

**CROSSING THE DIGITAL DIVIDE AND THE EQUITY EXPANSE:
REACHING AND TEACHING ALL STUDENTS DURING THE
PANDEMIC**

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ABSTRACT

The COVID-19 pandemic illuminated the digital divide revealing an expanse of inequity among students who had access to the internet, personal devices, and parental support during remote learning and those who did not. Framed with the theoretical lens of equity literacy, this paper details the results of a survey completed by 56 Minnesota district level technology directors. The survey asked how school districts were addressing the technology inequities experienced by students and families while in hybrid and distance learning models. Results reflected that districts' efforts to provide students technology devices were efficient and successful. Of greatest concern for respondents was the lack of students' attendance and engagement in learning. Recommendations for further research are provided including advocacy for the expansion of broadband service, the pandemic's impact on the mental health of students, and efforts to sustain access to technology for all learners after the COVID-19 pandemic concludes.

Keywords: covid-19, distance learning, digital divide, emergency remote learning, equity literacy, structural ideology, pandemic, students, technology, technology director

Introduction

The term “digital divide” became common vernacular following the publication of the National Telecommunications and Information Administration’s (NTIA) 1995 report titled *Falling Through the Net: A Survey of the “Have Nots” in Rural and Urban America*. The national survey included questions asking United States citizens about their access to computers and modems, finding that “the rural poor had the lowest computer penetration (4.5 percent),” (NTIA, 1995, p. 1). Decades later, the COVID-19 pandemic illuminated that the gap in access to computers and the internet still exists. The advent of remote learning revealed that the digital divide laid across an expanse of inequity where only some students had access to educational resources and technologies while learning from home, while others, many of whom experience poverty, did not.

The need for students to access the Internet from home to succeed academically and the reality that not all students have equitable access to information is not a new dynamic (Cantu, 2021). Anderson and Auxier (2020) reviewed data from 2018 and found that 60% of eighth grade students were dependent upon the Internet to complete their homework (para. 3). They also found that one-third of homes, (35%) with children ages 7-16, making less than \$30,000 annually, lack home Internet access (para. 5). This, in turn, impacts approximately 20% of teenagers who reported not being able to do their homework because of lack of access to the Internet at home (para. 6). Consequently, the digital divide has been exacerbated by the pandemic’s instantaneous and enduring dependency on technology for teaching and learning and is now a crisis (Cruz, 2021). Teenagers are not the only ones concerned by their lack of technology access. The educational software company Promethean (2020-2021), surveyed 1,200 K-12 teachers asking, “What is your biggest professional challenge in a remote learning scenario?” The largest challenge reported at 31% was the digital divide across the student population. Other challenges included the impact of the summer slide (26%), budget cuts (25%), lack of teacher training on technology (13%), and lack of technology resources at the district level (6%). The concern over the digital divide was supported by data from the Federal Communications Commission regarding access to the Internet in the United States. The FCC reported, “rural communities lag behind urban areas, as do tribal lands, where about 1/3 don’t have high speed Internet” (Reilly, 2020, p. 40).

This paper details a mixed-method study that included surveying technology directors in the state of Minnesota to discover how their districts structurally addressed the digital inequities experienced by students and families as learning models transitioned to hybrid and distance during the COVID-19 pandemic. It explores the equity literacy framework and integrates the framework within study findings and implications for further research.

Literature Review

Historically, there have been several supreme court cases and legislation in the United States supporting equal access to education, including *Brown v Board of Education* (1954), *Elementary and Secondary Education Act* (1965), *American with Disabilities Act* (1990), *No Child Left Behind* (2001), and *Race to the Top* (2009). While these efforts have helped students access education,

both the opportunity gap, disparities in access to resources, and the achievement gap, a disparity in academic achievement, still exist (Cruz, 2021).

Technology has often been lauded as a tool to close both the achievement and opportunity gaps by first closing the digital divide. In 2005, Nicholas Negroponte introduced a hand-cranked computer device at the World Summit on the Information Society that would later become the genesis of the non-profit organization *One Laptop Per Child*. The vision was to place cost-effective (\$100) devices into the hands of children facing poverty around the world in order to address and close the digital divide. However, this initiative failed when many devices broke, infrastructure received limited funding, and children were left unsupervised in their use of technology. Without the guidance of a teacher, the device became a distraction and the need for in-person, social learning became evident (Ames, 2021).

