

# Rural Educational Leader Perceptions of Online Learning for Students With and Without Disabilities Before and During the COVID-19 Pandemic

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The COVID-19 pandemic forced the temporary closing of many brick and mortar school buildings in fall 2020 while substantially changing the delivery of instruction for students with and without disabilities in rural schools. This article describes the qualitative results of an online study completed between August 2020 and October 2020 that investigated rural educational leaders' perceptions of the use of online instructional technologies before and during the COVID-19 pandemic. Rural educational leaders also shared how special education services were delivered and how parents felt about their children's learning. The early school year in fall 2020 was a critical period for rural educational leaders as they were managing persistent and evolving issues related to providing quality educational opportunities to all students. This article provides a unique portrait of that crucial moment for educators, students, and parents.

**Keywords:** rural, disabilities, technology, broadband, internet, connectivity, equity

The Internet has substantially changed the way teachers teach and the way students approach learning. Instructional technology is no longer a luxury. Rather, the ability to access online resources for 21<sup>st</sup> century teaching and learning has become a necessity (Kormos, 2018). Moreover, the COVID-19 pandemic forced the temporary closing of many brick and mortar school buildings in 2020 while leaving families to find the means to continue student learning from home. Additionally, educators had to quickly shift to online modalities for teaching. The pandemic necessitated greater use of internet for teaching and learning. Yet, equity in access to broadband internet, student devices, and teachers fully trained in online instruction has been an ongoing issue for many schools (Jackson & Garet, 2020).

This article will describe the qualitative results of an online study completed between August 2020 and October 2020 that investigated rural educational leaders' perceptions of the use of online instructional technologies before and during the COVID-19 pandemic. Rural educational leaders also shared how special education services were delivered and how parents felt about their children's learning. The early 2020 school year time frame was a crucial period for rural educational leaders as they were managing persistent and evolving issues related to providing quality educational opportunities to all students.

Approximately one in five Americans (60 million people) live in the rural areas that make up about 97% of the nation's land area (Ratcliffe et al., 2016). However, the geographic, socioeconomic, and demographic landscape of rural settings vary greatly across America. Rural communities can be distant and remote, or they can be located a relatively short distance from a suburban setting. The racial and ethnic diversity of rural communities can resemble America from

60 years ago, or they can foreshadow the demographic changes that are remaking increasingly diverse communities across the country. About one in five students, about 9.3 million, attend rural schools. In fact, most rural students attend school in states where they account for less than 25% of total school enrollment (Showalter et al., 2019). Additionally, school sizes in rural communities are often quite small. In fact, Showalter et al. (2019) found that the median school enrollment in rural districts is only about 494 students. While rural schools face differing strengths and confront unique challenges, one of the largest challenges that rural schools face has been economic inequality (Tieken & Montgomery, 2021).

### **Digital Divide**

The digital divide has been a part of the discussion of digital inequities since the late 1990s and early 2000s. The original definition was encapsulated by simply describing whether access to the internet was available or not (e.g., Dewan & Riggins, 2005; Novak et al., 2000). Over the following two decades the digital divide definition has evolved to describe three levels that include (a) Level 1: access to information and communication technology (ICT), (b) Level 2: variability in digital skills and digital usage, (c) Level 3: realizing beneficial outcomes as a result of using the internet including (e.g., Shakina et al., 2021; Wei et al., 2011). Each higher level encompasses the prior. In other words, Level 3 includes ICT access, skills and usage, and outcomes.

Among the factors that influence the digital divide are geographic setting (e.g., rural, urban, suburban), technology infrastructure cost and deployment, and socioeconomic factors (Reddick et al., 2020). For example, lower population density in rural settings makes installing broadband internet infrastructure less profitable for internet service providers (Riddlesden & Singleton, 2014). The digital divide is also influenced by broadband speed, a factor that affects the user's ability to effectively access the internet. Broadband speed is also affected by the number of devices accessing the internet simultaneously, as in the case of families with several school age children. Riddlesden and Singleton (2014) and Obermier (2018) reported that rural broadband speeds were slower and broadband services were costlier than in urban or suburban areas. The cost of broadband service can also be an issue in rural settings. A cost model developed by Rendon Schneir and Xiong (2016) indicated that the deployment costs for broadband infrastructure in rural areas are 80% higher than deployment in most urban areas. As a result, the potential for lower broadband service levels coupled with higher access costs continue to be issues in equitable access to broadband internet service.

Socioeconomic disparities in rural areas have also exacerbated the digital divide in terms of broadband availability or simply the availability of computing devices to connect to the internet (Jameson et al., 2020; Riddlesden & Singleton, 2014). In fact, only about 72% of rural Americans have broadband internet available at home (Vogels, 2021). Moreover, rural homes are less likely to have multiple internet-capable devices than urban or suburban families (Vogels, 2021). During the pandemic, families with multiple school age children and fewer devices may have contributed to some of the connectivity issues reported by participants in the current study.

### **Digital Divide in Schools**

Recently, school district leaders have stated that their greatest concern during pandemic remote instruction has been equitable access to instruction (Jackson & Garet, 2020). These educational leaders also emphasized that equity in remote digital instruction has been an ongoing

issue for years. They emphasized that financial resources continue to dictate the degree of digital divide that schools in rural areas encounter (Jackson & Garet, 2020). High poverty rates persist, especially in the most isolated rural areas (United States Department of Agriculture, 2019), which affects the tax base upon which most school funding is derived. As a consequence, available funding negatively affected access to technology in rural schools (Kormos, 2018) as inequities became more apparent during the pandemic.

Yet, rural schools have embraced online instructional technologies for teaching and learning (Kormos, 2021). Using online instructional technologies has provided remote schools an invaluable tool for overcoming issues related to geographic isolation (Gallegos et al., 2022). Additionally, broadband internet access has delivered opportunities for the development of 21st century skills related to communication, collaboration, critical thinking, and creativity (Kormos, 2018). The importance of reliable internet connections has been underscored by the COVID-19 pandemic while highlighting challenges faced by rural families and their ability to access broadband connections. Even though a rural school may have internet access, up to 26% of rural households may not have any internet access or limited access (FCC, 2019). Family poverty or lack of broadband infrastructure for delivering internet connections each contribute to the lack of connectivity in rural areas (Leichty, 2021).

