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DIGITAL EQUITY: DIFFICULTIES OF IMPLEMENTING THE 1:1 COMPUTING INITIATIVE IN LOW-INCOME AREAS

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DIGITAL EQUITY: DIFFICULTIES OF IMPLEMENTING THE 1:1 COMPUTING INITIATIVE IN LOW INCOME AREAS

by

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ABSTRACT

Successful One-to-One Computing Initiative implementation requires educators to communicate and collaborate effectively with everyone in the learning community. However, other factors such as teacher's professional development, student's perception, and parent's perception often affect the implementation of the One-to-One Computing Initiative. School districts, which serve low-income areas in Mississippi, have difficulties ensuring students and communities have access to the information technology they need to participate outside the school setting. The concept is often called digital equity. However, when officials do not address the capacity, there is a vital threat to the participants' civic, cultural, employment, lifelong learning, and access to essential services critical in a global society, democracy, and economy. Limited access to information and communication often exists in Mississippi's low-income areas, with economic, academic, and social inequality. Therefore, school districts across the country and Mississippi adopted one-to-one technology programs to give students access to mobile devices. However, despite millions of dollars spent on devices, deployment, and maintenance, school districts are finding many issues that still hinder student access to technology outside the school setting. This mixed-method research examined issues that affect the implementation of one-to-one technology in low-income areas. School officials from three school districts, parents from 113 school districts, and public charter schools in Mississippi participate in the research study. District officials and the parents lived in both urban and rural areas. The age group of the participants varied along with their gender. An interview protocol for school officials, comprising of 24 questions for teachers, 10 questions for technology directors, 12 questions for curriculum directors and

instructional technologists, and 9 questions for administrators, was used to collect data about the school officials' perception of the implementation process of one-to-one programs. Also, a questionnaire for parents, comprising of 6 questions, was used to collect demographics, types of devices students used at home, types of internet connection, quality of internet connection, and other information. The study examined the impact of one-to-one computing initiatives on digital equity in rural areas in Mississippi, program implementation challenges, difficulties to have full program participation, and factors affecting the participation rate in rural versus non-rural areas.

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1:1	One-to-One Computing Initiative Program
AUP	Acceptable Use Policy
BYOD	Bring Your Own Device
CARES Act	Coronavirus Aid, Relief, and Economic Security Act
CTE	Career and Technical Education
COVID-19	Novel Coronavirus of 2019
EETT	Enhancing Education Through Technology
EL Plan	English Language Plan
EDLA	Equity in Distance Learning Act
ICT	Information Communication and Technology
IEP	Individualized Educational Plans
ISTE	International Society for Technology in Education
LMS	Learning Management System
MECA	Mississippi Educational Computing Association
MDE	Mississippi Department of Education
NCLB	No Child Left Behind or Public Law 107-110
NETS	Widely Known Combined NETS and ISTE

	Standards
NETS-A	National Educational Technology Standards for Administrators
PLC	Professional Learning Community
SAMR	Substitution, Augmentation, Modification, and Redefinition
SES	Socioeconomic Status
WWW	World Wide We

CHAPTER I – INTRODUCTION

Background of the Study

The COVID-19 pandemic forced many school districts to close their doors and move to a virtual learning format. Virtual learning exposed the digital divide on a global scale because students around the world were left without adequate technology to attend school in the virtual setting during this pandemic. As the world avidly tried to implement public health measures that would restrain the spread of the virus, one of the recommended public health measures was closing schools. According to the Teacher Task Force (2021), over 191 countries closed schools from pre-kindergartener school to higher education institutions affecting approximately 1.5 billion students worldwide. To minimize the disruption in learning, governments and institutions implemented distant learning. The COVID-19 pandemic showed how the world advanced globally in the field of technology. However, the public health crisis exposed how innovation created a larger digital divide (Teacher Task Force, 2021). For example, online learning allowed teachers to maintain a classroom environment for students. Teachers could send assignments, assess the assignment once it was received from the students, and communicate daily with students. However, globally 826 million households did not have access to a computer. Another 706 million did not have access to the internet at home. The problem was even more ominous in low - income countries (Teacher Task Force, 2021).

The increasing importance of technology has motivated policymakers, industry, and advocates to make an honest effort to reduce the digital divide within the last decade. A high priority focuses on the public and private sectors to alleviate the problematic issue. Since then, the role of the internet, whether it is at work, school, home, and in the

community, has continued to surge. Policy interest in children's access to the internet appears diminished, despite the continuing growth in internet access (Kaiser Family Foundation, 2004; Muller, 2022). The decrease in internet access policies can be attributed at least in part to the diminishing digital divide. Researchers do not doubt that more American children of all incomes and backgrounds use computers and the internet more than ever before (Kaiser Family Foundation, 2004; Katz et al, 2018). However, some groups of young people, primarily low-income and minority youths, have inadequate access to technology (Kaiser Family Foundation, 2004; Katz et al, 2018). Other researchers indicate that other demographic groups are affected by inadequate technology access (Kaiser Family Foundation, 2004; Muller, 2022). Their finding presents an interesting argument within the digital divide deliberation (Kaiser Family Foundation, 2004; Muller, 2022).

For example, in the first three decades of the internet's history, access was entirely dominated by people with a high or medium level of education, both inside and outside work and school. Internet access has drastically changed, today, researchers considered lower educated and disabled people to be digitally falling behind. Results yielded that people within those demographic groups are less likely to use the internet, in any environment, than people that are employed or highly educated (van Deursen & van Dijik, 2014). Recent observations noted, some people might reason that the digital divide had finally closed (van Deursen & van Dijik, 2014).

What is digital equity or educational equity? Educational equity has long plagued the field of education. The term was first used in the mid-1990s and referred to unequal access to information technology. Researchers often refer to digital inequality as the

difference in information technology use based on ethnicity and socioeconomic status (Judge et al., 2004; Millán et al., 2021). Statistically, digital inequality applied to the community availability of computers and access to the internet in schools and homes (Judge et al., 2004; Millán et al., 2021).

Equality in education is evident when students are all treated the same and have access to similar resources. Equity is visible when all students receive the material they need, so they graduate prepared for success after high school (Center for Public School, 2016). The majority of the experts advocate that the problem is a lack of technology or digital equity (Center for Public School, 2016).

Many people aligned the concept of digital equity with the educational setting (Judge et al., 2004; Meyer et al., 2021). Digital equity is a social justice issue that denotes the process of ensuring that everyone, especially all students, has access to information and communication technologies. The idea that everyone should have access to some form of technology, however, is problematic. The conflict lies in the fact that digital equity lies within the broader concept of the digital divide since computer technology is becoming increasingly prevalent in our global society. The majority of the population expects to grow acclimated with technological skills (Judge et al., 2004; Millán et al., 2021). Everyone from educators to community leaders has concerns about the digital inequality between people who are benefiting and those who are being left behind (Judge et al., 2004; Millán et al., 2021). The section of the population most often affected by digital inequality is ethnic minorities and those in lower socioeconomic groups. Ethnic minorities and lower socioeconomic groups have experienced a lack of access, based on other disparities such as wealth that continues for the neediest students

(Judge et al., 2004; Katz et al., 2018). Digital inequality is frequently problematic and creates a lack of digital equity for individuals who lie within those populations. Access is essential for learning needs to occur regardless of socioeconomic status, physical disabilities, language, race, gender, and any other characteristics. Such characteristics are associated with unequal and discriminatory treatment. Therefore, ethnic minorities and those in lower socioeconomic groups have to disproportionately worry about equitable access to technology resources such as computers, software, and connectivity. There are other significant concerns of digital equity (Judge et al., 2004; Katz et al., 2018). Digital equity is not the only difficult challenge of access, but how such technology is effectively used in teaching and learning within the educational setting affects population communities. Access to such technology must be high quality and culturally relevant and present an opportunity for the creation of new content that can be related to the real-world setting of the affected population (Judge et al., 2004; Muller, 2022).

Katz et al. (2018) noted the importance of digital equity initiatives in low-income families in the United States. Researchers noted that the purpose of digital equity is to enable access to devices and internet services (Katz et al., 2018). Designers recognize the importance of access to people and programs that support digital skills development. Families in under-served communities are most likely to need such support and those families are least likely to have those resources available. Children within the United States are growing up in a global technologized world. Evidence also shows that the creation of a technologized world is not created equal across the income spectrum. For example, in the United States, research indicates that more than 90% of families with school-age children living below the median household income report having internet

access (Katz et al., 2018). More than half of these families report constraints such as interrupted or slow service, outdated devices, or sharing devices in their internet connectivity (Katz et al., 2018).

Ensuring equitable access to the internet and internet-capable devices is essential as technological innovation becomes synonymous with educational innovation. Katz et al. (2018) indicated that a call to action for various stakeholders led to a commitment to facilitating the educational and social opportunity for all children. Digital equity initiatives can also indirectly benefit children by supporting family stability and access to social opportunities. As more resources and services migrate online, parents' abilities to apply for jobs, locate health services, or stay updated on local news are often contingent on the extent of the family's connectivity (Katz et al., 2018). Digital equity has traditionally focused on ensuring access to devices and internet services. The success of these initiatives depends on access to people and programs to help develop and reinforce the skills required to engage digital technologies (Katz et al., 2018).

As various school districts seek to improve teaching and learning, many school officials have examined how to narrow the achievement gaps between high and low socioeconomic status students (Warschauer et al., 2014). The search for answers has led many school districts officials across the global landscape to adopt one-to-one instructional initiatives in the hope of improving school districts academically and designing a blueprint on how better academic results might help reach their ultimate goal (Warschauer et al., 2014). In the educational setting, the term one-to-one computing or 1:1 refers to a program in which academic institutions such primary, secondary, or higher

education institutions issue each enrolled student an electronic device to access the internet, digital course materials, and digital textbooks (Warschauer et al., 2014).

Some districts within the United States who face academic challenges started implementing one-to-one laptop programs and often deploy low-cost notebook computers and open-source software to enhance digital participation and increase educational equity among the low socioeconomic population (Warschauer et al., 2014).

Often confused with the Bring Your Own Device policy or BOYD, which encourages students to bring their technology devices from home. The one-to-one technology program goal is to provide all students in a school district, higher education institution, or state with their own laptops, netbooks, tablet computers, or other mobile computing devices. The one-to-one technology computing initiative aims to close the digital divide and solve the inaccessibility factors that exist between high and low socioeconomic populations (Greater Schools Partnership, 2018).

As the global technology landscape changes, computers, technology, and the internet redefine how we connect with others. Technology is expanding into other areas of modern life. Areas such as education, communications, and career, had been affected by technology (Greater Schools Partnership, 2018). Technology initiatives such as the one-to-one programs are generally motivated by preparing students and teachers to be global citizens. In today's global society, students need consistent access to computing devices throughout the day and, ideally, at home. Equipping all students with computing devices allows teachers to take full advantage of new learning technologies and online educational resources (Greater Schools Partnership, 2018). Therefore, teachers and students must be technologically literate and advance in computing skills. Ensuring

implementation of the one-to-one computing program with fidelity involved teaching the priority skills needed in today's educational setting (Greater Schools Partnership, 2018). Therefore, equipping all students with computing devices and incorporating technology into every course is indisputable to take full advantage of new learning technologies and produce technologically skilled and literate students (Greater Schools Partnership, 2018).

Despite more and more people gaining access to digital technology, there is a risk in which a small section of the population cannot use technologies fluently. As the technology access gap diminishes, many predict a more severe problem of fluency develops (Resnick, 2001; Doaks, 2021).

Technology fluency involves knowing how to use technology similar to a person fluent in natural languages such as English and American Sign Language (Resnick, 2001; Doaks, 2021). A person must develop the skills of knowing how and when to apply new technologies. In either case, the learner would need more than a phrase-book or surface knowledge of the language. Learners of technology and a natural language must create significant artifacts and go beyond the articulation of complex ideas or conversing to tell a story (Resnick, 2001; Doaks, 2021). For example, analogously new technology fluency means accessing information from the internet and creating different artifacts such as a web page or perhaps downloading MP3 music files and using music applications to compose an original digital music composition (Resnick, 2001; Katz et al., 2018).

All students must have access to and be fluent in new technologies because this generation of students is considered the next generation of children who will use and create advanced computer technologies. The prediction is that future computationally

enhanced devices will be ubiquitous, pervasive, and have the seamless capability to network (Resnick, 2001; Martin, 2016).

What is unknown, however critically important, is how people use and think about these devices. Educators and students must prepare today to take on the challenge of future technology demands by having access and being fluent in the area of new technology (Resnick, 2001; Martin, 2016).

Other researchers mention that there is a gradual introduction of mobile computers in the educational setting (Sung et al., 2016). Several studies focus on integrating technology within teaching and learning divided into two types according to the organization's device (Sung et al., 2016).

First, the organization should focus on how the student uses the device in schools. Second, the organization should focus on the applications of various types of devices in education. A review of the device programs indicated that districts are integrating laptops into schools, and the results are positively impacting student learning (Sung et al., 2016).

Researchers cautioned that laptop usage does not achieve the goals of increasing higher-level thinking. Also, there was no significant transformation of classroom instructional pedagogy. Studies indicated that students used mobile devices for educational tasks such as homework, note-taking, and finishing assignments (Sung et al., 2016).

Software such as word processors, web browsers, and presentation software was comparatively standard for usage in the instructional setting. Using software to write, browse the internet, make presentations, do homework, and take exams were common for

teachers to use in the classroom. When giving the opportunities to increase mobile devices usage, educators made significant pedagogy changes to increase student engagement (Sung et al., 2016). Also, researchers discovered that schools participating in one-to-one programs showed a significant increase in grade-point-average or standardized tests (Sung et al., 2016).

Often, members of the school learning community assume that implementing one-to-one technology initiatives can give teachers and students access to technology, which automatically leads to student achievement. Schools must ensure the purchase of fiber, hardware, and software and distribute the equipment throughout, leading to excellent classroom use by teachers and students and improved teaching and learning. Equipment and software access have infrequently led to widespread usage by the teacher and students (Cuban et al., 2001; Meyer et al., 2021). The majority of the teachers were sporadic users or nonusers (Cuban et al., 2001; Holen et al., 2017).

When teachers do use the computers for classroom work, often, their use is sustained rather than altering existing patterns of teaching practice. Therefore, two interrelated explanations provided for these challenges to the dominant assumptions that guide present technological policy-making (Cuban et al., 2001; Holen et al., 2017). Increased efforts to promote 21st-century learning emphasize the central role of technology in instructional delivery. School officials promote multifaceted abilities and skills that require students' success in increasingly technology-rich learning and work environments. School districts in the United States are increasingly adopting educational goals to promote 21st-century skills of enhanced collaboration, communication, creativity, digital literacy, and self-directed learning. Many school districts are taking an aggressive

approach to technology integration. The most popular approach is the one-to-one initiatives (Varier et al., 2017). One-to-one computing often refers to a learning environment where students and teachers have access to a personal computing device. Mainly the devices are used for academic learning (Varier et al., 2017).

As technology usage evolved into a international phenomenon, many aspect of technology are a part of everyday life. Importantly, school districts, who implemented one-to-one initiatives, aimed to use technology as an instructional tool and therefore improve teaching and learning and policymakers who attempted to fuse technology into the educational setting focused directly on teacher training and professional development. Many people within the educational environment voiced concerns about the adequate training of teachers or provided inadequate support beyond learning necessary specific technology skills. Those skills might include using a tool or software program (Kim et al., 2013).

Diminutive classroom change, complete disappointment, and bitter recriminations are often the sad result of school one-to-one technology initiative reform (Cuban et al., 2001; Holen et al., 2017). School reform supposedly aimed at substantially altering teachers' routine classroom practices is replete with school boards and superintendents adopting ambitious designs and not implementing proper professional development. Some might interpret the result of past failure as obstacles and succumb to pessimism. Zealous reformers view new technology ingenuity as a potential solution to solving the achievement gap (Cuban et al., 2001; Harris et al., 2016).

Policymakers who develop many of the transformations fail to take into consideration several vital components. Another such element is the environment within

which teachers labored, involved teachers in the design itself, allocated sufficient resources to develop teachers' capacity to implement the desired changes, or provided sustained support to ensure that those changes become part of teachers' daily routines (Cuban et al., 2001; Hershkovitz & Karni, 2018).

The objective of digital one-to-one initiatives is to place computers into every child's hands, not just within the school building computer labs. Many policymakers have learned that the challenge of moving beyond adoption and perpetuating widespread emphasis on teachers' consistent use to improve instruction and benefit the student is difficult. However, the vitality of digital one-to-one depends on the teacher. To bring success to educational initiatives such as one-to-one computing initiatives, school district officials must view the crucial implementation aspect and recognize the implementation of an initiative as a process, not a single event. Emphasis needs to focus on measuring, understanding, and addressing the concerns and perceptions of the teachers in the change process (Yeldell, 2017). Digital one-to-one initiatives policymakers tended to focus on technology and its impact on student achievement, attendance, and attitudes. One-to-one initiatives policymakers completely bypassed the phenomenon of teachers' and parent's perception and concerns with the initiative and the effect of teacher and parent perception upon the initiative's success in order to focus on the technological impact on resources (Yeldell, 2017).

Statement of the Problem

A digital divide continues to plague many school districts across the United States. The digital divide affects school districts in two phases. First, the digital divide is an issue of access and second as an issue of productive usage. Researchers argued that

the issues of digital equity should not be conceptualized solely as a technical or resource issue. Several researchers investigated the promise and potential of information and communication technology in education (Yuen et al., 2018). The argument centers around whether to focus attention on digital equity issues in education, which could be a locus and a cause for injustice.

The digital divide is a global, dynamic, and complex problem. The digital divide was originally defined as a gap between those who do and those who do not have access to computers and the internet (Yuen et al., 2018). Researchers acknowledge that internet connectivity and the number of household computers or mobile phones are by no means the only way to quantify inclusion in and exclusion from the information society (Yuen et al., 2018). As the focus of digital divide research shifts from physical access to digital devices to effective information communication and technology use and access (Yuen et al., 2018).

Usage of information and communication technology has become ubiquitous. The skills needed to use information and communication technology are becoming one of the most important life skills. Therefore, blending of information and communication technology into daily life has become widely explored in education. The concept of information and communication technology enhances learning and reduces the gap in access to learning resources, especially concerning demographic factors (Wu et al., 2014).

The number of one-to-one technology programs in schools has steadily increased. However, there is little consensus about whether such programs contributed to improve educational outcomes despite the growth of such programs (Zheng et al., 2016). Within

the United States educational system there is an issue that is passionately debated (Zheng et al., 2016). That topic is the effects of new technology on teaching and learning.

Researchers who investigated 100 years of educational technology have argued the use of technology in the educational setting (Zheng et al., 2016). The argument is based on the perception that schools are institutions that are deeply rooted in traditional moral values, and it would be difficult to change social dynamics. Researchers believe that computers are bound to play the same marginal role in schools as earlier technologies, such as radio, film, and television. (Zheng et al., 2016).

Technology has changed the way society interacts with each other. The use of mobile devices affects how we cooperate and collaborate. Many school districts have implemented the one-to-one technology initiative as an instructional approach with the desired result of giving students access to mobile devices outside the school setting. Technology implemented through the one-to-one technology initiative has shown to improve student's achievement. The theory concludes that giving students access will enhance academic performance (Lei & Zhao, 2008; School Transportation News, 2020).

Many students have access to mobile devices, but not wireless access (McElroy, 2021). The lack of internet access renders, such as mobile devices, useless in the home setting. One of the disparities within the educational environment includes access and use of technology. The concept connected to the term digital divide. The idea is highly debated, but many can agree that there is a mismatch in access to and use of information and communication technology (McElroy, 2021). Despite the benefits of the one-to-one initiative, many policymakers would agree that a one-to-one technology initiative is an expensive program to implement and maintain. Therefore, there is a need to explore

what ways school districts can effectively close the digital divide gap, especially within the low-income demographic through the implementation of the one-to-one program (McElroy, 2021).

Purpose of the Study

The goal of the research is to determine the impact one-to-one computing initiatives have on digital equity, computer access in rural areas in Mississippi, and determine how the implementation of the one-to-one initiative impacts students' performance in low performing schools. In this study, technology integration is defined as the incorporation of technology resources and technology-based practices into the daily routines, work, and management of schools (National Center for Education Statistics, 2019). Technology resources are computers and specialized software, network-based communication systems, and other equipment and infrastructure. Practices include collaborative work and communication, Internet-based research, remote access to instrumentation, network-based transmission and retrieval of data, and other methods. This definition is not in itself sufficient to describe successful integration: it is important that integration be routine, seamless, and both efficient and effective in supporting school goals and purposes (National Center for Education Statistics, 2019). Technology integration includes six categories: (1) technology planning and policies, (2) finance, (3) equipment and infrastructure, (4) technology application, (5) maintenance and support, and (6) professional development (National Center for Education Statistics, 2019). Technology integration essential conditions includes 14 categories: (1) shared vision, (2) empowered leaders, (3) implementing planning, (4) consistent and adequate funding, (5) equitable access, (6) skilled personnel, (7) ongoing professional learning, (8)

technical support, (9) curriculum framework, (10) student-centered learning, (11) assessment and evaluation, (12) engaged communities, (13) support policies, and (14) supportive external context (International Society for Technology in Education, 2019).

One-to-one initiative computing is a technology integration program that provides a learning device, such as laptops or tablets for every student and educator in the academic setting (Peterson, & Scharber, 2017). Many school districts in Mississippi have implemented the one-to-one initiative to give all students access to technology within the school setting. Students are allowed to take their devices home - however, access to the internet stops at the end of the school day for most students. The lack of access creates a digital divide within the educational setting. Many school districts are considering expanding the one-to-one initiative program to include internet access on school buses (School Transportation News, 2020). The theory is that students in rural areas will have internet access and then improve academic performance (Harris et al., 2016). However, school districts have noticed a problem with their one-to-one initiatives program, such as parents' willingness to participate in the technology program (Jackson, 2009).

The researcher analyzed factors that hinder the implementation of the one-to-one initiative process in rural areas. The researcher reviewed previous literature about technology integration and results showed that National Center for Education Statistics and ISTE plays an important role in evaluating technology integration. Therefore, the following research questions have been proposed based on the National Center for Education Statistics standards and ISTE standards:

The research questions for the qualitative stage are listed below:

- Research Question 1: What is the extent of educators' use of technology in the classroom?
- Research Question 2: How does the teacher's implementation of technology-enriched lessons impact the performance of one-to-one?

The following research questions for the quantitative stage are listed below:

- Research Question 3: Do students have access to the internet and emerging technologies to utilize digital learning resources at home?
- Research Question 4: Do students have access to effective internet connectivity at home?
- Research Question 5: What is the digital equity difference in devices, internet connectivity, and quality among students in four grouped school districts?
- Research Question 6: What proportion of devices, internet connection, and quality of internet access is available to elementary, middle, and high school students?

Theoretical Framework

The theoretical basis for this study includes (a) digital divide, (b) digital equity, and (c) one-to-one computing initiative. Digital divide is the theoretical basis for the theory of the information society. Lupač (2018) noted the theory of the information society. The theory is based on a composition of a wide set of diverse concepts that share certain fundamental arguments and beliefs. The common arguments and beliefs border on ideology and a specifically structured imaginary (Lupač, 2018). Researchers noted that connectivity to information societies can take on many forms (Van Reisen & Mawere, 2019). Individuals are either included or excluded from access. Van Reisen & Mawere (2019) noted the practices can lead to developing localized theories leading to

the understanding of the inherent structures of the Internet from the position of the disfranchised. Researchers argues that living solely with theory takes away the separation between the participant and the observer (Van Reisen & Mawere, 2019).

Digital Divide: Muller (2022) noted that at the highest-level digital divide is the widening gap between those with internet access and those without internet access. Digital divide is not a binary concept, but factors such as availability, affordability, quality of service, and relevance can lead to the multifaceted aspects of digital divide (Muller, 2022). Millán et al. (2021) noted that the worldwide diffusion of information and communications technology has increased over the last decade at a rapid pace. To participate in the modern society digital skills are necessary for many types of work and business. Despite this urgent need for digital skills, there are massive inequalities in access and adoption of ICT, affecting both households and businesses (Millán et al., 2021). Research has defined this phenomenon as the digital divide (Millán et al., 2021).

Digital Equity: Availability and relevance are the foundation for the concept of digital equity. Unequal access to information technology is often called digital equity (Judge et al., 2004). Broadband access in the home is a necessity, especially since the COVID-19 pandemic (Gleason & Suen, 2022). The pandemic has shown that high-speed internet is no longer a luxury, it is an indispensable utility required for functioning as a citizen of the 21st century (Doaks, 2021). Internet connectivity is of vital importance for school, work, family, and friends. Existing international research on the implementation of broadband has studied its adoption patterns with a focus on the rural/urban digital divide (Gleason & Suen, 2022). Past researchers test social exclusion theory such as the

structural facets of poverty and social marginality to ascertain its potential impact on broadband access (Gleason & Suen, 2022).

One-to-One Computing Initiative: The one-to-one computing initiative addresses the factors of affordability and quality of service. One-to-one computing initiatives seek to provide laptop computers and Internet access to students for use at home and school (Penuel, 2006). The decreasing costs, light weight of laptops, and increasing availability of wireless connectivity are making such initiatives more feasible to implement on a broad scale (Penuel, 2006). Meyer et al. (2021) noted many studies have investigated teaching in one-to-one computing classrooms. Therefore, using a sociomaterial perspective, the research aims to broaden the discussion about emergent teaching practices in Nordic classrooms where students use tablets as personal devices (Meyer et al., 2021).

Delimitations and Assumptions

One of the delimitations in this study is that not all school officials have the same feeling towards the one-to-one initiative and may have biases when answering interview questions. Their biases and experience with the one-to-one initiative could affect this study's results in the qualitative stage as they answer questions in the interviews. School officials with more experience may provide more in-depth information when explaining their perspective during the interview. School officials' attitude toward the one-to-one initiative might positively or negatively influence their answer to the questions. However, school officials with less experience working with one-to-one initiative might not be able to provide enough information about the implementation and professional development aspect of the one-to-one initiative. School districts are not willing to share

information that is considered non-confidential due to privacy laws (National Center for Education Statistics, 2019). Therefore, the results of the study may be incomplete.

The same delimitations exist with participants in the quantitative phase regarding the survey. Parents with better computer backgrounds or who are more actively involved in the school setting may answer the question differently. Parents who are not familiar with computers or who are not actively involved in the school setting may answer the questions differently.

This study is delimited to the state of Mississippi. Compared to their peers in other states, students in Mississippi are academically behind (Lynch, 2016). School districts focus on instructional technology as an instructional tool to help close students' achievement gaps. The state of Mississippi requires school districts to implement a form of instructional technology. However, the state does not provide guidelines as to how technology should be integrated. Therefore, low-income school districts often implement one-to-one initiatives. However, the implementation process is often challenging. Although being delimited to the state of Mississippi could hurt generalizing the results, this study can provide other researchers valuable information on technology integration in places that lack educational resources and support such as low-income areas.

In this study, the researcher assumed all participants have the same level of one-to-one initiative experience and answer the questions honestly and freely without fear of repercussion and bias. In addition, all participants are assumed to understand the questions being asked and respond accordingly to their experiences. Participants' name, locations, and other identifying information are kept anonymous. Only the researcher and participants can access the information with written permission. This study may

have sampling bias because the researcher tends to select participants who agree with the one-to-one initiative. Therefore, participants may respond positively to the one-to-one initiative. Participants are randomly chosen from the total population and it would help the research minimize research bias. Random selection would strengthen the generalization of the research results. However, for this study, the selection of participants in the interview helped the researcher make generalizations about the results of the survey.

Justification

Earlier studies disregarded the phenomenon of teacher and parent perception, and concerns, and focused primarily on the technological impact on resources, training, and student achievement, attendance, and attitudes. However, a successful educational initiative focuses on crucial details and recognizes that implementation of an educational initiative must be a process, not a single event that emphasizes the importance of measuring, understanding, and addressing the concerns and perceptions of the teachers and the parents in the change process. Early studies of digital one-to-one initiatives tended to focus on technology and its impact on student achievement, attendance, and attitudes. Additionally, studies included the aspects of the technological implications on resources but completely bypassed the phenomenon of teacher perception and concerns with the initiative and the effect of teacher perception upon the success of the initiative itself. Across the globe, schools continue to implement one-to-one initiatives. Those programs were implemented for a variety of different reasons, and the programs have also had varied results. Those results related to student achievement and other student behaviors, as well as teacher behaviors (Yeldell, 2017).

Much of the focus of one-to-one technology initiatives has been on the teachers and students' training during the implementation. However, parents must be trained throughout the process to make sure the technology initiatives are successful. Parent training programs promote positive parenting and benefits students, especially ones who are considered low-income. Researchers highly recommend the parent training program. However, the program is rarely implemented by those in the educational setting (McGoron et al., 2018).

Research-based programs and interventions must reach the target population in which the programs are designed to benefit. The benefits of such a program allow youth to overcome adverse behavior problems and deficits of school readiness skills. Even though such programs and interventions are beneficial, a small majority participate in such programs, especially among parents of students who are at-risk and low income (McGoron et al., 2018). Factors such as lack of time and scheduling conflicts are barriers to program engagement. Therefore, unique approaches to connect low-income parents with research-based parent training programs are imperative to the implementation stage of the one-to-one technology initiatives (McGoron et al., 2018).

The goal of the research is to determine the impact one-to-one computing initiatives have on computer access in rural areas in Mississippi. Also, the purpose of the study is to determine how the implementation of the one-to-one initiative impacts students' performance in low performing schools. Many school districts in Mississippi have implemented the one-to-one initiative to give all students access to technology within the school setting. Students are allowed to take their devices home — however, access to the internet stops at the end of the school day for most students. The lack of

access creates a digital divide within the educational setting. Many school districts are considering expanding the one-to-one initiative program to include internet access on school buses. The theory is that students in rural areas will have internet access and then improve academic performance. However, school districts have noticed a problem with their one-to-one initiatives program, such as parents' willingness to participate in the technology program. The research will analyze factors that hinder the implementation of the one-to-one initiative process in rural areas.

Definition of Key Terms

To encourage clarity for the reader, the following terms and variables are utilized throughout the study and are defined as follows:

1. Acceptable Use Policy refers to a document that stipulates constraints and practices that a user must agree to for access to an organizational network or the internet.
2. Administrators refers to individuals who are Principals or Career and Technical Directors that are certified by the Mississippi Department of Education in the areas of Administration K-12 and Career and Technical Education Administration.
3. Alternate Route Teaching Program refers to completing an Alternate Route program, which is a required step for an individual who holds a bachelor's degree (non-education), and would like to transition into teaching but lacks the certification or license. Currently there are four methods to obtain certification through the Alternate Route.

4. Biden's Build Back Better Plan or The American Jobs Plan refers to President Biden's infrastructure plan that supports investments in roads, water, electricity, broadband internet, and other physical infrastructure projects.
5. Bring Your Own Device (BYOD) refers to the policy that permits an individual to bring personally owned devices (laptops, tablets, and smartphones) and to use those devices to access the internet.
6. CARES Act refers to a stimulus bill passed by the United States lawmakers in March 2020, to blunt the impact of an economic downturn set in motion by the global coronavirus pandemic.
7. Computer Usage refers to the amount of time a person spends using the computer.
8. Coronavirus Disease 2019 refers to as COVID-19 is a contagious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first known case was identified in Wuhan, China, in December 2019. The disease has since spread worldwide, leading to an ongoing pandemic.
9. Curriculum Directors refers to individuals who serve as support instructional staff within the school district. The individuals are often located at a central location in the school district and dispatched to the local schools to provide instructional support when needed.
10. Digital Equity refers to a condition in which all individuals and communities have access to information and technology needed to participate in society, democracy, and economy.
11. Educational Background refers to the level of education completed by a person.

12. English Language Plans (EL) refers to a plan that the federal law requires to be created and implemented every year for each student who enters or is continuing in the English Language program.
13. Emerging Technology refers to technologies that development or practical applications are both still largely unrealized.
14. Equity in Distance Learning Act refers to the Mississippi legislature funded SB 3044 at a level of $150 million from the CARES Act funds in order to provide internet access to students in rural areas throughout the state of Mississippi.
15. Higher-Performance School District refers to school districts with a grade of an A or B as assigned by the Mississippi Department of Education.
16. Highly Qualified Teacher refers to a teacher that has obtained full state certification as a teacher or passed the State Teacher Licensing Examination and holds a license to teach in the state, and does not have certification or licensure requirements waived on an emergency, temporary, or provisional basis.
17. Income Status refers to households whose income ranges from less than $20,000 to over $200,000.
18. Individualized Educational Plans (IEP) refers to tools used by educational professionals to help children with special needs. Individualized Educational Plans are a roadmap laid out for teachers and parents to follow, offering advice on the best way to help these children reach their true potential.
19. Instructional Technologists refers to an individual whose task is to assist different types of learners using computer technology.

20. Low-Performance School District refers to school districts with a grade of a D of F as assigned by the Mississippi Department of Education.
21. Low-Performing Schools refers to the characterization of schools that have persistently subpar scores on standardized tests along the low graduation and high dropout rates.
22. Mississippi Pandemic Response Broadband Availability Act refers to a Mississippi legislature act that provides $50 million to school districts to help expand internet access to students who live in underserved areas.
23. One-to-One Computing Initiative Program (1:1) refers to a program in which academic institutions such primary, secondary, or higher education institutions issue each enrolled student an electronic device with the goal of access to the internet, digital course materials, and digital textbooks.
24. Pod System refers to small groups of students placed together in their respective age group. The platform is designed to connect students with teachers focusing on ensuring the same quality education students deserve, all in a safe learning environment.
25. Professional Development refers to training received to enhance work performance.
26. Professional Learning Community refers to a method to foster collaborative learning among colleagues within a particular work environment or field. It is often used in schools as a way to organize teachers into working groups of practice-based professional learning.
27. Rural refers to areas considered countryside rather than a town.

28. Socioeconomic refers to the social standing or class of a person or group.
29. Teacher refers to an individual who is certified by the Mississippi Department of Education. The individual helps students to acquire knowledge and master instructional standards.
30. Technology, in this study, is defined as digital hardware and software that include computers (Personal Computer or MacBook), Chromebook, iPad, iPod, open education resources, and other online resources and services.
31. Technology Directors refers to individuals who are in charge of technology within an organization. The individual overseers the deployment of new systems and services.
32. Usage Fee refers to the fee paid to the school district for use of a one-to-one computing device.

Summary

The COVID-19 pandemic forced school districts in Mississippi to reevaluate their technology program. An executive order issued by Mississippi Governor Tate Reeves closed schools and left many children within the state without access to an education. School districts with a formal one-to-one computing program were able to immediately implement a virtual learning component while other districts scrambled to implement a formal one-to-one computing initiative program. What factors make it difficult to have full participation in the one-to-one technology program? The research will analyze factors that affect the participation rate in the one-to-one program in rural and non-rural areas.

