Remote Learning Study

DECEMBER 2022

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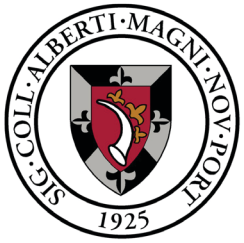

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Remote Learning Study

DECEMBER 2022

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About CCERC

The Center for Connecticut Education Research Collaboration (CCERC) is a research partnership between the Connecticut State Department of Education (CSDE) and institutions of higher education across Connecticut. CSDE sets the agenda, identifies projects, and allocates funding for CCERC. The University of Connecticut manages funding and provides an administrative team. A Steering Committee composed of researchers from various Connecticut institutions guides the administrative team in developing and approving research projects and reports. Researchers from Connecticut universities and colleges constitute the research teams. The mission of CCERC is to address pressing issues in the state's public schools through high quality evaluation and research that leverages the expertise of researchers from different institutions possessing varied methodological expertise and content knowledge.

CCERC was formed initially using federal relief funds to investigate the impact of the COVID-19 pandemic on learning and well-being and recovery efforts in the state's schools. The partnership was subsequently institutionalized to respond to ongoing evaluation and research needs of the CSDE, provide research opportunities for Connecticut researchers, and foster collaboration across the state's institutions of higher education.

CCERC

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A mixed-methods audit of Connecticut school districts' emergency response to the COVID-19 pandemic was conducted in fall 2021. This audit was requested by the Connecticut General Assembly in Section 389 of Public Act 21-2ss. (iStock Photo)

Executive Summary

In fall 2021, the Center for Connecticut Education Research Collaboration (CCERC) selected a team of researchers from Yale University and the University of Connecticut to conduct a mixed-methods audit of school districts' emergency response to the COVID-19 pandemic. This audit was requested by the Connecticut General Assembly in Section 389 of Public Act 21-2ss. The study we conducted in response to this request had the four main goals described below.

Project Goals

1. Document the **implementation** of remote learning models by local and regional boards of education during the first two school years impacted by the COVID-19 pandemic (2019-20 and 2020-21)
2. Document how districts supported **learning and student well-being**
3. Document how districts supported **teaching and teacher well-being**
4. Examine links between **learning conditions and student outcomes**, including absenteeism and academic performance

Data Source 1
State-level administrative data

Data Source 2
A survey of district leaders across Connecticut

Data Source 3
A survey of all K-12 Connecticut public school teachers

Data Source 4
Teacher focus groups

In fall 2021, CCERC selected a team of researchers from Yale University and the University of Connecticut to conduct a mixed-methods audit of school districts' emergency response to the COVID-19 pandemic.

Methodology and Analysis

Data Sources. The study used four data sources: 1) state-level administrative data; 2) a survey disseminated in winter 2022 to district leaders in every Connecticut school district and state-approved private special education program (APSEP); 3) a survey disseminated in spring 2022 to all K-12 Connecticut public school teachers, and; 4) focus groups conducted in summer 2022 with selected teachers who responded to the teacher survey.

Analyses. For the administrative data, we used inferential statistics to assess the effects of remote learning on student outcomes. We descriptively summarized survey data and used a coding scheme to summarize focus group data. Finally, we merged elements from the District Inventory with the administrative data to assess the effect of district conditions on student outcomes.

Findings

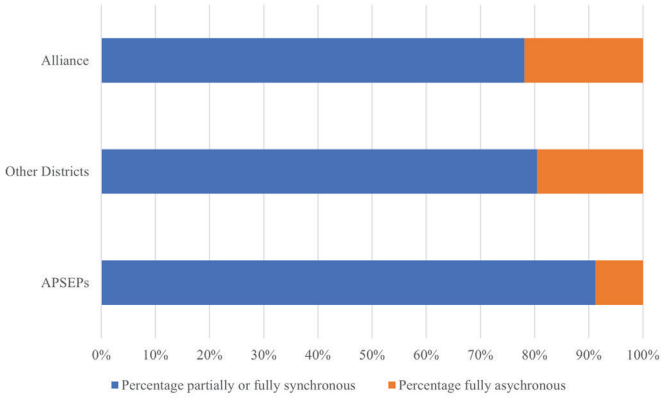
Caveats. Before summarizing the findings, it is important to note that readers should avoid generalizing findings from the teacher survey and focus groups to the entire state. The teacher survey had a low response rate, and participants may not be representative of the overall teacher population. Similarly, focus group participants were drawn from survey respondents and should not be treated as a representative sample. Additionally, focus groups are intended to provide context rather than generalizable data. Therefore, we caution readers not to draw broad conclusions from these data.

> *The study had four main goals: Document the implementation of remote learning models by local and regional boards of education during the first two school years impacted by the COVID-19 pandemic; Document how districts supported learning and student well-being; Document how districts supported teaching and teacher well-being; Examine links between learning conditions and student outcomes, including absenteeism and academic performance.*

Goal 1. Document the implementation of remote learning models

- Most districts reported providing partially or fully synchronous remote instruction during spring 2020, with only slight variation across grade levels. In contrast, most teacher survey and focus group participants reported that they provided fully asynchronous instruction during this period.

Figure F1. Spring 2020 synchronous instruction in elementary schools



- Districts reported that despite all efforts, in May 2020, approximately one-third of students were accessing remote learning less than half the time it was provided. Many teacher survey and focus group participants believed that student disengagement resulted from inadequate adult supervision and other family concerns.
- During the 2020-21 school year, districts with a large percentage of high-needs students[1] provided less opportunity for in-person learning than districts with a smaller percentage of high-needs students. In addition, uptake of in-person learning opportunities was lower among schools with a large percentage of high-needs students, especially during the transition from fully remote learning to in-person learning in fall 2020 and winter 2021.
- Focus group participants reported that the frequent changes in teaching modality during the 2020-21 school year caused them to cover less material. Teacher survey respondents also reported that they covered a smaller proportion of the curriculum in 2020-21 than in years prior to the pandemic.
- Focus group and teacher survey participants reported that concurrent hybrid instruction was extremely challenging; without adequate training and instructional technology, teachers found it overwhelming to teach students in person and on screen simultaneously.
- When comparing 2020-21 to spring 2020, 96-98% of Alliance districts, non-Alliance districts, and APSEPS reported that teachers were more fluent with remote learning technologies, and 88-94% reported that teachers were better at integrating recommended apps/tools.

Goal 2. Document how districts supported learning and student well-being

- Depending on their grade level and district type, teacher survey respondents reported that in the spring of 2020, 29-55% of their students were progressing with grade level learning and 41-59% of their students were in touch with their teachers daily.
- Again, depending on their grade level and district type, teacher

1 The Connecticut State Department of Education's high needs classification includes students who have a disability, are classified as English learners, and/or are eligible for free or reduced-price meals.

survey respondents reported that in 2020-21, 42-53% of their fully remote students were progressing with grade-level learning, compared to 51-62% of their hybrid students and between 66% and 77% of their fully in-person students.

- Alliance districts, non-Alliance districts, and APSEPs reported that the percentage of students at all levels with access to a district-provided Chromebook, laptop, or iPad increased dramatically, from 60-72% on March 1, 2020 to 91-95% on November 1, 2020.
- Focus group participants told us that the proportion of students dealing with stress, anxiety, depression, and social isolation was higher during the pandemic than they had ever seen. They reported that student coping skills and maturity levels were below what would be expected for their grade level.

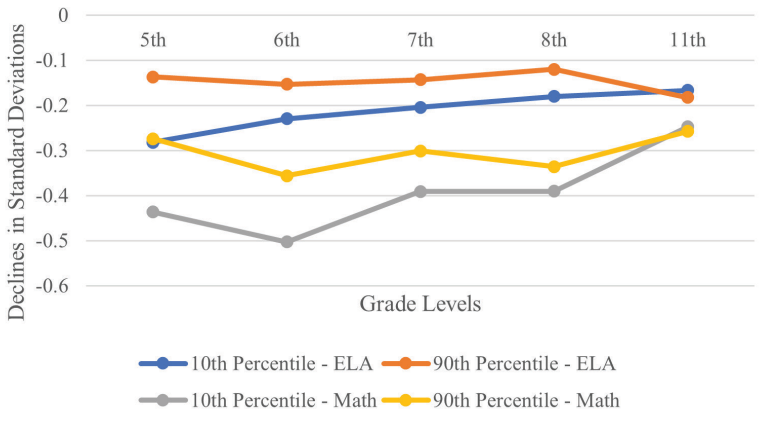
Goal 3. Document how districts supported teaching and teacher well-being

- Focus group and teacher survey participants reported that their well-being suffered from constant changes in class scheduling, pressing student and parent needs, shifting COVID guidelines, fear for their personal health, and absences due to teacher and student quarantines. They shared that these factors created a chaotic and stressful environment, yet they received inadequate support for their well-being from their school or district administrations. Depending on their grade level and district type, 47-58% of teacher survey participants said their district's support for their physical health was somewhat or extremely inadequate, and 63-68% said the same of their district's support for their social-emotional well-being.
- Districts reported making substantive changes to administrator and teacher roles to adapt to remote learning and accommodate student and district needs; in focus groups and surveys, many teachers said they found the added responsibilities overwhelming.
- Districts reported using formal and informal approaches to teacher professional development related to remote learning, including producing their own online teacher resources. Depending on their grade level and district type, between 40% and 60% of teacher survey participants said they had received an adequate amount of professional development across a variety of topics.
- Districts said they will continue to use learning management systems, SEL resources, and videoconferencing systems put in place during COVID to support future learning. Most (63-85%, depending on grade level and district type) teacher survey participants who reported using new instructional technologies during the pandemic indicated that they would like to continue using those resources.

Goal 4. Examine links between learning conditions and student outcomes

- The pandemic was associated with reduced school enrollment in fall 2020, especially among the lower grades.
- In the lower grades, schools with the lowest share of in-person days had the largest declines in ELA and Math test scores. However, we observed no differences on 11th grade SAT scores based on share of in-person days.
- Schools with lower shares of in-person days had lower attendance rates. This was most pronounced in grades 2-5. Declines in attendance were smaller when students had more opportunity for in-person learning, especially in elementary and middle school.
- Focus group teachers expressed significant concern about the amount of learning loss their students experienced. They reported that student's writing and math skills were significantly below expectations and that high school students were not prepared to take AP courses.
- Focus group participants reported that teachers and students struggled in dual learning models. They felt that they were not able to attend fully to either group of students and worried about the lack of supervision for students participating remotely.
- District-reported social services referrals for students were associated with lower test scores and proficiency. This was likely because the pandemic had differential social-emotional effects on students across schools in ways that depressed their academic performance. These effects were not captured by traditional measures of schools' need (for example, the share of high-needs students).

Pandemic Year Test Score Declines by Share of Days in Person



Recommendations

We recommend developing a statewide plan for potential disruptions to in-person learning that focuses on lessons learned about effective practices during the pandemic and includes input from a diverse group of administrators, educators, and parents. The plan should:

1. Provide resources and guidance to support safe in-person learning

Schools with less access to in-person learning experienced larger declines in student outcomes, and the uptake of in-person learning was lower in schools with larger percentages of high-need students than in schools with smaller percentages of such students. Districts had a great deal of autonomy in whether and how to implement learning models (remote, hybrid, or in-person), which led to different access to learning opportunities. Districts also varied in their ability to purchase safety equipment like desktop shields and high-quality masks for teachers and students. Students, especially those in high-needs schools, would benefit if the state provided more guidance and supports for schools to offer and engage students in in-person learning, including resources to support effective family engagement.

2. Ensure that all districts have adequate instructional technology, professional development, and curriculum resources for remote or hybrid instruction

The pandemic revealed dramatic inequity among districts in resources to support the pivot to remote instruction. The pivot was smoother for districts that had already implemented 1:1 computing, learning management systems, online curriculum resources, and professional development to support teachers in using these resources. Communities also varied in terms of whether families had the resources to support online learning, such as stable internet access. These differences in how quickly and effectively districts could pivot to remote or hybrid instruction and in families' ability to access remote learning had a dramatic impact on students. Developing an emergency plan for timely and efficient delivery of instructional technology, professional development, and curriculum resources for remote or hybrid instruction could shorten the time districts need to respond to emergencies in the future.

3. Carefully consider the challenges of concurrent hybrid instruction

Teachers generally expressed strong negative opinions about concurrent hybrid instruction (simultaneously teaching students in-person and remotely). The majority said it was overwhelming, especially with little support for providing it effectively. In 2022, the Connecticut General Assembly passed Public Act 22-80[2], which prohibits concurrent hybrid instruction. If elected officials decide to remove this prohibition in the future, our recommendation is to provide the necessary material and human resources as well as professional development to increase the likelihood of successful implementation.

4. Practically assess student academic progress and social-emotional well-being

As we note, the negative association between social service referrals and students' tests scores and proficiency likely reflects differential community or student vulnerability to the socio-emotional impacts of the pandemic. . Further, traditional measures of school or student need do not seem to capture baseline differences in student vulnerability to these pandemic effects. We recommend developing practical approaches for assessing students academically in remote environments when in-person assessments are not possible. Similarly, we recommend assessing the social-emotional well-being of students during and beyond times of crisis. Doing so would provide valuable information for targeted support.

5. Provide adequate resources to support student academic and social-emotional well-being

Effective student learning during a crisis is likely to require substantial resources like those described in our third recommendation. It also requires guidance and resources for supporting diverse academic needs, including the needs of special education students and English Learner students. Addressing students' social-emotional needs also requires resources, along with school structures designed to respond to those needs as they evolve. Evidence-based approaches to consider supporting in schools include multi-tiered systems of support (MTSS), social-emotional learning (SEL), and Positive Behavior Interventions and Supports (PBIS). These approaches should include formative evaluation or continuous quality improvement to gauge progress and quality of implementation. Learner analytics and artificial intelligence

2 Section 25-2a of Connecticut Public Act 22-80 defines dual instruction as "the simultaneous instruction by a teacher to students in-person in the classroom and students engaged in remote learning," and section 25-2c "prohibits the provision of dual instruction as part of remote learning."

also show promise for supporting evidence-based decision making and identifying at-risk students.

6. Support families so they can support their students

Families are essential partners in education at any time, but even more so when students are learning from home. This study documented the observation (common among educators) that students whose families could provide adequate support fared better academically, socially, and emotionally during the pandemic. Some caregivers struggled to support their students academically because working outside the home was essential to their families' survival. Other caregivers struggled with remote learning because they didn't have necessary resources or information. We recommend that the state develop resources for families in multiple languages to support communication, technology use, mental health, nutrition assistance, and other needs.

7. Design a plan that mitigates the strain on educators

This study documented that educators experienced high levels of work-related stress during the first two years of the COVID-19 pandemic. Although teachers consistently reported that the first three months of the pandemic were difficult, many said that during that period, they felt their school and district leaders and their communities were compassionate and supportive. However, teachers consistently reported different challenges in the 2020-21 school year and beyond: many felt that they were asked to carry unreasonable burdens in terms of their personal health and safety, their workload, and their accountability for student achievement. Although many teachers reported that the later period was challenging, expectations of teachers varied across schools and districts. We recommend that the state develop guidelines for teacher job responsibilities during an extended crisis to reduce stress, burnout, and attrition.

8. Acknowledge and reward educators' sacrifices and commitments

Over the course of this study, we heard from many teachers who said they had not been acknowledged or rewarded for their dedication and personal sacrifices during the pandemic. Many said public discourse about teachers had become extremely negative, and that the appreciation they felt early in the pandemic disappeared as the crisis wore on. Teachers expressed frustration that they had made the same sacrifices as other essential workers without receiving hazard pay, sick time for COVID-related absences, or other benefits. Numerous teachers spoke about the failed legislation that sought to award extra years of service toward retirement and the difference such an acknowledgement would make for their morale. We recommend that state and local leaders seek additional ways to acknowledge and reward educators' sacrifices and commitments during the pandemic and potentially during future crises.

(iStock Photo)

Full Report

Acknowledgements

The study team wishes to express its appreciation for the many educators who participated in this study: the district leaders who completed the district inventory (especially those who piloted it), the teachers who participated in the teacher survey (again, especially those who provided feedback during the pilot), and those teachers who took part in the focus groups. Without their knowledge and insight, this study would lose much of its meaning. We appreciate the steadfast support of research assistant Jordyn Beschel, who communicated with district leaders and teachers throughout data collection, including supporting the focus groups with coordination, notetaking, and data management. We are grateful for the leadership of Ajit Gopalakrishnan (Connecticut State Department of Education) and Morgaen Donaldson (University of Connecticut, Neag School of Education), who conceived and launched the Connecticut COVID-19 Education Research Collaboration. We are also thankful for the members of the CSDE and UConn teams who have supported this study, including David Alexandro, Abe Krisst, Briana Hennessy, Samuel Kamin, and their colleagues.

BACKGROUND

In fall 2021, the Connecticut COVID-19 Education Research Collaborative (CCERC) selected a team of researchers from Yale University and the University of Connecticut to conduct a mixed-methods audit of school districts' emergency response to the COVID-19 pandemic. This audit was requested by the Connecticut General Assembly in Section 389 of Public Act 21-2ss. The study in response to this request aimed to learn and share with state and local leaders:

1. How local and regional boards of education provided remote learning during the first two school years impacted by the COVID-19 pandemic (2019-20 and 2020-21);
2. How remote learning impacted the quality of instructional delivery, and;
3. How remote learning impacted K-12 students' educational progress, physical and emotional development, and access to special services, including mental health and nutrition services.

Project Goals and Research Questions

Goal 1. Implementation: Document the implementation of remote learning models

Q1a. What remote learning formats did districts use and how did these learning formats vary by district type?

Q1b. What general curricular student learning outcomes were targeted?

Q1c. What did administrators and teachers say about the challenges of and strategies for different learning formats?

Q1d. How did approaches to remote learning change over time, and how did these changes affect teachers and students?

Goal 2. Supports for Students: Document how districts supported learning and student well-being

Q2a. What do administrators and teachers say about the pandemic's effects on students and their families?

Q2b.What technological and other resources did districts provide to support student learning during the pandemic, and what technology challenges did students experience?

Q2c. What resources were available to support students' physical and emotional well-being during the pandemic, compared to before the pandemic?

Goal 3. Supports for Teachers: Document how districts supported teaching and teacher well-being

Q3a. What do administrators and teachers say about how the pandemic and the resources provided affected teaching and teacher well-being?

Q3b. What technological resources did districts/schools provide to teachers to support remote and hybrid learning, and what technology challenges and strategies did teachers report?

Q3c. What types and amount of professional development did districts/schools provide to teachers to support remote and hybrid learning (e.g., training on education technology, pedagogy of virtual teaching, etc.)?

Q3d. What tools and strategies introduced during the pandemic do administrators and teachers say they will continue to use in their practice?

Q3e.What lessons do administrators and teachers say they learned regarding teaching and learning during the pandemic and how the state could improve in a future pivot to remote learning?

Goal 4. Student Outcomes: Examine links between learning conditions and student outcomes

Q4a. To what extent were students able to access remote learning?

Q4b. What do teachers say about the association of learning models and conditions with student attendance and performance?

Q4c. How were remote learning models and conditions associated with changes in student attendance and performance on standardized assessments?

DATA SOURCES

This study involves four data sources: 1) state-level administrative data; 2) a survey disseminated to district leaders in every Connecticut school district and state-approved private special education program (APSEP); 3) a survey disseminated to all K-12 Connecticut public

school teachers; 4) and focus groups conducted with selected teachers. We provide more detail on each of these sources below, including Table 1.

CSDE Administrative Data

The Connecticut State Department of Education (CSDE) provided fall and end-of-year enrollment files for all students enrolled in publicly funded Connecticut schools during school years 2014-15 through 2020-21 and fall of 2021-22. The fall file identifies the school and district of enrollment for each student as of October 1, in addition to three indicators of whether students were part of the categories CSDE uses to define high needs students: (1) free or reduced-price lunch eligible (FRPL), (2) student with a disability (SWD), and English Learner (EL). The end-of-year file identifies the final school and district of enrollment, the number of days enrolled, and the number of days present/in attendance at that school. For 2020-21, the state provided monthly data by student for the number of days enrolled and in attendance separately by in-person and remote days. Except for 2019-20, administrative data also contains Smarter Balanced Assessment (SBA) English Language Arts (ELA) and Mathematics test scores and proficiency for third through eighth grade students and SAT English and Mathematics scores and proficiency based on state established standards for 11th grade students (starting in 2015-16). For 2020-21, administrative data also indicates whether the test was administered in person or online. The list of SDE student data elements is available in Tables A1-A3 of Appendix A. (Note: Appendices are available at ct.gov/ccerc)

For 2020-21, the CSDE provided weekly data collected from Local Education Agencies (LEAs) on learning models: remote, hybrid, or in-person, where the state classified hybrid as 25 to 75% of time in-person. Traditional school districts (including local and regional districts), Regional Education Service Centers (RESCs), charter school districts, endowed and incorporated academy districts (EIADs), the Connecticut Technical Education and Career System (CTECS), and Approved Private Special Education Programs (APSEPs) participated in weekly collection of learning models data. The list of learning models data elements is available in Table A4 of Appendix A.

Table 1. Study data sources

Data Source	Description	Representation/response rate
Administrative Data	CSDE provided fall and end-of-year enrollment files for school years 2014-15 through 2020-21, plus fall enrollment 2021-22. Other indicators included student demographics, attendance, and academic performance measures.	Data included all public-school students in CT. For example, the fall 2019 file included 527,829 students, and the fall 2020 file included 513,079 students.
Learning Models Data	CSDE provided data from the weekly learning models survey that districts were required to complete for 2020-21	Data include all local school districts (137); regional school districts (17); charter districts, RESCs, and EIADs (29); and APSEPs (63).
District Inventory	Survey disseminated to senior leaders in every CT school district and APSEP; topics included district practices and policies before and during the COVID-19 pandemic.	Data were provided by 96% of local school districts (132/137), 100% of regional school districts (17/17), 97% of charter districts, RESCs, and EIADs (28/29), and 87% of APSEPs (55/63).
Teacher Survey	Survey disseminated to all K-12 Connecticut public school teachers about instructional practices, perceived supports, and challenges before and during the COVID-19 pandemic.	Just over 6% of public-school teachers responded (approximately 2600 teachers). Forty out of 186 districts had a response rate greater than 10%. Interpret with caution.
Focus Groups	Twelve 90-minute focus groups from a sample of teachers stratified by grade level and district type.	Sixty-seven teachers from K-12 schools across urban, suburban, and rural districts.

