

Preparing Post-Pandemic, Equity-Focused Educational Leaders: Technology Requires Administrators to Reimagine Schools

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The emergence of the COVID-19 pandemic led to a significant transition towards online education in pre-K-12 schools, prompting school administrators to confront the disparities revealed by the remote learning model. This paper includes the findings of a multi-phase research project exploring the intersection of educational leadership, technology, and systemic inequities aimed to guide administrator preparation programs to meet relevant, post-pandemic leadership standards. Phase One of the research project, conducted early in the pandemic, highlights the findings from a survey administered to technology directors in Minnesota. The survey aimed to understand how school districts were addressing the technology disparities encountered by students and families during hybrid and distance learning models. Phase Two of the research project, conducted as the pandemic waned, focused on school leaders' evaluation of which practices developed and implemented during remote learning should be sustained. Technology directors participated in a focus group and asserted that the pandemic was an opportunity for educational leaders to reimagine schools for the success of all students. Findings call for revised administrator preparation standards, the implementation of technology plans in every state, and continued focus on identifying and addressing educational inequities.

Keywords: Online education, remote learning model, technology disparities

The Professional Standards for Educational Leaders (PSEL) were widely accepted by administrator preparation programs throughout the nation as the guiding principles to equip school leaders with the readiness to address current and future challenges and opportunities in the evolving landscape of education and society (National Policy Board for Educational Administration, 2015). Shortly after the PSEL were published, in the early years of implementation, the COVID-19 pandemic utterly and irrevocably altered the traditional duties and responsibilities of an administrator (Cannistraci, 2020).

The dramatic shift to remote learning at the onset of the COVID-19 global crisis necessitated rapid and substantial changes in the role of school leaders and the systems serving students and families (IES, 2021-2023). The transition disproportionately encumbered students and families from marginalized backgrounds (Reimer & Hill, 2022), illuminating the digital divide and other historical educational inequities. Compelled to prioritize addressing disparities promptly and effectively, leaders operated in survival mode with limited bandwidth for reflection, efficacy monitoring, and ongoing improvement efforts. As the pandemic subsided, the new digitized education terrain did not just involve remote learning technologies, but also tools for in-person learning. As a result, pre-K schools are modernizing, pixels are replacing pencils, and new competencies are required for effective educational leadership.

Purpose

The purpose of this study was to explore how the COVID-19 pandemic influenced the role of educational leaders to inform the standards guiding administrator preparation programs. This study examined how school leaders addressed the digital divide and other disparities brought to light during the pandemic. It also explored which practices have been sustained as schools transitioned to the endemic phase of COVID-19. A specific focus was educational leaders' understanding of how technology itself can be used to provide equitable access to an effective education within the classroom and the online environment (AASA, CoSN, NSBA as cited in Office of Educational Technology, 2017).

Research Questions

Phase One: How are educational leaders addressing the digital divide experienced by marginalized student populations as the COVID-19 pandemic required learning models to pivot to hybrid and distance learning?

Phase Two: What technology-related practices, initiated during the COVID-19 pandemic to address inequities experienced by marginalized populations, have been sustained?

Literature Review

School Leaders and Emergency Preparedness

Leading as a school principal during the pandemic was challenging for several reasons. One of those reasons was the lack of professional training to prepare for such an event. The Professional Standards for Educational Leaders (PSEL) developed by the National Policy Board for Educational

Administration was last updated in 2015. These standards “communicate expectations to practitioners, supporting institutions, professional associations, policy makers and the public about the work, qualities and values of effective educational leaders” (p. 4). A careful word search of the standards reveals that there are no standards that contain any of the following words: “pandemic,” “emergency” “online learning,” or “remote learning.”

Further compounding the challenge of leading a school through the pandemic was a lack of planning. The National Center for Educational Statistics at the Institute of Education Sciences published summaries of their annual school survey on *Crime, Violence, Discipline, and Safety in U.S. Public Schools*. In the 2017-2018 school year, only 45.5% of the schools surveyed had a written plan in place for addressing a pandemic disease outbreak (Diliberti, et al., 2019). This number increased to 52% during the 2019–2020 school year (Wang, Kemp, & Burr, 2022).