The result of the study provided researchers, government educational agencies, private funding agencies, school board members, administrators, teachers, and parents with information about how to properly implement a one-to-one computing initiative program that would benefit the sustainability of the program over time. Proper implementation of a one-to-one computing initiative program can have a tremendous impact on the academic success within a school district. However, other factors can impact the sustainability of a program. The research addressed those factors. The study informed how a successful one-to-one computing initiative program looks within a high-performance school district and low performance school district. Also, discussed in the study how income status, educational background, and parent's computer usage can affect the implementation. The adoption of the one-to-one computing initiative program depends on the teacher's willingness to incorporate the technology into the educational setting. Therefore, the study examined whether initial professional development or continuous professional development will encourage teachers to adopt the one-to-one computing program as an instructional tool.

CHAPTER II – LITERATURE REVIEW

Chapter II reviews literature on technology integration and the one-to-one computing initiative. This chapter examines the digital divide and digital equity. This chapter will also investigate the one-to-one computing initiative program and how the program is designed to alleviate the significant issues that hinder digital equity. Since technology integration is a meaningful process, this chapter examines the necessary conditions. The chapter closes with a summary of key points.

Digital Divide and the Technology Gap in Society

As early as 1989, Americans faced the challenge of providing access to technology to everyone within the general population. The introduction of the World Wide Web transformed the world of technology and affected how communication took place, especially in education. The internet population worldwide increased from 3 million in 1994 to approximately 400 million in 2000, and by December 2010, that number rose to 1.97 billion (Garrity, 2017). The internet participants became an integral part of the knowledge economy, and access to the internet facilitates rapidly increased knowledge acquisition. Non-users of online technology are often deprived of many technology-related opportunities and resources. Therefore, leading to a gap in the socioeconomic disparities within and between nations. To explain economic inequality related to code was coined (Anthony & Padmanabhan, 2010; Katz et al., 2018).

In the mid-1990s, society noticed there was a disparity between individuals who had and did not have access to information technology. The discrepancy came to be known as the digital divide. Two studies (Eamon, 2004; Katz et al., 2018), concluded that the inequalities between access and use of information technology reflect patterns of

social stratification in the United States. Demographics that fall within high-income, Caucasian, married, and well-educated individuals most likely have more access to information technology than low-income, African American, Latino, unmarried, and less-educated individuals. Increased access to information technology in public education has closed access to information technology among high-and low- income and white and minority students (Eamon, 2004; Katz et al., 2018).

As noted, two studies (Eamon, 2004; Katz et al., 2018) cited inequalities in information technology access among children, adolescents, and adults continue to expand. Studies revealed less than 3% of adolescents living in the highest income families do not use computers. The results compared to approximately 15% of youth in the lowest income category. Among wealthy youth, home computers are almost universal. However, one-third of the lowest-income youth use a home computer. There were differences in internet access within the low-and high-income youth demographic and computer and internet access and use between Latinos, African Americans, and Caucasians (Eamon, 2004; Katz et al., 2018).

According to Tichavakunda & Tierney (2018), the evaluation of technology must continue because of the ever-evolving impact on education. The digital divide is often manifested differently in adolescents, adults, and the elderly. The origin of the digital divide focuses mainly on access to information technology, and the digital divide concentrates more on the complicated relationship that exists between the have and the have nots. Many researchers have coined the term the second digital divide. The second digital divide explains the correlation between how users take advantage of information

technology access. Researchers are concentrating on the sociocultural context of internet users to study the digital range (Tichavakunda & Tierney, 2018).

Researchers adopted the digital divide, which highlighted the physical access to computers. Either a person has access to computers or does not have access to computers. All research yielded the same results (Tichavakunda & Tierney, 2018). Ones considered have nots are often people of color, the elderly, low-income families, and limited education. Youth often encounter some form of technology within public spaces such as community centers or schools. However, affluent students have consistent access to the internet or computer of their own. Students from wealthy families spend more time interacting with information technology and display higher digital fluency than their peers without the same advantage. Technically, many youths might access information technology through their neighborhood library (Tichavakunda & Tierney, 2018). However, access is different than access to a personal mobile device. Information technology does not automatically translate into meaningful use of information technology. Meaningful use or engagement involves the ability to control, obtain, and create content that has significance to the user. Therefore, the second digital divide refers to the differences between meaningful digital use and skills (Tichavakunda & Tierney, 2018).

The digital divide explains the lack of access to information via computers and the internet (Anthony & Padmanabhan, 2010; Tichavakunda & Tierney, 2018). Additionally, the digital divide is often used to describe inequalities in access and use of Information Communication & Technology. Information Communication & Technology policies often focus on the lack of physical access to computers. Therefore, providing

access by either increasing the number of computers or giving learners equal time on the computer does not automatically lead to increased use. The focus then shifts to going beyond the access and includes literacy, language, and education issues, focusing on excluded groups. Also, the digital divide can refer to a lack of access to the necessary material, human, and social resources to use computers in a meaningful way (Gudmundsdottir, 2010; Yuen et al., 2018). In 1996, the United States responded to the digital divide by issuing a Technology Literacy challenge and following up on the federal law titled No Child Left Behind. Accessibility to computers and the internet alone cannot bridge the digital divide (Anthony & Padmanabhan, 2010).

COVID-19 Revealed a Widening Digital Divide

In December of 2019, the United States of America started to learn about the novel coronavirus that would later lead to a global pandemic. The virus known as COVID-19 forced millions of people to stay home. Government executive orders mandated stay-at-home regulations and made it mandatory that millions of schools around the United States closed their doors, leaving students without an environment for learning (Lai & Widmar, 2020). Across the country, due to the coronavirus pandemic, districts everywhere scrambled to put in place remote learning programs. The COVID-19 pandemic exposed a digital pandemic which proved to be a significant stumbling block in guaranteeing that all students have equal opportunities to access the remote learning programs. In other words, in the United States, the digital divide was suddenly front and center (Teacher Task Force, 2021).

The United States of America was not the only county affected by the pandemic. Azubuike, Adegboye, & Quadri (2021) noted the effects of the global pandemic as early

as November 2019. COVID-19 was first discovered in Wuhan, China, and within a few months, the virus became a global pandemic that affected almost every county in the world. The worldwide economy and sources of livelihoods were heavily impacted. Public health measures such as government shutdowns were implemented to contain the virus. Economies shutdowns lead to the closure of traditional school services. It was estimated that 1.6 billion students in 190 countries worldwide were affected by the pandemic (Azubuike et al., 2021). School closures impacted Ninety-four percent of the world's school population. Azubuike et al. (2021) argue that in Nigeria alone, 39,440,016 primary and secondary school students were affected by schools' closure due to COVID-19. In response to the education emergency, governments and non-government institutes implemented measures to help ease the effect of the closures (Azubuike et al., 2021).

COVID-19 pandemic not only caused a digital divide issue among school districts. According to Nguyen et al. (2020), governments and public health institutions across the globe authorized social distancing and stay-at-home guidelines to battle the COVID-19 pandemic. The public health measures reduced opportunities to spend time together in person, which led to new challenges to remain socially connected. During the first month of the pandemic, Nguyen et al. (2020) noted that digital media rose tremendously as people spent more time at home due to the pandemic lockdowns. The use of social media and messaging apps increased, and video conferencing apps and programs increased. However, digital communication during the pandemic exposed digital inequality. The quality of internet services and skills vary significantly within the United States, especially among lower-income Americans (Nguyen et al., 2020).

Digital Divide Implications

According to DiBello (2005), there are four implications of the digital divide in education. Those implications are educational advantages, future employment and earning social and civic involvement opportunities, and equity and civil rights issues.

Educational Advantage Implications: One of the technological implications of the digital divide is an educational advantage. The educational benefits lie in the technologically savvy students. These students have a significant advantage over their peers. According to two studies (Mason & Dodds, 2005; McGoron et al., 2018), technologically savvy students challenged schools to make greater use of computers and the internet in their curricula. Technologically advanced students are ahead of the learning curve and often focused on the objective. Therefore, how to create a table using Word, how to use a mouse, and how to use a search engine are considered mundane technology issues (Mason & Dodds, 2005; McGoron et al., 2018).

Future Employment and Earnings Implications: Another implication is the digital divide's impact on future employment and earnings. Recent job ads often highlight the importance of Information Technology skills. Employers are willing to invest higher salaries for a potential employee who is already technologically trained (DiBello, 2005; Millán et al., 2021). As van Deursen & van Dijk (2010) noted, a vital differential possession is digital skills. Changes in society often determine the demand for new skills. Since the internet is an essential form of communication in contemporary society, having digital skills related to the internet is a valuable possession. Internet skills are considered a vital asset because most information needed for employment is online. Therefore, people's need for work is increasingly dependent on data found on the internet.

When there is an unequal distribution of digital skills within society, there might exacerbate existing societal inequalities (van Deursen & van Dijk , 2010).

Social and Civic Involvement Implications: Another implication is the opportunities for social and civic involvement. Regular use of the internet allows people to become aware of opportunities to participate, whether in civic activities or on a global scale. Participation in a technological environment gives participants a voice on current events. Researchers hoped that participation in a technological climate would help resolve the fourth implication of the digital divide, which is equity and civil rights issues. DiBello's (2005) research highlighted technology is often readily available for students in higher socioeconomic groups. However, results yielded that the students in lower socioeconomic groups are often left behind. The digital divide's equity and civil rights issues cannot be solved overnight. Two studies (Mason & Dodds, 2005; Muller, 2022) concluded not every student has the same access to technology, and the inability to keep pace has created a digital divide that only continues to widen. The digital range affects African American, Hispanic, Native American, and poor students (Mason & Dodds, 2005; Katz et al., 2018).

Students from those cultural backgrounds are far less likely to have computers or internet connections at home than their Caucasian or Asian peers. Two-thirds of Caucasian children have gone online compared to 45 % of African American children and 37% of Hispanic youth (Mason & Dodds, 2005; Katz et al., 2018). Students without connection at home have a school setting as the primary source of computer access. Frequently school is the only place students from different cultural backgrounds can go online. Technology access is not only limited to students within a particular culture.

Students with disabilities do not use technology or participate online because school equipment is not compatible with their learning and physical needs (Mason & Dodds, 2005; Katz et al., 2018).

Digital Equity as a Digital Divide Solution

The concept advocated as that solution to the digital divide is digital equity. Digital equity ensures that everyone has equal access to technology and digital information. According to Kranich (2001), the need to access information began long before internet innovation. In the 1930s, Congress passed the Communications Acts of 1934, which ushered in the Information Age. The Communications Acts of 1934 called for universal service to ensure equitable access to communication technologies. A significant area impacted was access to local libraries, which led to those facilities being open seven days a week, including holidays. Since the passage of the Communications Acts of 1934, the digital age has progressed to include multiple forms of communication (Kranich, 2001).

Government officials hope that everyone will have the opportunity to participate in an information society. One way to create opportunities is to allow people who cannot connect at home to access technology at their local library. Two studies (DeGennaro, 2010; Martin, 2016) noted many school districts are providing teachers, students, and parents the ability to access technology outside of the classroom setting. School districts schedule afterschool training sessions for teachers, parents, guardians, and students to gain technology skills and access technological resources. One such school called their technology equity program Tech Goes Home. The program has provided more than 5,000 families of low-income students in 43 public schools. Parents and students must

attend the technical training sessions at their local school (DeGennaro, 2010). After approximately 25 hours of training, the parents have an option to purchase the computer for fifty dollars. Each semester, the school allows all students to sign up for the program. Programs such as Tech Go Home give families an advantage in computer access at home. Therefore, providing students with equal opportunities to excel in school (DeGennaro, 2010).

According to Martin (2016), policymakers cannot assume that giving people easy access to technology will automatically succeed. The abundance of technology access is not necessary equity. However, providing access does facilitate community and opportunities for digital participation. Researchers noted that providing access does not solve digital equity issues because results are often generalized about youth engagement and technology (Martin, 2016). Additionally, low-income and at-risk students are often overlooked in research studies. Finding a way to achieve digital equity is paramount for the success of all students. Such inequality in educational opportunities is expanding and affecting the economic divide in society (Martin, 2016).

Everyone should be able to participate in the digital economy. Participation is contingent upon access to technology. Two studies (Adamson, 2008; Gleason & Suen, 2022) explain that living in a digital environment makes access imperative. Digital space is here to stay, and components of digital space triggered hyper-development of commercial brands. Commercial businesses send various experiences to your laptops, cellphones, or other mobile devices. Once the connection is made, the brands are incorporated into your life. Therefore, participation leads to economic growth and the expansion of digital equity. Adamson (2008) noted four success factors that contributed

to digital equity. One such factor is comprehensiveness. The digital environment allows for many choices and access to service. The organization must develop a process of making and cataloging personal selections that will enable them to achieve the desired outcome. Another factor that would allow for an organization to be successful is the selection of technology devices that are easy to use. Determining which technology is easy to use is not easy, especially when the digital world shows that one technology brand can make something more accessible or more convenient than another technology brand (Adamson, 2008; Cho et al., 2020).

According to Morgan (2020), organizations must use discretion when making technology selections. Playfulness and fun are other factors used to determine if digital equity is successful. Organizations must ensure that technology is fun and engaging to the target audience. Technology must prompt the user to interact with the device and another user on a global platform. Underlying the other factors is ensuring technology purchased is considered trustworthy — questions such as how data is collected from the user and how the organization uses that information. Also, users often want to know if the data collected, such as personal information, is protected and not misused (Morgan, 2020).

Digital equity aligned with the primary focus of the one-to-one computing initiative, which is to improve student's access to technology inside and outside the educational setting. The federal government has influenced the implementation of technology within the United States. The United States Department of Education required technology integration through federal laws such as the No Child Left Behind Act or NCLB; Public Law 107-110. The No Child Left Behind Act allowed funding

sources to be established to integrate technology into the classroom (Berrett, Murphy, & Sullivan, 2012). One such funding source is the Enhancing Education Through Technology or EETT. The Enhancing Education Through Technology grant requires professional development activities for administrators throughout the implementation stage. Also, a mentor, who is considered a technology-savvy teacher, is needed to complete professional development (Berrett et al., 2012).

Lei and Zhao (2008) noted the one-to-one computing initiative program's introduction to the educational setting was more than 20 years ago. Researchers have not been able to keep up with the one-to-one computing initiative program development or expansion. In the early 2000s, research was scarce, and the investigation was considered poor quality. However, implementing state-wide and district-wide one-to-one computing initiatives has led to increased evaluations and research studies. Researchers identified 46 implementation and outcome studies on the one-to-one computing initiative in 2005 (Lei & Zhao, 2008; Gleason & Suen, 2022). The emphasis of early one-to-one computing initiative studies has focused on two areas: the implementation of a one-to-one computing initiative and the impact of the one-to-one computing initiative. Most implementation studies were descriptive studies and were often in state reports. Many high-profile state reports gave insight into an overview of the one-to-one computing initiative. They introduced the mission and scope of the program — the implementation process described in the information and the preliminary impact on student learning (Lei & Zhao, 2008).

Government Solution to Digital Divide

Attewell (2001) noted the digital divide as a new social problem that has seized the attention of politicians and philanthropists. Why all the attention? Poor and minority families are less likely than other families to access computers or the internet. Therefore, the lack of access to technology leads to the information haves and the information have-nots. Policymakers have tried to respond to the digital divide problem in various ways. For example, President Bill Clinton proposed a $2.1 billion tax incentive for businesses that donated computers and related services to low-income area schools and communities (Attewell, 2001). In 2000, the United States Senate considered creating the National Digital Empowerment Act. The National Digital Empowerment Act would double funding for school technology. The same year the Governor of Maine announced a proposal to give every seventh-grade student a laptop computer (Attewell, 2001).

According to Attewell (2001), private entities have tried to solve the digital divide. Their effort helps gain insight into the problem of the digital divide. Several corporations implemented a home-computer program for employees who did have their own. Other high-tech firms and their philanthropies financed the creation of computer clubhouses in minority communities. Also, the firm provided technology training for public school teachers. Unions became involved in the fight against the digital divide. Many trade unions have secured computers for their members, but the digital divide is challenging to solve (Attewell, 2001).

Other researchers such as Attewell (2001) further attest that minorities and poor individuals are less likely to own computers and have internet access at home than whites and more affluent households. Between 1994 to 2000, the trend was equally disturbing.

The technology gap has widened among blacks and whites. The pattern indicates that the digital divide issues are not correcting themselves over time despite the fact the prices of computers have drastically fallen over the year, and many people of all races are purchasing home personal computers (Attewell, 2001).

The increase in purchase might suggest the gap in computer ownership and internet access will close, but the disparities in access are motivated by a factor other than race. Income inequality and educational differences affect computer ownership and internet access. When it comes to computer ownership and internet access, there are minimal ethnic and racial differences among people of higher income and educational backgrounds (Attewell, 2001, Katz et al., 2018). Middle-income families continue to make progress in computer ownership and internet access. Therefore, the bottom fifth of the income spectrum or families with incomes below $15,000 compared with the rest of society will notice a shift in the digital divide. The fact is that the racially heterogeneous stratum currently faces severe educational and economic disadvantage, in which approximately 19% of low-income families already own computers. If the trend of lower technology prices continues to fall, then more families with the lower-income spectrum will have access (Attewell, 2001, Katz et al., 2018).

A quality education system in Nigeria has always been a challenge. However, during the COVID-19 pandemic, Azubuike et al. (2021) noted Nigerian government officials and non-government officials implemented various learning interventions using technological platforms to narrow the digital equity disparities. The technical platform included internet-based tools and traditional media. As in other parts of the world, in Nigeria, the quality of education and the differences in digital technology are linked to the

student's socioeconomic background. Students whose parents or guardians are willing and able to pay more to access better learning resources are more likely to attend private schools (Azubuike et al., 2021). Students are more likely to access more digital resources in the private school setting. The opposite is true for their counterparts from lower socioeconomic households, who are more likely to attend public school and have minute access to digital resources (Azubuike et al., 2021). When COVID-19 disrupted the education system, the adoption of remote learning across Nigeria uncovered the dilemma of technology access. Students from financially privileged households represent the demographic that had more access to quality learning opportunities from the comfort of their homes (Azubuike et al., 2021).

On March 22, 2021, the White House released a press statement that noted that President Biden proposed to the United States Congress a 2.7 trillion-dollar plan called the American Jobs Plan. Over time, this Plan was called Biden's Build Back Better Plan (White House, 2021). The Plan included allocating $65 billion to build high-speed broadband infrastructures to reach 100 percent coverage. The President's Plan prioritizes building broadband infrastructure in unserved and underserved areas (White House, 2021). The Plan also prioritizes support for broadband networks owned, operated by, or affiliated with local governments, non-profits, and cooperatives. The federal government helps support the entities because the providers have less pressure to turn profits and commit to serving the entire community. Biden's Plan ensures funds are set aside for tribal lands (White House, 2021).

According to Mississippi First (2020), the pandemic created digital equity problems for school districts in Mississippi. School districts were forced to close due to executive

orders leaving many students without the opportunity to receive an education. The State of Mississippi Legislature stepped in to help alleviate the problems. The state legislature passed two bills to support K-12 online learning. The first bill was the Equity in Distance Learning Act which provided $150 million (Mississippi First, 2020). The funds were given to the Mississippi Department of Education, public school districts, and charter schools. Tribal schools and private schools were not eligible for the funds. The second bill was the Mississippi Pandemic Response Broadband Availability Grant Program which provided $50 million. The Mississippi Department of Education identified unserved areas that used Federal Communications Commission broadband data and then determined how many children were in these areas served in public, private, and tribal schools. The Mississippi Department of Education would then equitably and efficiently distribute money from the funds (Mississippi First, 2020)

One-to-One Computing Initiative in Education

Technology has changed many aspects of everyone's life. The field of education has not managed to escape the impact of technology since the obtainability of desktop computers, laptops, tablets, smartphones, and the internet. American education has seen its fair share of educational initiatives, but few have been more costly as the integration of computer technologies (Bebell & Kay, 2010; Millán et al.,2021). Technology made today's classroom a very different environment from what society used to be 20 years ago. In the K-12 educational setting, one-to-one computing initiatives started implementation within individual schools, school districts, and entire states throughout the United States. The rapidly technologically advancing world has made initiatives such as one-to-one computing a necessity. The next technological breakthrough is the key to

keeping countries competitive in a global society. A technically competent workforce is imperative to the continuation of being a leader in a technologically advanced world (Holen, Hung, & Gourneau, 2017).

The Goals of the One-to-One Computing Initiatives

According to Holen et al. (2017), the United States of America has two goals for the concept of one-to-one computing initiatives.

First Goal: The United States' first goal is to support the needs of an educational system to sustain public confidence, security, and economic competitiveness.

Second Goal: The second goal of the United States' one-to-one computing initiative is to solve the inequality of inaccessibility to technology among students with different socioeconomic backgrounds.

Achieving the two goals has been a challenge because preparing students for 21st-century competence is the disparity in students' ability to access technology (Holen et al., 2017). The advancement and adoption of technology have prevalently been a goal in our society. However, the technology adoption issues still plague disadvantaged student populations that do not have access to advanced technology. The solution to social problems is the implementation of one-to-one computing initiatives. The initiative's goal is to provide access to technology devices and internet services to every student (Holen et al., 2017). The entrance to technology devices and internet service serves a social justice purpose. All students, especially disadvantaged students, have an opportunity to prepare for a more technological workforce and become competent students whose future aim is to fill the vacancy in a global society (Holen et al., 2017).

One-to-One Computing Initiatives and Student Achievement

According to Henderson-Rosser & Sauers (2017), one-to-one computing initiatives have been around for many years. In 1986 technology programs such as The Apple Classroom of Tomorrow were introduced as a one-to-one learning program. Schools across the globe were early adopters of the technology program. The program's results varied, and some schools dropped the program because of a lack of positive results. Many schools indicated that one-to-one technology learning positively impacted student achievement — the outcome of the one-to-one computing initiative aligned with two major themes (Henderson-Rosser & Sauers, 2017).

Researchers have indicated that one-to-one computing initiative positively impacts writing, literacy, science, state and national assessments, and grade point averages. Writing is a common academic area where the one-to-one computing initiative has a dramatic impact. According to researchers, access to technology devices and the internet facilitates higher-order thinking (Henderson-Rosser & Sauers, 2017). Academics are not the only area affected by the one-to-one computing initiative. Students' engagement and motivation are areas shown to have increased due to a one-to-one initiative. Other researchers have a focus on how one-to-one initiatives impact teaching. For example, researchers suggest fundamental educational changes after an organization implements a one-to-one environment—some of the changes centered on a shift in teaching strategies, curriculum delivery, and classroom management. One researcher noted that teachers' classrooms were more student-centered (Henderson-Rosser & Sauers, 2017). A study conducted by Hershkovitz & Karni (2018) reported similar results. The study indicated a one-to-one computing program shifts the focus of the teacher.

Therefore, creating a more learner-centered environment. Also, the initiative promotes the acquisition of higher-order thinking skills (Hershkovitz & Karni, 2018).

Hew & Brush (2007) suggest since the mid-1970s, educators have been intrigued about the possibilities of implementing technology in the classroom. The intrigue centered around technology, helping transform education, and improving students' learning. The use of technology helped enhance students' scores on standardized assessments, creative thinking, self-concept, and motivation. Also, researchers noted that the use of technology in the educational setting increased the number of opportunities that would otherwise be difficult to attain (Hew & Brush, 2007; Millán et al. (2021). For example, students who have access to one-to-one technology can use computer-mediated communication tools. Conveniently, communication tools can help students from various geographical locations talk to experts. An increase in the number of opportunities to communicate with experts enhances students' learning process (Hew & Brush, 2007).

The Impact of One-to-One Technology in the Educational Setting

Andersson, Wiklund, & Hatakka (2016) noted that technology in the educational setting tends to facilitate a shift towards a more constructivist or collaborative classroom environment. Teachers are challenged to support collaborative learning in new ways. Although the collaborative group is a generic competence with high importance on enhancing employability, researchers indicated a definite connection between the collaborative or cooperative learning process. The results noted that too much individual assignment decreases students' performance. However, Andersson et al. (2016) suggest laptops enable cooperative groups rather than collaborative communication. Collaborative groups are known to take place face-to-face. Therefore, students who use

the computer in 1:1 school tend to divide the tasks and work individually. Some students were inactive, and the researchers attributed the laptop itself as playing a role in the inactivity. Students were tempted to access the internet during instructional time, and teachers found that social media use and gaming were distracting from the learning process (Andersson et al., 2016).

Distractions consistently led to inactivity in the classroom setting reported as one of the most harmful consequences of the one-to-one implementation. Teachers lack strategies for tackling problems, and students are often delegated to take on the responsibility of safe usage. Bergström & Årebrant (2013) mentioned similar results from their study. The study revealed one-to-one computing classrooms based on one portable laptop for each student. Two studies (Bergström & Årebrant, 2013; Sung et al., 2016) concluded students can access the internet through wireless networks and use mobile devices in school practice. The concept of 1:1 centered on analog designs of the learning experience. The idea is vastly different from traditional schools based on principles of the analog world. Students and teachers are expected to take on specifically designated roles. For example, students are the formal role of the students. Teachers are expected to hold students to certain expectations (Bergström & Årebrant, 2013; Sung et al., 2016). The classroom setting allows teachers to design learning opportunities that focus on teacher-centered or student-centered. One-to-one computing classrooms enable the teachers to develop a learning environment that emphasizes teacher-centered learning based on technology-enhanced media consumption. Educators benefitted more when one-to-one concepts, and social media applications, were integrated within a student-centered learning environment (Bergström & Årebrant, 2013; Sung et al., 2016).

Bowser & Zabala (2012) noted the benefit of educational mandates such as Common Core State Standards. The educational mandate has the prevalence of available content and the rapid increase in the availability of mobile technology. The expansion of Common Core State Standards will soon make paper textbooks a thing of the past in the United States of America's schools. Experts predict that within the next ten years, districts will be using electronic formats on mobile devices to deliver core instructional content that was once in a textbook. If the predictions are correct, the shift from print material to digital text will impact students' access to information, especially those who cannot use traditional printed instructional materials effectively (Bowser & Zabala, 2012). The implementation of one-to-one, therefore, becomes imperative. District implementation of a one-to-one computing program will significantly help struggling readers and students with disabilities. The benefits are derived from the use of malleable and flexible digital materials. Students who need or prefer alternatives to static printed material could decide to hear some or all read-aloud text. The book's size, font, or color can be adjusted to accommodate students' needs. Digital resources allow the students to get immediate assistance to help them understand words. The vocabulary learned is beyond their current language skill and background knowledge in most cases (Bowser & Zabala, 2012).

One-to-One Computing Impact on Rural and Low-Income Areas

Warschauer, Knobel, & Stone (2004) conducted comparative studies on the availability of, access to, and use of new technologies among low-income and high-income socioeconomic groups. For more than 100 years within the educational system in the United States, inequality has been a critical social issue. The problem is not solved

because substantial achievement gaps exist today within the academic setting. Although student-computer ratios in the schools were similar to the social context, computer usage differed drastically (Warschauer et al., 2004). Low -socioeconomic status schools are affected by students' uneven human support networks and random home access to computers. Also, regardless of addressing the needs of a large population of English learners, there is pressure on school districts to raise school tests among non-English speaking and low-socioeconomic status students. These differences are expressed within three primary forms. Those forms are technology access and usage, labeled performativity, workability, and complexity. Each of the types affects how schools deploy new technologies for academic preparation (Warschauer et al., 2004; Katz et al., 2018). Alves (2015) noted that the start of the millennium proved that there was inequitable access to computers.

One of the most common measures of technological access is student to computer ratios and percentages of internet connectivity. One study using the measurement discovered that high-socioeconomic status communities are on average to have 2.5 more computers per student than schools in low-socioeconomic communities. Between 2001 to 2003 there was a 25% increase in schools' spending on computers and other technologies. Studies mainly focus on showing the relationship between computer access and the internet in schools (Alves, 2015). The results were striking, showing student to computer ratios decrease from 12:1 to 4:1. Schools in low-income communities had higher percentages than schools in higher socioeconomic status communities. Therefore, the conclusion is that schools in high-status communities spend more than schools in low socioeconomic status communities to acquire and integrate technology into the

instructional setting. High-income areas spend over 400% more than schools in low-income regions regarding technical support personnel (Alves, 2015).

Several studies (Barrett, 2013; Cirell, 2017) noted funding and policies from the federal and state governments have led to a decrease in access disparities. However, classroom teachers across the nation still have to consider technology access and experiential variations. Computer access is difficult when assigning work within the classroom and home settings. According to Cirell (2017), wealth polarization in urban and rural areas is caused by growing income inequality. The internet and other digital technologies were at first great equalizers. There was an expectation that technology would diminish socioeconomic and geographic disparities. However, many studies have proven that equalizing power rests on equal access to digital resources. In addition, digital literacy, knowledge, and skills must be equally distributed to use them effectively (Cirell, 2017).

Research indicates those who are considered as the haves and have-nots experience new technologically–mediated gaps or digital divide. In this case, technology disparities follow traditional fault lines in social stratification, which means disadvantaged populations, such as racial minorities, low-income students, English language learners (ELLs), and rural communities, have less access to digital technologies (Cirell, 2017). Therefore, expert tools and the instrumental guidance needed for full participation in the global world would not be readily available. An exclusion of digital resources further segregates otherwise already marginalized populations into spatially distinct pockets of concentrated poverty (Cirell, 2017).

The Effort to Implement One-to-One Computing Initiatives

According to Dunleavy & Heinecke (2007), a project introduced by Apple Corporation increased the number, scope, and sophistication of the 1:1 computer to student ratio. The program, launched in 1995, was called the Apple Classroom of Tomorrow. The ubiquitous computing initiatives went from fewer than 100 computers in the implementation stage to over 36,000. Five years after its implementation, approximately 1,000 American schools were using a 1:1 model with 150,000 laptops — advocates of the 1:1 computing program hail such programs as the promise to transform education. However, opponents saw the promise of a 1:1 computing program only as another oversold fad (Dunleavy & Heinecke, 2007).

Also, opponents mentioned that 1:1 computing programs are a drain on the perpetually limited education budget and, at worst, a distraction that is detrimental to children's education. Researchers and evaluators attempted to document the impact of the 1:1 program on students, teachers, schools, and communities. There have been studies that demonstrate significant increases in more general achievement measures across content areas. Other studies suggest that laptops' have marginal and nonsignificant impacts on students' achievement and attitudes. Overall, researchers concluded a consensus that additional detailed information is needed to assess the effect of 1:1 laptop on teaching and learning (Dunleavy & Heinecke, 2007).

Using One-to-One Technology as an Instructional Tool

Two studies (Pack, 2013; Bergström, Mårell-Olsson, & Jahnke, 2017) noted teachers proficient with technology are a significant component of a successful one-to-one computing initiative. When the component is lacking, it often creates a challenge for

many organizations. Other factors hindering successful integration of technology as an instructional tool are many. However, most notably are extra time for instructional planning, and students not having adequate time with computers. Other challenges for concerns involved students' skill levels, outdated hardware, technical issues, and lack of access to appropriate software (Pack, 2013). Some challenges are ongoing such as technology advancement, especially when it moves beyond early adopters and enthusiasts to extensive and widespread usage. Several researchers examine how to achieve high-quality technology implementation. One key point that hinders the process is understanding what is needed to help educators fully and successfully implement technological tools (Pack, 2013; Bergström, et al., 2017).

Bergström et al. (2017) noted teachers faced many challenges within the one-to-one computing setting. One such problem is how differentiated instruction is supported in a one-to-one classroom. As teachers promote equitable learning experiences for all students, research suggests the goal is not always achievable with one-to-one computing. The analysis results indicate that the teacher's pedagogy did not change. Only to impress the results of earlier studies that focus on classroom settings without one-to-one computing. According to Buabeng-Andoh (2012), teachers lack the necessary skills to integrate technology in the classroom. One study in 2000 by the National Center for Education Statistics cited that only 23% of teachers surveyed feel they are prepared for technology integration in the instructional setting (Chou & Block, 2018). Multiple researchers noted that achieving technology integration in the educational environment is a slow and complicated process that many factors can hinder. Several researchers indicated the successful integration of mobile devices in the classroom setting. However,

countless teachers cannot capitalize on the promising benefits of the devices. The perception held by teachers and students can contribute to the success or failure of one-to-one integration — the success of the adaptation of educational technologies is mainly based on the teacher attitude of emerging technologies. However, student perceptions are vital when understanding how students engage and learn with mobile devices (Chou & Block, 2018).

One-to-One Computing and the Instructional Setting

Instructional settings using mobile devices are unique because devices are convenient and provide new methods of teaching and learning. Technology-based tools can allow students to become critical users and thinkers. Although the benefits of researchers such as Crompton & Keane (2012) noted, mobile technologies could be a focus of disruption in schools. One of the significant challenges is providing teachers with more professional support to integrate new technology in the learning environment effectively. According to Crompton & Keane (2012), Rogers' diffusion of innovation theory offers critical components to understand the success and barriers of implementing a one-to-one computing initiative. Technology models are abundant in the distribution of innovation networks. However, the most notable is Roger's Model — the framework used to explain and predict factors that hinder or support the dispersion of technologies. The four elements of Rogers' diffusion of innovations are innovation, communication channels, time, and social system (Crompton & Keane, 2012).

Any practice, ideas, or object perceived as new to an individual is called innovation. Communication is another element of Rogers' model which includes mass media and personal communication. Time is an element, and Rogers refers to time as an

element to describe the rate the users adopt the innovation. Labels are innovators, early adopters, early majority, late majority, and laggards. Donovan, Hartley, & Strudler (2007) suggested there is an increased frequency of the initiating of one-to-one computing programs within the United States and abroad. Results of research noted innovation adoption that successful implementation is deeply rooted in an understanding of the concerns of the individuals delivering the innovation. Researchers provided invaluable descriptions of the change processes and constructs. Other researchers gave insight into how the concepts impact educational settings (Donovan et al., 2007; Fraillon et al., 2014).

One-to-One Computing Perceived Usefulness and Ease of Use

According to Davis (1989), many variables influence the implementation of a new technology program. Research suggests two significant factors that are very important. The first to the extent people believe applications will help them perform their job better. People will use or not use technology.

Perceived Usefulness: The first variable is often referred to as perceived usefulness (Davis, 1989). Perceived usefulness is defined as the extent to which a person believes that using a technology will enhance his or her performance (Nirwanto & Andarwati, 2019). Perceived usefulness in the technology setting specifically is intended to predict the acceptance and eventually the usage of the technology (Nirwanto & Andarwati, 2019). The level of confidence in the use of the technology can improve performance and benefit the person who uses the technology (Nirwanto & Andarwati, 2019).

Ease of Use: The second variable is called the perceived ease of use (Davis, 1989). Donovan, Green, & Hansen (2011) stated policymakers invest in technology for educational purposes. However, technology is not being used to promote effective learning. Researchers suggested a larger scale 1:1 initiative highlighting the emphasis of a standards-driven curriculum that does not lead to the exclusion of educational technology in schools. To effectively implement 1:1 initiative in the classroom setting, schools need to prepare teacher candidates for employment in technology-rich schools. Some researchers suggest making technology integration part of the teacher credentialing process (Donovan et al., 2011). The perceived ease of use is associated with the acceptance of a technology (Cho et al., 2020).