Note: APSEP = state-approved private special education program; RESC = Regional Educational Service Center; EIAD = endowed and incorporated academy district

CCERC Remote Learning District Inventory

The team developed the CCERC Remote Learning District Inventory to collect information from district administrators about districts' remote learning policies and practices during the 2019-20 and 2020-21 school years. The district inventory included questions about learning models, learning goals, staffing, professional development, assessment, student supports, student engagement, and student behavior outcomes across a range of time periods—before the pandemic, during spring 2020, and during the 2020-21 school year. Some survey items were based on the Spring 2021 American Educator Panel COVID-19 Surveys developed by the RAND Corporation,[i] while others were developed by our team in collaboration with state and local education leaders. Most district inventory items were multiple choice, and some of those included an "other (please describe)" option with a text-entry field. The district inventory also included a small number of open-response questions. More information about the district inventory items is available in Table A5 of Appendix A2.

The inventory was administered online and organized into four sections: one group of district-wide questions, followed by a group of questions for each education level (elementary, middle, and high school); education-level questions were displayed only for levels that a district served. The survey was designed so that different administrators from a district could complete the sections of the survey that fell under their purview; a table of contents allowed district administrators to jump between sections. In March 2022, administrators from three districts piloted the survey and provided feedback. We created a unique online survey link for each Connecticut school district noted in the CSDE Administrative Data section above. In early April 2020, the team sent each district's superintendent or other lead administrator a personalized email with the district's unique survey link. These administrators were asked to work with their leadership teams to complete the district inventory.

We sent multiple follow-up messages to these senior leaders and to their leadership teams in April and May, and the SDE followed-up with district leaders in late May and June. **When the district survey closed in early July, district surveys had been submitted by 96% of local school districts (132/137), 100% of regional school districts (17/17), 97% of charter school districts, RESCs, and EIADs (28/29), and 87% of APSEPs (55/63).**

CCERC Remote Learning Teacher Survey

The teacher survey focused on classroom teachers' experiences during the 2019-20 and 2020-21 school years. Specifically, the teacher survey included questions about teaching assignments, teaching models, teaching challenges, professional development, educational technology, and student academic and behavioral outcomes. Although the district survey included many of the same topics, the teacher survey was designed to elicit teachers' perceptions of classroom practices and student experiences. As in the district survey, teacher survey items were developed by the research team in collaboration with state and local education stakeholders, drawing inspiration from the Rand American Educator Panel COVID-19 Surveys,[ii] InTASC Model Core Teaching Standards,[iii] and TeachingWorks High-Leverage Practices.[iv] In May 2022, approximately 20 teachers from a variety of districts piloted the survey and provided feedback that we used to finalize it. Most teacher survey items were multiple choice, although some of them included an "other (please describe)" option with a text-entry field. The teacher survey also included an extended text-entry item at the end, asking respondents to comment about their experiences as a Connecticut teacher during the COVID-19 pandemic. More information about the teacher survey items is available in Table A6 of Appendix A. However, to reduce the burden on teachers to complete the survey, we used a planned missing design,[v] which reduced the number of items displayed to each teacher (more information is provided in the next section).

Teacher survey recruitment. We launched the teacher survey on May 20, 2022, and we invited the participation of all classroom teachers from local school districts, regional school districts, RESCs, charter school districts, EIADs, CTECS, and APSEPs. Recruitment materials clarified that classroom teachers included general education teachers, special education teachers, ESL teachers, subject area teachers, specialist area teachers, and other teachers who provide direct classroom instruction. Initially, the research team sent the survey recruitment email to district leaders (superintendents, assistant superintendents, directors, etc.) and asked them to forward it to their district's teachers. At our request, CSDE sent the recruitment email to school leaders (principals and assistant principals) and asked them to forward it to their teachers. CSDE also asked the Connecticut Education Association (CEA), the American Federation of Teachers of Connecticut (AFT Connecticut), Connecticut Association of Schools (CAS), and Connecticut Administrators of Programs for English Language Learners (CAPELL) to distribute the recruitment materials to their members. Responses rates remained low, and after three weeks, the CSDE gave us permission to email the teacher survey invitation directly to all certified teachers who were employed in Connecticut public schools during the 2019-20 and/or 2020-21 school year. There was no way to directly email teachers employed in APSEPs. **The survey closed on July 28, 2022 with approximately 2,620 usable responses, for an estimated response rate of 6.2% of all public school teachers.[vi] Out of 186 districts, only 40 had a response rate greater than 10%.**

Teacher survey sample. Among teachers who participated in the teacher survey, 35% were from Alliance districts and 65% were from non-Alliance districts, compared to 40% and 60%, respectively, of all Connecticut teachers in 2021-22. In terms of grade level, 36% of survey respondents were elementary teachers, 20% were middle school teachers, 32% were high school teachers, and 12% taught at multiple levels or in

ungraded settings[1]; CSDE does not report teacher grade level assignments in a comparable manner. Approximately 12% were special education teachers, compared to 16% of Connecticut teachers, and survey respondents had more years of teaching experience than Connecticut teachers. Approximately 80% of teacher survey respondents identified as female, compared to 76% of Connecticut teachers. As a whole, survey respondents were slightly older than the Connecticut teacher population (43% over age 50, compared to 34% of Connecticut teachers). Most survey respondents identified as white (86%, compared to 90% of Connecticut teachers), with smaller proportions identifying as Hispanic or Latino of any race (5%, equal to the percentage of Connecticut teachers) and Black or African American (3%, compared to 4% of Connecticut teachers). See Tables A7-A13 for more detailed information.

Teacher Focus Groups

We developed the focus group protocol for this project to collect in-depth information about teacher experiences; the protocol can be found in Table A14 in Appendix A. We asked teacher focus group participants to reflect on their greatest teaching challenges, how they connected with students, and their students' greatest needs in the spring of 2020 and in the 2020-2021 academic year. We asked them about the teaching models (in person, remote, hybrid) that were used at the beginning of the 2020-2021 school year, how teaching models changed over time, and the supports that were offered to help them navigate these changes. Specifically, we asked them about the training and supports (e.g., technology, curriculum resources, or resources to support students) that were offered to them to assist with changes in teaching models, including how helpful these supports were and what else they needed to teach effectively in these models. We asked teachers what kinds of supports they provided to parents/caregivers who were helping their children navigate the different learning models. We also asked teachers to compare student learning, achievement, and emotional reactions, and behavior in the 2020-2021 school year versus pre-pandemic years. We asked what resources or skills were available to address these student concerns and what else was needed, as well as what supports teachers were offered to promote their own physical and emotional well-being. Finally, with an eye to future disruptions to in-person teaching, we asked teachers to share lessons learned, helpful resources that they continue to use to enhance teaching, and policy and procedural considerations.

Focus group recruitment. We recruited teachers for the focus groups through an interest form linked to the end of the teacher survey. Respondents who clicked on that link were asked to provide their basic employment information: school district, district type (rural, suburban, urban), job title, type of school (elementary, middle, high), years of teaching experience, etc.). We used this information to select a stratified sample of teachers based on their district type (rural, suburban, and urban districts). The stratification also accounted for teachers' roles to ensure a mixture of general education, special education, and specialist teachers. Within these strata, we selected teachers at random to participate in a focus group; we emailed selected teachers with the date and time of their focus group and a link to an online enrollment form, which included a consent form and a demographic survey. All participating teachers received a $100 gift card. It is important to note that the low response rate to the teacher survey (see above) meant that the pool of teachers who could be selected for focus groups was small.

Focus group sample. Two facilitators (Kaufman and Griffin) from our qualitative team conducted twelve 90-minute focus groups by Zoom in August 2022 with a total of 67 teachers from K-12 schools in urban, suburban, and rural districts. The focus groups were audio recorded. A majority (70%) of focus group participants were from non-Alliance districts and 30% were from Alliance districts, compared to 60% and 40%, respectively, of Connecticut teachers. Focus group teachers described their school districts as urban (45%), suburban (43%), and rural (12%);[2] participants taught at the elementary (34%), middle (33%), and high school level (37%). Most were general education teachers (75%), and the rest were special education teachers (15%) and other teachers (11%, for example, ESL teachers or specialists). In comparison, 84% of Connecticut's K-12 teachers are classified as general education teachers and 16% as special education teachers.[3] The mean number of years teaching was 17 (min. 2 and max. 36, SD= 8.73).

Most participants were in age groups 30-39 years (31%), 40-49 years (24%), and 50-59 years (31%), whereas most Connecticut teachers are in age groups 30-39 years (26%), 40-49 years (29%), and 50-59 years (24%). Most participants identified as female (79%), compared to 76% of Connecticut teachers. Finally, the majority identified as white (85%), with 10% identifying as Black or African American (10%) and 8% identifying as Hispanic or Latino. Overall, 90% of Connecticut teachers identify as white, with much small proportions identifying as Black or African American (4%), Hispanic or Latino of any race (5%), or another race (1%). See Tables A15 and A16 in Appendix A for more information about the focus group participants.

DATA ANALYSIS

We conducted analyses for each of the data sources described above. As noted, we also conducted analyses on merged administrative and district-level survey data. We describe our analytical approaches below.

Analytic Approach for Administrative Data

Our goal for analyzing administrative data (in isolation from other data) was to examine the pattern of Local Education Agency (LEA) decisions to offer in-per-

1 CSDE does not report teacher grade level assignments in a comparable manner.
2 CSDE does not classify districts in terms of urbanicity.
3 CSDE classifies teachers into two categories: general education teachers and special education teachers. ESL teachers, subject area teachers, specialists, etc. are considered general education teachers.

son learning opportunities (including hybrid and/or fully in-person learning), and study how those opportunities relate to student enrollment, attendance, and student test scores during the 2020-21 school year. We also examined whether these outcomes varied across schools as a function of student composition, following state guidance to use the share of high needs students, defined as the fraction of students in a school who are classified as free or reduced-price lunch (FRPL) eligible, students with disabilities (SWD), and/or English Learners (EL). We focused on school composition in order to compare more homogeneous institutions, as opposed to comparing large public-school districts to individual endowed or charter schools that comprise their own LEA.

We first estimated simple cross-sectional models of school and district decisions about providing a hybrid and/or fully in-person learning opportunity, which we to as in-person learning. Given the dramatic heterogeneity across LEAs, these models are estimated based on schools' share of high needs students to assess the likelihood that a school of a given student composition belonged to an LEA that provided in-person learning opportunities.

Next, we used student-level difference-in-differences analyses to examine enrollment, attendance and test scores comparing changes within schools during the pandemic and between schools belonging to LEAs that provided more in-person learning compared to schools that provided less in-person learning. Given the strong negative correlation between the share of high needs students and in-person learning opportunities, we also estimated models controlling for the likelihood of providing in-person opportunities based on both share of high needs students and the type of LEA.

Analytic Approach for District Inventory

As noted above, **the data collected through the district inventory reflects the policies and practices reported by the districts serving most Connecticut students.** Part of our strategy for analyzing these data was to present descriptive statistics to the State regarding the policies and practices around remoting learning. In doing this, it was also important to present the data with context—disaggregating it by education level, district type, and school year (where available). These descriptive results are presented in Appendices C-E for all survey items. For open-response questions from the district inventory, a research assistant used open coding to group districts' responses into themes. After these codes were reviewed by another member of the research team, she summarized the responses by theme; these summaries are presented in Appendixes C-E. The research assistant used a similar approach for district inventory items that offered an "other (please describe)" option; each summary is located below the relevant table in Appendices C-E.

Our second goal was to identify a set of district inventory items that described the ***teaching and learning conditions*** most likely to impact student outcomes data so that we could examine how district practices were associated with student outcomes. First, we collectively selected items that might serve as predictors of student effects based on theory. We cycled through this process until we agreed on a set of items and organized those items into two main domains for the 2019-20 school year and four for the 2021-22 school year (see Table 2). Then we conducted a series of factor analyses on several of the selected items. This approach helped us determine how to use items in ways that were reliable and valid. Details regarding the six district indicators of remote learning conditions are provided in Tables B1 and B2 of Appendix B.

Table 2. District Inventory Indicators of Remote Learning Conditions

1. Spring 2020 synchronous learning
2. Spring 2020 student access to technology for remote learning
3. Summer 2020 preparation for fall 2020
4. Improvements in online learning from spring 2020 to 2020-21
5. Rigor of student assessment during 2020-21
6. Social services referrals for students during 2020-21

Analytic Approach for Teacher Survey Data

As noted above, we used a planned missing design when administering the teacher survey to lower the number of survey items each teacher was asked to complete. This approach is intended to be used for conducting inferential statistics, which was our original intent. Specifically, we intended to create district-level indicators that could be combined with the district survey and administrative data to assess student outcomes. However, this plan was not viable due to the low teacher response rate, meaning that multiple imputation was of limited use. Therefore, in this report we present only unimputed results.

We need to emphasize again that because of the low response rate, the teacher survey should be interpreted with extreme caution. With only 22% of districts achieving a response rate of 10% or more, it would be inappropriate to generalize the results of this survey to the entire state without additional information. As with the district inventory, we conducted descriptive analyses by school level and district type. For teacher survey items that offered an "other (please describe)" option, a research assistant used open coding to group teachers' responses into themes. She then summarized the responses by theme; each summary is located below the relevant table in Appendices C-E. For the single open-response question at the end of the teacher survey, which received 1,500 responses, two research assistants and two other members of the team worked independently to review approximately 100 responses and generate a list of possible codes. One member of the group then created a hierarchical coding framework that was reviewed by the other members.

After the group reached consensus, a research assistant coded all responses, grouped the codes by research question, and summarized the responses for each code. These summaries are reflected in the qualitative findings in the Results section; the summaries can be found in Appendices C-E.

Analytic Approach for Focus Group Data

We created verbatim transcripts of the audio recordings from each of 12 focus groups. Our qualitative leads developed a coding scheme for the focus group data and tested it by independently coding the same two transcripts, then meeting to review their codes to ensure agreement and inter-rater reliability. A primary and secondary coder was assigned to each of the remaining 10 transcripts, each of which was coded to consensus. Data from the transcripts was entered into a database for thematic analysis.

Analytic Approach for Integrated Data (Administrative and District Inventory Data)

After using the district inventory data to produce district indicators of remote learning conditions, we merged district-level values into the administrative data, which allowed us to examine the effects of COVID-related district practices on student outcomes. For each remote learning condition (aka treatment), we examined whether the data rejected the following null hypothesis:

Student and school exposure to the following district-level remote learning condition had no impact on any of the following outcomes: student attendance or chronic absenteeism among second- through 12th-grade students, Smarter Balance assessment scores or proficiency among fifth- through eighth-grade students on ELA or Math assessments, and SAT scores or proficiency of 11th grade students on English or Math assessments.

In other words, we examined whether each indicator impacted any outcomes at any grade. Note that we could not examine attendance for kindergarten and first-grade students or test outcomes for third and fourth grade students because all analyses were conditional on pre-pandemic (i.e., 2018-19) student outcomes.

We began with a series of inferential analyses in which we tested the association of each of the six conditions in Table 2 (above) with each of the four outcomes in Table 3 (below). For example, we examined the association of spring 2020 learning models with student attendance, absenteeism, standardized assessment scores, and standardized assessment proficiency. For tests that allowed us to reject the null hypothesis, we followed our inferential analyses with exploratory analyses designed to detect which specific outcomes and grade levels were affected by the condition (see Table 3). This approach aimed to incorporate as much data from the district inventory as possible, while considering the implications for statistical power, type I error, and parsimonious explanations of effects.

We also created a pre-analysis plan that detailed whether an analysis would be inferential or exploratory. Further, to guard against "researcher degrees of freedom" in data analysis—that is, researchers inadvertently tweaking analyses to reach the findings they desire—we preregistered this plan. The preregistration detailed the analyses we would conduct to address our main questions, and it clearly specified which analyses would be inferential versus exploratory. Preregistration greatly limits researcher bias by forcing the researchers to commit to an analysis plan that they developed before conducting analyses. After receiving approval from the CCERC directors, we posted our detailed pre-analysis plan on Open Science Framework at https://osf.io/axreb (also summarized in Appendix B). We then began analyzing the merged data set. Any departures from the pre-analysis plan are carefully documented in Appendix B.

Table 3. Student outcomes examined in the merged data set

Outcome	Description
1. Attendance rates	Percentage of days absent, 0-100% (Grades K-12)
2. Chronic absenteeism	Binary indicator describing whether student was absent for 10% of days or more (Grades K-12)
3. ELA and Math Assessment Scores	Scale scores for SBAC (Grades 5-8) and SAT (Grade 11)
4. ELA and Math Assessment Proficiency	Binary indicators describing whether student achieved proficiency according to cutoff scores for SBAC (Grades 5-8) and SAT (Grade 11) (binary indicators describing whether student achieved proficiency according to cutoff scores, 0/1)

How to interpret study findings

Three caveats should be noted. First, readers should avoid generalizing certain findings in the report to the entire state. Specifically, the teacher survey had a low response rate (~6%). Thus, it would be inaccurate to extrapolate results from that survey to the larger population of teachers. Second, though the data from the teacher focus groups is informative, focus groups cannot be fully representative of the state's teacher population. Again, care should be taken about generalizing with these findings. Third, when examining the potential effects of district choices, it is challenging to account for correlations between the many variables affecting students during the pandemic. For example, though we control directly for the fact that high needs districts provided fewer opportunities for in-person learning during the pandemic, our finding of lower pandemic learning losses in districts that provided more in-person learning could still be driven by other differences between districts besides whether they offered more or less in-person learning. Despite their limitations, these data sources provide valuable context when interpreted in combination with other data that is more representative, namely the district inventory and the administrative data. We have tried to draw conclusions that integrate findings across all these data sources, and we encourage readers to do the same.

RESULTS

Goal 1. Implementation: Document the implementation of remote learning models

Q1a. What remote learning formats did districts use and how did these learning formats vary by district type?

Quantitative findings

We analyzed administrative data to examine the remote learning formats used by districts over time. Our simple cross-sectional models of the availability of in-person learning opportunities (hybrid or fully in-person) based on administrative data revealed that **schools with a large share of high needs students were less likely to provide some in-person learning at the beginning of the 2020-2021 school year and less likely to offer a higher share of days in-person over the course of the school year.** Results were similar for choice schools (i.e., RESCs, charters, and CTECS). For example, an initial hybrid or in-person option was available to 95-99% of students in traditional public schools with a 25% or lower share of high needs students, but to only 80-90% of students in schools with 60-70% high needs students (available to a higher percentage of students in elementary school grades). In choice schools, less than 10% of students on average in such high needs schools had access to early in-person

Goal 1 Key Findings

- Most districts reported providing partially or fully synchronous remote instruction during spring 2020, with only slight variation across grade levels. In contrast, most teacher survey and focus group participants reported that they provided fully asynchronous instruction during this period.
- Districts reported that despite all efforts, in May 2020, approximately one-third of students were accessing remote learning less than half the time it was provided. Many teacher survey and focus group participants believed that student disengagement resulted from inadequate adult supervision and other family concerns.
- During the 2020-21 school year, districts with a large percentage of high needs students provided fewer opportunities for in-person learning than districts with a smaller percentage of high needs students. In addition, uptake of in-person learning opportunities was lower among schools with a large percentage of high needs students, especially during the transition from fully remote learning to in-person learning in fall 2020 and winter 2021.
- Focus group participants reported that the frequent changes in teaching models during the 2020-21 school year caused them to cover less material. Teacher survey respondents also reported that they covered a smaller proportion of the curriculum in 2020-21 than in years prior to the pandemic.
- Focus group and teacher survey participants reported that concurrent hybrid instruction was challenging; without adequate training and instructional technology, teachers found it overwhelming to teach students in person and on screen simultaneously.
- When comparing 2020-21 to spring 2020, 96-98% of Alliance districts, non-Alliance districts, and APSEPs reported that teachers were more fluent with remote learning technologies, and 88-94% reported that teachers were better at integrating recommended apps/tools.

learning. Similarly, traditional public schools with smaller shares of high needs students had 78%, 70%, and 60% of days in person for elementary, middle, and high school, but traditional public schools with larger shares of high needs students had 72%, 61%, and 55% of days in person, respectively. Detailed results are described in Appendix C and shown in Tables C1-C3.

The March 2020 pivot to remote learning was sudden and unexpected, and districts in Connecticut and across the nation initially anticipated it would last only a few weeks. As this timeframe was gradually extended through the end of the 2019-20 school year, districts' approaches to remote learning evolved. On the district inventory, **over 78% of districts across grade levels and district types reported that by May 2020, they were providing partially or fully synchronous instruction to students using videoconferencing** (Figures F1-F3 and Table C5 in Appendix C); APSEPs did this somewhat more than Alliance districts or non-Alliance districts. Although almost all districts reported that they were providing a substantial amount of synchronous instruction by May 2020, teacher survey respondents indicated that a large percentage of students were receiving remote instruction with less than one real-time/synchronous class each day. **Among teachers from Alliance districts, 53%, 53%, and 46% percent of elementary, middle, and high school teachers, respectively, reported that they were teaching most of their students primarily through asynchronous instruction, compared to 49%, 54%, and 57% of elementary, middle, and high school teachers, respectively, from non-Alliance districts** (Table C6).