### **Theoretical Framework**

Inequities related to the digital divide provided the basis for identifying the theoretical framework used to guide our inquiry. While the extant literature includes varying interpretations of the term equity (e.g., Adams, 1963; Bolino & Turnley, 2008; Pick & Sarkar, 2016), the Resources and Appropriation Theory presented by Van Dijk (2017) provides the most appropriate undergirding for the current study. Van Dijk proposed five basic tenets:

1. Categorical inequalities in society produce an unequal distribution of resources.
2. An unequal distribution of resources causes unequal access to digital technologies.
3. Unequal access to digital technologies also depends on the characteristics of these technologies.
4. Unequal access to digital technologies brings about unequal participation in society.
5. Unequal participation in society reinforces categorical inequalities and unequal distributions of resources

Van Dijk's Resources and Appropriation Theory provided a foundation for examining participant qualitative responses through a lens focused on current internet technologies. The digital divide is a very real phenomenon that has persisted for over two decades (Dewan & Riggins, 2005; Novak et al., 2000) and has impacted schools in rural areas during the pandemic (Kormos, 2018). Van Dijk's theoretical lens also provided opportunities for a greater understanding of participant responses when they described some of the inequalities experienced by students as they worked to continue their learning during a period of rapidly changing factors related to the COVID-19 pandemic.

## Online Instructional Technologies

As the pandemic forced the closure of schools, teachers found that they had to quickly pivot from primarily face-to-face instruction to online instruction. Teachers had to convert their lessons with little time to redesign lessons or to develop their online teaching skillset. The ability to teach using online resources depends upon on several things including the quality of the internet connection and the availability of reliable devices to access learning materials. Teachers and students without access to these basic elements cannot teach or learn effectively online.

### Terminology

Some of the terms used in this article may have several common descriptions and definitions. For the purposes of this article, broadband connectivity is defined as the speed of data transfer that is available when using the internet. The Federal Communications Commission (FCC) estimates that only 52% of rural residents had 250/25 megabits per second, a reasonable broadband speed for operating four devices (i.e., phones, computers, laptops, digital televisions, etc.) in a household (FCC, 2020). Broadband connectivity can be affected by many factors including internet availability and reliability (FCC, 2020).

There are also a number of terms that are encompassed by the term teaching and learning technologies. These include web-based classroom technology, remote learning, mobile learning environments, digital learning, educational technology, e-learning, instructional technology, online learning, and e-learning technologies. For the purpose of this study, the operational definition used was developed by the Association for Educational Communications and Technology (AECT), which defined educational technology as "the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources" (Januszewski & Molenda, 2013, p. 1). The use of teaching and learning technologies provides opportunities for teachers to create a more student-centered learning environment with less emphasis on lectures and other teacher-centered approaches (Kormos & Julio, 2020).

### Learning Management Systems

Essential online learning technologies include learning management systems (LMS). LMS are internet-based systems that facilitate teaching and learning through a format that provides access to and interaction with content and assessments (Şahin & Yurdugül, 2020). Generally, LMS are used by schools as a platform for delivering instruction. Yet, prior to the pandemic, LMS may have been underutilized. In a recent study, Kormos and Wisdom (2021) found that teachers in rural schools rarely used learning management systems (e.g., Canvas, Blackboard, Google Classroom) primarily due to lack of funding to purchase district-wide access rights.

Yet, even if rural school districts can afford LMS, reliable broadband connections, and computers, teachers must be trained in their use for effective online teaching. The COVID-19 pandemic highlighted the need for all teachers, including those in rural settings, to have professional development opportunities that support the most effective use of online instructional technologies (Caglayan et al., 2021). Teaching all students, including those with disabilities, through an LMS requires professional development opportunities to ensure equity in student instruction (Tremmel et al., 2020).

## Method

The current study examined the perceptions of school educational leaders in rural areas in six central U.S. states regarding technology-related issues related to teaching students before and during the pandemic. The study was initiated as a result of the COVID-19 pandemic and the resulting need for rural schools to depend more fully on their existing instructional technology.

For this study, rural educational leaders were defined as special education directors, district administrators (not special education directors), and principals. Research questions included (a) What do rural educational leaders perceive are the differences in access to internet teaching and learning technology for delivering instruction in rural districts *prior to* and *during* the COVID-19 pandemic? (b) How do rural educational leaders perceive how special education services are provided and monitored *during* the COVID-19 pandemic? and (c) How do rural educational leaders describe the feedback received from parents regarding online learning *during* the COVID-19 pandemic? Two researchers, a doctoral student and a university faculty member, conducted the survey and analyzed the data.

## Participants

Participants were recruited using an email list developed by the researchers. To develop the list, state departments of education were contacted for access to their educator email lists. Six states, including Colorado, Nebraska, North Dakota, Missouri, South Dakota, and Wyoming, agreed to provide email lists for districts in rural settings. Participants included principals (n=63), district-level administrators (n=63), and district-level special education directors (n=16). See Table 1 for characteristics of study participants.

## Data Collection

Research regarding instructional technologies in rural schools was limited during the beginning of the current pandemic. Since no prior COVID-specific research on this specific topic was available, the questionnaire for this study was developed based on the research questions. The survey instrument was divided into two main sections, one quantitative and one qualitative. As a result of the depth of data developed from the quantitative analysis to be presented in a separate article, this analysis examines only the participant responses from the open-ended questions. The researchers felt that the depth and richness of the qualitative responses from rural educational leaders would be best shared separately to allow for the voices of participants to be clearly represented and to permit more in-depth data reporting. Qualitative responses were derived from five open-ended questions (a) **Prior** to the COVID-19 pandemic, how would you describe your teaching and learning technology status overall? What could have been improved? (b) **During** to the COVID-19 pandemic, how would you describe your teaching and learning technology status overall? What could have been improved? (c) **During** the COVID-19 pandemic, how have you provided special education services? (d) How are you tracking or monitoring service minutes described in student Individual Education Programs (IEPs) **during** the COVID-19 pandemic? (e) What feedback have you received from parents regarding online learning **during** the COVID-19 pandemic?

