provide information about the participants' perception of impending or present advantages to their commitment to improving digital literacy through a 1:1 digital device deployment.

9. Please explain if you think integrating robust digital learning in your classroom would increase or decrease your present workload. This question helped the researcher understand the effects of a perceived increased or reduced workload. If teachers believe that integrating activities that improve digital literacy would help improve student learning outcomes or 21st-century skills, the workload would not be a determining factor in incorporating it in their present classroom instruction (Sadaf & Johnson, 2017). This question will reveal if the workload is a factor in the participant's commitment to improving student digital literacy through a 1:1 digital device deployment.
10. What is the student digital literacy priority of your administration? This question helped the researcher understand the alignment of the participant's perception of the need to improve their students' digital literacy with the administration's priority. It is very beneficial for the pedagogical employee to follow their institution's current educational needs and priorities (Zahorec et al., 2019). This question will reveal if administration priority is a factor in the participant's commitment to improving student digital literacy through a 1:1 digital device deployment program.

Appendix C

Quantitative Survey Questions

This survey explores teachers' and instructional coaches' perspectives regarding the usefulness of a 1:1 digital device to improve students' digital literacy on their middle-school campus. The questions for the survey are used with permission from the Sadaf et al. (2016) study "Exploring Factors That Influence Teachers' Intentions To Integrate Digital Literacy Using The Decomposed Theory Of Planned Behavior (DTPB)." Please select: Strongly Agree, Agree, Neutral, Disagree, or Strongly Disagree for each statement.

1. The advantage of integrating digital literacy into my classroom outweighs the disadvantages of not integrating. Researchers Dolan (2016) and Wilkin et al. (2017) noted significant inequalities in students' digital literacy who are socioeconomically disadvantaged. This question reveals the participants' basis for their perception of the usefulness of a 1:1 digital device for improving students' digital literacy on their middle school campus.
2. Integrating digital technology into my classroom is useful in my teaching. "The effects of new technology on teaching and learning are one of the most hotly debated topics in U.S. education" (Zheng et al., 2016, p. 1052). This question reveals the participants' perception of the usefulness of a 1:1 digital device for improving students' digital literacy on their middle school campus.
3. Integrating digital literacy into my classroom will help increase students' engagement. Researchers Paterson and Scharber (2017) and Islam and Gronlund's (2016) found that increased student achievement, increased numbers of student-centered learning environments, increased motivation, and improved attendance for at-risk students were benefits in providing students with a 1:1 digital technology device. This question is to

understand the participants' perception of the usefulness of a 1:1 digital device for improving students' digital literacy on their middle school campus.

4. Integrating digital literacy into my classroom fits well with the way I teach. "Teachers' positive attitudes and intentions toward using technologies have been proven to be a major predictor of their successful integration of these technologies in the classroom" (Sadaf & Johnson, 2017, p. 129). This question is to understand the impact of the teachers' digital attitude on their perception of the usefulness of a 1:1 digital device to improve students' digital literacy on their middle school campus.
5. Integrating digital literacy into my classroom is a good idea. According to Cho and Littenberg-Tobias (2016), an educator's perspective of the importance of improving students' digital literacy can shape the success or failure of a 1:1 digital device program. This question is to understand the participants' perception of the usefulness of a 1:1 digital device to improve students' digital literacy on their middle school campus.
6. Integrating digital literacy into my classroom will prepare my students for college and future careers. High-skilled persons with cognitive and digital skills are increasingly in demand (Bejakovic & Mrnjavac, 2020; Mirra et al., 2018). This question is to help the researcher understand the participants' perception of the need to prepare students for college and future careers by integrating digital literacy in the classroom on their middle school campus.
7. Integrating digital literacy into my classroom will improve my students’ 21st century skills. However, many students who attend socioeconomically disadvantaged schools will exit K-12 with a potential technological disadvantage, which will make it difficult to compete for educational opportunities or career advancements (Dolan, 2016; van Laar et al., 2017). This

question reveals the participants' basis for their perception of the usefulness of a 1:1 digital device for improving students' digital literacy on their middle school campus.

