COVID-19 and Utah's Digital Divide:

Educational Leaders' Response to the Need for Equitable Home Technology Access

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Introduction

According to the United States Office of Educational Technology (USOET) (n.d.a), "preparing students to be successful for the future requires a robust and flexible learning infrastructure capable of supporting new types of engagement and providing ubiquitous access to the technology tools that allow students to create, design, and explore" (para. 1). The uneven distribution of access to information and communication technologies is commonly referred to as the digital divide. The most common definition of the digital divide is "a division between people who have access and use of digital media and those who do not" (Van Dijk, 2020, p. 9). The division becomes an educational issue as students increasingly need devices and broadband access at home to complete schoolwork and parents rely on the Internet to access online grading and student information systems (McLaughlin, 2016). The unequal opportunities to access lessons, resources, assignments, and communication tools affect student academic success (Robinson et al., 2018).

The digital divide in education is also characterized by inequitable skill development among students. More and more, technology skills and exposure are needed by students entering post-secondary educational institutions and the workforce. Students' future prospects are impacted by their level of technology access. In order to support this kind of rich, meaningful learning, the USOET has created a National Education Technology Plan that outlines a vision for providing an equitable digital learning opportunity for all students (United States Office of Educational Technology [USOET], n.d.c). To make this vision a reality, the plan proposes continued advancement in several areas: learning, teaching, leadership, assessment, and infrastructure.

Infrastructure, the final component of the National Education Technology Plan, is key to providing students access to the other four components. "All students and educators [must] have access to a robust and comprehensive infrastructure when and where they need it for learning" (USOET, n.d.a, sec. 5). Specifically, all students must have access to broadband -- meaning, a reliable, high-speed, always-on Internet connection -- and powerful digital devices in and out of school (USOET, n.d.a). Students need access to "ubiquitous connectivity" (USOET, n.d.a, para. 1). This means that student access to broadband and powerful digital devices is always present, making "everywhere, all-the-time learning possible" (USOET, n.d.b, para. 3). Students who do not have access to this kind of robust network are often referred to in information technology as the "have nots" (National Telecommunications and Information Administration [NTIA], 1995, para. 5).

The state of Utah has also developed a plan in order to "move all students to high levels of learning powered by technology" (Utah State Board of Education [USBE], 2015, p. 5). The Utah Master Plan describes the meaningful learning mentioned in the National Education Technology Plan and also includes "exploring real-world concepts, interacting with real-world experts and analyzing and solving real-world problems" (USBE, 2015, p. 5). This kind of learning is powered by infrastructure. The Master Plan addresses broadband access by outlining the continued collaboration of the Utah Education and Telehealth Network (UETN), Utah State Board of Education (USBE), and Local Education Agencies (LEAs) to ensure network readiness, identify gaps in broadband connectivity, and work to close such gaps (USBE, 2015, p. 9).

Despite improvements in technology infrastructure across the state, Utah communities continue to have differing levels of technology access. Factors like geographic location and economic status can greatly impact student access to robust technology infrastructure. For

example, 98.9% of households in Salt Lake County, Utah, the largest urban area in the state, have access to broadband speeds of 100 megabytes per second or faster; however, in San Juan County, one of Utah's rural areas, only 9% have that same access (Broadband Now, 2020). UETN provides a strong broadband backbone to most of the state; however, some rural communities, like those in Dagget, Wayne, and San Juan counties, must rely on microwave Internet signals because broadband is not yet accessible in those locations (Utah Education and Telehealth Network [UETN], n.d.c). Some urban communities, like those in Salt Lake City and Ogden, face greater economic challenges than suburban communities, like those in Draper and Alpine (USBE, n.d.c). Customization and innovation are needed for LEAs to bridge the digital divide in their unique communities, particularly as they attempt to provide equitable access outside of LEA and school buildings. While this may seem obvious, Gorski and Clark (2002d) point out that, despite government programs that support low-income families in acquiring technology devices and broadband service, technology access in households with an annual income less than $15,000 continues to decrease compared to those in other income brackets, even when other factors, like geography, are taken into consideration.

Utah legislators have worked to decrease the gap caused by the digital divide by passing legislation, such as the Smart School Technology Act of 2012, which encouraged "the deployment of an integrated school-wide technology plan in public schools" (Smart School Technology Act, 2012, sec. 1), and the Digital Teaching and Learning (DTL) bill of 2015, which resulted in the creation of the DTL grant program (Digital Teaching and Learning [DTL] Program Proposal, 2015). This legislation has provided opportunities for LEAs to purchase technology devices and improve broadband infrastructure. The Utah Technology Inventory Project report for January 2020, which is used by LEAs to identify gaps in student and teacher

technology access, states that since 2015 Utah LEAs have "significantly increased their investment in Google Chromebooks that are available for student use," reporting approximately 155,000 more Chromebooks in 2019 than were available in 2017 (UETN, 2020, p. 5). Thirty percent of Utah schools established a 1:1 mobile device program for students, meaning that every student in the school has access to a device while at school. This is up from 11% in 2015. The inventory also shows that Utah schools have increased the number of Wi-Fi access points in educational spaces to accommodate for the growth in mobile devices that need to be connected to the Internet (UETN, 2020, p. 13).

In addition to infrastructure upgrades that expand broadband connectivity, students also need access to devices. The cost of a new Chromebook can range from approximately $130 to $1400 (Amazon.com, n.d.). Apple's iPad now sells for approximately $329 (Apple.com, n.d.). Mid- to high-income families are more likely than low-income families to be able to afford up-to-date technology devices for in-home use. While each LEA makes its own policies regarding school devices, the overwhelming majority designate devices for school use, and students are unable to take them home at the end of each day or over the summer.

The efforts to increase broadband connectivity and have in-school devices have led Utah's educational leaders to label the state a "trailblazer" when it comes to technology innovation (UETN, 2020, p. 4). Still, there is a continued need to look at how inequitable access to technology is being addressed, particularly when it comes to home access. While the Utah Technology Inventory Project shows increased investment in school infrastructure to support student access, it also reports increased school use of collaborative web-based learning tools like Google Apps for Education, the Canvas Learning Management System (LMS) used for organizing digital teaching and learning, online student information systems, and digital

textbooks (UETN, 2020, p. 6). Increased use of these technology tools means an increased demand for student access at home as well as at school.

Statement of the Problem of Practice

As the National Education Technology Plan explains, digital teaching and learning have become increasingly important in K-12 education (USOET, n.d.a). Utah's educational leaders, like others across the nation, have found that access to technology devices and broadband has become necessary within the state public school system, and they have been working to bridge the gap caused by the digital divide. Although there is a provision in Utah's Master Plan for providing equitable technology access for K-12 learners on Utah campuses, it does not specify whether or not equitable access expands beyond the brick and mortar walls of the schools (USBE, 2015). Additionally, LEAs have begun to focus on the second and third levels of the digital divide, described in the literature review, but have failed to completely address the first level: access.

During the 2019-2020 school year, the spread of COVID-19, a novel coronavirus, escalated to the level of a pandemic. Schools across the world closed their doors as a means of mitigating the spread of the COVID-19 disease. On Friday, March 13, 2020, Utah's Governor, Gary Herbert, in partnership with the Utah Department of Health and USBE, issued a two-week "stay at home" order. Schools went into temporary "soft-closure," during which buildings remained open to faculty, staff, and administration, but were closed to students while preparations were made for a longer-term solution (Herbert, 2020). The following Wednesday, March 18, schools were dismissed. "A school dismissal means that students [are] sent home, but facilities [are] kept open and staff [are] allowed to continue to work" (Utah Department of Health, n.d.b, p. 2). In this particular case, school dismissal meant that teaching and learning

would still take place, but it would be conducted following distance- or online-learning models while teachers and students worked from their individual homes. Home learning plans were quickly created by LEAs and were employed in all of Utah's public schools. This was the first time that schools attempted to continue teaching and learning during a pandemic.

Before COVID-19, Utah's LEAs had been working to address the digital divide in schools by purchasing devices and strengthening broadband infrastructure utilizing funds from the state's DTL grant program (USBE, n.d.a). While these plans addressed technology access within schools, most did not focus on equitable at-home technology access. If LEAs were to successfully employ digital learning plans during COVID-19, every one of their students would need access to a technology device and reliable broadband Internet in their own home.

Purpose of the Study

This study focused on the response of state and LEA leaders in Utah to the digital divide, specific to equitable access to technology devices and broadband, during the COVID-19 school dismissal. It explored how educational leaders in rural, urban, and suburban communities addressed the digital divide specific to equitable home access and what lessons they learned as they worked to provide the infrastructure necessary to employ digital home learning plans during COVID-19.

Research Questions

1. How did Utah's state educational leaders support LEAs in addressing the digital divide, specifically the need for equitable home technology access, during the COVID-19 school dismissal?

2. How did leaders of Utah's LEAs in rural, urban, and suburban settings respond to the digital divide, specifically the need for equitable home technology access, during COVID-19 school dismissal?
3. What lessons did these state and LEA leaders learn from their efforts to provide equitable home technology access as a result of COVID-19 school dismissal?

Review of the Literature

The following sections provide a review of relevant literature demonstrating the impact of the digital divide on students and the efforts made by government and educational leaders to decrease the divide. A review of theoretical perspectives on the causes and various levels of the digital divide will also be reviewed. Finally, a review of the digital divide in times of unplanned school closures will be examined.

Evidence of Impact

Researchers for Project RED and the One to One Institute (2010) conducted what they claim was the first large-scale national study on K-12 technology integration. The study highlighted the increased use of technology in classrooms across the country and showed that schools with lower student to computer ratios had better outcomes than those in which many students had to share devices. Specifically, researchers saw improved high-stakes test scores, completion rates, and school discipline when more technology was utilized (Greaves et al., 2010, p. 16). A body of research supports their findings that, when used effectively, more continuous access to technology devices and broadband provides students with more engaging, dynamic, and varied learning opportunities (Argueta et al., 2011; Greaves et al., 2010; Penuel, 2006; USOET, 2017). While these studies indicate that school technology access can be beneficial for students, it stops short of what more recent research shows -- that as technology has continued to

become more available, more advanced, and more integrated into every career field, access at the K-12 level has become a necessity. In other words, without access to technology, students will not only miss out on exciting opportunities but will actually fall behind in essential preparation for college and career (Alliance for Excellent Education, 2011; Alliance for Excellent Education, 2012; Christensen & Horn, 2009; Farrell et al., 2009; Hacker, 2011).

A UETN (2020) report supports the claim that technology access is necessary for students, citing that devices and broadband are now required for students to successfully complete homework assignments, access course materials, and collaborate with teachers and classmates. Access to high-quality digital learning materials, subject matter experts, personalized learning, college and career planning resources, and accessibility tools is available for any student anywhere if they have access to devices and broadband (Molnar, 2014). Research examining the educational impact of the digital divide has shown that when barriers like high student to technology ratios prevent students from accessing technology or a cultural disconnect between teacher and student prevent teachers from assigning "stimulating online work," they are prevented from fully engaging in K-12 education (Dolan, 2017, p. 37). Any kind of barrier that prevents students from engaging with technology to their full potential will continue to widen the gap between the haves and the have nots (Dolan, 2017, p. 39). These findings are grounds for the argument that any inequities in technology access need to be addressed by educational leaders if they are to create the requisite conditions for success for every student and form the rationale for efforts to eliminate the digital divide in K-12 education.

Efforts to Decrease the Divide

Researchers have provided many examples of efforts made by government and educational organizations in response to the digital divide. Government reports in the United

States show an increase in community access to broadband due to support from telecommunication companies and government agencies (Gillibrand, 2015; NTIA, 2004). For example, the United State Census Bureau (2015; 2018) found that the number of households reporting no Internet connection was down 7.4%, from 22% in 2015 to 14.6% in 2018 and that households with broadband connection were up 8.4%, from 76.6% in 2015 to 85% in 2018.

Additional reports show that communities also worked to increase access to devices and broadband for those who did not have it at home by supplying libraries and community centers with technology stations (Whitacre & Rhinesmith, 2015). For example, the Salt Lake City Public Library in downtown Salt Lake City, Utah collaborates with community centers, like the Asian Association of Utah Refugee and Immigrant Center, to provide free technology access to area residents who do not have it at home (Salt Lake City Public Library System, n.d.). In Utah, it is estimated that public libraries are the only source of free broadband for 67% of library communities in the state (Utah Governor's Office of Economic Development [UGOED], n.d.).

Within educational organizations, the initial response has been characterized by efforts to increase the number of technology devices in schools and enhance broadband connectivity to and within school buildings (Argueta et al., 2011; Hohlfeld et al., 2017; UETN, 2020a). For example, a longitudinal study of public schools in Florida revealed that school access has steadily been increasing (Hohlfeld et al., 2017). It is unclear how successful these efforts have been, in part because they are relatively recent and time is required to evaluate long-lasting effects. What is clear is that local education agencies have focused their efforts to increase student access to technology primarily within their school buildings, leaving students to seek outside access in public locations like libraries and community centers. Even when public access to technology is possible, research by Hassani (2006) and Hargittai and Hinnant (2008) indicates that students

benefit from having access to technology in multiple locations and that the most beneficial location for access is the home. This indicates the need for more research on current efforts being made by LEAs to provide home technology access, as well as a discussion on their role in such efforts.

Theoretical Perspectives on the Digital Divide

Factors that Contribute to the Digital Divide

A key report from the National Telecommunications and Information Administration (NTIA) (1995), titled "Falling Through the Net: A Survey of the 'Have Nots' in Rural and Urban America," claimed that certain groups of people typically have less access to technology than others. The report identified geographic location, economic status, race, age, and education level as factors most likely to impact a person's level of access to technology, specifically broadband (NTIA, 1995). While some of the report's findings have been contested as misleading or out of date (Gorski & Clark, 2002d), the categories of so-called "have nots" listed in the report have continued to be the generally accepted personal and positional factors that increase the digital divide and are areas researchers continue to explore (Clark & Gorski, 2001; Simoni et al., 2016; Van Dijk, 2020; Warschauer et al., 2004; Wilson et al., 2003). Gender, language, and disability have since been added to the list of key factors by researchers (Clark & Gorski, 2001; Gorski & Clark, 2001; Sung, 2016; Van Dijk, 2020; Wilson et al., 2003). These personal and positional categories are now well-established as key contributors to the existence of the digital divide, and this research project is grounded in that understanding. Because previous studies have been focused on establishing the impact of the digital divide on marginalized populations, this study will focus on the remaining need to understand what educational leaders are doing to alleviate its impact.

Researchers view the digital divide as an issue of equity, and this has prompted research evaluating the divide through a critical theory lens. Gorski and Clark (2001), in particular, used a critical, multicultural education lens to study various marginalized student groups in an effort to make recommendations for needed changes in approaches to equitable technology access. Research by Rogers (2016), too, warns that without addressing non-inclusive technology practices, educational institutions will "facilitate the continued marginalization of economically challenged and culturally diverse learners" and urges educators to "pay close attention to the characteristics, cultural perspectives, needs, and attitudes of students" when building technology infrastructure and incorporating technology into teaching and learning (p. 199).

A critical lens has allowed researchers to point out the needs particular to specific marginalized groups and question the conclusions made by government and educational agencies regarding the digital divide. Because of their work, these key pieces of the divide are now more universally understood; however, it does not follow that research must be conducted through this lens alone. There is merit in approaching this research from an interpretivist lens in order to better understand the divide from the perspectives of state and LEA leaders. There remains a need to understand their realities and consider responses to the digital divide from an objective, broad view in order to continue to make progress toward equitable access.