**Table 1**  
*Participant Characteristics*

<b>Characteristic</b>	<b>n</b>	<b>%</b>
<b>Participant</b>		
<b>Role</b>		
Principal	63	44.4
District-level Administrator (not Special Education Director)	63	44.4
Special Education Director	16	11.2
<b>Years</b>		
1–5 years	39	27.7
6–10 years	20	14.2
11–15 years	35	24.8
16–20 years	29	20.6
More than 20 years	18	12.8
<b>District Size</b>		
Less than 500 students	57	40.4
501-750 students	15	10.6
751-999 students	9	6.4
More than 1,000 students	60	42.6
<b>Ruralicity – Miles from urban or suburban area</b>		
1–10 miles	28	19.9
11–20 miles	12	8.5
21–30 miles	23	16.3
31–40 miles	15	10.6
41–50 miles	19	13.5
More than 50 miles	44	31.2
<b>School Size</b>		
Less than 50 students	9	6.6
51–200 students	57	41.9
201–350 students	23	16.9
351–500 students	26	19.1
501–650 students	6	4.4
651–800 students	1	0.7
801–950 students	4	2.9
More than 950 students	10	7.4
<b>Free/Reduced Lunch</b>		
1–25 %	16	11.8
26–50 %	43	31.6
51–75 %	58	42.6
76–100 %	19	14

## Data Analysis

Qualitative responses to open-ended questions were analyzed using two qualitative data analysis techniques. First, a thematic analysis approach was used as proposed by Braun and Clarke (2006). The six-step approach include (1) become familiar with the data, (2) generate initial codes, (3) search for themes, (4) review themes, (5) define themes, and (6) write-up. This approach allowed for a nuanced data analysis through which data patterns were identified and



themes were generated actively without influencing each other's analysis or judgement. To become familiar with the data, a spreadsheet was created through a Qualtrics download of raw data. Each researcher read through the qualitative data section of the spreadsheet to gain preliminary impressions of patterns in the data. Next, specific phrases and repeated words were counted and highlighted to help make data patterns more visible. Step 2 involved transferring data to a new spreadsheet to begin developing codes. No pre-set codes were used. Rather, codes were developed and modified as the data were reviewed for relevancy and the relationship to the research questions. After codes were developed, Step 3 began with the researchers transferring data to a new spreadsheet under the broad headings *Prior* and *During*. These headings reflected the overall emphasis of the first research question. During Step 4, researchers examined the data under the *Prior* and *During* for more specific patterns.

After completing steps one through four independently, the researchers met to complete step five where independently identified potential themes were discussed and refined. Two themes were identified by both researchers, Learning Technology and Internet. A theme relating to pedagogy and professional development was further refined through conversation and negotiation into two themes: Teaching Teachers and Teaching Students. In addition, a specific theme of Learning Platform was added to more accurately describe responses to teaching and learning technology *during* the COVID-19 pandemic. Step six, writing up findings, was completed collaboratively.

Themes were developed and refined that reflected the emphasis of each research question. Researchers agreed that there were seven potential themes under the *Prior* heading and seven different themes under the *During* heading. Five of the themes overlapped between the *Prior* and *During* headings, while two themes under each heading were unique. We asked ourselves several questions to guide our thought process. These included (a) do the themes make sense, (b) does the data support the themes, (c) am I fitting too much into each theme, (d) are there any apparent subthemes, and (e) could there be other themes in the data (Maguire & Delahunt, 2017). The result of this heuristic process was that four themes were identified for the *Prior* survey question and five themes were identified relating to the *During* survey question.

Content analysis (Morgan, 1993) was completed concurrently with the thematic analysis. The frequency and the percentage of similar qualitative comments were calculated. The use of content analysis helped to drive the selection of themes. Higher comment frequencies helped to focus the grouping of qualitative comments into potential themes. Essentially, participant statements with higher recurring frequencies were compiled into potential themes. The content analysis was conducted independently by each researcher. Individual results were compared for consistency.

### **Peer Debriefing**

Explication through the process of peer debriefing was used to address trustworthiness of the study. An impartial peer debriefer was chosen to identify potential issues with data analysis and to minimize researcher bias. Lincoln and Guba (1985) explain, "the process of exposing oneself to a peer in a manner paralleling an analytic session and for the purpose of exploring aspects of the inquiry that might otherwise remain only implicit within the inquirer's mind" (p. 308). Our approach differed from that described by Lincoln and Guba (1985) in that we held the peer

debriefing after data analysis was completed. The peer debriefer for this study holds her PhD in Special Education and is a colleague with deep experience in qualitative research. The peer debriefer examined the data analysis procedures and themes developed through thematic and content analysis by the researchers. The peer debriefing process allowed us to test, challenge, and validate our findings.

Four spreadsheets were included in the peer debriefing. One spreadsheet included raw qualitative data. The second and third spreadsheets were the initial content analyses completed by the researcher and doctoral student. The fourth spreadsheet consisted of the final qualitative data groupings that were used by the researchers for identifying study themes. The peer debriefer examined the data for emerging themes, relationships in the data, and potential coding considerations (Spall, 1998). She provided several suggestions related to the content analysis that was used for developing themes derived from the qualitative feedback received from study participants. Her overall conclusions confirmed that the data analysis procedures and theme interpretations were appropriate for this study.

### Findings

A total of 4,649 email addresses received the questionnaire as the survey was distributed between August and October 2020. Two reminders were sent to non-respondents and a final email request was sent at the end of October 2020. Survey responses totaled 156 with for a response rate of 3.3% and completion rate of 62%. The researchers felt that the demands of the pandemic on school administrators may have prevented them from investing time into participating in survey studies, which resulted in a low survey response rate for the current study.

The data analysis in this study centered on discovering the perceptions, learning, and responses of individuals given the influence of the COVID-19 pandemic. Overall, we examined what educational leaders learned from this unprecedented experience.