8. Integrating digital literacy into my classroom will improve my students' technical skills. Student voice should be included in determining which technology will be suitable to engage them in the learning process (Stevenson & Hedberg, 2017). This question is to understand the relationship between potentially increased student engagement and the participant's perception of the usefulness of a 1:1 digital device to improve students' digital literacy on their middle school campus.
9. Integrating digital literacy into my classroom will improve my students' critical thinking skills. Studies have found that students in low socioeconomic schools use computers for drills and practices. In contrast, students who attend higher socioeconomic schools use technology to develop higher-order thinking and analyzing skills (Powers et al., 2020). This question reveals the participants' perception of the usefulness of a 1:1 digital device for improving students' digital literacy on their middle school campus.
10. Integrating digital literacy in my classroom is entirely within my control. A teacher's self-efficacy (Sadaf & Johnson, 2017), perceived ease of use, and perceived usefulness of a 1:1 computing device (Powers et al., 2020) are significant predictors of how much or little digital technology integration students will encounter during their school day. This question is to help the researcher understand the digital self-efficacy of the participant.

The second section of the survey questions are open-ended demographic questions.

Demographic Questions:

1. Which categories describe you? Select all that apply to you: This question will help discover if race or ethnicity is a factor in teachers' or instructional coaches; perception of the need to improve digital literacy skills through the deployment of a 1:1 digital device program.
    - Black or African American
    - White
    - Hispanic, Latino, or Spanish Origin
    - Asian
    - I prefer not to answer
2. What is your age in years? This question will help discover if age is a factor in teachers' or instructional coaches; perception of the need to improve digital literacy skills by deploying a 1:1 digital device program.
    - Please specify: _____
3. When did you get your teaching certification? This question will help discover if teaching experience is a factor in teachers' or instructional coaches; perception of the need to improve digital literacy skills by deploying a 1:1 digital device program.
        - Please specify:

Appendix D

Quantitative Survey Questions (Google Form)

Improving Digital Literacy Through 1:1 Implementation Survey

The purpose of this survey is to explore to what degree teachers perceive the usefulness of a 1:1 digital device for improving the digital literacy of students on their middle-school campus. The questions for the survey are used with permission from the Sadef et al. (2016) study "Exploring factors that influence teachers' intentions to integrate digital literacy using the decomposed theory of planned behavior (DTPB)."

Please select: Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, or Strongly Disagree for each statement.

The advantage of integrating digital literacy into my classroom outweighs the disadvantages of not integrating.

- o Strongly Agree
- o Agree
- o Neither Agree nor Disagree
- o Disagree
- o Strongly Disagree

Integrating digital technology into my classroom is useful in my teaching.

- o Strongly Agree
- o Agree
- o Neither Agree nor Disagree
- o Disagree
- o Strongly Disagree

Integrating digital literacy into my classroom will help increase student's engagement.

- o Strongly Agree
- o Agree
- o Neither Agree nor Disagree
- o Disagree
- o Strongly Disagree

Integrating digital literacy into my classroom fits well with the way I teach.

- o Strongly Agree
- o Agree
- o Neither Agree nor Disagree
- o Disagree
- o Strongly Disagree

Integrating digital literacy into my classroom fits well with the way I teach.
- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Integrating digital literacy into my classroom will prepare my students for college and future career.
- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Integrating digital literacy into my classroom will improve my students' 21st century skills.
- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Integrating digital literacy into my classroom will improve my students' technical skills.
- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Integrating digital literacy into my classroom will improve my students critical thinking skills.
- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Integrating digital literacy in my classroom is entirely within my control.
- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Which categories describe you?
- Black or African American
- White

- Hispanic, Latino or Spanish Origin
- Asian
- I prefer not to answer

What is your age in years?

_____

When did you get your teaching certification?

_____

Thank you for completing this survey. Please click this link to be taking to a new survey where you can enter your email address to receive the $10 Amazon gift card. Your survey responses will still be anonymous.

https://docs.google.com/forms/d/11o6npp5fuVLMT5gd8GouMUrSH1smaD3lmDHEPKMSlB0/edit

Appendix E

Qualitative Survey Questions (Google Form)

Improving Digital Literacy Through 1:1 Implementation Survey

The purpose of this survey is to examine teachers' commitment to improving the digital literacy of students through a 1:1 digital device deployment on their middle-school campus.

Please provide short answers to each question.