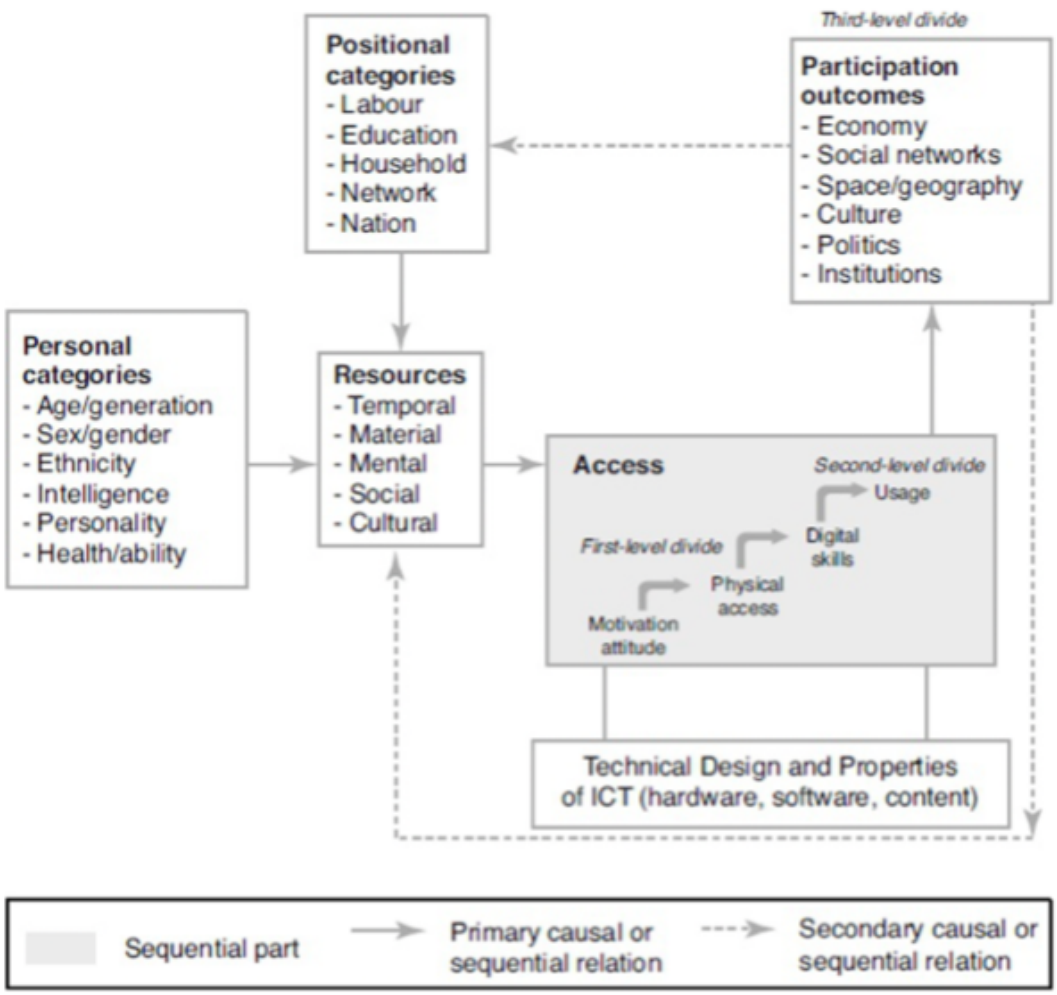
A New View of the Digital Divide

With the establishment of a body of research related to the digital divide concerning technology access as well as a firm understanding of factors contributing to inequitable access, research trends surrounding the digital divide have progressed. Van Dijk (2020), for example, conceptualized the digital divide in terms of three levels with causal and sequential relationships

(Figure 1). The first level concentrates on access, the second level on usage, and the third level on outcomes.

Figure 1

A Causal and Sequential Model of Digital Media Access



(van Dijk, 2020)

The first level is further broken down into two components: motivational attitude and physical access. According to van Dijk (2020), motivational attitude determines whether a person chooses to engage in the digital world. Once a person chooses to engage, their level of physical access to technology devices and broadband is dependent upon personal categories, like

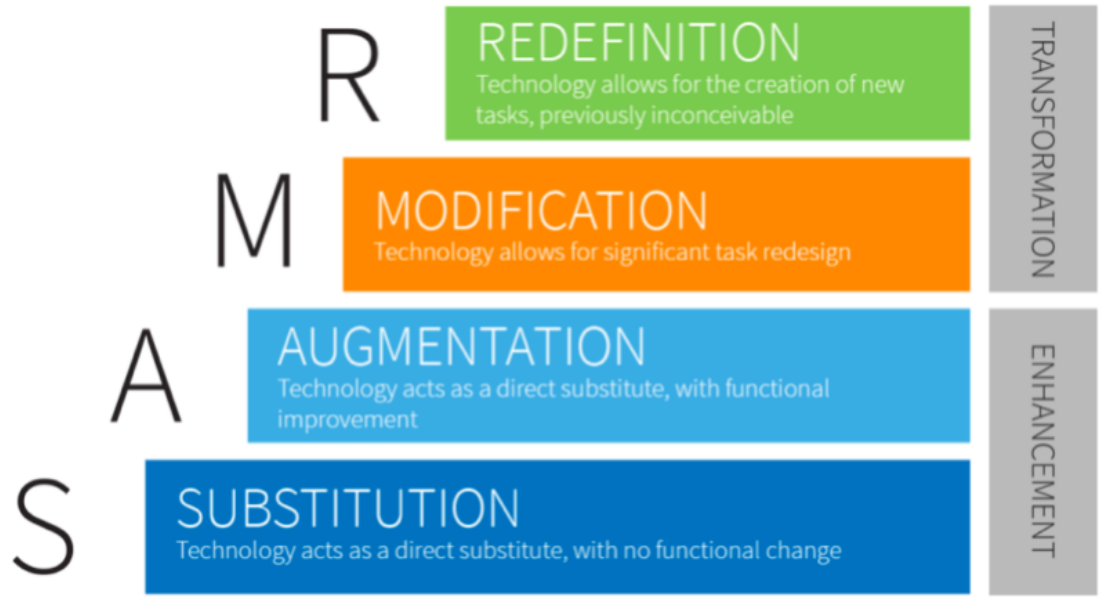
age, gender, ethnicity, intelligence, personality, and health and positional categories, such as locational position, education, household, network, and nation/region, that can "lead to different amounts of resources" (p. 35).

The second level of van Dijk's (2020) framework is also split into two components: digital skills and usage. These components focus on the frequency and diversity of technology use. Many researchers are currently focused on this second level of the digital divide and have developed frameworks for viewing the divide in relation to technology, claiming that "on its own, access to connectivity and devices does not guarantee access to engaging educational experiences or a quality education" and that "intervention and attention to the way technology is used for learning" is necessary to close the "digital use divide" (USOET, n.d.b, para. 64).

Two examples of such frameworks are the SAMR Model (Puentedura, 2009) and the TPACK framework (Mishra & Koehler, 2006). The SAMR Model (Figure 2) was created by Dr. Ruben Puentedura (2009). It is a framework designed to help educators conceptualize and evaluate the levels of technology integration by questioning whether the technology is being used for substitution, augmentation, modification, or redefinition and whether the purpose of using the tool is for enhancement or transformation of learning (Schoology, 2017). The TPACK framework (Figure 3), on the other hand, draws attention to how teachers are simultaneously incorporating technology, content, and pedagogy to enhance their daily lessons. Harris and Hofer (2017) state, "Using the TPACK construct in combination with the SAMR model has helped to create a roadmap for effective technology integration for teachers" (p. 14). Effective technology integration leads to the third level of van Dijk's (2020) framework, which focuses on outcomes.

Figure 2

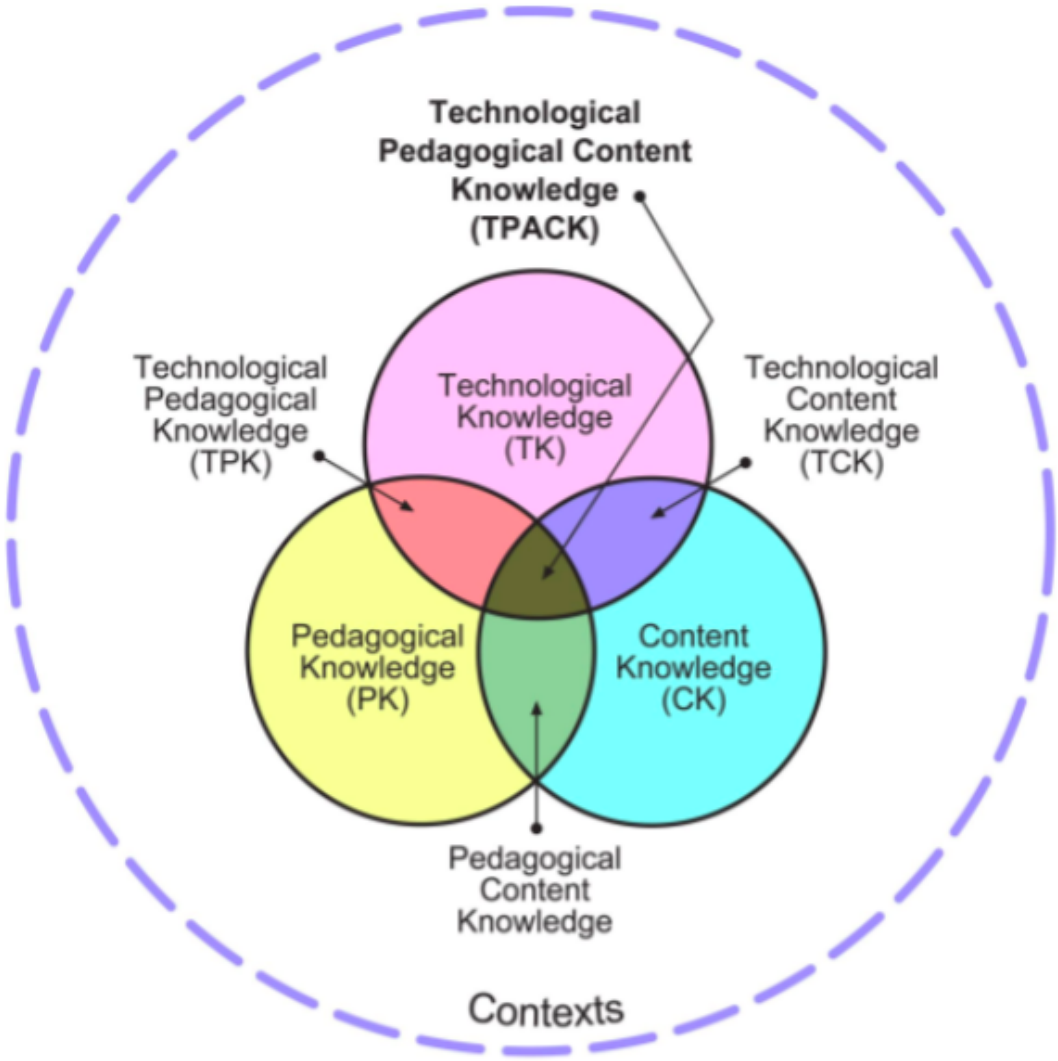
SAMR Model



(Schoology, 2017)

Figure 3

TPACK Framework



(Parkinson, 2009)

The third level of the digital divide concentrates on observing the positive and negative outcomes that come from using technology, with specific attention to social, political/civic, cultural, and personal domains (van Dijk, 2020, p. 94). The three levels of access, usage, and outcomes combined make up van Dijk's (2020) definition of the digital divide. His framework

has been instrumental in clarifying how the focus of this research project fits within a larger understanding of the digital divide.

While the call for a view of the digital divide as more than just an issue of access (Warschauer, 2003) is a valid one, there is a danger that this shift in attention gives the impression that access has ceased to be an issue of importance. Further research regarding technology access is still warranted. Gorski & Clark (2002d) argue that, despite reports claiming that lack of technology access has become a minor issue, and despite "an onslaught of government programs developed with the intent to address the digital divide," inequitable access continues to put already marginalized groups at a significant disadvantage (para. 7).

The Digital Divide and Unplanned School Closures

Unplanned school closures can occur for a variety of reasons, including weather, natural disaster, school building or utility problems, violence, illness, and environmental problems (Wong et al., 2014). Research conducted about unplanned school closures has generally focused on the economic impacts of parents missing work to stay home with children and attitudes about missed education days (Gift et al., 2010; Rainey et al., 2016); however, it appears that little research has been done surrounding LEA efforts to offer alternative educational opportunities, such as home learning guides or virtual lessons, during these closures.

The lack of research on home learning opportunities during unplanned school closures could simply be due to the fact that schools have not typically provided such opportunities. When natural disasters force school closures, the damage to school buildings and city infrastructure, like roads and power lines, can make it difficult and impractical for schools to continue providing educational services for their students during closure, although some attempts at telecommuting were made by school leaders during the aftermath of hurricanes Katrina and

Rita (Education Week, 2005; Samuels, 2005). A total of 812 school closures were reported in the United States during the 2009-2010 H1N1 pandemic, and apparently no educational services were provided during these closures, even though infrastructure was not affected (Wong et al., 2014).

As blended models of teaching and learning, in which students engage with educational content in both physical and virtual classroom environments, have become more prevalent (Drysdale et al., 2013), students and teachers have had to build skills needed to navigate and engage in online learning environments. This opens the door to the possibility that when unplanned school closures occur, learning might be able to continue virtually as long as critical infrastructures, like telecommunications lines, are intact. Reports show a recent increase in attempts by LEAs to provide online learning activities in order to count snow closures as academic days, thus avoiding having to make up missed days later in the year (Bentley, 2019; Berger, 2018; Nolan & Record, 2018). This could, perhaps, indicate a trend toward utilizing technology to provide continued learning opportunities during unplanned school closures. If this is the case, research surrounding the issue of home technology access becomes particularly necessary since school technology access is not an option during closures. Pandemic school closures require a special research focus due to the fact that when social distancing is required to mitigate the spread of disease, alternate access points to technology, like libraries, are not an option for students either.

Literature Review Summary

In summary, a body of research exists pointing to the benefits of technology use in educational settings and the negative impact on students when access to technology infrastructure is not present. Despite the fact that research has promulgated an understanding of

the effects of the digital divide on equitable educational opportunities for students and that government and educational agencies have attempted to address its impact, changing technologies and more extensive use of technology in education continue to challenge LEA efforts to provide equitable access to devices and broadband. Although current trends suggest that the 'new digital divide' should be the primary focus of research moving forward, the first level of the digital divide -- physical access to technology devices and broadband -- warrants continued research as well, particularly as home learning options during unplanned school closures that have not previously been utilized are now being employed as a way to continue educational services, even when school buildings are inaccessible.

Methods

Conceptual Framework

Conceptual frameworks provide clarity on which variables are most important and which information "should be collected and analyzed" when conducting research (Miles et al., 2014, p. 20). The conceptual framework also examines relationships between the information being gathered and provides the context and criteria for thinking about the appropriate tools and methods (Ravitch & Riggan, 2017).

