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

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The most common definition of the digital divide is “a division between people who have access to and use of digital media and those who do not” (Van Dijk, 2020, p. 9). This division becomes an educational issue as students increasingly need devices and broadband access at home to complete schoolwork (McLaughlin, 2016). Unequal opportunities to access lessons, resources, assignments, and communication tools affect student academic success (Robinson et al., 2018). This study examines 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.

Statement of the Problem

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 Digital Teaching and Learning (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?

Methods

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.

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 DTL 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.

Findings

Research Question #1: State Response

During the school dismissal 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).

Research Question #2: LEA Response

Chromebooks. Data collected from the research interviews shows that Chromebooks were the device of choice in each LEA during school dismissal. They 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. 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.

One-to-One. 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.

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.

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.

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. 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 rural 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. This ensured that rural students would not have to drive more than 20 minutes to access broadband.

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. 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.

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 after school 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.

**Research Question #3: Lessons Learned**

**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. 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 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.

**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.

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.

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. 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.

**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).

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. 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. 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 geographical 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.

Guides for Decision Making

Model of Equitable Technology Access

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 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.

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).

Utah Equitable Access of the Digital Divide Framework

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, 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.
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.

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 LEAs 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, it is evident that state leaders must continue to allow LEAs to formulate broadband solutions based on individual LEA needs.

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. 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. Leaders must keep in mind that technology advances quickly. The Utah Equitable Access of the Digital Divide framework 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 research 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 need to now expand their DTL plans to include all students at all grade levels. Once school-based, one-to-one has been accomplished for
these LEAs, they then 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.

Conclusion

Educational leaders 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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