* Required

1. Based on your understanding of digital literacy, describe the digital literacy of the students in your classroom. *

2. Based on your understanding of digital literacy, describe your present digital literacy. *

3. The ecology of resources is a model of learning in which there is a relationship between a learner's context and the learning that occurs because of the relationship (Lindqvist, 2015). The first element is the environment. Based on this definition of resources' ecology, what is the connection between a digital classroom environment and digital literacy? *

4. What types of support do you need to help improve the digital literacy of your students? *

5. Describe some ways you have attempted or been successful in developing a digitally inclusive classroom. *

6. What do you think is/will be an obstacle to providing a robust digital literacy learning experience for your students? *

7. Students become frustrated because teachers do not allow them to use the same technology in school that they use out of school (Hughes & Read, 2018). When you think about your digital interactions with students, do you think this statement is valid? *

8. What do you think is/ will be an advantage of providing a robust digital literacy learning experience for your students? *

9. Please explain if you think integrating robust digital learning in your classroom would increase or decrease your present workload. *

10. What is the student digital literacy priority of your administration? *

11. Which categories describe you?

Mark only one oval.

- Black or African American
- White
- Hispanic, Latino, or Spanish Origin
- Asian
- I prefer not to answer

12. What is your age in years?

_____

13. When did you get your teaching certification?

_____

14. Thank you for completing this survey. Please click this link to be taking to a new survey where you can enter your email address to receive the $10 Amazon gift card. Your survey responses will still be anonymous. https://docs.google.com/forms/d/11o6npp5fuVLMT5gd8GouMUrSH1smaD3lmDHEPKMSlB0/edit

Appendix F

Survey Compensation Form

Thank you for completing the survey. Please provide your email address to receive the $10 Amazon gift card. Your survey responses are still anonymous.

Appendix G

Interview Consent Form

Interview Consent Form

Title of the Project: Improving Digital Literacy Through 1:1 Digital Device Implementation: An Applied Study
Principal Investigator: Sherry Watts, Doctoral Candidate, Liberty University

Invitation to be Part of a Research Study

I invite you to take part in a research study. In order to participate, you must be an instructional coach, or a Texas certified teacher on the middle school campus being studied. Taking part in this research project is voluntary.

Please take time to read this entire form and ask questions before deciding whether to take part in this research project.

What is the study about and why is it being done?

This applied study explores teachers and instructional coaches' perspectives on improving the digital literacy of students at a specific middle school by focusing purposefully on having access to a 1:1 digital device, and by devising a plan to improve the students' digital literacy. Digital literacy engages students as they build upon their knowledge base to construct their future knowledge. These skills are important for preparing students for life after K-12. Research has noted that teachers, curriculum, and access to a 1:1 digital device improves the digital literacy skills of students. The primary goal of this study is to expand on the previous studies and to provide additional evidence of the relationship between improved digital literacy and 1:1 technology.

What will happen if you take part in this study?

If you agree to be in this study, I will ask you to do the following things:

1. Take part in an audio-and video-recorded, face-to-face interview via the Zoom video conferencing online platform at a time convenient to you. This recorded interview will take approximately 45 minutes.

How could you or others benefit from this study?

Participants should not expect to receive a direct benefit from taking part in this study.

Society may benefit from the plan to improve the digital literacy of students on the school campus from the plan devised because of the data received from this study.

What risks might you experience from being in this study?

The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

How will personal information be protected?

I will keep the records of this study private. Published reports will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records. Data collected from you may be shared for use in future research studies or with other researchers. If data collected from you is shared, any information that could identify you, if applicable, will be removed before the data is shared.

- Participant responses will be kept confidential through the use of pseudonyms. Interviews will be conducted in a location where others will not easily overhear the conversation.
- Data will be stored on a password-locked computer or in a locked desk and may be used in future presentations. After three years, all electronic records will be deleted, and any hard copy notes will be shredded
- Interviews will be recorded and transcribed. Recordings will be stored on a password-locked computer for three years and then erased. Only the researcher will have access to these recordings.

How will you be compensated for being part of the study?

Participants will be compensated for participating in this study. Participants will receive a $10 Amazon gift card for completing the interview.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free to not answer any question or withdraw at any time, without affecting those relationships.

What should you do if you decide to withdraw from the study?

If you choose to withdraw from the please contact the researcher at the email address included in the next paragraph. Should you choose to withdraw, any data collected from you will be destroyed immediately and will not be included in this study.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Sherry Watts. You may ask any questions you have now. [redacted]

Whom do you contact if you have questions about your rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. You will be given a copy of this document for your records. The researcher will keep a copy with the study records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

☐ The researcher has my permission to audio-record and video-record me as part of my participation in this study.

Printed Subject Name

Signature & Date

Appendix H

Teacher Recruitment Email

Dear Teacher,

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for an EdD degree. The purpose of my research is to understand the question "What are teachers' perceptions of improving digital literacy skills through the deployment of a 1:1 digital device program on our school campus?" I am writing to invite eligible participants to join my study.