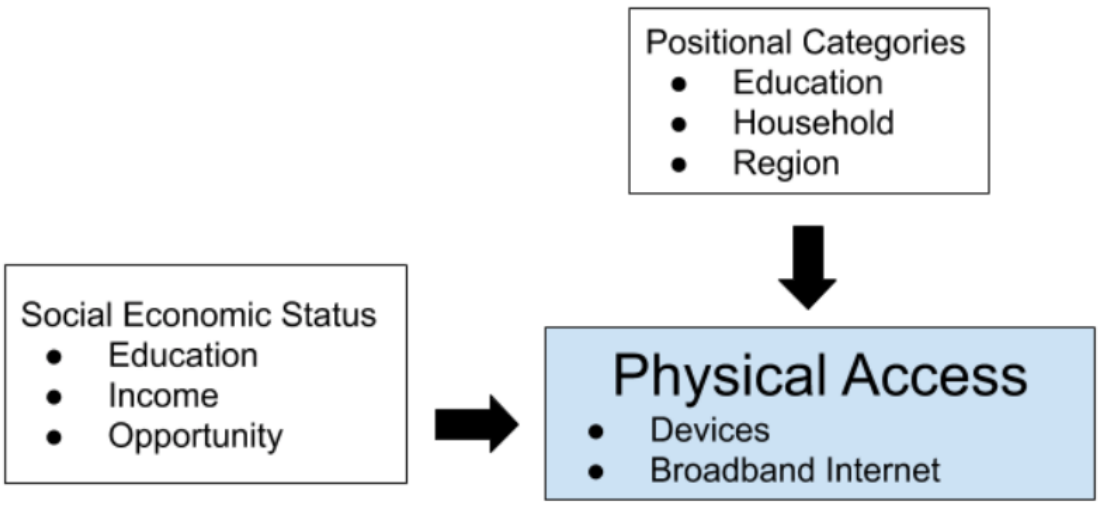
An interpretivist approach was used to construct meaning from the findings of this study. Interpretive research is the most common type of research in qualitative studies. Through this type of research, meaning is socially constructed and is based on multiple realities (Merriam & Tisdell, 2016, p. 8). The interpretivist approach allowed for the ability to acquire a leadership perspective on how the state and each unique LEA responded to the digital divide, specific to their region, in terms of physical access throughout the COVID-19 school dismissal. Black (2006) states that "the strength and power of the interpretivist approach lies in its ability to

address the complexity and meaning of (consumption) situations" (p. 319). Data for this study was collected through the implementation of interviews and focus groups that allowed for deeper understanding during data analysis.

Meaning was also constructed using the Physical Access of the Digital Divide framework (Figure 4), created by the researchers, to interpret the information gained from interactive and cooperative research. In the literature review, the researchers described van Dijk's (2020) Causal and Sequential Model of Access and Effects of the Digital Divide framework, which looked at the three levels of the digital divide. The focus of this study was specific to exploring level one of the digital divide and how the COVID-19 school dismissal impacted the decisions state and LEA leaders made to provide physical access to students across the state of Utah. While van Dijk's model is more all-encompassing, a narrower scope was used to look specifically at physical access to technology.

Figure 4

Physical Access of the Digital Divide



Physical access refers specifically to reliable devices and broadband. Physical access is the focus of the first level of the digital divide, with motivation as the permanent driver. The

COVID-19 school dismissal provided motivation for educational leaders to focus more attention on providing physical access to bridge the digital divide within student homes, not just within school buildings (van Dijk, 2020). As van Dijk (2020) states, "physical access is a prerequisite for reaching the next phases" (p. 49).

The Physical Access of the Digital Divide framework (Figure 4) was created by the researchers as a focus tool for knowledge interpretation in this study. It was created by simplifying van Dijk's (2020) model in order to outline the external factors specific to this study. Social-economic status, or simply economic status as it is labeled throughout this study, is often measured as a combination of household members' levels of education, income, and occupation (American Psychological Association, n.d.). This study modified van Dijk's (2020) framework to specifically address the social-economic status of students within the state of Utah. Van Dijk (2020) states that "although the gap has closed since the 1990s, those employed in middle-class jobs tend to have 100 percent access while those in lower occupations have approximately 70 to 80 percent access" (p. 52). Each LEA serves families of varying levels of social-economic status (SES), and through this modified framework, the researchers were able to determine to what extent SES impacted students' physical access to technology during school dismissal and to analyze how state and LEA leaders addressed student technology needs.

In van Dijk's (2020) framework, positional categories address the impact of location on technology access. In the modified framework, the positional categories have been narrowed down to only include education, household, and region. State and LEA leaders have long been focused on equity of access at educational institutions, but the COVID-19 school dismissal forced these leaders to address the digital divide within students' households. Education within the positional category refers to having physical access within a school building. Household

refers to having physical access within the home. Region, or geographic location as it is called in this study, refers to having physical access within a rural, urban, or suburban setting. This study examined what LEAs did to support the merger of these three positional categories.

Methods Overview

The purpose of qualitative research is to capture data that allows the researcher to gain a holistic overview of the context under study (Miles et al., 2014). Through interviews, observations, and documentation the researcher constructs an understanding of how people interpret their experiences and what meaning they attribute to those experiences (Merriam & Tisdell, 2016). This study was a qualitative study in which the researchers connected with educational leaders throughout the state of Utah and, through the use of interviews and focus groups, learned about their experiences as they worked to address the need for equitable home technology access within their communities during the COVID-19 school dismissal. As a qualitative study, the intent was that the findings would support other LEAs in Utah in their efforts to address the digital divide within their own communities.

Research Setting

Two state agencies were selected for this study because they have been heavily involved in digital divide conversations at the state and local levels and currently work together to provide digital teaching and learning support and guidance to all Utah LEAs. Three LEAs were also selected for this study to represent three different types of Utah communities: rural, urban, and suburban. LEA classifications were based on their LEA profiles on the Digital Teaching and Learning Grant Program website (USBE, n.d.b). In addition to selecting these LEAs based on their geographic classifications, they were also selected because they represent diverse communities with different economic needs and struggles as they relate to the digital divide. The

experiences of these three LEAs may not be identical to those of others in the state, but the lessons learned from them may be beneficial to educational leaders in other LEAs, and their stories may help these leaders as they address the digital divide within their own communities. While specific LEA demographics will not be included in this report, in order to maintain the anonymity of study participants, Table 1 does display overall demographic data for Utah LEAs as reported in the USBE fall demographics report for the 2019-2020 academic year (USBE, n.d.c).

Table 1

Utah State Board of Education Fall Demographics Report for the 2019-2020 Academic Year

Demographics	All Utah Local Education Agencies
Total number of students	666,457
Total number of schools	1,050
Economically disadvantaged	33%
Homeless	2%
English language learners	8%
Caucasian	74%
Hispanic	18%
Multi-racial	3%
Asian	2%
Pacific Islander	2%
Black/African American	1%
American Indian/Alaskan Native	1%

(USBE, n.d.c)

Sampling and Participants

Purposeful sampling (Merriam & Tisdell, 2016) was used to select the participants for this study to ensure that they would provide insightful and valuable perspectives that would allow the researchers to understand their experiences with the digital divide, specifically physical access, and tell their stories in a way that expresses the lessons learned through the COVID-19 school dismissal. State leaders were selected based on their experience and knowledge and their current roles within the selected state organizations. These qualifications were deemed necessary to inform the study of the state's efforts to address the digital divide.

These two individuals were also selected due to their professional connection to one of the study's researchers. This researcher had worked with these individuals on various professional collaborations and had ease of access to both, which assisted in recruiting them as study participants. Each of these participants was contacted by phone, and verbal and written descriptions of the study (See Appendix A) were provided. Following their verbal consent to participate, each was emailed a consent form (See Appendix B) for signatures prior to any interview or collection of data.

Three LEA leaders were selected to participate in this study. These leaders were selected due to their involvement in providing physical access to technology within their school communities as well as the insights they would be able to share about their work providing at-home technology and broadband access. Initial contact with these participants was conducted by phone, after which the researchers provided verbal and written descriptions of the study (See Appendix C). After verbal consent was obtained, the researchers followed up by providing a written consent form (See Appendix D) for signatures prior to any interview or collection of data.

Three school-based leaders from the participating urban and suburban LEAs and two school-based leaders from the rural LEA were also included in this study. Due to scheduling conflicts, no elementary leaders from the rural LEA were available to participate. The researchers were able to secure the participation of two rural high school leaders who oversee students in grades 7-12. These leaders were able to provide some insights into the rural elementary experience as well based on their familiarity with their elementary feeder schools.

The researchers requested that the LEA leaders participating in this study make recommendations regarding which elementary, middle, and high school leaders they should contact for participation in LEA-specific focus groups. The perspectives of these school-based educational leaders were beneficial to this study because of their close connections with students and families in their school communities. Their experiences provided insight into the challenges and successes of addressing the digital divide at the individual school level. Initial contact with these school-based leaders was conducted by phone. The researchers provided verbal and written descriptions of the study (See Appendix E). After verbal consent was obtained, the researchers followed up with the participants by providing a written consent form (See Appendix F) for signatures.

Data Collection

Qualitative data collection is about asking, watching, and reviewing (Merriam & Tisdell, 2016) people's lived experiences in order to gain their perspectives and reveal the meanings they place on certain events, processes, and structures of their lives and connect those meanings to the social world around them (Miles et al., 2013). In order to collect data that represented participants' perspectives and experiences during the COVID-19 school dismissal, data for this study was collected through interviews and focus groups (Merriam & Tisdell, 2016).

Interviews. The main purpose of an interview is to collect a special kind of information, such as behavior, feelings, and people's interpretations of the world around them that cannot be collected through observation (Merriam & Tisdell, 2016). The researchers conducted individual, synchronous, online interviews (Merriam & Tisdell, 2016) with each state and LEA leader. Each interview was approximately 60 minutes in length and conducted using Zoom, an online video conferencing tool. The interviews were highly structured, and participants were asked a mix of experience and sensory (Merriam & Tisdell, 2016) questions (See Appendix G), for the purpose of having participants share their experiences and specific related data. In order to help participants reflect and prepare to share their experiences, questions were emailed to participants prior to the interviews (Merriam & Tisdell, 2016).

Available interview dates and times were selected by the researchers and provided to participants using a Doodle poll, a free online meeting scheduling tool. Doodle allowed each participant to review the options provided and select the dates and times that worked best for their schedules. The researchers confirmed the interview date and time with each participant via email and/or electronic calendar invitation. Participants did not need to have an account with Zoom to participate in the virtual interviews. Links to the Zoom meetings were provided, and participants downloaded the software to their devices to ensure that they could connect. Participants had the option to connect to the Zoom meeting using their computer or phone. Participants were provided with step-by-step instructions and a video tutorial to support them in connecting and interacting using the Zoom platform.

To ensure confidentiality, the following mechanisms (Merriam & Tisdell, 2016) were put in place to ensure that participants remained anonymous (Miles et al., 2013). To prevent outsiders from joining the Zoom meetings, passwords were generated and shared with each participant.

The Zoom link and password were different for each interview and focus group. While Zoom provides the ability to record meeting sessions, only the researcher conducting each interview was given access to record the session, and this was communicated to the participants. Participants were assured that only the researchers in this study would have access to the recorded sessions and that interview videos would be uploaded to a secure Google Drive (cloud storage) to which only the researchers would have access. Each participant had the option to join their virtual interview from a location of their choice. The researchers asked each participant to select a location where they would be alone and could remain uninterrupted by distractors, such as coworkers and family members.

Focus Groups. Utilizing focus groups as a data collection method allows researchers to interview groups of people who have knowledge of and are able to talk about a specific topic (Merriam & Tisdell, 2016). Focus groups were conducted with each group of school-based leaders in order to facilitate discussions that centered around their experiences addressing the digital divide during the COVID-19 school dismissal. Participants were grouped with other school-based leaders within their own LEA and were asked a mix of experience and sensory (Merriam & Tisdell, 2016) questions (See Appendix H) that would enable them to share their experiences, including any challenges they encountered. The questions were emailed to participants prior to the focus groups in order to provide participants time to reflect and prepare for sharing their experiences (Merriam & Tisdell, 2016).

Each focus group was approximately 60 minutes in length and conducted using Zoom. Available focus group dates and times were selected by the researchers and provided to participants using a Doodle poll. Participants were asked to review the options provided and select the dates and times that worked best for their schedules. The researchers used the Doodle

poll to find a common available date and time for each of the LEA's school-based leaders. The researchers confirmed the interview dates and times with each participant via email and/or electronic calendar invitation.

Participants did not need to have an account with Zoom to engage in the virtual focus groups. A link to the Zoom meeting was provided, and participants downloaded the software to their devices to ensure that they could connect. Each participant had the option to connect to the Zoom meeting using their computer or phone. Participants were provided with step-by-step instructions and a video tutorial to support them in connecting and interacting using the Zoom platform.

To ensure confidentiality, the following mechanisms (Merriam & Tisdell, 2016) were put in place to ensure that participants remained anonymous (Miles et al., 2013). To prevent outsiders from joining the Zoom meeting, a password was used and shared with the participants. The Zoom link and password were different for each interview and focus group. While Zoom provides the ability to record meeting sessions, only the researcher conducting each focus group was given access to record the session, and this was communicated to the participants. Participants were assured that only the researchers in this study would have access to the recorded sessions and that focus group videos would be uploaded to a secure Google Drive (cloud storage) to which only the researchers would have access. Each participant had the option to join their focus group at a location of their choice. The researchers asked each participant to select a location where they would be alone and could remain uninterrupted by distractors, such as coworkers and family members.

Data Collection Process

The interviews and focus groups were divided amongst the four researchers involved in this study. It was important to maintain consistency with the interview and focus group questions, how the interviews and focus groups were conducted, and how the data was collected. Consistent communication among the researchers was key in ensuring the data remained valid and reliable and continued to support the goals of this study (Merriam & Tisdell, 2016). To maintain this consistency, the researchers worked in teams of two during the data collection process. One took the lead during each interview or focus group, and the other offered support by recording field notes (Merriam & Tisdell, 2016) on a Google Sheet (See Appendix I) that was shared with all four researchers using Google Drive.

To ensure that the data collection process was as consistent as possible, the research team utilized interview/focus group scripts (See Appendix J) in addition to the interview and focus group questions that were drafted by the research team. In order to provide the best data analysis of the recorded interviews and focus groups (Merriam & Tisdell, 2016), the audio recordings of each were sent to an online transcription service. The transcriptions were saved in a shared folder in Google Drive that was accessible only to the researchers in this study.

Data Analysis

In a collaborative effort, an open coding process (Merriam & Tisdell, 2016) was used to analyze the data that was recorded and transcribed. This coding process provided an avenue for the researchers to retrieve meaningful material by identifying words and phrases collected during the interviews and focus groups, which guided them in establishing common themes and categories (Merriam & Tisdell, 2016). Transcriptions were uploaded to a Google Sheet (collaborative spreadsheet), which served as a repository for the data and allowed the researchers

to code and calculate the number of times particular words or phrases were found in the data corpus (a collection of written or spoken language) (Saldaña, n.d.).

First cycle and second cycle coding were used to analyze the data (Miles et al., 2013). First cycle coding "is a way to initially summarize segments of data" (Miles et al., 2013, pg. 86). During this cycle, the in vivo coding process was used to review, analyze, and interpret (Miles et al., 2013) the data by creating codes using the direct language of the participants (Saldaña, 2016). Codes, as defined by Saldaña (2016), are words or phrases that "symbolically assign summative, salient, essence-capturing, and/or evocative attributes for a portion of language-based or visual data" (pp. 4-5). Second cycle coding groups the first cycle summaries into a smaller number of categories, themes, or constructs (Miles et al., 2013). During this cycle, pattern coding was used to pull together the codes collected from the first cycle and group them into more meaningful units of analysis, allowing the researchers to identify and define patterns and summarize the findings into categories, themes, causes, explanations, and relationships (Miles et al., 2013).

Once coding was completed, pivot tables were generated to further analyze the categories and themes discovered in the interview and focus group data. A total of 13 themes and 131 categories emerged. The most common themes became the key focus of the researchers' findings and lessons learned. Table 2 displays the top themes that were discussed by educational leaders at each level (state, LEA, and school) and geographic area (urban, suburban, and rural). An explanation of these themes can be found in Table 3 located in Appendix K.

