IES Institute of Education Sciences

APPENDIXES
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Regional Educational Laboratory Central
At Marzano Research

Variations in District Strategies for Remote Learning During the COVID-19 Pandemic

See https://go.usa.gov/xMaPX for the full report.

Appendix A. Brief literature review

The COVID-19 pandemic led schools across the country to abruptly shift to remote learning in spring 2020. School districts in Kansas, Nebraska, North Dakota, and Wyoming proposed a range of strategies for remote learning, which influenced students' learning experiences. When analyzing remote learning plans submitted by those districts, the study team organized the strategies into four categories: infrastructure, instruction, student supports, and parent supports. The ability of districts to implement strategies in these categories was likely influenced by district characteristics, specifically Internet connectivity level, poverty level, and locale.

This appendix provides a brief review of the literature on remote learning. The review focuses on previous studies that examined how different approaches to infrastructure, instruction, student supports, and parent supports related to student outcomes. Although many studies included here were conducted in higher education settings, they can still shed light on the experiences of students in K–12 settings.

Infrastructure

Critical infrastructure for remote learning includes Internet access, Internet-enabled devices, and technology support. The definition of infrastructure used in this study includes other non-Internet media, such as broadcast television, newspaper, and radio. However, there is limited literature about the role of these media in remote learning. In most cases, students need Internet-enabled devices to access course materials such as videos, instructional materials, and assignments, as well as to interact with teachers and classmates. Thus, the level of Internet connectivity in a district plays an important part in students' access to learning. For example, students need adequate download and upload speeds to engage in videoconferencing (Chandra et al., 2020). Although some forms of Internet access, such as free Wi-Fi zones, allow for some degree of engagement, they do not engage users to the extent that residential broadband Internet does.

Additionally, the type of device may matter in remote learning. Students in underserved communities likely have access to a single device, typically a smartphone, which may be shared with others in a household (Moore et al., 2018). One study conducted in higher education found that participants rated computers high in usability but rated smartphones significantly lower (Wilson, 2017). The study suggested that viewing content intended for computer screens on a smartphone may be a challenge for students and that small keyboards on smartphones may inhibit complete responses to open-ended questions. In other words, some types of devices, such as smartphones, do not allow students to engage with course materials to the extent a computer does. Without adequate access to the Internet and Internet-enabled devices, students may learn fewer digital skills, have lower homework completion rates and grade point averages, and be less motivated to pursue higher education or technical careers (Hampton et al., 2020).

In addition to having access to the Internet and Internet-enabled devices, students and families may benefit from technology support that helps them understand how to use the Internet, their devices, and the platforms used for remote learning. One study of higher education found that technical issues may affect student performance and that having technology support contributed to student satisfaction. This suggests that students need access to people who can answer their questions and resolve their technical issues while they learn remotely (Johnston et al., 2005).

Instruction

A key decision in delivering remote learning is whether instruction will be synchronous, asynchronous, or some combination of the two. Research has generally shown that synchronous learning can be beneficial in providing real-time engagement, attention, and support between students and teachers (Chandra et al., 2020). One study examined student interactions and cooperative learning in synchronous and asynchronous online courses in higher education, finding that synchronous learning was positively related to students' knowledge, sense of belonging, and positive affect, whereas asynchronous learning was challenging when students had to work together to complete learning tasks (Peterson et al., 2018). Another study of higher education has suggested that synchronous online learning assessments can intrinsically motivate students and may be an effective way to improve student performance (Amasha et al., 2018). However, synchronous learning may not be an option for all students because it requires adequate Internet connectivity and access to Internet-enabled devices at a certain time (Chandra et al., 2020). Benefits of asynchronous learning include more student access, flexibility, convenience, and personalization. It also allows students to learn at their own pace and reflect on their work (The Learning Accelerator, 2020).

Regardless of how remote learning is structured, teachers benefit from professional development opportunities to support them in providing remote instruction. Because remote instruction is inherently different from in-person instruction, teachers likely need to learn how to integrate digital tools and content into their instruction (Chandra et al., 2020). One study investigated the effectiveness of online professional development and found that most teachers improved their implementation of new strategies when they received specific training on when and how to implement the strategies (Ascetta, 2017). The study also found that student outcomes improved after teachers participated in professional development, suggesting that strengthening teachers' knowledge and instructional strategies may have a positive effect on students. Another study found that student outcomes likely improve when professional development focuses on an element of classroom practice, is of substantial duration, and involves teachers in the same school, grade level, or subject area (Garet et al., 2001).