School Leaders and Technology Planning

There appears to be more resources and support for school leaders in the areas of technology planning than pandemic response. PSEL (National Policy Board for Educational Administration, 2015), includes two standards that address technology, one related to curriculum, instruction, and assessment of learning and the other in regard to operating and managing a school.

Additional standards exist to help guide school leadership including those provided by the International Society for Technology in Education (ISTE). ISTE developed standards specifically for school leaders including standards that address technology equity (2019):

Equity and Citizenship Advocate

Leaders use technology to increase equity, inclusion, and digital citizenship practices.

Education leaders:

3.1.a. Ensure all students have skilled teachers who actively use technology to meet student learning needs.

3.1.b. Ensure all students have access to the technology and connectivity necessary to participate in authentic and engaging learning opportunities.

3.1.c. Model digital citizenship by critically evaluating online resources, engaging in civil discourse online and using digital tools to contribute to positive social change.

3.1.d. Cultivate responsible online behavior, including the safe, ethical and legal use of technology (p. 7).

The State Educational Technology Directors Association (SETDA), established in 2001, is a professional organization comprised of educational technology leaders from around the country. Part of their mission is “ensuring equity of access to all facets of digital learning” (SETDA, 2024, para. 3). Digital learning profiles of each state along with Washington D.C. and Guam exist on their website. The profiles detail the standards, definitions, and technology plans that have been adopted by each state’s department of education. Not every state has a mandated technology plan in place. According to SETDA’s 2019 report, “32 states have a digital learning plan, 19 states require a district to adopt a digital learning plan, and 29 states have digital learning standards for students” (p. 2).

While there may not be state-specific plans in place across the country to guide the use of educational technology in K-12 schools, the U.S. Department of Education Office of

Educational Technology [ED] publishes a National Educational Technology Plan. The plan centers around three main topics: “The digital use divide, the digital design divide, and the digital access divide” (p. 2-3). The “digital use divide” articulates the difference between students who have had opportunities to use technology paired with higher order thinking skills and those who have not had similar opportunities. This includes skills such as coding, collaboration, and critical thinking (ED, 2024). The plan’s recommendations to repair this divide are to develop technology plans, review curriculum, provide professional training for district level and building administrators, and seek to protect data privacy.

The “digital design divide” is the gap between school systems that provide compensated time for educators to develop digital instructional materials and those who do not (ED, 2024). Two of the many ways the plan suggests to close this gap include providing educators and administrators with the training they need to teach and model digital literacy and gathering input from diverse stakeholders when making decisions and implementing change.

The “digital access divide” is the division between those who have access to devices, robust internet access, and instructional content and those who do not. Accessibility is a broad term that encompasses six categories: “physical, visual, auditory, cognitive, digital, and language” (ED, 2024, p. 74). Establishing a district level technology director who can conduct regular assessments and oversee policy, promote inclusion, and model digital citizenship are several of the ways the plan recommends this division be mended (ED, 2024).

School Leaders and Mental Health Training

The need for school leaders to be aware of mental health issues is paramount as illustrated in the Centers for Disease Control and Prevention’s (CDC) 2011-2021 *Youth Risk Behavior Survey*. The CDC (2011-2021) reported that 42% of all teens surveyed in 2021 had felt “persistent feelings of sadness or hopelessness” (p. 60), 29% reported “poor mental health” in the past month (p. 62), and 22% “seriously considered attempting suicide” (p. 63). A reported 18% “made a suicide plan within the past year” (p. 65), 10% attempted suicide, and 3% were injured in the process. The Centers for Disease Control and Prevention (CDC) recognized the vital role that school administrators play and in late 2023 developed an action guide for school leaders available for free download on their website.

The PSEL (2015) mention “health” several times, twice when referring to the well-being of staff and twice related to the well-being of students. Once school leaders have met these standards and become licensed, they periodically renew their license by taking professional development coursework. It is common for school leaders to renew their teaching license alongside their administrative license. In 2007, the Jason Flatt Act was passed first in Tennessee requiring suicide awareness and prevention training in order to retain a teaching license in the state (Jason Foundation, 2024). As of 2023, Navigate 360, a company that develops training materials for schools, reported that 48 states have suicide prevention training tied to teacher relicensure. A total of 17 states mandate annual training, 21 states along with Washington D.C. have required training that is not annual, and 10 states encourage training on this topic.