Table 2

COVID-19 and Utah's Digital Divide: Major Research Themes

Level/Region	Theme 1	Theme 2	Theme 3	Theme 4	Theme 5
All Data	Broadband	Solutions	Challenges	Digital Skills & Usage	Devices
State	Solutions	Data	Funding	Broadband	Challenges Community Partnerships
LEA	Broadband	Solutions	Digital Skills & Usage	Devices	Challenges
School	Broadband	Challenges	Devices Digital Skills & Usage	Solutions	
Urban	Digital Skills & Usage	Broadband	Challenges	Devices	Solutions
Suburban	Broadband	Solutions	Equity	Devices Challenges	
Rural	Broadband	Solutions	Challenges	Community Partnerships	Emotional Response

An in-depth exploration of the data collected will be included in the findings section of this report; however, a look at the coding summary provided in Table 2 provides some initial insights. First, the trends in interview and focus group discussion topics do not directly align with the research questions. For example, while the topics of broadband and devices were equally represented in the researchers' questions, broadband was consistently a larger topic of discussion than was the topic of devices. It is also noteworthy that, even though no questions were asked regarding digital skills and usage (because these topics were beyond the intended scope of this research), these topics were heavily discussed by leaders during the interviews and focus groups.

It is also interesting to note the differences in focus between the various levels and locations of the educational leaders interviewed. Data and funding were top areas of discussion among state leaders, whereas LEA and school-based leaders discussed broadband more than any other topic. Regardless of the geographic area, broadband was an area of focus for all. That said, for rural leaders broadband was almost exclusively their focus, and devices were hardly discussed at all. In discussions with urban leaders, digital skills and usage surpassed broadband as the largest area of focus.

Limitations

There are several specific limitations to this study. As a qualitative study, findings are not generalizable to all educational settings. Additionally, this study used a small sample size, and even though LEAs were selected for the study to represent three types of communities (rural, urban, and suburban) in an effort to represent their different needs, the study is still not generalizable to every population (Merriam & Tisdell, 2016, p. 254). While differing groups (legislators, community members, parents, students) may view the digital divide through unique lenses, this study will focus on a sampling of state and LEA leadership, further limiting the generalizability of the research. The hope is that the findings of this study will prompt further research and will assist educational leaders who may be in situations similar to those of the three Utah LEAs studied.

As research was conducted, potential contextual issues were considered (Miles et al., 2013). Transitions in leadership, unforeseen personnel turnover, and leaders overwhelmed with new decisions were all issues as data was collected. The very fact that the research was conducted during a worldwide pandemic with longer-lasting and father-reaching impact than the researchers and participants anticipated complicated data collection as well.

Another limitation of this study is that it focused only on physical access to technology, van Dijk's (2020) first level of the digital divide. While the second and third levels of the digital divide (digital skills, technology usage, and outcomes and benefits) are issues worthy of study as well, the researchers believed that targeting physical access to devices and broadband would allow this study to remain narrowly focused on the most pressing issues at the time.

The focus groups conducted in this study were held virtually using the Zoom platform. A limitation in conducting focus groups in this way was the risk that broadband connection would be spotty or nonexistent, depending on the location of participants. Most participants did not experience connectivity issues during the focus group sessions; however, one participant utilized the option to connect using a cellular telephone for a portion of one focus group. Another participant struggled with audio connection and opted to utilize the Zoom chat feature for a portion of another focus group. These options still provided stable participation; however, the participants momentarily lacked face-to-face interaction with the other participants, which may have changed their level of engagement.

Finally, though the digital divide is a social issue that impacts students in all educational settings, this study focused on traditional public education agencies. In Utah, charter schools are funded through public monies, but because they are governed by a different set of policies and requirements than public schools, they were not considered in the selection of participants for this study. Additionally, since this study focused on public school LEAs, private schools and homeschooling providers were not included in the sampling.

Positionality

This study was a joint effort of four educators with extensive experience in educational technology. We are all educational technology leaders in our respective education agencies. As

former classroom educators, we have insight into what it is like to be in the teacher role as well as the role of educational technology trainer. Two of the researchers work in one of Utah's suburban LEAs. One researcher works for UETN and has trained educators in all of the LEAs being studied. One researcher worked for the same Utah suburban LEA at the start of this research project, and then began working for UETN during the time research was being conducted.

Though, as educational technology leaders, we often evaluate tools, software programs, and technology integration, we did not do so in this study. The information we gathered about the digital divide during COVID-19 school dismissal was specifically about equitable access to technology devices and broadband. One advantage of our status as educational technology leaders at the state and LEA level was that local educational leaders were comfortable talking to us about technology-related topics without being preoccupied with explaining any jargon.

Just as our expertise can be considered an advantage, it can also cause potential bias. We have had to be cautious during data analysis to remain objective (Merriam & Tisdell, 2016, p. 16). For example, when coding we had to ensure our coding was based on what participants said and not what we thought they meant (Merriam & Tisdell, 2016, p. 208).

As a group, we have functioned well together and have seen our collaboration as an asset. One of our strengths is that we have been able to use each other to continually check the focus of our study and stay on track. We have seen the expertise of the members of our research team and our ability to collaborate as assets within this research topic.

Narrative Report of the Study

The researchers had planned to conduct interviews and focus groups during the 2020 summer months. The intent was to allow the educational leaders involved in the research to

reflect on their COVID-19 school dismissal experiences while they were still fresh in their minds. However, the researchers did not anticipate that the pandemic would stretch out as long as it did and continue to heavily impact educators throughout the summer and into the 2020-21 school year. The state and LEA leaders in this study found themselves busier than ever training educators and preparing for what might come at the start of the new school year.

The demands the pandemic put on their time and attention resulted in the interviews and focus groups being delayed until September and October, a month to a month and a half into the new school year. The research questions remained unchanged and centered on leaders' actions in addressing the digital divide during the COVID-19 school dismissal; however, the delay resulted in leaders also sharing experiences beyond dismissal, including their work to develop long-term solutions. In the findings section of this report, the information shared remains focused on school dismissal efforts only. The researchers share some of the additional insights in a section of this report dedicated to unanticipated lessons learned.

How did Utah's state educational leaders support LEAs in addressing the digital divide, specifically the need for equitable home technology access, during the COVID-19 school dismissal?

As part of the Utah Master Plan, collaboration has been ongoing between UETN, USBE, and LEAs to identify gaps and ensure network readiness for broadband connectivity (USBE, 2015, p. 9). Prior to COVID-19, USBE and UETN were focused on solutions, data, and funding, all of which align with their roles and responsibilities as they oversee government programs and grants and strive to understand and serve the varied education populations across the state. When school was dismissed in March, there were no state-wide systematic solutions in place regarding

devices and home broadband access, and both entities used this time to compile and publish resources to assist LEAs in their efforts.

One such resource was the Xfinity Wi-Fi Hotspot Finder, an online map that provided the locations of open Wi-Fi access points in Utah communities. Other resources included information from telecommunications companies (telcos) that provided heavily discounted services during COVID-19. Comcast's Internet Essentials program, for example, provided qualifying households two free months of broadband. In order to qualify for these programs, families had to prove financial need. For state leaders, the development of these resources "highlighted that there were opportunities to have a larger conversation about what [solutions should] look like at the state level" (state leader, interview with the authors, September 2020).

During COVID-19 school dismissal, state leaders participated in the Utah Broadband Advisory Council that met weekly to discuss data and information collected from Utah broadband providers. They hoped to gain an understanding of broadband connections already present and available in individual households. They found that the data was "all over the place" (state leader, interview with the authors, September 2020) and did not help them gain a true sense of the broadband needs of K-12 students. Even though the data identified households with broadband access, it was not mapped against K-12 enrollment and therefore did not identify which of those households included K-12 individuals (state leader, interview with the authors, September 2020). State leaders continue to question what broadband access should look like for the broader population (state leader, interview with the authors, September 2020) as well as which data need to be collected and disseminated at the state level to best support the provision of broadband for the K-12 population.

USBE sent a survey to technology directors in each LEA asking what broadband solutions they already had in place and what role they saw the state playing in assisting their efforts. The intent was to understand how much involvement LEAs wanted from the state in implementing broadband solutions. A majority of LEA responses indicated a desire to have state leaders provide funding while allowing LEAs to "pick their own solutions" (state leader, interview with the authors, September 2020). During this time, the Utah legislature received funding from the federal government as a result of the Coronavirus Aid, Relief, and Economic Security (CARES) Act, which provided states with funds to be used in assisting LEAs during the COVID-19 pandemic.

The Utah legislature asked UETN to create a technology plan for higher and public education using these CARES Act funds. UETN did not feel confident they were the right entity to administer a K-12 broadband program because they did not "have all of the student data" (state leader, interview with the authors, September 2020) necessary to do so effectively. By combining efforts with USBE they were ultimately able to create the Home Broadband Program that utilized CARES Act money to fund various LEA solutions statewide. LEAs that opted in to the program were asked to submit plans that detailed their solutions and identified their communities of need. They were also required to provide data that would allow state leaders to "learn from the solutions that were the most successful and invest in those in terms of scaling and replication" (state leader, interview with the authors, September 2020).

In addition to working with USBE, UETN regularly works with other state entities, such as the Utah State Library Division. As mentioned in the literature review, it is estimated that Utah public libraries are the only source of free broadband for 67% of library communities in the state (UGOED, n.d.). During the school dismissal, the Utah State Library Division requested

funding from UETN for the purchase of personal mobile hotspots that could be distributed to Utah libraries in need. Libraries were then able to check these personal mobile hotspots out to patrons using the same process as checking out a book.

In their research interviews, state and LEA leaders shared that addressing the digital divide has been a topic of conversation within their organizations for years. Much of the focus in this space has been on school-based infrastructure because, in their experience, school infrastructure "is something that is easier to identify and solve" (state leader, interview with the authors, September 2020). Through work with various state agencies, one state leader has seen how difficult it can be to bridge the digital divide when it comes to home access due to its many varying elements. Leaders "know that it exists," but even so "being able to pinpoint individuals and actually being able to define the digital divide is not easy" (interview with the authors, September 2020).

How did leaders of Utah's LEAs in rural, urban, and suburban settings respond to the digital divide, specifically the need for equitable home technology access, during COVID-19 school dismissal?

When school buildings were closed in response to the COVID-19 pandemic, educational leaders in some states "called it," ending the school year in March because they did not have the necessary infrastructure in place for virtual, home-based learning (state leader, interview with the authors, September 2020). Thanks to the state broadband backbone provided by UETN, Utah LEAs "were at least on the road and not stuck where they were" (state leader, interview with the authors, September 2020). Rather than ending the school year, each LEA scrambled to provide ongoing learning opportunities for their students. Some found that they were not in a position to

distribute technology devices right away and instead distributed paper packets until they were able to determine how best to put digital home access solutions in place.

Devices

Since the beginning of the Digital Teaching and Learning grant program, USBE has kept a state-wide inventory of student technology devices. USBE collected data from LEAs to determine how many devices they had in relation to their students and teachers. The inventory showed that rural LEAs outpaced urban LEAs "by a lot" (state leader, interview with the authors, September 2020). In fact, it was a rural LEA that had the highest number of devices statewide. This is attributed to the fact that devices are required in order for rural students to access much-needed distance learning classes (state leader, interview with the authors, September 2020). During their interviews, the rural LEA leaders did not focus much of their conversation on the distribution and tracking of devices during school dismissal because, in their region, broadband access was a bigger issue.

When school dismissal was announced, the switch to virtual learning happened quickly. LEAs did not have weeks to prepare for this shift, they had days. This meant they had a very short timeframe to gather, prepare, and distribute devices to as many students as possible. Although the urban and suburban LEAs had invested in devices for years prior to COVID-19 school dismissal, they did not have enough devices for every student, nor were systems in place to send devices home. The urban LEA's initial plan was to ensure every household had access to at least one Chromebook, but during the rush to distribute devices "some households may have received more" (urban LEA leader, interview with the authors, October 2020). This was particularly true for households with multiple students of varying ages since elementary, middle, and high schools were all working to distribute devices simultaneously.

In the suburban LEA, the Information Technology (IT) director created and published a Google Form that allowed families to request Chromebooks. This supported schools that found they did not have enough devices for every student. Families were prioritized based on need, and to accommodate these requests, IT personnel were instructed to "tear apart classroom sets of Chromebooks" (suburban LEA leader, interview with the authors, September 2020) in order to distribute individual devices to students. Overall, the LEA had enough devices for every student who requested a Chromebook, but this seems to have happened only through a coordinated effort between LEA and school leadership, causing them to question how best to coordinate in the future.

The urban and suburban LEA leaders found they needed to create systems to check out and track devices being distributed to students. It was left up to individual schools to determine which systems would work best for them. Through their experiences, however, they discovered the need for a universal, LEA-wide system that is digital, easy to use, and easy to manage. The urban LEA utilized a mixture of barcode scanners, spreadsheets, and paper receipts to distribute and track devices, but they found it was difficult to manage. School leaders in the suburban LEA were encouraged to check out devices using their digital library system, and while most leaders followed this recommendation some came up with their own procedures. As a result, trying to track all of the devices became a challenge, and many devices wound up "out in the wild" (suburban LEA leader, interview with the authors, September 2020).

Chromebooks. Data collected from the research interviews shows that Chromebooks were the device of choice in each LEA during school dismissal. This was not just because Chromebooks were the only devices they had access to. The LEA leaders found that Chromebooks "did everything they needed them to" (suburban LEA leader, interview with the

authors, September 2020), meaning they enabled students to successfully access and complete their schoolwork. They also proved to be the most cost-effective and reliable computing devices for students. Technical problems and broken devices were still to be expected, but LEAs found that Chromebooks were easier to set up and manage and less expensive to replace than other options. Chromebooks could be tied to LEA Google domains, guaranteeing that they were filtered and met government safety and security requirements.

Chromebooks did, however, prove to be problematic for elementary students, specifically those in grades K-2. Prior to the dismissal, many of these students had little to no experience using Chromebooks, and as a result they struggled with using them to access their virtual coursework. One LEA leader commented that "for our younger grades there is still kind of that technology gap with our students" (urban LEA leader, interview with the authors, October 2020). Leaders found that iPads were easier for their youngest students to use, mainly because of the touch screen feature. However, leaders did not feel comfortable sending iPads home with students because they are more expensive to repair and more difficult to manage and filter than Chromebooks (urban LEA leader, interview with the authors, October 2020). If LEA leaders continue to utilize Chromebooks for home use moving forward, they will need to determine if they are the best devices for K-2 students. Additionally, they will need to determine what type of experience and training young students should have before taking these devices home. LEA leaders may also need to explore Chromebook options that include a touchscreen feature.

One-to-One. Prior research indicates that schools with increased use of technology in classrooms and lower student-to-computer ratios have better outcomes than those in which many students have to share devices (Greaves et al., 2010). As LEA leaders expressed their intentions to continue building their technology inventories to support one-to-one access, it became clear to

the researchers that the term "one-to-one" has different meanings when used in different contexts. School-based, one-to-one access is when students have access to one device while in a classroom, or they have access to one device throughout the entire school day, but that device remains on campus at all times. In a take-home, one-to-one model, each student is assigned one device to take home, with the expectation that this device is also with them throughout each school day.

In some cases, both types of one-to-one models were found within the same LEA. For example, one rural high school has had a school-based, one-to-one program in place for the last five years. Students in this program have access to either a laptop or Chromebook while on campus, but not at home. Another rural high school has had a take-home, one-to-one pilot program in place since 2019. This program provides devices for qualifying eighth-grade students to use while on campus and at home. The LEAs that were already moving toward a take-home, one-to-one model prior to COVID-19 found themselves in a better situation when school dismissal started. Systems were in place that allowed them to send devices home within days of the governor's announcement. Other LEAs that were only school-based, one-to-one needed additional time to gather, set up, and distribute devices to their students.