Student supports

Because students' interactions with teachers, peers, and academic content during remote learning are different from their interactions during in-person learning, students need different forms of support for remote learning. One common challenge for students during remote learning is feeling more separated from teachers and other class members (Holbeck & Hartman, 2018). Teachers can use digital tools and strategies, such as text messaging, gamification, and video discussion platforms, to help reduce students' feelings of separation as well as increase cognitive, social, and teaching presence (Holbeck & Hartman, 2018). Virtual office hours are also an opportunity for students to interact with teachers and build supportive relationships in remote learning environments (Holland et al., 2020). In a study examining virtual office hours in higher education, 70 percent of students had positive perceptions of virtual office hours, but only 12 percent actually attended virtual office hours (Edwards & Helvie-Mason, 2010). Although this finding suggests that virtual office hours may benefit postsecondary students during remote learning, it remains unclear how many students would attend virtual office hours in K–12 settings.

In spring 2020, students were forced to leave their traditional in-person learning environments and learn at home. This sudden and drastic shift to remote learning, coupled with the reality of a global pandemic, has added to the particular importance of social-emotional learning (SEL) and mental health support for students. One study has suggested that SEL is important not only for nonacademic outcomes but also for academic performance, as students learn in collaboration with their peers through the support of teachers and parents (Zins et al., 2007). Another study has suggested that students, especially high school students, may have less motivation and more distractions in remote learning environments and therefore need additional SEL support (Holland et al., 2020). The methods for providing SEL in remote environments are likely different from those for in-person environments, and research has not yet examined those differences.

Parent supports

Parent supports are also an important component of remote learning, which usually takes place in the home and in which parents likely play an integral role. Parents need adequate resources to help their children learn remotely (Chandra et al., 2020). Those resources may include guidance on using digital platforms, online tutoring solutions, and health and safety tips and can be shared with parents in a variety of ways, such as school websites, emails, newsletters, and multilingual communications. Regular communication between teachers and parents may encourage parent involvement in their students' learning. One study examining school communication methods in virtual high schools and colleges has suggested that, to play a positive role in their children's remote learning, parents should understand the learning expectations for students, receive real-time communications from teachers, and engage in their students' learning (Belair, 2012). One way to engage parents in remote learning is communicating through text messaging. Research has found that sending text messages to parents is associated with fewer student absences, improved math outcomes, and higher reading levels (Doss et al., 2017; Miller et al., 2017).

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Appendix B. Coding protocol for document analysis of remote learning plans

The coding protocol items and response options that the study team used to analyze district remote learning plans are in table B1. The table is organized by remote learning strategy within each of the four broad categories described in appendix A.

Table B1. Coding protocol items and response options

Code #	Strategy	Item	Response options
1	***Infrastructure***		
1a	Internet access	How does the district's plan ensure student access to the Internet?	• Home based: The district takes direct action to ensure student access to the Internet at home. This includes actions such as providing mobile hotspots or arranging for free or low-cost Internet service but does not include providing lists of providers or surveying families. It also includes the use of existing Internet service in homes. • Community based: The Internet is accessed through community resources outside the home. The district provides or arranges student access to the Internet (for example, Internet buses, access to business or school Wi-Fi). • Neither: Not specified or no direct action. This includes when the district reports that all students have access to the Internet and do not need the district to provide access. • Both: The district takes direct action to provide home- and community-based Internet access.
1b	Student access to devices	How does the district's plan ensure student access to Internet-enabled devices (for example, computer, Chromebook, tablet)?	• Full: The district ensures that all students have access to Internet-enabled devices (for example, through lending programs or existing one-to-one initiatives). • Partial: The district provides or loans Internet-enabled devices to ensure that certain grade levels or student populations have access. • None: The district does not provide Internet-enabled devices to students or does not specify such provision in its plan.
1c	Other technology	Does the district's plan incorporate the use of non-Internet media to provide instruction (for example, broadcast television, newspaper, radio)?	• Yes • No
1d	Videoconferencing	Does the district's plan describe the use of videoconferencing to provide instruction or communicate with students and/or parents (for example, Zoom, Google Hangouts, Webex, Skype)?	• Yes • No
1e	Technology support	Does the district's plan describe technical support for students and/or parents?	• Yes • No