School Leaders and (Dis)Ability Knowledge

The PSEL (2015) state that effective school leaders: “Confront and alter institutional biases of student marginalization, deficit-based schooling, and low expectations associated with race, class, culture and language, gender and sexual orientation, and disability or special status” (p. 11). Schaeffer (2023), a research analyst with PEW Research Center, reported that 7.3 million students with disabilities attend K-12 public schools. This comprised about 15% of the overall enrollment of students. During the height of the pandemic, the number of students with disabilities decreased by 1%, likely due to a dip in overall school enrollment during that period. The number has since rebounded.

Literature repeatedly expressed that very little research has been done to understand how school principals are prepared to meet the needs of students with special needs (Lasky & Karge, 2006; Rodl et al., 2018; Samuels 2018; Steinbrecher et al., 2015). Sun and Xin (2020) surveyed 2,500 school principals to learn more about their experience providing leadership to the special education programs in their schools. Principals were challenged with a lack of funding, professional development, and available technology. It was noted that little training was being given to school administrators during their licensure coursework. Sun and Xin (2020) stressed, “It is, thus, urgent for university preparation programs to include special education content, which could provide school leaders with the knowledge and professional skills needed in decision making and service provision to support students with disabilities” (p. 107).

School Leaders and Equity Leadership

The 2015 PSEL have an entire section devoted to equity. Standard three is entitled “Equity and Cultural Responsiveness” and states, “Effective educational leaders strive for equity of educational opportunity and culturally responsive practices to promote each student’s academic success and well-being” (p. 11). Eight sub-standards address several areas where effective leaders must advocate for equity in their schools including access to resources, implementation of policy, and confrontation of institutional bias. Ultimately, the 2015 PSEL call upon school principals to “Address matters of equity and cultural responsiveness in all aspects of leadership” (p. 11).

One might wonder how standards calling for equitable school leaders are instilled in aspiring candidates. Rasmussen and Raskin (2021) reflected:

There is nothing magical about preparing students for principal licensure; many institutions do this. However, in a world where systemic racism runs rampant yet unchallenged, school leaders must embed their newly minted technical skills into an equity frame to disrupt the inequitable practices and policies that continue to exist in schools. (p. 4)

Grooms et al., (2024) considered what content has been included in highly effective principal preparation programs when training equitable leaders. Content included “relationship building” with staff members, fostering “culturally diverse practices” in teacher classrooms, and “opportunities for practical applications” where principals spend time in the culture where they intend to work (p. 9). Including authentic experiences into principal preparation programs to expand one’s awareness and skills for leading in a diverse culture has been well documented (Miller & Martin, 2015; Bustamante et al., 2009; Gurin et al, 2002). Using equity as a lens to design

content and pedagogy within school principal preparation programs has resulted in candidates feeling more prepared for their roles (Rasmussen & Raskin, 2021).

Developing school principals to lead equitably should not end once a license is granted. Professional development which includes applying equity learning within on-the-job contexts needs to be offered (Rimmer, 2016). Indeed, principals made equity-based decisions when leading schools during the pandemic. Jackson et al., (2022) described how these decisions were related to the professional development of teachers instructing in an online format, the opening and closure of school, compliance with state policies, and equity of resources for students.

Equity Literacy Framework

Equity literacy is an adaptive and technical approach to establishing and upholding equitable educational environments (Equity Literacy Institute, 2021). This framework includes understanding bias, inequity, and oppression across various identities such as religion, language, immigration status, race, ethnicity, socioeconomic class, gender, sexual orientation, and (dis)ability. Diverging from conventional diversity initiatives, equity literacy emphasizes the need to uphold transformative equity practices (Gorski, 2021). It rests on a commitment to strengthening comprehension of how inequity and equity function within organizations and systems, while also developing the knowledge, skills, and determination to identify, address, and actively promote equity (Reimer & Hill, 2022).