In each LEA, providing take-home, one-to-one access has been a lower priority in elementary schools. The suburban LEA leader reported that the LEA's superintendent wants to move to a take-home, one-to-one model for all secondary schools. Elementary leaders were only challenged to consider going school-based, one-to-one, indicating the prioritization of secondary students (interview with the authors, September 2020). The Utah Master Plan was developed to "move all students to high levels of learning powered by technology" (Utah State Board of Education [USBE], 2015, p. 5). This means leaders "have to think about both levels" (urban

LEA leader, interview with the authors, October 2020). Take-home, one-to-one plans that focus only on middle and high school students do not take into proper consideration that elementary school is a fundamental time for building knowledge and skills and bridging learning gaps. "If you don't start at the bottom with the elementary kids, you're just spinning your wheels. By the time they're in high school, they're so far behind" (suburban school leader, interview with the authors, October 2020). LEA leaders planning to implement one-to-one models need to thoughtfully consider their end goals and how their plans will impact students at all levels.

Broadband

When the COVID-19 school dismissal started, providing broadband access was a top priority in each LEA, and geography played a role in what leaders were able to do. In the rural LEA, broadband connectivity was almost exclusively their focus because their level of access was so much lower than in other areas. The urban and suburban LEAs had access to the state's broadband infrastructure, therefore the question of access was more focused on filling in gaps and finding the best, most equitable solutions for pockets of the population who were without.

Extending LAN to Parking Lots. One of the first solutions that each LEA put into place was the extension of their Local Area Networks (LAN) to reach outside their school buildings and into their parking lots. This made it possible for students and families to connect to school broadband without having to be inside a school building. "I saw at least five cars on a regular basis in my school's parking lot and families sitting on the grass of the playground accessing the school's broadband" (suburban LEA leader, interview with the authors, September 2020). LEA leaders knew that while this was an acceptable temporary solution for some, it was not a sufficient, long-term solution for all.

To accommodate students living farther away from school locations, the rural LEA equipped school buses with Wi-Fi access points and parked these buses in various locations around the community. Knowing the LEA had "dead spot" locations throughout the region where there were no cellular signals, "drive-by Wi-Fi" locations were created (rural LEA leader, interview with the authors, October 2020). Monopoles, or small Wi-Fi towers, were strategically placed around the community as well. Each monopole is equipped with small access points that connect with a radio tower that has been placed on a mountain top in the area, creating a similar broadband connection to what schools have. Community members came together in support of this LAN access project, and private residences, community buildings, and churches were also used for monopole placement. This ensured that rural students would not have to drive more than 20 minutes to access broadband. Even though this solution was put into place in response to increased demand for home access during the COVD-19 school dismissal, the need for home broadband access existed before the pandemic. Other rural leaders could learn from the "drive-by Wi-Fi" system that was created and implement similar solutions in their regions as well.

Community and State Resources. In all three LEAs, communities came together to provide broadband access. Businesses like McDonald's allowed students and families to access their broadband from parking lots, and local churches posted their Wi-Fi access information on their doors. These options caused concern among LEA leaders because they could not ensure the safety of students who chose to walk to these locations alone or at night (urban LEA leader, interview with the authors, October 2020). Urban and suburban school leaders found that sharing information from UETN and USBE about affordable broadband options, such as the Xfinity Wi-Fi Hotspot Finder and Comcast Internet Essentials program, helped many families connect. However, enrolling in the Comcast Internet Essentials program was not always a quick process.

It took as long as three weeks for some households to obtain access, and even then they only received minimal connection speeds (around 25 megabytes per second). This type of connection was faster than they would get with a hotspot but was not always enough to meet their needs.

Distribution of Personal Mobile Hotspots. The distribution of personal mobile hotspots was the solution all three LEAs had hoped would be the answer for providing home broadband access. Unfortunately, these hotspots proved to be largely unreliable due to location, connectivity, and data restrictions. Rural students traveled to drive-by Wi-Fi locations to upload and download content using flash drives because the personal mobile hotspots they had received did not have enough bandwidth to support these processes. One rural high school student would go to bed between 7:00-8:00 every night so she could wake up at 3:00 in the morning to complete her homework. This was the only time she found her personal mobile hotspot had a strong enough connection to support her schoolwork (rural LEA leader, interview with the authors, October 2020).

LTE (long term evolution) is the standard for wireless data transmissions for personal mobile hotspots and determines the speed at which a user can access online content. According to the suburban LEA leader, network engineers at UETN suggest 10 to 15 megabytes per second per student as a minimum LTE standard for students (interview with the authors, September 2020). However, when multiple people in a household rely on the same hotspot, they often find that 15 megabytes per second will not meet their needs. Many personal mobile hotspots come with monthly data limits, and once those limits have been met users may experience slowness with their service. The result is students not having the robust connections needed to run the programs or access the content their schoolwork demands.

Even though LEAs in this study have shifted to other, more reliable solutions, they are not ridding their schools of personal mobile hotspots entirely. There are situations in which these hotspots are an appropriate solution. For example, in areas where personal mobile hotspots are able to receive strong signals, they can be effective. Personal mobile hotspots are designed to provide mobility with on-the-go access. This can benefit students who move between various households and/or various afterschool activities. When deciding whether or not a personal mobile hotspot is an appropriate solution for their students, leaders should remember to keep location, connectivity, and data usage under consideration.

What lessons did these state and LEA leaders learn from their efforts to provide equitable home technology access as a result of COVID-19 school dismissal?

Equitable Access Means Home Access

Leaders in this study learned that for technology access to be truly equitable it needs to extend into student homes. As mentioned in the literature review, students with one-to-one technology access have improved high-stakes test scores, higher completion rates, and improved school discipline (Greaves et al., 2010, p. 16). Although LEAs thought they were addressing access issues with one-to-one device and broadband solutions within schools, leaders came to realize that without home access these solutions were not truly equitable (suburban LEA leader, interview with the authors, September 2020). LEAs determined that they must find solutions for providing take-home, one-to-one devices and home broadband support for families who would not otherwise have access (urban school leader, interview with the authors, October 2020).

Based on this determination, the urban LEA worked to increase the number of devices available for student home use. Purchasing devices was "the first decision that was made when

the CARES Act funds were made available" (urban LEA leaders, interview with the authors, October 2020). The need for clear communication and training for families in the use of these devices were also important lessons learned (urban school leader, interview with the authors, October 2020). In the suburban LEA, leaders learned that differentiation was key to supporting home access for students (suburban LEA leader, interview with the authors, September 2020). They addressed individual school needs as they arose, providing some with extra Chromebooks for home use, providing some with personal mobile hotspots for home broadband connection, and guiding others toward affordable telco broadband services (suburban LEA leader, interview with the authors, September 2020).

In rural areas, home access needs were primarily centered around broadband. To fully comprehend these needs, it is important first to understand why access is lacking in these areas. Previous research (as referenced in a state leader interview) suggested that urban communities were more interested in having and using broadband than rural communities; however, a more recent 2011 survey "showed that's not the case in Utah at all." In reality, the demand for broadband "is kind of equal" (state leader, interview with the authors, September 2020). Lack of access in rural Utah communities is not due to resident preference. Rather, it is due to a lack of infrastructure in their area.

Projects were started before the pandemic to extend fiber broadband connections into more areas of the state. These efforts have been ramped up since school dismissal with the aid of CARES Act funding, but this infrastructure will still only provide connections to school buildings, not to homes (rural school leader, interview with the authors, October 2020). Telcos have been reluctant to provide service in some rural areas because they are afraid they will not make a return on their investment (rural school leader, interview with the authors, October 2020).

One state leader mentioned that rural telcos connected over 1,800 homes during school dismissal, but it is unclear what will happen post-pandemic (interview with the authors, September 2020).

When leaders were asked what perfect access would look like, all agreed that home access to technology needs to extend beyond the pandemic. One state leader went so far as to advocate for broadband to be considered an essential utility (interview with the authors, September 2020) and suggested this as a way to provide home access that can continue even after COVID-19 subsides. Now that students have become accustomed to home broadband connections and take-home devices, the suburban LEA leader commented that it would not be wise to take such access away in the future, stating, "I don't see us ever moving away from that now" (interview with the authors, September 2020).

Not All Broadband is Created Equal

During school dismissal, LEA leaders realized that not all broadband is equal. In some areas, especially rural areas, the lack of a robust broadband connection -- a connection with sufficient speed and bandwidth -- meant that educators were forced to provide "data-wise" instruction (rural LEA leader, interview with the authors, October 2020). Rather than utilizing the engaging, multimedia tools that make online learning most effective, they had to adjust their lessons and assignments to the capacity of the equipment and connections that were available. An important lesson learned from these struggles is that "we need to continue to find solutions that provide truly adequate bandwidth" (suburban LEA leader, interview with the authors, September 2020). It is no longer enough to just have broadband. Robust broadband is required in order to accommodate the number of users in a home -- students and adults -- as well as the latest educational technology tools.

LEA leaders sought to identify students and families that needed assistance securing home broadband access. Urban leaders used surveys to determine the broadband needs within their communities (urban LEA leader, interview with the authors, October 2020). However, originally these surveys did not take bandwidth and speed into account. As time went on, LEA leaders found that even in households where broadband connections existed, many students experienced unstable and inconsistent access. As families lived through school dismissal they, too, came to a better understanding of the kind of access needed to accommodate home learning. In updated surveys sent later into dismissal, more families indicated their need for LEA support because the weak broadband and cellular connections they thought would suffice were not enough after all (urban LEA leader, interview with the authors, October 2020).

Social-economic status is known to play a role in the digital divide (Clark & Gorski, 2001; NTIA, 1995; Simoni et al., 2016; Van Dijk, 2020; Warschauer et al., 2004; Wilson et al., 2003), and while leaders considered this as they developed plans to support home broadband access, initial efforts were only focused on whether a family had a broadband connection or not. Speed and bandwidth levels are often based on what households can afford, and even with the low-cost broadband options that were offered during school dismissal, many families still did not have the means to pay for the level of connection needed to complete online schoolwork. Some households did not want to go through the application process for such programs because they did not "feel comfortable with government or any [other] officials in their home" and did not want to provide personal information to telcos (urban school leader, interview with the authors, October 2020). Other families tried to qualify for these programs but did not meet the specific requirements because the pandemic had caused them sudden job loss or other abnormal economic strains (state leader, interview with the authors, September 2020). Families that had

been able to get by with weaker, lower-cost broadband connections found that this was no longer enough to meet their demands. While some were able to upgrade their data and connection plans, many could not afford these more robust solutions, once again leaving LEA leaders with more disconnected students than their original data collection efforts revealed.

Leaders learned that meeting broadband needs requires more data collection that will help them understand not just the presence or absence of broadband in each home, but also the level of access in each home. As one leader put it, "we have a long way to go before our kids experience equitable access to the Internet" (rural school leader, interview with the authors, October 2020). As LEAs expand their surveys to include more specific questions regarding home broadband access, they can use that information to ensure each student has access to broadband robust enough to enable equitable participation in educational opportunities.

Whose Role is it Anyway?

Participants in this study learned that a balance between state, telco, and LEA leadership is needed in order to supply equitable access to home broadband. LEA leaders rely on the support of state leadership in gathering data and information about innovative solutions that are working for LEAs around the state. They also depend on the services that telcos provide. At the same time, local leaders need the freedom to adjust state recommendations and make decisions that work for their specific populations. Similarly, school leaders need LEA support and flexibility in order to meet individual school, student, and family needs (suburban school leader, interview with the authors, September 2020). The exact combination of support and flexibility that would be most effective was a matter of debate between leaders.

State organizations and LEAs are not typically the entities responsible for the provision of broadband in Utah. Usually, telcos and Internet service providers (ISPs) supply that service.

Even so, when Utah's governor announced in March of 2020 that schools would be dismissed, shifting to virtual learning, many educational leaders found themselves being asked to assume roles they had not previously taken on, such as the role of broadband provider. This caused them to question who the authority should be when it comes to expanding broadband connectivity within the state, specifically to support students within the public education system. State educational leaders saw the need to support students and teachers, but they also knew that they were "not an entity that is responsible for the provision of broadband" (state leader, interview with the authors, September 2020). Despite this, some local leaders advocated for state organizations and legislators to provide emergency stipends for families who needed broadband assistance (rural school leader, interview with the authors, October 2020).

Differences in geography and demographics impacted the kind of broadband support individual LEAs needed, and while local leaders wanted the freedom to provide educational support specific to their school communities, they did not have the capacity to do everything on their own. One LEA leader questioned the new role LEAs were playing in providing home broadband access saying, "somebody other than school personnel needs to solve this equity issue. It's way beyond the scope of what a principal should be doing" (rural school leader, interview with the authors, October 2020). Feeling their frustration, a colleague participating in the focus group added, "Where are the people working on Internet connectivity?... COVID-19 has made it a principal's role to do it, but we can't do it... We have schools to run, and the work that it takes to bring real Internet access to the home needs to be a full-time job that someone else is doing" (rural school leader, interview with the authors, October 2020).

Educational leaders also learned that there is a delicate balance between LEAs and telcos when attempting to provide affordable home broadband for students. While LEAs want to

provide for their students, they do not want to take business away from these companies. As described in the narrative report of this study, during the COVID-19 school dismissal, local telcos worked with state and LEA leaders to provide emergency free and low-cost broadband solutions (suburban school leader, interview with the authors, September 2020; urban school leader, interview with the authors, October 2020). These solutions have alleviated some of the burden placed on LEA and school leaders, but they are not permanent solutions, and it is unclear how long these special COVID-19 connections will be in service. Without a clear, immediate answer regarding who should provide broadband access, two LEAs in this study had begun moving forward with their own solutions to connect students. While neither was fully operational at the time interviews were conducted, both LEAs planned to move forward with solutions tailored specifically to their geographic needs.

In parts of rural Utah, telcos often do not provide any broadband connections "because they cannot make money" (rural school leader, interview with the authors, October 2020). The rural LEA leaders used CARES Act funding to support the creation of their own LAN access project. In this region, LEA-owned teacher homes are already connected to school LANs. This project will increase connectivity throughout their community using towers and radio signals that will extend school LANs into student homes. "Once we extend our LAN, I honestly hope that it'll work and we'll be able to connect the way kids in the cities do" (rural school leader, interview with the authors, October 2020).

In the urban LEA, there have been ongoing discussions about an LTE project that would broadcast the LEA's broadband to students and families within the LEA boundaries. Authentication, through employee and student login credentials, would be required to access the LEA network. This would be managed by the LEA's IT department. The proposed LTE project is

possible for this urban LEA mainly because it is geographically small. This further supports the idea that while state and telco broadband support is needed, local conditions and needs greatly impact the effectiveness of such solutions. While there seems to be a consensus that balance and cooperation between state, telco, and LEA leadership is needed to solve broadband access equity issues, the exact combination of support remains unclear.

Outcomes and Critical Reflections

In the following section of this report, outcomes, reflections, unanticipated lessons learned, and recommendations will be presented. As explained in the methods section, the researchers used an interpretivist approach to construct meaning based on the multiple realities of the study's participants (Merriam & Tisdell, 2016, p. 8). This approach proved to be beneficial in assisting the researchers as they reflected on the varied and complex experiences of educational leaders during the COVID-19 school dismissal. As these leaders sought the best solutions for addressing the digital divide, the specific needs of their school communities impacted their responses. Each experienced their own reality based on their region (urban, suburban, rural), their level (state, LEA, school), and the characteristics of their school communities (including social-economic status). An interpretivist approach allowed the researchers to "address the complexity and meaning of [these] situations" (Black, 2006, p 319). While there was overlap in their experiences, and some common conclusions and recommendations can be made, the participants' unique perspectives prompted the researchers to also recommend flexibility and individualization within these solutions.