Code #	Strategy	Item	Response options
2	***Instruction***		
2a	Prekindergarten instruction	Does the district's plan describe instruction for prekindergarten students?	• Yes • No
2b	Online learning management system	Does the district's plan specify the use of an online repository of instructional materials to provide instruction (for example, Canvas, Schoology, Google Classroom, Seesaw; school and class websites; online collaborative tools such as Google for Education or Microsoft Office 365)?	• Yes • No
2c	Attendance	Does the district's plan specify a daily attendance policy (regardless of how it is determined)?	• Yes • No
2d	Synchronous/asynchronous instruction	Does the district's plan include synchronous or asynchronous instruction?	• Synchronous: The plan includes evidence of a regular schedule of online classes (synchronous class meetings). • Partial: Instruction differs by grade level or school, or students watch recorded instruction later. • Asynchronous: The plan includes evidence that students learn on their own time; no specified class schedule.
2e	New content	Does the district's plan require teachers to teach new content or standards?	• Yes: Instruction includes new content or standards. Instruction is modified to cover the same content or curriculum as before, the number of standards is reduced, or the content is streamlined. • No: Instruction focuses solely on enrichment or practice of previously learned content. • Unspecified: It is unclear if the curriculum is altered.
2f	Grading: A–F	Does the district's plan require the assignment of grades (A–F or equivalent, such as a standards scale)?	• Full: All students receive letter grades. • Partial: Grading differs by grade level or course (for example, non-core courses or specials), or students are given the choice of grading system. • No.
2g	Grading: Pass/fail	Does the district's plan require a pass/fail or met/not met (standards-based) grading system?	• Full: All students receive pass/fail or met/not met grades. • Partial: Grading differs by grade level or course (for example, non-core courses or specials), or students are given the choice of grading system. • No
2h	Instructional mode	How is instruction primarily provided in the district's plan?	• Online: Instruction is primarily provided online. Online resources are used to interact for instructional purposes. • Offline: Instruction is provided offline (for example, through printed packets delivered to or picked up by students, packets downloaded from websites, projects, other offline activities). • Both: A balance of online and offline instruction is provided.

Code #	Strategy	Item	Response options
2i	Graduation requirements	Does the district's plan specify changes to graduation requirements (for example, based on progress before school closures)?	• Yes • No
2j	Professional development	Does the district's plan provide professional development to teachers and/or other staff (individually or as a group) to support the transition to remote learning (for example, training on remote learning strategies or technology use)?	• Yes • No
2k	Modified responsibilities for nonteaching staff	Does the district's plan modify nonteaching staff responsibilities to support instruction?	• Yes: Responsibilities are modified for paraprofessionals only. • Yes: Responsibilities are modified for other nonteaching staff only. • No • Both
2l	Collaborative teacher planning time	Does the district's plan provide time for teachers to collaboratively plan and share strategies for remote learning?	• Yes • No
3	***Student supports***		
3a	Virtual office hours	Does the district's plan describe regularly scheduled virtual office hours provided by teachers or other instructional staff to assist students?	• Yes • No
3b	Social-emotional learning and mental health support	Does the district's plan require the provision of social-emotional learning or mental health support to students?	• Individual: The district provides individual meetings with counselors or specific individual interventions. • Group: The district provides social-emotional learning or mental health lessons to groups of students. • No • Both
3c	One-on-one meetings	Does the district's plan describe required (not optional) one-on-one meetings between students and teachers (for example, feedback, emotional support, instruction, check-ins)?	• Full: One-on-one meetings are required for all students. • Partial: Requirement differs by grade level, school, or student population. • No
4	***Parent supports***		
4a	Parent resources	Does the district's plan specify resources for parents (for example, websites to support instruction, information on supporting remote learning, health information on COVID-19, daily learning schedules)?	• Yes • No
4b	Parent communication systems	Does the district's plan specify strategies for communicating with parents?	• Yes • No

Source: Authors' construction.

Appendix C. Proposed remote learning strategies for districts in Kansas, Nebraska, North Dakota, and Wyoming

Percentages of proposed remote learning strategies for each state that participated in the Regional Educational Laboratory Central study, as well as for all participating states combined, are in tables C1–C4. The tables are organized by response option for each remote learning strategy described in appendix B.

Table C1. Percentages of districts proposing remote learning strategies related to infrastructure, by state

Strategy and response options	Percent of districts				
	Kansas	Nebraska	North Dakota	Wyoming	All states
Internet access					
Home based	34	17	57	21	33
Community based	28	4	7	4	14
Neither	20	77	16	60	40
Both	18	1	20	15	13
Student access to devices					
Full	75	32	88	60	63
Partial	15	32	9	8	19
None	10	35	3	31	18
Other technology					
Yes	5	2	5	6	4
No	95	98	95	94	95
Videoconferencing					
Yes	95	82	98	92	91
No	5	18	3	8	9
Technology support					
Yes	98	31	54	25	61
No	3	69	46	75	39

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming.