When the COVID-19 pandemic occurred, students around the nation and world found themselves in a similar situation when they were issued devices to learn from home. Though learning online can be effective when carefully planned and implemented (Means et al., 2014), what students received during the pandemic was, in contrast, emergency remote teaching (ERT), a temporary delivery of instruction used until a crisis is resolved. Hodges et al. (2020, para. 13) explain, “The primary objective in these circumstances is not to re-create a robust educational ecosystem but rather to provide temporary access to instruction and instructional support.”

Admittedly, ERT does not provide a rich educational experience, resulting in students, parents, and families relying upon tools such as Google searching to find additional educational resources to supplement their learning. A study by Bacher-Hicks et al. (2020) found that access to digital resources during ERT was not equitable. The researchers found that those of higher socioeconomic status had a higher rate of searching for educational resources online; those who had greater access to resources tended to make more progress in math. This suggests both opportunity and achievement gaps not only during the 2019 - 2020 and 2020 - 2021 school years, but points to a disparity that will continue in years to come.

Yale economists Agostinelli et al. (2020) utilized quantitative research methods to understand the impact of the pandemic not only on students’ current academic achievement but to build a model predicting the impact of the pandemic on their future incomes. The researchers developed a model which showed, “School closures will cost ninth graders in the poorest communities a 25% decrease in their post-educational earning potential, even if it is followed by three years of normal schooling. By contrast, their model shows no substantial losses for students from the richest 20% of neighborhoods” Cummings (2021, para. 2).

To address these problems, Cruz (2021, p. 47) suggests, “In order to avoid these extreme predictions and best prepare the nation for the next disruption to traditional in-person instruction, policymakers must analyze expanding opportunity and achievement gaps at their causal roots.” This study aims to do just that.

Theoretical Framework

Equity literacy is a comprehensive framework for creating and sustaining equitable schools (Equity Literacy Institute, 2021). The framework encompasses bias, inequity, and oppression related to race, language, immigration status, religion, class, gender identity and expression, sexual orientation, and (dis)ability. Equity literacy is founded on commitments to deepening understandings of how equity and inequity operate in organizations and societies and developing knowledge, skills, and will to identify inequities, eliminate inequities, and actively cultivate equity. The framework contends that the capacity to understand and identify disparities is a prerequisite to responding effectively to inequity. Equity is defined as a process through which educators ensure that policies, practices, institutional cultures, and ideologies are actively equitable. A structural approach contends that effective equity initiatives do not focus on fixing marginalized students and families, but rather on fixing the conditions within education that perpetuate marginalization (Gorski, 2018).

The equity literacy framework promulgates that educational outcome disparities are not the result of deficiencies in marginalized populations but rather inequities in the system (Thomas, 2018). Educational leaders have a significant responsibility to not allow deficit narratives and assumptions to invade their school or district cultures but, instead, invite stakeholders to view equity through a more structural lens. Structural ideology postulates that traditional early childhood - grade 12 schooling is set up in a way that only some groups of people will experience success and prosperity and that regardless of the amount of effort members of other groups exert, they may continue to experience diminished outcomes. Educators with a structural ideology understand that achievement gaps are the result of structural barriers in and out of school rather than moral deficiencies or grit shortages in families experiencing poverty (Gorski, 2018).

The equity literacy framework rejects deficit narratives, such as the view that students from low-income backgrounds are “at-risk” because they live in an imagined “culture of poverty” (Equity Literacy Institute, 2021, para. 15). In response to research that has found that socioeconomic status is a main contributor to academic achievement disparities (Byrd, 2020), the equity literacy framework identifies class-based inequities within schools such as disproportioned access to experienced teachers, honors or advanced curriculum, engagement with authentic learning, arts education, and co-curricular programs (Dudley-Marling, 2015). Family involvement opportunities are rarely organized in ways that are responsive to the challenges economically marginalized families may face, such as a lack of paid leave, difficulty securing transportation, the inability to afford childcare, and the necessity of working multiple jobs. Families experiencing poverty often have less access to Internet technology, books, tutoring, and other resources that support school achievement (Lineburg & Ratliff, 2015).

Structural ideology contends that as long as systemic barriers exist, education outcome disparities will exist (Berliner, 2013). Educators must position themselves to become a threat to the existence of structural inequities in schools and districts. This audacious calling will require a disruption to past traditions, values, and beliefs as educators seek new solutions and practices.

Research Methodology

The purpose of the study was to learn how Minnesota school districts addressed the digital inequities experienced by staff members, students, and families as the COVID-19 pandemic required learning models to pivot to hybrid and distance learning. Technology directors serving traditional public schools, public charter schools, and cooperatives were emailed a 10-question survey asking them to identify barriers that inhibited equitable learning experiences and share how their districts responded to the challenges that impacted student learning. Technology director contact information was acquired from the Minnesota Department of Education.