Unanticipated Lessons Learned

Throughout this research, educational leaders were asked questions specific to physical access, yet topics relating to motivation/attitude, digital skills, and usage were also consistently

brought up during each interview and focus group. It became evident to the researchers that all four of these components are necessary for providing equitable home access to students. Therefore, the researchers have developed a new model to represent the implications of the unanticipated lessons learned in this study. The Model of Equitable Technology Access (Figure 5) has been designed based on Timothy Knoster's Model of Managing Complex Change (Knoster, 1991). In presenting this model, Knoster suggested that when certain components are "inherent in [a change] system, the change will likely take place. However, if any one of the components was missing, then the 'Change Process' may be inhibited or may not take root" (Orange County Department of Education, n.d.). The researchers' new model is intended to aid educational leaders in evaluating technology access and understanding what happens when pieces of that access are missing. When all four components of the model work together, whether across an entire LEA or within an individual teacher's classroom, equitable access is achieved. When any of the pieces are missing, efforts to achieve equitable access are thwarted.

Figure 5

Model of Equitable Technology Access

Motivation/Attitude	Physical Access	Digital Skills	Usage	=	Equitable Access
Motivation/Attitude	Physical Access	Digital Skills	Missing	=	Disengagement
Motivation/Attitude	Physical Access	Missing	Usage	=	Anxiety
Motivation/Attitude	Missing	Digital Skills	Usage	=	Detachment
Missing	Physical Access	Digital Skills	Usage	=	Resistance

Physical Access - Detachment

The focus of this research was physical access to technology, and in the narrative report of this study the researchers have explored how lack of physical access results in the inability for students to fully engage in educational opportunities. In this model, we refer to this phenomenon as detachment. Learners with physical access can complete schoolwork, review lessons, and participate in intervention and extension opportunities. Without physical access at home, some learners have to leave these opportunities at school. According to the suburban LEA leader, "it should be a basic human right to have access to the information that the affluent have readily at their disposal" (interview with the authors, September 2020). To avoid detachment, LEAs are working to provide physical devices and broadband access to students in school and at home. While this study shows how lack of physical access contributes to detachment, what was not anticipated were the lessons learned about motivation/attitude, digital skills, and usage.

Motivation/Attitude - Resistance

Without motivation and positive attitudes toward educational technology, resistance to its acquisition and use occurs. The virtual instruction necessitated by COVID-19 school dismissal provided motivation for equitable home access to technology. On the other hand, "school dismissals had a huge impact on our kids' overall social, emotional well-being" (urban LEA leader, interview with the authors, October 2020). As students began completing schoolwork virtually, positive attitudes declined because "parents and students were [emotionally] overwhelmed" (suburban LEA leader, interview with the authors, September 2020). A sense of resistance formed when students had little to no personal connection with their teachers. Educational leaders quickly learned that to decrease resistance to online learning it was important for teachers to instill "that personal feel where they can feel connected to each other"

(urban school leader, interview with the authors, October 2020). Therefore, to decrease resistance, they created online learning discussions, held virtual office hours, created learning videos with a personal touch, and scheduled synchronous online group time when possible.

Digital Skills - Anxiety

Anxiety can occur when technology users do not possess the skills necessary to complete digital tasks. Without these digital skills, misuse of technology or even resistance to technology can transpire. LEA leaders learned from their COVID-19 experience that training to improve the digital skills of students, families, and educators was crucial in order to decrease the anxiety that accompanied technology-based home learning. Where sufficient training had not been provided, leaders encountered educators who were unable to effectively integrate technology, students who shied away from technology-based learning, and household members who experienced confusion and frustration as they attempted to assist their students. Lack of digital skills can ultimately develop into overall anxiety surrounding technology use that can stop any movement toward innovative teaching and learning practices.

One interviewee explained that "if a student can't connect effectively, engage effectively… have digital skills to the point where they can create, collaborate, communicate, et cetera" it puts students at a clear disadvantage (urban LEA leader, interview with the authors, October 2020). Prior to COVID-19, students were trained to use specific technology within the school setting. During school dismissal, however, some students were handed Chromebooks without such training, resulting in a population of students who were "not able to learn effectively" (urban LEA leader, interview with the authors, October 2020). Educators often assume that their students already possess the necessary digital skills for learning, but leaders came to realize that although "kids might say they're technology savvy" (suburban school leader,

interview with the authors, September 2020) they were not always skilled enough to use the devices and platforms utilized for online schoolwork on their own. When they turned to their families for help, it also became apparent that not all households were equipped to offer technology support (suburban school leader, interview with the authors, September 2020).

Usage - Disengagement

Leaders also expressed a sense of responsibility to provide every child with equitable access to high-quality learning experiences. This meant focusing on what makes digital teaching and learning, in all its forms and variations, effective and engaging. Leaders discovered that LEA-wide utilization of one consistent learning platform, appropriate learning tools, and best practices for blended and online learning are all required to ensure effective usage of technology by educators.

Prior to COVID-19, teachers used a variety of digital learning platforms in their daily routines. During school dismissal, parents and students became frustrated and confused when required to access the variety of systems utilized by different teachers (urban school leader, interview with the authors, October 2020). LEA leaders agreed that being "unified" and setting the expectation that their educators would all use the same learning management system (LMS) for blended and online learning was vital for reducing the frustration of learners and their families (suburban school leader, interview with the authors, September 2020; urban LEA leader, interview with the authors, October 2020). Even when accessing the same system, students and families experienced difficulty when online courses were set up with different expectations or navigation, which led to disengagement. Base-line expectations for every teacher became a norm, including standardization of the LMS to be used and course design within that LMS (urban LEA leader, interview with the authors, October 2020).

Even after establishing such standardized practices, leaders learned that educators needed to be wise about which tools and applications to use, as well as when and how to use them within each course. Introducing too many new options to present content and solicit interaction from students was overwhelming and caused students to disengage. While varied and engaging activities are important, leaders learned that new tools should be introduced only after assuring that students and families were successfully using tools already introduced (urban LEA leader, interview with the authors, October 2020). Proper training and modeling must be provided for each new tool. Limiting the platform and the new tools being utilized allows for uniformity of usage within the LEA, which eases the stress of online learning and minimizes the chance of disengagement.

LEA leaders discovered an exigency to clearly define remote, blended, and online learning for educators and provide resources to support best practices in each modality. Professional learning opportunities were planned to help educators provide high-quality educational experiences for students in new and innovative ways as a means to avoid disengagement. To achieve these new goals, leaders emphasized the need for new and improved pedagogical resources. Some developed resources within their own LEA, and others emphasized the need for increased partnerships with state organizations, such as the Utah State Board of Education and the Utah Education Network (urban LEA leader, interview with the authors, October 2020).

The unanticipated lessons learned in this study provide evidence that to achieve equitable access to online learning all four components of access must be present. The Model of Equitable Technology Access summarizes how each component affects equitable access. Depending on which component is missing, technology users can experience resistance, detachment, anxiety,

disengagement, or combinations of these results. Fortunately, the COVID-19 school dismissal brought all components of equitable access to the forefront for many educational leaders in Utah. One leader commented, "if there's a silver lining in [our COVID-19 experience], it caused a certain degree of awareness... that it's not enough just to have devices and Wi-Fi access. If our teachers cannot provide meaningful learning experiences remotely, then it doesn't matter if a kid can connect" (urban LEA leader, interview with the authors, October 2020).

A New Framework for the Digital Divide in Education

Throughout this research project, the researchers were guided by the Physical Access of the Digital Divide framework (Figure 4), which they created based only on the first of three levels in van Dijk's (2020) Causal and Sequential Model of Access and Effects of the Digital Divide framework (p. 33) (Figure 1). As explained in the methods section of this report, this framework was intended to help the researchers maintain focus on physical access and aid in interpreting the information gained. The rationale for this focus was that, despite the valid need for research into levels two and three of van Dijk's model, lack of technology access remained an equity issue affecting Utah students. Maintaining focus on physical access alone, however, proved to be more difficult than expected. While research questions specifically targeted physical access, the answers provided by research participants (examined in the narrative report section of this study) proved that for Utah educators physical access could not be separated from motivation/attitude, digital skills, and usage, which are the remaining components in the first two of van Dijk's digital divide levels. Their responses made it clear that for them, these pieces of the digital divide are inseparable and intertwined.

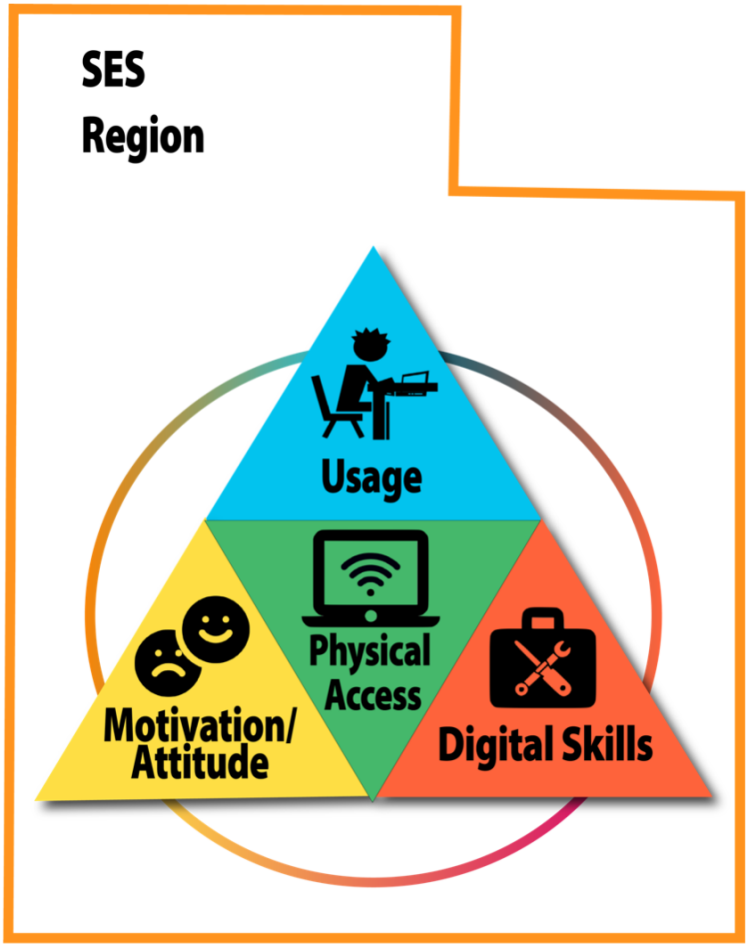
Even including the broader scope of the access portion of van Dijk's model, the researchers have concluded that the linear flow of his model does not accurately represent the

digital divide in education. While motivation/attitude and physical access may precede digital skills and usage initially, the four components begin to influence each other in a nonlinear way. As soon as one component is altered, the other components are affected and need to be revisited and adjusted to meet changing needs. The following section of this report will explain in detail a new digital divide framework developed by the researchers.

Based on the understanding that neither van Dijk's (2020) digital divide framework nor the researcher's original framework has been sufficient for understanding the digital divide in an education context, the researchers have constructed a new digital divide framework specifically for educational leaders. While previous frameworks created a basic foundation for understanding the digital divide, for stakeholders to grasp the complexity of the digital divide within education they must analyze it through an educational lens. This new framework, known as the Utah Equitable Access of the Digital Divide Framework (Figure 6), uses the same access components van Dijk (2020) used in his framework -- namely, motivation/attitude, physical access, digital skills, and usage. In the new framework, however, these components are represented in a way that illustrates the interconnectivity between them.

Figure 6

Utah Equitable Access of the Digital Divide Framework



In the Utah Equitable Access of the Digital Divide framework, a triangle is used to represent overall access to educational technology. The four components come together to make up the whole. Physical access is the focal point of this new framework; therefore, it has been placed in the center of the triangle. Its centrality shows that without physical access the remaining three components are nonissues. Motivation/attitude, physical access, and digital skills form the base of the triangle. These three components are foundational because without them educators do not have the need or ability to even consider usage, which has been placed at the top of the triangle.

The circle around the triangle shows that, while the foundational components may need to be established first, they are not ignored once educators begin to use technology. On the contrary, similar to the TPACK model (Mishra & Koehler, 2006), the pieces of the triangle are interconnected. When making revisions to any one component, all four need to be reanalyzed and revised. Positive outcomes occur when the four components of access work synchronously. For example, during COVID-19 school dismissal, educators had no choice but to evolve and find new ways to use technology in order to present content virtually. This shift in technology use caused changes in motivation for using technology. More motivated technology users created new demand for technology devices that were up to date and broadband connections that were more robust. All of these changes resulted in the need for improved digital skills among all stakeholders. This experience shows how each component continually affects the others.

This interconnectivity can impact components negatively as well. For example, even when LEAs were able to provide physical access to all their students during COVID-19 dismissal, lack of digital skills had a negative impact on student motivation/attitude. Negative attitudes then impacted student use of the technology. This is further evidence that it is not enough to merely provide a physical device for students. All components of access must be considered for the digital divide to be fully addressed.

The Physical Access of the Digital Divide framework (Figure 4) included factors that impact access to technology. While this original framework illustrated that social-economic status (which includes education, income, and opportunity) and positional categories (like region) impact physical access specifically, the new framework shows that these factors can influence every component of access. Because findings in this study have confirmed that these factors influence equitable access, social-economic status (SES) and region have been listed as

influences that need to be considered and addressed statewide. This study's findings have also shown that these influences need to be considered in every Utah LEA, regardless of location or population generalities. For example, even in suburban areas, where lack of physical access to broadband is less widespread than in rural areas, educational leaders still reported pockets of their school communities where families were not connected. Every LEA, regardless of region, had to consider the impact social status, including citizenship and home language, had on attitudes, physical access, and digital skills. Thus, these influences remain important for all Utah educational leaders to be aware of as they attempt to decrease the digital divide, as represented by the state outline around the whole of the framework.

This study has also shown that technology access is not one-size-fits-all. Educators need to make adjustments to ensure that equitable access is being achieved for every member of their school community, both at school and at home. Because learners, families, educators, and communities are diverse, technology access must be adapted to best meet individual needs. If the desired outcomes of educational technology use do not occur as expected, each component of the triangle needs to be reexamined. Perhaps some students need different physical access due to grade level or region. Perhaps some teachers need different training to gain digital skills due to age or experience. These differences further emphasize the need to address and re-address each component of access, as illustrated by this new framework.

Recommendations and Implications for Practice

As a result of this study, the researchers have developed a new definition of equitable physical technology access, which is one take-home device and robust home broadband access for every individual student. This definition is the standard that LEA leaders must achieve in order to provide equitable physical access for all Utah students.

First, equitable physical access requires one-to-one, take-home devices for all students. This means that each and every student has a fully-operational and up-to-date device to use at school and at home. To ensure that students do not have to divvy up learning time with others, this device is not shared with siblings or other household members. Instead, this device is available for the student to use whenever it is needed.

Second, equitable physical access requires robust, home broadband for all students. This means that each and every student has broadband access at school and at home and does not have to travel to another location, like a parking lot or "drive-by WiFi" station, to connect. Because household broadband needs can vary greatly, robust broadband cannot be defined as one predetermined level of speed or bandwidth. Instead, robust broadband is defined qualitatively as the speed and bandwidth required to allow multiple members of the household to engage in full learning activities on the Internet with their devices at the same time.

In order to reach this ideal, Utah LEA leaders will need to work on different aspects of physical access depending on their region. For example, in the rural LEA we studied, leaders will need to continue to focus on increasing broadband availability, while in the urban LEA leaders will need to focus mostly on acquiring devices, with some additional broadband support. Equitable physical technology access is achievable if Utah's state, LEA, school, and community leaders work together to eliminate the digital divide.

Based on this new definition, the researchers make the following recommendations.

Non-Prescriptive Broadband Support

Because LEA broadband needs depend greatly on the region in which an LEA is located, and consistent with the recommendations made by state leaders in this study, the researchers recommend that funding and policy related to broadband disparity in Utah should not be

prescriptive. Instead, state leaders must continue to allow LEAs to formulate broadband solutions based on individual LEA needs. As explained in the introduction to this study, currently the Utah Master Plan addresses broadband access by outlining collaboration between UETN, USBE, and LEAs to ensure network readiness, identify gaps in broadband connectivity, and work to close such gaps (USBE, 2015, p. 9). It is necessary for this collaboration to continue with the inclusion of home broadband solutions. This might necessitate the inclusion of additional state agencies, such as the Utah Division of Public Utilities, and telcos in the collaborative effort. Such collaboration at the state level could essentially relieve LEA leaders of the burden of having to take on the additional roles of broadband expert and broadband provider.