Table C2. Percentages of districts proposing remote learning strategies related to instruction, by state

Strategy and response options	Percent of districts				
	Kansas	Nebraska	North Dakota	Wyoming	All states
Prekindergarten instruction					
Yes	41	50	63	8	47
No	59	50	37	92	53
Online learning management system					
Yes	94	84	95	96	91
No	6	16	5	4	9
Attendance					
Yes	8	12	94	96	34
No	93	89	6	4	66
Synchronous/asynchronous instruction					
Synchronous	3	2	3	8	3
Partial	82	68	94	79	80
Asynchronous	16	30	4	13	17
New content					
Yes	16	46	73	81	43
No	3	10	3	0	5
Unspecified	81	44	25	19	52
Grading: A–F					

Strategy and response options	Percent of districts				
	Kansas	Nebraska	North Dakota	Wyoming	All states
Full	7	12	70	35	25
Partial	4	13	6	21	9
No	89	75	24	44	67
Grading: Pass/fail					
Full	1	5	4	8	4
Partial	3	8	6	23	6
No	96	87	90	69	90
Instructional mode					
Online	15	6	16	4	12
Offline	0	4	0	0	1
Both	85	90	84	96	87
Graduation requirements					
Yes	52	1	0	10	21
No	48	99	100	90	79
Professional development					
Yes	90	12	88	33	60
No	10	88	12	67	40
Modified responsibilities for nonteaching staff					
Yes: Paraprofessionals only	5	2	6	19	5
Yes: Other nonteaching staff only	6	9	9	10	8
No	87	86	74	27	80
Both	2	3	11	44	7
Collaborative teacher planning time					
Yes	48	31	68	63	52
No	52	69	32	38	48

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming.

Table C3. Percentages of districts proposing remote learning strategies related to student supports, by state

Strategy and response options	Percent of districts				
	Kansas	Nebraska	North Dakota	Wyoming	All states
Virtual office hours					
Yes	74	37	85	54	63
No	26	63	15	46	37
Social-emotional learning and mental health support					
Individual	51	18	30	56	36
Group	3	3	4	0	3
No	3	75	10	40	30
Both	44	4	56	4	31
One-on-one meetings					
Full	28	8	23	23	20
Partial	16	13	14	13	14
No	56	78	63	65	65

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming.

Table C4. Percentages of districts proposing remote learning strategies related to parent supports, by state

Strategy and response options	Percent of districts				
	Kansas	Nebraska	North Dakota	Wyoming	All states
Parent resources					
Yes	77	37	43	40	46
No	23	63	57	60	54
Parent communication systems					
Yes	98	54	80	90	79
No	2	46	20	10	21

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming.

Appendix D. Proposed remote learning strategies by district Internet connectivity

Percentages of proposed remote learning strategies for districts with varying levels of Internet connectivity are in tables D1–D4. (See box 1 in the main report for a description of district Internet connectivity levels.) The percentages represent all districts in the sample across the four states that participated in the Regional Educational Laboratory Central study. The tables are organized by response option for each remote learning strategy described in appendix B.

Table D1. Percentages of districts in all states proposing remote learning strategies related to infrastructure, by district Internet connectivity level

Strategy and response options	District Internet connectivity level			
	Very low	Low	Moderate	High
Internet access				
Home based	21	25	30	41
Community based	13	15	12	15
Neither	56	50	45	29
Both	11	10	12	15
Student access to devices				
Full	53	53	60	71
Partial	26	21	19	16
None	22	26	21	13
Other technology				
Yes	4	1	3	6
No	96	99	97	95
Videoconferencing				
Yes	87	85	91	95
No	14	15	9	5
Technology support				
Yes	47	62	62	66
No	53	38	38	35

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming and of data retrieved from the Federal Communications Commission Form 477 database (Center on Rural Innovation, n.d.).