The Investment of a One-to-One Computing Program

One-to-one computing initiative involved a considerable amount of investment. Therefore, recently one-to-one computing initiative studies have been focusing on the return of such investment. State and district officials have conducted evaluations on large and small scales. Many of the assessments have included pre-test and post-test measures of student achievement in one or more content areas. The result of student outcomes in such studies are positive (Lei & Zhao, 2008). Researchers used a quasi-experimental design to examine the impact on one-to-one computing imitative usage on students' overall grade point average, state test results, and district test results. The studies yielded students who participated in the one-to-one computing initiative scored significantly in writing, English-Language Arts, and Mathematics. Several researchers examined teaching and learning in the classroom with mobile carts and permanent one-to-one computing initiative laptops. The studies yielded the frequency of technology usage,

higher rate of student motivation, engagement, and increased utilization by students in the area of writing (Lei & Zhao, 2008; Meyer et al., 2021). Technology is becoming the focal point within the educational setting. Educational reform on the federal, state, and local levels has designated funds for the sole purpose of implementing academic policies and new technology in a school district. One of the challenges for many school districts is met with good support from teachers. Teachers are the ones who are implementing technology to enhance and improve the teaching and learning process (Lei & Zhao, 2008; Meyer et al., 2021).

One-to-One Computing Implementation Challenges and Best Practices

Challenges: According to Pack (2013), the transformation in the American education system came during the Obama administration. During that period, technology was implemented to close the achievement gap and raise the proportion of college graduates by the year 2020. Technology integration seemed to be the apparent answer to meet those goals. The one-to-one computing program became the top funding priority of many school districts (Pack, 2013). However, merely funding the initiative was not enough to successfully implement the program. Using technology as an instructional tool ultimately depended on the pedagogical knowledge and skills of the educator. Decisions have to be made, such as who will determine how and when the devices are used in the instruction process create significant instructional challenges for school districts (Pack, 2013).

Best Practices: Anderson & Dexter (2005) noted the role of school leadership within the one-to-one implementation process. Research concerning leadership and technology acknowledges either explicitly or implicitly that school leaders should

provide administrative oversight for educational technology. National standards, such as the National Educational Technology Standards for Administrators (NETS) or International Society for Technology in Education (ISTE), which later became widely known as NETS-A, were adopted by educational practitioners. The standards of NETS-A were used as a guide for administrators for implementing technology within the educational setting (Anderson & Dexter, 2005). The process is expressed in Section 4 which focuses on Support Management and Operation. The standards within this section ensure that systems are in place to support technology use within the instructional setting. Also, the details of the standards of how to maintain the technology system which includes coordinating and allocating decisions such as, spending on equipment, networks, software, staff, and promoting services of all types included in Section 4 of the NETS-A. The majority of the research suggests that providing staff access to equipment is the primary responsibility of principals. Other research supports this finding and even implied that principals must seek funding to provide technology equipment and establish an ongoing budget for technology (Anderson & Dexter, 2005).

According to Anderson & Dexter (2005), technology leaders recommend principals need to have advanced technology skill sets. Therefore, administrators should learn how to operate and use technology whenever possible to perform their duties. Communication is a perfect opportunity for administrators to use technology. Several researchers suggest administrators have the responsibility not only to learn about technology but to ensure all staff receive learning opportunities. Professional development can take place by providing release time and other learning opportunities for staff (Anderson & Dexter, 2005).

Chou & Block (2018) recommended implementing the practitioner pedagogical model of Ruben Puentedura. Puentedura proposed the Substitution, Augmentation, Modification, and Redefinition or SAMR pedagogical model. Substitution refers to the use of technology as a direct tool substitute with no functional change. For example, when an organization decides to replace the use of a word processor instead of a typewriter. The use of technology as a direct tool substitute with a functional improvement is known as augmentation. An example of this is using the spell-check function in a word processor application to proofread an essay (Chou & Block, 2018). Using technology to allow for significant task redesign is known as a modification. Modifications take place when educators integrate e-mails, spreadsheets, and graphing programs for the purpose of classroom assignments. Finally, the use of technology that allows for the development of new tasks is called redefinition (Chou & Block, 2018). An example of redefinition takes place when small-groups collaborate to solve the world problem with partners through the use of learning management systems. Critics have leveled the charge SAMR does not have a specific context for technology integration. According to critics, SAMR places more emphasis on products rather than the process. Despite the critics, the model had become extremely popular within the K12 setting because of the simplicity and transparent development. Educators have offered their renditions of SAMR with specific instructional examples (Chou & Block, 2018).

According to Cho (2017), as the global landscape forces more and more schools to become computerized. The concept of one-to-one computing initiatives aims to ensure that every student has access to digital devices. One-to-one computing promises more accessible access to online resources, improvements to students' communication and

collaboration skills, and increased student achievement. Not all one-to-one computing initiatives implementation processes are the same. For example, school officials must decide the nature of one-to-one access (Cho, 2017). The decisions such as what type of devices will be purchased or will the devices be allowed to go home by the students. Other challenging decisions such as will the device be bought or leased. Some school districts have implemented an alternate initiative. The adoption of the Bring-Your-Own-Device or BYOD approach policy allows students and families the opportunity to make a personal decision about mobile device selection and ownership (Cho, 2017).

Morgan (2020) suggests in order to provide effective online education, educators should review the technology such as the ones offered by ISTE. According to ISTE there are 14 critical elements for using technology for learning. Therefore, using ISTE suggestions, especially the one published after the COVID-19 pandemic will allow educators to minimize the effects of school closure can have on academic progress. Morgan's (2020) recommendations include implementing methods that ensure equity, communicate expectations clearly, and providing students-centered learning opportunities. Providing free online resources and responding to the emotional toll of students and teachers were cited as essential recommendations especially during a pandemic (Morgan, 2020).

According to Morgan (2020), the offset of the COVID-19 pandemic led to a pause within the educational setting because many school districts had an equity concern. Some school districts banned teachers from offering graded virtual instruction and requiring students to work remotely. Many school districts worked with telecommunication companies in order to have open Wi-Fi hotspots and many companies

agreed not to terminate service to customers who cannot pay their bills. However, increasing access does not guarantee equitable services. Many school districts had to provide mobile devices and hotspots to students (Morgan, 2020). Another recommendation is to communicate expectations clearly. Clear communication with administrators, staff, and parents when planning to implement an online program is imperative to the success of the program. School districts should provide student-centered learning assignments. The step should be implemented as soon as parents and teachers gain awareness of the critical aspects of the program. Using free high-quality resources is another aspect of a successful program (Morgan, 2020). A motivating instructional method involves taking advantage of virtual tours and other free educational resources. Virtual field trips can inspire students and create learning opportunities. COVID-19 has made the last recommendation even more critical. Responding to the emotional toll of students helps them to deal with the isolation due the pandemic. One of the strategies teachers and parents can use to alleviate fears involves having a cheerful disposition. The method promotes mental and physical well-being of the student (Morgan, 2020).

Aguilar (2020) offered three guidelines known as senses, imagination, and thought, affiliation, and play. Senses, imagination, and thought focuses on the ability to use the insights to imagine, think, and reason. The concept is rooted in two guidelines. The first guideline gives students projects that center on the big picture and are drawn from various disciplines. The second guideline focuses on embracing asynchronous activities. The concept of affiliation centers on two goals. The first goal is to show genuine concern for others by engaging in various forms of social interaction (Aguilar,

2020). The second goal is treating others as a dignified being whose worth is equal to that of others. The play concept focuses on fostering opportunities for students to play in a manner that encourages them to engage with ideas, and foster a sense of agency or give them opportunities to be connected to others (Aguilar, 2020).

Willems, Farley, & Campbell (2019) noted five dimensions that can hinder digital equity. The dimensions encompass the following: access to hardware, software, and connectivity to the internet; meaningful, high-quality, and culturally relevant content in local languages; creating, sharing, and exchanging digital content; educators who know how to use digital tools and resources; and high-quality research on the application of digital technologies to enhance learning. A lack of access to hardware, software, and connectivity to the internet may be due to a range of complex factors which may include the lack of technical infrastructure, lack of affordability of technologies, gender bias or lack of digital literacies (Willems et al., 2019). Meaningful, high-quality, and culturally relevant content in local languages is essential because open education resources are one means of being able to create, share, and exchange digital content with disadvantaged learners. Creating, sharing, and exchanging digital content in order for appropriate education considers all facets, including the abilities of those who teach. This is not simply how to access right resources for learners but also how to teach in a digital age. Educators who know how to use digital tools and resources means increasing the use of technology that helps address the emerging demand for flexibility in learning, it also excludes significant portions of the student population (Willems et al., 2019). Finally, high-quality research on the application of digital technologies to enhance learning in

which everyone is concerned about the digital divide for four key reasons: educational advantages, future employment and earnings, opportunities for social and civic involvement, and equity and civil rights issues (Willems et al., 2019).

Summary

The COVID-19 pandemic exposed how digitally divided the world is from each other. Millions of people globally were instructed to stay at home as a public health measure in order to mitigate the deadly virus. However, millions were left without means of information communication and technology. When individuals do not have access to technology in order to become informed citizens the problem of digital equity exists. Many factors affect a person's access to technology. Income status, education level, and demographic characteristic into a person's ability to access technology. Many school districts have implemented one-to-one computing to help curve the digital equity issue among school-aged students. Making sure every student and educator has access to information communication and technology is the goal of one-to-one computing. However, there is a consensus among school districts about the challenge of implementing one-to-one computing in rural areas. Many experts have made recommendations and yet the problems persist. Some of the difficulties stem from the ability to offer high quality internet services in rural areas.

Implementing a one-to-one initiative is challenging in a rural area which is vital for the success of the program. Proper implementation of a one-to-one computing initiative program can have a tremendous impact on the academic success within a school district. However, other factors can impact the sustainability of a program. A successful one-to-one computing initiative program varies in looks within a high-performance

school district and low performance school district. As outlined in ITSE essential conditions and National Center for Education Statistics, the adoption of the one-to-one computing initiative program depends on factors such as the teacher's willingness to incorporate the technology into the educational setting. Therefore, initial professional development or continuous professional development will encourage teachers to adopt the one-to-one computing program as an instructional tool.

CHAPTER III – METHODOLOGY

Chapter III explains the research methods for answering the research questions proposed in Chapter I. The research design of this study was a mixed-method approach that consists of both qualitative and quantitative methods. This chapter begins with an explanation of the reasons for choosing mixed-methods, specifically the use of a Triangulation Design. This chapter explains the design and methodology for this study. Included in this chapter are (a) research setting, (b) participants, (c) instrumentation (d) data collection, (f) data analysis.

Research Design

The purpose of this study is to look at digital equity issues through the lens of the difficulties Mississippi school districts have in implementing the one-to-one computing initiative in low-income areas. To accomplish this goal, the researcher explored teachers, technology directors, curriculum directors, and administrators' perceptions of the implementation process of the one-to-one computing initiative. The researchers also gathered insight into the digital learning readiness of families in Mississippi. Mixed methods were used to explore the research problems of this study because the results of the data allowed for the generalization of the parent's survey. Also, the mixed-method strengthened the reliability of the study because the design included two forms of data collected explicitly. Qualitative data provided a detailed explanation of school officials' perceptions of the challenges of the one-to-one computing initiatives. Quantitative data collected from the parent survey provided a detailed explanation of the availability of mobile devices to students in the home setting and the challenges of the one-to-one initiatives in Mississippi.

Leedy & Ormrod (2016) noted that many research problems have quantitative and qualitative dimensions. The researcher must employ both quantitative and qualitative techniques to address the dimensions of the research. Quantitative and qualitative methodologies are not a case of either-or but rather a matter of more or less. A study that includes quantitative and qualitative methods explicitly mixing that data derived from each is simply a collection of multiple methods (Creswell, 2006).

How a researcher might combine qualitative and quantitative methods is limitless. Mixed-methods consists of several designs, including convergent designs, embedded designs, experimental designs, explanatory designs, and multi-phases iterative designs (Leedy & Ormrod, 2016). According to researchers, four significant mixed-methods designs are triangulation design, embedded design, explanatory design, and experimental design (Creswell, 2006). Multiphase Iterative designs include three or more phases. The earlier phases provide foundation data on which later phases can build. This design is called iterative because the researcher moves back and forth between quantitative and qualitative methods. Each new body of data informs the conceptualization and implementation of subsequent phases (Leedy & Ormrod, 2016). Exploratory Designs typically encompass two phases. Phase I and Phase II require the researcher to use the qualitative method followed by a quantitative method to get the general sense of characteristics, phenomena, and issues related to the topic of study. Explanatory Design is aligned with experimental designs. The explanatory design is usually in a two-phase process. In this design, the quantitative phase comes first. Phase 1 involves collecting considerable quantitative data, perhaps in an experiment, ex post facto study, or survey. Convergent Designs or triangulation occurs when the researcher collects both quantitative

and qualitative data in parallel. The data collection is usually done simultaneously and with respect to the general research problem. The researcher gives similar or equal weight to the two types of data and strives for triangulation, hoping that analyses of both data sets lead to similar conclusions about the phenomenon under investigation. Embedded Design is like convergent design. Both quantitative and qualitative data are collected within the same general time frame. However, one known approach dominates in most cases the qualitative approach. More often, a quantitative approach with the other approach serves a secondary, supplementary role (Leedy & Ormrod, 2016).

Triangulation Design will be implemented to answer the research questions. According to Creswell (2006), the most common and well-known approach to mixing methods is Triangulation Design. The overall purpose of Triangulation Design is to obtain different but complementary data on the same topic and to understand the research problem best. The intent in using this design is to bring together the differing strengths and non-overlapping weaknesses of quantitative methods such as large sample size, trends, and generalization with those of qualitative methods such as small N, details, and in-depth. This design and its purpose of converging different techniques used when a researcher wants to compare and contrast quantitative statistical results with qualitative findings directly or to validate or expand quantitative results with qualitative data. Based on Creswell's (2009) *Steps*, the researcher collected and analyzed qualitative and quantitative concurrently to explore how school officials and parents perceived the one-to-one computing initiative's challenges. Afterward, the research coded the qualitative data, and the quantitative data were analyzed. The process and relationship of each stage are shown in Figure 1.

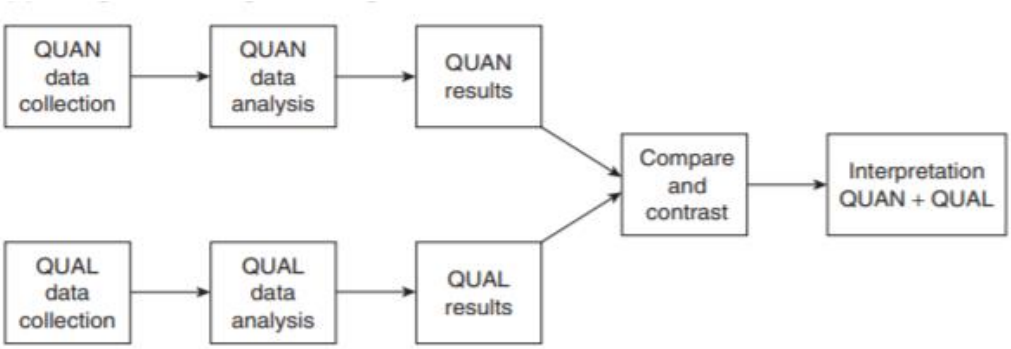

Figure 1. Research Timeline of Study.

Note: (Triangulation Design, Convergence Model, adapted by Creswell, 2009).

Qualitative Stage

The qualitative stage of the study utilized a case study approach as the research method because of the unique context. The study was conducted in K-12 schools implementing the one-to-one computing program. A case study was well-suited for this qualitative stage because a particular individual, program, or event is studied in-depth for a defined period of time. A case study is especially suitable for learning more about a little-known or poorly understood situation. A case study is appropriate for investigating how an individual or program changes overtime, perhaps due to certain conditions or interventions (Leedy & Ormrod, 2016). This study focused on understanding and exploring how school officials integrate the one-to-one computing program into the instructional setting during the qualitative stage. This study explores participants' real-life experiences in regards to one-to-one computing. The qualitative data for this study was collected using an interview protocol designed to analyze teachers, administrators, technology directors, curriculum directors, and instructional technology directors' perceptions of the 1:1 computing program in their school districts. Those factors were categorized into three constructs. The responses were quantified by transcribing the

result of the interview protocol. The following research questions were proposed for the qualitative stage:

- Research Question 1: What is the extent of educators' use of technology in the classroom?
- Research Question 2: How does the teacher's implementation of technology-enriched lessons impact the performance of one-to-one?

Quantitative Stage

The goal of quantitative researchers is to examine basic, applied, or translational research questions. Research involves generating knowledge to understand fundamental processes and mechanisms that do not necessarily apply to real-world problems. Applied research addresses a specific, real-world problem, such as identifying factors related to increases in the availability and use of a particular drug in certain areas. Translational research tries to bridge the gap between basic and applied research. The researcher may use basic research knowledge to develop and test real-world problems. No matter the type of research, all questions are grounded in theory and are answered through quantitative analysis (Fallon, 2016).

Fallon (2016) noted quantitative researchers employ several methodologies to obtain data. The three quantitative research forms are Content Analysis, Primary Data Collection, and Secondary or Archival Data Analysis. Content analysis involves carefully examining artifacts that function as a medium for communication, including songs, sculptures, graphic designs, comic strips, newspaper articles, magazine advertisements, books, films, television shows, tweets, Instagram pictures, letters, etc. Quantitative content analysis requires counting the occurrence or rating the strength of

particular social or behavioral phenomena within the media. Primary data collection occurs in vivo (i.e., happening within a living organism). Collecting primary data involves directly obtaining responses from people, and emerging researchers collect such data using a combination of survey, experimental, and observational methods. A survey approach involves participants completing questionnaires in person or online. An experimental approach attempts to establish a cause-and-effect relationship between phenomena. Researchers systematically manipulate participants' experiences, control extraneous variables, and measure the outcome. Although experiments are usually conducted in the laboratory, researchers also perform them in natural environments using observational methods. Secondary or Archival Data Analysis allows quantitative researchers who do not collect their data to use other researchers' large-scale data databases (Fallon, 2016).

The quantitative data for this study used secondary data collected by the Mississippi Department of Education. This study focused on understanding and exploring parent access to mobile technology within the home setting. The following research questions were proposed for the quantitative stage:

- Research Question 3: Do students have access to the internet and emerging technologies to utilize digital learning resources at home?
- Research Question 4: Do students have access to effective internet connectivity at home?
- Research Question 5: What is the digital equity difference in devices, internet connectivity, and quality among students in four school districts?
- Research Question 6: What proportion of devices, internet connection, and quality

of internet access is available to elementary, middle, and high school students?

Research Setting

Qualitative Stage Setting

The qualitative phase was conducted at three public school districts in the northern, central, and southern Mississippi areas. The northern district is considered an urban community. The school districts had 1,017 employees, which include 593 certified teachers (Tupelo Public School District, 2021). Fifty-two percent of the teachers hold advanced degrees, and there is a Teacher Leadership Academy within the district. The northern school district also served over 7000 students who speak approximately 11 languages. Fourteen schools and students in the 2^{nd} – 12^{th} grades participated in the district one-to-one computing program (Tupelo Public School District, 2021). The central school district is considered a rural community. The school districts had approximately 525 employees, including 300 certified personnel and 225 support service personnel (Petal School District, 2021). The central school district also served over 4000 students. The district had five schools, and students in 7^{th} – 12^{th} grades participated in the district one-to-one computing program (Petal School District, 2021). The southern school district is considered urban. The school districts had 1100 employees, including certified teachers, administrators, instructional, and other support personnel (Pascagoula-Gautier School District, 2021). The southern school district also served over 7000 students. The district had 19 schools and students in 7^{th} – 12^{th} grades participate in the district one-to-one computing program (Pascagoula-Gautier School District, 2021). Each school district varied in its integration and implementation of the one-to-one initiative.

The classroom instructional educators included seven teachers. The district instructional technology department had two technology directors. The district curriculum department had one curriculum director. The building level administrator had six principals. Secondary schools shared the curriculum director. The curriculum director oversees teacher's training. The technology director oversees technology integration support and other technical issues.

Although instructional technology resources varied in all districts, all schools had an interactive board, computer station with Chromebook, and printer. All teachers had access to at least one computer. All schools did not have a separate fee for students who participated in the one-to-one program. However, parents had the option of allowing their child or children to participate in the one-to-one program. Students who did not participate in the one-to-one program had a Chromebook computer cart available for teachers to use throughout the school day. Ninety-five percent of the classroom were equipped with interactive boards.

Quantitative Stage Setting

This study's quantitative data used secondary data collected via the Mississippi Department of Education's Digital Learning – Family Readiness Survey. The survey was designed to analyze mobile devices' availability within the home setting. The research settings for the quantitative stage were 113 public and charter schools in Mississippi. Using the One the World Map (2021), the researcher divided the state of Mississippi into four districts. The four districts are a modified version of the Mississippi congressional districts (Appendix J). The Mississippi Department of Education allowed each school district to distribute the questionnaire to the parents.

There were representatives of three school districts who participated in the interview process and participated in the Mississippi Department of Education's technology questionnaire. One in north Mississippi, one in central Mississippi, and one in south Mississippi. All school districts' technology directors had the sole responsibility of providing technical support for teachers, staff, parents, and students. The school districts provided internet connections for students, teachers, and staff during the instructional day. Also, they provided hotspots throughout the community for students to use after school hours and weekends. Parents were encouraged to contact the school if they need technical assistance with their child's or children's devices. Parents and students received communications, such as homework assignments and school announcements, email, learning management system, and apps. The responses were analyzed using SPSS software.

Participants

According to Creswell & Creswell (2018) the number of participants can be between three to fifteen depending on the qualitative research approach. Qualitative interviews generally include 10 to 15 people in the interview process. The qualitative research stage included 16 participants from across Mississippi. Convenience sampling was the method used to sample participants from the population. The total participants were seven teachers, two district instructional technology administrators, one curriculum director, and six administrators. The participants for the quantitative research stage include 17,064 parents from 113 public school districts and public charter schools. The demographic characteristics such as age, race, gender, school location, and grade level of the children were diversified. Research participation was voluntary and anonymous.

Instrumentation

The instruments in this study include an interview protocol and a parent survey. Researchers use this mixed method design when they want to directly compare and contrast quantitative statistical results with qualitative findings to validate or expand quantitative results with qualitative data. Using quantitative and qualitative procedures usually involves the concurrent but separate collection and analysis of quantitative and qualitative data. To best understand the research problem, the research may utilize the process. The researcher may attempt to merge the two data sets. The merging typically happens by bringing the separate results together in the interpretation. Another way the merging can happen is by transforming data to facilitate integrating the two data types during the analysis (Creswell, 2006).

A researcher conducting a study may use a variety of data collection procedures. The procedures for conducting research involve the researcher considering multiple information sources. The information is then used for reconstructing and analyzing the case that is being researched. The researchers must investigate the perceptions of a diverse group of participants. There must be a collection of multiple types of evidence. The attention must be placed on the context in which all study aspects were embedded. There must be a triangulation of the data (Tomaszewski et al, 2020).

According to Tomaszewski et al., the narrative approach focuses on an individual's meaning to an experience through storytelling. The storytelling process exposes a relationship between the words within multiple texts and text and social reality. Therefore, it is essential to consider that the story has an event or an experience that has caused a change within the person or a specific situation in a narrative study. The

research topics and questions indicate when using a narrative approach are appropriate. However, the key criterion of narrative research is storytelling. Narrative research can be conducted with a single participant, such as a biographical study or an autoethnography, or with several people who share everyday experiences using oral history. Most often, the narrative approach is used in the process of identity.

Different typologies exist to characterize the emphasis of narrative study. One researcher outlined three possible foci. The three possible foci are: (a) the correspondence between the temporal order of sequences and when they are presented in the text, (b) the linguistic and narrative strategies used to organize different story types, and (c) the social, cultural function of the story and its purpose for the storyteller. Other researchers outlined three concentrations. The three concentrations are text as linguistic structures (word sentences and topical cohesion), texts as cognitive structures (plot themes and coherence), and beyond the text (why the story here and now). All researchers agreed that regardless of how researchers frame their narrative study, the essence is the same; the focus is on how people tell their personal stories and the relationship that those stories have with people's lived histories (Tomaszewski et al.).

Interview Protocols for Educators

This research's qualitative data collection is based on the narrative study approach due to the COVID-19 pandemic. The interview protocol was developed based on the needs assessment of school districts across Mississippi. School officials' interview protocol (Appendix G) is divided into four individual interview protocols. The beginning of the interview protocols has a topic, introduction, and research questions sections that cover the overall instrument.

Interview Protocol One: Teachers

The interview protocol one consisted of 24 questions for teachers. Four subheadings were designed to measure school officials' perceptions of difficulties in implementing 1:1 computing initiatives in low-income areas to gather data from teachers. The first subheading, titled "Background Information," consisted of question 1, which centered on collecting information about teacher preparation. Subheading two, titled "Teaching Experience," which included items 2 through 5, focused on teaching experience and how teacher experiences play a role in adopting one-to-one within the classroom setting. The third subheading was titled "Teacher Philosophy," which covered questions 6 through 8. The subheading was designed to understand how teachers feel about teaching in general and how it impacts technology implementation in the classroom. Finally, the last subheading was titled "Technology in the Classroom," and it covered questions 9 through 24. The subheading was designed to measure the availability of one-to-one within the classroom setting. Also, the subheading addressed the aspect of professional development.

Interview Protocol Two: Technology Directors

The interview protocol two consisted of 10 questions for technology directors. The subheading was used to measure the technology directors' perception of the one-to-one program. The subheading was divided into four subheadings. The first subheading was titled, "Perspective of One-to-One Programs." The subheading had 1 through 2 questions that measured the technology director's perception of the one-to-one programs and their perceptions on whether they felt the program was effective. Diffusion of the One-to-One Computing was the following subheading. The subheading consisted of

questions 3 through 4 and measured the technology directors' first awareness of the program and who communicated its potential in their school district. The third subheading addressed Adopting One-to-One Computing. The subheading addressed questions 5 through 8 and was designed to gain insight into how the technology directors favorable or unfavorable view of the one-to-one program developed. The final subheading was titled, "Benefits or Challenges Associated with One-to-One Adoptions," and questions 9 through 10 addressed the benefits and obstacles of the one-to-one program implementation.

Interview Protocol Three: Curriculum and Instructional Technology Directors

The interview protocol three consisted of 12 questions for curriculum directors and instructional technology directors. The subheading was designed to gain insight into the development of curriculum standards and the type of ongoing professional development provided to teachers within the school setting. The overall subheading had three subheadings. District Curriculum Implementation was the first subheading. The subheadings covered questions 1 through 4, which addressed the development of curriculum standards and what type of professional development was available to teachers. The following subheading was titled, "Adoption of One-to-One Program." Questions 5 through 11 addressed the implementation process of the one-to-one program in the school district. The subheading considered the diffusion network and the process in which information was gained to develop technology-based instruction. Finally, the last subheading was designed to measure any additional information or comments about teachers' preparation the curriculum director and instructional technology directors would like to share.

Interview Protocol Four: Administrators

The interview protocol four consisted of 9 questions for administrators. There were four subheadings. The Implementation of One-to-One Computing was the first subheading. The subheadings addressed questions 1 through 2 and were designed to gain insight into the administration of the implementation process at the district and school levels. The following subheading was titled, "The Usage of One-to-One Devices." The subheading addressed questions 3 through 4 to gain insight into how students use one-to-one computing devices. Also, how teachers use technology devices to engage students in the instructional process was addressed within the subheading. The third subheading was titled "Participation in One-to-One Computing," which consisted of questions 5 through 8. The questions addressed students' participation in the program. Also, the subheading examined the cost of participation in the program and responsibility for equipment maintenance. Finally, the last subheading addressed the administrator's insight into the teacher's preparation and the one-to-one program. The qualitative data will be analyzed to conclude the one-to-one program.

Digital Learning – Family Readiness Survey

A good practice for coaching is to make sure it is supported by empirical research. Researchers have not only argued for but stressed the importance of coaching using an evidence-based approach to practice. There are three features of the evidence-based practice. The first feature is evidence-based practice explicitly combines practitioner expertise and external research evidence. The practice uses the best available evidence to answer a particular question of interest. Finally, evidence-based uses systematic reviews

to access all the available evidence relevant to the question of interest, rather than relying on single studies. The contribution of quantitative studies is essential as the evidence base for coaching continues to develop and evolve (Skews, 2020).

The researcher at the Mississippi Department of Education designed the quantitative survey used in this study. The parents' survey (Appendix H) contained seven questions. The survey instrument is composed of six scales: (1) Demographic Information, (2) Families and Students, (3) Desktops/Laptops/Tablets at Home for Students Use, (4) Quality of Internet Access, (5) Home Internet Uses, and (6) Special Needs. Each scale of the survey contained one question and described the family activity when it came to the implementation of technology in the home setting. The Mississippi Department of Education developed the instrument using Survey Monkey. The data were analyzed to conclude devices and internet access is not available equally to all students in Mississippi in Mississippi households.

Data Collection

Qualitative Data Collection

The following were steps for collecting qualitative data: (1) an email was sent to ten superintendents of education (Appendix A) requesting permission to conduct the study, (2) once permission was granted (Appendix F), the researchers were approved by IRB (Appendix B) to conduct the study, and (3) an email was sent out to teachers, technology directors, curriculum directors, and administrators (Appendix D) that explained the purpose of the research and that the interview would be conducted via Zoom to limit human contact due to the COVID-19 pandemic. Also included in the email was a consent letter (Appendix E) that explained the purpose of the study, risks,

and benefits. Participation was voluntary, and anonymity and confidentiality would be preserved. The email asked participants if they would like to schedule a one-on-one interview and that scheduling and accepting a one-on-one interview would serve as consent to participate in the study. Participants would communicate acceptance by replying to the email and the researcher would follow up to schedule an interview time that fits their schedule. The interview was conducted using video conferencing software such as Zoom and would last up to 30 minutes. (4) Once the one-on-one interview was scheduled, the researcher sent a confirmation email to the participant that included the scheduled interview details. (5) The one-on-one interview Zoom link sent to the participant was password-protected to ensure the participant's privacy. (6) During the interview, the researchers asked the participant permission to audio record and took notes about the participant's responses for transcription accuracy. (7) Once the interview was conducted, the data collected was transcribed using Microsoft Transcription. (8) The data was converted into a Word text document and then analyzed using a content analysis approach. (9) Data was stored on a password-protected computer and stored for up to three years.

Quantitative Data Collection

The following are steps for collecting quantitative data: (1) The researcher emailed the Mississippi Department of Education to request the Digital Learning – Family Readiness Survey (Appendix C). (2) Once the data was collected, the data was sorted from the Excel spreadsheets. (3) The information was entered into SPSS and analyzed. (4) Data will be stored in a password-protected computer and stored for up to three years.

Data Analysis

Qualitative Data Analysis

The first cycle in qualitative data analysis was preparing the data from the interviews. A case study database was created to organize the collected data. The recorded interviews were transcribed into a Word file by the researcher. The researcher first read the transcript to develop a general understanding of the data. This process included writing memos in the margins of the transcript (Blair, 2015). Then the researcher developed a qualitative code guideline to maintain the coding process's consistency. For privacy, pseudonyms were used throughout the data collection process. All participants' names used in this study were replaced with letters from the Greek alphabet. The name of the school districts was replaced with district 1, district 2, and district 3. The codes for the school districts are listed in Table 1.

Table 1

Codebook of School Districts

School District Code	Classifications
District 1	Urban
District 2	Rural
District 3	Urban

Microsoft Word Transcription was the qualitative transcription software that helped the researcher transcribe the original audio into a text format that was easier to code and analyzes. Microsoft Word Transcription allowed the researcher to be consistent

in the coding process by generating codebooks. According to Kanygin & Koretckaia (2021), a researcher who wants to coordinate reasoning and data practically (i.e., under a working technology) should propose instrumental means to allow any community of informants to gather in a team working together. Not “literary theory” such as codebooks or hyperlinks known in qualitative data analysis, but ontology-like methods aimed to describe any subjects or objects through explicit relationships among them. The way to connect theoretical ideas with data based on them as a whole conceptual framework is under permanent development by ordinary people (i.e., subjects of any social theory). Blair (2015) refers to such internal scrutiny as performing a reflective “audit” that allows researchers to explore and acknowledge their particular form of subjectivity. The research study was a mixed-method design, and the researcher conducted the qualitative stage first before working on the quantitative phase. Therefore, coding was especially appropriate for a qualitative beginner because it helped the researcher quickly grasp the basic themes from the data.

Quantitative Data Analysis

The data were analyzed using SPSS for Windows. The independent variables were school districts and grade levels. The dependent variables were devices at home for students' use, quality of internet access, and home internet uses. The sample included 17, 064 parents from 113 public school districts and public charter schools. The school districts were divided into four groups (Appendix I). The responses collected from the survey were entered in SPSS. In the quantitative stage, Microsoft Excel was used to calculate the sum of frequencies for all schools for the type of internet connection and home internet uses. One-way ANOVA and post-hoc Tukey's HSD were conducted to

identify the significantly different scale of school districts and grade levels. Chi-Square was conducted to compare the proportions of the type of internet. The level of significance used in this study is .05, and the responses collected from the interview were transcribed and analyzed by the researcher.

Summary

This chapter included an overview, research design, participants, instrumentation, procedures, limitations, and data analysis. The research design of this study is a mixed-methods approach that consists of both qualitative and quantitative methods. The mixed-method is based on the triangulation design. The qualitative method consists of an interview protocol for educators designed by the researcher. The researcher utilized the standards from the International Society for Technology in Education. The interview protocol had four subheadings. The purpose of the interview protocol is to allow educators on different levels to give their perspectives on the one-to-one computing program's effectiveness. Three school districts in Mississippi took part in the research study. School officials from the various school districts across Mississippi participated in the process. The interview participants are coded according to the Greek alphabet. The school districts are from rural, urban, and suburban communities and were coded as District 1, District 2, and District 3.

The quantitative methods consist of a questionnaire for parents. The parents are from across Mississippi. The parents are from rural, urban, and suburban communities, as with the educators. Parents were asked to complete a seven questions questionnaire. The questionnaire has six main subheadings. Data was collected using a link generated by the survey software Survey Monkey. One of the primary forms of limitation was the

COVID-19 pandemic. The researcher had a tough time collecting data from parents. Parents decided not to respond to the survey. Therefore, the researcher had to expand the network of data collection. The researcher reached out to the Mississippi Department of Education to request Digital Learning-Family Readiness Survey data.

CHAPTER IV – ANALYSIS DATA

In this study, a triangulation mixed-methods design was used to investigate the effectiveness of the implementation process of the one-to-one program in Mississippi. Two data collection methods were implored to address the research questions: qualitative and quantitative stages. The qualitative stage interviewed 7 teachers, 2 technology directors, 1 curriculum directors, 0 instructional technology directors, and 6 administrators in Mississippi.

The quantitative stage delivered a survey based on the Mississippi Department of Education results to K-12 parents enrolled in public and charter schools. The chapter first presents the data collection result from the qualitative stage, including the process of evaluating interviews. After the qualitative results section, results from the quantitative stage are presented and explained.