The equity literacy framework challenges the notion that educational disparities stem from deficiencies within marginalized populations, instead highlighting systemic inequities (Thomas, 2018). Educators embracing equity literacy reject deficit narratives and encourage stakeholders to adopt a structural perspective on equity. This viewpoint asserts that the traditional schooling system inherently privileges certain groups, evidenced by unequal access to advanced curriculum, experienced teachers, meaningful learning experiences, arts education, and extracurricular activities (Dudley-Marling, 2015). Marginalized families often face barriers such as limited access to technology, books, tutoring, and other resources crucial for academic success (Lineburg & Ratliff, 2015). Educators with a structural perspective understand that education disparities are rooted in systemic barriers rather than inherent shortcomings or lack of perseverance among historically marginalized students and families (Gorski, 2018).

The Equity Literacy Framework maintains that education outcome disparities persist as long as structural barriers remain unaddressed (Berliner, 2013). Educators must serve as agents of change, challenging the presence of structural inequities in schools and districts. This necessitates disrupting traditional practices, values, and beliefs to pursue innovative solutions and practices.

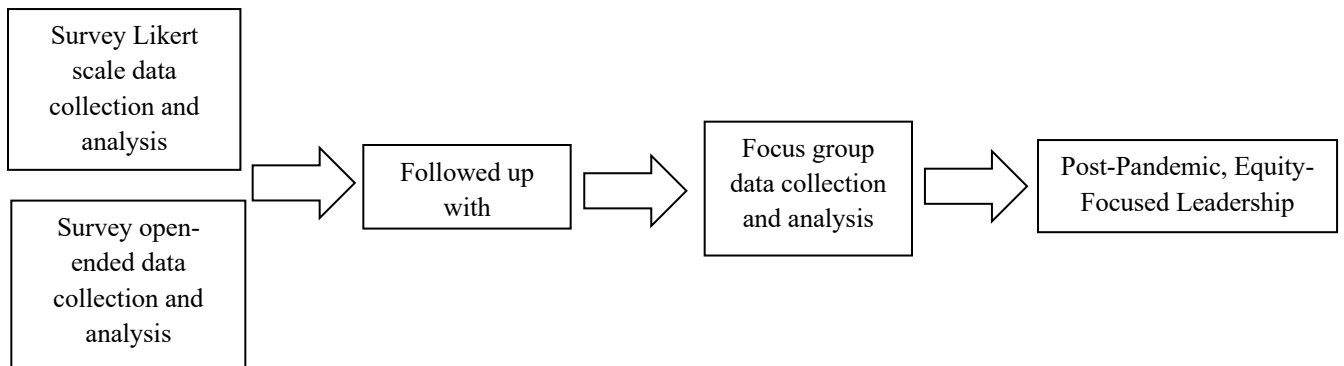
Methodology

This research project utilized Convergent Explanatory Sequential Design (Harvard, 2023; Ivankova, Creswell, & Stick, 2006) and encompassed a two-phase, multi-year study exploring the convergence of educational inequities, school leadership, and technology through the COVID-19 pandemic.

Phase One, conducted in 2021, involved the email distribution of a mixed methods survey to Minnesota district technology directors. This survey utilized Likert scales to identify the school leaders' primary concerns related to the digital divide and included open-ended questions to understand how districts addressed inequities (Reimer & Hill, 2022). Participants were recruited using names and email addresses available on the Minnesota Department of Education website, which listed 505 district technology coordinators. Surveys were completed by 56 participants, which was an 11% response rate. Participants provided initial insights into leaders' priorities and efforts to address disparities. However, further investigation was deemed necessary to gain deeper insights and understand long-term implications.

Phase Two aimed to gather rich, detailed accounts of school leaders' perspectives on technology's influence on educational systemic inequities during and beyond the pandemic. Data was collected through a two-hour focus group conducted via video conferencing technology (Zoom). Technology directors were invited via e-mail to participate in the study. Eight directors confirmed their participation, two asked to email their responses, and one did not attend the Zoom meeting. Five technology directors ultimately took part in the focus group, discussing how their districts' leaders utilized technology to navigate the pandemic, what was learned in the process, and what practices will be sustained moving forward.