Table D2. Percentages of districts in all states proposing remote learning strategies related to instruction, by district Internet connectivity level

Strategy and response options	District Internet connectivity level			
	Very low	Low	Moderate	High
Prekindergarten instruction				
Yes	39	44	48	49
No	61	56	52	51
Online learning management system				
Yes	84	93	93	92
No	16	7	7	8
Attendance				
Yes	20	23	29	46
No	80	77	72	54
Synchronous/asynchronous instruction				
Synchronous	1	3	2	4
Partial	72	74	80	85
Asynchronous	27	23	18	12
New content				
Yes	37	35	44	47
No	5	7	6	4
Unspecified	59	58	51	49

Strategy and response options	District Internet connectivity level			
	Very low	Low	Moderate	High
Grading: A–F				
Full	19	19	22	30
Partial	9	9	11	7
No	72	73	67	63
Grading: Pass/fail				
Full	4	4	4	3
Partial	9	5	6	6
No	87	91	90	90
Instructional mode				
Online	12	12	11	12
Offline	3	2	2	1
Both	86	86	88	88
Graduation requirements				
Yes	14	22	18	24
No	86	78	82	76
Professional development				
Yes	49	46	54	73
No	51	54	46	27
Modified responsibilities for nonteaching staff				
Yes: Paraprofessionals only	5	4	4	6
Yes: Other nonteaching staff only	10	10	5	8
No	75	78	86	79
Both	10	8	5	7
Collaborative teacher planning time				
Yes	35	38	48	56
No	66	62	52	44

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming and of data retrieved from the Federal Communications Commission Form 477 database (Center on Rural Innovation, n.d.).

Table D3. Percentages of districts in all states proposing remote learning strategies related to student supports, by district Internet connectivity level

Strategy and response options	District Internet connectivity level			
	Very low	Low	Moderate	High
Virtual office hours				
Yes	50	52	62	73
No	51	48	38	27
Social-emotional learning and mental health support				
Individual	29	34	31	42
Group	3	4	3	2
No	50	40	37	17
Both	19	22	30	38
One-on-one meetings				
Full	16	18	18	23
Partial	11	10	15	17
No	72	71	67	60

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming and of data retrieved from the Federal Communications Commission Form 477 database (Center on Rural Innovation, n.d.).

Table D4. Percentages of districts in all states proposing remote learning strategies related to parent supports, by district Internet connectivity level

Strategy and response options	District Internet connectivity level				
	Very low	Low	Moderate	High	Total
Parent resources					
Yes	46	48	52	59	51
No	54	52	48	41	49
Parent communication systems					
Yes	68	76	79	85	78
No	33	24	22	15	22

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming and of data retrieved from the Federal Communications Commission Form 477 database (Center on Rural Innovation, n.d.).

Reference

Center on Rural Innovation. (n.d.). *Broadband access map*. https://maps.ruralopportunitymap.us/broadband-access-map

Appendix E. Proposed remote learning strategies by district poverty quartile

Percentages of proposed remote learning strategies for districts in different poverty quartiles are in tables E1–E4. (See box 1 in the main report for a description of district poverty quartiles.) The percentages represent all districts in the sample across the four states that participated in the Regional Educational Laboratory Central study. The tables are organized by response option for each remote learning strategy described in appendix B.

Table E1. Percentages of districts in all states proposing remote learning strategies related to infrastructure, by district poverty quartile

Strategy and response options	District poverty quartile			
	First quartile (low)	Second quartile (somewhat low)	Third quartile (somewhat high)	Fourth quartile (high)
Internet access				
Home based	35	36	32	28
Community based	8	14	16	19
Neither	41	40	41	40
Both	16	11	12	13
Student access to devices				
Full	66	64	61	60
Partial	18	20	19	19
None	16	16	20	20
Other technology				
Yes	4	4	3	5
No	96	96	97	96
Videoconferencing				
Yes	96	90	92	88
No	4	11	8	12
Technology support				
Yes	60	59	65	61
No	40	41	35	39

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming and of data retrieved from the American Community Survey 2014–2018 5-Year Estimates (U.S. Census Bureau, 2018).

Table E2. Percentages of districts in all states proposing remote learning strategies related to instruction, by district poverty quartile

Strategy and response options	District poverty quartile			
	First quartile (low)	Second quartile (somewhat low)	Third quartile (somewhat high)	Fourth quartile (high)
Prekindergarten instruction				
Yes	48	46	45	48
No	53	54	55	52
Online learning management system				
Yes	92	89	91	91
No	8	11	9	9
Attendance				
Yes	42	34	30	30
No	59	66	70	70
Synchronous/asynchronous instruction				
Synchronous	3	3	3	2
Partial	81	81	79	80
Asynchronous	16	16	18	19
New content				
Yes	49	41	44	37
No	8	2	5	5