Qualitative Stage Findings

The purpose of the qualitative stage was to investigate how educators support and promote the one-to-one computing initiative in Mississippi. International Society for Technology in Education standards were used to evaluate the data. Based on the research statement and research question in Chapter I, the result was organized in five sections: an overview of the participant (section one), teachers (section two), district instructional technology administrators (section three), curriculum and instructional technology directors (section four), and administrators (section five). The first section reviewed the demographic information of the teachers. The report includes background information and teaching experience. The participants were coded according using Greek letters to ensure confidentiality. Participants' codes are shown in Table 2.

Table 2

Codebook of Interview Participants

Teachers	Code
Iota	3
Kappa	3
Lambda	2
Mu	2
Nu	2
Xi	2
Omicron	2
District Technology Directors	**Code**
Delta	2
Sigma	3
Instructional Technology and Curriculum Director	**Code**
Theta	1
Principals	**Code**
Alpha	3
Beta	1
Gamma	3
Epsilon	2
Zeta	2
Eta	1

Overview of Teacher Participants

After receiving research approval from the university (Appendix B), seven K-12 teachers (coded as teachers Iota, Kappa, Lambda, Mu, Nu, Xi, and Omicron) from three school districts (coded as school district 2 (5) and school district 3 (2) were interviewed with in-depth questions as shown in Appendix G. Codes of the participants were shown

in Table 2. Observation notes were taken, and the interviews were audio-recorded. Of all the teacher participants, all were female. Five worked in the middle school setting, and two worked in the high school.

Overview of District Technology Director Participants

After receiving research approval from the university (Appendix B), district technology directors (coded as technology director Delta and Sigma) from two school districts (coded as school district 2 and district 3) were interviewed with in-depth questions as shown in Appendix G. Codes of the participants were shown in Table 2. Observation notes were taken, and the interviews were audio-recorded. One of the directors was female, and one was male. Both directors worked at the district office.

Overview of Curriculum and Instructional Technology Director Participants

After receiving research approval from the university (Appendix B), one K-12 curriculum director (coded as curriculum director and instructional technology director (Theta) from one school district (coded as school district 1were interviewed with in-depth questions as shown in Appendix G. Codes of the participants were shown in Table 2. Observation notes were taken, and the interviews were audio-recorded. The curriculum director participants were female. The director worked at the district office as the secondary curriculum director.

Overview of Principal Participants

After receiving research approval from the university (Appendix B), six K-12 principals (coded as principals Alpha, Beta, Gamma, Epsilon, Zeta, and Eta) from two school districts (coded as school district 1 (2), school district 2 (2), and school district 3 (2) were interviewed with in-depth questions as shown in Appendix G. Codes of the

participants were shown in Table 2. Observation notes were taken, and the interviews were audio-recorded. Of all the principal participants, two were female, and four were male. Three worked in the middle school setting, two worked in the high school setting, and one worked in the Career and Technical Education setting. Demographic information of the participants is shown in Table 3.

Table 3

Demographic Data of Participants

Teacher	Gender	Subject	Grade Level
Iota	F	Language Arts	7
Kappa	F	Language Arts	7
Lambda	F	Language Arts	7
Mu	F	Science	9-12
Nu	F	Language Arts	10-12
Xi	F	Language Arts/PLC Leader	8
Omicron	F	Language Arts	7

District Technology Director	Gender	Grade Level
Delta	M	District K-12
Sigma	F	District K-12
Instruction Technology/Curriculum Director	Gender	Grade Level
Theta	F	District 9-12
Principal	Gender	Grade Level
Gamma	M	6-8
Epsilon	M	9-12
Zeta	M	7-8
Eta	F	Career Technical Education

All the qualitative data were coded and summarized for classroom educators are coded according to four themes. The themes of each research question are displayed in Table 4. As shown in Table 4, the main focus of the qualitative data for teachers centers on background, teaching experience, teaching philosophy, and technology use in the classroom. The main focus for district technology directors centered on the perspective of the one-to-one program, diffusion of one-to-one computing, adopting one-to-one computing, and benefits or challenges associated with one-to-one adoptions. The main focus for district curriculum directors and instructional technology directors centered on district curriculum implementation, adoption of one-to-one programs, and additional information. The main focus for principals centered on the implementation of one-to-one computing, the usage of one-to-one devices, participation in one-to-one computing, and additional information.

Table 4

Qualitative Research Questions and Over-Arching Themes

Qualitative Research Questions	Themes	Participant
Research Question 1: What is the extent of educators' use of technology in the classroom?	• Background Information • Teaching Philosophy • Technology in the Classroom	Teachers
Research Question 2: How does the teacher's implementation of technology-enriched lessons impact the performance of one-to-one?	• District Level Implementation of One-to-One Computing Initiative • Blueprint For a Successful One-to-One Computing Program	District Technology Director

Table 4 (Continued)

Qualitative Research Questions and Over-Arching Themes

Research Question 2: How does the teacher's implementation of technology-enriched lessons impact the performance of one-to-one?	• District Curriculum Implementation • Adoption of One-to-One Program	District Curriculum and Instructional Technology Directors
Research Question 2: How does the teacher's implementation of technology-enriched lessons impact the performance of one-to-one?	• The Usage of One-to-One Computing Devices • Participation in the One-to-One Program	Administrators

The qualitative Research Question 1 centered on the extent of educators' use of technology in the classroom? The following are the finding of the qualitative research question 1 based on the teachers' responses:

Background Information

The teachers in this study come from a variety of backgrounds. For example, Iota originally pursued a career in speech pathology during her undergraduate program. However, after her undergraduate program, she switched over to education because she found it more engaging to use language in education. She earned a master's degree through the alternate master's program outlined by the Mississippi Department of Education.

Kappa never thought that she would be a teacher, even though in high school and college, she always had jobs such as after-school daycare or tutoring in which she interacted with children. Later in college, she started to give some consideration to becoming a teacher. However, when she graduated from college, Kappa became a waitress. After a couple of years, she decided to go back to school for her master's degree in the alternate route program.

Lambda has a master's degree in gifted education and a master's degree in English. Her specialist degree is in emotional and behavioral disorders, and currently she is working on her doctorate in educational leadership. However, Lambda never imagined that her career path would take her down the road of education because she never wanted to be a teacher. She received her undergraduate degree in English, which required her to take a class that she stated would change her life. According to Lambda, the course showed her that kids do not care about English because nobody makes it attractive. So, because she loves reading and writing, she ended up actually going into teaching. Now she cannot imagine doing anything else.

Her passion for teaching lies in the fact that her career path to education was not easy. She dropped out of college three times which she said was very stupid cause she did not have a scholarship because of her ACT score. She noted that she managed a Pizza Hut and delivered radiation. Also, she guarded federal penitentiary inmates. She realized that she had a lot of careers before she finally ended up being a teacher. She goes all out for her students because she grew up dirt poor, and her grandparents adopted her and her brother. She finally realized that she wanted to teach. She saw a need for someone who was not just your typical child who grew up wealthy and did not have

anything else to do with their life. She is not the typical teacher whose husband makes enough money to teach for fun. She saw a real need for kids with that background, and they need to know that they can do whatever they want to do in life. All students must do is work for it no matter their background. She went to college and participated in a four-year program for teacher education. Once she graduated with her cohort of nine and she heard the number of students participating in the teacher cohort program today is just declining. Now, the teacher education program is just like going through a typical four-year program.

Mu started college, majoring in education. However, she transferred from the education department to the nursing department. During her nursing program, she gained custody of her five nieces and nephews. During that time, she had three children of her own. Due to her family arrangement, completing the two classes required for her nursing program was difficult. It was hard to schedule a time to meet the educational curriculum, clinicals, and working in a hospital while taking care of her children and her newly adopted nieces and nephews. She switched back to education and obtained a degree in Biological Sciences and Psychology. She later obtained a master's degree in Education through the alternate route program. It was her family who pushed her back into the education field, knowing that she would have to help educate her nieces and nephews because they were behind in school.

Nu has been teaching for about 12 years, majoring in speech pathology. That was her original major, and about a semester into those classes, she decided she was very bored was not for her. So, she did not know what she wanted to pursue. She has always been pretty good at English, and so she spent three summers as a camp counselor

working with teenagers, and that was where she found her niche with teenagers. She thinks she wanted to teach, and then she narrowed it down to teaching English. Nu said she earned her degree "sort of by the grace of God."

Nu thought about being a speech-language pathologist. That was her focus in her first couple of years of college. That was her major, then when she changed majors, she lost a semester or two of classes. She graduated from the education program at the local college for English licensure, and it took her about two years. Afterward, she got her essential first couple of years, and then she did student teaching at the district where she currently works. Also, Nu is a National Board-Certified Teacher.

Xi originally wanted to be an attorney. However, back in 1987, when she graduated from high school, her aspiration was not something her family could financially afford. So, she just went ahead and started college, and there she began to realize that she loved working with kids. She stated that she always had excellent teachers, and she always admired certain teachers. She thought that would be a career that she would probably step into, and then if she decided later, she wanted to go to law school.

Xi began secondary education because she wanted to teach history. She started college as a non-traditional student who loved Anthropology. However, the more she got into her studies, she realized that she wanted to focus on education. She had a child in the middle of college, and she tried to juggle being a mother with her studies. She decided that teaching elementary would be excellent and she could work with the lower grade kids because she was still young. She has always been passionate about education, and she stated that anything she does like, she goes 100%. So, at around the age of 30,

she stated that she decided if she was going to do law school. She needed to be doing it at that point. She needed to be thinking about it, and she just never did apply for the program. It was not anything that really came about her desire to become a lawyer.

Xi stated that she did not work in any profession other than education. She mentioned that she laughed when she tells people she knows how to do absolutely nothing but to be a teacher. She never did anything but teach. As she reflects on her career, she stated that she went from working in high school at a daycare and going into college. She states that she literally never left school one year since she was six years old. She has either been in school or been teaching school and that is all she has ever done. She jokingly says that she does not even know how to run a cash register. She says she knows nothing about anything but being a teacher.

Omicron is 41 years of age and she has been teaching for 20 years. She spent all those years teaching middle school except for three years. She always wanted to be a teacher, and there was never an option to do anything else as a career. She has a bachelor's and a master's degree from the local colleges. She has an after-school job where she goes in with the cleaning company and she cleaned two businesses in the area.

Teaching Experience

Iota worked seven years as a middle school English Language Art teacher. Currently, Iota teaches her classes in a traditional classroom setting. There is one class in which Iota facilitates online due to COVID-19. She monitors the student's program status and progress through a web-based program. The web-based class amounts to 10% of her classes. Iota received virtual training in Canvas during the beginning of the school

year professional development. Also, she received a one-day virtual training to be a facilitator for the web-based program.

Kappa is a 3rd year middle school teacher. Currently, she teaches 7th Grade English Languages. All her classes are face-to-face. The middle school has a virtual class for students who must be quarantined due to the COVID-19. Kappa is assigned to monitor the students while they are online at home learning. When the student returns to school they are assigned to her face-to-face class for a certain frame. Therefore 93% of her classes she sees in the classroom setting and 7% of her class load is virtual. Like Mu, Kappa may modify her virtual classes due to the number of students that are required to quarantine. Kappa is a highly qualified teacher in English according to the Mississippi Department of Education. Her undergraduate degree is in English. Also, she has a master's degree in English through the alternate route education program.

Lambda is completing her 12th year of teaching. She has always taught English. She taught six years of high school. She did long-term substitution in a 6th grade class. Currently, she is completing her first year as a 7th grade English teacher. All her classes are traditional in-person learners. She does have a cohort of virtual learners and she has nine of those in her class. She has about 13% of her teaching load that is considered virtual, and she did not receive any specialized training to teach the course.

Mu has been teaching for 13 years and currently she teaches Marine and Aquatic Science. Also, she teaches Zoology. Despite the COVID-19 pandemic, the school district is still operating their traditional face-to-face setting. However, students who are required to quarantine if they are exposed to the virus. Quarantine students are then transferred to the virtual setting for the allotted time. Mu noted teachers are required to

give students access to the curriculum. She videotaped her lessons for those students who are required to quarantine. Quarantine students can access all classroom material on Google Classroom which includes PowerPoints, screencast, videos of all her lessons. She complements those with assignments that can be completed on Google Docs, Google Slides, or Google Forms. Mu mentioned that 100% of her classes are face-to-face. It is hard to determine the percentage of virtual students because she does not know who would have to quarantine throughout the year. She is not required to use technology in the instructional portion of her classes because she does not have a core curriculum class like Biology I. She does have to make sure she follows Individualized Educational Plans (IEP) and English Language Plans (EL). Therefore, she uses technology to make sure that students not only get the information, but also, she wants to make sure that students get to see her and feel as if they are still in the classroom. Mu is considered highly qualified by the Mississippi Department of Education to teach elementary school grades 5-6, and high school grades 7-12. She has college courses in the area of Biological Sciences and history.

As stated, earlier Nu has been teaching for 12 years. She teaches English II and accelerated English II. In the past, Nu taught English I, but all her experience centered on either English I or English II. She never taught above the English II, and she never taught middle school. Her classes are traditional face-to-face. Despite the pandemic her classes are 100% traditional. She had students who could opt out of the tradition to do a program called Edgenuity online. Nu do not have any interactions with those students. The school has two teachers who facilitate that class and work with the students. All the students that she has in her room are traditional students and are at school every day.

About 10% or 12% of the students do the online format through Edgenuity. Students and parents have the option to choose virtual learning if the students have health concerns or their family has health issues. Other than her teaching certification, Nu mentioned that she did not have any certification or any specialized training to teach the course.

Xi noted that she cannot remember if she is completing her 28th or 29th year as a teacher. Half of her teaching career was spent in Kentucky and the other half is in Mississippi. She can retire from teaching because of the number of years in the retirement system. However, she mentioned that she still loves teaching, and she wants to stay in it until she gets to where she wants to do something different. She mentioned that right now teaching is what she wants to do as a career. Currently, she teaches 8th grade English Language Arts. Due to COVID-19, the virtual teachers as well as the traditional teachers are collaborating on all the classes. Xi noted that she is the PLC leader for her department, and the school district trained the teachers on how to use the Swivl™, which is a device that holds the iPad and follows the teacher around the classroom, and then teachers use the Zoom for video conferencing. Every day, her second block class is her regular traditional class, and she has 54 students who log on to Zoom. In her second block class she has about 80 students. Each one of the four teachers has those students on their class roll. She is teaching to all the students at once, but as far as questions that the students have about the specific curriculum, they are watching her teach the lesson. However, after the lesson is over, and if the students have questions about the assignment, about homework, etc., teachers have asked the students to address concerns with their homeroom teacher. Xi noted that no one teacher is being overloaded with multiple emails and messages, and teachers are concerned with just their

students who are on their roll. If the students were at school, they would be in Xi's classroom. Xi noted that she has her students, but she is also teaching the other three teachers' students at the same time. Since implementing this new format, the teachers started something new because she is the PLC leader, and she is overloaded with a lot of responsibility. She along with the other teachers propose the idea that, since there are four weeks in a month, every week a teacher on the team does the virtual. The teachers condense everything into the week by focusing on what they wanted to teach for that week so that there is not a lot of lay over to the next week.

Xi gave an example for her week of virtual learning the teachers made a schedule, and when she is doing virtual her team of teachers are helping her with the attendance and other duties. One teacher is prepping for next week, for whichever teacher is doing virtual the following week. So, the teachers have time to prepare, so the team is reflecting on the new implementation. If they have decided one teacher had to do all of it all of the time, that teacher would not be their best self. However, if a teacher knew that one week a month was their turn, they would make it the most fabulous opportunity for the students to learn because the teacher would have all that time to build up to thinking about every little thing that has to be put in place. She thinks that has made all the difference for the teachers, just knowing they only must do it once a one week a month, and that one week they are highly prepared. Xi thinks things will run much smoother even though the team was at the beginning of the implementation stage. She admits that she usually takes on a lot of responsibility, but she realized that is something that must be shared and cannot be done by just one person.

Xi stated that it was hard to calculate the percentage of virtual students. She noted that 54 students are considered virtual students. She explained that technically the 54 students are not her students. She further explained that she normally has anywhere from 85 to 90 students on her class roll. However, now she has about 130 but that is because some of those students she teaches are not actually on her class roll, but they are just on Zoom. She states that the number of students she teaches have gone up at least 50% in one day. She went from 80 to 130 in one day. Xi noted that she is teaching the virtual students but she does not handle everything about all those students such as attendance and grades. She handles every aspect of teaching for her 15 or so students. The department dynamic is one team of 8th grade teachers, and there are four teachers, and each teacher has approximately 15 students in virtual. Therefore, it is estimated that Xi and the other teachers have approximately 12% of their students who are considered virtual students.

Xi mentioned that she has her teaching certifications, but she also received specialized training from the school district to aid with teaching virtually. She noted that the initial virtual training was basic, in fact she called it a "there you go" type training. Xi noted that teachers were giving their respective boxes with Swivl. They were told to take the Swivl out of the box, screw the Swivl on to the device and push the button. However, school administrators saw the need for additional training. According to Xi, two sisters who are teachers on staff at the school. Xi describes them as fabulous with technology, and one is a science teacher the other is a math teacher. According to Xi the teachers are considered technology savvy.

The two sisters were hired as coordinators of virtual learning. The teachers spent a lot of time in the beginning of the school year trying to get the whole teacher staff to figure out how to Zoom and screen share. Xi noted that she already knew how to do zoom, and how to screen share. However, she did not know how to put it all together to use as an instructional tool. Xi stated that the training was extremely stressful because the staff did not know entirely how to put it all together. She noted that it was an ordeal, and it was the first 2 weeks of school. She thought the teachers were going to lose their minds. She wanted to quit teaching, and she contemplated retirement. She noted as time went on it got easier and easier because the teachers started figuring out shortcuts to save time. The teachers went from 18 steps just to logging on with these kids, and now they have got it down to three.

As mentioned earlier Omicron has been teaching for 20 years and 17 years at the middle school level. Currently she teaches 7th grade Language Arts. Her classes are traditional face-to-face. However, she live streamed with a group of virtual students during her 2nd Block class. Conventional and virtual students are in her class during the same period. Omicron states that 1/3 of her teaching load consists of virtual students. She is considered highly qualified to teach her class according to the Mississippi Department of Education certification process. However, she did not receive any specialized training to teach the virtual aspect of her class.

Teaching Philosophy

Teaching philosophy is the self–reflective statement about the participants' beliefs about teaching and learning. The participant develops ideas about teaching and learning with concrete evidence of how they apply one-to-one initiative technology in the

classroom. In this study, the findings indicated that the participants create core beliefs about how teachers self-reflect about their students, the impact of COVID -19 on teaching and learning, and traditional versus online teaching.

Teacher's Self-Reflection About Students

The findings indicated that the teachers in this study strongly feel that all students have the ability to learn, and education gives students the opportunity to choose a path in life that will inspire the child. As a result of that inspiration comes the ability to be passionate about something in life. The teacher does not believe in throwing the students deep in the learning process and hoping that they will achieve the academic standards. Instead, the findings showed that teachers believe in academically meeting the students at their current learning ability. The belief that all students can learn is an academic construct that is a dominant teaching philosophy among the participants. According to teacher Kappa,

> I encourage my students to come into the classroom with a big heart and a small mind, and together we can get to where the students need to be academically. In academic if the students have the passion for actually taking value in their education, it is okay if one student's mind is not where maybe the student next to them is; I will get a student where they need to be if the students put forth the effort.

The study findings also indicated that teachers saw their students as autonomous learners who were not in school to learn dry facts about a subject. According to the participants, the real goal of education is to help students develop skills that would allow them to have more opportunities to choose a better path. Students are taught that

language is one of the keys that would lead to practical communication skills, and by acquiring these skills, they would be successful in whatever career. Therefore, teachers are not in the classroom to regurgitate a lot of stuff about a subject but to teach critical thinking skills. According to teacher Lambda,

> I can definitely say that education got me out of poverty. It is not that I make much money, but education got me to what I wanted to do in life. I walk into work and love what I do every single day. That is what I hope for my kids; no matter what they do, I want to make sure that I give them the tools to do that.

The findings indicated that teachers have a belief in setting high expectations for their students. The teachers said that they believe that when teachers set high expectations for students, they rise to meet them. Teachers systematically structure and organize their classes in order to promote the learning environment. The key to good classroom management is having protocols for students while having the teaching engagement strategy in place. Like so many participants, laying the foundation, building, and continuing to implement more rigorous curriculum as the teacher builds a solid foundation with students is imperative. Students have to know that teachers care about them and are invested in their future. When that happens, students will perform to their highest ability in the classroom.

The Impact of COVID-19 on Teaching and Learning

The findings from this study indicated that COVID-19 had forced school districts to implement some form of a virtual learning setting. Many school districts implemented some virtual learning methods as a result of COVID-19. Many participants indicated that a web-based educational program is designed to be the platform students' instruction

because of the way the school district implemented the web-based program. The role of the teacher changed for many teachers had to change from teacher-centered to student-centered classrooms. For example, according to Iota,

> I think that my role is more of monitoring the students' progress. I am responsible for ensuring that homebound students due to COVID-19 complete a certain percentage of the lesson. If the students fail to accomplish the required completion percentage, I would then contact parents to encourage student completion. My online class is vastly different from traditional classes because I do not provide direct instruction to the student.

The finding indicated that other teachers embraced their role as online teachers due to previous virtual learning experiences before the pandemic. Kappa stated,

> An online teacher was making sure all kids had access to instructional material other students were doing because Covid did hit abruptly. Now, if I was to make this shift like if we were all going back home as online teacher, I feel like it would be very smooth since we are one-to-one in all my work anyway. Now, the classroom is online like I do not use paper in my class. An online teacher's role is to make sure that every student has access somehow to what teachers are doing, whether that is through the technology or whether that is with an instructional package with the same online content that parents can pick up at the school. I believe in providing a link with a packet that parents can print off. Or the parent may need to come to the school and get a package. I feel like providing instructional content in different formats is the role of an online teacher.

The findings also indicated that other participants' roles also changed during the pandemic. When some districts indicated that the district would switch to either hybrid or fully digital settings, the participants felt they had to support their students and their understanding of subject area content in a hybrid platform. Teachers supported learning by creating video mini-lessons to be utilized throughout the semester. The teachers used their mobile devices to annotate lessons for students who had to sit in other teachers' classes. Overall, the participants feel their role has shifted to learning facilitator who helps students navigate different applications such as graphic software, presentation software, or database software. Due to COVID-19 protocols, teachers have increased learning management systems for in-person and virtual learners. Teachers had to transfer all of their course content to Google Classroom, one of the most popular learning management systems. The findings indicated that teachers created many videos and embedded the videos in the lesson. The students were able to re-watch videos to complete their assignments. Teachers try to provide the same rigor and level of instruction they provide in a traditional setting.

The findings indicated that teachers' roles extend far beyond imparting knowledge. The teachers also provided emotional support to virtual students. Teachers try to keep students abreast of school events and create a classroom environment where students feel like they are just like traditional students. Xi noted,

> I feel empathy for my virtual students when the camera is engaged. Some of them are home because their parents need them to be there. Someone in the household has health issues, and the parents cannot risk the student bringing COVID-19 home. Some of the students feel left out, and I want to make sure that they know

> they are part of my class. I try to engage with the students personally because I want to ensure that the transition will be smooth when the time comes for the students' return to an in-person class. The students virtually know most of the kids in my class. However, they still may feel like they are missing out on everything.

Traditional Teaching Versus Online Teaching

The findings indicated that teachers' view of online learning is vastly different from their perspectives about traditional face-to-face learning. The teacher feels like more of a facilitator in an online setting. According to Nu,

> I feel like my role, especially that of a facilitator than a teacher. I think the teacher's role has evolved a little bit. I think that can be positive because sometimes that is teacher-centered and the students act as recipients of the formation. The way my school has it structured is very much student-centered, and the teacher is there to facilitate and monitor students' learning.

Teachers have converted over to paperless classrooms, and students are adapting to the structure of an online classroom. The findings indicated that there had been a shift in the students' ability to handle new assignments. The participants are having a hard time determining if the students fully understand the instructional content due to the students' ability to access online resources and the teacher's inability to conduct regular assessment in person. The teachers have problem with students accessing many outside sources to complete assignments. For example, teachers found that students are Googling videos in order to better understand the content. Some teachers scheduled Zoom calls with their students to ascertain whether they understood the content. However, the

findings indicated that teachers could not respond immediately to each student's inquiry. The findings indicated that virtual students do not turn in assignments at the same rate as their traditional counterparts. Teachers stated that virtual students do not show up for Zoom class.

The study participants have created virtual groups in order to provide remediation. The teachers noted that it was hard for them to get to know their students. Therefore, applying certain forms of intervention to specific students is more challenging in a virtual setting. According to Lambda,

> Realistically, all I have access to is the students' work on the slide show that I designed. The student's grades are Edulastic, which means I do not know the students. I do not know their strengths, their weaknesses. I do not know the virtual students like I know the face-to-face students. If the virtual students do not complete their work online, I do not know anything about them. When students do not do the work, I have no data at all to help them. Virtual learning often makes me feel helpless in the student education process.

Online teaching requires teachers to provide more explicit instructions. The delivery of information is more methodical in an online setting. For example, the participants noted they had to be selective in choosing the type of device used to communicate with students and making sure students had the connectivity of the internet. The teachers might have to methodically verbally describe and instruct the students on where to find the information, how to turn in the assignment, and how to create folders online.

Technology in the Classroom

Technology in the classroom is used to support teaching and learning. Technology also expands courses, classroom experiences, and learning resources. The digital learning tools allow learning to engage students and provide cost-effective alternatives to traditional materials. Authentic learning opportunities can also take place in a digital learning environment. The concept of one-to-one computing initiative provided many school districts to benefit from implementing technology in the classroom. The findings indicated that the participants were knowledgeable about the one-to-one computing initiative, technology as an instructional tool, learning opportunities, and cost-effective alternatives to traditional materials.

One-to-One Computing Initiative

The findings indicated the study participants have a fundamental perception about the purpose of the one-to-one computing initiative. The participants' overall perception of the one-to-one computing initiative was that the program is an educational technology program that allow students to have access to a device within the entire school and or district. The participant indicated that the program allows students to use the devices within the school and home environment. The findings also indicated that some of the participants indicated that the one-to-one computing initiative gives students access to devices and other digital resources. For example, according to Mu,

> Covid -19 pandemic have shaped how I view the one-to-one computing initiative. The program makes sure each student has access to individual technology. My students can use this technology in the classroom as well at home. Also, the one-

to-one computing initiative gives access to all the resources virtually as if you were in a traditional classroom.

The findings also indicate that many factors affected the participants' perception of the one-to-one computing initiative. For example, one participant's perception of the one-to-one computing initiative evolved over the years. For example, according to Kappa,

> I feel that the 1:1 computing program has evolved over the years. In my first year of teaching, the district did not have a one-to-one computing program. However, in my second year of teaching had my technology cart was in the same school. The program was effective, and the student had access to the technology. Now, I have it where every kid has their Chromebook there is no excuse for students not to have their devices. I find the program to be different across the whole realm to where the program concept is easier after the three years.

The school district's one-to-one computing initiative policy formed the participant's perception. Some school districts have a supplement to their one-to-one computing initiative policy that allow students to bring their own device to school. The addendum combined the one-to-one computing initiative with a technology concept called Bring Your Own Device. According to Nu,

> My understanding of the one-to-one program is that the program is really meant to give students an equal opportunity for technology access. My school has some students who have their own Chromebooks or laptops, and the students decided to bring their device from home every day. However, most of my students have been issued a school device. The school purchased the devices with funds, and

> the students have Chromebooks. In my class the students use the devices every day and I think in most classes, teachers use the devices almost every day. The program is meant to give students an opportunity to be able to do work in class and at home, and open that lane of technology for students.

Some participants wanted to reserved judgment as to the program effectiveness, because they felt like more data is needed to conclude as to the evaluating the program's impact on education. The findings indicated that the participants think overall the one-to-one computing initiative is an effective program. However, school districts implemented their one-to-one computing initiative during COVID-19. Therefore, the school districts had faced some serious technical issues in providing faculty, staff, and students with reliable access to technology. However, the findings indicated that the participants feel that there are many factors attributed to the technical issues that are encountered by the school districts. For example, according to Iota,

> The one-to-one computing initiative in my school district has been successful in the sense that the district implemented the program successfully in the mist of the COVID-19 pandemic. However, I feel that there needed to be more training to expand the depth of training for teachers as far as which tools are appropriate for teachers to use in order to teach curriculum objectives. Overall, I feel that the school district is making good progress.

Despite feeling that the program is successful in their district, some participants indicated that it seemed to take more effort to make the one-to-one computing initiative work in their school district. The participants noted that the one-to-one computing initiative allowed students to have technology in the classroom. However, some students

have technology access at home while others do not. Some students can finish assignments at home, whereas others cannot complete their assignments due to technology access. According to Lambda,

> I feel that the one-to-one initiative program is effective because I do not have to give the students Chromebooks out of the cart every day. If a student damages their Chromebook, it does not affect any other students except for them. I do not assign digital work at home because as the teacher I cannot guarantee that a student has access to the internet at their home. Where I live, there are more rural areas than there are urban areas.

The findings indicated that some participant focused more on the benefits rather than the technical issues teachers faced. The participants noted that technical issues will happen in any situation and students faced similar technical issues. The findings indicated that one of the main benefits that make the one-to-one computing initiative effective is the affordability of the program. Participants noted that school districts are using funds to invest in their technology infrastructure for teachers and students. According to Xi,

> I think that the one-to-one computing program is effective. Many school districts had to spend thousands of dollars for textbooks, and districts really do not have do that anymore. Textbook adoption has somewhat gone away in a lot of school districts and that money had been rerouted or used in a different way. I knew that there used to be money for textbooks, and that money is better allocated towards technology.

Technology as an Instructional Tool

The findings indicated that the participants' experience with technology vary from sometimes to frequently for the integration of technology in the delivering of lessons. The participants' comfort level with using technology as an instructional tool ranged from somewhat comfortable to extremely comfortable. The findings indicated that the participants' experience with technology as an instructional tool vary. Some of the participants received experience working with technology as an instructional tool through their graduate degree programs. According to Iota,

> I have a decent experience when it comes to using technology as an instructional tool. I graduated with a specialist degree in technology, and the experience allowed me to learn on my own how to implement technology into the classroom setting. Also, I have a better grasp on how I can use technology to reach my English objectives. As far as implementing technology throughout the school, I think teachers need more training in the area of using technology as an instructional tool.

Other participants received experience by attending professional development that addressed how to use technology as an instructional tool. The participants attended district-wide professional development sessions learned how to use learning management system as an engagement strategy for students. According to the participants, they were taught how to use technology to present video presentations to their students. They used software applications such as PowerPoint and Google Classroom in their classrooms. The participants learned how to use screen casting software to create instructional videos

and how to use online resources in order to bridge the gap between secondary and post-secondary education. According to Nu,

> I used Google Classroom, and I do a lot with the web-based software Kahoot. I along with the other teachers in the department made a lot of videos through YouTube, and we tried to do things that are interactive in our classroom. My school has subscriptions to Classkit, which I considered a neat resource. I also use Nearpod and Screencastify. I relies heavily on the three applications that I never heard about before the pandemic.

The findings also indicated that technological savvy participants used their love technology to implement technology as an instructional tool. The technological savvy participants experienced technology as an instructional tool by using many web-based platform such i-Ready. The participants admitted that in general they love using computers, and they think the world is heading towards a more technology driven society. Therefore, it is imperative to use technology as an instructional tool. According to Kappa,

> Essentially, as a teacher, I needed to know how I am going to use the tool to benefit the student, and not rely on that tool to teach the student. Basically, I think that is the main problem with some programs. Some programs try to do the lecturing or the platform give the teacher absolutely nothing to use as a tool. I do feel like there are times when other teachers might just put students on the device and use the technology program as the main form of instruction for the rest of the school day. If that is the case, the purpose of the instructional program changed

from a tool into the teachers. The reversal of the role leaves me wondering what is teaching the students.

The findings indicated that the participants examine their curriculum in order to find creative ways to incorporate technology in the assignments. The findings indicated that participants desire for technology stem for their love to technology and their earlier adoption of technology as an instructional tool. Some participants used technology in the classroom every single day starting with the students logging into the learning management system. According to Lambda,

> I described myself as a nerd. So, I have a lot of experience with using technology as an instructional tool. I love to use smart boards, because I love the interactivity the tool offers. I love to get my students up to the smartboard and allow my students to use the different aspect of the board such as the drag and drop components. I want my students to use the Chromebooks as a tool of creation. I want the students to designed beautiful things when they have technology in their hands. For example, I taught my students how to make a documentary about the pandemic. The student used the TikTok application to create a presentation called "TikTok Docs." The students' videos basically cover an aspect of the pandemic, and the students could have used any form of technology.

Providing Authentic Learning Opportunities

The findings indicated that the participants felt that students use their one-to-one computing initiative for the sole purpose that was intended by the program. The participants stated that the school districts' network is equipped with a strong internet filtration software and the students realized that they cannot utilize the devices outside of

its intended usage. The findings also indicated that the participants attempt to match technology applications according to the curriculum standards they are teaching. The successful integration of technology and curriculum do not give students the opportunity to use the devices for anything other than its intended purpose. According to Omicron,

> Many people think that one-to-one devices are a major distraction for students. However, the purpose of a one-to-one program is to provide a technology device to students and teachers for use in the instructional setting. People may feel like students will not use the devices for which the program intended purpose. However, I think that students are using their 1:1 computing devices for the purpose of which is intended by the program. My students are using their devices in the instructional process.

The findings indicated that the participants' technology integration process might involve technology applications that coincide with speaking and listening for their students. The instructional process might call for some integration of a video such as the one created by a technology software called Flipgrid. Other online instructional tools are used by the students to make the classroom more engaging. The student can use the tools to present to their fellow classmates in the front of the class. Whatever the online tool might be, it has to correspond with the curriculum standards. According to Lambda,

> I like to use the instructional strategy called project-based learning. Anytime, I can have student create projects using multimedia formats in order to learn the lesson content. I also want the students to use technology in the instructional process because the students are a very visual generation. I like having it as a

> research tool, and I try to teach them how they can do anything they want because have the knowledge to create anything.

The findings indicated that the participants are innovative when using technology to promote authentic learning experiences. The participants allow their students to do research projects using Google Slides. While students are creating their presentation, the participants encourage the students to use transitions and video. The students can post brainstorming ideas on a virtual sticky note, and the students are encouraged to virtually answer questions while their classmates can provide instant feedback. The participants stated that students are encouraged to experiment with different applications. According to Kappa,

> I love to use technology as an engagement strategy for my students. In fact, I feel like technology is great especially among the middle school age group because the world around us is evolving with the advances in technology. I think that the middle school age group will likely be more engaged with the instructional tool. I am only 10 years older than my students and some of the students probably have had technology devices in their hand since the age of three. Students are used to having technology devices and I get to show them how to use the device for instructional purpose.