For the 2020-21 school year, over 94% of Alliance districts and non-Alliance districts reported that their elementary through high schools were offering instruction using a partial or fully synchronous learning model to students who remained fully remote (Table C7). For hybrid students, a somewhat lower percentage of districts (over 83%) reported that they were using partially or fully synchronous instruction when hybrid students were learning from home (Table C8), with values lowest at the elementary level and highest at the high school level; values were somewhat lower in Alliance districts than in non-Alliance districts. Less than 5% of elementary, middle, and high school teacher survey respondents reported that they were providing their students less than one synchronous class

Figure F1. Spring 2020 synchronous instruction in elementary schools

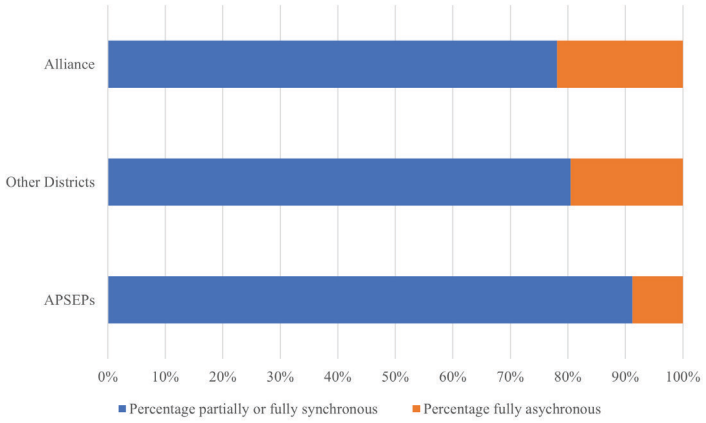


Figure F2. Spring 2020 synchronous instruction in middle schools

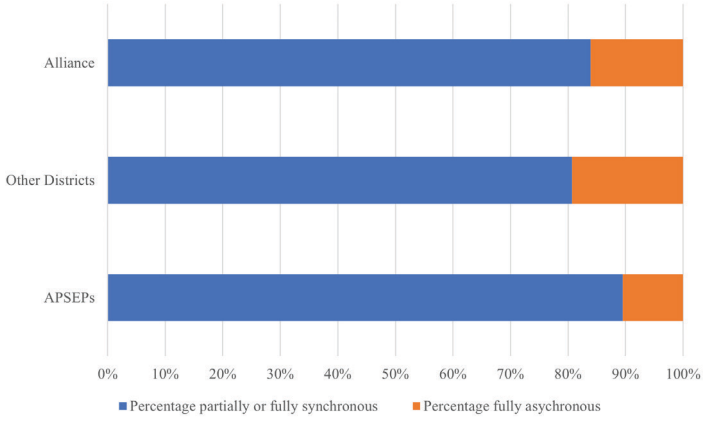
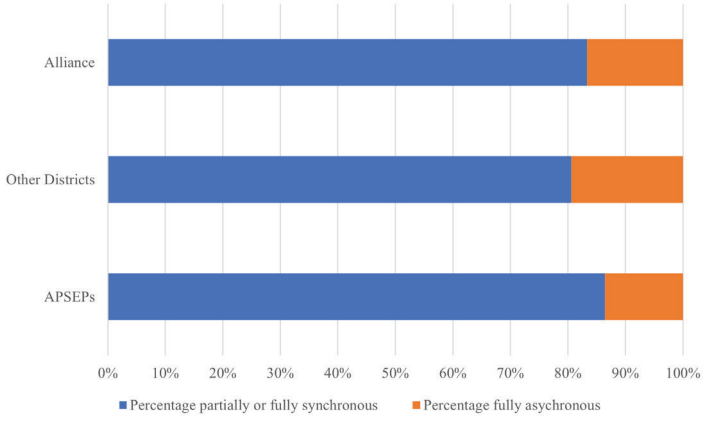


Figure F3. Spring 2020 synchronous instruction in high schools



per day during the 2020-21 school year (Table C9).

As noted elsewhere in this report, districts allowed families to choose between two or more learning models offered by the district for the 2020-21 school year (fully remote along with fully in-person and/or hybrid), and preferences varied across districts. For example, differences between Alliance districts and non-Alliance districts were striking. The teacher survey asked teachers to estimate approximately what percentage of their students attended school in fully in-person, hybrid, or fully remote models for most of the 2020-21 school year. Teachers from Alliance districts reported an average of 34%, 27%, and 18% of their elementary, middle, and high school students, respectively, learned in person for most of the 2020-21 school year; teachers from non-Alliance districts reported that 52%, 37% and 24% of these students learned in person over the same period. Conversely, teachers from Alliance districts reported that 30%, 30%, and 40% of their elementary, middle, and high school students learned remotely for most of 2020-21; teachers from non-Alliance districts reported that 20%, 17%, and 21% of their elementary, middle, and high school students learned remotely.

Qualitative findings

Focus group participants reported using a **variety of teaching models in the spring of 2020**, the majority being asynchronous, where students either picked up paper packets once per week or weekly assignments were posted in an online classroom management system like Google Classroom. About one-third of the focus group participants reported that their districts were providing synchronous teaching virtually. A few participants indicated that their districts offered a mix of synchronous and asynchronous lessons. Some reported that after a few weeks they began to move from paper packets to online assignments.

When **the 2020-2021 school year began**, most the focus group participants reported that their districts were using a **hybrid teaching model**. Most teachers participating in the focus groups reported that hybrid teaching meant their classes were split in half, with each group attending in person two days per week and completing their work independently the other three days. Some teachers reported a subset of students were **fully remote**, meaning that they learned from home every day. Other teachers reported that students participated in class virtually, via video-conference, on the days they worked at home. This model can be described as **dual instruction**, a model in which the teacher delivers instruction simultaneously to students in-person in the classroom and students engaged in remote learning. About 15% of the focus group participants indicated that their districts were **providing remote instruction only well into the academic year**, although some districts offered students with disabilities and ELs an in-person leaning option. About 7% of focus group participants indicated that their districts **began the school year fully in person**. Finally, about 10% of the focus group participants reported that their district offered **a remote academy option**, with dedicated teachers for students whose parents chose to keep them at home.

Q1b. What general curricular student learning outcomes were targeted?

Quantitative findings

Just as approaches to teaching and learning evolved over the first 16 months of the pandemic, so did districts' primary goals for teaching and learning. **For the spring of 2020, about 50% of districts reported that their primary goal across all grade levels for core academic subjects was to continue grade level learning, though values were somewhat lower for Alliance districts (45-50%) compared to non-Alliance districts (60-63%)** (Table C11). The remaining districts reported less ambitious primary goals for core academic subjects: maintaining contact with students (over 20% of districts) or minimizing learning loss (over 25% of districts). In non-core areas (music, art, health/PE), a smaller percentage of districts reported primary goals of continuing grade level learning and minimizing learning loss, with a larger percentage of districts reporting that their primary goal was staying in touch with students (Table C12). For special services, 36-40% of Alliance districts reported that their primary goal was to continue on-grade learning, and 40-42% of Alliance districts reported that their primary goal was to minimize learning loss, compared to 48-50% and 33-34% for non-Alliance districts (Table C13).

A substantially higher percentage of districts reported that their primary goal for the 2020-21 school year was to continue grade-level learning. For fully remote students, 74-78% of Alliance districts reported that grade-level learning was their primary goal (values highest at the elementary level and lowest at the high school level), and a slightly higher percentage of non-Alliance districts reported the same (Table C14). For hybrid students, the percentage of Alliance districts reporting grade-level learning as their primary goal was somewhat higher, with a larger percentage of Alliance districts indicating "other" as their primary goal (Table C15). The district inventory did not ask about the primary goal for fully in-person students in 2020-21.

Assessment practices also evolved over the 2019-20 and 2020-21 school years. Across all school levels, most Alliance and non-Alliance districts reported that they used attendance (>94%), completion of classroom assignments (>93%), performance on classroom tests (>87%), and performance on standardized assessments (>70%) to assess student progress in fall 2019-winter 2020 (Tables C16-C18) and 2020-21 (Tables C22-24). Values were noticeably lower in spring 2020 (Tables C19-C21), particularly for the use of classroom quizzes and tests (>69%) and standardized assessments (>37%). Although teacher survey respondents generally reported 2020-21 grading practices that were similar to those reported in the district inventory, the percentage of teachers reporting that they used standardized assessments to assess student progress was substantially lower (approximately 64%, 49%, and 21% for elementary, middle, and high school teachers) than reported by districts for the same period (Tables

C25-C27).

Similar to district-reported assessment practices, the percentage of districts reporting that they used an early warning system to detect student risk factors was substantially lower in the spring of 2020 (Tables C30, C33, C36) than before the pandemic (C29, C32, and C35) or during the 2020-21 school year (Tables C31, C34, and C37). Grading practices also varied over the course of the pandemic, with a higher percentage of districts reporting pass/fail grading (33%, 51%, and 60% at the elementary, middle and high school levels, respectively) and the suspension of grades (31%, 20%, and 12% of elementary, middle and high school levels, respectively) in the spring of 2020, compared to before the pandemic or during the 2020-21 school year (Tables C38-C46).

Q1c. What did administrators and teachers say about the challenges of and strategies for different learning formats?

Quantitative findings

Districts reported that **despite all efforts, in May 2020, about one-third of students were accessing remote learning less than half the time it was being provided** (Table C47), likely contributing to learning loss for those students. Percentages were similar for Alliance districts and non-Alliance districts at the elementary level, but higher for Alliance districts than for non-Alliance districts at the middle and high school levels. Although districts indicated that technology was likely an issue (including inadequate internet connections and hardware issues), they reported that inadequate parental support and supervision or students' limited attention spans were likely more problematic, since many parents were working or were unable to facilitate online learning for other reasons (Table C48).

The teacher survey also asked about the percentage of students who were logging in to remote learning less than half the time in spring 2020. Teacher survey respondents reported that about 40% of students were accessing remote learning less than half the time, but values were somewhat higher for Alliance districts than for non-Alliance districts (Table C49). Based on the early results of the district inventory, teacher survey respondents were asked to rank a longer list of possible reasons that these students weren't participating in remote learning in spring 2020, which include two options not listed in the district inventory: *inadequate adult supervision* and *other family reasons*. Teacher ratings from Alliance districts and non-Alliance districts indicated that inadequate adult supervision was perceived as the largest problem at all grade levels, except for high school teachers from Alliance districts, who indicated that other family responsibilities were a larger obstacle (Table C50).

During 2020-21, approximately one-fifth of fully remote students were accessing remote instruction less than half the time (Table C51). During this period, percentages were higher at all levels for Alliance districts than for non-Alliance districts (23% to 31% of elementary to high school students in Alliance districts, compared to 17% to 22% of elementary to high school students in non-Alliance districts; Table C51), likely meaning that a larger proportion of Alliance students experienced learning loss. As for May 2020, districts indicated that technology was probably part of the issue, particularly internet connectivity and hardware issues, but once again, districts indicated that "other" issues were more problematic (Table C52). Again, districts cited inadequate parental support and supervision, but they also named disengagement as a major issue.

The teacher survey asked about the percentage of fully remote learners, hybrid learners, and fully in-person learners who missed school more than half the time in 2020-21. Alliance district teachers reported average rates of 32%, 34%, and 41% of elementary, middle, and high school remote learners, respectively; teachers from non-Alliance districts reported lower rates of 21%, 30%, and 32%, respectively (Table C53). Across all school levels, teachers from Alliance and non-Alliance districts reported that lower percentages of hybrid learners missed school more than half the time, compared to remote learners (Table C54). Percentages were lower still for in-person learners, with Alliance teachers reporting average rates of 23%, 23%, and 30% for elementary, middle, and high school in-person learners, respectively, and non-Alliance districts reporting average rates of 12%, 17%, and 22%, respectively (Table C55). As described above, the teacher survey asked respondents to rank a longer list of possible reasons for student disengagement in 2020-21 than the district inventory had provided to administrators. For spring 2020, teacher respondents from Alliance districts and non-Alliance districts indicated that inadequate adult supervision was the most likely explanation across all school levels, with the same exception described above: high school teachers from Alliance districts gave the same mean ranking for inadequate adult supervision and other family responsibilities (Table C56).

Finally, the district inventory asked about digital cheating. The same percentage of Alliance districts and non-Alliance districts (61%) reported that digital cheating was much more of a problem or somewhat more of a problem at the high school level during the pandemic than before the pandemic. Values were lower at the middle school level (53% of Alliance districts and 47% of non-Alliance districts) and lower still at the elementary level (33% for Alliance districts and 25% of non-Alliance districts). A much lower percentage of APSEPs indicated that digital cheating was much or somewhat more of a problem during the pandemic (23%, 10%, and 4% at the high school, middle school, and elementary levels, respectively) (Table C57). Similarly, the highest percentage of teacher survey respondents reported that digital cheating was much more of a problem or somewhat more of a problem at the high school level, with the lowest percentages at the elementary level. Notably, teachers reported substantially higher values than district inventory respondents. Between 73% and 85% of high school teachers in Alliance and non-Alliance districts, respectively, said that digital cheating was somewhat or much more of a problem, along with 67% and 71% of Alliance and non-Alliance middle school teachers,

respectively, and 63% and 50% of Alliance and non-Alliance elementary school teachers, respectively (Table C58).

Qualitative findings

Focus group participants and teacher survey respondents **uniformly agreed that dual instruction—concurrently teaching some students in the classroom and others in class virtually—was not workable** in the fall of 2020. They reported that teachers struggled, often without support from their districts, to have the technology in place, to attend to both groups of students and provide them with the support they needed, and to make sure that the students were OK. One teacher participating in the focus groups shared the sentiment of many by saying:

"Dual-teaching was the worst idea ever … you were emotionally drained, you were physically drained, in the beginning I was, like, 'Oh my God, how am I going to do this?' and it never got easier."

Another teacher said:

"You would not expect a teacher to teach in two classrooms (across the hall from each other) at the same time while physically in the building with students. Yet, that is what we were doing while teaching with our [dual-teaching] model."

Some focus group participants reported that **dual instruction was so stressful that it was the impetus for some to leave the teaching profession.** Teachers participating in the focus groups reported that many of the **students who were remote did not do their assignments**, and teachers struggled to identify solutions to assess remote students' progress. Many teachers expressed significant challenges with the policy that **allowed students to move between in-person and remote classes with no notice.** They reported never knowing who would be in person on a given day, making it difficult for them to plan or to engage students in group activities. Educators participating in the focus groups also spoke of the constraints they were under because some of their students were remote. Teacher survey respondents and focus group participants reported that they were challenged to find ways to **engage the remote students in hands-on lessons** and had to develop two sets of lesson plans: one for in-person students and one for remote students. Additionally, many focus group participants reported that they were u**nable to take a break in the day to bring their students outside,** as the remote students would be left with no supervision. Some teachers reported that their districts always **had one teacher or paraprofessional in the classroom and the other in the virtual classroom,** which allowed for all students to have an adult who could provide guidance for the lessons and make sure that student behavior remained appropriate.

Some focus group participants spoke about **the challenge of providing educational content for their students.** In districts that were asynchronous, they spoke about the significant work to **create or identify mechanisms to deliver the curriculum.** Most prepared paper packets for the students, and some supplemented these with videos. Once schools transitioned to remote teaching, focus group participants and teacher survey respondents talked about the **difficulty of translating their in-person lessons to the online format.** This included figuring out how to teach hands-on lessons (e.g., science labs) remotely. Several focus group participants and teacher survey respondents talked about **losing the ability to differentiate the work for their students** and to monitor student academic progress due to the significant time needed to translate the curriculum for independent learning. When asked about strategies, some reported that **they partnered with other teachers in their schools and divided up the lessons that needed to be modified.** Other participants indicated that they wished their school had used this strategy.

Q1d. How did approaches to remote learning change over time, and how did these changes affect teachers and students?

Quantitative findings

The district inventory asked administrators to report on the availability of remote learning opportunities before the start of the pandemic (Tables C61-C63). Across all grade levels, less than 4% of Alliance and non-Alliance districts reported that some of their teachers were teaching virtually, except for non-Alliance high school teachers (11%); percentages were somewhat higher for APSEPs. The percentage of students learning virtually was also low for Alliance districts and non-Alliance districts at the elementary (<10%) and middle school levels (<13%), but substantially higher at the high school level (43% and 33%, respectively). The percentage of Alliance districts and non-Alliance districts who reported that they had the capability to manage and deliver virtual/remote learning was somewhat larger, but still small: 16%, 16%, and 30% of Alliance districts at the elementary, middle, and high school levels, respectively, and 19%, 30%, and 36% of non-Alliance districts, at the elementary, middle, and high school levels, respectively. The teacher survey asked respondents to report whether they had any experience with a variety of learning models, and **a very small percentage of teachers at any level reported that they had pre-pandemic experience with these hybrid or virtual learning models** (Table C64).

The district inventory also asked administrators to select all that applied from a list of improvements to remote learning from 2019-20 to 2020-21. **Across Alliance and non-Alliance districts and across all school levels, 96-98% of districts reported that teacher fluency with remote learning technologies had improved, and 88-94% of districts reported that teachers' integration of recommended apps/tools had improved** (Tables C65-C67). Similarly, the teacher survey asked teachers to select all that applied from a list of ways their own approach to remote/hybrid instruction might have improved from 2019-20 to 2020-21. Among teachers from Alliance and non-Alliance districts across elementary, middle, and high schools, 85-93% of teachers reported that "I became more

comfortable using available learning technologies" and 80-89% reported that "I became more knowledgeable about available learning technologies" (Tables C68-C70).

In addition, the teacher survey asked respondents to estimate how much of the curriculum they were able to cover in the 2019-20, 2020-21, and 2021-22 school years, compared to what they typically would have covered before the pandemic. Across all levels, **teachers indicated they covered a smaller amount of the curriculum during pandemic years, compared to previously** (Table C72), but covered a larger percentage in 2021-22 than in the first two years impacted by the pandemic. Elementary teachers reported a lower mean percentage in 2019-20 than middle or high school teachers but a higher mean percentage in 2021-22. In addition, at each level, teachers from Alliance districts reported lower mean percentages than teachers from non-Alliance districts for all levels and years.

Qualitative Findings

Teacher focus group participants and teacher survey respondents reported that **as the 2020-21 school year progressed, there were many changes in how students were taught.** Many focus group participants reported that their schools moved from hybrid to completely virtual between mid-November and mid-December in an attempt to mitigate transmission of COVID-19 between students and teachers. Others reported moving from hybrid to in-person with the option of students joining remotely. One focus group teacher said, "One constant was change, things were always changing," and a teacher survey respondent reported that the frequent changes were "exhausting and stressful." Teachers in the focus groups and survey participants alike believed that the **frequent changes in teaching models during the 2020-2021 school year meant that less material was covered.**

Goal 2. Supports for Students: Document how districts supported learning and student well-being

Goal 2 Key Findings

- Depending on their grade level and district type, teacher survey respondents reported that in the spring of 2020, 29-55% of their students were progressing with grade level learning and 41-59% of their students were in touch with their teachers daily
- Again, depending on their grade level and district type, teacher survey respondents reported that in 2020-21, 42-53% of their fully remote students were progressing with grade-level learning, compared to 51-62% of their hybrid students and 66-77% of their fully in-person students.
- Alliance districts, non-Alliance districts, and APSEPs reported that the percentage of students at all levels with access to a district-provided Chromebook, laptop, or iPad increased dramatically, from 60-72% on March 1, 2020, to 91-95% on November 1, 2020.
- Focus group participants said that the proportion of students dealing with stress, anxiety, depression, and social isolation was higher during the pandemic than they had ever seen. They reported that student coping skills and maturity levels were below what would be expected for their grade level.

Q2a. What do administrators and teachers say about the pandemic's effects on students and their families?

Quantitative findings

To detect how students were doing academically at the start of the pandemic, the teacher survey asked respondents to indicate what percentage of students were exhibiting each of several academic behaviors in spring 2020. **Teachers reported that 39-55% of their elementary, middle, and high school students were progressing with grade level learning in spring 2020**; teachers from Alliance districts reported lower mean percentages than teachers in non-Alliance districts and lower values for younger students than for older students. **Teachers reported that 41-59% of their students were in touch with their teachers daily,** with values lowest for high school students in Alliance districts and highest for elementary students in non-Alliance districts. Importantly, **teachers reported that a meaningful percentage of students were performing better while learning remotely than they had in person**; values ranged from 9% for elementary school students from Alliance districts to 16% for high school students from non-Alliance districts. (Table D1).

Teacher survey respondents from Alliance and non-Alliance districts reported similar values for elementary, middle, and high school students in 2020-21: **42-53% of fully remote students were progressing with grade-level learning, 43-64% were in contact with the teacher every day, and 12-16% were performing better than they had in person** (Table D2). In contrast, district inventory results indicate that higher percentages of fully remote students were meeting these benchmarks in the 2020-21 school year. According to the district inventory (Table D3), 67-84% of fully remote students were in contact with their teachers daily during the 2020-21 school year, with mean percentages lowest for high school students in Alliance districts and highest for elementary students in non-Alliance districts; percentages were within that range for APSEPs as well. Districts reported that 81-88% of fully remote students were working on grade-level content in 2020-21, with mean percentages again lowest for high school students in Alliance districts and highest

for elementary students in non-Alliance districts; percentages were lower for APSEPs. Finally, districts reported that 19-39% of fully remote students were completing advanced or enrichment content in 2020-21, with mean percentages lowest for middle school students in Alliance districts and highest for high school students in non-Alliance districts; values were higher still for elementary students from APSEPs.

The teacher survey also asked respondents to indicate what percentage of hybrid and fully in-person students were exhibiting these academic behaviors during the 2020-21 school year (Tables D4 and D5). Depending on their grade level and district type, **teachers reported that 51-62% of their hybrid students were progressing with grade level learning and 66-77% of their fully in-person students were progressing with grade-level learning,** with teachers from Alliance districts consistently reporting lower values. Teachers reported that 16-23% of their hybrid students and 23-31% of their fully in-person students were completing advanced or enrichment content in 2020-21, compared to 13-19% of students in spring 2020 (Table D1).

In addition, the teacher survey asked respondents to rate the adequacy of their districts' support for student learning. At each level, a substantially smaller percentage of teachers from Alliance districts said that support for student learning was *somewhat adequate* or *extremely adequate*, with values lowest at the high school level. Specifically, 48% and 64% of elementary teachers from Alliance and non-Alliance districts, respectively, said that support for student learning was *somewhat adequate* or *extremely adequate*, compared to 48%-56% of middle school teachers from Alliance and non-Alliance districts, and 39-51% of high school teachers from Alliance and non-Alliance districts (See Table D6).