Technology directors in the state of Minnesota do not require a specific license, however, many hold an administrative license similar to that of a building principal. The educational role of technology director is identified with different titles around the nation including “Chief Technology Officer, Chief Information Officer, Director of Information Systems, Director of Instructional Technology, Director of Education Technology, and Network and Systems Administrator” (Cannistraci, 2020, para. 3). For the purposes of this study, a technology director is defined as those on the district leadership team in charge of purchasing and implementing the use of technology for both teachers and students.

The survey was distributed to approximately 505 district technology directors; the estimate reflects districts having multiple technology directors, districts sharing technology directors, and districts not having a technology director. Fifty-six district level technology directors completed the survey, which reflected an 11% response rate. Likert scale responses were analyzed, and descriptive statistics were displayed in pie chart format. Open-ended responses were analyzed and organized by theme. Study findings may provide guidance to schools as online learning models continue to be a viable option for students and families. A list of survey questions is listed below in Table 1.

Table 1*Addressing Technology Inequities (2020)*

Item	Response Scale
Rate the level of concern regarding a lack of technology devices in the home for your district's students learning in a hybrid or distance learning model.	1 = not a concern for district students
Rate the level of concern regarding a lack of access to internet/wifi for your district's students learning in a hybrid or distance learning model.	2 = minimal concern for district students
Rate the level of concern regarding a lack of adult academic support/supervision in the home for your district's students learning in a hybrid or distance learning model.	3 = moderate concern for district students
Rate the level of concern regarding a lack of technology savviness/knowledge in the home for your district's students learning in a hybrid or distance learning model.	4 = significant concern for district students
Open Ended Questions	
How has your district responded when students do not have devices to complete hybrid or distance learning school work?	
How has your district assisted students and families in accessing the Internet or hot spots?	
How has absenteeism/truancy been addressed by your district?	
Within homes, there is a range of support and instruction adult caregivers provide to their child(ren) in distance or hybrid learning models. How has your district attempted to identify and address these differences?	
During distance or hybrid learning, how does your district provide assistance to adults/caregivers who do not have the technology skills to support their child(ren)?	
As your district pivoted to hybrid or distance learning, are there other inequities you have discovered that are not included in this survey? How are these inequities being addressed?	