Cost-Effective Technology Selection Process and Professional Development

The findings indicated that the participants have a choice to use or implement whatever technology in the classroom. However, the use of technology is for engagement purposes. The participants indicated that the school districts decided which learning management system each school use for the school year. The participants decide

which web-based applications such as Edpuzzle and Flipgrid are used in the classroom. However, the participants evaluate each software platform to make sure whether the software will help them accomplish mastery of the curriculum standards. The decision to use a certain device was decided at the district level. The participants noted the school district adopted the use of Chromebooks for the teachers and students. However, there were participants who decided to use their personal device which were an Apple MacBooks. According to Lambda,

> The school provides the Chromebooks, and I have the autonomy to decide the different platforms in my classroom. I has a YouTube channel and I upload lessons such as a reading of "The Call of the Wild." I use technology a lot as a support tool because technology is wonderful, and I am a geek that loves technology. I still make my students hand write their paragraph responses because they still need that dexterity and muscular skills.

The findings also indicated that participants were introduced to different software applications at school district sponsored professional development. The school district leaders conducted informed research by asking building level administrators what was effective in their building. Once a list of effective applications was gathered, the building level administrators presented it to the faculty. During professional development, teachers were taught how to use the applications. The pros and cons are evaluated during the professional development process, and then the school districts introduce the applications district-wide and purchase subscriptions for the teachers. Some of the applications had trial or free versions of software, and the participants could try out for a limited time. Some of the software applications, teachers had an opportunity to try it out

to see if they liked the software and they would then share the application with other teachers. Other school personnel such as the media specialists sent out a survey asking which applications teachers use regularly and then the top applications selected is purchased by the school district.

The findings indicated that the participants developed their own standards for selecting technology applications. The participants noted that the main factor for selection a technology application is the promotion of student privacy and protection of student information. For example, the participants indicated that the student has to have their own account or the teacher can send out information to the students by using a classroom code. Other participants prefer a certain brand of devices because they said the software applications associated with that brand is easier to navigate. The findings indicated that participants select technology based on the application user-friendly. The participants noted that teachers do not have time sit around and play different application with the sole purpose of try to figure it out how it works. The participants look for applications that have video tutorials with a step-by-step and robust user-friendly feature. The findings indicated that some of the participants select technology applications based on their students. According to Mu,

> I select technology that will allow students to become 21st century learners. I mainly use technology that helps students to responsibly navigate, create, and master techniques in order to become more efficient learners. I use video software that will help my exceptional education students as well as my English as a Second Language students become successful in my classroom. My goal is to ensure that all students are 21st century learners when they leave my class.

The findings indicated that the participants do not experience any challenge obtaining software application to use in the classroom. However, the participants do experience challenging accessing reliable internet. Some participants did receive professional development from their college education preparation program which was in technology integration. However, the findings indicated that majority of the participants received professional development from the district level. The professional development centered on implementing learning management systems, various web-based platforms, and other subject the centered on implementing technology in the classroom. The district conducted their training sessions using school district personnel as instructors. Some of the participants were asked by school districts to facilitate some of the professional development sessions. For example, Lambda stated,

> The district conducted a series of digital workshops, and I was asked to conduct two district level professional development that centered on using gaming interactively in the classroom, and app smashing which is a process of using multiple apps to create projects. The professional development was available in an online database for teachers to access.

The school districts utilized the school media specialists to facilitate two professional development sessions within the professional learning communities (PLC). Teachers who were technological savvy conducted professional development sessions that focus on new forms of technology that they used in their classroom. Xi noted,

> The building level administrators have access to teachers that were kind of experts because they have been experimenting with different forms of technology over the years. I tried to be very patient because I knew the presenters were trying to

learn how to conduct the professional development session on a virtual platform. The teaching staff was getting information as the presenters were learning it, and the training was a lot smoother. I acknowledge that the staff has had quite a bit of training especially in the beginning of the school year. The first 2 weeks I thought my head was going to explode, but now I sort of pulled it all together and made it work to the best of my ability.

The findings indicated that the participant's perspective was that students are very receptive to technology in the classroom. The participants explained they have to find creative ways to incorporate technology into the classroom because they are teaching a technological generation. The students had a poor grasp on the power of technology, and the students see technology as a platform to just take a picture and vote. However, once the participants invested time meaningfully integrating technology, the students are receptive about the use of technology. The participants noticed that technology make the students writing easier, and the puzzles make the class more engaging.

The participants noted that the students are especially receptive when the instructor is knowledgeable about the application that was being used in the classroom setting. Students were open to technology usage when the teacher gives clear instructions and the teacher demonstrates effective usage of the application. Students seemed apprehensive when the teacher did not know how to use the software application. Therefore, a teacher who knows a particular type of technology well can assist students to be more receptive to using the application. Otherwise, students were frustrated with having to use an application that the teacher does not know how to use themselves. According to Kappa,

> I noticed that my students are receptive to using technology in the classroom. The students are very comfortable and eager especially when the students were already familiar with the software applications. Also, the students were eager to help me with different applications. The eagerness of the students makes the students more willing to find new ways to apply the function of the application to an instructional task. Therefore, teachers and students were engaged in the use of technology and mastering the instructional standards.

Participants had concerns about students' ability to access to technology at home. The participants were concerned that the students whose parents cannot afford to provide access to the internet at home do not have a choice but to participate in the one-to-one program. The participants are fully aware of the digital equity issues, and had always voiced concerns about if an equitable education were not being provided to all students in the school district. Since the school years started, the participants noticed that virtual students are most likely affected by digital inequality. The participants were aware of home situations where most students' parents cannot pay the water power bill. The participants try to work with those students separately in order to figure out how to complete assignment. According to Lambda,

> I recalled the first week of class when I was asking my students if she needed to know any concern the students had about virtual learning platform. A student told me that she did not actually have access to the internet, and the student was doing virtual because the parent was worried about the pandemic. The student informed me that once a day the parent would drive to one of the Wi-Fi buses that the district has at a church. The Wi-Fi bus were located about 3 miles away, and the

student could do the assignment at that time. The student and the parent did not realize that virtual learning required the students to sit through class all day long.

The participants hoped that the funding the state governor had allocated will help ease the digital equity issues throughout the state of Mississippi would help improve internet connection. The governor and the legislature are attempting to use at least some of the CARES Act money toward funding bandwidth and creating better technology sources for students. The money would be allocated to each of the school districts in order to create better rural access. The participants feel terrible for the students who have to struggle with internet access issues in order to learn. Some of the students still must drive to a Wi Fi hotspot. Xi related,

> I remembered given an assignment to my students. One of my students completed only the portion of the assignment she could do on her mother's cell phone. I felt horrible for the student. The student had to take her mother or father's cell phone then sit and type the assignment. I told my student if that ever happens again, to let her know. I printed out assignments for the student. I have to spend time to figure out another alternative for the students. I do not want students sitting on a cell phone trying to do homework. If a student cannot do the assignment on a computer, then I have to find a better way for the students to submit the assignment.

According to the study findings, the participants feel that meaningful implementation of technology such as using the different applications strategically to meet an objective would increase engagement and participation in the one-to-one

computing program. The participants reiterated that teachers, not the computer, are responsible for teaching the students. Lambda noted,

> I feel that when it comes to increasing the participation in the one-to-one program it really depends on the teacher. The teacher must understand how authentic engagement strategies are different from entertainment. I notice a lot of teachers want to log the students onto a game and say it is a form of test review. The questions then become the game authentically engaging the student. Therefore, increasing participation in the 1:1 program would take many more levels than just creating a Kahoot.

The participants suggested that teachers use one-to-one computing initiative devices for project-based learning and authentic engagement by having students to create artifacts. Chromebooks are awesome internet gateways, but the devices are not really that effective for the creation of artifacts that students need to demonstrate learning. The world is moving towards a more technological society. The employment of the future would require more technology skills. The participants had argued that it is best to give students the skills today that the student would need in an advanced employment market tomorrow, and the one-to-one computing initiative would in that area.

The second qualitative research centered on the implementation process that technology directors used to distributed one-to-one computing initiative devices in their districts. The following are the findings of the qualitative research question 2 based on the district technology directors' responses:

District Level Implementation of One-to-One Computing Initiative

Digital technologies have been used for many years in the educational setting in the United States. School district officials have been looking for the most cost-effective way to deploy mobile devices to educators and students, and one-to-one computing initiative seemed to be the answer. The school district officials lead the deployment of the devices are the directors of technology. This section will give the technology director's perspective about the computing program. The technology director's findings were presented in two themes. The themes were Diffusion and Adoption of One-to-One Computing Initiative and Benefits and Challenges Associated with One-to-One Computing Initiative. The findings indicated that the participants perspective of the one-to-one program were shaped by different experiences. One participant's understanding of the one-to-one computing program came from her interaction with other professionals in other school districts. The participant noted that based on her experience there were different ways that an organization could implement a one-to-one computing program. Several districts' one-to-one program were model based on one device to one student. However, the participant's school district followed a different model where there was one device to one student, but the device stayed in the classroom. However, the school district's one-to-one computing program model had to changed due to COVID-19. The current model allowed the student to have the device, and the device goes around with the student. The other participant's perspective is based on the school district mission for each student. According to Delta,

> My understanding of the one-to-one initiative concentrated on our school district's primary focus which was to do what was best for our students. We feel

> that with the 1:1 initiative we were making sure that every student had a device, and students could complete their school-work. We wanted every student to have a device and the hotspots around the schools so the students would have students access to the internet. The district one-to-one program give students the opportunity to learn and do their school-work not only at school but at home. If the students happened to be absent from school, for any reasons, the students could still complete their classwork. The school district program was designed to allow officials to help track the students' progress. The tracking process was done to see if students were really completing assignments so officials could try to help the students.

The findings indicated that one participant mentioned that their school district's one-to-one computing was effective. However, there were some technical issues that each participant encountered during the program implementation. The difficult stage in the implementation process was getting the parents and students to complete the documentation that the school district required for students to receive a device. The school district goal was to get the devices out to the students in a timely fashion. However, district officials feared that parents would wait an additional two weeks after the district original device distribution date and then finally deciding to get the device for the students. According to the participant, the most difficult aspect of the one-to-one program was getting the parents and the students to get the device. However, once students had the device then everything was better. Sigma stated,

> The effectiveness of the program going to really depend on the effectiveness of the curriculum. School districts official realized that technology were

> supplementally resources to the curriculum. So, the school districts had to improve the teacher's pedagogy skills. Teacher must have a strong understanding of their content area and they must have the ability to assign activities and assignments with the use of technology. If pedagogy skills are established, and a district has the technology infrastructure, then the one-to-one computing program will be effective.

Diffusion and Adoption of One-to-One Computing Initiative

The findings indicated that the participants were knowledgeable about the one-to-one computing initiative through another school district officials who already implemented the program in their districts. Delta noted,

> School officials from other districts were always talking about their program. As a collaborative group of technology directors, we would talk and share feedback about the positive and negative aspect of each other technology department. The goal of sharing ideas as a collaborative group were to help everyone succeed with past experiences. As a result of the discussion from the collaborative group feedback, the superintendent and I began to actively communicate about the potential of the 1:1 computing program in our school district.

When it came to gaining information about the one-to-one program, the participants mentioned that he does not usually follow current trends in technology just because the trend is popular. Typically, if the current trend was aligned with the school district's mission, then the concepts would be implemented. The school district developed their own acceptable uses policy guidelines. Delta stated,

> We did not research a lot of different school district implementation procedures during the adoption process. Our goal was to simply plan effectively and ensure that the implementation go the way the school district outlined. I researched which devices were durable, so when the students traveled back and forth from home and school, the device would not be easily damaged. Also, I researched information about the benefits of extra warranties, and the need for cases to protect the devices. I created a student help desk and other platforms to gather feedback. The decision was not based solely on me. A team of different technology department staff members and other directors from across the district helped with the decision-making process. Our school district implemented an adoption program that was slightly different from some other districts, and we made our own guidance for the one-to-one program.

The finding indicated that the other participant was already aware of the one-to-one computing initiative since 2014. She mentioned that in 2013, the previous technology director started the program and the district started the implementation process only at the high school grade level. There were other districts nearby who were slightly ahead in the implementation process. The technology department were the medium that communicated to the potential of a one-to-one computing program in the school district. The technology department conducted the research, and they saw what other districts were doing with the program. During the research process, the technology department saw the benefit and how it could benefit the district. Sigma stated,

> Based on the research conducted by the technology department, we gathered some valuable information about the one-to-one computing program. The research

involved looking at other school districts one-to-one programs and evaluating the program effectiveness. The technology department was very much aware of what the implementation entailed, and we tailored some aspect to fit the need of our school district.

The findings indicated that when a program such as the one-to-one computing initiative work effectively there tends to be a favorable attitude towards adoption of the concept. The participants noted that was how they were persuaded to adopt the one-to-one computing program. The fundamental component of the one-to-one computing initiative, the fact that students could have a device and use the same device at school and at home, were another aspect that helped formed a favorable opinion of the program. Delta stated,

> The fact that the program ensures that students have a device at home whereas without the program they may not have a device at home were one of the main benefits of the 1:1 computing program allowed me to have a favorable attitude towards the program. The students were taking care of the devices because the students were held responsible for any damages. I am happy the district implemented the program, and the superintendent was actively involved in the decision to adopt. The superintendent and I discussed the program and the impact the program would have on the district. We both agreed that the plan that we developed was a good idea to move forward to implement.

The findings indicated that the diffusion network could involve the superintendent and technology director. The diffusion process could start after a need assessment of the school district. Delta noted,

> We did not seek information from social media or any other type of media. I did observe what other districts were doing with their programs, and asked other school district questions about their policies. Our district technology department adopted some of those same policies along with new ones that we created, and to make what I feel like was a really good modeling program.

The finding also indicated that experience as a technology trainer could helped for a favorable attitude toward the one-to-one computing program. Sigma stated,

> I was a technology trainer when the school district initiated the one-to-one computing program in the school district. I was what would be considered an earlier adopter of the program being implemented in the school district. The vast majority of people in the district were very much for the one-to-one computing program being implemented in the district, and some hesitation came from a teacher that was not quite sure how to do the integration. However, at the time of implementation my job was to help teachers integrate technology into the instruction.

The findings indicated that the implementation of the one-to-one computing program could have a positive impact on the district. However, district leadership still had the ultimate decision to adopt the one-to-one program in the district. The idea of implementing a one-to-one program in the district were presented by the technology director to the district leadership team and the school board. The presentation was designed to get the approval of the superintendent and school board because of the cost to implement a one-to-one in a school district. The school district has about 6,700 students,

and requesting the funds to implement a 1:1 computing program were a big commitment. Sigma noted,

> The change agents consisted of individuals within the technology department who wanted to move the district forward. The change agents conducted research about the program, and they gathered and analyzed the data that showed what impact the one-to-one program had on other school districts. The agents decided that they wanted the school district to move in the same direction, and that was the very beginning of the implementation stage.

The findings indicated that the technology department created a school district social media account slightly after the implementation process started. So, social media really did not have a big impact when the department tried to locate information about different program implementation processes. The technology department read scholarly journals such as Education Week, Educational Leadership, and Tech and Learning looking at what the publications were publishing, and the department also talked to other districts in the State of Mississippi. Sigma noted,

> I was a technology trainer at the time of the school district implementation of the one-to-one computing program. The biggest issue was getting all the devices and developing a technology infrastructure. The district had to purchase the carts and we had to make sure that the Wi-Fi infrastructure was installed. Once those three components were developed, we started delivering the carts and the Chromebooks to the schools.

The finding indicated that the implementation process involved intensive technology training and the technology trainers would be a valuable asset for the school

district. The training might include professional development for learning management systems such as Google Classroom or Canvas and software applications. The technology trainers would have to do a lot of modeling of technology integrated lessons and worked with the curriculum specialists to remind the teacher of the standards.

Blueprint for a Successful One-to-One Computing Program

The findings indicated that the blueprint for a successful implementation of a one-to-one computing initiative involved the earlier adopters communicating with building level principals, teachers, other staff, parents, and students about the benefits of the program. The consensus among those in the learning community would aid in the successful distribution of the devices. Establishing a protocol in which students know how to reach out and get help with technical issues is vital. The participants suggested having a long-range plan, and one-to-one computing devices should be purchased every few years.

Benefits and Challenges Associated with One-to-One Adoption

The findings indicated that the elements that the participants feel would help improve a school district expanding the 1:1 computing program. The participants mentioned that the corner-stone to any one-to-one computing initiatives was making data-driven decisions. Data-driven decisions could help in the development of a better management platform for the purpose tracking and managing the devices. A plan to care for the maintenance and repair of the devices is imperative. Delta noted,

> I acknowledged that students will make mistakes but the students sign an agreement that says that the student would be responsible for the device. The first time the device is damaged the student has to pay a $25 deductible. The second

time the deductible was $25 deductible plus the cost to repairs the device. The fourth time the device was damaged there would be a possible quote of the cost to replacement of the device, and parents do agree to those terms.

The findings indicated that the participants' school districts decided not charge a usage fee for students. School district officials discussed a usage fee to help with a replacement plan cost, and the parents had to sign a waiver stating that next year there may be a usage fee. The school district fully disclosed to parents that the district might implement a usage fee. Parents understood that the fee were waived for a year simply because the district does not know how much it would cost to maintain the program. The findings indicated that the other school district did not associate a technology or usage fee with their one-to-one computing program. Some school district might impose a fee because of the type of device the district purchased such as Apple products which are more expensive. The school district has that fee there to help compensate for the repairs and maintenance. The participants' districts do not have an upfront fee because both districts decided to purchase Chromebooks. Delta noted,

> The school district tried to find research that show the benefits of charging a usage fee to students. Since we did not find any existing data to support charging a usage fee, we decided to continue to collect data. The school district does not want to just charge whatever at this stage of the implementation process. The fee needs to be reasonable. What would be the point in charging a usage fee if the fee would not benefit the program like the program was designed? The school district would probably start charging a fee for parents. However, the discussion was ongoing.

The findings indicated the participants became aware of students who have problems accessing Wi-Fi at home. Therefore, the school district implemented a plan to extend the Wi Fi infrastructure of the school district into the community. Delta noted,

> The technology department conducted a survey of the households within the district. The result of the survey indicated that there were approximately 20% of the students who do not have internet access at home. So, what the school district did was put hotspots or internet access areas into the community. The school district paid for installation of Wi-Fi outside of the district central office and outside of the high school. The high schools are at two separate ends of town so that students could park in their car to do their work. The school district also had 5 school buses that the district parked in different areas of the community so that parent could park in their car and use the internet that was broadcast from the school bus.

The findings indicated that the one-to-one computing initiative process had changed since COVID-19. Schools closure due to COVID-19 had a major impact of school districts' ability to provide internet access to students while the students was shelter in place at home. Every student had to literally walk out of the building with a device and charger. One factor that helped ease the apprehension for the school district were the Mississippi Senate Bill 3044, which was known as the Equity Distance Learning Act. The senate bill allocated a large amount of money that would help the school district with the next steps in the implementation process. The state invested millions in the Equity Digital Learning Act and districts across state was ensure that the district could implement a one-to-one computing initiative program. Sigma noted,

> My school district had about 7% of the district population stated that the households do not have reliable internet access. That equated to about 200 households. The school district looked at individual houses because some houses have more than one child. Some options the school district looked at was the purchase of hotspots to give to those students. The problem with the hotspots option was that the school district cannot just give a lot of hotspots to students because the school district had government regulations and rules that we must follow up. For the last several years, the district installed Wi Fi hotspots at the two football stadiums that are in both cities which is served by the district. Students could drive up to those stadiums and the devices that the school district provided would connect to the network at those stadiums. Also, students could go to several of the schools and sit in the parking lot, and they can connect to the district network. I know that the options are not ideal.

The findings indicated that school districts are looking at other ways they could help provide internet to the houses. One problem the district found out is that parents lack knowledge of where to go to get internet service. For example, parents are not able to connect to Sparklight because of the cost. Parents may not know of programs for low-income housing that are available to get internet access. However, the participant noted that every household that lack internet service received a letter from the technology department with resources that help the families gain access to internet connections.

The finding indicated that the Wi Fi infrastructure is imperative to the expansion of a one-to-one computing program. The participant noted that if a school district does not have enough bandwidth that could support the devices of the one-to-one program,

then that is the first indication of failure. How would a school district pay for the installation of the infrastructure would be an indication that Wi Fi network could support the program. The Wi Fi infrastructure, strong bandwidth, and devices are just three components of a one-to-one computing initiative. The findings indicated that a successful one-to-one computing initiative must also have a technology trainer. Sigma noted,

> A school district wants to make sure that the Wi-Fi infrastructure could support an expanding one-to-one computing initiative. The school district wants to make sure that the funds are allocated not only initiate the implementation process, but sustain the process over the years. School districts need to be able to purchase the resources and then implement the training. If a school district has the bandwidth, Wi-Fi, devices but does not have a trainer, the one-to-one computing initiative would fail.

The finding indicated that school district should develop a cohesive plan that can incorporate the components. However, once the devices are distributed to the students, the school district might want to implement a digital citizenship curriculum. A lack of digital citizenship K-12 lessons even for the teachers, would only be problematic for the school district. The main component of a successful one-to-one computing initiative plan would be the infrastructure for the bandwidth, the device, the training along with the curriculum, and digital citizenship.

The findings indicated that the utilization of a technology trainer is important. The Mississippi Department of Education do not require school districts to have a technology trainer on staff. However, the findings indicated that several districts have

technology trainers and the trainers seem to be a benefit, especially in today's technological society. The school districts that do not have technology trainer are at a disadvantage, but there are alternative resources. The school district personnel, who are member of an organization called Mississippi Educational Computing Association (MECA), could gain the latest information at the organization annual conference. There are other resources that school district can take advantage of the technology professional development. Sigma noted,

> My school district does a program called Tech Camp for teachers that is a two-day technology training every summer. The school district had provided the training for about 6 years now. The Mississippi Department of Education started to hire more trainers that traveled around the state. In the past the Mississippi Department of Education had the literacy coaches that traveled around the state. The purpose of the coaches was to look for trainers within the district setting. If a district decides to implement the one-to-one computing initiative, technology trainers would be a piece of the puzzle that need to be implemented. If technology training is not implemented at the beginning, it needs to be incorporated somewhere down the line in the process, because without a trainer it is going to be difficult to manage the program.

District Curriculum Implementation

The qualitative research question 2 centered on the curriculum development of the one-to-one computing initiative implementation process at the district level. The following are the findings of the qualitative research question 2 based on the curriculum directors' responses:

The one-to-one computing program is expected to change rapidly because of the new state legislation. The Senate bill and the House bill called House Bill 1788 will provide funding for student connectivity. Since state funds are available for school district to use, many school district officials are brainstorming ways they can have an effective one-to-one computing program but keep it sustainable as well. A Curriculum Director has a vital role in the sustainable of a one-to-one computing initiative. This section will give the curriculum director's perspective about the computing program. The curriculum director's findings were presented in two themes. The themes were District Curriculum Implementation and Adoption of One-to-One Program.

Development of Curriculum Standards and Professional Development

The findings indicated that the development of curriculum standards for the school district were led by two directors of curriculum and instruction. One of the directors was assigned to the elementary division, and that director covered grades Pre-Kindergarten through 5th grades. The other curriculum director was assigned to the secondary division and covered grades 6th through 12th. Both directors worked as a collaborative group, that include lead teachers and instructional coaches, to develop the curriculum standards.

The findings indicated that the curriculum department offered ongoing professional development about instructional techniques. Sometimes professional development sessions are facilitated by the members of the curriculum department and, sometimes the department out sources the sessions by bringing in content specialists to provide the professional development. The curriculum directors are required to develop a district professional development plan which is submitted to the school board for

approval. The findings indicated that data from a needs assessment was used to determine what area of professional development will be implemented for the school year. If the school district decides to implement a new program such as a new Kindergarten through 5th grades program. The curriculum department have to implement a new reading book, and provide ongoing support for the teachers.

The findings indicated that the curriculum department helped the schools with exceptional education students. The school districts have a special service program for gifted, advanced classes, self-contained, special education, and dyslexia. The special service program has a director who oversees the department and works directly with the curriculum department. The director makes sure that the curriculum also meets the needs of students. The Individual Education Plan required all teacher to attend training that focuses on modifications and accommodations. The process of curriculum development addressed the need of students who are gifted, wheelchair bound, or self-contained.

Adoption of One-to-One Program

The finding indicated the district's one-to-one program have been established for nearly 10 years, and the program was originally implemented with every secondary student in 7th through 12th grades. Every student was issued a MacBook and then the program transitioned to every student were issued a Chromebook. Currently, every student in kindergarten -12th grades have a digital device. The kindergarten through 2nd graders shared a cart. The 3rd through 5th grades classroom has one each cart. Every student in the 6th grade has one device that stayed at school. Every student in 7th through 12th grades were issued a device that the students could took home. The school district expanded the one-to-one computing initiative so that every student in pre-kindergarten

through 12th grade has a device. COVID-19 changed the dynamic of the one-to-one computing in the school district. Traditional students' devices remained at the school, and grades kindergarten through 12th virtual students were issued a device that remained in their possession. Students who were quarantined throughout the year or if the district should have an intermittent closure were eligible to take a device home.

Curriculum Standards Vetting Process

The findings indicated that the administrative process used to integrate specific curriculum standards into a course was through a vetting process. The department had a process of vetting curriculum standard to determine the scope and sequence of the standards. Once the vetting process was completed, the curriculum department officials would allocate resources and provide the teacher with support. The department developed a pacing guide or scoping sequence for teachers to use in the classroom. According to Theta,

> The school district provided a variety of resources for the teachers to use in the classroom. Teachers have access to everything from original hard copy textbooks, to companion student workbooks, to consumables, to digital textbooks, and digital resources. If the textbook companies offer digital resources, the department definitely takes advantage of the resources, and teachers implement them into the assignments. The district also uses other stand-alone software, such as Reading Plus and i-Ready. The curriculum department uses the digital resources as supplement instructional material. The teachers have tons of resources that are digital and some in print that they can use to supplement the curriculum.

The findings indicated that teaches have access to many resources that can be used to facilitate the expansion of the 1:1 computing program. During the school year, the district purchased a new learning management system called Canvas. Canvas was purchased to help streamline their curriculum so that the teachers can teach and meet the distance learning needs. The one-to-one devices are really a help in implementing an online learning platform. The district does not provide incentives to implement the one-to-one program because facilitation the implementation of the one-to-one computing program is an expectation in school district.

One-to-One Computing Expansion

The findings indicated that the expansion of a one-to-one computing program must have the support of everyone in the learning community. The school district must have the Wi-Fi infrastructure strong enough to support all the district student body and teachers being on a network at one time. According to Theta,

> The district found out that when we expanded the one-to-one, we had to also expand our bandwidth to be able to support those devices. So, a district needs to make sure we have the technology support and the internet support to be able to implement a one-to-one program. Some of the school buildings were really old and built in the 1960s. The electrical system could not support 20 devices and chargers in one classroom. So, the district had to rewired and restructured the electrical system.

The findings indicated that the expansion of the one-to-one computing program involved supporting teachers who are struggling with distant learning or the implementing technology into the classroom. The curriculum department provided a

mentor teacher to help struggling teacher. The technology department also offered support. The district purchased with their one-to-one computing program budget a helpdesk support for every building. Teachers could support for their device or video conferencing. Theta noted,

> School district officials do not just hand teachers a classroom set of Chromebook. I think that there needs to be planning, training and purposeful use of why teachers and students use a device. When I was a principal, I always strongly encourage there needs to be purposeful and meaningful use of a device when a Chromebook was open. The device needed to be geared towards a standard that teachers were teaching in the activity. Teachers do not need to open Chromebooks just for the sake of typing something or watching a video.

The Usage of One-to-One Computing Devices

The qualitative research question 2 centered on the implementation process of the one-to-one computing initiative from the administrators' perspective in their districts. The following are the findings of the qualitative research question 2 based on the administrators' responses:

The educational initiative of one-to-one computing has the simple goal to prepare every student for a successful life in a technological society. Laptops, personal computer, and tablets enrich the educational setting. School districts that implement one-to-one computing devices harnesses the technology to create a virtual learning environment. This section will give the administrators' perspective about the computing program. The administrators' findings were presented in two themes. The themes were The Usage of One-to-One Computing and Participation in the One-to-One Program.

The Implementation of One-to-One Computing

The findings indicated that the number of years varied among the participants when it came to the year the one-to-one computing programs were established in the district. Some of the participants were in their first year of implementation and others were in their ninth year of implementation. The participants noticed the improvement that the implementation of the one-to-one computing program had on their school. The findings indicated that students had access to a device in every class. Prior to the program implementation the number of devices available for use was sporadic. Students had access to devices in the core classes. However, when the pandemic hit, the one-to-one computing policy changed in lieu of the pandemic and the district decided to let the students take the devices home. Eta stated,

> The expansion of the program has improved drastically since the district recently went virtual. The district has done a great job in doing a universal system. Now, the students and teachers can communicate between the biggest platform such as Canvas. So, in the past the teachers were communicating, maybe through Haiku, and the teacher may have had different programs that they communicated through. So, I think that improvement of having a universal communication database between students and teacher is definitely an improvement within itself.

One-to-One Computing Challenges

The finding indicated that there are many challenges when it comes to the expansion of the one-to-one computing program. The findings indicated that the biggest difficulty in the districts right now is the population of students who do not have internet

access. The schools were still making paper copies for students who do not have access to the internet, which defeats the whole purpose of being one-to-one.

There was ongoing communication about providing hotspots or strengthening the Wi-Fi at the schools and other public areas. The proposed concepts were to allow students to have a location to go to, perhaps after school hours or on weekends, that gives internet access with the Chromebooks. Some participants estimated that 15% to 20% of the student's population do not have access to the internet. Beta stated,

> Throughout the years the school district has faced an expanding one-to-one program. However, with progress there are challenges, and most schools have faced many challenges with expanding the one-to-one computing program. Many factors have created obstacles to our vision. However, a citywide broadband extension would improve the school district expansion of the one-to-one computing program.

The findings indicated that another challenge were the parents did not have some technology literacy or really understanding of what it means to have the Chromebook. The participants noted that parents do not understand how to use the device or what the student's responsibility was when having access to the device. School officials have received phone calls about simple computer issues that most people would know how to do on a device. Parents, who live in a rural area, may not have any other type of laptop or mobile device in the house. Therefore, the participants feel technology literacy would help parents understand more about the technology. Zeta noted,

> I acknowledged that COVID-19 have made parents lack of technology literacy part of that challenge. Some form of technology is dangerous to kids whether it is

Chromebooks or cell phones. Parents need to be aware of what applications mean or what it means when kids are doing commands on the computer. Parents faced all the situations mentioned on top of just being able to help their kid educationally.

The findings indicated that the participant felt that students use one-to-computing devices for the sole purpose which were intended by the program. The instructional process was designed to have the students engaged in the classroom. Teachers are encouraged to incorporate technology as part of their engagement strategy in their structural activities. Therefore, students do not have an opportunity to use their devices for other purposes. The school district monitors the devices, and the participants acknowledged that every now and then they might receive an email from my Information Technology Department stating that a student searched an inappropriate website. Other participants acknowledged administrators have discovered that students attempt to access non educational sites. The district and the schools do have established safeguards so students not able to access the websites. Epsilon noted,

> The students use the one-to-one computing devices for the sole purpose of which is intended by the program at school. I would love to say that is the sole reason that students use the devices. When students are in school, administrators and staff do a pretty good job of making sure the students are on appropriate websites. Students are on the school district network, and the district has a lot of limitations that the technology department put on the usage of the network. If students do take the devices home, the students may not necessarily use the devices for education purposes. Administrators had to put measures in place for discipline

> matters when students engage in using someone else's Chromebook inappropriately. Administrators had to deal with the mishandling of a Chromebook or damaging another student's Chromebook.

Using One-to-One Computing Devices for Instructional Purposes

The finding indicated that technology was featured in most teacher's instruction, and teachers are equipped with some form of technology. Teachers can use the technologies to informally assess students during their lessons. The students' Chromebooks are connected with whatever source of technology that teachers have in the classroom. Also, in conjunction with the Chromebooks and the technology that the teachers have, students use both constantly. Beta stated,

> Using technology is a staple feature in most classrooms, and teachers used technology devices to engage students in the instructional process. My school could almost be considered paperless. Teachers use computer technology and try to decrease the use of paper within the classroom setting, and teachers only use paper for the sole purpose of remediation. Teachers might send something home on paper with the sole purpose of providing parents with a hard copy of a document. However, approximately 90% of what we do at my school is online.

The findings indicated that teachers use technology devices to engage students in the instructional process. Teachers used Canvas to facilitate assignments and activities daily. Teachers also used Canvas for students who are having to be quarantined. Therefore, quarantined students could stay on tasks and make progress even when the quarantine for situations beyond their control via Canvas. The same was true for teachers

who were quarantined. The teacher could continue to provide instruction at home with the substitute teacher in the classroom.

The findings indicated that school mandared that all testing is done on computers. Devices was not only used for state test, but classroom assessments were also on the computer. Zeta noted,

> All assessments are done in the same manner. I think that is why people see our school district score higher than a lot of the other districts. Our student used the drag and drop technique that are seen on computerized tests. The school district has been using the technique for the last couple years, but now the students are able to use the testing techniques every day in the classroom. Teachers, who are videoing lessons every day, can upload the videos to their school website. Parents and students can rewatch lessons. Also, the school is 100% into technology.

Participation in the One-to-One Program

The finding indicted that all the school districts have a 100% participation rate in the one-to-one computing program. Some school districts allowed students to participate in a form of Bring Your Own Devices. The students have their own personalized devices and would rather use the personal device at school, and the devices have access to the school internet network. Some of the parents would rather the students to use their personal devices because the parents want to be responsible for fixing the device. One participant encountered a parent who was hesitant about participating in the one-to-one computing program. Gamma noted,

> I have not encountered any parents who did not want their child to participate in the one-to-one computing program. He did encounter one or two parents that did not want to be responsible for the devices. Once I outlined the conditions in which teachers were going to be instructing students, such as the Canvas program, and just letting the parents know that the students would be at a real deficit not having the device. I was able to convince the parents to let the students participate. So, my school has a 100% participation rate in the one-to-one computing program.

The findings indicated that the school districts require administrators to have an alternative for students who do not bring a device to school. Some administrators allowed students to use a desktop or a borrowed laptop for that day. The students would a have to log into the student Google account in order to save their assignment for that day. Once the classroom is over, the students received another borrowed device and start the process over again. The participants indicated that students usually bring the needed material to school every day. The school district does not charge the students a usage fee in order to participate in the one-to-one program. However, the findings indicated that the school district charges the students a fee if the student damage the device.

Technical and Maintenance Issues

The research participants indicated that the main technical issues encountered by the participant centered on software issues, occasional internet outages at school and the students lack of internet access at home. Zeta noted,

> I do not see a problem with students accessing internet at home. The school district uses Google as our main platform and what Google has allowed an

> individual to work offline on just about anything. If students are around Wi-Fi every day, they can reload everything and they can do all their work offline. The assignment just will not show up in real time on the teacher's device. We also purchased about 200 flash drives in case we have some kids who need to go into quarantine or if any other students who need to be out of school. If the student does not have internet, the students can come and download their schoolwork on the flash drive to complete it at home.