Participants must be Texas-certified teachers on the school campus. Participants will be asked to complete a 10-question quantitative survey, a 10-question qualitative survey, and to take part in an individual audio- and video-recorded interview as an optional additional procedure. It should take approximately 90 minutes to complete the procedures listed. Survey responses will be anonymous. If participants choose to do the interview, names and other identifying information will be requested as part of this study, but the information will remain confidential.

For more information or to schedule an interview, please contact me by email at [redacted] The first 5 teachers to email me to schedule an interview will be selected.

A consent document is attached to this email. I will also provide an additional consent document via email before the interview. The consent document contains additional information about my research.

After reading the consent form, please click this link https://docs.google.com/forms/d/1cKEKuHIuD38HYTnzKZwWxphyzyZLYu8Fa5WnntukTgE/prefill to proceed to the quantitative survey.

After completing the quantitative survey, please click on this link https://docs.google.com/forms/d/1BGZwzBOU77l90Gq3DBk4tBSHu4fJ_iGapyE_rIHB6_Q/prefill to complete the qualitative survey.

Doing so indicates that you have read the consent information and would like to participate in the survey.

If you want to take part in the interview, you will need to sign the consent document that will be emailed to you and return it to me via email prior to the interview.

Participants will receive an Amazon $10 gift card for each section of the study completed. The total compensation for participants could be $30 if they complete all three sections of the study.

Sincerely,

Sherry Watts
[redacted]

Appendix I

Survey Consent Form

Survey Consent Form

Title of the Project: Improving Digital Literacy Through 1:1 Digital Device Implementation: An Applied Study
Principal Investigator: Sherry Watts, Doctoral Candidate, Liberty University

Invitation to be Part of a Research Study

You are invited to participate in a research study. To participate, you must be a Texas certified math teacher, career technology teacher, or any elective teacher on the middle school campus being studied. Taking part in this research project is voluntary.

Please take time to read this entire form and ask questions before deciding whether to take part in this research project.

What is the study about and why is it being done?

This applied study explores teachers and instructional coaches' perspectives on improving the digital literacy of students at a specific middle school by focusing purposefully on having access to a 1:1 digital device, and by devising a plan to improve the students' digital literacy. Digital literacy engages students as they build upon their knowledge base to construct their future knowledge. These skills are important for preparing students for life after K-12. Research has noted that teachers, curriculum, and access to a 1:1 digital device improves the digital literacy skills of students. The primary goal of this study is to expand on the previous studies and to provide additional evidence of the relationship between improved digital literacy and 1:1 technology.

What will happen if you take part in this study?

If you agree to be in this study, I will ask you to do the following things:

1. Complete two, 10-question surveys. The survey should take approximately 20 minutes each.

How could you or others benefit from this study?

Participants should not expect to receive a direct benefit from taking part in this study.

Society may benefit from the plan to improve the digital literacy of students on the school campus from the plan devised because of the data received from this study.

What risks might you experience from being in this study?

The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

How will personal information be protected?

I will keep the records of this study private. Research records will be stored securely, and only the researcher will have access to the records. Data collected from you may be shared for use in future research studies or with other researchers.

- Responses to the survey will be anonymous.
- Data will be stored on a password-locked computer or locked desk and may be used in future presentations. After three years, all electronic records will be deleted, and any hard copy notes will be shredded.

How will you be compensated for being part of the study?

Participants will be compensated for participating in this study. Participants will receive a $10 Amazon gift card for each survey completed.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free to not answer any question or withdraw at any time prior to submitting the survey without affecting those relationships.

What should you do if you decide to withdraw from the study?

If you choose to withdraw from the study, please exit the survey and close your internet browser. Your responses will not be recorded or included in the study.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Sherry Watts. You may ask any questions you have now.

[redacted]

Whom do you contact if you have questions about your rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

Before agreeing to be part of the research, please be sure that you understand what the study is about. You can print a copy of the document for your records. If you have any questions about the study later, you can contact the researcher using the information provided above.

Appendix J
Instructional Coach Recruitment Email

Dear Instructional Coach,

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for an EdD degree. The purpose of my research is to understand "What are teachers' perceptions of improving digital literacy skills through the deployment of a 1:1 digital device program on our school campus?" Therefore, I am writing to invite eligible participants to join my study.

Participants must be instructional coaches on the school campus. Participants are asked to take part in an audio and video recorded individual interview. It should take approximately 45 minutes to complete the procedures listed. Names and other identifying information will be requested as part of this study, but the information will remain confidential.