As a result of the qualitative data analysis process, an overarching theme of *Equity* became the umbrella encompassing all other themes emerged. Within the scope of the current study, participants expressed an overall feeling of not being able to do enough to support all students equitably relative to teaching and learning online during the COVID-19 pandemic. This was especially apparent when faced with the internet issues present in rural school districts represented in this study. One rural educational leader captured this overarching sentiment, “A huge concern is lack of internet access for our students. I view this as a major equity issue. Many of our families do not have reliable internet access.”

Respondents indicated that very few school districts had enough computers and tablets to provide 1:1 devices for teachers and students when online learning became necessary. Educators shared their concerns about technology equity, with the following statements, “We could have improved the equity of access to tech in the classrooms” and “Needed updated technology/devices, needed more devices, and needed a lot of professional development.” Since districts had not been providing sufficient devices and useful software programs prior to the pandemic, the online learning created inequity in instruction and expectations of students’ performance” and “Too many programs and lack of standard expectations led to inequities in instruction.” Survey results indicated that the digital divide that exists in rural America has never



been felt more keenly than during the COVID-19 pandemic. Other themes revealed in the data further support this umbrella theme of (in)equity.

### Teaching and Learning Technology Status *Prior* to the COVID-19 Pandemic

Responses to the survey questions, *Prior to the COVID-19 pandemic, how would you describe your teaching and learning technology status overall? What could have been improved?* were coded into four different themes. The themes that emerged included *Learning Technology, Internet, Teaching Students, and Teaching Teachers*. Content analysis for frequency and percentage were calculated. Percentage is based on the number of responses for each theme compared to the total participants who provided comments on the survey (n=117). See Table 2.

**Table 2**

*Themes from Teaching and Learning Technology Status Comments - Prior to the COVID-19 Pandemic*

Theme	n	%	Representative Comments
Learning Technology	63	54	“Compared to many more affluent districts, we had less technology available for student use. We operated primarily with Chromebooks on carts...shared among electives...in some cases, the size of the class exceeded the number of computers on the cart.”
Internet	42	36	“...internet at home is very very poor in general and ridiculously poor for most.” “old laptops, several computer labs with old desktops, and our internet would go out frequently.”
Teaching Students	20	17	“Very poor...old curriculum not available online.”
Teaching Teachers	73	62	“Did not have consistent exposure to online learning platforms and communication platforms.”

The theme *Learning Technology* encompassed participant comments related to laptop computers and tablets, how many students had devices, and descriptions of support for those devices from technology experts within the school districts. The *Internet* theme was defined as statements centered around internet access that included descriptions of bandwidth reliability issues experienced by both students and teachers. The theme described as *Teaching Students* was framed by statements describing how students were being taught and how they were accessing their learning experiences in person or remotely. The *Teaching Teachers* theme emerged from rural educational leaders' descriptions of issues related to supporting teachers in

the world of online teaching and learning. Comments about competency in devices, technology, access, and online/remote pedagogy also helped form the *Teaching Teachers* theme.

### **Learning Technology**

Study participants' accounts of issues related to learning technology access prior to the COVID-19 pandemic included descriptions that ranged from having 1:1 devices for students and teachers to a single computer lab or a cart of laptops/tablets shared among the whole school. Educational leaders shared that devices provided 1:1 occurred most often in secondary grades while K-6 grades had only occasional device access. One participant described a favorable status, "Prior to COVID-19, all high school students were assigned a computer. We had chrome [sic] books available in carts for each grade level K-8." While other participants shared statements such as, "Had just one computer for every two students," and "We had a few computer carts with old laptops, several computer labs with old desktops, and our internet would go out frequently," and "In the high school, five or so teachers are sharing a single lab/cart."

Device access was only one of the issues related to learning technologies. Some school districts used little or no technology or used it to supplement their classroom teaching. When technology was available, it was often underutilized as captured in this respondent statement, "It is available but not many teachers were using it." Another educator shared, "I could and did use it, but in my sped classes, face to face [sic] was much more effective and online was just to supplement learning." Even when technology was available, it was underutilized: "Technology availability was good. Effective use of technology for learning was fair to poor." It appears that the use of technology in the classroom was often based on each teacher's choice for whether to integrate technology into their teaching. "Tech access mostly depended upon individual teacher interest. If a teacher wasn't interested, the kids in that room were not benefiting from tech."

Ruralness also played a role in the use of teaching and learning technologies, as summarized clearly by one respondent, "We were behind, but we are a small, rural community & it wasn't emphasized as much because our world still involves face-to-face contact 'accounts' as the local stores, writing checks, etc.)."

### **Internet**

This theme describes respondent feedback related to internet access and broadband reliability issues prior to the pandemic. Overall, participant comments indicated that, prior to the COVID-19 pandemic, communities and their schools struggled with internet access. Descriptions of school situations where there was either no connection or the connection was unstable were frequent in the qualitative data. The need for increased bandwidth was stated by a number of respondents, "We always have problems with internet speed and reliability" and "We are at the mercy of the internet company" were representative statements.

Yet, not all access to the internet was limited: "We have a phone company in town that has an internet component, so our school has strong consistent internet both wired and wireless." However, internet access was described as an issue for families. Their experiences are well summarized by one participant as, "Multiple children and adults in the family needing access to internet and computers made it difficult for all to work at the same time. Often there was a loss of bandwidth with too many devices operating." The limited availability of reliable broadband internet

clearly created issues for families and contributed to the lack of equity in learning experienced in rural areas during the pandemic.

### Teaching Students

The teaching and learning technology status of teaching students prior to the COVID-19 pandemic included participant descriptions of occasional blended learning, flipped classrooms, and the use of computer learning as replacement activities. One respondent stated, “Teaching with technology was across the spectrum. Some worked exclusively through Google Classroom, some used no technology at all.” Another shared, “It was minimal at best. Some of our teachers would do the flip(ped) classroom.”

Many schools had not yet made the move to using technology for daily instruction prior to the pandemic. “Most in-district classes were traditional with textbooks [sic], lecture, and hands-on activities though many classes were available to students through on-line and ITV modes of delivery.” ITV (Interactive TV) describes synchronous LMS where real-time instruction is provided to students in different viewing locations.