Some of the issues are student related meaning the issues were caused by a failure on the part of the student. For example, a student may forget to charge their computer at night. If the students come to school and then the device is not charged, the students would attempt to try to charge the device in class. To solve that problem, some of the participants had to put some extra devices in class for teachers especially in the core classes. So, each teacher has about three extra computers. Other participants purchased charging stations and installed the station in elective classes. The students are instructed to charge their devices during the elective classes.

The findings indicated that the school districts are responsible for any maintenance of one-to-one computing devices. If the district can make the repairs, the repair cost for the parent would be reduced. However, if the school district cannot repair the device and the device is still under warranty, the school official would send the device off to be repaired. Some administrators have developed a partnership with the technology department to develop creative alternatives to the school maintenance issues. Epsilon mentioned,

> My school has access to the district technology officials. Officials were set up in the school library along with students that are enrolled in the information technology classes. Students, who are enrolled in Career Technical Education courses, are able to gain hands-on learning because the students are helping repair devices. If there is a device that needs fixing, such as one of the keys coming off on the device, one of the keys is missing, or it is having some technical issues, the student will receive a new device while the technology department works on the devices.

Another participant uses a similar system. A technology personnel from the department is assigned to handle the technical issues at the middle school. The administrators created a platform called Little IT Help Desk to report technical issues. The school Little IT Help Desk is a group of students who are based out of the library. If the teacher or a student has an issue with a Chromebook, the Little IT Help Desk would go and check a new device out to the teacher or student.

The Little IT Help Desk has a few things that can be troubleshooted to fix the device, but the team has loaners to switch out and then the administrators take it to the technology department at the school. The district technology department technician along with the Little IT Help Desk will work on the device, but the major repairs fall solely on our technology department. If a parent or a student encounters a problem with a device at home, the participant indicated that the school district has a helpline.

The helpline is a website called helpme@school-domain.com. If at any time there is a technical issue with the device, the help inquiry goes straight to the technology personnel. The technology personnel would correspond with the parent and student

through email. Also, a student knows if they are having technical issues, maybe they cannot send an email, the students can bring the device to school, the technician at school can give the students a new one. School officials do not want technology to get in the way of instruction. So, officials want the part of maintenance of devices to be really seamless.

One-to-One Computing and Teacher's Preparation

The findings indicated that teachers are provided professional development in order to implement the concept of one-to-one computing in the classroom. One of the school districts has a menu of professional development sessions, and the school district provided technology training for all school districts across the state. The technology department provided a menu of professional development topics for the whole year, and the teachers can select session off the menus. Also, principals can assign professional development session if they think the teachers need any support such as how to use Microsoft Words or to how to create a Flipped classroom.

If a teacher is not comfortable with implementing technology into the classroom the school has a process in place to help that teacher. The principal can utilize the Professional Learning Community process. Also, the teachers are organized by a pod system. A pod system occurs when a group of teachers are responsible for instructing a certain group of students and support one another. The teachers teach within the same pod and the teacher offer feedback from peer observations. The principals also have the option to utilize outside agencies to train teachers.

Teacher could access a virtual or an in-person method of professional development. Training method sessions are also provided so principals can make sure

that all teachers are able to use the equipment. The principals are required to attend sessions in order to better understand how to address the needs of the teacher. The school district also provides training for new teachers before they start teaching in the school to make sure that they understand how to use devices that are issued by the district. Zeta noted,

> The professional development sessions were all based on technology and my school have some teachers at the school who are really good with technology. The teachers are certified in certain technology aspects. The teacher facilitated the technology professional development sessions and answered the other participants' questions. School officials also have assistant teachers to come in and help some teachers who are struggling with technology. I have to say for the most part, everybody has been eager to learn about technology but it has taken longer for some of the teachers.

Quantitative Stage Findings

This section provides findings of the quantitative stage, including demographic information about the school districts in which 17, 064 parents who participated in this study reside. The statistical analysis results of each scale of devices available for students use at home, the usage of internet at home, access to effective internet connectivity at home, and quality of internet access at home. The research questions and the related survey questions are listed in Table 5.

Table 5

Quantitative Research Question and Related Survey Questions

Table 5 (Continued)

Quantitative Research Question and Related Survey Questions

Quantitative Research Questions	Related Survey Questions
• Research Question 3: Do students have access to the internet and emerging technologies to utilize digital learning resources at home?	• Question B • Questions E
• Research Question 4: Do students have access to the effective internet connectivity at home?	• Question C • Questions D
• Research Question 5: What is the digital equity difference in devices, internet connectivity, and quality among students in four grouped school districts?	• Question B • Question C • Questions D
• Research Question 6**:** What proportion of devices, internet connection, and quality of internet access is available to elementary, middle, and high school students?	• Question B • Question C • Questions D

Demographic Information

The data used in the study is secondary data obtained by the Mississippi Department of Education. The Mississippi Department of Education allowed each school district to administer the survey to the parents. The original data sets and reports were obtained by a record request submitted to the Mississippi Department of Education Office of Reporting. Once the data via email, the data was organized through a process of data cleaning. The process of data cleaning helped avoid errors and ensure everything works

as planned. The invitation to participants in the survey were sent to 144 school districts and charter schools. In this study, parents in 113 school districts and charter schools responded to the survey. Therefore, the percentage of people who participated compared to how many were invited was 78.5 %. Table 6 explains how many public schools and charter schools participated in the study.

Table 6

Participant's Location

Participant's Location	Location Number
Public School Districts	110
Public Charter Schools	03

Desktops/Laptops/Tables at Home for Students Use

Research Question 3 focuses on whether students have access to the internet and emerging technologies to utilize digital learning resources at home? Question B and Questions E were analyzed to answer the research question. The mean was calculated for Question B. Question B centers on devices that are available for students to use at home and the question has eight scales. The eight scales are Windows Laptops, Apple Laptops, iPads Tablets, Chromebook, Other Types (Samsung, Kindle), and Hours Spent on the Devices. Table 7 showed the initial diagnostics statistics of each scale.

The researcher calculated by summing the frequencies from all schools to see the overall results by grouping the school districts and grade levels. Question E centers on how parents use the internet in their home and the question has six scales. The six scales are To Participate, To Download, To Stream, To Play, To Print, and None.

The results from Question B indicated that the number of hours spent on the devices subscale had the highest rating. The average number of hours students on the device was 5 hours and 25 minutes. The Smartphones had the second highest rating with an average of 2.55 students using that type of device at home. Window Laptops had the third place with 1.11 average students using that type of device at home. Gaming Consoles which have an average of 0.86 had a similar rating as Apple Laptops, iPad Tablets, Chromebook, and Other Type (Samsung, Kindle) devices.

Table 7

Descriptive Statistics - Home Desktops, Laptops, and Tablets for Students Use

Scale	N	*M*	*SD*
Window Laptops	113	1.11	0.28
Apple Laptops	113	0.29	0.19
iPad Tablets	113	0.52	0.23
Chromebooks	113	0.35	0.29
Other Type (Samsung, Kindle)	113	0.60	0.20
Gaming Consoles	113	0.86	0.22
Smartphones	113	2.55	0.31
Hours Spent on the Devices	113	5.25	4.08

Home Internet Uses

Question E is also related to Research Question 3. To answer Research Question 3 the 113 school districts were grouped off into four districts. The four districts are similar to the four congressional districts in Mississippi. The grade level included is for elementary students only. The higher school students are a combination of middle school

and high school students. Question E was calculated by summing the frequencies from all schools to see the overall results by grouping the school districts and grade levels for home internet uses. The standardized residuals of greater than positive or negative 2 are significant. Question E centers on how parents use the internet in their homes, and the question has six scales. The six scales are To Participate, To Download, To Stream, To Play, To Print, and None. Table 8 and Table 9 contained the descriptive statistics of each scale in Home Internet Uses.

According to the results, the overall Chi-Square for Elementary Grade Level was $\chi^2(15, 12{,}510 = 36.298, p = .002)$. Zero cells had expected count less than 5. The overall Chi-Square for Higher Grade Level was $\chi^2(15, 32{,}272 = 159.948, p < .001)$. Zero cells had expected count less than 5. The findings indicated that both grade levels were non-significant among all of the school districts in which students use their devices to participate in video chats, or video calls while at home. The findings indicated that the same was true for both grade levels who students downloaded video or audio content while at home. The elementary grade level findings indicated that students who used their devices to stream video or audio content while at home were non-significant among all school districts. However, the higher grade level findings indicated that District 2 and District 4 were statistically significant.

Both grade levels were non-significant among all of the school districts who students used their devices to play online multiplayer video games while at home. The elementary grade level findings for students who used their devices to print documents and other materials from websites were non-significant among all the school districts. However, the higher grade level findings indicated that District 1were significant. The

finding indicated that the elementary grade level District 2 and District 4 were statistically significant for students who did not use the internet at home. District 1, District 2, and District 4 were significant for the higher grade level for student who did not use the internet at home.

Table 8

Grade Level _ Elementary: Home Internet Use District Crosstabulation

Home Internet Use * District Crosstabulation					
		District			
		1	2	3	4
1 Participate	Count	458	863	207	1189
	Expected Count	468.3	872.9	207.0	1168.9
	Standardized Residual	-.5	-.3	.0	.6
2 Download	Count	397	725	165	961
	Expected Count	387.4	722.2	171.3	967.1
	Standardized Residual	.5	.1	-.5	-.2
3 Stream	Count	512	867	224	1226
	Expected Count	487.6	908.9	215.5	1217.1
	Standardized Residual	1.1	-1.4	.6	.3
4 Play	Count	303	613	128	771
	Expected Count	312.8	583.1	138.3	780.8
	Standardized Residual	-.6	1.2	-.9	-.4
5 Print	Count	359	645	175	958
	Expected Count	368.3	686.5	162.8	919.4
	Standardized Residual	-.5	-1.6	1.0	1.3

Table 8 (Continued)

Grade Level _ Elementary: Home Internet Use District Crosstabulation

Home Internet Use * District Crosstabulation					
		District			
		1	2	3	4
6 None	Count	127	306	54	277
	Expected Count	131.7	245.4	58.2	328.7
	Standardized Residual	-.4	3.9	-.6	-2.9
Total	Count	2156	4019	953	5382
	Expected Count	2156.0	4019.0	953.0	5382.0

Table 9

Grade Level _ Higher: Home Internet Use District Crosstabulation

Home Internet Use * District Crosstabulation					
		District			
		1	2	3	4
1 Participate	Count	1471	1027	2775	1548
	Expected Count	1517.6	1016.2	2728.4	1558.8
	Standardized Residual	-1.2	.3	.9	-.3
2 Download	Count	1266	797	2198	1304
	Expected Count	1238.1	829.1	2226.0	1271.7
	Standardized Residual	.8	-1.1	-.6	.9
3. Stream	Count	1633	967	2858	1727
	Expected Count	1598.5	1070.4	2874.0	1642.0
	Standardized Residual	.9	-3.2	-.3	2.1
4. Play	Count	1000	713	1808	1057
	Expected Count	1018.5	682.0	1831.2	1046.2
	Standardized Residual	-.6	1.2	-.5	.3

Table 9 (Continued)

Grade Level _ Higher: Home Internet Use District Crosstabulation

Home Internet Use * District Crosstabulation					
		District			
		1	2	3	4
5 Print	Count	1254	854	2472	1414
	Expected Count	1333.6	893.0	2397.6	1369.8
	Standardized Residual	-2.2	-1.3	1.5	1.2
6 None	Count	556	450	798	325
	Expected Count	473.7	317.2	851.6	486.5
	Standardized Residual	3.8	7.5	-1.8	-7.3
Total	Count	7180	4808	12909	7375
	Expected Count	7180.0	4808.0	12909.0	7375.0

Research Question 4 focuses on whether students have access to effective internet connectivity at home? To answer this question the researcher used Question C and Question D. The frequencies from all schools were calculated to see the overall results of the grouped districts and grade levels. The standardized residuals of greater than positive or negative 2 are significant.

Question C focuses on the type of internet connection parents have in their home and the question has five scales. The five scales are Wired, Wireless, Dial-up, Smartphone/Cellphone, and No Internet Access at Home. Table 9 showed the descriptive statistics of each scale. Question D focuses on the quality of internet access parents have at home. Question D has five scales. The five scales for Question D are Excellent Access, Average Access, Poor Access, Occasional Access, and No Internet Access.

Table 10, Table 11, Table 12, and Table 13 showed the descriptive statistics of each scale.

Internet Connection at Home

Question C centers on what type of internet connection do parents have in their home? According to the results, the overall Chi-Square for Elementary Grade Level was $\chi^2(12, 6{,}768 = 80.259, p < .001)$. Zero cells had expected count less than 5. The overall Chi-Square for Higher Grade Level was $\chi^2(12, 17{,}973 = 150.901, p < .001)$. Zero cells had expected count less than 5. The first scale is Wired Broadband. The internet connection could be accessed through DSL, fiber, or a cable provider. The findings indicated that elementary grade level was non-significant among all of the school districts who students use wired to connect to the internet. Higher grade level was significant among District 1, District 2, and District 4. The second scale is Wireless Broadband internet connection in the home. The internet connection could be accessed through using satellite, 5G, Wi-Fi, or hotspots. The findings indicated that both grade levels were significant among District 1 for students who use wireless to connect to the internet. The third scale is Dial-up connection. The internet connection could be accessed through the phone company.

The findings indicated that elementary grade level was significant among all District 1, District 2, and District 3 who students use dial-up to connect to the internet. Higher grade level was non- significant among all the school districts. The fourth scale is Smartphone/Cellphone. The internet connections could be accessed through a cellular data plan. The findings indicated that elementary grade level was non-significant among all school district who students use smartphone/cellphone to connect to the internet.

Higher grade level was significant among District 1. The last scale is No Internet Access. Parents acknowledge that there is no internet connection at home. The findings indicated that elementary grade level was significant among District 2 and District 4 who students do not have internet connection at home. Higher grade level was significant among District 1, District 2, and District 4.

Table 10

Grade Level _ Elementary: Type of Internet Connection at Home

Type of Internet Connection at Home * District Crosstabulation					
		District			
		1	2	3	4
1 Wired	Count	236	388	107	549
	Expected Count	231.3	404.3	101.9	542.4
	Standardized Residual	.3	-.8	.5	.3
2 Wireless	Count	428	874	199	1198
	Expected Count	487.7	852.6	214.9	1143.7
	Standardized Residual	-2.7	.7	-1.1	1.6
3 Dial-Up	Count	34	21	16	33
	Expected Count	18.8	32.9	8.3	44.1
	Standardized Residual	3.5	-2.1	2.7	-1.7
4 Smartphone	Count	439	649	182	937
	Expected Count	398.8	697.2	175.8	935.2
	Standardized Residual	2.0	-1.8	.5	.1
5 None	Count	86	206	35	151
	Expected Count	86.4	151.0	38.1	202.6
	Standardized Residual	.0	4.5	-.5	-3.6
Total	Count	1223	2138	539	2868
	Expected Count	1223.0	2138.0	539.0	2868.0

Table 11

Grade Level _ Higher: Type of Internet Connection at Home

Type of Internet Connection at Home * District Crosstabulation					
		District			
		1	2	3	4
1 Wired	Count	699	447	1352	888
	Expected Count	767.3	537.1	1350.0	731.5
	Standardized Residual	-2.5	-3.9	.1	5.8
2 Wireless	Count	1459	1139	2799	1470
	Expected Count	1556.2	1089.3	2737.9	1483.6
	Standardized Residual	-2.5	1.5	1.2	-.4
3 Dial-Up	Count	34	32	84	32
	Expected Count	41.2	28.9	72.6	39.3
	Standardized Residual	-1.1	.6	1.3	-1.2
4 Smartphone	Count	1538	966	2448	1318
	Expected Count	1420.9	994.6	2499.9	1354.6
	Standardized Residual	3.1	-.9	-1.0	-1.0
5 None	Count	343	267	483	175
	Expected Count	287.4	201.1	505.6	273.9
	Standardized Residual	3.3	4.6	-1.0	-6.0
Total	Count	4073	2851	7166	3883
	Expected Count	4073.0	2851.0	7166.0	3883.0

Quality of Internet Access

Question D centers on what is the quality of internet access do parents have in their home? According to the results, the overall Chi-Square for Elementary Grade Level was $\chi^2(12, 4{,}707 = 158.490, p < .001)$. Zero cells had expected count less than 5. The overall Chi-Square for Higher Grade Level was $\chi^2(12, 12{,}359 = 192.111, p < .001)$. Zero cells had expected count less than 5.

Excellent Access is the first scale. The concept of Excellent Access is defined as reliable with unlimited data. The findings indicated that elementary grade level was significant among District 1 who students had excellent internet quality. Higher grade level was significant among District 1 and District 4. The second scale is average access. Average access is defined as mostly reliable with sufficient amount of data. The findings indicated that both grade levels were non-significant among all of the school districts who students had average internet quality.

The third scale is Poor Access. Poor Access is defined as unreliable and/or very limited data. The findings indicated that the elementary grade level was significant among District 1 and District 2 who students had poor internet quality. Higher grade level was significant among District 1, District 2, and District 4.

The fourth scale is Occasional Access. Occasional Access is defined as internet service that the parents and students gain through family members, the local library, or public Wi-Fi. Both grade levels were non-significant among all the school district who students have access to occasional internet quality. The last scale is No Internet Access at home. Parents who selected this option do not have access to any form of internet quality. Both grade levels were significant among District 2 and District 4.

Table 12

Grade Level _ Elementary: Quality of Internet Access

Quality of Internet Access * District Crosstabulation					
		District			
		1	2	3	4
1 Excellent	Count	192	475	95	610
	Expected Count	248.9	432.8	108.1	582.1
	Standardized Residual	-3.6	2.0	-1.3	1.2
2 Average	Count	361	658	167	901
	Expected Count	378.6	658.4	164.5	885.4
	Standardized Residual	-.9	.0	.2	.5
3 Poor	Count	203	119	70	311
	Expected Count	127.5	221.8	55.4	298.3
	Standardized Residual	6.7	-6.9	2.0	.7
4 Occasional	Count	13	22	4	29
	Expected Count	12.3	21.5	5.4	28.8
	Standardized Residual	.2	.1	-.6	.0
5 None	Count	85	211	35	146
	Expected Count	86.5	150.5	37.6	202.4
	Standardized Residual	-.2	4.9	-.4	-4.0
Total	Count	854	1485	371	1997
	Expected Count	854.0	1485.0	371.0	1997.0

Table 13

Grade Level _ Higher: Quality of Internet Access

Quality of Internet Access * District Crosstabulation					
		District			
		1	2	3	4
1 Excellent	Count	598	549	1317	786
	Expected Count	759.2	528.0	1291.7	671.1
	Standardized Residual	-5.8	.9	.7	4.4
2 Average	Count	1164	826	2051	1115
	Expected Count	1204.4	837.7	2049.2	1064.7
	Standardized Residual	-1.2	-.4	.0	1.5
3 Poor	Count	743	313	963	428
	Expected Count	571.6	397.6	972.5	505.3
	Standardized Residual	7.2	-4.2	-.3	-3.4
4 Occasional	Count	64	50	91	39
	Expected Count	57.0	39.6	97.0	50.4
	Standardized Residual	.9	1.6	-.6	-1.6
5 None	Count	318	270	490	184
	Expected Count	294.8	205.0	501.6	260.6
	Standardized Residual	1.4	4.5	-.5	-4.7
Total	Count	2887	2008	4912	2552
	Expected Count	2887.0	2008.0	4912.0	2552.0

Questions B, C, and D were used to answer the Research Question 5 and Research Question 6. Question B was used to calculate and compare means by One-Way ANOVA. Question C was used to calculate and compare the proportions by Chi-Square. Question D was used to calculate and compare the proportions by Chi-Square. As mentioned earlier, Question B has eight scales, Question C has five scales, and Question D has five scales. Table 11 was used to answer Research Question 5. Also, Figure 3 was used to answer Research Question 5. Table 14 was used to answer Research Question 6. Also, Figure 5 and Figure 6 were used to answer Research Question 6.

Devices for Students Use, Internet Access, and Quality of Internet Access

Question B was calculated using One-Way ANOVA. Research Question 5 focuses on what is the digital equity difference in devices, internet connective, and quality among students in the four grouped school districts? The first scale for Question B is Window Laptops. The average number of Window Laptops in each district was similar. However, District 4 had the highest average number of Window Laptops and District 1 had the least number of Window Laptops. There was a statistically significant difference among districts in the number of Window Laptops at home *($F (3, 109) = 1.27$, $p<0.05$*. The second scale is Apple Laptops. The average number of Apple Laptops in each district was similar. District 1 had the highest average number of Apple Laptops and District 2 had the least number of Apple Laptops. There was no significant difference among districts in the number of Apple Laptops at home *($F (3, 109) = 1.86$, $p=0.05$*. The third scale is the iPad Tablet. The average number of iPad Tablets in each district was similar. District 3 had the highest number of iPad Tablets and District 2 had the least number of iPad Tablets. There was a statistically significant difference among

districts in the number of iPads Tablets at home *(F (3, 109) = 1.52, p<0.05*. The fourth scale is Chromebooks. The average number of Chromebooks in each district was similar. District 4 had the highest number of Chromebooks and District 2 had the least number of Chromebooks. There was a statistically significant difference among districts in the number of Chromebooks at home *(F (3, 109) = 1.22, p<0.05*. The fifth scale is Other Type of Devices such as Samsung or Kindle. The average number of Other Types of Devices in each district was similar. District 4 had the highest number of Other Types of Devices and District 2 had the least number of Other Types of Devices. There was a statistically significant difference among districts in the number of Other Types of Devices at home *(F (3, 109) = 1.25, p<0.05*. The sixth scale is Gaming Consoles. The average number of Gaming Consoles in each district was similar. District 4 had the highest average number of Gaming Consoles and District 1 had the least number of Gaming Consoles. There was no significant difference among districts in the number of Gaming Consoles at home *(F (3, 109) = 1.97, p=0.05*. The seventh scale is Smartphone. The average number of Smartphones in each district was similar. District 1 had the highest average number of Smartphones and District 4 had the least number of Smartphones. There was a statistically significant difference among districts in the number of Smartphones at home *(F (3, 109) = 1.18, p<0.05*. The eighth scale is Hours Spent on the Devices. The average number of Hours Spent on the Devices in each district was similar. District 3 had the highest average number of Hours Spent on the Devices and District 1 had the least number of Hours Spent on the Devices. There was a statistically significant difference among districts in the number of Smartphones at home *(F (3, 109) = 0.85, p<0.05*.

Table 14

Study Variables of Means, Standard Deviations, and One-Way ANOVA

Devices/ Hours	District 1		District 2		District 3		District 4	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Window Laptops	1.05	0.25	1.09	0.27	1.11	0.36	1.20	0.21
Apple Laptops	0.35	0.21	0.23	0.12	0.29	0.25	0.27	0.13
iPad Tablets	0.55	0.22	0.45	0.19	0.56	0.27	0.53	0.21
Chromebooks	0.30	0.35	0.38	0.32	0.31	0.20	0.43	0.27
Other Type (Samsung, Kindle)	0.60	0.21	0.56	0.22	0.58	0.19	0.66	0.14
Gaming Consoles	0.86	0.19	0.82	0.22	0.82	0.21	0.94	0.22
Smartphones	2.63	0.28	2.51	0.43	2.56	0.25	2.49	0.22
Hours Spent on The Devices	4.63	1.15	5.10	2.77	6.19	7.04	4.87	1.13

Devices/Hours	F (3,109)	Eta Square
Window Laptops	1.27	0.03
Apple Laptops	1.86	0.05
iPad Tablets	1.52	0.04
Chromebooks	1.22	0.03
Other Type (Samsung, Kindle)	1.25	0.03
Gaming Consoles	1.97	0.05
Smartphones	1.18	0.03
Hours Spent on The Devices	0.85	0.02

Question C is also related to Research Question 5. Question C calculated the frequencies from all schools to see the overall difference within the grouped school districts. Results are shown in Figure 2. The first scale is Wired internet connection. District 3 had the highest percentage of households that had wired internet connection, and District 2 had the lowest percentage. The second scale is Wireless internet connection. District 3 had the highest percentage of households that had wireless internet connection, and District 1 had the lowest percentage. The third scale is Dial-up internet connection. District 3 had the highest percentage of households that had dial-up internet connection, and District 1 had the lowest percentage. The fourth scale is Smartphone internet connection. District 3 had the highest percentage of households that had smartphone internet connection, and District 2 had the lowest percentage. The fifth scale is No Home Internet connection. District 3 had the highest percentage of households that had no internet connection, and District 4 had the lowest percentage. District 3 had the highest percentage of households that had excellent access to the internet, and District 2 had the lowest percentage.

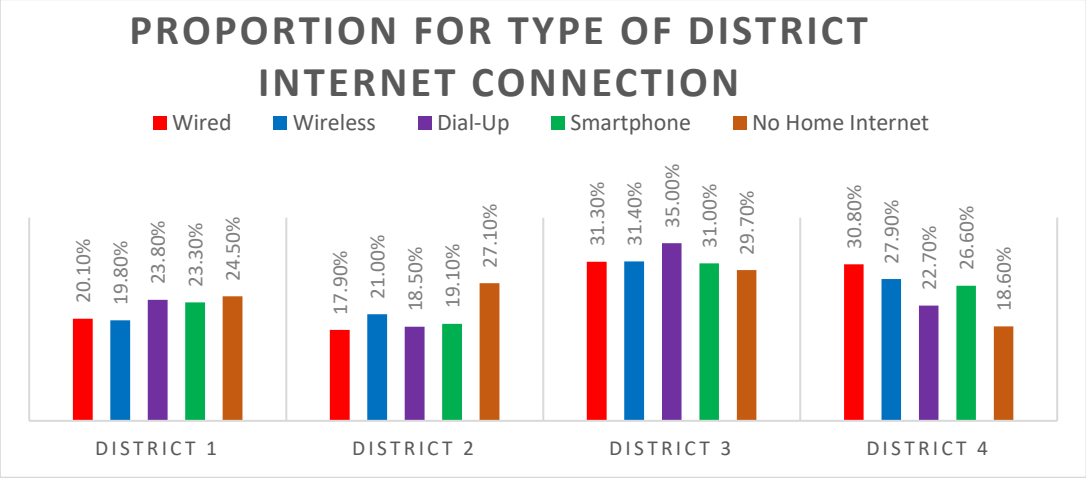

Figure 2. Proportion for Type of District Internet Connection.

Question D is also related to Research Question 5. Question D calculated the frequencies from all schools to see the overall difference within the grouped school districts. Results are shown in Figure 3. The first scale is Excellent Access to the internet. District 3 and District 4 had the highest percentage of households that had excellent access to the internet, and District 1 had the lowest percentage. The second scale is Average Access to the internet. District 3 had the highest percentage of households that had average access to the internet, and District 2 had the lowest percentage. The third scale is Poor Access to the internet. District 3 had the highest percentage of households that had poor access to the internet, and District 2 had the lowest percentage. The fourth scale is Occasional Access to the internet. District 3 had the highest percentage of households that had occasional access to the internet, and District 4 had the lowest percentage. The fifth scale is No Home Internet Access to the internet. District 3 had the highest percentage of households that had no home internet access, and District 4 had the lowest percentage.

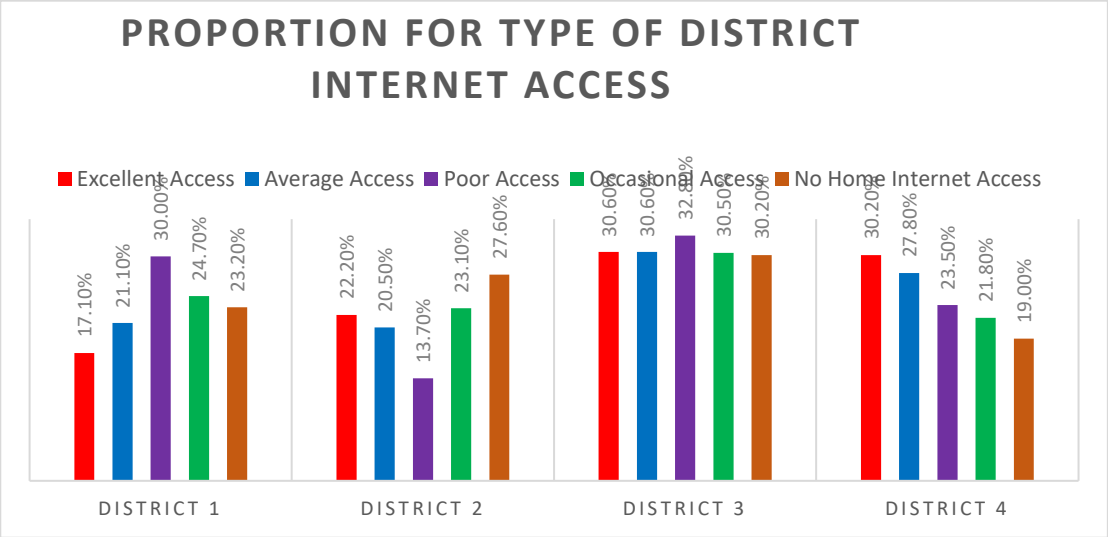

Figure 3. Proportion for Quality of District Internet Access.

Question B was calculated using One-Way ANOVA. Research Question 6 focuses on what proportion of devices and internet connections is available to elementary students. middle, and high school students? The first scale is Window Laptops. The means among elementary school and higher school are similar. The test was found to be statistically non-significant, $t\ (111) = 0.17, p>.05; d = 0.035$. The second scale is Apple Laptops. The mean among both grade levels is similar. The test was found to be statistically non-significant, $t\ (111) = 0.29, p>.05; d = 0.052$. The third scale is iPads Tablets. The mean among both grade levels is equal. The test was found to be statistically non-significant, $t\ (111) = 0.09, p>.05; d = 0$.

The fourth scale is Chromebooks. The mean for the higher school group is slightly higher than the elementary school group. The test was found to be statistically significant, $t\ (111) = 1.27, p<.05; d = 0.276$. The fifth scale is Other Type Devices such as Samsung or Kindle. The mean among both grade levels is similar. The test was found to be statistically non-significant, $t\ (111) = 0.15, p>.05; d = 0.051$. The sixth scale is Gaming Consoles. The mean among both grade levels is similar. The test was found to be statistically non-significant, $t\ (111) = 1.93, p>.05; d = 0.418$.

The seventh scale is Smartphones. The mean for the higher school group is slightly higher than the elementary school group. The test was found to be statistically significant, $t\ (111) = 3.43, p<.05; d = 0.718$. The eight scale is Hours Spent on the Devices. Parents in the higher school group reported that students spent 5 hours and 34 minutes compared to 4 hour and 96 minutes reported by elementary school students' parents. The test was found to be statistically non-significant, $t\ (111) = 0.43, p>.05; d = 0.093$.

Table 15

Result of Analysis Examining Digital Equity Difference in Devices

Devices/Hours	Elementary		Higher Level		*t* (111)	*p*	Cohen's d
	M	*SD*	*M*	*SD*			
Window Laptops	1.10	0.37	1.11	0.25	0.17	0.87	0.035
Apple Laptops	0.29	0.23	0.28	0.18	0.29	0.77	0.052
iPad Tablets	0.52	0.27	0.52	0.22	0.09	0.93	0
Chromebooks	0.29	0.22	0.37	0.31	1.27	0.21	0.276
Other Type (Samsung, Kindle)	0.59	0.21	0.60	0.19	0.15	0.88	0.051
Gaming Consoles	0.79	0.21	0.88	0.21	1.93	0.06	0.418
Smartphones	2.38	0.29	2.60	0.29	3.43	<0.001	0.718
Hours Spent on The Devices	4.96	2.79	5.34	4.43	0.43	0.67	0.093

Question C is related to Research Question 6. Research Question 6 focuses on the proportion of devices, internet connection, and quality of internet access available to the grade level. Question C was calculated to compare the proportion by Chi-Square. Results are shown in Figure 5. The first scale is Wired internet connection. There were more students among the higher school group than the elementary school group who used wired internet connection at home. The second scale is Wireless internet connection. There were more parents in the higher school groups that use wireless internet connection. The third scale is Dial-up. More parents in the higher school group used dial-up internet connection than parents in the elementary school group. The fourth scale is Smartphone. Higher school group parents use smartphones more than elementary school groups. The fifth scale is no home internet connection. There were more households among the higher school groups that did not have internet connection than elementary.

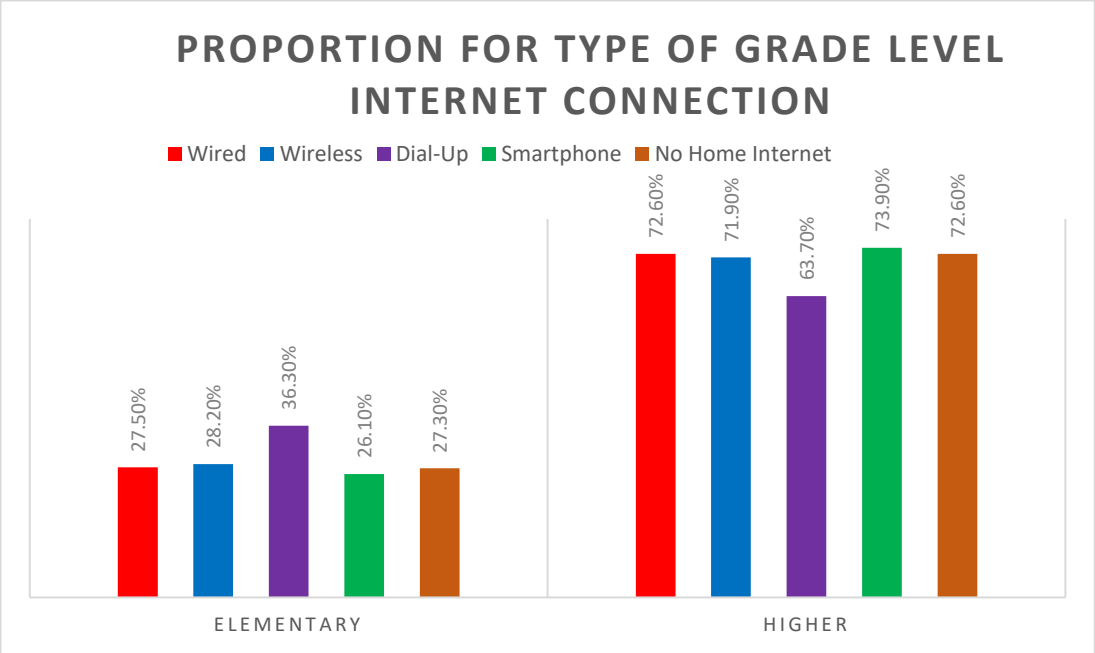

Figure 4. Proportion for Type of Grade Level Internet Connection.

Question D is related to Research Question 6. Research Question 6 focuses on the proportion of devices, internet connection, and quality of internet access available to the grade level. Question D was calculated to compare the proportion by Chi-Square. Results are shown in Figure 5. The first scale is Excellent Internet Access. The higher school group has more access to excellent internet access than elementary.