For more information or to schedule an interview, please contact me by email at [redacted]. The first 2 instructional coaches to contact me expressing interest will be selected for an interview.

A consent document is attached to this email. The consent document contains additional information about my research. If you choose to participate, you will need to sign the consent document and return it to me via email prior to the interview.

Participants will receive an Amazon $10 gift card via email for completing the interview.

Sincerely,

Sherry Watts
[redacted]

Appendix K

Site Approval Email

From: Watts, Sherry [redacted]
Sent: Thursday, June 10, 2021 10:31 AM
To: [redacted]
Subject: Site Approval Request

I am a graduate student in the Education Department at Liberty University. I am conducting research as part of the requirements for an Educational Leadership Ed.D. degree. The title of my research project is "Improving Digital Literacy Through a 1:1 Digital Device Implementation: An Applied Study." This applied study explores middle school campus teachers' and instructional coaches' perspectives on improving the digital literacy skills of students through the deployment of a 1:1 digital device program and to devise a plan to improve the students' digital literacy.

I am writing to request your permission to conduct my research at [redacted]. This request is not to begin the study, but rather to get your permission to use [redacted] and its teaching and instructional coaching staff as participants in this study.

This study will begin after I receive approval from the Institutional Review Board at Liberty University and should take approximately 14 days to complete. I will ask one instructional coach and five (5) campus teachers to take part in a face-face interview via the Zoom videoconferencing online platform. I will also email at least 20 campus teachers to request their participation in completing a 10-question quantitative survey and a 10-question qualitative survey using these links:

Quantitative
Survey:
https://docs.google.com/forms/d/1cKEKuHIuD38HYTnzKZwWxphyzyZLYu8Fa5WnntukTgE/p refill.
Qualitative
Survey:
https://docs.google.com/forms/d/1BGZwzBOU77l90Gq3DBk4tBSHu4fJ_iGapyE_rIHB6_Q/prefill
I will present participants with an informed consent form prior to taking part. Taking part in this study is completely voluntary, and participants are welcome to discontinue participation at any time.

I will email instructional coach participants requesting them to contact me to schedule a face-face interview via the Zoom videoconferencing online platform. I will present participants with an informed consent form prior to taking part. I have attached the teacher consent form,

instructional coach consent form, quantitative survey questions, interview questions, and qualitative survey questions to this email for your review.

Taking part in this study is completely voluntary, and participants are welcome to discontinue participation at any time. All participants will receive a $10 Amazon gift card via email for each section of the study they complete.

Thank you for considering my request. If you choose to grant permission, please respond by email to [redacted] or provide a signed statement on official letterhead indicating your approval.

Sincerely,

Sherry Watts

From: [redacted]
Sent: Thursday, June 10, 2021 10:35 AM
To: Watts, Sherry <sherry.watts[redacted]>
Subject: Re: Site Approval Request

I approve the use of this site.
[redacted]

Appendix L

Quantitative Question Permission

Sherry Watts 5:25 PM

Research Questions

Hello, I am a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for an EdD degree. The purpose of my research is to understand "What are teachers' perceptions of improving digital literacy skills through the deployment of a 1:1 digital device program on our school campus." Your journal article "Exploring factors that influence teachers' intentions to integrate digital literacy using the decomposed theory of planned behavior" has informed many of the assumptions in the dissertation. I am contacting you to get your permission to use some of the questions from your research. I would like to use them in a quantitative survey to explore teachers' perception of their role in improving the digital literacy of middle school students on their urban middle school campus. I look forward to your response to this request. Thank you

- [redacted] sent the following message at 8:38 PM
  [redacted] 8:38 PM

  Hello Sherry - You have my permission to use my research.
- TODAY Sherry Watts sent the following message at 10:11 AM
  Sherry Watts 10:11 AM

  Thanks

Appendix M

IRB Approval Letter

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

March 23, 2022

Sherry Watts
L. Bradshaw

Re: IRB Exemption - IRB-FY20-21-108 IMPROVING DIGITAL LITERACY THROUGH 1:1 IMPLEMENTATION: AN APPLIED STUDY

Dear Sherry Watts, L. Bradshaw,

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under the following exemption category, which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:104(d):

Category 2.(iii). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by §46.111(a)(7).

Your stamped consent form(s) and final versions of your study documents can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB. Your stamped consent form(s) should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document(s) should be made available without alteration.

Please note that this exemption only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued exemption status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this exemption or need assistance in determining whether possible modifications to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,
G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office