### Teaching Teachers

Even without the influence of the pandemic forcing brick-and-mortar school closures, teaching and learning technology requires training through ongoing professional development to insure its effectiveness. Yet, survey respondents indicated that the status of training teachers for technology use in classrooms *prior* to the COVID-19 pandemic was “sporadic and inconsistent.” Participants suggested solutions of “additional staff development to improve our teachers’ knowledge of best practices of technology use” and “Specific training for online learning has only included grades 6 to 12 at the moment.” One educator summed up the issue thusly, “I would say for a rural district, we were slightly above average. The main challenge is professional development of technology use with staff.”

Often, the decision for which classroom technologies were used was solely dependent upon teacher preferences. Survey respondents confirmed that “use of virtual learning, such as Google Classroom, was up to individual teachers” or “Tech access mostly depended upon individual teacher interest. If the teacher wasn’t interested, the kids in that room were not benefitting from tech.” Survey results also indicated that “use of online teaching tools needed some improvement.” Teachers needed more specific instruction in particular programs and methods for teaching and engaging students in learning through the online environment. In addition, “Teachers need professional development on how to implement technology, but first, they need the devices and bandwidth.” Another participant stated, “They (teachers) still need further training in how to implement technology in an effective manner.” Respondents also indicated the need for teachers to learn how to “better engage students through technology.”

### Teaching and Learning Technology Status *During* the COVID-19 Pandemic

Responses to the questions, *During the COVID-19 pandemic, how would you describe your teaching and learning technology status overall? What can be improved?* were coded into the same four themes, *Learning Technology, Internet, Teaching Students, Teaching Teachers*. A fifth theme, *Learning Platforms*, was indicated through data analysis. A discussion of *Learning*

*Platforms* is included. Content analysis frequency and percentages are shown. Percentages are based on a total of 116 responses for this question. See Table 3.

**Table 3**

*Themes from Teaching and Learning Technology Status Comments – During the COVID-19 Pandemic*

<b>Theme</b>	<b>n</b>	<b>%</b>	<b>Representative Comments</b>
Learning Technology	37	32	“We did not have enough devices to be fully remote. We also [sic] did not have video conferencing available.”
Internet	36	31	“The availability of internet service for families was less than adequate.”  “The district is having to loan out WIFI hot spots in order for the student to access the instruction.”
Teaching Students	21	18	“Teachers were using multiple platforms to communicate with students, we improved this by adopting Microsoft Teams and the single platform.”
Teaching Teachers	56	48	“Teachers did not have experience and/or training in delivering remote services.”  “During COVID-19 teachers received more training on how to navigate platforms like ZOOM, Seesaw, Google Classroom, etc.”
Learning Platforms	23	20	“We were using too many various platforms and programs. There was little consistency among teachers and families were asked to participate in numerous types of technology programs.”

Overall comments for this open-ended survey question described how school districts were able to improve teaching and learning technology status during the pandemic. Districts supported teachers and quickly adjusted resources to get students and teachers 1:1 devices. One participant stated, “We grew leaps and bounds in our ability to use a variety of different platforms.” A “steep learning curve” in the change is described by many as the change to distance learning

occurred quickly and unexpectedly: “It has certainly improved but the curve of understanding is quite steep for staff” as well as “Teachers had a steep learning curve on how to suddenly deliver full-distance education.” During the pandemic, survey participants described a persistent need for an adequate number of devices: “We need more computers and better access”; improved internet access: “The availability of internet services for families was less than adequate”; and training for teachers and students: “Teachers need training on how to create engaging learning opportunities for students.” During the pandemic, previously existing inequities not only remained but also accelerated. Thus, teachers became acutely aware of the need to comprehensively support students. One participant voiced this representative comment, “It [the pandemic] revealed the inequities among students as well as staff. Some of our staff members didn’t know how to conduct teaching online. We discovered we needed to offer professional development at so many different levels to get our teachers to a higher level of tech fluency.”

### **Learning Technology**

Rural educational leaders expressed concerns regarding learning technology as they reflected on their district or school situation during the pandemic. Many responses echoed the learning technology status prior to the pandemic. Those who struggled prior to the onset of the pandemic continued to struggle as they needed “newer machines” and “more machines.” Students were “still having to share computers” as “we did not have enough devices to be fully remote . . . we also did not have video conferencing available.” One respondent shared, “it was dismal . . . a district wide plan in place for technology versus letting it come from each building would have improved our response.” The transition to online learning proved too fast for many school districts given the lack of internet access and low number of devices available to students and teachers.

Those educational leaders who described more effective use of teaching and learning technology during the pandemic shared, “We were not 1:1 before the pandemic but we are now.” Another stated, “we have been fortunate and have good technology within our rural, 1-school district.”

Prior to the pandemic, some schools were already positioned to support online learning. One educational leader said, “Prior to the pandemic, teachers were using multiple platforms to communicate with students, we improved this by adopting Microsoft Teams and the single platform.” Twelve participants commented on the ability and commitment of teaching staff to pivot to online learning in a short time. These teachers were a key factor in student success during the pandemic. One educational leader’s comment encompasses this phenomenon, “While we weren’t prepared, my staff got onboard quickly. They created engaging lessons and made sure lessons were recorded so students who had to share computers could get materials when needed.” Despite these positive reports, participants said they still needed more: “Digital lesson delivery and submission skills improved immensely. Staff are getting much better. Still have room to improve, for sure!”

### **Internet**

Participants also reported internet access during the pandemic as unsatisfactory: “The status was nothing . . . we sent paper and pencil items home to students.” Others shared, “our internet would go out frequently” and “a great number of students do not have internet access

that is adequate for online learning.” Connectivity issues for students were addressed through some of the following solutions: “The district is loaning out WIFI hotspots” and “local phone company provided internet service for the remainder of the school year to the few families that did not have service.” However, these solutions were not completely reliable, nor did they provide equitable access for all students in the district. As these responses show, “Families without . . . internet are at a disadvantage” as well as “Wireless carriers do not provide solid signals consistently and when they do, they limit usage to small amounts that prevent online learning.” Equal access to internet service remained poor during the pandemic.