Figure 1
Convergent Explanatory Sequential Design



Instruments and Protocol

Mixed Method Survey

Phase One aimed to learn how Minnesota school leaders addressed the digital divide and other inequities experienced by marginalized students during the COVID-19 pandemic. A 10-question survey asked participants to identify inequities in their communities and share how their school leaders responded to the inequities.

Table 1

Addressing Inequities During the COVID-19 Pandemic

Item	Response Scale
<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>	<p>Options:</p> <p>1 = not a concern for district students</p> <p>2 = minimal concern for district students</p> <p>3 = moderate concern for district students</p> <p>4 = significant concern for district students</p>
<p>Open Ended Responses:</p> <p>How has your district responded when students do not have devices to complete hybrid or distance learning school work?</p> <p>How has your district assisted students and families in accessing the Internet or hot spots?</p> <p>How has absenteeism/truancy been addressed by your district?</p> <p>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?</p> <p>During distance or hybrid learning, how does your district provide assistance to adults/caregivers who do not have the technology skills to support their children?</p> <p>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?</p>	

Focus Group Protocol

Phase Two involved a focus group protocol centered on identifying and addressing the needs of underserved student populations (Gorski, 2021). This protocol (Table 2) comprised eight open-

ended questions crafted to guide conversation without imposing limitations (Patten, 2014), affording the researchers the versatility to modify or adapt questions based on participants' responses, experiences, and perspectives (Creswell, 2014; Merriam, 2015). The researchers employed follow-up questions such as "tell me more" and "you mentioned" to elicit a detailed, comprehensive narrative. This approach enabled the researchers to "respond to the situation at hand, to the emerging worldview of the respondent, and to new ideas on the topic" (Merriam, 2015, p. 90).

Table 2

Focus Group Questions

1. Can you share any surprising or unexpected things that you learned while educating students remotely or hyflex during the pandemic?
2. How did your school utilize technology to address SES inequities during the pandemic?
3. How did your school utilize technology to address racial/ethnic inequities during the pandemic?
4. How did your school utilize technology to address (dis)ability related inequities during the pandemic?
5. How did your school utilize technology to address mental health-related inequities during the pandemic?
6. Of these practices, what have you sustained?
7. Were there any practices or initiatives that you tried or implemented during the pandemic that you stopped using or discontinued using?
8. Is there anything else you would like to add regarding serving students and families during the pandemic and practices that have been discontinued or sustained?

Data Analysis

Phase One survey Likert scale responses were exported to Excel for statistical analysis. The percentage of participants reporting each level of concern (none, minimal, moderate, or significant) for identified inequities was calculated. Open-ended responses were analyzed via iterative, manual coding. All participants' responses were collected and organized by research question. Responses were read once to gather a general understanding. The second and third reads of the responses included identifying meaning units. The fourth and fifth reads of the responses resulted in determining if meaning units were similar and should be combined into a shared code, if meaning units were frequently mentioned and were stand-alone codes, or if meaning units were infrequently mentioned and would not be included in a code. Codes were reviewed by a co-researcher with multiple discussions to work through code disagreement, incorporate feedback, and increase trustworthiness. Codes documented in more than two responses were then synthesized and organized by theme.

Phase Two focus groups Zoom recordings were transcribed using a transcription service. Transcripts were then organized into a three-column table, as shown in figure 2. The left-hand column contained the number associated with the participant because participant identifiers

(such as names, district names, school names, and locations) were redacted to safeguard confidentiality. The middle column contained the transcribed text from participants, organized into stanzas as recommended by Saldaña (2014) to facilitate analysis. The right-hand column provided space to note codes.