The district inventory and teacher survey both asked about changes in problematic behavior during the pandemic compared to before. About 21-42% of Alliance districts and non-Alliance districts reported that cyberbullying was *somewhat more of a problem* or *much more of a problem* during the pandemic than before, with higher values reported for higher grades than for lower grades and for Alliance districts compared to non-Alliance districts (Table D7). Teacher survey respondents generally reported higher values than districts (44-60%); in both Alliance and non-Alliance districts, middle school teachers reported higher values than elementary or high school teachers (Table D8). Across all levels, over 86% of Alliance districts and other districts reported that excessive screen time was *somewhat* or *much more of a problem* (Table D9), compared to over 91% of teachers (Table D10). Similarly, most Alliance districts and non-Alliance districts reported across all levels that lack of connection to school was *somewhat* or *much more of a problem*; values ranged from 89% to 97% (Table D11). Teacher survey respondents reported lower values, ranging from 79% of elementary teachers from non-Alliance districts to 92% of high school teachers from non-Alliance districts (Table D12).

Teacher survey respondents were asked about the extent to which their special education (IEP) students and EL students in the 2020-21 school year were receiving the supports normally provided. About 35% and 55% of elementary teachers from Alliance and non-Alliance districts, respectively, said that their students in 2020-21 were *mostly* or *completely* receiving the services specified in their IEPs, compared to 31% and 48% of Alliance and non-Alliance middle school teachers, respectively, and 30% and 43% of Alliance and non-Alliance high school teachers (Table D14). Most of the remaining teachers responded *somewhat*, and 12% or fewer responded *not at all*. Values were lower for EL students, with only 29% and 43% of elementary teachers from Alliance and non-Alliance districts reporting that their EL students were *mostly* or *completely* receiving the services normally provided, compared to 22% and 35% of Alliance and non-Alliance middle school teachers, respectively, and 18% and 31% of Alliance and non-Alliance high school teachers, respectively (Table D15). The percentage of teachers replying *not at all* was somewhat higher for EL services than for IEP services.

Finally, teacher survey respondents were asked to review a list of resources and indicate the level of student need during the pandemic, compared to before. Elementary and middle school teachers from Alliance and non-Alliance districts indicated that technology devices, improved Wi-Fi access, and behavioral health services were their students' greatest needs; elementary and middle school teachers from Alliance districts also indicated that students' greatest needs included food assistance and "other" (Tables E16 and E17). High school teachers from Alliance and non-Alliance districts reported similar results, although they also indicated that special courses were one of their students' greatest needs (Table E18.)

Qualitative findings

Challenges and strategies related to student engagement

The teaching challenge that was most frequently mentioned by focus group participants was **student engagement**. In the **spring of 2020** focus group participants and teacher survey respondents reported that many districts made the decision that the **final grades for the academic year would not be lower than the grades students had on the last day of in-person classes.** They reported that not grading the students made it very hard for students to stay motivated or connected to school, which **resulted in some students not participating in schoolwork at all and most not completing all their assigned work.** One teacher said:

"[Engagement] definitely went down, especially once it became known that basically whatever GPA they had when we went out was going to be what they stayed with … our district felt that it was very punitive to punish someone for not doing their work in these exceptional times."

Most focus group participants reported that their **districts were initially asynchronous, and many did not have required time online.** One

teacher said:

"When we first started during the spring of 2020, none of our online time was required time, so everything was asynchronous and engagement in the lessons that were being posted was probably the biggest challenge."

Once students were online, many focus group participants and teacher survey respondents reported challenges that impacted engagement, including **schools not requiring students to have cameras on; students having other priorities** like caring for younger siblings or working to help support their families; and **younger students needing help** from an adult to complete lessons or log on. Some focus group participants reported that they did not know how to engage students through technology. Teacher survey respondents also reported that students became increasingly dependent on devices and social media, leading to digital cheating.

Issues with engagement persisted into the **2020-2021 school year**, when many focus group participants and teacher survey respondents reported that their schools were using concurrent hybrid teaching models (also known as dual instruction). Teachers reported that it was **difficult to both attend to the students in the classroom and to engage the students joining remotely.** Students at home often had their cameras off, were distracted (e.g., by others at home, or by playing video games), and some just did not log on. Focus group participants also noted that in the fall of 2020 it was **very hard for students to adjust to being back in the classroom.** One teacher said:

"They were less engaged; we had trouble trying to get them to focus in class … we had a lot of social issues. It seems that they had regressed significantly, not only academically but emotionally and socially as well."

Another struggle reported by focus group participants was that some **students did not believe they had to complete their schoolwork**, because they thought that just like in the spring of 2020, grades would not count. One educator said:

"I would say that last year the greatest challenge we had was getting the students to believe that they could fail this time … they didn't believe it, so … there was quite a large amount of students that were retained because they did nothing all year."

In the spring of 2020, many focus group participants reported that they **used technology** to engage their students. Some reported that their schools instituted **"office hours"** when teachers were available to meet with students individually or in small groups. Others provided this medium as a way for their students to socialize, opening Zoom 20 minutes before class or scheduling a "lunch bunch" or a non-instructional class meeting where their students could spend time together. Early in the pandemic, some participants reported that their districts **asked teachers to call or email their students and their families multiple times per week** to keep them connected. Others reported innovative ways that they used technology to engage their students. Even though their district was asynchronous, some elementary school teachers **started each day with a morning meeting,** trying to keep some type of routine for their students. In districts where not all students had access to a computer, teachers would record a video of morning meeting and email the link to families. One teacher said:

"And so every morning I would shuffle up my cards and I would say good morning to every one of my kids on the recording, and parents told me that the kids would say, 'Good morning, Mrs. M.' back when they heard their name."

In the older grades, focus group participants would **post a fun question or a poll in Google Classroom**. Some used this to take attendance, and others as a strategy to get their students to log on. **Other focus group participants made videos** to keep students engaged, for example, reading books aloud, and for students who could not be synchronous they made videos explaining the assignments. A few made personal videos for each student as a way to connect. For synchronous participants, teachers reported engaging in activities like bringing a pet to school or giving a tour of their home. Some participants noted that **because they were teaching from home, their students got to know them as people and not just as teachers.**

Other engagement strategies reported by the focus group participants included **sending birthday cards to students, doing a car parade, dropping off care packages for graduating students, and delivering awards to students.** Two pre-K teachers made "flat Stanley" cardboard cutouts of themselves and sent one to each student so that when students were watching videos or listening to a story their teacher was in the house with them. When they returned to school in the fall of 2020, **some focus group participants used SEL curricula to reconnect with students. A few paired students in the classroom with those learning remotely** for group activities, providing a peer connection for students at home.

Teacher survey respondents reported that **students who were engaged and motivated, as well as those whose parents were able to support their academic development, were successful** with remote learning.

Student Learning and Achievement

Focus group participants and teacher survey respondents expressed **significant concern about the amount of learning loss** that students have experienced. They reported that **writing and math skills were significantly below expectations** and that high school **students were not prepared to take AP courses.** One respondent to the teacher survey said:

"Students covered up their lack of progress/mastery during fully remote that are discovered once we returned to school."

Another reported:

"At the high school level, over half the population of our students cannot do basic math or write a grammatically correct sentence."

Focus group participants indicated that the amount of **content being covered**

between March of 2020 and June of 2021 was less than half of what was typically covered. Many attributed this reduced content to the fact that students "could only handle so much" because of the social-emotional impacts of the pandemic. While focus group participants **felt that the increased focus on SEL is necessary**, they worried about how students would learn the material missed. Some teacher survey respondents noted that **students seemed to forget how to be students** during the pandemic. Many focus group participants expressed concern that the curriculum in the 2020-2021 school year began where it typically does and did not focus on helping students to learn missed content from the spring of 2020. **They noted not just *"a summer slide but a six-month slide."*** Some teacher survey respondents said that **students were passed on to the next grade** at the end of the 2019-2020 school year despite being academically at least one grade level behind.

Focus group participants believed that the **frequent changes in teaching models** during the 2020-2021 school year meant that less material was covered. They also reported that students had ***"internalized the decreased expectations"* from the spring of 2020**, when missing schoolwork or poor attendance did not impact their grades. Many elementary school teachers participating in the focus groups expressed **a notable difference in achievement between students who had parents' support to complete their work in the spring of 2020 and those who did not.** Others noted that some **parents did their child's schoolwork** in the spring of 2020, so when they returned to school in the fall of 2020, their deficits were more pronounced than anticipated. Focus group and teacher survey participants reported that **students receiving special education and EL supports struggled**, as they were not getting the support they needed and fell far behind. One educator said that *"EL students were uniquely poorly suited for online learning."* Some teacher survey respondents noted that language barriers made it difficult for some parents to engage with teachers or help their student with schoolwork. A positive outcome expressed by many teacher survey respondents and focus group participants was that their **student's technology skills had grown significantly** and that this was especially true for students who previously lacked access to technology at home. Teacher survey respondents also noted that many students became more flexible in their learning and more able to work collaboratively with their peers.

Student Emotional Concerns

Focus group participants were asked how their students' emotional concerns in the 2020-2021 school year, such as stress, anxiety, depression, and trauma, compared to before the pandemic. The focus group participants and teacher survey respondents reported that although some students were very resilient, **the pandemic had a significant emotional impact for many, if not most of their students. The rates of students dealing with stress, anxiety, depression, and social isolation were beyond anything they had ever seen.** One teacher said:

"It really literally broke my heart to see teenagers unable to even speak to each other, to see people scared in the hallway or get yelled at because they are not wearing a mask correctly but not being given a hello".

Focus group participants and teacher survey respondents reported that **student coping skills, conflict resolution skills, and maturity levels were below what was expected for their grade level.** They noted that **going back to school was emotionally difficult for their students** and that many had "forgotten how to socialize." Many focus group participants and teachers responding to the survey noted the **detrimental impact that student social-emotional stress had on their academics** and how it had been hard to see their students struggle. One said:

"So it was like we were not giving them what they needed socially, and then academically they were feeling like, well, nobody cares anyway so I'm not going to do anything."

Another stated:

"Students lack more empathy … There are constant bullying, fights, and crying students with drama."

Teachers in the focus groups observed a **significant increase in the number of students who had an IEP for emotional disturbance.** Some focus group participants and teacher survey respondents who teach at secondary schools reported **increased incidents of self-harm, suicide attempts, psychiatric inpatient stays, and students who died by suicide.** One educator said:

"I'm just seeing much higher levels of anxiety and depression and isolation. Where students feel like they don't know how to make friends anymore. And high school can be lonely anyways, but if you go through it completely by yourself and you don't know how to go up to someone and make friends, that's so hard for these kids."

Another stated:

"[Our school] had more students hospitalized for psych issues in the last two years than in the previous 14 combined."

Focus group participants also reported that it was not just the students who were struggling **but that teachers and administrators also needed support.** One educator said:

"Everybody has difficulty with the social emotional and the whole pandemic. It was a collective trauma for everybody."

Student Behavior

Focus group participants and teacher survey respondents **noted a significant number of concerns regarding student behavior.** They indicated that students had less ability to self-regulate, which led to a significant increase in **behavioral problems including fighting, bullying, cheating, truancy, and being disrespectful to peers and school staff.** Focus group participants and survey respondents reported that students were **exhibiting more limited conflict resolution skills compared to before the pandemic. Participants believed that this was partially due to increased stress**

and limited socialization. One teacher said:

"Kids emotionally are further behind, and they're not ready for some of the demands that are being asked of them."

Many teacher survey respondents and focus group participants **expressed frustration that school administration was not holding students accountable** for violent behavior, instead allowing it to continue. Some respondents indicated that their **administrations attempted to ease the impact of the pandemic on students by relaxing school rules and lowering expectations** for student conduct, resulting in negative student behaviors becoming unmanageable. One educator said:

"Kids were getting away with physical violence towards themselves and teachers, swearing at teachers, and they would basically go to an administrator … and, you know, they might get a lollipop, and that's not an exaggeration. And then they'd go back to class."

Even with the increase in behavioral issues, focus group participants reported that **most students were happy to be back in school.** Teacher survey respondents reported that even a small amount of time in school improved students' mental health.

Q2b. What technological and other resources did districts provide to support student learning during the pandemic, and what technology challenges did students experience?

Quantitative findings

The district inventory indicated that before the pandemic, access to electronic devices varied by district type and by school level. Approximately 78% of Alliance districts indicated that every elementary student had access to a school-provided device for use in school, compared to 71% of other districts and 55% of APSEPs (see Table D21). At the high school level, 80% of Alliance districts and 74% of other districts reported that every student had access to a school-provided device for use in school, compared to 60% of APSEPs (see Table D29); values were similar at the middle school level (see Table D25). A much lower percentage of districts indicated that every student had their own school-provided device for use at home or school (see Tables D21, D25, and D29).

District inventory results also indicated that access to electronic devices changed over time. **Alliance districts, non-Alliance districts, and APSEPs reported that the percentage of students at all levels with access to a district-provided Chromebook, laptop, or iPad increased from March 1, 2020, to November 1, 2020.** For example, districts overall reported that 60 % of elementary students had access to a district-provided device on March 1, but this value increased to 87% on May 1 and 95% on November 1 (Tables D22-D24). The percentages of students with access to a district-provided device were typically lower at younger grades. Although values were lower in Alliance districts than in non-Alliance districts on March 1, values were higher in Alliance districts than non-Alliance districts on May 1 and November 1; values were consistently lowest in APSEPs (Tables D22-D24, D26-D28, D30-D32).

Teacher survey respondents were asked to rate the adequacy of student access to 1:1 devices at two different times. (See Tables D33-D34). Between 79% and 85% of teachers from non-Alliance districts reported that their access to 1:1 devices for students was somewhat adequate or extremely adequate in spring 2020, compared to 63% to 75% of teachers from Alliance districts. For the 2020-21 school year, between 92% and 94% of non-Alliance districts reported that their access to 1:1 devices for students was somewhat or extremely adequate, compared to between 85% and 87% of teachers from Alliance districts. Although access increased at all levels for both types of districts, the percentage of teachers that reported somewhat or adequate access was consistently lower in Alliance districts.

The district inventory asked about changes over time in internet access to support online learning (see Tables D35-D36). Alliance districts reported that the mean percentage of students with sufficient internet access to participate in online learning increased from 69% on March 1, 2020 (before the pandemic) to 93% on November 1, 2020 (eight months later), whereas non-Alliance districts reported a higher mean percentage of 83% on March 1 and 96% on November 1 and APSEPs reported lower mean percentages of 73% on March 1 and 90% on November 1. When asked to predict what would have happened without district action, Alliance districts reported that by November 1, 2020, a mean percentage of 66% of students would have had sufficient internet access for full participation in online learning, compared to 84% reported by non-Alliance districts and 81% for APSEPs.

Qualitative findings

Internet and bandwidth, access to computer devices, and technology skills to log on and use software platforms were the most common student challenges with technology that focus group participants and teacher survey respondents shared. They noted that these challenges were **heightened for elementary school children and for students with disabilities.** As one special education teacher in the focus group said:

"Every day, I would log on as a student so I could make a video of myself accessing the assignments in every class and send that to my students. They just couldn't figure out how to do all the technology."

For students who needed technology support at home, focus group participants said that many **parents were not equipped to assist their child with the remote learning technology** and that a substantial amount of their week was spent helping (via phone, written resources, and videos) parents log on to the remote learning platform, monitor their child's virtual attendance, and locate assignments, schedules, and other student resources. Some parents also needed support from teachers in assisting their child with class assignments and how to manage their schedules. **For parents with limited English profi-**

ciency, training and supports were insufficient.

Participants in the focus groups and teacher survey noted that over time, students in need were provided Wi-Fi hotspots and Chromebooks to assist with their virtual learning. The timing of these supplies varied among participants' districts. Some teachers said that some hotspots did not work or that they were insufficient to support the bandwidth needed to participate in remote learning.

Q2c. What resources were available to support students' physical and emotional well-being during the pandemic, compared to before the pandemic?

Quantitative findings

During the first two years of the COVID-19 pandemic, districts worked to support students' physical and emotional well-being, as well as their academic development. Many districts focused resources on nutrition support. **In the district inventory, 69-84% of Alliance districts reported that they were offering free meals to all elementary, middle, or high school students before the pandemic, compared to 13-18% of non-Alliance districts and 26-38%% of APSEPs** (see Table D39). However, 94% of Alliance districts and 88% of other districts offered free take-away meals to all students in the spring of 2020 (see Table D40); during the 2020-21 school year, 97% of Alliance districts and 92% of non-Alliance districts offered free in-school meals to all students (see Table D41). Very few APSEPs (8%) offered free take-away meals to all students in spring 2020, though 42% offered free in-school meals to all students during the 2020-21 school year.

The district inventory asked how the allocation of resources for social services referrals and the number of referrals changed over time. For spring 2020, 50% of Alliance districts reported that they allocated a lot more resources or somewhat more resources for social services referrals compared to before the pandemic, followed by 35% of non-Alliance districts and 28% of APSEPs (see Table D42). For the same period, 56% of Alliance districts reported that they referred a lot more or somewhat more students for social services compared to before the pandemic, followed by 36% of non-Alliance districts and 16% of APSEPs (see Table D43). **For the 2020-21 school year, 74% of Alliance districts reported that they allocated a lot more or somewhat more resources for social services referrals compared to spring 2020, followed by 61% for non-Alliance districts and 25% for APSEPs** (see Table D45); values were similar for the number of students referred (see Table D46). The results show that over the first two school years affected by the pandemic, Alliance districts saw a dramatically larger increase in the allocation of resources for social services referrals and in the number of students referred, compared to non-Alliance districts and APSEPs. Tables D44 and D47 summarize how districts described their efforts to connect students to social services in spring 2020 and school year 2020-21, respectively.

In terms of support for emotional well-being, the district inventory asked how student participation in virtual or in-person counseling meetings changed during the pandemic, compared to before the pandemic (see Table D48). The percentage of districts reporting that counseling visits were much more common or more common ranged across district types and grade levels, from 66% of elementary schools in Alliance districts to 60% of high schools in Alliance districts and from 56% of elementary schools in non-Alliance districts to 71% of high schools in non-Alliance districts. Smaller percentages of APSEPs reported that counseling visits were much more common or more common, ranging from 24% of APSEPs serving elementary school students to 41% of APSEPs serving high school students.

The district inventory also asked districts to indicate which of eight social-emotional learning (SEL) programs or approaches they were using at different school levels during the 2019-20 and 2020-21 school years (see Tables D49-D51). **Across all district types and grade levels, fewer districts reported using PBIS during the 2020-21 school year, compared to 2019-20. Similarly, more districts across all types and grade levels reported using Restorative Practices and RULER in 2020-21 compared to 2019-20; the use of Second Step also seemed to increase at the elementary and middle school levels in Alliance districts.** Notably, there was also an increase in the number of districts reporting that they were using other SEL programs, and no change in the number of districts reporting they were using no SEL program.

The teacher survey asked respondents to rate the adequacy of their schools' support for students' physical health and social-emotional well-being. **At all levels, a substantially smaller percentage of teachers from Alliance districts said that support for students' physical health was *somewhat adequate* or *extremely adequate*, with values lowest at the high school level.** Specifically, 41% and 54% of elementary teachers from Alliance and non-Alliance districts, respectively, said that support for students' physical health was somewhat adequate or extremely adequate, compared to 42% and 48% of middle school teachers, and 32% and 46% of high school teachers (Table D52). **Similarly, a substantially smaller percentage of teachers from Alliance districts said that support for students' social-emotional well-being was somewhat adequate or extremely adequate, with values again lowest at the high school level.** Specifically, 39% and 50% of elementary teachers from Alliance and non-Alliance districts, respectively, said that support for students' social-emotional well-being was somewhat adequate or extremely adequate, compared to 38% and 43% of middle school teachers, and 34% and 45% of high school teachers (See Table D53). Notably, values on these items were lower than for the item in which teachers were asked to rate their schools' support for student learning (Table D6).

Qualitative findings

Most focus group participants and many

teacher survey respondents reported that **their districts increased use of SEL programs**, including RULER and Second Step. While they appreciated the recognition of student needs and the time allocated for this work, **many felt it was not enough**. One educator stated:

"There's no set SEL program that would ever be adequate enough for what we were facing in the moment, and so it's hard to pinpoint a specific resource that would accommodate what was happening".

Some focus group participants and teacher survey respondents reported that their districts were able to add staff to do outreach to students not coming to school (e.g., staff that could provide tutoring; additional social workers, school psychologists and guidance counselors). However, the need was so great that **many districts struggled to provide the level of supports needed by the students.** Focus group participants and teacher survey respondents who worked with **students receiving special education or EL services noted that their students did not receive all the supports typically available to them,** and students with emerging concerns could not be assessed. One educator said:

"So I do think that a lot of the students didn't get the services that they should have during that time because it was virtually impossible to meet what an IEP said that was written before remote learning was even a thing."

Some participants from the Special Education focus groups expressed their support for the newly developed electronic IEP, CT SEDS portal. They hoped that the system would be easy for parents to access and use and felt that it would support students with IEPs and 504s if future remote learning mandates occur. One educator said:

"The idea of having everything electronic and translated for parents and in a portal where parents can access all of those documents sounds wonderful."

Focus group participants reported that students were often unable to access supports such as physical, occupational, and speech therapy. They also reported that families who tried to find community-based mental health services for their students often struggled because of the shortage of providers.

Goal 3. Supports for Teachers: Document how districts supported teaching and teacher well-being

Q3a. What do administrators and teachers say about how the pandemic and the resources provided affected teaching and teacher well-being?

Quantitative findings

The district inventory included two open-ended items about staffing adjustments. Many districts (n=49, Table E1) reported that in spring 2020, they shifted teacher and staff responsibilities or reassigned teachers and staff to new roles to support remote learning. For fall 2020, districts reported that new hires were the main staffing adjustment (n=54, Table E2); they largely hired teachers and other staff to teach and support fully remote students, although reassigning teachers and staff was still common (n=33, Table E2).