### **Teaching Students**

Teaching students during the COVID-19 pandemic was described as difficult at best. Several educators reported difficulties providing consistent instruction: “Too many programs and lack of standard expectations led to inequities in instruction. Each teacher was using something different and kids have to figure out how to use varying platforms.” Others were somehow nimble enough to respond as quickly as needed. One district shared, “We are prepared to go fully virtual if we need to (again). . . . We have adopted Canvas online learning platform.” The use of a common learning platform/learning management system (LMS) was determined to be the most effective approach for teaching students who were not able to attend brick-and-mortar schools.

The move to online learning and the speed with which it occurred was disruptive to both teachers and students. Most concerning was how to hold students accountable for their learning. When assignments were required to be submitted, some students were instructed to take pictures of their work rather than submitting a document to an online link. In an attempt to maintain an equitable learning environment for students with and without disabilities, teachers in some districts chose not to grade assignments during the initial phases of the transition. The sense was that those students with disabilities would not be able to achieve at pre-pandemic levels and districts did not want grades and advancement to suffer as a result. Responses noted, “We were not using technology to engage students and to hold them accountable for learning” as well as “Accountability was not written into the initial plans and students/families took advantage of it.” In another strategy, some districts decided that any work students completed would only improve grades and a lack of work would not lower grades. One district reported, “students knew that their grades could only be helped and not hurt after shutdown. Most students stopped the educational process at this point.”

In addition to the lack of accountability, student engagement online was reported as an overall challenge. Rural educational leaders clearly expressed that student engagement in online learning was dismal. Even when the internet was working correctly in schools and at home, student engagement declined. One response acknowledged, “Engagement is a huge component that was lacking last spring. It was very difficult to keep the classes attention online.” Without students engaging in the lessons, showing up to live online class meetings, and completing work independently, learning slowed to nearly a standstill. Students did not have the experience and instruction necessary to use the classroom time and programs for learning effectively online.

### **Teaching Teachers**

Teaching and learning technology status during the COVID-19 pandemic tells a story of committed and persistent educator: “While we weren’t prepared, my staff got onboard quickly”



and “When we were at distance-education, it was a steep learning curve for all. We taught teachers how to connect over video chat and most continued to teach with textbooks [sic] sent home and classes held over video. When not teaching students virtually, teachers were involved in online professional development to improve their teaching skills in the online environment.” Daily problem solving included “how to handle technical issues from a distance” and instruction on how to record each lesson or class meeting to provide additional supports for those students needing more repetition and support. The training to improve teacher competency in the technology and programs needs to continue “to create engaging learning opportunities for students.” The most successful report describes a collaborative approach: “We scaled up quickly and adapted very well. We put our teachers and support staff into expanded learning communities we called support teams. The tech experts in those groups helped the rest and everyone’s expertise increased.”

### **Learning Platforms**

Learning platforms include online tools used to instruct, grade, and engage with students. Learning platforms used by the participants in this study included Google Meet, podcasts, video, live streaming, Zoom, Seesaw, and Google Classroom. Learning platforms also include learning management systems such as Canvas and Blackboard. Prior to the pandemic, technology use was based on teacher interest and competence rather than a mandated or necessary skill. This meant that “Teachers had a hard time learning to utilize Google Meet,” and, “During COVID-19 teachers received more training on how to navigate platforms.” During the shutdown, “The overall use of technology increased a lot.”

The transition to online learning was unexpected and immediate. Therefore, software or systems used for instruction and grading *prior* to the pandemic were not always useful *during* the pandemic. Most often, different teachers or school grade levels were using different platforms. These differences created confusion for students. One educator reported, “We were using too many various platforms and programs. There was little consistency among teachers and families were asked to participate in numerous types of technology programs. We were not using technology to engage students and to hold them accountable for learning.”

Finally, the pandemic created some permanent changes in the use of learning platforms in rural school districts. One educator wrote, “The district has now switched to Canvas as the delivery platform to help provide continuity in case of another quarantine.” Another participant stated, “We moved our curriculum to online, so students are working on the same online curriculum regardless of where their physical presence is.”

### **Provision of Special Education Services**

Participants were asked, *During the COVID-19 pandemic, how have you provided special education services?* Responses to this question were initially coded by the researchers between *Did Not Provide/Incomplete Provision* and *Provided*. Those who *Provided* special education services fell into three types of provision: *Remote/Online*, *In Person/Face to Face*, or *Compensatory*. *Compensatory* refers to the provision of special education services outside of the regular school hours and as a remedy to not providing all the services or service amounts listed in a child’s Individualized Education Program (IEP) as required by federal law (IDEA, 2004). Equity for all students, including those with disabilities, was a concern during the shutdown and

one educational leader addressed this point, “During the first months of the shutdown, students (on IEP’s) had optional, supplementary lessons provided online. A huge part of why it wasn’t required was because it would be inequitable for our special education and ELL students.”

### ***Did Not Provide/Incomplete Provision***

Two school district leaders reported, “We did not provide support for students with an IEP” and “We have been unable to provide these in any meaningful way since the inception of the pandemic.” Two other school districts stated, “There was minimal one-on-one services provided by staff as the pandemic continued through the school year” and “not full minutes coverage.” One of these district leaders mentioned working with their state department of education to “address these concerns.” Participants did not report specific reasons for these decisions. However, one leader described underutilized supports for students with disabilities as “planning and collaboration for special education modifications and accommodations.”

### ***Provided***

Most students with disabilities were served through remote learning using various online platforms like Google Meet and Zoom. Special Education teachers and rural Educational Service Agencies (ESA) scheduled regular online meetings with students with disabilities and their families to provide services and interventions. Materials outside of the online learning platforms were given as “take-home materials,” or “paper pencil work picked up at school, done at home, and then dropped off at school.” Another reported, “We also put together notebooks for younger students that had multiple activities for the students to practice skills at home.”