Figure 2

Speaker	Response	Codes
Prompt	Can you share any surprising or unexpected things that you learned while educating students remotely or hyflex during the pandemic?	
6	Well, it certainly was a trying time all together for everyone, as we had to completely ²⁰⁵ change our method of delivering instruction with very little notice and I get emotional when I think about how hard both the Discovery teachers that I work with worked, and how committed my technology team was to doing whatever it takes to make sure we can control everything that we could control. Through it all, I asked everyone to do two things as guiding principles for us, to ²⁰⁶ control what we can control (and there was a lot that we couldn't control) and walk through it all together. "Together we're better" is our motto and we truly lived and breathed it through the distance learning that spring.	<p>²⁰⁵ Changing delivery modes</p> <p>²⁰⁶ Relinquishing control</p>

Prompts were listed at the top of the table. Responses from each participant were listed below each prompt, formatted in stanzas, and identified by participant number. The transcripts were thoroughly read, with key ideas in each stanza highlighted. A key idea was defined as an action that was taken by the participant or the participant's school district. Key ideas usually contained verbs. Key ideas were highlighted in different colors, one color assigned to each participant's responses.

The highlighted segments were revisited, read a second time, and assigned a number and a code that was recorded in the right-hand column, aligned with the highlighted stanza. The coding strategy employed terms ending in "ing" to encapsulate the main idea conveyed in each stanza. There were 213 codes initially identified. This approach to analysis is known as process coding. "Processes can consist of observable human actions mental processes, and more conceptual ideas" (Saldaña, 2014, p. 8). Process coding was chosen as an analytical tool given the focus of the research questions on actions.

Upon completing the initial reading and coding, a second researcher independently reviewed the transcript stanzas, assigning her own set of codes to ensure inter-rater reliability. The two researchers then convened to discuss areas of agreement and discrepancy. Codes were subsequently organized into subcategories to identify emerging concepts corresponding to each focus group question. These concepts were also labeled using terms ending in "ing" to denote actions taken. Interview questions and concepts that emerged are shown in Table 3 below.

Table 3
Concepts by Interview Question

Interview Question	Emerging Concepts
Can you share any surprising or unexpected things that you learned while educating students remotely or hyflex during the pandemic?	<ul style="list-style-type: none"> • Increasing teachers' technology proficiency and instructional skills at an extremely rapid rate • Addressing educational equity barriers through online learning • Sustaining preference for remote modality after the pandemic
How did your school utilize technology to address SES inequities during the pandemic?	<ul style="list-style-type: none"> • Providing students technology devices • Ensuring students have adequate internet access • Identifying, addressing, and monitoring family technology needs and basic needs
How did your school utilize technology to address racial/ethnic inequities during the pandemic?	<ul style="list-style-type: none"> • Pausing focus on culturally relevant teaching in the transition to remote/hyflex instruction • Implementing culturally responsive initiatives pre-pandemic, through the pandemic, and post-pandemic • Decreasing student joy in learning due to inherent detriments of technology
How did your school utilize technology to address (dis)ability related inequities during the pandemic?	<ul style="list-style-type: none"> • Building teachers' capacity to meet the needs of SPED students when learning online • Utilizing intentionality in technology tools, add ons, and materials to serve students receiving special education service
How did your school utilize technology to address mental health-related inequities during the pandemic?	<ul style="list-style-type: none"> • Prioritizing serving student mental health as a post pandemic initiative
Of these practices, what have you sustained?	<ul style="list-style-type: none"> • Sustaining effective technology instructional practices, tools, and platforms • Serving families better through bilingual supports and technology support/devices • Reimagining school • Protecting student data privacy • Advocating for continued funding stream to education • Shifting enrollment in traditional brick and mortar schools, charter schools
Were there any practices or initiatives that you tried or implemented during the pandemic that you stopped using or discontinued using?	<ul style="list-style-type: none"> • Ceasing to offer hybrid learning model • Declining enrollment in online learning model/online schools
Is there anything else you would like to add regarding serving students and families during the pandemic and	<ul style="list-style-type: none"> • Enrollment Shifts • Rethinking Education • Funding

practices that have been discontinued or sustained?	
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Findings

Phase One: How are educational leaders addressing the digital divide experienced by marginalized student populations as the COVID-19 pandemic required learning models to pivot to hybrid and distance learning?

Provided Devices

Out of the 56 respondents, 53 districts provided devices to students; 28 stated their district was operating under a 1:1 model, 15 indicated otherwise, and 10 did not specify their 1:1 status. Districts without a 1:1 platform either provided devices to students upon request, allowed students to rent devices, or distributed one device per family. In cases where necessary, devices were delivered directly to students' homes.