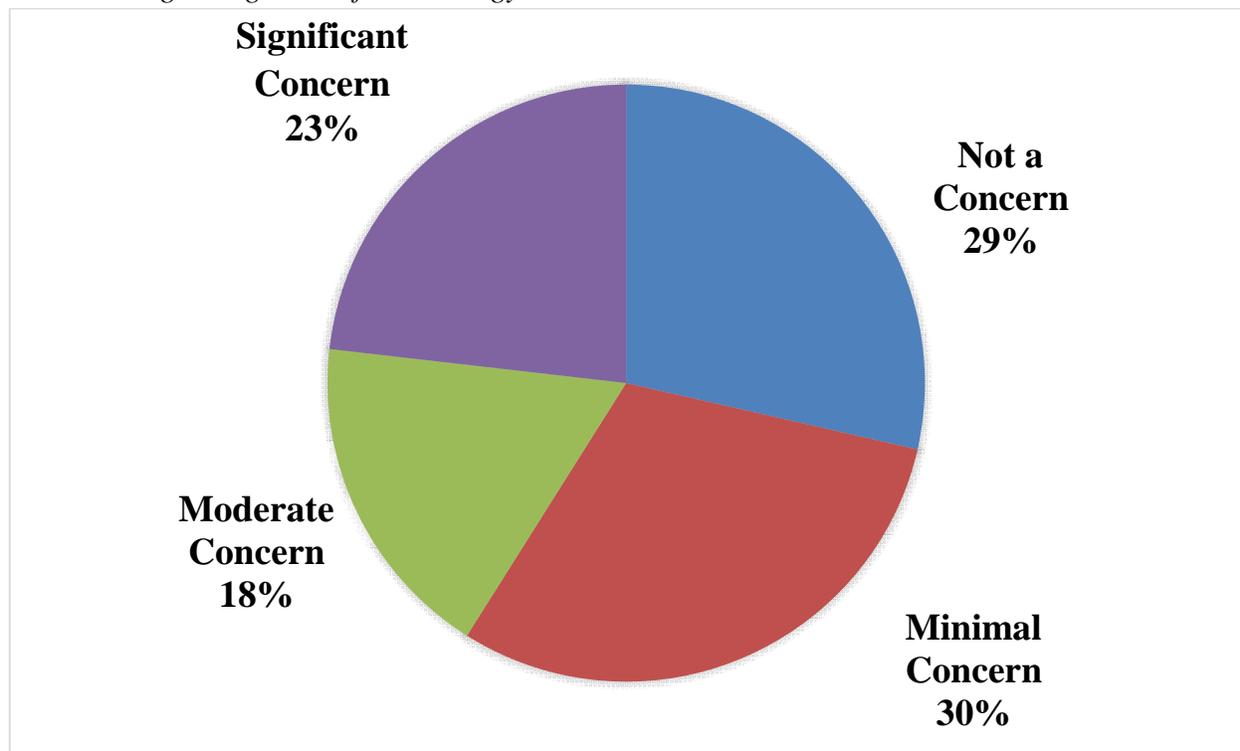
Research Questions

1. What digital inequities do school districts identify as student learning pivoted to hybrid and distance learning models?
2. What level of concern do school districts report for the digital inequities experienced by students and families as student learning pivoted to hybrid and distance learning models?
3. How are school districts addressing the digital inequities experienced by students and families as student learning pivoted to hybrid and distance learning models?

Findings and Discussion

Figure 1

Concern Regarding Lack of Technology Devices in the Home



Addressing Lack of Devices in the Home

Figure 1 illustrates that school districts have provided devices such as iPads and Chromebooks to students to use outside of the school building. There were 54 responses to the open-ended question and 53 responded that the district provided a device while one respondent stated that the district mailed paper packets to students without a device. There were a variety of approaches that districts carried out when providing devices. The most popular approach was 1:1 - providing one device for each student. A typical participant response, “We are K-8 and have been able to go 1:1 for all but K-1. Our K-1 1:1 devices ordered in midsummer still have not arrived. We do have enough spare devices to cover K-1 needs.” Districts reported having a 1:1 initiative in place prior to the pandemic while other districts transitioned to 1:1 due to the pandemic through the use of stimulus

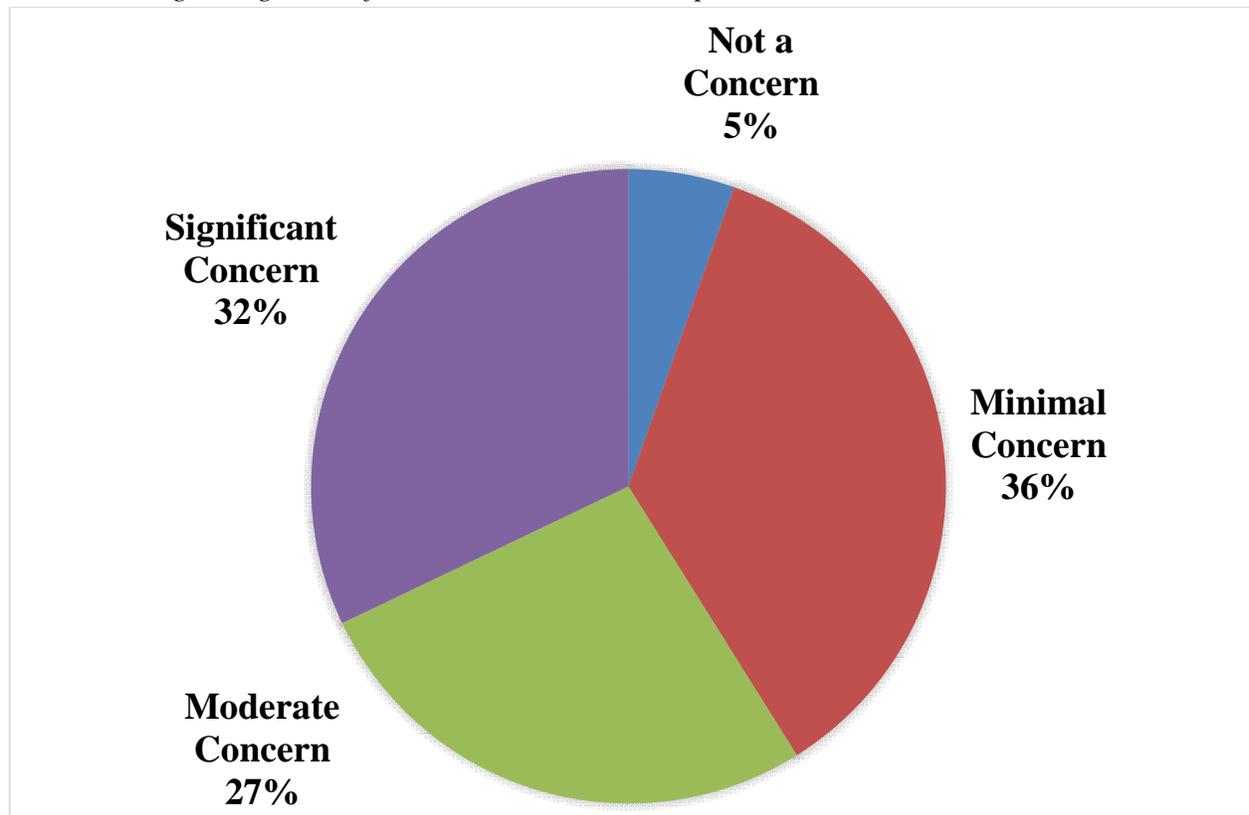
funds or dismantled carts of devices previously used as classroom sets. Districts without 1:1 platforms provided devices for students who expressed the need, allowed students to rent devices, or provided one device per family. When necessary, devices were delivered directly to the students' homes. Of the 53 districts providing devices, 28 stated their district was 1:1, 15 stated their district was not 1:1, and 10 did not specify if they were 1:1.