Moving forward, state educational leaders should also take on the role of information gatherers regarding broadband strategies throughout the state, as they did during school dismissal. As one state leader suggested, they could then create a "menu" of broadband recommendations for LEAs to consider. This list also needs to include solutions that have not been successful so that LEA leaders can learn from others' experiences and avoid repeating missteps (state leader, interview with the authors, September 2020). LEA leaders would then have the flexibility to use this menu to design broadband solutions unique to the needs of their LEAs.

When asked what perfect broadband meant to them, LEA leaders indicated that perfect access is reliable access without "data speed or connectivity issues impeding learning" (rural school leader, interview with the authors, October 2020). Therefore, a recommendation for minimum broadband capacity is one component that must be included in the state's broadband menu. Broadband plans need to ensure sufficient capacity to meet the demands of blended and online learning. This calls for some investigation by state and LEA leaders in order to determine

a minimum level of broadband connectivity. This minimum level will then require periodic reevaluation to keep up with changing broadband demands.

To further ensure that LEA broadband solutions meet the needs of their diverse school community members, these solutions will need to be multi-tiered. While one solution may be successful for most households, LEAs should prepare alternative solutions for households that need them. For example, while this research shows a consensus among educational leaders that personal mobile hotspots are not an effective overall solution for broadband connectivity, a small number of these hotspots would be beneficial as an additional layer to LEA solutions for students who are involved in school activities that require a lot of bus travel, students in transition, or students who alternate between two households. As one LEA leader put it, "perfect access looks like meeting the end-user where they need us to meet them… it isn't one size fits all. It can't be" (suburban LEA leader, interview with the authors, September 2020).

Chromebooks as the Preferred Student Devices

The findings in this study show consensus among LEA leaders that Chromebooks are the devices of choice for take-home, one-to-one student access. The researchers, therefore, also recommend Chromebooks as take-home student devices with a few caveats. As the TPACK model (Mishra & Koehler, 2006) explains, thoughtful evaluation of content and pedagogical needs, not to mention specific student needs, should be considered when determining the best devices for student use. Leaders must also keep in mind that technology advances quickly. The Utah Equitable Access of the Digital Divide framework (Figure 6) was created to help educators consider how changes in motivation/attitude, digital skills, and technology usage can affect physical access and vice versa. The ever-evolving nature of technology means that leaders need to regularly reevaluate their choices regarding student devices. Additionally, the findings in this

study indicate a need for special attention to be paid to primary grade devices. Many questions remain regarding which devices and what modes of digital teaching and learning are best for young students. The researchers call for continued study in this area in order to determine the most appropriate device choices and most effective digital teaching and learning strategies for young students.

Utah's Digital Teaching and Learning Grant Program

The evidence in this study suggests that the Digital Teaching and Learning grant program in Utah successfully aided LEA leaders in supplying a large number of students with technology devices prior to COVID-19 school dismissal. This is one major reason the education of K-12 students was able to continue virtually throughout the school dismissal. It is imperative for state leaders to continue funding the DTL program. Continuation of this program will allow LEAs to not only complete their current technology access plans but to expand upon them. "Trailblazers," or LEAs that had already completed school-based, one-to-one device and broadband initiatives prior to school dismissal, should now take the next step in expanding their plans to include home access (state leader, interview with the authors, September 2020). LEAs that were less prepared or had not yet made much progress in their one-to-one efforts now need to expand their DTL plans to include all students at all grade levels. Once school-based, one-to-one access has been achieved for these LEAs, they can focus on the implementation of take-home, one-to-one initiatives. These LEAs would benefit from continued support from state leaders as they expand their vision of equitable access. Further, a continuation of the DTL program would help all LEAs fund regular equipment rotation plans to ensure devices and broadband are kept up to date.

Recommendations and Implications for Future Research

The COVID-19 school dismissal resulted in a myriad of unanswered questions for educational leaders concerning equitable access. While the main focus of this study was physical access to technology, the results of the interviews caused the researchers to conclude that motivation/attitude, digital skills, and usage are also vital components of equitable technology access, as illustrated by the new Utah Equitable Access of the Digital Divide framework (Figure 6). Therefore, the researchers call for further investigation into the impact that motivation/attitude, digital skills, and usage have on pedagogy related to online and blended learning.

The following topics, manifested through the course of this study, should be considered as subjects for further research. The first three bullet points center around motivation/attitude. The remaining bullet points focus on technology usage. The researchers did not include topics relating specifically to digital skills because they believe digital skills are deeply intertwined into all of the topics listed here.

- Student engagement in online learning environments, including participation in learning activities and response to school communication
- Social and emotional learning in online environments, including support for students experiencing emotional crises
- Relationship-building, community-building, and discussion in online learning environments
- Best practices for various modes of learning, including blended, online, synchronous, and asynchronous learning
- Creation and curation of quality online learning materials

- Appropriate course loads, workloads, and screen time for online learners
- Arts, physical education, athletics, and other interactive courses in online learning environments
- Mastery and assessment of mastery in online learning environments
- Effectiveness and appropriateness of online learning environments for primary-grade students

Reflective Conclusion

Statewide school dismissal due to COVID-19 ended in May of 2020. The pandemic, however, was far from over, and educators spent the summer preparing for a variety of possible education scenarios that might await them in the fall. The start of the 2020-21 school year included new regulations, such as the wearing of personal protective equipment (PPE), new responsibilities, like contact tracing to determine which students would be placed under quarantine, and new modes of teaching and learning, including hybrid learning models and virtual elementary schools. In each interview conducted for this research project, educational leaders emphasized that COVID-19 has created a paradigm shift in education. One educational leader stated, "sometimes when your foundation shifts, it doesn't ever return back to normal" (suburban LEA leader, interview with the authors, September 2020). This leader compared the start of every school year to a tsunami, which is caused by the shift of tectonic plates under water. Normally, the only major shift that occurs each year is the return of students. COVID-19 caused an unexpected shift in education, triggering additional foundational shifts and causing the tsunami "to hit everyone to such a level that we [were] all just under water" (suburban LEA leader, interview with the authors, September 2020).

One part of this shift is the understanding that learning opportunities are thwarted without equitable home technology access. Prior to COVID-19 school dismissal, many LEAs focused their efforts on access within the brick-and-mortar walls of the school. Since school dismissal, schools have gone one-to-one with technology, including the development of systems that allow students to take devices home, and most will not be moving away from this model. Plans for robust home broadband access for every student and teacher have also become standard in LEAs across the state, and many are now transitioning from temporary to more sustainable and manageable broadband solutions for the future. Educational leaders have seen first-hand that equitable learning opportunities depend on cohesive access, and the pandemic has been a catalyst for this access to be addressed.

Another part of this shift is the continuing need for blended and online learning. Blending face-to-face learning with online activities and modules is now a part of every student's educational experience. For some, learning completely online has been a positive experience that they plan to continue. LEAs need to support teachers by training them in the best practices for a variety of teaching modalities using a consistent instructional framework. With this support, teachers can ensure equitable learning opportunities for students in person and online. Blended and online learning options also create opportunities for students to continue learning when they are on extended leave due to quarantine, home health care or hospitalization, vacation, extra-curricular activities, and even snow days.

As has been mentioned, despite the focus on physical access throughout this research project, educational leaders have learned that training, pedagogy, and technology use have had to shift as well as a result of COVID-19. Additional studies about digital teaching and learning pedagogy are needed. Specifically, questions surrounding the effectiveness of teaching subjects

like art, music, and physical education online need to be explored. Expectations for online learning, such as the proper amount of time to expect students to spend on their coursework, demonstration of concept mastery, and appropriate course loads for students have also been brought into question by the pandemic teaching experience. The researchers call for continued research in these areas.

The COVID-19 experience has been exhausting -- physically, mentally, and emotionally -- for educators, students, and families. Educational leaders expressed feelings of inadequacy as they attempted to meet everyone's needs (urban LEA leader, interview with the authors, October 2020). School dismissal "had a huge impact on [students'] overall social, emotional well-being" (urban LEA leader, interview with the authors, October 2020). Parents and guardians struggled to support their children as they learned at home, and emotions were close to the surface as educational leaders reflected on taking calls from "desperate" parents (urban LEA leader, interview with the authors, October 2020; rural school leader, interview with the authors, October 2020).

Through the challenges, Utah educational leaders have learned a great deal. One leader explained that "even though it has nearly killed many of us -- the work and hours we put in -- I still feel like it's been worth it" (urban LEA leader, interview with the authors, October 2020). Another leader expressed a similar sentiment saying that "one silver lining to all of this" is that the digital divide is being addressed and students are benefitting (rural school leader, interview with the authors, October 2020). As educational leaders discussed each challenge and solution, they gained a high level of appreciation for the hard work and dedication of the educators they serve. Leaders realized that the digital skills learned by all school community members will help teaching and learning be more effective even after the pandemic has ended. One leader

commented that because of the emphasis right now on technology training, educators are "so much more effective in the classroom and are meeting students' digital needs just in regular learning" (urban LEA leader, interview with the authors, October 2020). The same can be said about improved communication and support for families. Regardless of the pandemic, and regardless of the learning environment, educational leaders have been reminded that partnership with parents and guardians is a vital component of students' educational success.

Educational leaders also feel a heavy responsibility to provide equitable educational opportunities for every student. COVID-19 has been a tipping point for many of them, pushing them to bridge the digital divide that still exists in their communities. Educators' eyes were opened to the reality of the inequities perpetuated by the digital divide, and they "could no longer tolerate the discrepancies" (urban LEA leader, interview with the authors, October 2020). Their commitment to bridge this divide is a lasting change the pandemic has prompted. As education and educational technology continue to evolve, the researchers call for continued, collaborative efforts to bridge the digital divide and ensure equitable access for all Utah students.

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Appendix A

Verbal and Written Descriptions of the Study for State Leaders

Recruitment Letter

Hello, <insert name here>. I am a doctoral student in the Educational Leadership and Policy program at the University of Utah. I am working on a research study with three other doctoral students on the topic of the digital divide during COVID-19. The purpose of this study is to learn about the experiences of state, district, and school-based educational leaders as they have worked to address the digital divide, specifically equitable home access to technology devices and broadband, within their communities.

We would love to include you and your state organization in this study so that we can share your perspective and experience with this topic. As a participant in this study, you will be asked to participate in a 60-minute interview that will be conducted online using Zoom. In order to allow time for you to reflect on your experience and prepare for the interview, the questions will be emailed prior to the interview. Participation in this study is completely voluntary, and you may withdraw from the study at any time. Your information in this study will be anonymous.

Please let me know if you are willing to participate in this study or if you have any questions.

If the state leader agrees to participate in this study: *Thank you for your willingness to participate in this study. An email will be sent to you within the next few days that will include a written description of the study and details regarding the online interview. If you have any questions that come up between now and then, here is my number (XXX-XXX-XXXX) and my email address (xxx@xxx.xxx).*

If the state leader does not agree to participate in this study: *Thank you for your time and for taking my call. Is there someone else in your organization you recommend I talk to?*

Written Description

Dear <insert name here>,

Thank you for your willingness to participate in this study about the digital divide during COVID-19. Attached to this email is a consent form. Please read and sign the form, then email it back to me. We would like to schedule an interview date and time that is convenient for you. This link (*provide Doodle link*) provides available interview dates and times. Please select the dates and times for which you are available. Once the interview date and time has been finalized, a confirmation email will be sent.

Thank you for your time and participation,

Katie, Camille, Chandra, and Dani

Appendix B

Consent Form for State Leaders

Research Topic: COVID-19 and Utah's Digital Divide: Educational Leaders' Response to the Need for Equitable Home Technology Access

This study is focused on the response of state and LEA leaders in Utah to the digital divide, specifically access to technology devices and broadband, during the COVID-19 school dismissal. Kathryn M. Blunt, Camille Cole, Chandra Martz, and Dani Sloan make up the research team for this study. They will explore how educational leaders in rural, urban, and suburban communities addressed the digital divide specific to equitable home access and what lessons they learned as they worked to provide the infrastructure necessary to employ digital home learning plans during COVID-19 with the intent that the findings will support other LEAs in Utah and their efforts as they address the digital divide within their own communities.

You have been identified by the researchers as a potential participant for this study based on your experience with the digital divide at the state level. As a participant in this study, you will be asked to participate in a one-hour interview during which you will be asked questions about how your organization supported LEAs in addressing the digital divide and the lessons learned as a result of your efforts. The questions will be emailed to you prior to the interview, allowing time for you to reflect on your experiences and prepare for the interview.

The interview will be conducted virtually using Zoom, and to ensure confidentiality a Zoom link and password will be created and distributed to you by the researchers. You will have the option to participate in the virtual interview at a location of your choice, but you will be asked to select a location where you will remain alone and uninterrupted by distractors, such as coworkers and family members. The researcher conducting the interview will record the session

and upload the recording to a secure Google Drive folder which will only be accessible to the researchers in this study. Once the study is complete, the folder and its contents will be permanently deleted.

The researchers will keep your identity and responses anonymous by removing any identifiers in the findings. Information that is collected as part of the research, even if identifiers are removed, will not be used or distributed for future research studies. There are no direct benefits for taking part in this study; however, the researchers hope the information obtained from this interview will support other LEAs in Utah and their efforts as they address the digital divide within their own communities.

If you have any questions or complaints, or if you feel you have been harmed by this research, please contact Marilynn Howard in the Department of Educational Leadership and Policy at the University of Utah. Her phone number is 801-581-6714.

If you wish to contact any of the researchers, please feel free to do so for any reason. The contact information for each researcher is listed below:

- Kathryn M. Blunt: 801-518-9717; sassmasterkmb@gmail.com
- Camille Cole: 801-913-7838; ccole09@gmail.com
- Chandra Martz: 801-258-1845; chandramartz@gmail.com
- Dani Sloan: 801-979-3264; danikauerz@gmail.com

Contact the Institutional Review Board (IRB) if you have questions regarding your rights as a research participant. Also contact the IRB if you have questions, complaints, or concerns which you do not feel you can discuss with the principal investigator. The University of Utah IRB may be reached via phone at 801-581-3655 or via email at irb@hsc.utah.edu.

Consent

I confirm I have read the information in this consent form and have had the opportunity to ask questions. I understand I will be given a signed copy of this consent form.

By signing this consent form, I voluntarily agree to take part in the interview.

_____

Printed Name of Participant

_____ _____

Signature of Participant Date

_____

Printed Name of Person Obtaining Consent

_____ _____

Signature of Person Obtaining Consent Date

Appendix C

Verbal and Written Descriptions of the Study for LEA Leaders

Recruitment Letter

Hello, <insert name here>. I am a doctoral student in the Educational Leadership and Policy program at the University of Utah. I am working on a research study with three other doctoral students on the topic of the digital divide during COVID-19. The purpose of this study is to learn about the experiences of state, district, and school-based educational leaders as they have worked to address the digital divide, specifically equitable home access to technology devices and broadband, within their communities.

We would love to include you and your district in this study so that we can share your perspective and experience on this topic. As a participant in this study, you will be asked to participate in a 60-minute interview that will be conducted online using Zoom. In order to allow time for you to reflect on your experience and prepare for the interview, the questions will be emailed prior to the interview. Participation in this study is completely voluntary, and you may withdraw from the study at any time. Your information in this study will be anonymous.

Please let me know if you are willing to participate in this study or if you have any questions.