Ensured Internet Access

Districts supported students and families in obtaining Internet access during the pandemic primarily by providing hotspots or collaborating with local Internet service providers (ISPs) to negotiate free or reduced-price access. Despite the availability of funds for devices and Internet access, challenges persisted. Distribution to families was sometimes delayed, and factors such as rural locations, lack of cellular service, and adverse weather hindered the reliability and adequacy of Internet access. In some instances, multiple hotspots per family were necessary to meet the demand for reliable connectivity. However, even with a hotspot provided for home use, some households still lacked Internet access. To address this issue, one school opened its doors to allow hybrid learning for students on-site, while another district compiled information onto flash drives or provided paper copies of homework assignments.

Dealt with Increased Absenteeism

School districts addressed attendance in online learning models in a variety of ways. Some districts retained their existing attendance policies from in-person learning, while others modified their policies for remote instruction. For instance, one district enacted a policy where parents were contacted if students hadn't attended online classes for three consecutive days. However, merely signing into a class did not always indicate engagement. Some students logged in but did not actively participate in their online instruction. To provide additional support, certain districts hired paraprofessionals during online learning. Additionally, students who were not participating online were given the opportunity to attend in-person classes at school.

Communication regarding attendance between home and school was facilitated through various methods, including phone calls, home visits, conferences, and software alerts. A range of staff members, such as deans, principals, counselors, social workers, advisors, distance learning liaisons, student success coordinators, student care teams, family literacy specialists, and

classroom teachers, were involved in establishing these connections. Leaders emphasized the importance of showing compassion, prioritizing relationships, and problem-solving when working with families during the pandemic. Despite the districts' efforts, some families remained unresponsive to attempts at engagement, which was consistently reported as a challenge. In such cases, the county intervened to assist with truancy issues if necessary.

Assisted Caregivers with Technology-Related Support

The overwhelming majority (52 out of 56) of the participants confirmed the necessity of providing adult caregivers with technology assistance and training during hybrid and fully online learning models. Among the four schools that did not express the necessity, two relied on students to be self-sufficient technology users.

Caregiver needs were determined by surveying families and efforts were implemented according to the results. These efforts involved distributing information (i.e. instructional documents, short videos, and online resources) about the districts' remote learning models to assist caregivers in utilizing digital tools, troubleshooting issues with devices, and navigating software applications. Information was provided in multiple languages to ensure accessibility for all members of the community. Furthermore, districts reduced the number of apps and platforms used by teachers to alleviate "parent paralysis."

Districts created physical help desks, support phone lines, and online portals specifically to provide students and families with technology assistance. Virtual office hours were conducted, and teleconferences (ex. Google Meet, Zoom) and phone calls were offered and extended beyond the school day to help with homework in the evening. New staff were hired and existing staff members were reassigned to positions responsible for supporting families with titles such as Tech Team Digital Navigators. School employees made home visits, and parents were encouraged to attend online classes with their children when able.

Phase Two: What technology-related practices, initiated during the COVID-19 pandemic to address inequities experienced by marginalized populations, have been sustained?

Choosing to Remain a Remote Learner

When reflecting on the practices they have continued, technology directors highlighted a notable trend: the preference for maintaining a remote learning approach even post-pandemic. Many districts opted to establish an online counterpart to their traditional in-person instruction.

There was a recognition that remote learning could be beneficial for certain student populations, including those with disabilities, multilingual learners, and students from diverse cultural backgrounds. Specifically noted were benefits of online learning for students who have anxiety or overstimulation with peer interaction and some EL students because they were surrounded by their family. In addition, technology directors discovered the significant impact of providing multilingual support to better serve families.

Enhancing Teachers' Technological Proficiency

School districts recognized the significant learning curve teachers faced at the outset of remote learning. Participants expressed admiration for the progress made and a commitment to

maintaining effective instructional technology practices, tools, and platforms. Technology directors noted a surge in Chromebook distribution, particularly at the secondary level, and observed Google's increasing popularity as a software platform directly attributable to the pandemic. Technology was universally accepted as an integral part of the learning process.