When asked about a variety of safety-related activities conducted in the summer of 2020 to prepare for fall 2020, almost all districts reported buying personal protective equipment such as masks and shields (nearly 100%), providing COVID safety training for teachers (96%), and making building improvements including ventilation, air purification devices, and directional signs (92%); values for safety training and building improvements were slightly higher for Alliance districts than for other districts (Table E3).

Goal 3 Key Findings

- Focus group and teacher survey participants reported that their well-being suffered from constant changes in class scheduling, pressing student and parent needs, shifting COVID guidelines, fear for their personal health, and absences due to teacher and student quarantines. They shared that these factors created a chaotic and stressful environment, yet they received inadequate support for their well-being from their school or district administrations. Depending on their grade level and district type, 47-58% of teacher survey participants said their district's support for their physical health was somewhat or extremely inadequate, and 63-68% said the same of their district's support for their social-emotional well-being.

- Districts reported making substantive changes to administrator and teacher roles to adapt to remote learning and accommodate student and district needs; in focus groups and surveys, many teachers said they found the added responsibilities overwhelming.

- Districts reported using formal and informal approaches to teacher professional development specifically related to remote learning, including producing their own online teacher resources. Depending on their grade level and district type, between 40% and 60% of teacher survey participants said they had received an adequate amount of professional development across a variety of topics.

- Districts said they will continue to use learning management systems, SEL resources, and videoconferencing systems put in place during COVID to support future learning. Most (63-85%, depending on grade level and district type) teacher survey participants who reported using new instructional technologies during the pandemic indicated that they would like to continue using these resources.

The teacher survey asked respondents to rate the difficulty of eighteen aspects of teaching during the pandemic compared to before. Mean values indicated that elementary teachers from Alliance districts and non-Alliance districts rated *Coping with unexpected challenges or interruptions during teaching* as most challenging, along with the high ratings for *facilitating student engagement, motivating students to complete assignments,* and *preparing students for summative assessments (high stakes tests and unit tests)* (Tables E4). Middle and high school teachers rated *eliciting student participation during instruction, facilitating student engagement,* and *motivating students to complete assignments* as most difficult (Tables E5 and E6). Across all grade levels, teachers from Alliance districts rated these aspects of teaching as slightly less challenging than teachers from non-Alliance districts.

Teacher survey respondents were asked how adequately their school supported staff members' physical health and social-emotional well-being. Across district types, only 23-33% of elementary, middle, and high school teachers reported that support for staff members' physical health was *somewhat adequate* or *extremely adequate*, with values generally lower for teachers from Alliance districts. Similarly, only 18-26% of elementary, middle, and high school teachers reported that support for staff members' social-emotional well-being was *somewhat adequate* or *extremely adequate*, with values generally lower for teachers from Alliance districts. (Tables E8-E11).

Finally, the teacher survey asked respondents to rate how much they needed a variety of resources and supports during the pandemic, compared to before. Responses were very similar for Alliance districts and non-Alliance districts, but they varied by grade level. Elementary teachers from Alliance districts and non-Alliance districts reported that their greatest needs were *remote and/or hybrid lesson plans* and *additional staff* for three purposes: to address students social and emotional needs, to support students' use of instructional technology, and to help with concurrent instruction (Table E12). Middle and high school teachers from Alliance and non-Alliance districts also reported that their greatest needs included r*emote and/or hybrid lesson plans* and *additional school staff who can address students' social and emotional needs*, along with *strategies to keep students engaged and motivated* (Tables E13- E14). In addition, high school teachers said that one of their greatest needs was *strategies to catch students up to grade level.*

Qualitative Findings

Throughout the focus group discussions and in responses to the teacher survey, participants expressed **concern for their own emotional well-being while trying to meet their expanded teaching responsibilities** during the spring of 2020 and the 2020-2021 school year. They discussed the stress and strain from working additional hours to learn new technologies, adapt their curriculum to varying teaching models, and attending to COVID-19 safety protocols while also keeping students engaged and connected. Some respondents to the teacher survey reported that staff shortages and a lack of substitute teachers left them covering other classes and other activities (e.g., lunch duty). Many also reported frustration that the boundary between home and work dissolved during the pandemic. Participants indicated that **school leaders failed to recognize their efforts in response to the growing demands placed on them.** They also said that leadership expected teachers to be flexible to meet student needs, but teachers were not receiving that flexibility in return from the administration. Participants indicated that **constant changes to class scheduling, pressing student and parent needs, shifting COVID guidelines, and absences due to teacher and student quarantining created a chaotic and stressful atmosphere.** As one teacher explained, *"Everyone became really skilled at pivoting on a dime!"*

Many focus group participants and teacher survey respondents said that they were **fearful for their physical safety** in their school buildings, especially before COVID vaccinations were available. Some indicated that they were not supplied with masks or COVID tests despite mandates to return to their buildings. One teacher said:

"It felt so unsafe having to go into that building every day in 2020-21. The school district clearly just wanted to get students in person to be babysat and didn't care about us giving them an education or keeping them and ourselves from getting COVID."

Another stated:

"Just as other professions were protected, so should we have been".

Focus group participants who were special education teachers and those teaching younger grades shared concerns for their physical well-being because of the way they interacted with and assisted students. As one teacher explained:

"At the preschool level, you're going to help the kids tie their shoes and so on. There were things that we weren't supposed to be doing [for the kids], but how could you not at that age? I am immune compromised. In the beginning [of the 2020/21 school year] it was scary. These kids aren't wearing masks and they're coughing and sneezing all over me and I'm wiping their noses."

Many teacher survey respondents reported that **the stress of teaching during the pandemic** led many peers to resign from teaching, move their retirement to an earlier date, or seriously consider leaving the profession. They attribute this to teachers feeling less safe, having an increased workload without fair compensation, and experiencing increased work-related stress.

Teacher survey respondents **reported feeling disrespected during the pandemic.** They said that they had to work much harder without appreciation or increased compensation. They expressed frustration about leadership structures and inflexible policies that prevented them from teaching in ways they believed would best serve students. They also expressed disappointment that legislation was not passed to give

teachers credit toward retirement for two extra years of service. They said that a failure to engage their expertise and feedback throughout the pandemic showed a lack of respect for teachers. Expressing a concern shared by many focus group participants and teacher survey respondents, one teacher said:

"Our school boards and government officials need to start listening to teachers, who are highly educated professionals, about what the needs are in the classrooms."

Supports Provided to Promote Teacher Well-Being. Focus group participants and teacher survey respondents indicated that **their school and district leadership gave them limited support** during the 2020-2021 school year to protect their physical and emotional well-being. Participants noted that the most common types of supports provided to teachers by school administration were links to online resources for self-care or wellness events, email reminders to take care of themselves, and occasional time off from meetings to recharge. Some participants had access to a mental health hotline, town hall–style meetings, or a school psychologist or social worker. Many said that support from their colleagues was critical for their well-being during the pandemic.

Many focus group participants indicated that supports provided were inadequate and that messages from the administration to "take care of themselves" while they were simultaneously being asked to work harder felt insincere. Some felt that the lack of a unified policy or articulated district position about self-care and teacher well-being left teachers unsure about how to prioritize their well-being while balancing teaching responsibilities. As one teacher put it:

"Our administration talked about social-emotional care, but I didn't feel like it was geared toward teachers. They expected us to be there for the students and parents, but there wasn't anyone looking out for us. They just wanted more curriculum. It was a lot."

Q3b. What technological resources did districts/schools provide to teachers to support remote and hybrid learning, and what technology challenges and strategies did teachers report?

Quantitative findings

The district inventory asked about the technology resources available to teachers before the COVID-19 pandemic. At all grade levels, **Alliance districts were less likely than non-Alliance districts to report that before the pandemic, teachers had access to technology integration support (42-44% vs. 57-60%) and learning management platforms like Google Classroom (22-60% vs. 60-83%)**, with values consistently lowest in elementary school and highest in high school. However, Alliance districts were slightly more likely to report that teachers were using apps, including Remind and Class Dojo, to communicate with parents (60-78% vs. 66-74%), with values consistently lowest in high school and highest in elementary school (Tables E17-E19).

Districts were asked to report what technologies were provided to teachers to support remote learning in spring 2020 and in the 2020-21 school year. For spring 2020, the highest percentage of districts reported that they provided Chromebooks to elementary teachers (85% and 71% of Alliance districts and non-Alliance districts, respectively), followed by laptops (55% and 52% respectively), and Wi-Fi hotspots (46% and 42%, respectively); in these three categories, percentages were consistently higher for Alliance districts. For the 2020-21 school year, Alliance districts reported slightly lower values for Chromebooks and higher values for laptops and Wi-Fi hotspots, whereas non-Alliance districts reported slightly higher values for Chromebooks and laptops and slightly lower values for Wi-Fi hotspots (Table E20). **Chromebooks, laptops, and Wi-Fi hotspots were the technologies that the highest proportion of districts reported providing to middle and high school teachers, with values general increasing between spring 2020 and 2020-21.** However, differences between Alliance districts and non-Alliance districts were less consistent at the middle and high school levels than at the elementary level, with non-Alliance districts sometimes reporting higher levels of access than Alliance districts. (Tables E21 and E22).

When districts were asked to report what learning management platforms they provided to teachers in spring 2020 and 2020-21, the most common option at all levels was Google Classroom, ranging from 79% to 84% for Alliance districts and from 82% to 94% for non-Alliance districts, decreasing slightly between spring 2020 and 2020-21 (Tables E23-E25). The second most common option for elementary teachers was SeeSaw, reported by 36% and 58% of Alliance and non-Alliance districts, respectively, in spring 2020 and approximately 58% of both Alliance and non-Alliance districts in 2020-21 (Table E23). The second most common option for middle and high school teachers in Alliance districts was "Other" (16-20%, with a variety of platforms mentioned; Tables E24-E25). In non-Alliance districts, the second most common option was Seesaw for middle school teachers (24-26%, Table E24) and Schoology for high school teachers (15-17%, Table E24-E25).

Districts were also asked to report the apps and tools that were most used by teachers. Alliance districts and non-Alliance districts reported that Google Forms and YouTube were the most-used apps for elementary teachers in spring 2020 (reported by 69-78% of districts), with values generally higher for 2020-21 (Table E26). Trends were similar for middle school teachers (values ranged from 74-84% in spring 2020 and slightly higher in 2020-21l Table E27) and high school teachers (74-87% in spring 2020 and slightly higher in 2020-21; Table E28). Approximately 64-71% of Alliance districts and 33-39% of non-Alliance districts reported that in spring 2020, they used a single-sign-on system (like Clever) that could record what apps were being used by teachers and students, but a sizeable proportion (27% and 15.3% of Alliance and non-Alliance districts, respectively) reported that did not use the associated analytics (Table E29). The percentage of Alliance districts

using a single sign-on system increased slightly in 2020-21 (71-76%); while the percentage increased substantially for non-Alliance districts (54-58%), it was still notably lower than for Alliance districts (Table E30). When asked about technology-related preparation for fall 2020, over 93% of Alliance district and other districts reported creating online resources for teachers and over 72% reported that they had adopted new learning management tools (Table E31).

The teacher survey took a broader view and asked teachers to rate the adequacy of their access to three different categories of instructional technology in spring 2020 and in 2020-21. Responses consistently improved over time, although the percentage of teachers saying access was *somewhat adequate* or *extremely adequate* was consistently lower for Alliance districts than for non-Alliance districts. Approximately 36% of all elementary teacher respondents said that access to hardware/software for concurrent hybrid instruction was *somewhat adequate* or *extremely adequate* in spring 2020, compared to 60% in 2020-21. Approximately 50% of all elementary teachers said that access to learning apps was *somewhat adequate* or *extremely adequate* in spring 2020, compared to 77% in 2020-2021. Approximately 64% of all elementary teachers said access to a learning management system was *somewhat adequate* or *extremely adequate* in spring 2020, compared to 82% in 2020-21. (Tables E32 and E33). The trend was similar among middle school teachers, with the percentage of middle school teachers reporting adequate access to hardware/software for concurrent hybrid instruction increasing from 43% to 67%, the percentage reporting adequate access to learning apps increasing from 66% to 86%, and the percentage reporting adequate access to learning management systems increasing from 80% to 92% (Tables E34 and E35). The same trend was present among high school teachers, with the percentage of all high school teachers reporting adequate access to hardware/software for concurrent hybrid instruction increasing from 46% to 65%, the percentage reporting adequate access to learning apps increasing from 67% to 76%, and the percentage reporting adequate access to learning management systems increasing from 80% to 90% (Tables E36 and E37).

Qualitative findings

Many of the teachers participating in the focus groups and teacher survey respondents reported that in the spring of 2020, they had a very steep learning curve to be able to teach remotely. One teacher said:

"For me, it was the technology and getting everything I needed on the computer to share with my students … I'm okay with tech, but this was like learning a whole different career or something. That whole piece of it definitely stressed me the most."

Teachers received training to learn new technologies required to teach via an online platform. Some reported that this training was adequate, but **many felt that these trainings were not helpful or were too time intensive given the immediacy of their need to pivot to online learning.** Some participants noted that their districts provided self-guided training through a variety of online resources. Many said that they were not given adequate time to participate and integrate the trainings to support their needs. One educator said:

"The training was minimal and was even more, I hate to say insulting, but it was kind of insulting. They would send links to videos or articles on how we can teach ourselves on what we could be doing that might be helpful without setting any time aside to give us the training or the time to teach ourselves."

Peer support was a training resource frequently cited by teacher survey respondents and focus group participants. Many noted that their peers would help those in need learn how to navigate Teams, Zoom, Google Meet, and various learning platforms. They would also meet informally to share best practices for creating video content and translating curriculum to an online format. This was especially true for hands-on subjects such as home economics, theater, and science labs.

Some participants said that in the spring of 2020 **many of their students did not have access to technology,** with some lacking a device and others lacking internet access or having limited bandwidth in their homes. This was especially true for teachers in urban and rural districts. Some focus group participants reported that **they did not have enough bandwidth at home** with their family members either working from home or engaged in virtual learning. They were also **challenged to teach students and their parents how to use learning management systems like Google Classroom.** Some focus group participants and teacher survey respondents reported that their districts had IT staff providing information and training for families. But in others, it was the teacher's responsibility to assist the families. One teacher said:

"My district was playing catch-up with technology. We were not one to one to start off with, so it was like learning to teach kids how to use computers. Being a tech teacher while also teaching history."

Other participants spoke of younger children struggling to log in without assistance. As one teacher said:

"These are third graders, they're nine years old, and many of them did not have parents that were able to help them because the parents were trying to work, so I feel like the technology piece for my students was the most challenging for them."

In **fall 2020**, many focus group participants reported being overwhelmed with the amount of technology that was available to them. Though some liked the ability to choose the programs that worked best for them, others lamented **the lack of direction from their district,** leaving students and families to have to figure out multiple platforms. Focus group participants also reported significant difficulties in getting their classrooms set up for dual instruction, noting that there were many issues and appropriate technology solutions were not always provided. Every focus group participant who used **dual instruction reported that it was difficult if not impossible.** One teacher stated:

"Dual teaching was hellacious … an incredible challenge and technologically untenable. I said at the time it took me three times longer to get everything done, which I think in retrospect it was six or seven times longer … I was not getting through curriculum."

When asked about successful strategies for using technology to support COVID-era learning, focus group participants spoke about the significant benefit when **all their students were provided with a device and internet access.** Others said that the IT staff at their schools were heroes. And participants from a few districts reported that the **professional development they received was invaluable.** And some developed **innovative strategies** so that their dual teaching would be successful. One educator said:

"I took kind of like a mixer board and I hung two overhead mics in my classroom like you would for a choir. I ran those into a mixer board along with a mixer coming off of my Mac, which had a level ear microphone and then I had an output which was the speakers from Zoom so the kids in the room could hear the kids at home and the kids at home could actually participate in the discussions."

Q3c. What types and amount of professional development did districts/schools provide to teachers to support remote and hybrid learning (e.g., training on education technology, pedagogy of virtual teaching, etc.)?

Quantitative Findings

The district inventory asked districts how many hours of paid professional development in the spring of 2020 had been devoted to strategies and skills for remote learning. Approximately 36% of districts reported that they provided 6 or fewer hours, 43% reported that they provided 7-18 hours, and 21% reported that they provided 19 or more hours. Values were similar for Alliance districts and non-Alliance districts, whereas APSEPs provided dramatically less paid professional development (Table E41).

Districts were asked whether they conducted a variety of PD-related activities during summer 2020. Most districts reported that they provided paid professional development related to learning technologies (73%) and strategies for remote teaching (71%), with values higher for Alliance districts and lower for non-Alliance districts. Over 55% of districts reported that they offered voluntary learning opportunities and resources on these topics (Table E42).

Finally, districts were asked how many hours of paid professional development during the 2020-21 contract year had been devoted to strategies for remote and/or hybrid instruction. About 25% of Alliance and non-Alliance districts reported that they provided 6 or fewer hours. The majority of the remaining Alliance districts provided 19 or more hours, whereas the majority of the remaining non-Alliance districts provided 7-18 hours (Table E43). As in spring 2020, APSEPs provided substantially less paid professional development during the 2020-21 school year, compared to Alliance and non-Alliance districts.

The teacher survey asked respondents to consider the professional development they had completed in four areas over the past five years—both professional development provided by their district and professional development they had completed on their own. **Approximately 36-60% of elementary, middle, and high school teachers reported they had received the amount of PD they needed or more across a variety of topics.** Among elementary teachers, 52% said they had received an adequate amount of professional development on learning management systems, compared to 44% for PD on content-specific online instructional materials, 36% for PD on SEL during remote or hybrid instruction, and 40% for PD on other strategies and skills for remote/hybrid instruction. Values were similar for elementary teachers from Alliance districts and non-Alliance districts (Table E44). Approximately 60% of middle and high school teachers said they had received the amount they needed or more when it came to professional development on learning management systems; compared to 50% and 46%, respectively, for PD on content-specific online instructional materials; 40% and 43% for PD on SEL during remote or hybrid instruction, and 41% and 46% for PD on other strategies and skills for remote/hybrid instruction (Tables E45 and E46). Values were higher for middle school teachers from Alliance districts than for middle school teachers from non-Alliance districts, whereas values were lower for high school teachers from Alliance districts than for high school teachers from non-Alliance districts.

Q3d. What tools and strategies introduced during the pandemic do administrators and teachers say they will continue to use in their practice?

Quantitative Findings

The district inventory asked districts which of a list of online practices they planned to continue using after the pandemic. **The most common online practices districts indicated they would continue using after the pandemic were virtual meetings with parents (94%), followed by virtual teacher professional development (82%).** Other practices reported by a majority of Alliance and non-Alliance districts include continuing use of their learning management system and/or digital learning tools, one or more stand-alone online course (for example, credit recovery or advanced coursework), online diagnostic or benchmark assessments, and virtual meetings with students (for example, counselors, social workers, or therapists meeting with students to provide services; Table E49).

Relatedly, teacher survey respondents were asked about online materials or technologies they had begun to use since the pandemic started. Respondents were also asked which of these online materials they would like to continue using after the pandemic. Almost 80% of elementary school teachers from Alliance districts and non-Alliance districts reported that they had started to use a new learning management system and new content-related online instructional materials during the pandemic, with approximately 60% reporting that they

had started to use new online SEL-related instructional materials (Table E50). The majority (63-85%) of elementary teachers who reporting using new online materials or technologies indicated that they would like to continue doing so (Table E51). Approximately 70% of middle school teachers and 64% of high school teachers reported that they had started using new content-related online instructional materials during the pandemic; less than 50% of middle school and high school teachers began using the other online materials or technologies during the pandemic (Table E50). However, **like elementary teachers, most middle and high school teachers (64-87%) who reported using new online materials or technologies during the pandemic indicated that they would like to continue doing so** (Tables E52-E53).

Qualitative findings

Focus group participants were asked if they would retain any new tools or strategies that they began to use during the pandemic. The **most frequent responses were related to technology. Participants spoke about the benefits of learning management systems,** including Google Classroom or Class Dojo. Some continued to have students **upload their homework assignments** into the management systems, eliminating the need for papers to be turned in and returned. They spoke of how efficient this was, with one teacher saying that her students *"no longer had to decipher my handwriting to get feedback."* Some participants **uploaded supplemental materials** such as videos providing additional explanation of a concept covered in class. Many spoke of the added convenience of using the system to **communicate with students** or their parents through an *"information hub."* Focus group participants also spoke about additional uses for the system, including the **option of telling students which lessons to review if they were out** sick or had been suspended. Many appreciated having their **lessons digitalized** and available for their students and found that the **students were more responsible and independent when the materials were readily available for them.** Some also reported that having more learning tools available for all students created *"greater opportunities for equity"*.

Focus group participants say they continued to use some digital tools with students. Those working with EL students talked about the benefit of **Google Translate,** which allows students to be more independent in their work and demonstrate increased problem-solving skills. Others spoke about the benefits of **audio books and speech-to-text tools,** which allow students with learning differences to receive information and communicate their thoughts more independently. Participants also reported significant benefits from using **document cameras** when teaching remotely and said they continued to use them in the classroom.

Focus group participants discussed the benefits of having **virtual PPTs, parent-teacher conferences, and school open houses,** as more parents were able to attend without having to miss work and more of these meetings could happen during the workday, allowing teachers to be home in the evenings. Some reported that their schools continued to offer **virtual office hours** where teachers are available during their planning period or after school to meet individually with students; teachers said that some students are more comfortable meeting virtually.