Strategy and response options	District poverty quartile			
	First quartile (low)	Second quartile (somewhat low)	Third quartile (somewhat high)	Fourth quartile (high)
Unspecified	43	56	51	59
Grading: A–F				
Full	32	25	25	16
Partial	8	8	7	11
No	60	66	68	73
Grading: Pass/fail				
Full	4	3	4	3
Partial	4	6	6	10
No	91	91	91	88
Instructional mode				
Online	14	14	12	7
Offline	1	1	1	3
Both	86	85	87	90
Graduation requirements				
Yes	15	18	24	28
No	85	82	76	73
Professional development				
Yes	62	57	61	62
No	38	43	39	38
Modified responsibilities for nonteaching staff				
Yes: Paraprofessionals only	5	4	8	4
Yes: Other nonteaching staff only	9	8	7	7
No	79	82	80	79
Both	8	6	4	10
Collaborative teacher planning time				
Yes	50	51	38	53
No	50	49	62	47

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming and of data retrieved from the American Community Survey 2014–2018 5-Year Estimates (U.S. Census Bureau, 2018).

Table E3. Percentages of districts in all states proposing remote learning strategies related to student supports, by district poverty quartile

Strategy and response options	District poverty quartile			
	First quartile (low)	Second quartile (somewhat low)	Third quartile (somewhat high)	Fourth quartile (high)
Virtual office hours				
Yes	67	61	62	64
No	33	39	38	37
Social-emotional learning and mental health support				
Individual	31	35	36	43
Group	3	3	2	3
No	31	32	34	24
Both	35	30	28	30
One-on-one meetings				
Full	14	21	21	24
Partial	19	10	13	16
No	67	69	66	60

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming and of data retrieved from the American Community Survey 2014–2018 5-Year Estimates (U.S. Census Bureau, 2018).

Table E4. Percentages of districts in all states proposing remote learning strategies related to parent supports, by district poverty quartile

Strategy and response options	District poverty quartile			
	First quartile (low)	Second quartile (somewhat low)	Third quartile (somewhat high)	Fourth quartile (high)
Parent resources				
Yes	48	53	54	61
No	53	48	46	39
Parent communication systems				
Yes	78	77	78	84
No	22	23	22	16

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming and of data retrieved from the American Community Survey 2014–2018 5-Year Estimates (U.S. Census Bureau, 2018).

Reference

U.S. Census Bureau. (2018). *2018 ACS 5-year summary file* [Data set]. https://www.census.gov/programssurveys/acs/data/summary-file.2018.html

Appendix F. Proposed remote learning strategies by district locale

Percentages of proposed remote learning strategies for districts in different locales are in tables F1–F4. (See box 1 in the main report for a description of district locales.) The percentages represent all districts in the sample across the four states that participated in the Regional Educational Laboratory Central study. The tables are organized by response option for each remote learning strategy described in appendix B.

Table F1. Percentages of districts in all states proposing remote learning strategies related to infrastructure, by district locale

Strategy and response options	District locale			
	City	Suburban	Town	Rural
Internet access				
Home based	33	16	21	36
Community based	0	21	21	13
Neither	38	53	39	40
Both	29	11	19	11
Student access to devices				
Full	52	47	56	66
Partial	33	32	25	17
None	14	21	19	18
Other technology				
Yes	19	0	2	4
No	81	100	98	96
Videoconferencing				
Yes	100	100	92	90
No	0	0	9	10
Technology support				
Yes	67	68	72	58
No	33	32	29	42

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming and of data retrieved from the National Center for Education Statistics urban-centric locale framework (Geverdt, 2015).

Table F2. Percentages of districts in all states proposing remote learning strategies related to instruction, by district locale

Strategy and response options	District locale			
	City	Suburban	Town	Rural
Prekindergarten instruction				
Yes	43	68	47	46
No	57	32	53	54
Online learning management system				
Yes	100	95	92	90
No	0	5	9	10
Attendance				
Yes	48	16	28	36
No	52	84	72	64
Synchronous/asynchronous instruction				
Synchronous	0	0	2	3
Partial	71	74	85	79
Asynchronous	29	26	14	17
New content				
Yes	57	42	41	43
No	5	16	2	5
Unspecified	38	42	57	52
Grading: A–F				