Lack of Internet access, especially in rural areas, was reported by district technology directors as a continued concern for students in hybrid or distance learning. One participant shared, "The other issue that is a little more difficult is the access to a quality internet connection in our area which has both city and rural areas." School districts attempted to address the concern by reaching students by phone when they were unavailable via email, paying family Internet bills, and purchasing hot spots for students without Internet access.

COVID relief funds, or stimulus funds, were used to address the digital divide. Districts stated that they did not have the funding available to meet all of the existing needs. Funding concerns were shared regarding device repair, device replacement, and the sustainability of 1:1 programming.

Figure 2

Concerns Regarding Lack of Internet Access or Hot Spots Within Homes



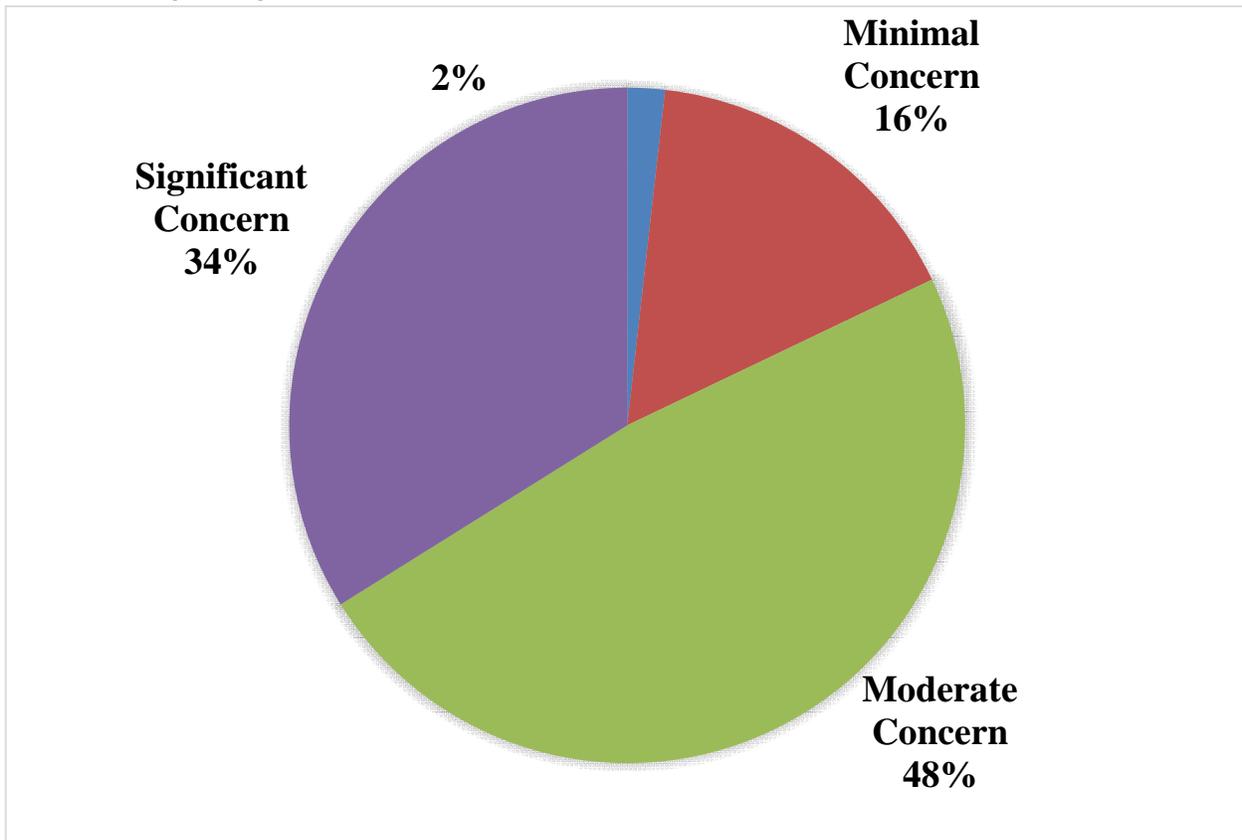
Addressing Lack of Internet or Hot Spots at Home