Teachers have continued to refine their technological skills. They are more consistently utilizing learning platforms and exploring software such as GoGuardian to improve classroom management in remote settings. The conversation around software usage in classrooms is evolving from technical proficiency to effective pedagogy.

Reimagining Pre-K-12 Education

Technology directors expressed optimism about the opportunity to reimagine schools in the aftermath of the pandemic. They emphasized the need to facilitate change and rethink traditional approaches to education. Leaders acknowledged the impact of innovation on instruction and pondered the lingering challenges and new possibilities. There is a growing recognition of the need to reconsider what skills are best acquired through schooling and how to engage students more effectively.

Conclusions

Implications for Practice

When the PSEL are updated for a post-pandemic world, it is important they reflect the dynamic and evolving role of the school principal. Standards need to be added related to emergency preparedness (Diliberti et al., 2019) and meeting the needs of students with mental health concerns (CDC, 2023) and disabilities (Sun & Xin, 2020). Standards should continue to focus on equity in all areas of leadership. Preparation programs need to implement relevant standards and allow for training of new and existing principals through authentic experiences (Miller & Martin, 2015). Equity-centric licensure coursework paired with opportunities for school leaders to immerse themselves in the communities they serve will lead to a clearer understanding of student needs and how to meet them (Rasmussen & Raskin, 2021).

Well funded technology plans with dedicated technology directors to administer them need to be required in every state. The focus of these plans must be on how to equitably address the digital use, design, and access divides that are outlined in the National Educational Technology Plan (ED, 2024). Enhancing digital use, moving passive consumers of technology to active creators and critical thinkers can be guided by the ISTE standards for students and educators. These standards support student learning using technology in areas such as “innovative design, computational thinking, creative communication, and global collaboration” (n.p., 2024). Standards are also published to guide teachers, administrators, and academic coaches. Artificial Intelligence must be embraced in education to avoid creating an additional digital divide (Trucano, 2023). Organizations such as TeachAi provide educators with toolkits to help instruction in this new space (TeachAi, 2023).

The digital design divide can be crossed with greater mandated support and funding at the state level, nationwide. Drawing upon the trends reported by SETDA (2019), there is vast

room for improvement. All states should be required to develop and implement a digital learning plan that is properly funded, for devices and internet access for students, and for professional development time for teachers who are instructing in technology integrated in-person environments, hybrid/blended environments, and fully online environments. Digital learning standards need to be implemented, digital curricula materials need to be adopted, including access to Open Educational Resources (OER), and teachers need to be trained in online learning best practices like those outlined by Quality Matters in their course design rubric standards (2019).

Digital access encompasses more than simply handing students a device and internet access. According to the 2024 National Educational Technology plan, accessibility is multifaceted and includes “physical, visual, auditory, cognitive, digital, and lingual features” (ED, p. 74). Strong collaboration between the principal and licensed school library media specialist, technology department, English language learner teachers, and special education teachers can help to provide access to students. School library specialists/teacher librarians are highly qualified to develop and deliver effective curriculum addressing “digital health, digital safety, and digital citizenship” (p. 84) that are outlined in detail in the 2024 plan. Resources, standards, and curricula abound to help collaborate and teach these subjects from the American Library Association (2018), Common Sense Media (2023), and The Internet Education Foundation (2023) which recently launched an award-winning website called *Copyright & Creativity for Ethical Digital Citizens: Resources for Teaching Copyright and Fair Use*. Ultimately, the mending of the digital divide will begin to heal with each stitch of the equity needle, each school leader’s decisions working as thread.

Implications for Future Research

This research project elicited expertise from technology directors related to their school districts strategies aimed to address technology inequities during and just after the pandemic. School principals were not surveyed or interviewed because of the demands on their time and breadth of new responsibilities during the global crisis. This presents a limitation to this study because it is deprived of their building-level perspective and an opportunity for further research in order to glean their insights. Future research may involve identifying, addressing, and monitoring educational disparities, including the use of artificial intelligence in 2024 and beyond.

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