The second scale is Average Internet Access. Parents in the higher school group had more access to average internet than parents in the elementary school group. The third is Poor Internet Access. The higher school group had more access than the elementary school group to poor internet access. The fourth scale is Occasional Internet Access. More parents in the higher group had occasional internet access than parents in the elementary school group. The fifth scale is No Home Internet Access. More parents in the higher group had no home internet connection than parents in the elementary school group.

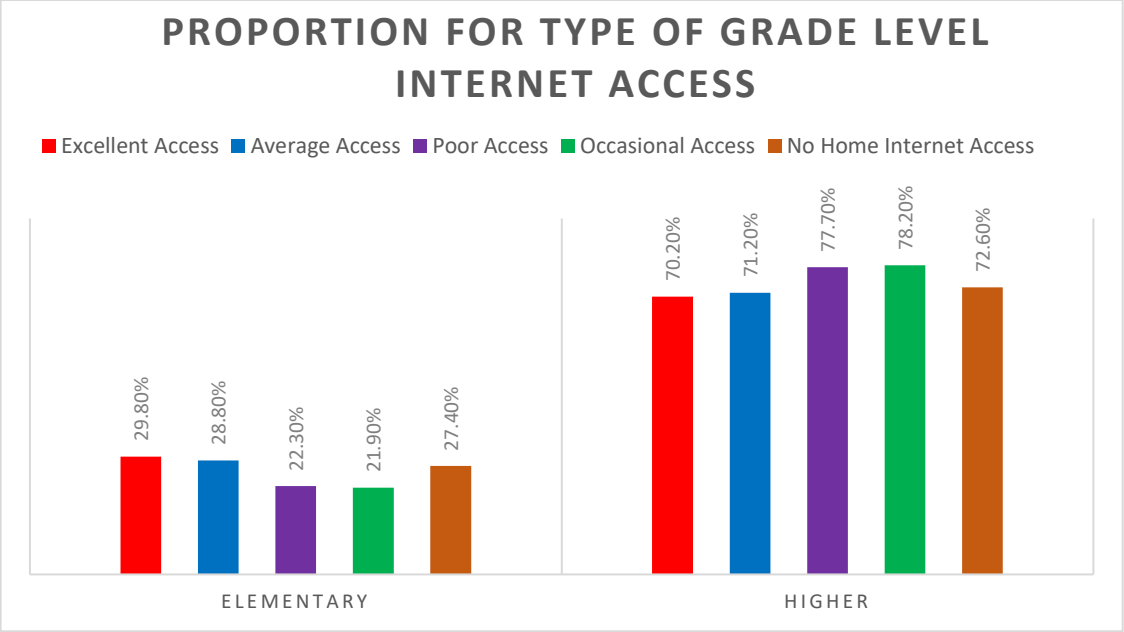

Figure 5. Proportion for Quality of Grade Level Internet Access.

Summary

This chapter summarized the main findings of the mixed-methods study. The qualitative stage aimed to collect data to gain educators' perspective of the one-to-one computing in Mississippi. There were 7 teachers, 6 principles, 1 curriculum director, and 2 technology directors from 3 school districts interviewed. Interviews were transcribed and coded. The quantitative stage aimed at addressing potential digital equity issues in the state of Mississippi. Due to a lack of response from parents to the researcher's survey, the researcher used secondary data from the Mississippi Department of Education survey. The Mississippi Department of Education developed the survey and then allowed the school districts and charter schools to administer the instrument to the parents. There were 17,064 effective responses, which consisted of 110 public school districts and 03 charter schools. Qualitative results showed that each school district was at a different

stage of implementing their one-to-one computing program. However, the educators recommended pedagogy and program guidelines for an effective one-to-one computing program. Quantitative results showed that certain districts in the state of Mississippi have issues with technology access to all students. Also, certain grade levels are experiencing issues with digital equity.

CHAPTER V – DISCUSSION

This chapter aligned the findings of the studies with the research questions to interpret, explain, and compare the results of prior studies. The study's implications from the educational and practical perspective were discussed by exploring the ways administrators and practitioners could apply the results to real-world situations. The study limitations were discussed to remind other researchers to generalize the findings to different contexts. Finally, the chapter ended with suggestions and recommendations for future research to indicate how the study results might encourage additional investigations on the one-to-one computing program in low-income areas.

Conclusions and Discussions

This mixed-method study investigated the one-to-one computing program in low-income areas in Mississippi. The researcher first interviewed 7 teachers, 6 principals, 1 curriculum director, and 2 technology directors to gain educators' perspectives on the effectiveness of the one-to-one computing program in Mississippi. Due to the pandemic, secondary data from a survey conducted by the Mississippi Department of Education was used to explore parents' access to devices and quality internet in Mississippi. The Mississippi Department of Education sent the survey to 110 school districts and 3 charter schools. The data was collected, and based on the data from the Mississippi Department of Education, that data was analyzed. The study's findings were organized in the following sections based on the data collection sequence. The themes emerging from the qualitative stage were summarized under the two research questions. Statistical analysis results in the quantitative stage were aligned with 4 research questions.

Qualitative Stage

The main goal of the qualitative stage was to collect data about educators' perspectives on the effectiveness of the one-to-one computing program in Mississippi. Seven teachers, 6 principals, 1 curriculum director, and 2 technology directors with various backgrounds and experience participated in the qualitative data collection. The interviews were conducted via Zoom due to the pandemic. Also, the researchers and participants collaborated via emails and phone calls. The following sections discussed educators' strategies for supporting the one-to-one computing program in their school district.

Research Question 1: What is the extent of educators' use of technology in the classroom?

The first research question addressed teachers' perspectives of the one-to-one computing program. As noted in Chapter II, researchers who investigated 100 years of educational technology have argued for the use of technology in the educational setting. The argument was based on the perception from educators that schools are institutions that are deeply rooted in conservative values, and it would be difficult to change social dynamics (Zheng et a., 2016). According to the qualitative stage findings, teachers in this study utilized technology in various ways. Despite starting their educational and professional career in other professions than teaching, the teachers all completed a traditional education program or an alternate route program through Mississippi. The teachers all teach classes using the traditional face-to-face method. However, most of the courses are online due to parents who prefer their children stay at home during the pandemic. Students who must be quarantined because of a COVID-19 outbreak are also moved online for instruction.

The teachers noted their philosophy of teaching centers on the belief that all students can learn given an opportunity. COVID-19 has presented a challenge to providing meaningful learning opportunities. As a result of the pandemic, instruction has shifted to online learning. Therefore, the role of the teacher has changed. This study noted that their primary function is to facilitate students' learning. According to the teachers, the facilitator role is very different from teaching a traditional face-to-face classroom.

As noted in Chapter II, technology integration is defined as incorporating technology resources and technology-based practices into schools' daily routines, work, and management (National Center for Education Statistics, 2019). Another study noted that school districts that implemented one-to-one initiatives used technology as an instructional tool and improved teaching and learning. The implementation process is different for policymakers who attempt to fuse technology into the educational setting and focus directly on teacher training and professional development. Therefore, the concern within the academic environment is that teachers are not adequately trained or provided adequate support that goes beyond learning necessary specific technology skills, and those skills might include using a tool or software program (Kim et al., 2013). The research findings indicated that the teacher in the study had a clear understanding of the one-to-one computing program. The teachers view one-to-one computing as effective. Most of the teachers have experience with using technology as an instructional tool. The teachers gain their expertise through various sources. Some gain the knowledge through professional development sessions while working in other school districts. Others gained experience through their degree program while earning a degree. The teachers integrated technology in delivering their lessons almost every time or frequently. Also, the teachers

were either slightly, moderately, or extremely comfortable with using technology as an instructional tool, and the results were evenly spread across the four choices.

The teachers noted that students use one-to-one computing devices for the sole purpose intended by the program because the students are engaged in the instructional process. Teachers use one-to-one computing devices to use different applications and web-based programs like i-Ready and Canva. The teacher uses other learning management systems such as Canvas and Google Classroom to engage students in the instructional process. Some of the most popular applications used by the teachers are Jamboard, Classkick, Kahoot, Edgenuity, and Screencastify.

The teachers use technology applications because the school district requires i-Ready and Edgenuity. Also, teachers noted that if they attend a professional development session and a new application is featured, they are most likely to use the application in the classroom setting. Teachers mentioned that if the school library media specialist or other colleagues recommend applications for instructional purposes, they will use them in the classroom. Teachers noted that the attribute that attracts them to a particular technology application is whether it is user-friendly. They also mentioned any application that does not require students to provide personal information is preferred. The teacher stated that any applications that are free or offer a free trial are also preferred.

Teachers in the study do not have a problem gaining access to technology in their classrooms. Teachers noted that their school districts provide technology applications, especially during the pandemic. Teachers pointed out that some companies offer a free trial period. The district has provided training to support the teacher's current use of technology. Administrators at the building level have also provided teacher training.

Some school administrators have utilized teachers, who have a vast knowledge of technology, to provide professional development sessions in their building.

Teachers find that students are receptive to using technologies in the classroom. Some teachers noted that their students already have a vast knowledge of the technology applications being used in the school. The students are now learning how to apply the knowledge in the instructional setting. For example, teachers often use Tik Tok for instructional purposes. Students already know how to use Tik Tok. Therefore, teachers assign a project where students create videos on various subjects. Most of the teachers have concerns about students having access to technology. Teachers in the rural and one of the urban school districts noted that some students do not have access to Wi-Fi once they go home. Teachers must think of alternative ways to assign homework for the students. The teachers noted that school district officials had addressed the concern by placing Wi-Fi hotspots in different areas in the community. Teachers mentioned that officials had parked old buses with Wi-Fi hotspots in various communities. Other school districts have Wi-Fi hotspots in the high school football stadiums. Teachers believed that increasing technology in the classroom would increase the need for a one-to-one computing program. One teacher cautioned that technology does not replace the teacher as the instructor. She viewed technology as a supplement within the instructional process.

Research Question 2: How does the teacher's implementation of technology-enriched lessons impact the performance of one-to-one?

The second research question addressed the perspective of the one-to-one computing program from technology directors, curriculum directors, and principals. As

noted in Chapter II, researchers indicated that school districts in the United States are increasingly adopting educational goals to promote 21st-century skills that enhance collaboration, communication, creativity, digital literacy, and self-directed learning. Technology integration is the aggressive approach many school districts have decided to implement. One of the most popular approaches to technology integration is one-to-one initiatives. One-to-one computing often refers to a learning environment where students and teachers can access a personal computing device. The devices are mainly used for academic learning (Varier et al., 2017).

According to the qualitative stage findings, technology directors in this study implement the one-to-one computing program in their district in various ways. The technology directors have immense knowledge of the one-to-one computing program. One of the directors noted that one-to-one computing is defined in multiple ways depending on where you live in the state. For example, the technology director noted that the one-to-one computing program is implemented differently in several districts in the state. One school district indicated by the director allows each student and teacher to take the device home. Another district has a device for every student, but the device remains at school. Both technology directors feel that the one-to-one computing program effectively provides students with technology access.

Both directors of technology became aware of the one-to-one computing program through research about the program. One of the technology directors mentioned that the district superintendent first communicated about the potential of the one-to-one computing program. The other technology director said that the district technology director spoke about the possibility of the one-to-one computing program in the district.

As a result of the program research, both directors found the information reliable as to the understanding, how it works, and why it works. Both directors formed a favorable attitude towards the program by researching the positive benefits other districts reported.

One technology director noted the superintendent was actively involved in the decision-making process. The other technology directors said that the technology research was presented to the superintendent and the school board, and the final decision was made to implement the program. Both directors noted that the diffusion networks were a change agent. One of the change agents was the superintendent, and the other was the former technology director. The directors did not seek social media to gain information about the program. However, one director did consult an education publication about the one-to-one computing program. The director did have an opportunity to observe the implementation process. One director was a technology trainer when the district implemented the program. The technology trainer was responsible for showing students how to implement technology into the curriculum using the one-to-one computing devices. Both directors' overall experience with the adoption of the one-to-one program was positive. One director noted that looking for ways to expand the program in the school district requires the collection of more data. The other technology director notes the expansion of the Wi-Fi infrastructure needs to be in place along with professional technology development. The director also suggested teaching digital citizenship to teachers and students.

According to the qualitative stage findings, curriculum directors in this study help implement the one-to-one computing program device into the instructional process. The curriculum directors for the school district oversee developing the curriculum standards.

They work with lead teachers and instructional coaches to set those standards. The curriculum directors offer ongoing professional development about instructional techniques. The school district provided ongoing professional development for teachers. The district has a professional development plan. The curriculum and instructional department submit that plan to the school board at the beginning of the year. Professional development goals for the year based on needs assessment data in which the curriculum department assesses their teachers at the end of the school year.

The curriculum department helps the schools with exceptional education students. The school district has a unique service program that offers a variety of exceptional education classes. The curriculum directors work collaboratively with the special service program director. Both directors directly oversee the professional development of all teachers. Some of the collaborative professional development sessions that are developed are how to meet the needs of all students, training for the teachers on modifications and accommodations required by the IEP for those students.

The director noted that the one-to-one computing program had been introduced 10 years ago, and the one-to-one computing program is implemented for students in 7th through 12th grades, and those students are allowed to take the devices home. Students in kindergarten through 2nd grade use a computer assigned to the teachers. Students in 3rd through 5th grades had a computer cart in every classroom, and in the 6th-grade classroom, every student had one device that stayed at school.

The director stated the school district uses a vetting process to integrate specific curriculum standards into a course. The curriculum department staff vet their standards

to determine which measures will be taught and which standards will focus on. The vetting process is used to determine how much time will be spent on each standard and develop a pacing guide or scoping sequence for teachers to use in the classroom.

The curriculum director mentioned that teachers have access to various resources. Teachers can access everything from original hard copy textbooks, companion student workbooks, consumables, digital textbooks, and digital resources. The textbook companies have started to offer digital resources. The district uses other stand-alone software, such as Reading Plus and i-Ready. She mentioned the community purchased a learning management system such as Canvas to facilitate the expansion of the 1:1 computing program. Canvas was purchased to help streamline their curriculum to teach and meet the distance learning needs, which also helped develop the district's online learning platform.

The district expects that all schools will implement the one-to-one computing program. Therefore, the district does not give incentive to implement the one-to-one program. The director thinks to improve the expansion of a one-to-one computing program, the first thing a district must do is ensure support among all in the learning community to implement one-to-one. A school district must have a Wi-Fi provider or internet access. The broadband must be strong enough to support all the district student body and teachers. Another concern is making sure that the electrical infrastructure can support the technology. A district must have professional development for teachers who struggle with implementing technology.

The director emphasized that officials do not just hand teachers a classroom set of Chromebooks and say, here you go and have fun. She thinks there needs to be planning

and training so teachers can intentionally use the technology. The device needs to be tied to a standard that teachers are teaching in the activity and geared toward that. Teachers do not open Chromebooks just for the sake of typing something or watching a video.

According to the qualitative stage findings, administrators in this study help implement the one-to-one computing program device into the school building level. The administrator mentioned that the number of years their one-to-one computing program varies. However, some of the administrators' one-to-one computing program implementation ranges from one year to ten years. The administrator mentioned that expanding the one-to-one computing program in a school district would improve the Wi-Fi infrastructure. The administrators said that the school district must provide Wi-Fi capabilities to the students once they are at home. One administrator mentioned that teaching parent technology literacy would help expand a district's one-to-one computing program. Another administrator said creating a central communication database platform will help develop the one-to-one computing program.

The administrators mentioned that students do use a one-to-one computing program for the sole purpose of the program. They also said that teachers incorporate technology so much that students do not have time to use their devices for anything else. Also, the administrators credit the district technology department for providing a solid internet filter system. Administrators are notified when students are searching inappropriate websites. In addition to the notification, some administrators have incorporated a discipline system for students who repeatedly violate the district internet policy. According to the administrators, teachers use one-to-one computing devices for integrating different applications such as Pear Deck, Nearpod, Kahoot, and Classkick.

Also, teachers use the device to teach using learning management systems such as Canvas and Google Classroom. One administrator noted that his school is almost paperless, and everything, including parents' communication, is done electronically.

According to the administrators, all students participate in the one-to-one computing program. The districts do not require a usage fee for students to participate in the program. The administrators acknowledge there have been situations where parents still decided not to participate in the one-to-one computing program. One administrator noted that two parents at his school decided not to participate. He talked to the parents and informed them that the district was moving toward the program. He also reported that their child would be missing necessary instruction. The parent enrolled their child in the one-to-one computing program. Some administrators noted that students could bring their devices from home. The district allows students who get their own devices to connect to the district Wi-Fi. Administrators mentioned that students who do not participate in the one-to-one computing program are given a desktop or a laptop to use during the class period.

Some students have problems accessing the internet when they are at home. According to the administrators, other problems encountered by the students are caused by the student themselves. Some students lose computer keys or accidentally do something to the computer and do not correct the issues. All the administrators noted that the technology department is responsible for maintaining the devices. One high school administrator noted that Career and Technical Education students assist the technology technician in the school library. The assistance allows CTE students to gain hands-on experience in information technology. Middle school administrators have a group of

middle school students called the Little IT Help Desk. The students repair minor computer issues for students and teachers under the supervision of the technology technician.

The administrators shared additional information about the one-to-one computing program. One administrator noted how her district actively promotes technology in the classroom. Each summer, the technology directors host a technology camp for teachers and administrators from all over Mississippi. The technology camp recently included educators from other states. Another administrator noted that school districts should provide professional development for their teachers. The administrator indicated that PLC or a pod system could conduct professional development. All the administrators mentioned that much planning must occur, especially ensuring that the Wi-Fi infrastructure is implemented effectively. Also, unexpected issues might come up after the implementation of the program. One administrator mentioned having to implement a disciplinary system for students who repeatedly violate the Acceptable Use Policy. Also, the administrators said having to purchase charging stations so students can charge their devices throughout the day.

Quantitative Stage

The main goal of the quantitative stage was to collect data about parent access to emerging technology in Mississippi. The data was collected to gain a perspective on access to devices, type of internet connection, and quality of home internet access. There were 110 public school districts and 3 public charter schools that participated in the quantitative data collection. Also, 17,064 parents participated in this study. The

following sections discussed the details of parents' access to emerging technologies, internet access, and quality of internet at home.

Research Question 3: Do students access the internet and emerging technologies to utilize digital learning resources at home?

Chapter II of the study noted that researchers indicate that inadequate technology access affects other demographic groups. According to the researchers' findings, an interesting augment presented the digital divide deliberation. An example of this was evident during the first three decades of the history of the internet. People entirely dominated access to the internet with a high or medium level of education, both inside and outside work and school. The demographic group that can access the internet has drastically changed. Today, lower educated and disabled people are considered as digitally falling behind. Results yield people within those demographic groups are less likely to use the internet, in any environment, than people that are employed or highly educated (van Deursen et al., 2014).

The first quantitative research question centers on students' access to devices and home internet. Question B (devices at home for students' use) was used to compute the averages and number of hours students spend on those devices. Parents in 113 school districts and public chartered schools responded to this question. According to the quantitative stage findings, parents have access to emerging technologies. However, the main form of emerging technology that parents have access to is Smartphones. On average, 2.55 school districts reported that parents use smartphones as their primary form of emerging technologies more than any other device. The second highest devices used by parents were the Window Laptops. On average, 1.11 school districts indicated that

parents had Window Laptops in the home. Apple Laptops, iPads, Tablets, Chromebooks, Other Types such as Samsung, Kindle, and Gaming Consoles had an average of less than 1. Parents indicated that students spent an average of 5 hours and 25 minutes on their devices.

The number of households in Mississippi that lack mobile devices were highlighted by the United States Census. According to the United States Census Bureau (2020), between 2015 through 2019, approximately 83.8 percent of the households in Mississippi have access to a computer. The census categorized computers as a desktop, laptop, smartphone, tablet, some other type of portable wireless computer, or some other type of computer. Some of the participants noted a computer in the household and then proceeded to write in a type of computer. The census officials then reclassified the device into the main category, such as desktop or smartphone. Based on a 4-year reclassified evaluation, the census data do not include individuals living in dormitories, prisons, nursing homes, or foster care facilities.

Question E (home internet uses) was used to calculate the sum frequencies from all schools. The 113 school districts and chartered schools were divided into four grouped school districts. The four grouped school is a modified model of Mississippi's four congressional districts. In addition, the participants were placed into two grade levels. The two grade levels are elementary and higher (combined middle school and high school). 12,510 parents responded to the question. The elementary grade level was non-significant in all school districts among households who use the internet to participate, download, stream, play, and print. District 1 and District 3 were non-significant among families who do not use the internet in the home. However, District 2,

with a count of 306 and expected count of 245.4, and District 4, with a count of 277 and an expected count of 328.7, were significant among households who do not use the internet in the home setting.

The higher-grade level was non-significant in all school districts among households who use the internet to participate, download, and play. District 1and District 3 was also non-significant among families who use the internet to stream. District 2, District 3, and District 4 were also non-significant among households who use the internet to print. However, District 2, with a count of 967 and expected count of 1,070.4, and District 4, with a count of 1,727 and expected count of 1,642.0, were significant among households who use the internet to stream. District 1, with a count of 1,254 and an expected count of 1,333.6, was substantial among homes that use the internet to print. District 1, with a count of 556 and expected count of 473.7, and District 2, with a count of 450 and an expected count of 317.2, were significant among households who do not use the internet in the home. Also, District 4 was substantial, with a count of 325 and an expected count of 486.5.

According to the United States Census Bureau (2021), between 2015 through 2019 there were 71.5 % of the households in Mississippi had broadband internet subscriptions. However, access to internet services refers to whether or not someone in the household uses or connects to the internet services regardless of whether they pay or do not pay for the services themselves. The data is consistent with the results of this study. For example, the elementary grade level findings indicated significance for District 2 in households who do not use the internet. District 4 findings were significant in the same category for both grade levels. According to Data USA (2021), since 2019,

the second congressional district has seen a decrease in population, and the median household income only grew by 1.28%. African Americans account for 66.6% of the people, and Caucasians account for 29.5 %. The third most common ethnic groups are Hispanics, which account for 1.86 % of the population. The fourth congressional district has seen an increase in population, and the median household income grew by 4.41%. Caucasians account for 68.3% of the population, and African Americans account for 23.4%. The third most common ethnic groups are Hispanics, which account for 3.21%. Other ethnic groups of individuals reported being members of two or more races that account for 2.27% and Asians who account for 1.28%. Therefore, minority ethnic groups in Mississippi disproportionally have access to the internet and emerging technologies at home to utilize digital learning resources.

Research Question 4: Do students have access to effective internet connectivity at home?

Comparative studies were conducted on the availability of, access to, and use of new technologies among low-income and high-income socioeconomic groups. Inequality is a critical social issue within the educational system. The problem of inequality still exists because huge achievement gaps continue within the academic setting. Although student-computer ratios in the schools were similar to the social context, computer usage differed drastically. Low-socioeconomic status schools are affected by students' uneven human support networks and random home access to computers. The differences are expressed within three primary forms. Those forms are technology access and usage, labeled performativity, workability, and complexity. Each of the types affects how schools deploy new technologies for academic preparation (Warschauer et al., 2004).

The second quantitative research question centers on students' access to effective internet connectivity at home. Question C (type of internet connection at home) was used to calculate the sum frequencies from all schools to see the overall results by district groups and grade level. Six thousand seven hundred sixty-eight parents responded at the elementary grade level, and 17,973 responded at the higher grade level from the four grouped districts. The findings indicated that the wired category on the higher level in District 1, with a count of 699 and an expected count of 767.3, District 2 with a count of 447 and expected count of 537.1, and District 4 with a count of 888 and expected count of 731.5 were that only significant districts. The wireless category was substantial on the elementary grade level in District 1, with a count of 428 and an expected count of 487.7. District 1, with a count of 1,459 and an expected count of 1,556.2 was also significant on the higher grade level. The dial-up category was only significant on the elementary grade level. The districts that were statistically significant are District 1 with a count of 34 and expected count of 18.8, District 2 with a count of 21 and expected count of 32.9, and District 3 with a count of 16 and an expected count of 8.3. District 1, with a count of 1,538 and an expected count of 1,420.9 among the higher grade level, was the only significant finding in the smartphone category. The no type of internet connection category was significant in District 2 with a count of 206 and expected count of 151.0 and District 4 with a count of 151 and expected count of 202.6 among the elementary grade level. District 1 with a count of 343 and expected count of 287.4, District 2 with a count of 267 and expected count of 201.1, and District 4 with a count of 175 and expected count of 273.9 were significant among the higher grade level.

The findings of this study are consistent with earlier research. As stated earlier in this chapter, the United States Census reported that 71.5 % of the households in Mississippi have broadband internet subscriptions. However, that subscription might or might not be paid by the householder (Data USA, 2021). Further, evaluation of this study's findings is aligned with the earlier research. For example, on the elementary grade level, only two districts (District 2 and District 4) showed statistically significant results, and three districts (District 1, District 2, and District 4) showed statistically significant developments in the category of not having an internet connection at home. According to Data USA (2021), the percentage of the population of the three congressional districts is higher than the national average of 12.3%. The percentage of people that live below the poverty line is 16.3% in the 1st Mississippi congressional district. The largest demographic living below the poverty line is females ages 25 through 34. The following demographic is females aged 18 through 24, followed by males ages 18 through 24. The percentage of the population that lives below the poverty line in the 2nd Mississippi Congressional District is 27%. The largest demographic living below the poverty line is females ages 25 through 34. The following demographic is females aged 6 through 11, followed by males ages 6 through 11. The percentage of the population that lives below the poverty line in the 4th Mississippi Congressional District is 19.6%. The largest demographic living below the poverty line is females ages 25 through 34.

Question D (quality of internet access) was used to calculate the sum frequencies from all schools to see the overall results by district groups and grade level. Four thousand seven hundred seven parents responded at the elementary grade level, and 12

359 responded at the higher grade level from the four grouped districts. The findings indicated that the excellent access category, District 1, with a count of 192 and an expected count of 248.9, was the only district significant among the elementary grade level. District 1 with a count of 598 and expected count of 759.2 and District 4 with a count of 786 and expected count of 671.1 among the higher grade level. Both grade levels were non-significant in all school districts among the average access category. The poor access category was significant among District 1 with a count of 203 and an expected count of 127.5 and District 2 with a count of 119 and an expected count of 221.8 among the elementary grade level. The higher-grade level was significant among District 1 with a count of 743 and expected count of 571.6, District 2 with a count of 313 and expected count of 397.6, and District 4 with a count of 428 and an expected count of 505.3. Both grade levels were non-significant in the school district among the occasional access category. District 2 and District 4 were significant among both grade levels in the no access category. The elementary grade level District 2 count was 211 and expected count of 150.5, and District 4 count was 146 and expected count of 202.4. Higher grade level District 2 count was 270 and expected count of 205.0 and District 4 count was 184 and expected count of 260.6

The findings of this study indicated that District 2 and District 4 were significant among both grade levels in the no access category. According to Data USA (2021), the most common racial or ethnic group living below the poverty line in Mississippi Congressional District 2 is African American, Caucasian and Hispanic. The most common racial or ethnic group living below the poverty line in Mississippi Congressional District 4 are Caucasian, followed by African American and Hispanic. Males ages 6

through 11 in Mississippi Congressional District 2 and District 4 are among the third demographic living in poverty. This study's findings are aligned with earlier research concerning social-economic status. Students who live in Mississippi Congressional Districts with a high poverty rate do not have a quality internet connection at home (Data USA, 2021).

Research Question 5: What is the digital equity difference in devices, internet connectivity, and quality among students in four grouped school districts?

According to Chapter II, ethnic minorities are the population that is most often affected by digital inequality. Ethnic minorities are often those who are in lower socioeconomic groups. Both groups have experienced a lack of access, and other disparities are based on wealth that continues for the neediest students (Judge et al., 2004). Earlier research indicated that every student does not have the same access to technology. Students who are African American, Hispanic, Native American, and poor are affected the most by the digital divide, and this division inequity is only expected to widen. Students from those cultural backgrounds are far less likely to have access to computers or quality internet connections at home compared to their Caucasian or Asian peers. One-third of minority students can log online, and their primary source of computer access is within the school setting (Mason & Dodds, 2005).

The third quantitative research question centers on students' access to devices, the type of internet connection, and the quality of internet access. Question B statistical analysis for Research Question 5 is different from Question B in Research Question 3. Question B (devices at home for students use) was used to compare means by One-Way ANOVA for the number of devices and number of hours students spent on those devices

among the four grouped school districts. According to research findings, the highest average number of devices parents have to use at home are smartphones. There was a statistically significant difference among districts in the number of smartphones at home *(F (3, 109) = 1.18, p<0.03)*. The averages in all the communities were similar. However, the parents in District 1, with an average of 2.63, had the overall highest standard. The next highest average device is the Windows Laptops, and the findings indicated the averages were also similar among all school districts. There was a statistically significant difference among districts in the number of Windows Laptops at home *(F (3, 109) = 1.27, p<0.03*. However, District 4, with an average of 1.20, had the highest average. Apple Laptops, iPads, Chromebooks, Other Devices (ex. Samsung and Kindle), and Gaming Consoles all had an average of less than 1. There was a statistically significant difference among districts in the number of hours spent on the devices *(F (3, 109) = 0.85, p<0.02*. The findings indicated that District 3 has the highest average of hours spent on the devices, with an average of 6 hours and 19 minutes. The average number of hours spent on the device was slightly different among District 1(5 hours and 3 minutes), District 2 (5 hours and 10 minutes), and District 4 (5 hours 27 minutes).

District 3 had the highest average of devices which was smartphones. According to Data USA (2021), the 3rd congressional district has seen a decrease of -0.0739% in the population and an increase in the median household income of 4.54%. The district has five ethnic groups. Caucasians are the largest ethnic group at 65.5%, followed by African Americans at 28.8%. Hispanic ethnic groups represent 1.68%, and two or more races represent 1.27%. Asian ethnic group represents 1.08%. The national average for the population that lives below the poverty line is 12.3%. The poverty status for the 1st

congressional district is 16.3%. The largest demographic living in poverty is females 25 through 34, followed by 18 through 24. Also, males 18 through 24 are affected by poverty.

Question C (type of internet connection at home) was used to compare the proportions of the four grouped districts. The findings indicated that the kind of internet connection varies among districts. District 3 had the highest percentage of students who had wired internet connection with 31.3%. District 2 had the lowest percentage of students who had wired internet connection with 17.9%. District 3 had the highest percentage of students with a wireless internet connection with 31.4%. District 1 had the lowest percentage of students with a wireless internet connection with 19.8%. District 3 had the highest percentage of students who had dial-up with 35%. District 2 had the lowest percentage of students who had dial-up with 18.5%. District 3 had the highest percentage of students who had a smartphone internet connection with 31%. District 2 had the lowest percentage of students who had a smartphone internet connection with 19.1%. District 3 had the highest percentage of students who did not have an internet connection, with 29.7%. District 4 had the lowest percentage of students who did not have an internet connection with 18.6%.

Question D (quality of internet access) was used to compare the proportions of the four grouped districts. The findings indicated that the quality of the internet connection varies among districts. Excellent access had the highest percentage of 30.6% in District 3 and the lowest percentage of 17.10% in District 1. Average access had the highest percentage of 30.6% in District 3 and the lowest percentage of 21.1% in District 1. Poor access had the highest percentage of 32.8% in District 3 and the lowest percentage of

13.7% in District 2. Occasional access had the highest percentage of 30.5% and the lowest percentage of 21.8% in District 4. No internet access had the highest percentage of 30.2% in District 3 and the lowest percentage of 19% in District 4.

According to Data USA (2021), the first congressional district had an income increase of 4.54%. The poverty rate was 16.3%, and the minority rate was 34%. The second congressional district had an income increase of 1.28%. The poverty rate was 27%, and the minority rate was 70.5%. The third congressional district had an income increase of 6.77%. The poverty rate was 18.9%, and the minority rate was 40.8%. The fourth congressional district had an income increase of 4.41%. The poverty rate was 19.6%, and the minority rate was 31.7%.

The findings of this study are consistent with earlier research. Congressional districts with higher poverty rates, higher minority rates, and lower-income rates, such as the 2nd Mississippi Congressional District, do not have access to various types of internet connections. Students in such as do not have access to quality internet access. Students in those areas a most likely to have no access to internet services. However, congressional districts with lower poverty rates, lower minority rates, and higher income rates, such as the 1st Mississippi Congressional District, the 3rd Mississippi Congressional District, and the 4th Mississippi Congressional District, have access to various internet connections and better quality of internet access.

Research Question 6: What proportion of devices, internet connection, and quality of internet access is available to elementary, middle, and high school students?

Chapter II of the study noted when all students are treated with equality in education; it is evident when they received that same or have access to similar resources.

Students receiving that material needed to graduate and be successful after high school is called visible equity (Center for Public School, 2016). Children within the United States are growing up in a global technologized world, and research shows that technologized world is not created equal across the income spectrum. The research indicates that in the United States has, more than 90% of families with school-age children living below the median household income report having internet access. More than half of these families report constraints such as interrupted or slow service, outdated devices, or sharing devices in their internet connectivity. Ensuring equitable access to the internet and internet-capable devices is essential as technological innovation becomes synonymous with educational innovation (Katz et al., 2018).

The fourth quantitative research question centers on students' access to devices and home internet. Question B statistical analysis for Research Question 6 is different from Question B in Research Question 3 and Research Questions 5. Question B (devices at home for students use) was used to compare means by One-Way ANOVA for the number of devices and number of hours students spent on those devices among the grade level. According to the finding, the highest average among the devices is Smartphones. The test was found to be statistically significant, $t\ (111) = 3.43, p<.05; d = 0.718$. The higher school level has the highest average among the Smartphone scale with an average of 2.60. The next highest average is Window Laptops, and the averages were similar among both grade levels. The test was found to be statistically non-significant, $t\ (111) = 0.17, p>.05; d = 0.035$. The average for elementary grade level was 1.10 and 1.11 for the higher grade level. The number of hours spent on the device was highest among

elementary grade levels, with an average of 5 hours and 36 minutes. The test was found to be statistically non-significant, $t\ (111) = 0.43, p>.05; d = 0.093$.

Question C (type of internet connection at home) was used to compare the proportions of the grade level. The highest percentage of students with wired (72.6%), wireless (71.9%), dial-up (63.7), smartphone (73.9), and no home internet connection (73.6%) was among the higher grade level. The lowest percentage of students with wired (27.5%), wireless (28.2%), dial-up (36.3), smartphone (26.1), and no home internet connection (27.3%) was among the higher grade level.

Question D (quality of internet access) was used to compare the proportions of the grade level. Also, the highest percentage of students with excellent (70.2%), average (71.2%), poor (77.7%), occasional (78.2%), and no home internet access (72.6%) was among the higher grade level. The lowest percentage of students with excellent (29.8%), average (28.8%), poor (22.3%), occasional (21.9%), and no home internet access (27.4%) was among the higher grades level.

According to Data USA (2021), the median household income for Mississippi is $45,792. Males have an average income that is 1.34 times higher than females. Mississippi income inequality is 0.458 lower than the national average. The minority population is 43.7%. The overall poverty rate is 20.3% which is 12.3% more than the national average. The poverty demographic are females ages 25 through 34, followed by females 18 through 24, and then females 35 through 44. The findings of this study are aligned with earlier research. Elementary grade level students disproportionally do not have access to devices, internet connection, and quality internet access.