Districts assisted students and families, and in some cases, staff members, in gaining access to the Internet during the pandemic. This was primarily achieved through providing them with hotspots

or working with their local Internet service providers (ISP) to negotiate a free or reduced price. A technology director explained, “We were able to purchase 20 hotspots with unlimited data. This has closed a big gap for us, ensuring we could get access to those with the highest need.”

Districts were able to secure funds: donations, grant monies, and COVID relief funds to cover the cost of hotspots and Internet access. One district reported that they provided information about Internet options in the area but did not provide direct access.

Even when funds were available for devices and Internet access, there were still reported challenges. Distribution to families was sometimes slow. Rural locations, lack of cellular service, and inclement weather were all factors that impeded the reliability and adequacy of Internet access. A participant shared, “We have done hot spots - but in our area even that does not help because cell data coverage is VERY bad. Rural internet/broadband is a HUGE issue in this rural area... Our local phone companies are not blameless in this mess either.” In some cases, more than one hotspot per family had to be issued to address the demand for reliable Internet access. In other cases, no Internet access could be achieved even when a hotspot was provided for home use; this was particularly an issue with Chromebooks, which dropped Internet signal for unknown reasons. One district reported the use of transferring information onto flash drives for students or providing paper copies of homework assignments. When Internet access could not be achieved in a home location, one school reported opening its doors to allow hybrid learning for students on site.

Figure 3*Concerns Regarding Absenteeism***Addressing Absenteeism**

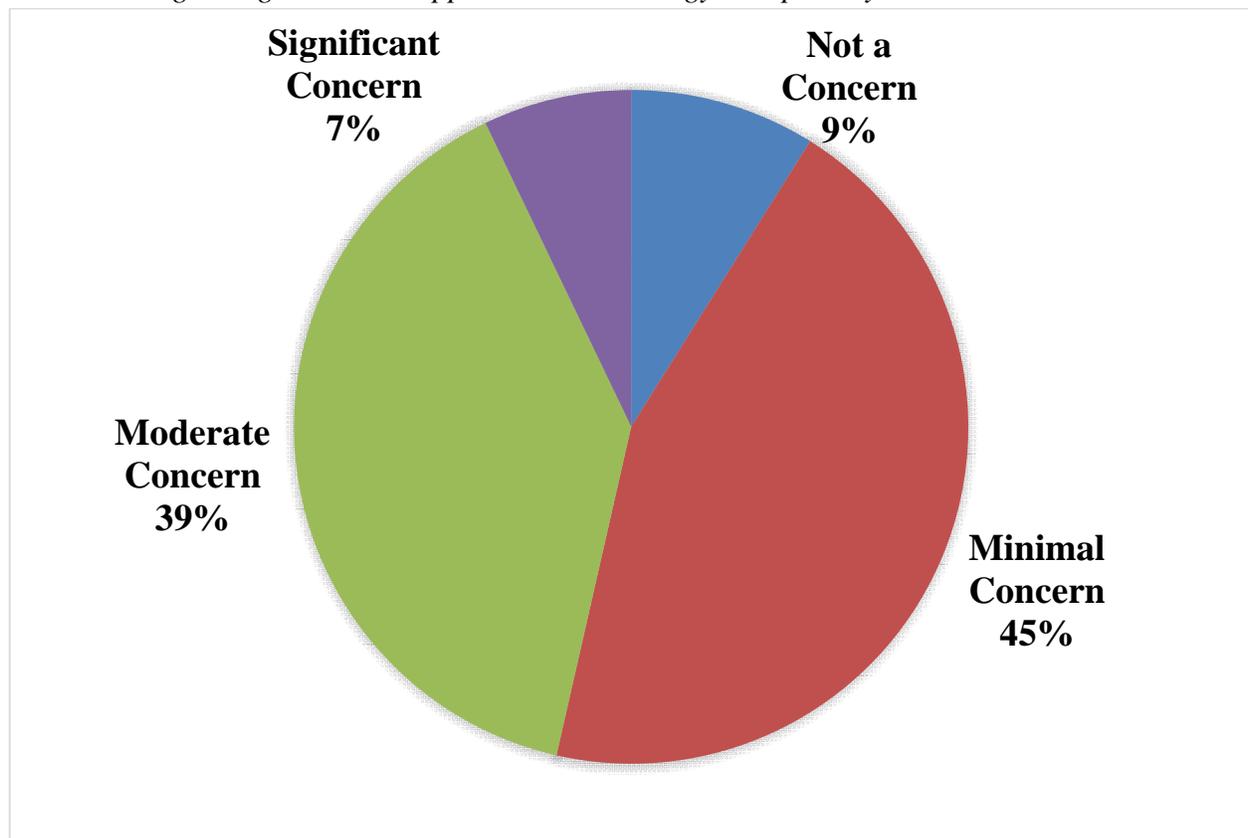
Concerns regarding absenteeism are represented in Figure 3. Absenteeism was mainly addressed by school districts through contact with parents and students. Communication between home and school occurred through a variety of methods including home visits, conferences, phone calls, and software alerts. Home visits could include the delivery of both food and school assignments. A range of staff members were called upon to make these connections, including deans, counselors, social workers, principals, advisors, distance learning liaisons, student success coordinators, student care teams, family literacy specialists, and classroom teachers. Districts noted the need to exercise compassion, prioritize relationships, and problem-solve when working with families during the pandemic. One respondent shared, “We have specific guidelines in place for students we would call academically disengaged. This can occur when we do not see them attending or when schoolwork seems to be slipping. This involves outreach from the building support team to re-engage with students and/or family.”