If the LEA leader agrees to participate in this study: *Thank you for your willingness to participate in this study. An email will be sent to you within the next few days that will include a written description of the study and details regarding the online interview. If you have any questions that come up between now and then, here is my number (XXX-XXX-XXXX) and my email address (xxx@xxx.xxx).*

If the LEA leader does not agree to participate in this study: *Thank you for your time and for taking my call. Is there someone else in your district you recommend that I talk to?*

Written Description

Dear <insert name here>,

Thank you for your willingness to participate in this study relating to the digital divide during COVID-19. Attached to this email is a consent form. Please read and sign the form, then email it back to me. We would like to schedule an interview date and time that is convenient for you. This link (*provide Doodle link*) provides available interview dates and times. Please select the dates and times for which you are available. Once the interview date and time has been finalized, a confirmation email will be sent.

Thank you for your time and participation,

Katie, Camille, Chandra, and Dani

Appendix D

Consent Form for LEA Leaders

Research Topic: COVID-19 and Utah's Digital Divide: Educational Leaders' Response to the Need for Equitable Home Technology Access

This study is focused on the response of state and LEA leaders in Utah to the digital divide, specifically access to technology devices and broadband, during the COVID-19 school dismissal. Kathryn M. Blunt, Camille Cole, Chandra Martz, and Dani Sloan make up the research team for this study. They will explore how educational leaders in rural, urban, and suburban communities addressed the digital divide specific to equitable home access and what lessons they learned as they worked to provide the infrastructure necessary to employ digital home learning plans during COVID-19 with the intent that the findings will support other LEAs in Utah and their efforts as they address the digital divide within their own communities.

You have been identified by the researchers as a potential participant for this study based on your experience with the digital divide at the district level. As a participant in this study, you will be asked to participate in a one-hour interview during which you will be asked questions about how your organization supported LEAs in addressing the digital divide, and the lessons learned as a result of your efforts. The questions will be emailed to you prior to the interview allowing time for you to reflect on your experiences and prepare for the interview.

The interview will be conducted virtually using Zoom, and to ensure confidentiality a Zoom link and password will be created and distributed to you by the researchers. You will have the option to participate in the virtual interview at a location of your choice, but you will be asked to select a location where you will remain alone and uninterrupted by distractors, such as coworkers and family members. The researcher conducting the interview will record the session

and upload the recording to a secure Google Drive folder which will only be accessible to the researchers in this study. Once the study is complete the folder and its contents will be permanently deleted.

The researchers will keep your identity and responses anonymous by removing any identifiers in the findings. Information that is collected as part of the research, even if identifiers are removed, will not be used or distributed for future research studies. There are no direct benefits for taking part in this study, however, the researchers hope the information obtained from this interview will support other LEAs in Utah and their efforts as they address the digital divide within their own communities.

If you have any questions or complaints, or if you feel you have been harmed by this research, please contact Marilynn Howard in the Department of Educational Leadership and Policy at the University of Utah. Her phone number is 801-581-6714.

If you wish to contact any of the researchers, please feel free to do so for any reason. The contact information for each researcher is listed below:

- Kathryn M. Blunt: 801-518-9717; sassmasterkmb@gmail.com
- Camille Cole: 801-913-7838; ccole09@gmail.com
- Chandra Martz: 801-258-1845; chandramartz@gmail.com
- Dani Sloan: 801-979-3264; danikauerz@gmail.com

Contact the Institutional Review Board (IRB) if you have questions regarding your rights as a research participant. Also contact the IRB if you have questions, complaints, or concerns which you do not feel you can discuss with the principal investigator. The University of Utah IRB may be reached via phone at 801-581-3655 or via email at irb@hsc.utah.edu.

Consent

I confirm I have read the information in this consent form and have had the opportunity to ask questions. I understand I will be given a signed copy of this consent form.

By signing this consent form, I voluntarily agree to take part in the interview.

_____

Printed Name of Participant

_____ _____

Signature of Participant Date

_____

Printed Name of Person Obtaining Consent

_____ _____

Signature of Person Obtaining Consent Date

Appendix E

Verbal and Written Description for School-Based Leaders

Recruitment Letter

Hello, <insert name here>. I am a doctoral student in the Educational Leadership and Policy program at the University of Utah. <insert LEA leader's name> gave me your name and contact information and recommended that I reach out to you to see if you would be willing to participate in the research study I am working on. I am working on a research study with three other doctoral students on the topic of the digital divide during COVID-19. The purpose of this study is to learn about the experiences of state, district, and school-based educational leaders as they have worked to address the digital divide, specifically equitable home access to technology devices and broadband, within their communities.

We would love to include you and your state organization in this study so that we can share your perspective and experience with this topic. As a participant in this study, you will be asked to participate in a 60-minute focus group that will be conducted online using Zoom. The focus group will include you and two other school-based leaders from your district. In order to allow time for you to reflect on your experiences and prepare for the interview, the questions will be emailed prior to the interview.

Participation in this study is completely voluntary, and you may withdraw from the study at any time. Your information in this study will be anonymous.

Please let me know if you are willing to participate in this study or if you have any questions.

If the school-based leader agrees to participate in this study: *Thank you for your willingness to participate in this study. An email will be sent to you within the next few days that will include a written description of the study and details regarding the online interview. If you have any questions that come up between now and then, here is my number (XXX-XXX-XXXX) and my email address (xxx@xxx.xxx).*

If the school-based leader does not agree to participate in this study: *Thank you for your time and for taking my call.*

Written Description

Dear <insert name here>,

Thank you for your willingness to participate in this study about the digital divide during COVID-19. Attached to this email is a consent form. Please read and sign the form, then email it back to me. We would like to schedule a focus group date and time that is convenient for you. This link (*provide Doodle link*) provides available interview dates and times. Please select the dates and times for which you are available. Once the interview date and time has been finalized, a confirmation email will be sent.

Thank you for your time and participation,

Katie, Camille, Chandra, and Dani

Appendix F

Consent Form for School-Based Leaders

Research Topic: COVID-19 and Utah's Digital Divide: Educational Leaders' Response to the Need for Equitable Home Technology Access

This study is focused on the response of state and LEA leaders in Utah to the digital divide, specifically access to technology devices and broadband, during the COVID-19 school dismissal. Kathryn M. Blunt, Camille Cole, Chandra Martz, and Dani Sloan make up the research team for this study. They will explore how educational leaders in rural, urban, and suburban communities addressed the digital divide specific to equitable home access and what lessons they learned as they worked to provide the infrastructure necessary to employ digital home learning plans during COVID-19 with the intent that the findings will support other LEAs in Utah and their efforts as they address the digital divide within their own communities.

You have been identified by the researchers as a potential participant for this study based on your experience with the digital divide at the state level. As a participant in this study, you will be asked to participate in a one-hour focus group during which you will be asked questions about how your school addressed the digital divide and the lessons learned as a result of your efforts. The questions will be emailed to you prior to the interview, allowing time for you to reflect on your experiences and prepare for the interview. You will be grouped with two other school-based leaders from your district, and the questions will be emailed to you prior to the focus group allowing time for you to reflect on your experiences and prepare for the focus group.

The focus group will be conducted virtually using Zoom, and to ensure confidentiality a Zoom link and password will be created and distributed to you by the researchers. You will have the option to participate in the virtual interview at a location of your choice, but you will be

asked to select a location where you will remain alone and uninterrupted by distractors, such as coworkers and family members. The researcher conducting the interview will record the session and upload the recording to a secure Google Drive folder which will only be accessible to the researchers in this study. Once the study is complete, the folder and its contents will be permanently deleted.

The researchers will keep your identity and responses anonymous by removing any identifiers in the findings. Information that is collected as part of the research, even if identifiers are removed, will not be used or distributed for future research studies. There are no direct benefits for taking part in this study; however, the researchers hope the information obtained from this interview will support other LEAs in Utah and their efforts as they address the digital divide within their own communities.

If you have any questions or complaints, or if you feel you have been harmed by this research, please contact Marilynn Howard in the Department of Educational Leadership and Policy at the University of Utah. Her phone number is 801-581-6714.

If you wish to contact any of the researchers, please feel free to do so for any reason. The contact information for each researcher is listed below:

- Kathryn M. Blunt: 801-518-9717; sassmasterkmb@gmail.com
- Camille Cole: 801-913-7838; ccole09@gmail.com
- Chandra Martz: 801-258-1845; chandramartz@gmail.com
- Dani Sloan: 801-979-3264; danikauerz@gmail.com

Contact the Institutional Review Board (IRB) if you have questions regarding your rights as a research participant. Also contact the IRB if you have questions, complaints, or concerns

which you do not feel you can discuss with the principal investigator. The University of Utah IRB may be reached via phone at 801-581-3655 or via email at irb@hsc.utah.edu.

Consent

I confirm I have read the information in this consent form and have had the opportunity to ask questions. I understand I will be given a signed copy of this consent form.

By signing this consent form, I voluntarily agree to take part in the interview.

_____

Printed Name of Participant

_____ _____

Signature of Participant Date

_____

Printed Name of Person Obtaining Consent

_____ _____

Signature of Person Obtaining Consent Date

Appendix G

Interview Questions

Interview Questions for State Leaders

- How did your organization support LEAs in addressing the digital divide, specifically the need for equitable home technology access, during the COVID-19 school dismissal?
    - What challenges has your organization experienced in providing physical access to devices and broadband during COVID-19 school dismissal?
    - How did you address the challenges unique to various Utah communities?
    - How did you specifically address the need for home access for Utah students?
    - How has your organization helped to secure access to broadband and/or devices since the COVID-19 school dismissal?
    - To what extent have organizations outside of education supported your efforts?
- What lessons did you learn from your efforts to provide equitable home technology access as a result of COVID-19 school dismissal?
    - Is there anything you wish you would have known prior?
        - Is there anything you would have done differently? As a result, what have you done differently in preps for this school year?
- What would perfect access look like?
    - How should this look for the future?
    - What do you want to do moving forward?
- Do you have any final thoughts or anything else you would like to add?

Interview Questions for LEA Leaders

- How did leaders in your district respond to the digital divide, specifically the need for equitable home technology access, during COVID-19 school dismissal?
    - What challenges has your district experienced in providing physical access to devices and broadband during COVID-19 school dismissal?
    - How did you address the challenges unique to your district?
    - How did you specifically address the need for home access within your district?
    - How has your district helped to secure access to broadband and/or devices since the COVID-19 school dismissal?
    - To what extent have organizations outside of education supported your efforts?
- What lessons did you learn from your efforts to provide equitable home technology access as a result of COVID-19 school dismissal?
    - Is there anything you wish you would have known prior?
        - Is there anything you would have done differently? As a result, what have you done differently in preps for this school year?
- What would perfect access look like?
    - How should this look for the future?
    - What do you want to do moving forward?
- Do you have any final thoughts or anything else you would like to add?

Appendix H

Focus Group Questions

Focus Group Questions for School-Based Leaders

- How did leaders in your district respond to the digital divide, specifically the need for equitable home technology access, during COVID-19 school dismissal?
    - What challenges has your school experienced in providing physical access to devices and broadband during COVID-19 school dismissal?
    - How did you address challenges unique to your school and community?
    - How did you specifically address the need for home access with your students?
    - How has your district helped to secure access to broadband and/or devices since the COVID-19 school dismissal?
    - To what extent have organizations outside of education supported your efforts?
- What lessons did you learn from your efforts to provide equitable home technology access as a result of COVID-19 school dismissal?
    - Is there anything you wish you would have known prior?
        - Is there anything you would have done differently? As a result, what have you done differently in preps for this school year?
- What would perfect access look like?
    - How should this look for the future?
    - What do you want to do moving forward?
- Do you have any final thoughts or anything else you would like to add?

Appendix I

Google Sheet for Field Notes

Name of Participant	State Entity, District, and/or School	Summary of Interview or Focus Group	Codes	Additional Notes

Appendix J

Interview and Focus Group Scripts

Interview Script

Beginning Script. *Thank you for being willing to participate in this study. As a reminder, the purpose of this study is to learn about your experiences addressing the digital divide, specifically equitable home access to technology devices and broadband. This interview will last for about 60 minutes. If you lose your connection to Zoom, you can call in using this phone number (XXX-XXX-XXXX), and we can continue the interview via phone. I will be recording this session, and I want to assure you that only the researchers for this study will have access to the recording. This recording will be saved in a Google Drive folder, to which only the researchers will have access. Your information - name, state entity/district will be kept anonymous.*

Any questions before we get started?

As we get started, I will ask you to state your name and role within (USBE, UETN, District). I will start. My name is _____, and I am a doctoral student at the University of Utah. I work as a _____ in the _____.

Concluding Script. *Thank you so much for taking the time to meet with us today. I want to remind you, again, that your information will remain anonymous in our findings and that this recording will only be available to researchers.*

Thank you again, and have a wonderful day.

Focus Group Script

Beginning Script. *Thank you for being willing to participate in this study. As a reminder, the purpose of this study is to learn about your experiences addressing the digital divide, specifically equitable home access to technology devices and broadband. This is your group, so feel free to build off of each other as you share your experiences and lessons learned. This focus group will last for about 60 minutes. If you lose your connection to Zoom, you can call in using this phone number (XXX-XXX-XXXX), and we can continue the interview via phone. I will be recording this session, and I want to assure you that only the researchers for this study will have access to the recording. This recording will be saved in a Google Drive folder, to which only the researchers will have access. Your information - name, state entity/district will be kept anonymous.*

Any questions before we get started?

As we get started, I will ask you to state your name and role within (USBE, UETN, District). I will start. My name is _____, and I am a doctoral student at the University of Utah. I work as a _____ in the _____.

Concluding Script. *Thank you so much for taking the time to meet with us today. I want to remind you, again, that your information will remain anonymous in our findings and that this recording will only be available to researchers.*

Thank you again, and have a wonderful day.

Appendix K

Explanation of Major Research Themes

Table 3

COVID-19 and Utah's Digital Divide: Explanation of Major Research Themes

Theme	State Leaders	Urban LEA	Suburban LEA	Rural LEA
Broadband	-Need statewide structure for support -Equity -Essential utility -Support for teachers -Program evaluation	-Student home access -Broadband disparity	-Broadband disparity -Insufficient broadband -Adequate access for all students -Basic human right to have access	-Most students without broadband -Insufficient broadband -Drive by wi-fi
Solutions	-Research to recommend options for LEAs -Provide flexibility for LEAs -GOED Broadband Commission	-Online option for all students -Hotspots -Procedures (tracking, returning devices, damage, etc.) -Paper packets	-Form for parents to request devices -Procedures (tracking, returning devices, damage, etc.) -Dismantle Chromebook carts -Existing hotspot program	-Drive by wi-fi -In-person outdoor instruction -Paper packets
Challenges	-Community partnerships -Lack of needed data -Working with other state agencies -Who is responsible?	-Internet connectivity -Families hesitant to utilize assistance programs -Participation/motivation -Primary grades -Communication -Community partnerships	-Devices -Personal mobile hotspots unreliable -Different solutions work for different students -Expectations and accountability	-Displaced students -Lacking infrastructure for robust broadband -Personal mobile hotspots unreliable -'data-wise' instruction -Community partnerships
Devices	X	-Chromebooks -Dismantle device carts -One device per family -Devices for lower elementary students	-Chromebooks -Dismantle device carts -Not enough devices for take home 1:1	X
Community Partnerships	-Coordinating broadband support -Telcos -GOED -UETN	X	X	-Local government -UETN support -Telcos
Data	-Needed student broadband access data -Survey to track LEAs solutions	X	X	X
Digital Skills	X	-Students lacking skills at a disadvantage -Pedagogy in distance/online learning	X	X
Funding	-Budgeting -Grants -CARES Act -State Lifeline Program	X	X	X
Equity	X	X	-Prioritization of distribution -Identifying needs -Broadband disparity -Equitable access to devices	X
Emotional Response	X	X	X	-Dedication -Frustration -Silver linings