Strategy and response options	District locale			
	City	Suburban	Town	Rural
Full	14	21	14	28
Partial	14	11	10	8
No	71	68	76	64
Grading: Pass/fail				
Full	5	0	4	4
Partial	5	0	9	6
No	91	100	87	90
Instructional mode				
Online	10	16	9	12
Offline	0	0	2	1
Both	91	84	89	87
Graduation requirements				
Yes	24	42	37	16
No	76	58	63	84
Professional development				
Yes	81	79	65	58
No	19	21	35	42
Modified responsibilities for nonteaching staff				
Yes: Paraprofessionals only	5	5	9	5
Yes: Other nonteaching staff only	10	0	9	8
No	76	95	77	80
Both	10	0	6	7
Collaborative teacher planning time				
Yes	86	58	59	44
No	14	42	42	56

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming and of data retrieved from the National Center for Education Statistics urban-centric locale framework (Geverdt, 2015).

Table F3. Percentages of districts in all states proposing remote learning strategies related to student supports, by district locale

Strategy and response options	District locale			
	City	Suburban	Town	Rural
Virtual office hours				
Yes	71	74	67	62
No	29	26	33	38
Social-emotional learning and mental health support				
Individual	33	26	43	35
Group	0	11	2	3
No	33	11	25	32
Both	33	53	30	30
One-on-one meetings				
Full	29	16	26	18
Partial	24	5	12	15
No	48	79	62	67

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming and of data retrieved from the National Center for Education Statistics urban-centric locale framework (Geverdt, 2015).

Table F4. Percentages of districts in all states proposing remote strategies related to parent supports, by district locale

Strategy and response options	District locale			
	City	Suburban	Town	Rural
Parent resources				
Yes	81	68	65	50
No	19	32	35	51
Parent communication systems				
Yes	86	90	87	77
No	14	11	13	23

Note: Small percentages in cells are not suppressed because they represent publicly available district plans. Percentages may not sum to 100% due to rounding.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming and of data retrieved from the National Center for Education Statistics urban-centric locale framework (Geverdt, 2015).

Reference

Geverdt, D. E. (2015). *Education Demographic and Geographic Estimates Program (EDGE): Locale boundaries user's manual* (NCES 2016–012). U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. https://eric.ed.gov/?id=ED577162

Appendix G. Data and methods

This appendix contains information about the sample, data, and methods used to conduct the study.

Study setting

In spring 2020, the COVID-19 pandemic led to an abrupt shift to remote learning across the country. To ensure students could access educational opportunities in remote environments, state education agencies required districts to outline their strategies in remote learning plans. State education agencies in the Regional Educational Laboratory (REL) Central region needed to ensure continued student access to remote learning as well as provide teacher and parent supports. Four of seven states in the REL Central region—Kansas, Nebraska, North Dakota, and Wyoming—shared district remote learning plans with the study team to review.

Data sources

The study team conducted document analysis on all publicly available district remote learning plans in the four participating states in the REL Central region, using a common coding protocol (see appendix B). The study team merged district-level data from the Federal Communications Commission (FCC) Form 477 database (Center on Rural Innovation, n.d.), the American Community Survey 2014–2018 5-year estimates (U.S. Census Bureau, 2018), and the National Center for Education Statistics urban-centric locale framework (Geverdt, 2015). The FCC Form 477 database contains data submitted by Internet service providers on connectivity and speeds. From this database, the study team used district-level data on broadband Internet connectivity (that is, Internet speeds of at least 25 megabits per second). The U.S. Census Bureau conducts the American Community Survey to gather data on demographic, economic, and educational characteristics of the national population. From this survey, the study team used district-level estimates of the percentage of people within a district whose household income in the previous 12 months was below the federally defined poverty level. District locale data for the study were based on the National Center for Education Statistics locale framework. The study team collected data on district Internet connectivity level, district poverty level, and district locale for each district with an available remote learning plan. A recent study of remote learning plans in Michigan used similar demographic variables to understand how proposed strategies differed by district characteristic (Lovitz et al., 2020).

Sample

The study team used all available data (demographic data and district remote learning plans) for the four states that participated in the study: Kansas, Nebraska, North Dakota, and Wyoming. These were the only four states in the REL Central region that required remote learning plans in a manner such that the study team could apply a common coding protocol to answer research questions across the sample. Of the 761 districts in these states, 724 districts, or 95 percent, had available remote learning plans. None of these districts were missing other district variables, resulting in a final sample of 724 districts with complete data (table G1).