In some cases, student IEPs were modified in the face of the pandemic. Educators were “contacting parents individually and setting up how to provide services based on the individual case.” In addition, paraprofessionals were assigned to “virtually attend classes that our SPED students were in. Those paras then did virtual hangouts . . . to assist the students they were assigned to.”

Those districts that provided special education services in person/face to face did so by completing home visits or setting up one-on-one or small group sessions between students and their service providers. One rural district leader said, “We had a few students (about 3%) that came into the school to receive face to face [sic] services.” One educator stated, “Students can come in person to receive accommodations. Or they can be served through online learning.” Two rural districts were supporting students on IEP’s “as normal. In person” while another instructed “as normal but in limited numbers at a time.”

### ***Parent Feedback***

Educational leaders were asked, *What feedback have you received from parents regarding online learning during the COVID-19 pandemic?* Out of 111 question responses, 51 were *Satisfied* and 76 were *Dissatisfied*. Of these responses, 23 included comments relaying both satisfaction and dissatisfaction. Those responses coded as dissatisfied included details on the experiences of *Parents Supporting Students* and *Technologies* in the home. Sixteen responses indicated parents wanted a return to schools as soon as possible. These responses were coded as *Return to Brick-and-Mortar Schooling*.

One comment was representative of most parents' sentiments: "the amount of mental stress on both parents and students was most telling." During the 2020–2021 school year, most communities were in "shutdown" where workers and students remained at home. Parents worked online from home, and children learned online from home. There was no escape from the pressures of any aspect of life—work, parenting, schooling, and more all occurred in one place.

### ***Satisfied***

Parents who communicated satisfaction with learning during the pandemic (51) expressed gratitude and support for their educators and the sudden online learning needs as expressed here, "Most of our parents have been supportive of the effort performed by our teachers." Another response stated, "Parents (for the most part) thought teachers went over and above to meet the needs of students." Regular consistent communication with families appeared to be vital to parent satisfaction with online learning. As one response showed, "Consistency was key! Teachers and kids were online daily at the same times. Parents received emails with information for the week, kids received daily communications through Google Classroom." As a result, "Parents have appreciated the efforts we have made. They have been supportive partners."

### ***Dissatisfied***

The primary concern of *Dissatisfied* parents during the COVID-19 pandemic was their ability to support their children's learning at home. A substantial number of responses (76) showed that parents were dissatisfied with online learning for their children. One response describes this struggle: "They hated it. Kids were off task and parents were trying to work while trying to also help their children." The challenge for parents was "maintaining jobs and teaching/watching their children" as "it was hard for them to juggle the at-home learning with their work schedules." In addition, parents "feel completely unprepared to assist their children in online learning." Responses indicate parents had difficulty "getting their children to access and engage in the learning" and "take the learning seriously." One participant shared, "as time progressed it became harder and harder to keep students engaged." In one school district, parents had a hard time getting students to consistently make progress on their work. Eventually, "students wore the parents down and parents got tired of fighting with the student, allowing the student to disengage."

A few parents "weren't cognitively able to support their students." The level of work their children were expected to complete was beyond their "skill-levels." Others said the work was "too easy and there wasn't enough work" as their children could "finish it very quickly." Another response sums up a common sentiment that "Many parents felt that the older students were just given busy work and did not learn the standards. The parents of younger students were upset that they received too much work and couldn't get it all completed." Two responses specifically commented on a need for more rigor in the content and learning as stated, "They (parents) are unsure that we will be able to deliver a more rigorous program," and learning "needs to be more rigorous." Finally, one participant reported, "We did have many questions in regard to how we were going to help students with IEP's." This same participant discussed working daily to improve services and instruction for those students on IEP's.

### ***Technologies***

Parent feedback responses coded as *Technologies* refer to parent experiences with the technology available for their children's online learning. Responses also refer to the equity umbrella theme. Thirteen responses included details about technology use and difficulties for parents, families, and students online learning. Ten of the thirteen responses refer to internet access as the primary challenge. Most telling were the comments: "Families without internet or a device were at a disadvantage" and "Some families never receive internet access—too rural." Another noted, "internet access in my school is a huge challenge. It is terrible." Other participants stated, "We had multiple families that lacked internet and electronic devices. Also, many homes only had one electronic device, but multiple people needed to use it each day," and, "In our rural area, internet connectivity is limited—when there's more individuals per household online, the service is slower." Some families chose to use phones to access the material; however, "programs were more difficult to operate on phones than computers." For those districts that provided devices (laptops, Chromebooks, tablets) to families as evidenced by "Families have also been leery of bringing home expensive computers that they do not trust their students to care for. . . . Our district is implementing a technology fee for broken equipment, but with 70% free/reduced, most families will not pay the full fee."

In addition, not all parents felt confident or competent with the technology used for online learning. As responses show, "Parents did not feel comfortable being the teacher" and "parents are not able to facilitate learning because of skills or work requirements." Some participants felt parents needed more support in the online learning environment, identifying that "Parents/guardians need more training regarding technology and how to access the various devices/platforms, etc."

### ***Return to Brick-and-Mortar Schooling***

Of the 16 responses describing parents' desire to move back to brick-and-mortar schooling as soon as possible, "most were ok with it on a temporary basis." Responses showed, "They (parents) appreciate our district's response however they want their kids back in school because they have to work." One response addressed the parents' lack of confidence in supporting their children's learning: "They have stated they are not teachers and have not been exposed to the material that is expected to be taught to their children."

### **Limitations and Future Research**

One limitation of this study was its geographic focus on the central and western United States. Additionally, the sample size was small, and it was based on the willingness of state departments of education to provide access to their email lists. The state of mind of rural educational leaders must also be considered as a potential limitation. At the beginning of the 2020–2021 school year, educational leaders were likely overwhelmed with issues related to keeping districts and schools running during the COVID-19 pandemic. Rural educational leaders' time was at a premium and completing a survey was likely low on their priority list, so responses might be more limited than under more normal conditions.