Focus group participants and teacher survey respondents also spoke of **systemwide changes** that they hoped would continue. **Many said that *"one-to-one technology needs to stay in schools"*** providing equitable access to technology for all students and allowing them to continue to use the tools they adopted when teaching remotely. Some hoped that districts would continue to use technology to offer school remotely on severe weather days. Some participants suggested that districts find a way to have a permanent remote learning option for students who *"thrive in that environment."*

SEL was also mentioned by many of the teachers who participated in the focus groups. **They spoke of the desire to keep the focus on SEL,** recognizing that *"children need that piece (social-emotional) to be intact and in place for them to address the academic piece."*

Some reported appreciating the **SEL curricula** that were offered in their school, such as RULER or Second Step, because these curricula teach ways for children to identify their feelings and a common language to talk to their teachers and peers about them. Some said that they appreciated the schoolwide implementation of these programs as they have found ways to **integrate SEL into the academic curriculum.**

Q3e. What lessons do administrators and teachers say they learned regarding teaching and learning during the pandemic and how the state could improve in a future pivot to remote learning?

Quantitative Findings

Three teacher survey items were designed to explore teacher perceptions of five learning models that were implemented widely over the first 16 months of the pandemic:

- Fully in-person instruction;
- Concurrent hybrid instruction (also known as dual instruction), where teachers provide in-person and remote instruction to different students at the same time;
- Non-concurrent hybrid instruction, where teachers provide in-person instruction and remote instruction at different times;
- Fully remote instruction, where teachers interact with their students during one or more synchronous/real-time class each school day; and
- Fully remote instruction, where teachers interact with their students for less than one synchronous/real-time class each school day

Specifically, the survey asked teachers to rank these five learning models in terms of how they would prefer to teach after the pandemic, how prepared they feel to implement each model, and how effective they believe each model to be.

Across all grade levels and both district types (Alliance and non-Alliance), **teachers consistently indicated that in-person instruction was their first choice, with non-concurrent hybrid instruction as a distant second, followed by fully remote instruction with synchronous interactions, concurrent hybrid instruction, and finally fully remote asynchronous instruction** (Table E55). When asked to rank the five learning models in terms of how prepared they felt to implement them, respondents ranked them in the same order (Table E56). When asked to rank the learning models in terms of effectiveness, teachers responded somewhat differently. Though fully in-person instruction was ranked as most effective, non-concurrent hybrid instruction was ranked second most effective, and fully remote asynchronous instruction was ranked as least effective (similar to teacher preferences and preparedness), ranks were reversed for the other two models: concurrent hybrid instruction was ranked as more effective than fully remote synchronous instruction (third and fourth most effective, respectively; Table E67). These results may indicate that teachers see some benefit in concurrent hybrid instruction even though they find it challenging.

Qualitative Findings

Across focus groups, **participants expressed their appreciation for the opportunity to share their teaching and learning experiences during spring 2020 and the 2020-2021 school year.** Many indicated that it was the first time that they had been asked to share their experiences professionally. Participants provided policy and practice recommendations to prepare for future disruptions to in-person learning.

Focus group participants emphasized the need for a **statewide plan** that is developed using best practices from districts with **input from a diverse group of administrators, educators, and parents.** For many, district-level planning and supports during the pandemic were inconsistent, confusing, and ever-changing, and they revealed inequities in the types and quality of teacher and student supports across districts. As one teacher said:

"It was like night and day between my district and my child's district. There was so much confusion."

A teacher survey respondent said:

"The pandemic exposed gross and shameless education inadequacies throughout the state of Connecticut. Poor and disenfranchised students in this wealthy state have very separate and very unequal schools."

Focus group participants would like the statewide plan to outline **consistent resources (e.g., technology), dedicated professional development and planning time, and clear expectations about teaching priorities to support them in their teaching role.** As one participant stated:

"Having more consistent expectations and statewide or regional recommendations would have made us felt like we are all in the same boat rather than some people are in a yacht and some are in a dinghy fending for themselves."

To seamlessly pivot to a remote learning environment in the future, focus group participants said that a statewide **technology plan** should articulate how teachers and families will be supported with the **necessary equipment** to effectively engage in remote learning, as well as how **training, supports, and resources will be provided to parents** to help them monitor their child's remote learning progress. This plan should include access to translated resources for parents in multiple languages. One teacher said:

"I would say that I put a lot of effort into training parents. If this should happen again, it would make my job a lot easier if someone would train parents."

Focus group participants also said they would like to have a **state repository *(resource bank)* of training materials and curriculum resources** from their peers that includes remote teaching best practices, lesson plans, curriculum adaptations, and virtual engagement strategies to reduce the burden of re-envisioning their curriculum to accommodate remote learning.

Last, focus group participants and teacher survey respondents reported student learning successes with **remote learning academies that had dedicated teachers**, as these students were able to progress through the curriculum at the typical pace. **They felt that this strategy would work long-term for students** who have peer issues, are bullied, have social anxiety, are introverts, or are easily distracted.

Goal 4. Academic Outcomes: Examine links between learning models and student outcomes

Q4a. To what extent were students able to access remote learning?

Quantitative findings from administrative data analysis

As described in Q1a, analysis of administrative data showed that schools with a large share of high needs students were less likely to provide some in-person learning at the beginning of the 2020-21 school year and less likely to offer a higher share of days in person over the course of the school year. Further, **uptake of in-person options between October and March was also lower in schools with large shares of high needs students,** with uptake rates of 76%, 71%, and 65%, respectively, for elementary, middle, and high schools with smaller shares of high needs students, and rates of 52%, 51%, and 45%, respectively, for schools with larger shares of high needs students. Detailed results are described in Appendix C, which includes Figures C1-C2 and Tables C1-C3.

Our analysis of administrative data revealed substantial heterogeneity in the extent to which districts offered in person learning opportunities to students, and substantial heterogeneity in the uptake of those options by students. In local and regional public-school districts, the probability of students having either a hybrid or in-person option averaged around 90%: higher (95-98%) for districts at the 25th percentile for share high needs students (lowest values at the high school level) but falling to 60-70%

Goal 4 Key Findings

- The pandemic was associated with reduced school enrollment in fall 2020, especially among the lower grades.
- In the lower grades, schools with the lowest share of in-person days had the largest declines in ELA and Math test scores. However, we observed no differences on 11th grade SAT scores based on share of days in-person.
- Schools with lower shares of in-person days had lower attendance rates. This was most pronounced in grades 2-5. Declines in attendance were smaller when students had more opportunity for in-person learning, especially in elementary and middle school.
- Focus group teachers expressed significant concern about the amount of learning loss students experienced. They reported that student's writing and math skills were significantly below expectations and that high school students were not prepared to take AP courses.
- District-reported social services referrals for students were associated with lower test scores and proficiency. This likely was because the pandemic had differential social-emotional effects on students across schools in ways that depressed their academic performance. These effects were not captured by traditional measures of schools' need (for example, share of high needs students).

for districts at the 75th percentile for high needs students (again, lowest values at the high school level). Similarly, the proportion of in-person days offered over the entire school year ranged from 60% of all days for high school to 80% for elementary school at the 25th percentile for share high needs students, but from 55% to 70% at the 75th percentile. The proportion of days in person ranged much more widely by share of high needs students for Regional Education Service Centers (RESC) and charter schools—from 90% to 98% at 25th percentile to 76% to 63% at the 75th percentile—and it was much lower overall for endowed and incorporated academies, falling to between 35% and 50% of days.

In terms of uptake, though districts offered many more in-person days at the end of the school year (37% of days between September and December and 68% of days between April and June), student uptake improved only modestly, with student in-person enrollment days increasing from 70% of in-person days offered to 80% of days offered between the same two periods. Further, student uptake of in person learning opportunities was much lower in schools with larger shares of high needs students. For example, a district that offered 10 additional in-person days between September and December saw an increase of 7.6 days of in-person student enrollment on average for schools around the 75th percentile of share of high needs, but an increase of only 5.2 days at the 25th percentile. This in-person enrollment response gap narrowed as the school year progressed, especially in the April to June period, with 5.7 days at the 75th percentile and 4.5 at the 25th percentile for 10 additional days offered in person.

Our student-level difference-in-difference analyses of administrative data indicate that the provision of hybrid or in person learning opportunities had minimal impact on fall 2020 enrollment decisions. The only major declines in enrollment occurred for public pre-K and kindergarten, with at most minor declines in the likelihood that a student enrolled in public school in the fall of 2020 was also enrolled in the fall of 2021 (typically never more than a 1 percentage point decline; see Table F1). For kindergarten enrollment declines, we use students enrolled in first grade in the fall of 2022 as a lower bound on fall 2021 kindergarten enrollment loss, since some parents may have simply delayed kindergarten enrollment by a year during the pandemic. Only about 87% of fall 2022 first-graders had been enrolled in kindergarten in September of 2021, and by June of 2022 the share had risen only to 91%. However, even in this heavily affected population, we could not detect any impact of the share of days offered in person on enrollment, as shown in Tables F2-F4 in Appendix F.

Quantitative summary of district inventory indicators

As described in the ***Data Analysis*** section above, we identified a set of district inventory items that describe the teaching and learning conditions most likely to impact student outcomes data. This allowed us to integrate data from the district inventory with the administrative data to examine the association between district practices and student outcomes. The first district inventory indicator describes students' access to synchronous instruction in spring 2020; districts received a value of 0 if they indicated that instruction was fully asynchronous or a value of 1 if they indicated that instruction was partially or fully synchronous. As shown in Figures F1-F3 on page 15 (and Table F15 in Appendix F), **the percentage of districts reporting synchronous instruction varied by district type.**

The second district inventory indicator describes students' access to remote learning at the start of the pandemic, based on items about the percentage of students with adequate internet access and access to devices for remote learning as of March 1, 2020. As shown in Figure F4 (and Table F16 in Appendix F), **access to remote learning varied systematically by district type.** The next indicator describes activities districts reported doing in the summer of 2020 to prepare for fall 2020. As shown in Figure F5 (and Table F17 in Appendix F), most districts selected at least half the options.

Figure F4. Spring 2020 student access to remote learning

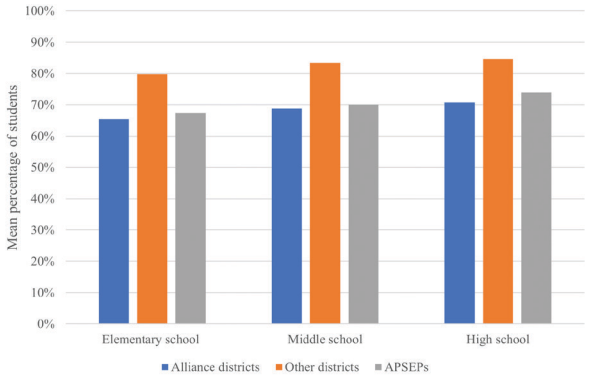


Figure F5. Summer 2020 preparation for fall 2020

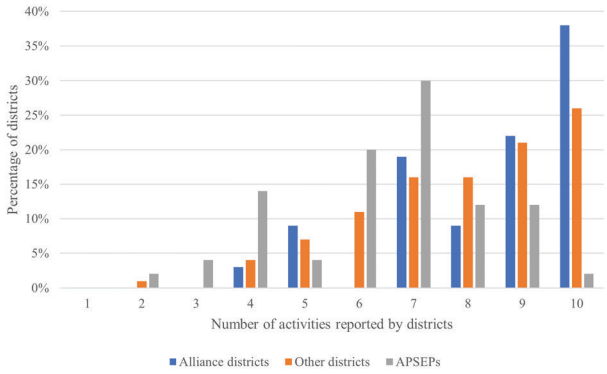


Figure F6. 2020-21 improvements to remote learning in elementary schools

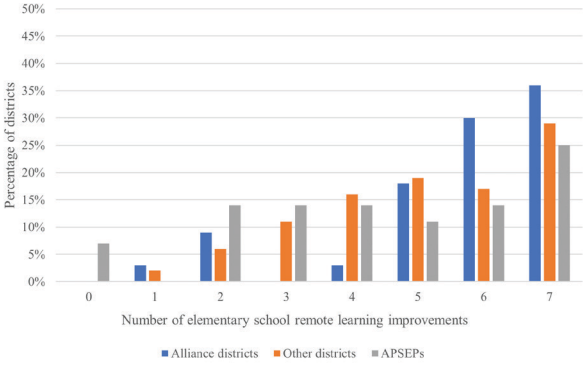


Figure F7. 2020-21 improvements to remote learning in middle schools

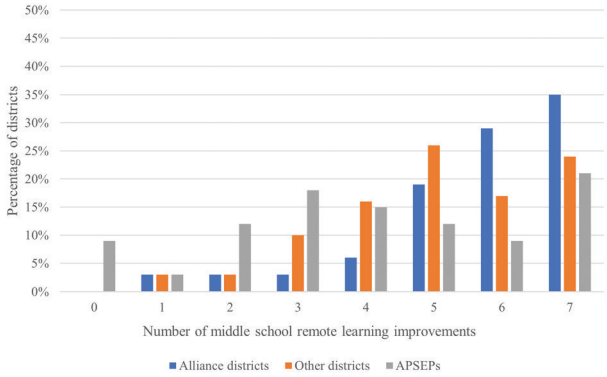


Figure F8. 2020-21 improvements to remote learning in high schools

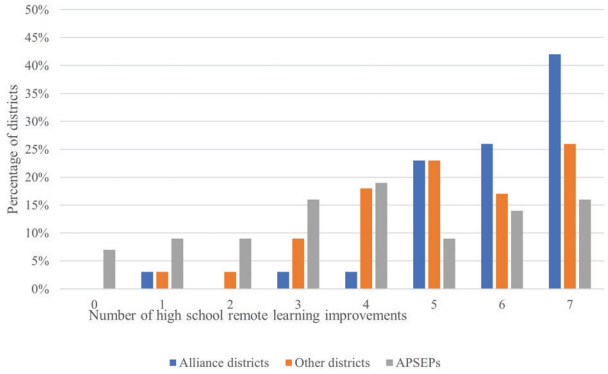


Figure F9. 2020-21 assessment rigor in elementary schools

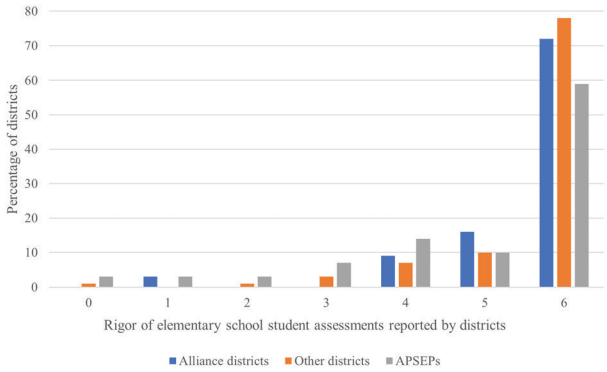


Figure F10. 2020-21 assessment rigor in middle schools

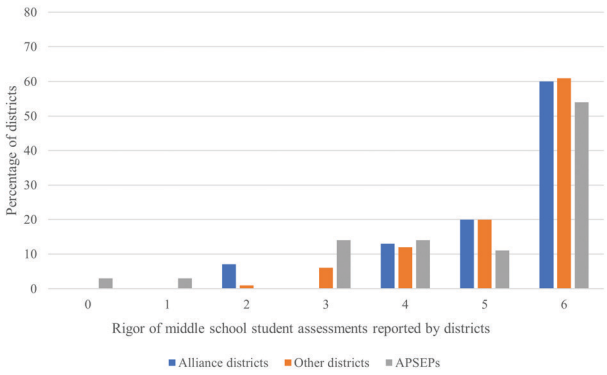


Figure F11. 2020-21 assessment rigor in high schools

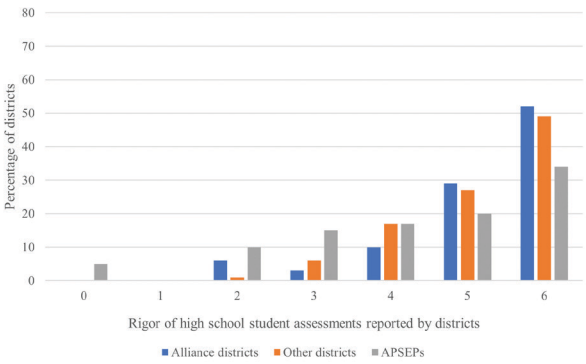
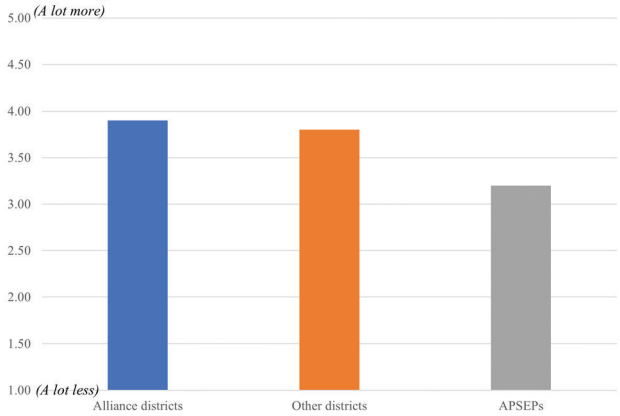


Figure F12. 2020-21 social services referrals for students



The remaining three indicators related to teaching and learning conditions during the 2020-21 school year. The fourth indicator describes improvements to online learning that districts reported for the 2020-21 school year, compared to spring of 2020. Most districts reported five or more improvements, as shown in Figures F6-F8 (and Table F18 in Appendix F).

The fifth indicator describes the rigor of the assessment practices that districts reported for 2020-21, on a scale of 0-6. Figures F9-F11 (and Table F19 in Appendix F) show that while most districts scored high on this measure, scores were lower for older grade levels. Finally, the sixth indicator describes the volume of social services referrals for students in 2020-21 (for example, for physical or behavioral health care, nutrition assistance, or housing assistance). This indicator is based on items about the resources allocated for social services referrals and the number of students referred, with a scale of 1-5. Figure F12 (and Table F20 in Appendix F) show that values were highest for Alliance districts and lowest for APSEPs.

Q4b. What do teachers say about the association of learning models and conditions with student attendance and performance?

Qualitative findings

In focus groups and on the teacher survey, teachers reported that **asynchronous education resulted in difficulty keeping students engaged** in their education. While focus group participants reached out to students and families by phone and email, **some districts did not provide any online content, and in others not all students had access to online materials.** One educator said:

"I feel that spring [2020,] a lot of kids, we never heard from because they just, they had no way to access the distance learning plan and no way to connect with teachers and it was, sometimes you have three kids sharing one tablet, so if all teachers wanted the kids on at a certain time they could only have one kid on at a time."

Focus group participants reported that **teachers and students who were in dual-learning schools struggled.** They reported feeling that **they were not able to attend fully to either group of students and worried about the lack of supervision for students joining remotely.** The dual-teaching model was reported to be successful only in districts that **had one teacher or paraprofessional in the classroom and the other in the virtual classroom,** which allowed for all students to have an adult who could provide guidance for the lessons and make sure that student behavior remained appropriate.

Focus group participants and teacher survey respondents said that **many of the remote students in dual-teaching classes did not do their assignments,** and teachers struggled to assess their progress. Many of the participants expressed significant challenges with the policy that **allowed students to move between in-person and remote classes with no notice.** They reported that they never knew who would be in person on a given day, making it difficult for them to plan or to engage students in group activities.

While some teacher survey respondents reported that having fewer students in a hybrid classroom led to students learning at a typical pace, most focus group participants felt that **students who were in schools that were hybrid had fewer opportunities to learn as they were typically in school half of the time or less and then given lessons to complete at home.** Participants reported that many students did not complete the work assigned for home. One teacher said:

"If the blue classes came on a Monday, most of them did not engage on Tuesday doing the work that I provided. And that work was reinforcement. It wasn't anything new. It was, you know, and it wasn't busy work, so I found that they really felt that they were going to school three days a week."

Focus group participants reported success with **remote learning academies that had dedicated teachers for students whose parents chose to keep them home.** These students were able to progress through the curriculum at the typical pace. Additionally, **teachers reported that some students thrived in the online environment, especially those who had peer issues, were bullied, had social anxiety, were introverts or were**

easily distracted.

Q4c. How were remote learning models and conditions associated with changes in student attendance and performance on standardized assessments?

Quantitative findings from administrative data analysis

Our student-level difference-in-differences analyses of administrative data show substantial declines in attendance during the 2020-21 school year, compared to prior years. **However, we found that declines in attendance were smaller when students had more opportunity for in-person learning, especially in elementary and middle school.** Comparing schools in districts that provided the largest and smallest shares of days in-person (100% elementary, 95% middle, and 82% high school at the 90th percentile as compared to less than 50% at the 10th percentile), we find declines of 2 percentage points in attendance rates for schools with the smallest shares of in-person days. Declines in elementary, middle, and high schools with the largest shares in-person days were 0, 1, and 1.5 percentage points, respectively. Although declines in attendance were larger for schools with a large share of high needs students, we found minimal evidence of differences between schools with large and small shares of high needs students in terms of the positive effects of in-person learning on attendance. Detailed results are described and shown in Tables F5 and F6 in Appendix F.

Our difference-in-difference analyses of administrative data show that test score declines were smaller in districts that provided the largest shares of days in-person compared to districts that provided the smallest shares of days in person. Smarter Balanced Assessment score losses ranged from 17% to 26% of a standard deviation in ELA and 33% to 44% of a standard deviation in math for schools with less opportunity for in-person learning (with larger losses in lower grades), whereas losses ranged between 11% and 15% of a standard deviation in ELA and 27% and 31% of a standard deviation in math for schools with more opportunity for in-person learning, again comparing the 90th to the 10th percentile of schools in terms of share of in-person days offered. However, when we examined SAT scores in English and Math (administered statewide in 11th grade), we found no effect of in-person learning. Similar to our findings for attendance, declines in test scores were larger for schools with a large share of high needs students, but we found minimal evidence of differences between schools with large and small shares of high needs students in terms of the positive effects of in-person learning on test scores. Detailed results are described and shown in Tables F7-F10 in Appendix F.

In summary, our analyses show that learning losses during the pandemic were significantly larger in schools with a high share of high needs students. Declines in attendance rates and ELA test scores were larger in schools with large shares of high-need students regardless of district decisions concerning remote learning. These learning losses were exacerbated because these schools were also much less likely to belong to LEAs that were aggressive in returning to in-person learning. And even when the LEAs provided in-person learning opportunities, students in high needs schools were less likely to take up those opportunities. As a result, both district and family decisions concerning in-person learning likely led to substantially worse attendance rates and standardized test score performance in our most disadvantaged schools.