Some districts maintained the same attendance policies that they had for in-person learning, while others adjusted their attendance policies when instruction was delivered remotely. A principal affirmed, “This problem existed even with in-person learning. Administration works with the family as much as possible to get the child(ren) to school.” For example, one district

implemented a policy where students were contacted after they had not been seen online for three days. However, evidence of a student signing into a class was not necessarily a sign of engagement. There were scenarios when students signed into class but failed to fully engage with their online instruction. In some districts, paraprofessionals were hired as additional support for students during online learning. Students who were not participating online were offered the option to come to school to learn. Despite districts' best efforts, sometimes families were unresponsive to districts' attempts to engage with them. This was repeatedly reported as a struggle. If needed, the county stepped in to assist with truancy cases.

Figure 4

Concerns Regarding Parental Support and Technology Competency



Addressing Parental Support and Technology Competency

The vast majority (52/56) of respondents corroborated that providing adult caregivers technology assistance and training was a necessity during hybrid and fully online learning models as reported in the graph in Figure 4. One school leader remarked, “We have increased the number of staff reaching out to families and students with classroom connection issues (staying connected to the class and teacher and following along/staying caught up). Additionally, we have allowed students with limited home support to come into schools to get help when possible.” Two of the four schools that did not report a concern relied on students to be self-sufficient technology users. Districts

responded to needs by providing an array of responses to address the range of support and instruction caregivers provided their child(ren) in distance and hybrid learning models. Districts implemented proactive, conventional, and innovative strategies to support adult caregivers with technology questions.

Proactive efforts were identified by polling families and acting based on findings. These actions included disseminating information about the districts' distance learning models with the goal of fostering independent learning. The aim was to help caregivers use digital tools, troubleshoot devices, and operate software applications. A variety of media were distributed to support this aim, including *how to* documents, short videos, and online resources. Instructions were made available in multiple languages in order to be accessible for everyone in the community. In addition, districts limited the number of apps and platforms teachers used to help alleviate "parent paralysis." When needed, students were offered the opportunity to come to school in-person to work on their homework.

These efforts faced some challenges. A technology director observed, "We have worked to make sure staff are available to help students with schoolwork and have designed assignments to not require parent assistance. Unfortunately, we cannot help students who refuse to login at all."

Conventional approaches included caregivers contacting the teacher, calling the school, and emailing the school office. Districts created a physical help desk, a support phone line, and an online portal specifically to provide students and families with technology assistance. One district created paper packets of student work for families with technology concerns. When further communication was needed, teachers and other available staff, including administrators, were utilized to answer questions that arose from parents. Virtual office hours were conducted, and support was offered online and in-person. Personalized Zoom, Google Meets, and phone calls were offered and extended beyond the school day to help with homework in the evening. Synchronous online learning was offered to students in real time to encourage engagement. Advisors met with students to develop success plans and students were given additional support if needed through the formation of small groups and paraprofessional assistance. Many of these efforts were enacted to try to alleviate parental burdens. As one respondent said, "This year for distance learning and for hybrid, we are using a combination of instructional practices from school to the students directly, hopefully leaving none of the responsibilities to the parents."