Opportunities for future research include multiple areas of investigation. Although schools are no longer operating in a strictly virtual mode, future studies can evaluate rural educational

leaders' perceptions of how the COVID-19 pandemic has changed the teaching and learning environments in their schools. Further investigation is necessary to discover any long-term effects of the COVID-19 pandemic on the learning of students with and without disabilities. We also need a greater understanding of how students with disabilities can be better served with online technologies, especially when considering specific disability categories. Further research will provide a better understanding of potential regression in student learning, especially in rural areas where schools and parents struggled to stay connected. It will be important to understand which changes to virtual instruction, temporary or permanent, have been most helpful or detrimental for student learning. Having a more complete understanding of how online teaching and learning technologies can best be applied to brick-and-mortar schools is also essential. Future studies must also identify how to provide the most effective professional development for teachers who may struggle with adopting teaching and learning technologies into their own instructional repertoires.

The COVID-19 pandemic also required parents to become more immersed in their children's learning. To better support parents in the future, we need to investigate the perceptions of parents regarding their insights on how to better engage their children's learning at home.

It is also essential that we continue to study the availability of broadband connectivity for schools and families in rural settings. Understanding more clearly the implications of poor broadband access on student advancement in rural areas will support efforts to change state and national policies and influence decision makers as they consider how to best improve internet access for all Americans.

### **Conclusions and Implications**

The COVID-19 pandemic tested the mettle of students, parents, teachers, and educational leaders for their ability to quickly adapt to abruptly changing conditions. In a few short months in 2020, millions of students transitioned to learning online rather than in their traditional brick-and-mortar schools (National Center for Education Statistics, 2022). The current study provides a unique snapshot of a critical juncture during the fall of 2020 as the impacts of the pandemic on rural schools were being fully felt. This study investigated rural educational leaders' perceptions of the effects of the pandemic on teaching and learning prior and during the crisis. The study also provides insights on issues related to providing special education services in virtual settings and parent reactions to how the pandemic affected their children's learning.

The pandemic focused brightly the light of inequity for teaching and learning in rural settings. The digital divide affecting the connectivity of rural areas has been a known issue for decades (e.g., Hindman, 2000; Rooksby et al., 2002), yet it persists. Bandwidth reliability issues in the fall of 2020 affected both schools and homes as children tried to continue their educations (Kormos & Wisdom, 2021). Some rural schools struggled to maintain connectivity to their students while families in outlying areas tried to remain connected to schools (Jacques, et al., 2021). Insufficient broadband connectivity caused some students to be left behind (Pitluck & Jacques, 2021). Yet, not all educational leaders in the current study reported difficulties with teaching and learning technologies, though the data revealed that these instances were not as common.

Educational leaders provided insights into some of the issues related to the quick pivot to online learning. Prior to the pandemic, some leaders described technologies that were



underutilized and that the limited use was often due to teacher comfort or knowledge of the available technologies. Leaders also expressed that teachers needed additional teacher training in the use of internet technologies. Issues related to the forced use of relatively unfamiliar technologies and the lack of essential technological learning tools became more evident as COVID-19 dictated how students accessed curricula (Pitluck & Jacques, 2021). Additionally, educational leaders emphasized the fact that some districts had not been investing in online technologies including devices and software due to lack of funding. Providing teacher training and ongoing professional development will help to ensure the effectiveness of teaching and learning technologies as districts seek to improve their investment in teaching and learning technologies (Caglayan, et al., 2021).

Schools and districts struggled to support students with disabilities during fall of the 2020–2021 school year (Jameson et al., 2020). According to the perceptions of educational leaders who participated in this study, students with identified disabilities may not have been receiving special education services according to their IEPs. It was reported that some students with disabilities received fewer or no special education services. In some cases, services were provided face-to-face even though schools were shut down. One educational leader even stated that schools in their district provided parents with the option to bring their child to the school or to just receive services online. Though which online special education services were available were not described by respondents in the current study. To overcome the IDEA (2004) service provision requirements, some student IEPs were changed. This insight begs the question of what special education services were reduced or eliminated. Additional research would be helpful for understanding how students actually did receive virtual services during the pandemic.

According to the educational leaders who participated in this study, parents communicated frustration as they attempted to keep their children engaged in the learning process. Parents were concerned with not only keeping up with the responsibilities of their jobs but also with the education of their children at home. Furthermore, home internet access was often described as compromised by multiple users each trying to use limited or nearly nonexistent bandwidth. Parent sentiments also echoed that face-to-face instruction was preferable to virtual teaching and learning. Educational leaders described the grateful feelings of many parents while also acknowledging that many parents were disturbed by the lack of consistent education that their children were receiving.

Yet, the umbrella theme of this study was that of equity. Rural educational leaders expressed that not enough was done to support all students equitably during the pandemic. They lamented that remote learning opportunities have been identified for years as important equity issues. In 2019, the Federal Communications Commission (FCC) attempted to evaluate the broadband deployment for communities and schools in the U.S. (FCC, 2019). One of the most telling statements of the report was “Although we agree . . . that our fixed speed benchmark must continue to keep pace with consumer usage, demand, and technology, the definition of ‘advanced’ telecommunications capability in section 706 nowhere suggests that ‘advanced’ necessarily means the highest quality service possible.” Clearly, an equity gap for broadband service in rural schools will remain for the foreseeable future. Equity issues in the current study included access to broadband internet, student devices, and teachers fully trained in online instruction.



Limited broadband in rural areas is only part of the equity issue. Rural schools struggle with budgets for many necessities (Tieken & Montgomery, 2021), including teaching and learning technologies (Kormos & Wisdom, 2021). Moreover, family poverty is a real and constant issue in rural areas (Dobis et al., 2021). Families should not have to decide between providing basic needs for their children and paying for internet access so that their children can continue learning. When students do have access to broadband internet, there are some technology options that provide important opportunities. Web-based document software (e.g., Google Docs, Microsoft Office Online, etc.) may provide more equitable access during online learning. Some web-based solutions may also provide students with valuable opportunities for online collaboration. Learning management systems may also provide more consistency when online learning is provided.

Twenty-first century teaching and learning requires greater investment in technologies for all students to access the general education curriculum even beyond the limits posed by the current pandemic. It is essential that rural schools are provided equal opportunities to meet the learning needs of students with and without disabilities through the application of appropriate teaching and learning technologies.

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