Quantitative findings from integrated data analysis

As described above, we conducted **inferential analysis of a merged data set that combines administrative data with data from the district inventory to examine the association of remote learning conditions with key student outcomes.** As noted above, for each of the six district inventory items, we examined the item's association with student attendance rates, whether a student was chronically absent, student scores on Smarter Balanced and SAT English language arts and mathematics, and whether students scored at the proficiency level or higher on

the same tests. Attendance and chronic absence were assessed separately by grade span: early elementary, later elementary, middle school, and high school. Test scores and proficiently levels were assessed separately by grade. Appendix F provides more detail on these analyses, with results shown in Table F21 for overall significance and Tables F22 and F23 for effects on specific outcomes and grades.

After correcting for the risk of type 1 error given that we are considering six district inventory items and four outcomes across many grades, we found strong evidence that district efforts to refer students to social services during the 2020-21 school year and the share of district students with online access in spring 2020 are strongly associated with student outcomes during the 2020-21 school year. We also find more marginally significant evidence that the rigor of student assessment activities pursued by districts was associated with student outcomes. We do not find evidence that synchronous versus asynchronous learning in spring 2020, the number of types of activities undertaken during the summer to prepare for 2020-21, or the number of areas of improvement in online learning were associated with student outcomes. However, the lack of findings for synchronous versus asynchronous learning may reflect the disconnect between district-reported data from the district inventory and teacher-reported data from the teacher survey and focus groups.

District efforts to refer students to social services during the 2020-21 school year and the share of students with online access in spring 2020 appear to be associated with test scores and/or test proficiency. For student referrals to social services, we observe lower test scores and proficiency levels as the resources allocated and number of referrals increases. This evidence of lower performance levels is observed across the board, with larger declines in Math test scale scores and proficiency levels as referral efforts increased, especially in lower grades, and

larger declines in ELA scores and proficiency for sixth grade. In terms of magnitude, a one-point in the five-point social services referrals scale was associated with a 1 to 2.5 percentage point decrease in the share of fifth-eight grad students proficient in Math in spring 2021 and a 1 percentage point decrease in the share of sixth grade students proficient in ELA. For the same grades, test scale scores in Math and ELA decreased by between 2.5% and 3.5% of a standard deviation.

Given that increased social services referrals (specifically, the relative number of referrals and the amount of resources for referrals in 2020-21, compared to before the pandemic) are associated with lower test scores, it is important to discuss what mechanisms may lie behind these effects. Given the low correlation with the share of high needs students, we do not anticipate that these results were caused by pre-pandemic differences between districts. Rather, one possible explanation is a type of reverse causality where, conditional on students' pre-pandemic needs, the students in some districts faced larger shocks and therefore needed more social services referrals, such that districts needed more resources for referrals. These same schools saw substantially larger declines in test scores, especially math test scores, during the pandemic, findings consistent with reports from teachers focus group and teacher survey participants about how students experienced significant emotional and psychological stress. A natural policy implication to draw from these results is that standard measures of district need and disadvantage may not fully capture the heterogeneous impacts of a crisis on districts' student bodies, and ongoing monitoring during a crisis may be required to identify districts where, due to unforeseen circumstances, learning losses are likely to be especially large.

For online access in spring 2020, **most of the estimates are positive, but only two are statistically significant: sixth-grade proficiency in math and 11th-grade proficiency in ELA (based on the state-established proficiency threshold for the SAT).** In terms of magnitude, a 20% increase in the share of students with online access, equivalent to one standard deviation, implies a 1.5 percentage point increase in the share of sixth-grade students proficient in Math in the spring of 2021 and a 1 percentage point increase in the share of 11th-grade students proficient in the ELA. Given the lack of any specific pattern in the grade and subject matter affected, one might reasonably conclude that although there were positive test score effects, they were sufficiently small that we can only detect effects when estimation errors lead to large magnitude estimates and we cannot reliably determine whether these estimated effects are concentrated in a specific grade or in a specific subject area. It is important to note that this analysis cannot distinguish between the effects of online access in spring 2020 and the possibility that online access in spring 2020 correlates with the quality of online learning during the 2020-21 school year.

For attendance and chronic absence, we observed effects for online access in spring 2020 and rigor of student assessment. For online access, chronic absence and attendance effects are unexpectedly negative, with better access in spring 2020 being associated with worse attendance in 2020-21. Notably, the estimates are quite small, less than 0.2% in terms of attendance rates and at most just over half a percentage point in terms of the share of students chronically absent in 2020-21. These effects may arise simply because good online access in spring 2020 was consistent with better ability to manage hybrid and on-line learning in 2020-21 and therefore may have led to better tracking of student attendance.

More rigorous district student assessment practices are also associated with differences in attendance and chronic absence during the pandemic. In this case, more rigorous assessment is associated with better attendance in middle school, but the effects are small in magnitude. A 1-point improvement in the 6-point assessment index has effects of less than 0.2% in terms of increased attendance rates and a reduction of only half a percentage point in the share of students chronically absent.

RECOMMENDATIONS

We recommend developing a statewide plan for potential future disruptions to in-person learning that focuses on lessons learned about effective practices during the pandemic and includes input from a diverse group of administrators, educators, and parents. The plan should:

1. Provide resources and guidance to support safe in-person learning

Schools with less access to in-person learning had larger declines in student outcomes, and the uptake of in-person learning was lower in schools with larger percentages of high needs students than for schools with smaller percentages of such students. Districts had a great deal of autonomy in whether and how to implement learning models (remote, hybrid, or in-person), which led to different access to learning opportunities. Districts also varied in their ability to purchase safety equipment like desktop shields and high-quality masks for teachers and students. Students, especially those in high needs schools, would benefit if the state provided more guidance and supports for schools to offer and engage students in in-person learning, including resources to support effective family engagement.

2.Ensure that all districts have adequate instructional technology, professional development, and curriculum resources for remote or hybrid instruction

The pandemic revealed dramatic inequity among districts in resources to support the pivot to remote instruction. The pivot was smoother for districts that had already implemented 1:1 computing, learning management systems, online curriculum resources, and professional development to support teachers in using these resources. Communities also varied in terms of whether families had the resources to support online learning, such as stable internet access. These differences in how quickly and effectively districts could pivot to remote or hybrid instruction and in families' ability to access remote learning have a dramatic impact on students. Developing an emergency plan for timely and efficient delivery of instructional technology, pro-

fessional development, and curriculum resources for remote or hybrid instruction could shorten the time districts need to respond to emergencies in the future.

3. Carefully consider the challenges of concurrent hybrid instruction

Teachers generally expressed strong negative, opinions about concurrent hybrid instruction (simultaneously teaching students in-person and remotely), the majority saying that it was overwhelming, especially with little support for doing it effectively. In 2022, the Connecticut General Assembly passed Public Act 22-80[4], which defines and prohibits concurrent hybrid instruction. If elected officials decide to remove this prohibition in the future, our recommendation is to provide the necessary material and human resources as well as professional development to increase the likelihood of successful implementation.

4. Practically assess student academic progress and social-emotional well-being

As we note, the finding of a negative association between social service referrals and students' tests scores and proficiency likely reflects differential community or student vulnerability to the social-emotional impacts of the pandemic. Further, traditional measures of school or student need do not seem to capture baseline differences in vulnerability to pandemic effects. We recommend developing practical approaches for assessing students academically in remote environments for cases when in-person assessments are not possible. Similarly, we recommend assessing the social-emotional well-being of students during and beyond times of crisis. Doing so would provide valuable information for targeted support.

5. Provide adequate resources to support student academic and social-emotional well-being

Effective student learning during a crisis is likely to require substantial resources like those described in our third recommendation. It also requires guidance and resources for supporting diverse academic needs, including the needs of special education students and EL students. Addressing students' social-emotional needs also requires resources, along with school structures designed to respond to those needs as they evolve. Evidence-based approaches to consider supporting in schools include multi-tiered systems of support (MTSS), social-emotional learning (SEL) approaches, and Positive Behavior Interventions and Supports (PBIS). These approaches should include formative evaluation or continuous quality improvement to gauge progress and quality of implementation. Learner analytics and artificial intelligence also show promise for supporting evidence-based decision making and identifying at-risk students.

6. Support families so they can support their students

Families are essential partners in education at any time, but even more so when students are learning from home. This study documented the observation (common among educators) that students whose families could provide adequate support fared better academically, socially, and emotionally during the pandemic. Some caregivers struggled to support their students academically because working outside the home was essential to their families' survival. Other caregivers struggled with remote learning because they didn't have the resources or information.

We recommend that the state develop resources for families in multiple languages that support communication, technology use, mental health, nutrition assistance, and other needs.

7. Design a plan that mitigates the strain on educators

This study documented that educators experienced high levels of work-related stress during the first two years of the COVID-19 pandemic. Although teachers consistently reported that the first three months of the pandemic were difficult, many said that during that period, they felt their school and district leaders and their communities were compassionate and supportive. However, teachers consistently reported different challenges in the 2020-21 school year and beyond: many felt that they were asked to carry unreasonable burdens in terms of their personal health and safety, their workload, and their accountability for student achievement. Although many teachers reported that this later period was challenging, expectations of teachers varied across schools and districts. We recommend that the state develop guidelines for teacher job responsibilities during an extended crisis to reduce stress, burnout, and attrition.

8. Acknowledge and reward educators' sacrifices and commitments

Over the course of this study, we heard from many teachers who said they had not been acknowledged or rewarded for their dedication and personal sacrifices during the pandemic. Many said public discourse about teachers had become extremely negative, and that the appreciation they felt early in the pandemic disappeared as the crisis wore on. Teachers expressed frustration that they had made the same sacrifices as other essential workers without receiving hazard pay, sick time for COVID-related absences, or other benefits. Numerous teachers spoke about the failed legislation that sought to award extra years of service toward retirement and the difference such an acknowledgement would make to their morale. We recommend that state and local leaders seek additional ways to acknowledge and reward educators' sacrifices and commitments during the pandemic and potential during future crises.

CONCLUSION

The COVID-19 pandemic triggered a public health crisis response that was unparalleled in modern history. The closing of schools and the various forms of remote learning that followed placed immense strain on students, their families, and educators, resulting in negative consequences that will be felt for many years to come. Many states, including Connecticut, have sought to learn from this crisis and to identify ways we might improve education to be better prepared for such events. The pandemic also ex-

4 Section 25-2a of Connecticut Public Act 22-80 defines dual instruction as "the simultaneous instruction by a teacher to students in-person in the classroom and students engaged in remote learning," and section 25-2c "prohibits the provision of dual instruction as part of remote learning."

posed many areas in which our education systems can be improved more generally to better serve students in greatest need of support. This study is one of many efforts by the Connecticut COVID-19 Education Research Collaborative (CCERC) that seeks to uncover lessons from the pandemic to guide policy and practice. In response to Connecticut General Assembly Public Act 21-2ss, Section 389, we used multiple sources of data to accomplish four goals: 1) document the implementation of remote learning models; 2) document how districts supported learning and student well-being; 3) document how districts supported teaching and teacher well-being, and 4) examine links between learning conditions and student outcomes. Through the voices of district administrators and teachers captured in our surveys and focus groups, many lessons emerged about where the pain points were for district leaders, teachers, students, and their families. And through combining these data with administrative data, we uncovered valuable lessons about the learning conditions that helped and hindered educational success. As we detail in our recommendations, efforts to improve our educational system will require careful attention to the needs of all stakeholders invested in its success. Our hope is that this report contributes to that process.

[i] Kaufman, J. H., Diliberti, M. K., Hunter, G. P., Snoke, J., Grant, D., Setodji, C. M., and Young, C.J. (2021). COVID-19 and the State of K–12 Schools: Results and Technical Documentation from the Spring 2021 American Educator Panels COVID-19 Surveys. Santa Monica, CA: RAND Corporation. Retrieved from https://www.rand.org/pubs/research_reports/RRA168-7.html.

[ii] Ibid.

[iii] Council of Chief State School Officers. (2013). Interstate Teacher Assessment and Support Consortium (InTASC) Model Core Teaching Standards and Learning Progressions for Teachers 1.0: A Resource for Ongoing Teacher Development. Washington, DC: Author. Retrieved from https://ccsso.org/sites/default/files/2017-12/2013_INTASC_Learning_Progressions_for_Teachers.pdf.

[iv] TeachingWorks Resource Library. (2022). High-Leverage Practices. Ann Arbor, MI: TeachingWorks. Retrieved from https://library.teachingworks.org/curriculum-resources/high-leverage-practices/

[v] Rhemtulla, M. and G. R. Hancock (2016). Planned missing data designs in educational psychology research. Educational Psychologist 51(3-4): 305-316.

[vi] Out of 1194 teachers employed by approved private special education programs (APSEPs), fewer than 15 participated in the teacher survey. For this reason, we exclude APSEP teachers when reporting the response count and response rate for the teacher survey.

[vii] Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative research in psychology, 3(2), 77-101.

[viii] Nosek, B. A., et al. (2018). The preregistration revolution. Proceedings of the National Academy of Sciences 115(11): 2600-2606.

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CCERC Remote Learning Study: Appendices

Contents

Appendix A: Measures

Connecticut State Department of Education (CSDE) administrative data

Table A1. CSDE student demographic variables

Variable Name	Description
SASID	State Assigned Student ID
RaceEth	USDE race/ethnicity code: 1. Hispanic/Latino of any race; 2. American Indian or Alaska Native; 3. Black or African American; 4. Asian; 5. Native Hawaiian or Other Pacific Islander; 6. White; and 7. Two or more races.
FRPL	3-category code for Free or Reduced-Price Lunch eligibility: F=eligible for free lunch; R=eligible for reduced-price lunch; N=ineligible
SpEd	Special Education status: Y=student has an active IEP and receives special education instruction (i.e., student with disability) N=student does not have an IEP (i.e. student without disability)
EL	English Learner status: Y=identified as an English Learner; N= not identified as an English Learner

Note: Students are included in the CSDE's high needs group if they are a student with a disability, English learner, or eligible for free or reduced-price lunch..

Table A2. CSDE enrollment and attendance variables

Variable Name	Description
SASID	State Assigned Student ID
FallOfYear	Year in which school year began
CollectionInstanceName	Name of data collection
GradeLevelCode	Code for student grade level, from PK-12
School_SK	School name
SchoolCode	School code
RptngDistrict_SK	Reporting district name
ReportingDistrictCode	Reporting district code
Fac1AttendanceDays	Number of attendance days at end-of-year school
Fac1MembershipDays	Number of days enrolled at end-of-year school
AttendanceRate	Attendance days divided by membership days, expressed as a percentage
ChronicAbsenteeism	1 if attendance rate is <=90%, 0 if attendance rate is >90%

Table A3. CSDE standardized assessment variables

Variable Name	Description
SASID	State Assigned Student ID
FallOfYear	2014-2020
Grade	3-8, 11
AssessmentName	Smarter Balanced or SAT
Subject	ELA or Math
PerformanceLevel	1-4
ProficientOrAbove	1 if PerformanceLevel=3 or 4, 0 if PerformanceLevel=1 or 2
ScaleScore	Raw scale score

Table A4. CSDE learning modes survey variables

Variable Name	Description
District code	State assigned district identification number
District name	Name of district
School start date	Date of first date of school
Grades: In person	Comma delimited list of grades taught in person
Grades: Hybrid	Comma delimited list of grades taught hybrid
Grades: Remote	Comma delimited list of grades taught remote
ProficientOrAbove	1 if PerformanceLevel=3 or 4, 0 if PerformanceLevel=1 or 2
ScaleScore	Raw scale score
Percentage fully remote	Percentage from 0 to 100 of students attending fully remote in district
Total number students	Total number of students in district
Predominant model	Text variable describing the primary learning model across grades
Organization type	The type of Local Education Authority reporting
Alliance district	Whether alliance, alliance opportunity, or non-alliance district
Reporting period	Calendar week for which the remote learning report was made
Update date	Date on which the weekly report was filed

CCERC remote learning district inventory

Table A5. CCERC remote learning district inventory domains

Domain	Items
District information	Q1-Q3
Pre-pandemic learning opportunities	Q4
Spring 2020 learning models	Q5-8
Spring 2020 learning goals	Q5-8
Spring 2020 staffing	Q9
Spring 2020 professional development	Q10
Spring 2020 food security	Q11
Spring 2020 social services referrals	Q12-Q14
Summer 2020 preparation	Q15
2020-21 learning models	Q16
Fall 2020 staffing	Q17
2020-21 professional development	Q18
2020-21 food security	Q19
2020-21 social services referrals	Q20-Q22
2020-21 technology	Q23-Q25
Post-COVID plans	Q26
Spring 2020 student disengagement	Q27-Q28
2020-21 remote learning	Q29-Q33
2020-21 hybrid learning	Q34-Q35
2020-21 improvements in online learning	Q36
Changes in technology	Q37-Q41
Changes in assessment and grading	Q43-44
Changes in emotional wellbeing	Q45-Q47

Note: The complete CCERC remote learning district inventory is posted at https://osf.io/9k5yg.

CCERC remote learning teacher survey

Table A6. CCERC remote learning teacher survey domains

Domain	Items
Professional background	Q1-Q5
2019-20 Instructional models	Q6-Q8
2020-21 Instructional models	Q9-Q17
2020-21 Teaching challenges	Q18
Technology	Q19-Q21
Professional development	Q22-Q23
Priorities, needs, and supports	Q24-Q28
Teacher beliefs and preferences about learning models	Q29-Q31
Teacher demographics	Q32-Q35

Note: The complete CCERC remote learning district inventory is posted at https://osf.io/psrgf.

Table A7. Teacher survey respondents by district type

Based on district named in Teacher Survey Q4. In what school district were you a teacher?

	Survey respondents		***Connecticut teachers***	
	Valid Count	Valid Percent	FTEs	Percent
Alliance Districts (including Opportunity Districts)	1009	35.4	16717.9	39.9
Local School Districts (excluding Alliance Districts)	1424	49.9	19730.5	47.1
Regional School Districts	150	5.3	1975.6	4.7
Public Charter School Districts	45	1.6	758.6	1.8
Endowed and Incorporated Academy Districts	45	1.6	267.6	0.6
Regional Education Service Center Districts	108	3.8	1338.7	3.2
College Affiliated School Districts	2	0.1	0.0	0.0
State Agencies	4	0.1	122.5	0.3
CT Technical Education and Career Districts	64	2.2	982.7	2.3
Total N	2851	100.0	41894.1	100.0

Table A8. Teacher survey respondents by education level

Teacher Survey Q2. What grade levels did you teach? Please select all that apply.

	Survey respondents	
	Valid Count	Valid Percent
Elementary school	1024	35.9
Middle school	576	20.2
High school	899	31.5
Multiple levels, ungraded, or unknown	352	12.3
Total N	2851	100.0

Note: CSDE does not report teachers by grade level. Also note that respondents were instructed to "select all that apply;" the fourth category includes respondents who selected >1 education levels.

Table A9. Teacher survey respondents by job type

Teacher Survey Q3. What was your main teaching assignment?

	Survey respondents		***Connecticut teachers***	
	Valid Count	Valid Percent	FTEs	Percent
Special education	345	12.1	6976.17	16.4
General education			35663.2	83.6
Early childhood or general elementary	690	24.2		
Arts or music	196	6.9		
English and language arts	326	11.4		
English as a second language or bilingual education	113	4.0		
Foreign languages	130	4.6		
Health education	27	0.9		
Mathematics	288	10.1		
Natural sciences	243	8.5		
Social sciences	197	6.9		
Career or technical education	110	3.9		
Other (please describe)	184	6.5		
Total N	2849	100.0	42639.4	100.0

Note: CSDE reports teachers by general education vs. special education; CSDE does not report general education teachers by certification area or teaching assignment.

Table A10. Teacher survey respondents by years of experience

Teacher Survey Q32. Including this school year (2021–2022), but excluding your student teaching, how long have you worked as a teacher? Please round to the nearest whole number.

	Survey respondents		***Connecticut teachers***	
	Valid Count	Valid Percent	FTEs	Percent
1-5 years	223	8.7	8674.21	20.3
6-15 years	829	32.5	15038.39	35.3
16 or more years	1498	58.7	18926.75	44.4
Total N	2550	100.0	42639.35	100.0

Table A11. Teacher survey respondents by gender

Teacher Survey Q33. How would you describe your gender?

	Survey respondents		***Connecticut teachers***	
	Valid Count	Valid Percent	FTEs	Percent
Male	442	16.9	10362.90	24.3
Female	2095	79.9	32276.45	75.7
Another gender identity	12	0.5		
Prefer not to answer	72	2.7		
Total	2621	100.0	42639.35	100.0

Note: Note that the CCERC RL teacher survey offered response options for the gender question that differ from how CSDE collects data on teacher gender.

Table A12. Teacher survey respondents by age

Teacher Survey Q34. What is your age?

	Survey respondents		***Connecticut teachers***	
	Valid Count	Valid Percent	FTEs	Percent
20-29	155	5.9	4893.95	11.5
30-39	545	20.8	11175.54	26.2
40-49	710	27.1	12179.66	28.6
50-59	794	30.3	10163.17	23.8
60 or older	339	12.9	4227.03	9.9
Prefer not to answer	78	3.0		
Total	2635	100.0	42639.35	100.0

Table A13. Teacher survey respondents by race/ethnicity

Teacher Survey Q35. What categories describe you? Please select all that apply.