Table G1. Characteristics of the study sample, by state and for the entire sample

Characteristic	Kansas	Nebraska	North Dakota	Wyoming	Total sample
Total number of districts	286	246	179	50	761
Number of districts with available remote learning plans	279	235	162	48	724

Characteristic	Kansas	Nebraska	North Dakota	Wyoming	Total sample
Number of districts missing remote learning plans	7	11	17	2	37
Percentage of districts with available remote learning plans	98	96	91	96	95

Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming.

The numbers of districts with available remote learning plans, organized by Internet connectivity level, poverty level, and locale, are in table G2.

Table G2. Numbers of districts with available remote learning plans, by Internet connectivity level, poverty level, and locale

Internet connectivity level	High-poverty districts[a]		Low-poverty districts[b]	
	Rural	Nonrural[c]	Rural	Nonrural[c]
High and moderate[d]	88	63	351	111
Low and very low[e]	27	0	82	2

a. Districts in the third and fourth district poverty quartiles. See box 1 in the main report for a description of district poverty quartiles.
b. Districts in the first and second poverty quartiles. See box 1 in the main report for a description of district poverty quartiles.
c. Districts designated as city, suburban, and town. See box 1 in the main report for a description of district locales.
d. Districts with 70 percent or higher of individuals with access to broadband Internet. See box 1 in the main report for a description of district Internet connectivity levels.
e. Districts with 69 percent or lower of individuals with access to broadband Internet. See box 1 in the main report for a description of district Internet connectivity levels.
Source: Authors' analysis of 724 district remote learning plans submitted in spring 2020 to state education agencies in Kansas, Nebraska, North Dakota, and Wyoming.

Analysis methods

To answer the research questions, the study team conducted document analysis on the 724 districts remote learning plans. The initial coding scheme was based on the guidance that each state education agency provided to districts for submitting remote learning plans. Using these initial codes, one study team member coded eight district plans, resulting in the creation of new codes and the merging of several codes into one. Three study team members then applied the new codes to six additional plans. The team members met to reach consensus and further revise the codes, resulting in a draft coding protocol that included information on district infrastructure (for example, plans for providing access to the Internet and Internet-enabled devices), instruction (for example, plans for adjusting instructional content, changing grading systems, and modifying graduation requirements), student supports (for example, plans for scheduling virtual office hours and offering social-emotional learning and mental health support), and parent supports (for example, plans for providing resources to and communicating with parents). The final coding protocol is in appendix B.

Before conducting any analysis, all study team members were trained on the draft coding protocol, using a common district plan for each state. This training involved meeting to discuss the definition of each code and the response options, and to discuss how the common district plan should be coded and why. Next, the study team reviewed a common district plan from each state and discussed its coding, reaching consensus and updating the protocol to improve alignment with the remote learning plans and add clarity to increase inter-rater agreement. This process was similar to the process for training raters of constructed response items in open-ended assessments (Lane & Stone, 2006; McClellan, 2010). The study team then conducted document analysis of remote learning plans across all four participating states.

To monitor the consistency of coding, every two weeks the study team coded a common district plan and met to discuss coding decisions until reaching consensus on any disagreements. Additionally, every two weeks the study team double-coded about 20 plans and calculated the percentage of exact agreement (a measure of inter-rater reliability) for each item in the protocol. If the percentage of exact agreement fell below 80 percent (0.8) for any item during a two-week period, the study team further discussed discrepancies on that item. Note that 0.8 would be considered relatively high inter-rater reliability in scoring performance tasks (Lane & Stone, 2006), and that value is an established criterion in related work (Brennan, 1992; Marzano, 2002).

The study team double-coded roughly 10 percent of remote learning plans in each state over the entire analysis. Of the 724 districts in the total sample, 83 (11.5 percent) were double-coded. The average percentage of exact agreement across all items was 84 percent, with individual items ranging from 61 percent to 98 percent. The percentage of exact agreement for each coding item that fell below the 80 percent threshold is in table G2. Coder discussion resulted in all items meeting the 80 percent threshold.

Table G3. Percentages of exact agreement for strategies and response options that fell below the 80 percent threshold

Strategy	Percentage of exact agreement	Response option	Percentage of exact agreement
Internet access	78	Grading: A–F	77
Technology support	78	Social-emotional learning and mental health support	71
New content	66	One-on-one meetings	61

Source: Authors' construction.

The study team then calculated frequencies of codes separately for each state, district Internet connectivity level, district poverty level, and district locale. The study team made each of these cross-tabulations across the four categories for each district characteristic: very low, low, moderate, and high for district Internet connectivity; low, somewhat low, somewhat high, and high for district poverty; and city, suburban, town, and rural for district locale.

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