Innovative strategies often involved using financial and human resources in new ways. In some districts, new staff members were hired to bridge family-technology concerns. While in other districts staff members were redesignated with titles and responsibilities such as Tech Team Digital Navigators. Districts organized technology information sessions and invited families to the school campus, met with families individually to provide assistance, and made home visits. School districts attempted to serve the larger community by offering technology related virtual community education classes. Family Literacy nights were utilized to help connect with families. In some scenarios, parents were encouraged to attend class with their children when able.

Inequities Emerging During Hybrid and Distance learning

District technology coordinators were asked if there were additional inequities discovered that were not included in the survey and how the inequities were addressed. Six inequities emerged from their responses.

Poverty Inequities Beyond the Digital Divide

Poverty was a factor that impacted students and families during COVID either due to pre-pandemic socioeconomic status or caregivers losing their jobs during the pandemic. The loss of school meals (breakfast, lunch, snacks) had a more significant impact on students experiencing poverty. It was difficult, logistically, for schools to provide food for kids. There were scenarios when drivers had COVID, so only the students who could self-transport received meals. Finally, poverty was frequently compounded by intersecting factors such as challenges associated with providing special education services and poor broadband.

Inadequate Broadband Service for Rural Communities and Large Families

Geographical inequities were significant. An issue was broadband availability to rural students in certain counties that have not had fiber Internet to the home installed. Districts reported as much as half the district boundary did not have connectivity. In some districts, there were many homes where the best form of Internet that the home could access was a hard-line dialup. There were affluent families that could not access reliable Internet for their homes. Districts shared that families live in communities where the Internet Service Providers do not reach them, or they cannot get a strong enough signal to support distance learning.

During the pandemic, it was realized that big families did not have adequate broadband to support distance learning. Districts reported that in distance learning even a 25MB Internet connection was not enough when there were three or four kids in a home attempting to participate in video conferences at one time.

Students' Mental Health Concerns

The need to adapt and keep students home, depending on childcare and job status, was challenging for most families. Districts reported that students' mental health was affected during the pandemic due to lack of interaction with peers, new competing responsibilities, and academic performance decline. Respondents felt that children in a single-child home were more significantly impacted due to not having other siblings in the home. It was noted that older siblings were often providing daycare for younger siblings as well as trying to learn themselves. Younger siblings in the home made it more difficult to concentrate. The stress and fatigue experienced by older siblings acting as the primary instructional support caregiver in the home during the school day caused some older students' academic progress to slip. Students shared that there was added pressure to work additional hours placed on them by their employers. The notion of remote school resulted in employers of students not respecting students' school hours. Post-pandemic, schools shared that they have a focus on social emotional learning (SEL) and the distribution of skills for learners and

families. An increased emphasis on relationships and keeping learners and teachers connected was prioritized.

Resource Implications to Sustain Technology Initiatives

Districts expressed concern regarding the long-term financial implications of distance and hybrid learning models. It was acknowledged that funds would be required to replace devices and the software costs for additional management and monitoring. Respondents were aware that student use would result in natural wear and tear on school issued devices. Human resource inequities were noted. Districts shared that inequities exist in staff because there are employees who do the minimum to get by and there are those who are early adopters who are eager to improve.

Systemic Cultural Inequities Affecting Marginalized Populations

Districts reported cultural barriers to using technology. For example, in northern Minnesota, the Native American population entrusted distance learning oversight to tribe elders. Yet, elders were often the least technologically savvy tribe members. Districts stated that students of color and high needs students struggled more than their peers in hybrid and distance learning models. Districts noted that an inequity that needed to be addressed was language concerns and educational services for students and families who are multilingual, specifically those qualifying for EL services.

Respondents contended that the school system is inequitable by design. The type of learning created in school does favor those who will persist through the work. When in-person, that persistence can be seen and encouraged if it is diminishing. Once learning models transitioned to distance learning, the compliance model became more challenging. It was noted that students learn differently, and some excelled with distance learning while others struggled and fell behind.

Conclusion

This study provides a glimpse of the inequity expense that existed across the digital divide during the COVID-19 pandemic. The COVID-19 crisis required school districts to identify and address historical inequities that inhibited student academic success. To reach and teach all students, a structural approach needs to be taken to identify the inequities that exist within the educational system itself. School leaders need to be trained in equity literacy, and further research needs to be conducted. Additional insight can be gained from surveying technology directors beyond Minnesota to learn how they addressed their district's needs, especially those who lack home Internet access, are experiencing poverty, and speak a language other than English. Such information will guide educators and administrators to better address structural inequities within their school systems.

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