Implications

The findings of this study have provided empirical evidence of effective strategies on how to implement the one-to-one in low-income areas. School teachers, school district officials, and administrators are not the only ones who would benefit from the results of how to implement the one-to-one computing program successfully. Governments and industries can also benefit from the results of this study. All investors can know the effectiveness of the strategies implemented for their one-to-one computing program. For example, the results indicated that all school district officials that participated in the study had a data-driven adoption process. The adoption process is critical because officials created diffusion networks and assigned various roles within that network. The officials could conduct and present research to all within the learning community. The analysis yielded that the officials need to develop or strengthen existing Wi-Fi infrastructures, and students might need some form of internet access at home. Providing access might come in the form of placing internet hotspots in certain areas within the community. The Wi-Fi infrastructure might include upgrading the electrical system to handle the increased usage of devices. Another recommendation that the participants made was providing surge protectors or a charging station for students. Some administrators in the study recommended giving teachers extra computers for students to use if the student's device is not charged.

School districts that implement a successful one-to-one computing program must implement a maintenance program. The administrator who participated in this study had a technology department technician assigned to their school. In addition to having an assigned technician, some administrators have Career and Technical Education students

studying information technology to assist the technician. The CTE students will be able to gain hands-on experience. Another administrator recommended allowing middle school students to volunteer for the Little IT Help Desk. The student would volunteer under the supervision of the district technician. Another study found that successful one-to-one computing programs provide digital citizenship lessons for teachers, students, and parents. Teachers will learn about device maintenance and professional development sessions about implementing technology in the classroom. Students would also learn about device maintenance and expectation of the program. Students will learn about the disciplinary protocol for violating the Acceptable Use Policy during this time. Parents will learn about the expectations of participating in the program and any technology that their child will be using throughout the school year. Parents and students can sign up for the district notification system during the digital citizenship orientation class.

Teachers might need ongoing professional development to help them learn how to implement technology into the instruction process. One of the study participants mentioned that her school district has a process for professional development sessions in her school district. She said that the first step is to send out a needs assessment survey to all administrators and teachers at the end of the school year. Once the data is collected, her department creates a professional development plan which is then submitted to the superintendent and the school board for approval. Once the project is approved, the program is implemented the next school year. If a teacher needs help with a specific skill not included in the professional development plan, the participant noted that the teacher would receive the requested professional development session. The participant indicated that the school district has a vetting process for the curriculum standards that will focus

on the following school year. Once the vetting process occurs, the curriculum department creates a document called a scope and sequence or pacing guide. Other participants recommended that teachers discuss different teaching strategies in their Professional Learning Community or a pod system.

The participants made recommendations about the application selection process to be used in the classroom. One participant noted she selected an application based on the application's user-friendliness. The teacher usually learns how to use the application during a professional development session. The participants stated they preferred to use any application that protects students' privacy. If the application does not require students to enter personal data, the participant is open to use the application in the classroom. Teachers are allowed to submit application recommendations to the district office. The school district would then purchase subscriptions for all teachers in the district.

The result of the parents' survey yielded some interesting findings. The main form of devices used by students in the home was the smartphone, and the second form of device was the Windows Laptop. To encourage more students to participate in the one-to-one computing program, school districts that participated in the study decided to purchase more economical devices. The purchase of such devices has allowed districts to eliminate the usage fee for parents. The study results indicate that the average number of hours spent on the computer was 5 hours and 25 minutes to participate in video calls, download videos, stream video/audio, play online multiplayer games, and print documents. Some households do not use their devices for any of the reasons listed

above. Due to the ongoing pandemic, some students might have to attend school via a virtual setting.

The study finding showed that the majority of the household have some form of internet connection. However, some districts had parents who did not have any form of the internet at home. Also, when looking at the data from the perspective of grade level, the study finding showed that the higher grade level, which is middle school and high school combined, had the higher percentage of students who had all types of internet connection. The data includes students who do not have an internet connection at home. When the research focuses on the quality of the internet connection, there are a lot of districts that have poor internet connections or no internet connection. The data indicated higher grade level experience with various internet connections, including no internet connection. The implication of this study finding centers on the different types of legislative acts designed to close the digital equity gap. For example, Mississippi passed The Equity in Distance Learning Act and the Mississippi Pandemic Response Broadband Availability Act. The Mississippi Department of Education can use the findings to determine how to distribute the $150 million allocated by The Equity in Distance Learning Act and the $50 million of the Mississippi Pandemic Response Broadband Availability Act. Policymakers will know which underserved school district and grade level most need computer devices software, enhance internet connectivity, and professional development for digital teaching and learning. This study can help policymakers focus necessary funds on those areas and grade levels that have the greater need. The United States Congress passed Biden's Build Back Better Plan. Biden's Plan will invest $65 billion in reliable, affordable, and high-speed internet for every

household. Policymakers can use the finding of this study to gear the designated $14 billion geared towards helping low-income Americans pay for service.

Limitations

The studies were conducted at the offset of the COVID-19 pandemic, and the public health emergency caused significant disruption in the education system in Mississippi. Only three districts, located in Mississippi, granted permission to conduct the interviews. There was one rural and two urban school districts. The participants for the qualitative phase of the study were interviewed on Zoom due to safety protocols set forth due to the COVID-19 pandemic. The researcher was not able to conduct observations within the school districts. The researcher used convenience sampling. Only one curriculum director and two technology directors participated in this study. Therefore, more teachers and administrators were interviewed to get a balanced perspective of the one-to-one computing program.

Early in the quantitative stage, the researcher developed a parent's survey for this study. The researcher emailed Parent Teacher Organizations to ask for permission to distribute the survey, and only one organization responded. However, after a month, the researcher asked one of the principals to submit the survey to the parents who were on faculty. After another month, the response rate slowed considerably. The researcher resorted to using an alternative survey that was developed and administered by the Mississippi Department of Education. The Mississippi Department of Education allowed each school district to administer the survey to parents.

Additionally, identifying information in the data from the Mississippi Department of Education was redacted to protect the privacy of the respondents. The Mississippi

Department of Education submitted the averages of survey questions. Therefore, the researcher had to calculate the standard of the norm. Also, the researcher could not use the entire data set simply because of how the data was received from the Mississippi Department of Education. The findings may not indicate educators' perceptions of the one-to-one computing program in other states or even in Mississippi.

To overcome the problem encountered during the qualitative stage in the future, researchers suggest adding more items to the survey that centers on information that would otherwise be collected through observation. The researcher might request artifacts from the school districts that would help the researcher gain more insight into the one-to-one computing program. The researchers' suggestions for overcoming the problem encountered during the quantitative stage are to mail a letter to the president of the Parent Teacher Organization. The researcher might want to send a follow-up email to the organization's president.

Future Research

The analysis of qualitative and quantitative data shows the need for further one-to-one computing program research in teacher professional development, digital learning, and family access to emerging technologies in the home setting. As mentioned above, the results of the interviews showed how a well-planned adoption of the one-to-one computing program could lead to academic success for students. Another direction of future research can focus on what positive or negative effect the COVID-19 pandemic had on one-to-one computing. Researchers can investigate how the pandemic affected implementing a new one-to-one computing program. They could address how teachers

had to modify their teaching pedagogy during the pandemic and how the one-to-one computing program impacted it?

The Digital Learning – Family Readiness Survey showed inequality in the type and number of devices students have access to at home. There was also inequality in internet connection and internet connection quality at home. Factors such as those mentioned have a significant impact on the students' academic growth. For example, some students might have to switch to virtual classes due to a state lockdown, or they might have to quarantine because of the pandemic. Most one-to-one computing programs collect the devices at the end of the school year. Therefore, students do not have access to one-to-one computing devices during the summer recess. Students not having access to devices or the internet might limit their ability to participate in summer school technology camps. The researcher could investigate how the increase of pandemic funds such as laws like the Biden's Build Back Better Plan, the Equity Distance Learning Act, and the Mississippi Pandemic Response Broadband Availability Act impacted internet connection and internet quality in the home setting.

Research could also research whether the laws increase student access to emerging technologies. Future research is recommended to adjust the qualitative sampling strategies and obtain samples with more balanced demographics by increasing parental involvement in the interview process. Future researcher could investigate the impact the one-to-one computing program on students with disabilities. Results may then be more comprehensive in how the one-to-one computing program impacts low-income areas in Mississippi. Research is suggested to use a different population of teachers, principals, technology directors, instructional directors, and curriculum directors to

develop interview protocol. Superintendents, assistant principals, instructional coaches, and interventionists can be included to gain insight into their opinions of the one-to-one computing program in Mississippi.

More extended qualitative studies that focus on multiple school districts are recommended. Researchers can do longer and in-depth observations of the implementation process to examine how the adoption process impacts the success of a one-to-one computing program. In addition, asking more specific questions about how one-to-one computing has helped schools implement a successful academic program is highly recommended.

Summary

The research produced a wealth of information regarding the one-to-one computing program in Mississippi. The significant point of the study include: (1) an effective adoption process is essential and must be data-driven, (2) all students must be able to participate in the one-to-one program or be able to participate in the BYOD program, (3) ongoing technology professional development is significant to the sustainability of program, (4) schools must install an excellent Wi-Fi infrastructure, (5) school districts must ensure building electrical infrastructure is upgraded to meet the need of the additional devices or have an alternative way for a student to charge their devices, (6) students must have access to devices at school and at home, and (7) students must have access to quality internet at home. Exploring the perceptions of educators and parents regarding the one-to-one computing program and access to emerging technologies in Mississippi were advantageous. This research study has contributed to digital equity by providing insight from educators to use research-based strategies to turn

around persistently underserved areas in Mississippi. Lawmakers, educators, parents, students, and communities have additional research to help determine if the one-to-one computing program has a significant impact on decreasing the digital divide among low-income children. Now, lawmakers can make informed decisions on whether to continue providing additional funding and resources to low-income areas. Lawmakers have additional research to help determine where and how to allocate technology funding. School district officials have research in order to make informed decisions about how to earmark funding within their district.

APPENDIX A– Participation Invitation Letter for Superintendent

Demetric D. Williams

Current Date

Name
Superintendent of Education
School District
Street Address
City, State Zip Code

Dear Name:

I am in the process of completing requirements for the Doctor of Philosophy Degree in Instructional Technology and Design at the University of Southern Mississippi in Hattiesburg, Mississippi. One of the requirements for this degree is that of conducting research. My dissertation's title is Digital Equity: Difficulties of Implementing the 1:1 Computing Initiative in Low-Income Areas.

I would like to include School District Name's technology directors, principals, assistant principals, and teachers in this study to complete this task. With your permission, I will like to interview each participant. All responses will be kept strictly confidential.

I am requesting your permission to include your school district in this process. With your consent, I would need to contact the school officials to provide specific instructions for interviewing.

Please enable me to conduct this research by permitting me to include your school district in this research. I will need a letter to include as an attachment in my dissertation, allowing me to conduct the research. You may indicate your response via email. My email address is Demetric.Williams@usm.edu.

Thank you so much for your attention and participation.

Sincerely,

Demetric D. Williams
Doctoral Student

(000) 000-0000
Demetric.Williams@usm.edu
Post Office Box 000000
Flowood, Mississippi 39232

APPENDIX B –IRB Approval Letter

Office *of*
Research Integrity

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

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NOTICE OF INSTITUTIONAL REVIEW BOARD ACTION

The project below has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services regulations (45 CFR Part 46), and University Policy to ensure:

- The risks to subjects are minimized and reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered involving risks to subjects must be reported immediately. Problems should be reported to ORI via the Incident template on Cayuse IRB. Dashboard
- The period of approval is twelve months. An application for renewal must be submitted for projects exceeding twelve months.
- FACE-TO-FACE DATA COLLECTION WILL NOT COMMENCE UNTIL USM'S IRB MODIFIES THE DIRECTIVE TO HALT NON-ESSENTIAL (NO DIRECT BENEFIT TO PARTICIPANTS) RESEARCH.

PROTOCOL NUMBER: IRB-19-610
PROJECT TITLE: Digital Equity: Difficulties of Implementing the 1:1 Computing Initiative in Low-Income Areas
SCHOOL/PROGRAM: School of IAPD, Human Capital Development
RESEARCHER(S): Demetric Williams, Jonathan Beedle

IRB COMMITTEE ACTION: Approved
CATEGORY: Expedited
7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

PERIOD OF APPROVAL: July 6, 2020

Donald Sacco Jr.

Donald Sacco, Ph.D.
Institutional Review Board Chairperson

APPENDIX C –MDE Request for Public Information

Public Record Request

Demetric Williams <Demetric.Williams@usm.edu>
Wed 1/6/2021 8:58 AM
To: reporting@mdek12.org <reporting@mdek12.org>

1 attachments (1 MB)
Data Public Record Request .pdf;

Dear Office of Public Reporting Representative:

Attached is a copy of my public record request. Many thanks for considering my request.

Sincerely,

Demetric Williams

MISSISSIPPI DEPARTMENT OF EDUCATION
Ensuring a bright future for every child

Office of Public Reporting
PO Box 771
Jackson, MS 39205-0771
601-359-3857
Email: reporting@mdek12.org

Requesters Public Records Request/Report Information

Full Name: Williams (Last) Demetric (First) D (M.I.)

Organization: University of Southern Mississippi

Address: Post Office Box 67 (Street Address)

Itta Bena (City) MS (State) 38941 (Zip Code)

Phone: (601) 675 2906 Alternate Phone: _____

Email: demetric.williams@usm.edu

Information Requesting

I hereby request the following records maintained by the MS Department of Education. (Request shall be specific enough to allow the Department employees to identify and retrieve records requested)

I would like received a copy of the data set from the survey titled, " Digital Learning - Family Readiness Survey."

My Request is to:

_____ 1. Review the records listed above
_____ 2. Receive copy (s) of records listed above
X 3. Mail copy (s) of records to address shown above

I understand that appropriate charges for searching, copying and/or mailing shall be paid in full prior to granting this request. I acknowledge that the Mississippi Department of Education has a minimum of seven (7) working days from the date of receipt to respond to my request in accordance with MS Public Records Act § 25-61-1 seq.

Signature of person making request: Demetric D. Williams

Doctoral Student (Title) 01/06/2021 (Date)

MDE USE ONLY

Footprint Number: _____ Date Completed: _____

	Approved	Denied	
Office of Public Reporting:	☐	☐	Initials_____ Date_____
Legal:	☐	☐	Initials_____ Date_____

APPENDIX D –Participation Invitation Letter for Administrators and Teachers

Demetric D. Williams

Dear Name:

Administrators & Teachers' Email Sample (1st Email)

Dear (Person Name):

I am in the process of completing requirements for the Doctor of Philosophy Degree in Instructional Technology and Design at the University of Southern Mississippi in Hattiesburg, Mississippi. One of the requirements for this degree is that of conducting research. My dissertation's title is Digital Equity: Difficulties of Implementing the 1:1 Computing Initiative in Low-Income Areas.

To complete this task, I would like to include you in this study. Due to the COVID-19 pandemic, I would like to interview via Zoom. The interview will be recorded for accuracy transcribing purposes, and all responses will be kept strictly confidential.

If you would like to participate in this study, please contact me at the email listed below to schedule a convenient time. I will email you a password-protected Zoom link and the participant consent letter.

Thank you so much for your attention and participation.

Sincerely,

Demetric D. Williams

(000) 000-0000
Demetric.Williams@usm.edu
Post Office Box 000000
Flowood, Mississippi 39232

APPENDIX E –Interview Authorization to Participate in Research Project

ORI | Office of Research Integrity

INSTITUTIONAL REVIEW BOARD

STANDARD (ONLINE) INFORMED CONSENT

STANDARD (ONLINE) INFORMED CONSENT PROCEDURES
The Project Information and Research Description sections of this form should be completed by the Principal Investigator before submitting this form for IRB approval. Use what is given in the research description and consent sections below when constructing research instrument online. Last Edited May 13th, 2019

Today's date:		
PROJECT INFORMATION		
Project Title: Digital Equity: Difficulties of Implementing the 1:1 Computing Initiative in Low-Income Areas.		
Principal Investigator: Demetric Williams	Phone: (601) 214-2206	Email: demetric.williams@usm.edu
College: College of Arts and Sciences	School and Program: Interdisciplinary Studies and Professional Development	

RESEARCH DESCRIPTION

1. **Purpose**:

The purpose of the study is to gain educators' perceptives about the one-to-one intiative in their schools. Participants will have the ability to reflect on their experience with the one to one program.

2. **Description of Study**:

The goal of the research is to determine the impact one-to-one computing initiatives have on computer access in rural areas in Mississippi. From the various educators' perspectives (district technology directors, curriculum directors, administrators, and teachers), the study will examine what factors : (1) make it difficult to implement the one-to-one program, (2) make it difficult to have full participation in the one-to-one technology program, and (3) their beliefs about the effectiveness of the one-to-one program intiative.

3. **Benefits**:

The following are potential benefits participants may gain as a result of participation:

1. Educators will have greater insight into best practices concerning one-to-one computing implementation.
2. Educators will learn how to maximize the instructional benefits of one-to-one computing.

4. **Risks**:

There are no known risks associated with individual's participation in this study.

5. **Confidentiality**:

The interviews will be audio recorded solely for the purpose of transcription. The data will be coded so as not to identify participants. The data will be stored in a locked file cabinet. The file cabinet will also have a padlock. All electronic files from the survey and the data will be stored on a password-protected computer

and erased. Media containing personal data will be burned so that the information cannot be read or reconstructed. The data will be destroyed after three years.

6. **Alternative Procedures:**

7. **Participant's Assurance:**

This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5125, Hattiesburg, MS 39406-0001, 601-266-5997.

Any questions about this research project should be directed to the Principal Investigator using the contact information provided above.

CONSENT TO PARTICIPATE IN RESEARCH

I understand that participation in this project is completely voluntary, and I may withdraw at any time without penalty, prejudice, or loss of benefits. Unless described above, all personal information will be kept strictly confidential, including my name and other identifying information. All procedures to be followed and their purposes were explained to me. Information was given about all benefits, risks, inconveniences, or discomforts that might be expected. Any new information that develops during the project will be provided to me if that information may affect my willingness to continue participation in the project.

Include the following information only if applicable. Otherwise delete this entire paragraph before submitting for IRB approval: The University of Southern Mississippi has no mechanism to provide compensation for participants who may incur injuries as a result of participation in research projects. However, efforts will be made to make available the facilities and professional skills at the University. Participants may incur charges as a result of treatment related to research injuries. Information regarding treatment or the absence of treatment has been given above.

CONSENT TO PARTICIPATE IN RESEARCH

By clicking the box below, I give my consent to participate in this research project.

☐ Check this box if you consent to this study, and then click "Continue." (Clicking "Continue" will not allow you to advance to the study, unless you have checked the box indicating your consent.)

If you do not wish to consent to this study, please close your browser window at this time.

1006 Community Avenue
P.O. Box 250
Pascagoula, Mississippi 39568-0250
Office: 228.938.6491
Fax: 228.938.6528
Website: www.pgsd.ms

February 11, 2020

To Whom it May Concern:

The purpose of this letter is to inform you that I give Demetric D. Willams permission to conduct the research titled "Digital Equity: Difficulties of Implementing the 1:1 Computing Initiative in Low-Income Areas" in the Pascagoula-Gautier School District for the purpose of completing requirements for the Doctor of Philosophy Degree in Instructional Technology and Design at the University of Southern Mississippi. I am giving Mr. Williams permission to interview the district's technology director, principals, assistant principals, and teachers in this study.

Sincerely,

Wayne V. Rodolfich
Superintendent

PASCAGOULA - GAUTIER SCHOOL DISTRICT

Re: Research Requested Information

Kelli Brown <kelli.brown@petalschools.com>

Wed 2/26/2020 8:50 AM

To: Demetric Williams <Demetric.Williams@usm.edu>

Thank you for your interest in conducting research in the Petal School District. I have received your documentation and will let the principals and the technology director know that you will be contacting them and/or their staff with questions if they choose to participate. Good luck in your research. Please share your results of the research when you complete it.

Kelli Brown
Director of Student Assessment
Petal School District

On Sun, Feb 23, 2020 at 6:31 PM Demetric Williams <Demetric.Williams@usm.edu> wrote:

> Dear Mrs. Brown:
>
> Attached is the information request. Please feel free to contact me if additional information is needed to complete the process.
>
> I look forward to hearing from you. Thank you in advance.
>
> Sincerely,
>
> Demetric D. Williams

Doctoral Research

Robert J Picou <rjpicou@tupeloschools.com>
Tue 2/25/2020 4:54 PM
To: Demetric Williams <Demetric.Williams@usm.edu>

Good morning,

I am writing to give you permission to conduct research in the Tupelo Public School District for the purposes of completing your dissertation named Digital Equity: Difficulties of Implementing the 1:1 computing Initiative in Low-Income Areas. Your research will include interviews with technology directors, principals, assistant principals and teachers, but only if they decide to participate, and will be kept confidential.

Thank you,
Dr. Rob Picou
Superintendent of Tupelo Schools

APPENDIX G –Interview Protocol for Educators

Topic: Digital Equity: Difficulties of Implementing the One-to-One Computing Initiatives in Low-Income Areas

Introduction: The interview begins with the researcher sharing a few comments about herself. The opening statement should include my role in IT 898 and why I am interested in the research project.

Research Questions: The following research questions addressed in the study:

- Question 1: What is the extent of educators' use of technology in the classroom?
- Question 2: How does the teacher's implementation of technology-enriched lessons impact the performance of one-to-one?

Teachers

I. Background Information

A. Can you tell me about yourself? Describe how you chose teaching as a career path, the type of work you did prior to entering the teaching profession and any preparation you had.

II. Teaching Experience

A. How long have you been working as a teacher?

B. What classes do you currently teach?

- Are any traditionally face-to-face, online, or technology course? What percentage of your teaching load?
- Do you have any certifications or did you receive any specialized training to teach the courses?

III. Teaching Philosophy

A. What is your teaching philosophy?

- Given the current COVID-19 situation, you find yourself teaching online. What do you think your role is in online classes?
- Is it different from teaching a traditional Face-to-Face course?

IV. Technology in the Classroom

A. What is your understanding of the one-to-one initiative?

B. What are your thoughts on whether or not the program is effective?

C. Tell me about your experience with technology as an instructional tool.

- On a scale of 1 to 5, with 1 being never and 5 being frequently, how would you rate the extent that you integrate technology in delivering your lessons? [Scale: 1-not at all, 2 – almost never, 3 – sometimes, 4 – almost every time, 5 – frequently]
- On a scale of 1 to 5, with 1 being not comfortable at all and 5 being extremely comfortable, where would your comfort level fall? [Scale: 1-not at all, 2 – slightly, 3 – somewhat, 4 –moderately, 5 – extremely]
- Do students use 1:1 computing device for the sole purpose of which is intended by the program?
- How do you use technology devices to engage students in the instructional process?

D. Describe any technologies that you use in the classroom.

- Why did you choose to use these technologies?
- Are there any specific attributes that attracted you to use them?
- Do you experience any challenges with gaining access to technology for use in your classroom?

- Have you received any training to support your current use of technology in the classroom? (ex: from the district, the campus, other teachers, etc.)

B. Do you find that your students are receptive to using technologies? Why? Explain.

- Are there any concerns about students' access to technology?
- Do you believe that increasing the use of technology in the classroom would increase students' participation in the one-to-one program?

District Technology Directors

I. Perspective of One-to-One Program

- What is your understanding of the one-to-one initiative?
- What are your thoughts on whether or not the program is effective?

II. Diffusion of One-to-One Computing

- How did you first become aware of the 1:1 computing program and knowledgeable of its implementation in the district? Who or what medium communicated to you about the potential of the 1:1 computing at your school?
- Did you find that having received information about the program, did you find that you had a good understanding of "the program," "how it works," and "Why it works"?

III. Adopting One-to-One Computing

- How were you persuaded to form a favorable or unfavorable attitude toward the 1:1 computing program?
- Did someone help in the decision to adopt?
- What were your diffusion networks (e.g., opinion leader, change agent)?

- Did you seek information from social networks, media, reviews.? Were you able to observe the implementation process?

IV. Benefits or Challenges Associated with One-to-One Adoptions

- Describe your overall experience with adopting the program
- What do you think would help improve your district/school expanding the 1:1 computing program?

Curriculum Directors and Instructional Technology Directors

I. District Curriculum Implementation

A. Who developed the curriculum standards for your district?

B. Does anyone offer ongoing professional development about instructional techniques? Does the school district provide help in accessing continuous professional development?

C. Does the school assist with exceptional education students?

II. Adoption of One-to-One Program

A. What is in the one-to-one implementation process in your district?

B. How many years has 1:1 computing implemented in your district?

C. Are there administrative processes that need to consider when deciding whether or not to integrate specific curriculum standards into your courses?

D. What types of resources are available to improve the quality of the instruction process for faculty?

- What kinds of resources, if any, do you feel would help facilitate the expansion of the 1:1 computing program?

- Were there any incentives in place for you to implement the 1:1 computing program at your school?
- What do you think would help improve your district/school expanding the 1:1 computing program?

III. Additional Information

A. Is there anything else about 1:1 computing teacher's preparation that you would like to share?

Principals and Career and Technical Directors (Administrators)

I. The Implementation of One-to-One Computing

A. How many years has 1:1 computing implemented in your school?

B. What do you think would help improve your district/school expanding the 1:1 computing program?

II. The Usage of One-to-One Devices

A. Do students use 1:1 computing device for the sole purpose of which is intended by the program?

B. In general, how do teachers use technology devices to engage students in the instructional process?

III. Participation in One-to-One Computing

A. Does every student in the classrooms participate in the one-to-one computing program?

B. If a student cannot afford the usage fee for the device, what alternative available for the student to use technology in the classroom.

C. What problems do students encounter using 1:1 device?

D. Who is responsible for the maintenance of 1:1 equipment?

IV. Additional Information

A. Is there anything else about 1:1 computing teacher's preparation that you would like to share?

APPENDIX H –MDE Digital Learning - Family Readiness Survey

Digital Learning - Family Readiness Survey

Digital Learning - Family Readiness Survey

Please Select District Name where you live*

--Please Select--

A. Families and Students*

- ☐ We have one or more students enrolled in ELEMENTARY SCHOOL
- ☐ We have one or more students enrolled in MIDDLE SCHOOL
- ☐ We have one or more students enrolled in HIGH SCHOOL

B. Desktops/Laptops/Tablets at Home for Students Use

*How many devices (Desktops/Laptops/Tablet/etc.) are available for student use at home? (ANSWER ALL THAT APPLY)**

How many Windows laptops, tablets, or desktop computers (Windows 8.1 or higher)?	
How many Apple laptops or desktop computers (Mac OS X 10.9 or higher)?	
How many iPad tablets (iOS 10 or higher)?	
How many Chromebooks (Chrome OS 75 or higher)?	
How many other types of internet-connected tablets (e.g., Samsung, Kindle)?	
How many Internet-connected gaming consoles (e.g., Xbox, Playstation)?	
How many smartphones (e.g., iPhone, Android, or other)?	
If you have NO devices available for student use, please enter "0".	
How many hours per day on average can each student spend on the device(s) available at home?	

C. Internet Access at Home

*What type of internet connections do you have in your home? [CHECK ALL THAT APPLY]**

- ☐ "Wired" Broadband (through DSL, fiber, or a cable provider)
- ☐ "Wireless" Broadband (using satellite, 5G, Wi-Fi, or hotspot)
- ☐ Dial-up (through the phone company)
- ☐ Smart phone/cell phone (with a cellular data plan)
- ☐ We have NO internet access at home

D. Quality of Internet Access

*What is the quality of internet access do you have in your home?**

- ○ Excellent access (reliable with unlimited data)
- ○ Average access (mostly reliable with sufficient amount of data)
- ○ Poor access (unreliable and/or very limited data)
- ○ Occasional access (e.g., through family, library, or public Wi-Fi)
- ○ We have NO internet access at home

E. Home Internet Uses

*How do you use the internet in your home? [CHECK ALL THAT APPLY]**

- ☐ To participate in video chats or video calls while at home
- ☐ To download video/audio content while at home
- ☐ To stream video/audio content while at home
- ☐ To play online multiplayer video games while at home
- ☐ To print document and other materials from websites
- ☐ None

F. Special Needs

*What types of special supports do you need to access digital learning at home? [CHECK ALL THAT APPLY]**

- ☐ Translation services
- ☐ Closed captioning services
- ☐ Other special accommodations
- ☐ None

Done

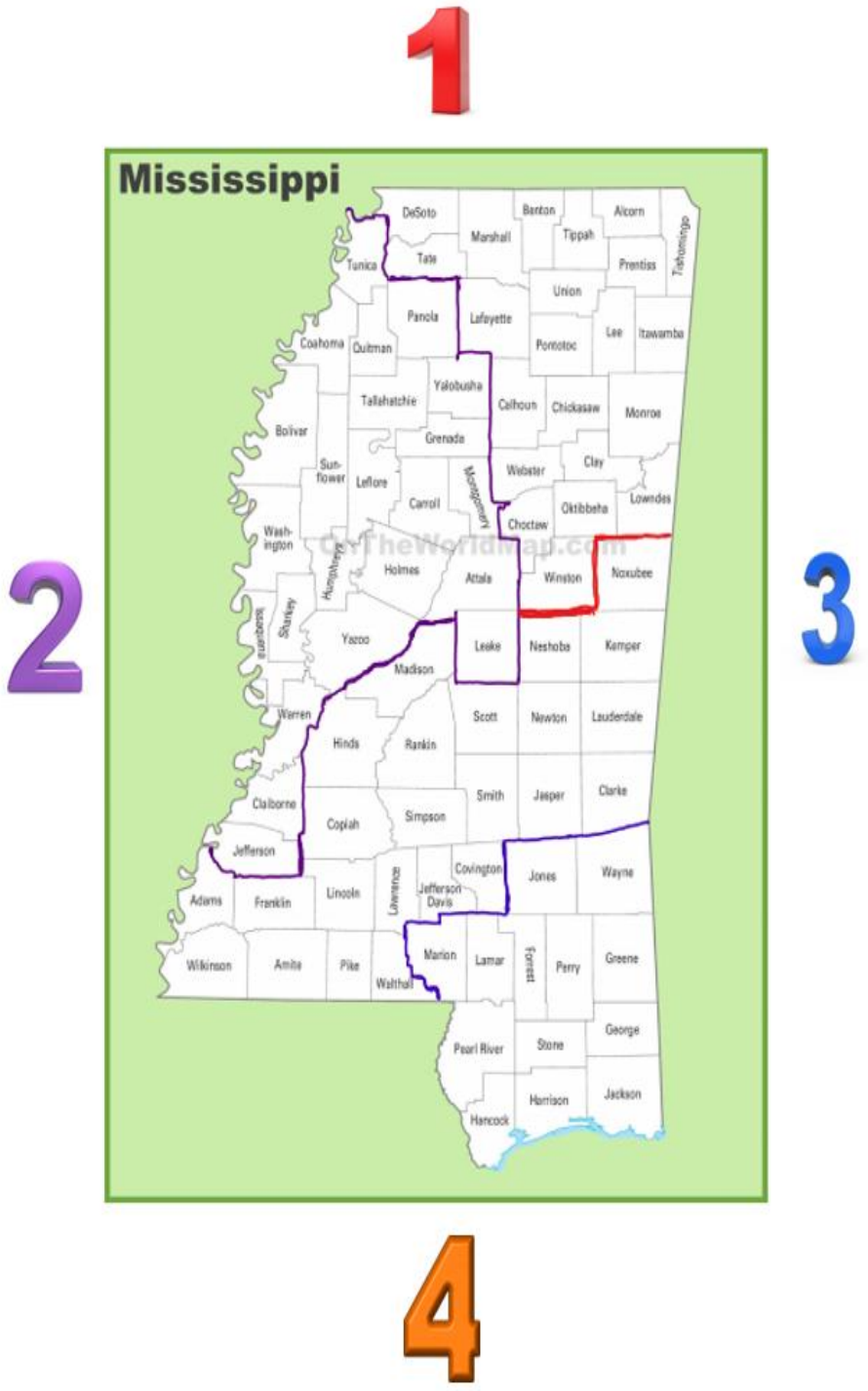
APPENDIX I –Mississippi One-to-One Computing Districts

One-to-One Computing Districts

District 1	District 2	District 3	District 4
Alcorn School District	Carroll County School District	Brookhaven School District	Bay St. Louis-Waveland School District
Amory School District	Clarksdale Collegiate	Clinton Public School District	Biloxi Public School District
Baldwyn Public School District	Clarksdale Municipal School District	Copiah County School District	Forrest County AG High School
Benton County School District	Cleveland School District	Covington County School District	Forrest County School District
Calhoun County School District	Coahoma County School District	East Jasper Consolidated School District	George County School District
Chickasaw County School District	Coahoma Early College High School	Enterprise School District	Gulfport School District
Columbus Municipal School District	Coffeeville School District	Hazlehurst City School District	Hancock County School District
DeSoto County School District	East Tallahatchie Consolidated School District	Hinds County School District	Harrison County School District
Holly Springs School District	Greenville Public Schools	Jackson Public School District	Hattiesburg Public School District
Houston School District	Greenwood Leflore Consolidated School District	Jefferson Davis County School District	Jackson County School District
Itawamba County School District	Grenada School District	Kemper County School District	Jones County School District
Lee County School District	Hollandale School District	Lauderdale County School District	Lamar County School District
Louisville Municipal School District	Humphreys County School District	Lawrence County School District	Laurel School District
Lowndes County School District	Jefferson County School District	Lincoln County School District	Moss Point Separate School District
Monroe County School District	Leake County School District	Madison County School District	Pass Christian Public School District
Nettleton School District	Leflore Legacy Academy	Meridian Public Schools	Pearl River County School District
New Albany Public School District	Leland School District	Natchez-Adams School District	Perry County Schools
Okolona Municipal Separate School District	North Bolivar Consolidated School District	Neshoba County School District	Petal School District
Pontotoc City Schools	North Pike Consolidated School District	Newton County School District	Picayune School District

Pontotoc County School District	South Delta School District	Noxubee County School District	Poplarville Special Municipal Separate School District
Senatobia Municipal School District	South Panola School District	Pearl Public School District	Quitman School District
Starkville Oktibbeha Consolidated School District	Sunflower County Consolidated School District	Rankin County School District	Quitman County School District
Tate County School District	Tunica County School District	Reimagine Prep	Richton School District
Tupelo Public School District	Vicksburg-Warren School District	Scott County School District	Stone County School District
Union County School District	West Bolivar Consolidated School District	Simpson County School District	Wayne County School District
Webster County School District	West Tallahatchie Consolidated School District	Smilow Prep	
West Point School District	Western Line School District	Smith County School District	
	Yazoo City Municipal School District	South Pike School District	
	Yazoo County School District	Union Public School District	
		Walthall County School District	
		West Jasper Consolidated School District	
		Wilkinson County School District	

APPENDIX J –Modified One the World of Mississippi Four Congressional Districts



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