	Survey respondents		***Connecticut teachers***	
	Valid Count	Valid Percent	FTEs	Percent
American Indian or Alaska Native	15	0.6	58.14	0.1
Asian	39	1.5	576.43	1.4
Black or African-American	75	2.8	1527.05	3.6
Hispanic, Latino, or Spanish origin	128	4.9	1905.5	4.5
Middle Eastern or North African	10	0.4		
Native Hawaiian or other Pacific Islander	2	0.1	22.2	0.1
White	2266	86.4	38409.81	90.2
Two or more races			80.42	0.2
Some other race, ethnicity, or origin	22	0.8		
Prefer not to answer	159	6.1		
Not reported			59.8	0.1
Total			42579.55	100.0

Note: Note that the CCERC RL teacher survey offered response options for the race/ethnicity question that differ from how CSDE collects data on teacher race and ethnicity. In addition, the CCERC RL teacher asks respondents to select all that apply, whereas the CSDE demographic categories include "Hispanic or Latino of any race" and "Two or more races." For this reason, the teacher survey columns include more than one response for some respondents and valid percentages do not add up to 100%.

CCERC remote learning focus groups

Table A14. CCERC remote learning teacher focus group protocol

This first set of questions will focus on your experiences in March of 2020 at the beginning of the pandemic and also during the 2020-2021 school year.

1. **Thinking back to the beginning of the pandemic in the Spring of 2020, what was your greatest teaching challenge?**
    a. What about during the 2020-2021 school year, what would you say was your greatest teaching challenge then?

2. **What about your students? What were their greatest needs in the Spring of 2020?**
    a. What about during the 2020-2021 school year, what do you think were your students' greatest needs then?

3. **How did you connect with your students in the Spring of 2020 when the pandemic first began?**
    b. What strategies worked well to help you connect with your students when you first pivoted to remote or asynchronous teaching?

4. **What about during the 2020-21 school year, how did you connect with your students?**
    a. What strategies worked well to help you connect with your students during the 2020-21 school year?

Now I would like to ask you about any training or supports that were offered in the Spring of 2020 and in the 2020-21 school year, to assist with changes in teaching modalities.

5. **In the spring of 2020 what supports or resources such as: technology supports, curriculum resources, resources to help support your students or other resources did your district provide as you transitioned to fully remote or asynchronous teaching?**
    a. How helpful were these supports?
    b. What else was needed?

6. **How did the 2020-2021 school year begin in your district, in person, remote or hybrid?**
    a. Were there any changes in teaching modality as the year progressed?
    b. What supports or resources such as technology supports, curriculum resources, resources to help support your students or other resources were provided as you continued to teach remotely or in person?
    c. How helpful were these supports?
    d. What else was needed?

7. **When you think back to how parents navigated the different learning models and transitions from one learning model to another, what types of supports if any did parents need you to provide to help them navigate these learning models?**

The next set of questions have to do with how students were doing and access to services and supports since the beginning of the pandemic.

8. **When you think about student learning (and achievement) in the 2020-21 school year, how did that compare to prior to the pandemic?**

9. **What about any emotional concerns of your students like stress, anxiety, depression, trauma in the 2020-21 school year, how did this compare to prior to the pandemic?**

10. **What about student behavior during the 2020-21 school year, how did that compare to prior to the pandemic?**

11. **What resources or skills did you have to address student concerns?**
    a. What other resources would have been helpful to support your students?
    b. Were support services like social work, guidance counselors available to students and families during the 2020-2021 school year?
        i. What did families do if they needed more support?

12. **What about you and your colleagues, what supports were provided to you to support your physical and emotional well-being?**

We just have two more questions.

13. **Looking back on these past two years, is there anything that you learned or any changes that were made during the pandemic that you think should continue post-pandemic?**

14. **Finally, what is the take home message for the state in thinking about how to prepare for something like this in the future?**

Thank you for participating in this focus group, the information you shared will be invaluable in helping the state to understand the experiences of teachers during the pandemic.

Table A15. Teacher focus group participants' demographics

	Focus group participants (n=67)		*Connecticut teachers (n=42,639.35)*
	n	**%**	**%**
Age			
20-29	3	5%	11%
30-39	21	31%	26%
40-49	16	24%	29%
50-59	21	31%	24%
60-69	6	9%	7%
Gender			
Male	14	20.9%	24%
Female	53	79.1%	76%
Race/Ethnicity (select all)			
Asian	1	2%	1%
Black or African American	7	10%	4%
Hispanic, Latino, or Spanish origin	5	8%	5%
White	57	85%	90%
Other	0	-	<1%

Table A16. Teacher focus group participants' professional characteristics

Years of teaching experience (excluding student teaching)	**Focus group participants** (n=67)		**Connecticut teachers** (n=*42,639.35*)
Mean	17		
SD	8.73		
Min / Max	2 / 36		
Current Role (select all that apply)	**n**	**%**	**%**
General Education Teacher	50	75%	84%
Special Education Teacher	10	15%	16%
Other Teacher (e.g., ESL teachers, specialists)	11	16%	
Other (e.g., instructional coach, afterschool teacher, etc.)	7	10%	
Type of School District			
Alliance	57	70%	60%
Non-Alliance	20	30%	40%
District locale			
Urban	30	44.8%	
Suburban	29	43.3%	
Rural	8	11.9%	
School Type (select all)			
Elementary School (grades preK-5)	24	35.8%	
Middle School (grades 6-8, 5-8, etc.)	22	32.8%	
High School (Grades 9-12)	25	37.3%	

Appendix B: Technical details

Administrative data analysis

We first estimate a model of the likelihood that a school (s) belongs to an LEA or district (d) that provides an in person option either hybrid or fully in person in September (I) as a function of both the school share of high needs students (Z_{sd}) and the type of LEA (T_d). All models are weighted by pre-pandemic school enrollment. We estimate simple probit models of this likelihood that follows the standard form.

$$I_{sd} = \begin{cases} 1 & if \;\; I^*_{sd} > 0 \\ 0 & otherwise \end{cases} \quad (1)$$

where

$$I^*_{sd} = \alpha_1 + \alpha_2 \, Z_{sd} + \alpha_3 T_d + \alpha_4 T_d \, Z_{sd} + \varepsilon_{sd} \quad (2)$$

We also estimate similar models for a two sided Tobit on share of days offered in person (S) since this share is truncated at zero and one.

$$S_{sd} = \begin{cases} 1 & if \;\; S^*_{isd} \geq 1 \\ S^*_{sd} & if \; 1 > S^*_{isd} > 0 \\ 0 & if \;\; S^*_{isd} \leq 0 \end{cases} \quad (3)$$

where

$$S^*_{sd} = \varphi_1 + \varphi_2 \, Z_{sd} + \varphi_3 \boldsymbol{T}_d + \varphi_4 \boldsymbol{T}_d \, Z_{sd} + \varepsilon_{sd} \quad (4)$$

With the notable change that LEA type is specified as a vector of indicators because the continuous share of days variables allows for a more disaggregate classification of LEA's. Standard errors in both models are clustered at the district level.

For examining student take up, we regress each student's fraction of days enrolled in person relative to the total days enrolled each month (F_{isdt}) on our calculated share of days available in person each month based on weekly learning modes relative to the total days of school each month (S_{sdt}).

$$F_{isdt} = \alpha + \beta S_{dt} + \varepsilon_{isdt} \quad (5)$$

We also estimate an interactive model based on each school's share of high needs students

$$F_{isdt} = \alpha + \beta_1 S_{dt} + \beta_2 Z_{sdt} + \beta_3 S_{dt} Z_{sdt} + \varepsilon_{isdt} \quad (6)$$

Standard errors are clustered at the district level.

For examining initial enrollment of kindergarteners, we only observe students who actually enrolled in kindergarten, and so we cannot know how many students would have enrolled if the pandemic had not occurred. Therefore, we reverse the regression, similar to many studies of discrimination in police stops where those at risk of stop are unobserved (Kalinowski et al. 2021; Grogger and Ridgeway 2006), and regress whether the school belongs to an LEA that provided a September in person option (I) on a linear trend (T) and a dummy for the pandemic year (P) using a linear probability model.

$$I_{isdt} = \alpha + \beta T_t + \gamma P_t + \varepsilon_{isdt} \quad (7)$$

The trend allows enrollment to change over time away from or towards schools that will offer an in person option in 2020-21, and the pandemic dummy tests for a trend break associated with enrollment responses to an in person option. Again, we expand this model allowing effects to differ between schools with high and low shares of high needs students.

$$I_{idt} = \alpha_1 + \beta_1 T_t + \gamma_1 P_t + \alpha_2 Z_d + \gamma_2 P_t Z_d + \varepsilon_{idt} \quad (8)$$

Again, standard errors are clustered at the district level.

While we observe large declines in kindergarten enrollment, a significant share of that decline is eliminated by the end of the school year because students enroll in kindergarten midway through the school year. Using first grade enrollments, we estimate a month by month model of the likelihood of observing 2021-22 first graders enrolled in kindergarten (*E*) during the 2020-21 school year in order to test whether in person opportunities (share days in person) increases the likelihood of mid-year enrollment among those future first graders who have not yet enrolled.

$$E_{isdt} = \alpha + \beta S_{dt} + \varepsilon_{isdt} \quad (9)$$

$$E_{isdt} = \alpha + \beta_1 S_{dt} + \beta_2 Z_{sdt} + \beta_3 S_{dt} Z_{sdt} + \varepsilon_{isdt} \quad (10)$$

We mean difference share in person prior to including the control so that intercept can be interpreted as the share of first graders present in kindergarten for the state average share of days offered in person.

Next, we exploit longitudinal information on students starting with enrollment in fall 2020-21 (*E*) if the student was observed in public education in the previous year. Continued enrollment is estimated using a difference-in-differences model, comparing changes in the likelihood of continuing enrollment the next year pre/post pandemic and estimating differences in those differences between schools with an in person option in September and those without.

$$E_{isdt} = \alpha_{sd} + \gamma_1 P_t + \gamma_2 P_t I_d + \varepsilon_{isdt} \quad for \ E_{isdt-1} = 1 \quad (11)$$

$$E_{isdt} = \alpha_{sd} + \gamma_1 P_t + \gamma_2 P_t I_d + \gamma_3 P_t Z_{sd} + \gamma_4 P_t I_d Z_{sd} + \varepsilon_{isdt} \quad for \ E_{isdt-1} = 1 \quad (12)$$

where α_{sd} are school fixed effects.

Estimates of equations (2) and (4) will show that high needs districts are less likely to provide in person learning and traditional public schools are more likely to provide in person learning than choice schools like magnet or charter schools. Therefore, we use the propensity score estimates from equation (2) to develop overlap weights (Li et al. 2018), and re-estimate equations (11) and (12) using weighted regressions. Overlap weights, like inverse propensity score weights, restore sample balance, but do so by targeting the product of the probability of treatment and the probability of not receiving treatment, which places more weight on propensity scores near zero where the data provides equal support over treatment and non-treatment. Specifically, we define overlap weights as

$$W_{isd} = \begin{cases} \left(1 - F(\hat{\alpha}_1 + \hat{\alpha}_2 Z_{sd} + \hat{\alpha}_3 T_d + \hat{\alpha}_4 T_d Z_{sd})\right) & if\ NR^*_{isd} = 1 \\ F(\hat{\alpha}_1 + \hat{\alpha}_2 Z_{sd} + \hat{\alpha}_3 T_d + \hat{\alpha}_4 T_d Z_{sd}) & if\ NR^*_{isd} = 0 \end{cases} \quad (13)$$

based on estimates arising from equation (2).

Finally, we develop difference-in-differences models of attendance and test scores (*Y*) that include controls for lagged student outcomes. For these models, we control for the share of days offered in person over the relevant portion of the school year.

$$Y_{isdt} = \alpha_{sd} + \delta Y_{idt-s} + \gamma_1 P_t + \gamma_2 P_t S_{sd} + \varepsilon_{isdt} \quad (14)$$

$$Y_{isdt} = \alpha_{sd} + \delta Y_{idt-s} + \gamma_1 P_t + \gamma_2 P_t S_{sd} + \gamma_3 P_t Z_{sd} + \gamma_4 P_t S_d Z_{sd} + \varepsilon_{isdt} \quad (15)$$

where *s* represents the lag applied to the previous outcome control, which is one year for attendance in our primary models and two years for test scores.

As with September in person learning, we use the estimates from equation (4) to obtain a propensity score associated with each student's school's tendency to offer a higher share of days in person based on the school's share of high need students and LEA. However, simple weighting approaches based on probabilities or densities are not available because the appropriate model for share of days involves a continuous variable with truncation. Since the weights are intended to avoid differences in trends created by imbalance in the sample over treatment, we instead address potential bias from such trends by adding an interaction of the propensity score with the pandemic control. The propensity score is defined as

$$\hat{S}_{sd} = \hat{\varphi}_1 + \hat{\varphi}_2 Z_{sd} + \hat{\varphi}_3 \boldsymbol{T}_d + \hat{\varphi}_4 \boldsymbol{T}_d Z_{sd} \quad (16)$$

Admittedly, the same effect could be accomplished by adding the controls in equation (16) interacted with the pandemic variable to equations (14) and (15). However, by using the propensity score, we can mean difference a single variable, propensity score, prior to inclusion in the model, and as a result the pandemic variable estimate represents the effect for the average school in terms of propensity to offer a high share of days in person. The resulting model is

$$Y_{isdt} = \alpha_{sd} + \delta Y_{idt-s} + \gamma_1 P_t + \gamma_2 P_t S_{sd} + \gamma_3 P_t \left(\hat{S}_{sd} - \bar{S}\right) + \varepsilon_{isdt} \quad (17)$$

$$Y_{isdt} = \alpha_{sd} + \delta Y_{idt-s} + \gamma_1 P_t + \gamma_2 P_t S_{sd} + \gamma_3 P_t Z_{sd} + \gamma_4 P_t S_d Z_{sd} + \gamma_5 P_t \left(\hat{S}_{sd} - \bar{S}\right) + \varepsilon_{isdt} \quad (18)$$

Standard errors for all difference-in-differences models are clustered at the level of the fixed effects, i.e. the school.

For all difference-in-differences models, we estimate falsification tests where we treat an earlier year, 2018-19, as a fake pandemic year and use the years 2016-17 and earlier as the pre-event sample.

District inventory indicators of remote learning conditions

Table B1. District inventory indicators: Remote learning conditions in spring 2020

Domain	Item	Levels*	Response Set/Measurement
1. Synchronous learning in spring 2020	As of May 1 2020, what did learning look like when students from the following grade levels were learning from home?	E, M, H	**Binary indicator** (fully or partially synchronous vs. fully asynchronous) based on four possible responses: a. Fully asynchronous without technology: assignments were distributed in print format and no online/electronic learning materials were provided b. Fully asynchronous with technology: students had no classes conducted in real time through video conferencing (for example, Google Meet or Zoom), but online/electronic learning materials were provided (e.g, online activities, instructional videos, etc.) c. Partially synchronous: students had at least one class meeting conducted in real time through video conferencing (for example, Google Meet or Zoom) d. Fully synchronous: the majority of students' classes took place in real time, through video conferencing (for example, Google Meet or Zoom)
2. Student technology access in spring 2020	(1) Please provide your best guess for what percentage of students had sufficient internet access for full participation in online learning as of the following dates. March 1, 2020 (2) Please estimate the percentage of **[GRADE SPAN LEVEL]** students who had access to digital devices at home as of March 1, 2020: - Chromebooks, laptops, or iPads provided by the district or by family	E, M, H	**Mean percentage** based on the two items.

Note: *E,M,H=Question asked regarding elementary, middle, and high school levels; District=Asked of the district as a whole

Table B2. District inventory indicators: Remote learning conditions in 2020-21

Domain	Item	Levels	Response Set/Measurement
3. Summer 2020 preparation for fall	Which of the following activities did your district conduct between the last student day of spring 2020 and the students' return to school in fall 2020? Please select all that apply.	District	**Count of the following binary responses**: a. Building improvements (ventilation, air purification devices, directional signs) b. Purchase of safety equipment (PPE; e.g. shields, masks) c. Creating online resources for teachers d. Adopting new learning management platforms e. Hiring additional personnel (e.g. tutors, counselors, etc.) f. COVID safety training for school personnel g. Paid professional development related to learning technology h. Paid professional development related to strategies for remote teaching i. Voluntary workshops related to learning technology j. Voluntary workshops related to strategies for remote teaching
4. Improvements for remote learning in 2020-21	In what ways did remote learning for [**GRADE SPAN LEVEL**] students improve from 2019-20 to 2020-21? *[Respondents select all that apply]*	E,M,H	**Count of the following binary responses:** a. Better learning management system b. Better apps in place c. Improved accessibility for students d. Teacher fluency with remote learning tech e. Teachers' integration of recommended apps/tools f. Improved tech support for teachers g. Increased implementation of on-grade curriculum
5. Rigor of student assessment in 2020-21	On what basis did your [**GRADE SPAN LEVEL**] teachers report student progress during each of the following time periods? *Please select <u>all that apply</u> for school year 2020-21.*	E,M,H	**Weighted sum of two items:** **0-2 points based on grading approach (maximum score wins):** 0. "Grading was suspended" and/or "Pass/fail" was selected AND neither "Proficiency" and/or "Letter grades" was selected 1. "Proficiency" and/or "Letter grades" was selected AND "Grading was suspended" and/or "Pass/fail" was selected 2. "Proficiency" and/or "Letter grades" was selected AND neither "Grading was suspended" or "Pass/fail" was selected

	What data did your district use to assess how [**GRADE SPAN LEVEL**] students were doing during the following time periods? *Please select all that apply for school year 2020-21*. -		**1 point each for in-class assignments, quizzes/tests, diagnostic assessments:** a. Their completed classroom tasks or assignments b. Their performance on classroom quizzes or tests c. Diagnostic or benchmark schoolwide assessments in English language arts d. Diagnostic or benchmark schoolwide assessments in mathematics <u>No points for</u>: • Their attendance in class • Their responses to a student survey (excluding social and emotional assessments) • Their performance on a social and emotional assessment
6. Social services referrals in 2020-21	During the 2020-21 school year, how did your district's allocation of resources for referrals to social services (for example, physical or behavioral health care, nutrition assistance, housing assistance) compare to spring 2020?	District	**Mean score of two items:** 5-point scale: Allocated a lot more resources to Allocated a lot less resources
	During the 2020-21 school year, how did the number of students referred for social services (for example, physical or behavioral health care, nutrition assistance, housing assistance) compare to spring 2020?		5-point scale: A lot more students to A lot fewer students

Note: E,M,H=Question asked regarding elementary, middle, and high school levels; District=Asked of the district as a whole

Analysis of integrated data set

Approach for Inferential Analyses (see Figure B1)

1. Estimate treatment effects with difference-in-differences models for each combination of district-level predictors and the four outcomes of interests (24 models) across all relevant grades for standardized assessment performance and broader grade spans for attendance.
2. Using pooled samples across all relevant grades or grade spans, we will conduct an F-test for each of the four outcomes listed above to assess whether the district-level treatments predict any of these outcomes for any grade or grade span.
3. We will then combine the information from these four tests to assess the *general* combined statistical significance of any rejection of the null hypothesis above.
4. We will test for the *specific* combined effect of each treatment using a Bonferroni step-down procedure to adjust for Type-1 error.

Approach for Exploratory Analyses (see Figure B2)

5. If the specific combined effect for a treatment is significant with alpha set to .10, we will explore the treatment's effect on each outcome at the .05 level.
6. If the above step is significant for any of the outcomes, we will examine the treatment effect at each grade span (k-2, 3-5, 6-8, and 9-12) for each significant outcome, again setting alpha at .05.
7. If any grade span is significant, we will assess whether effects differ across demographic groups by assessing homogeneity via F-tests.

Figure B1: Inferential analysis

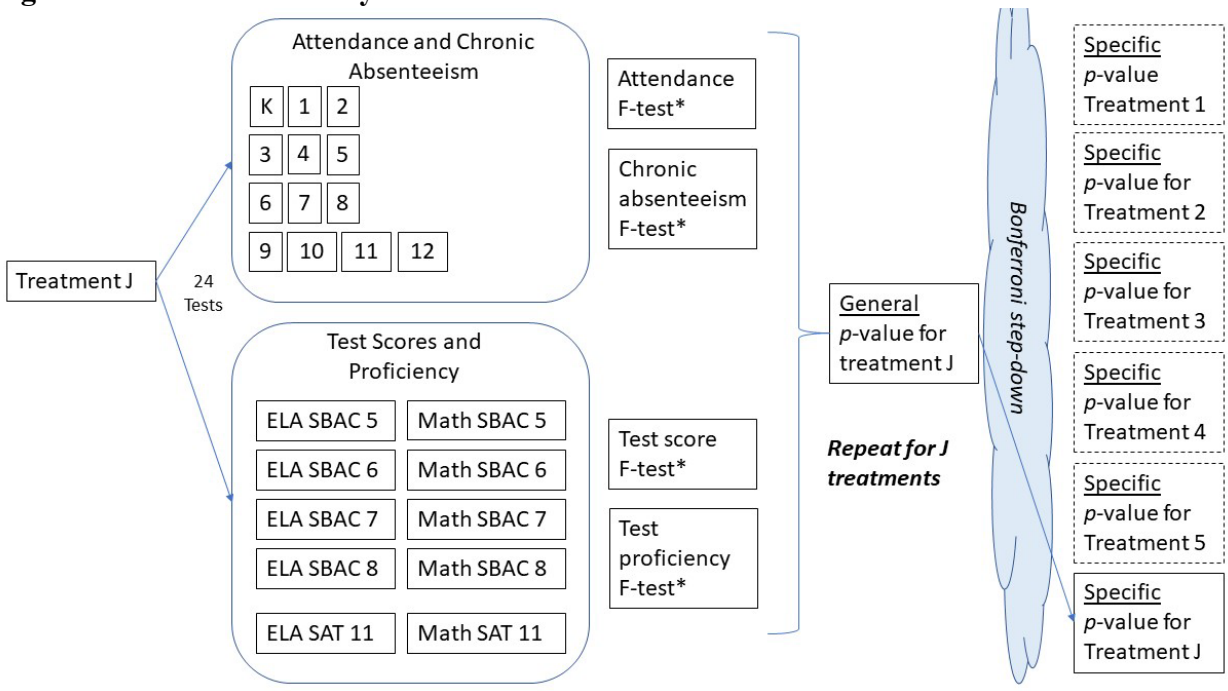
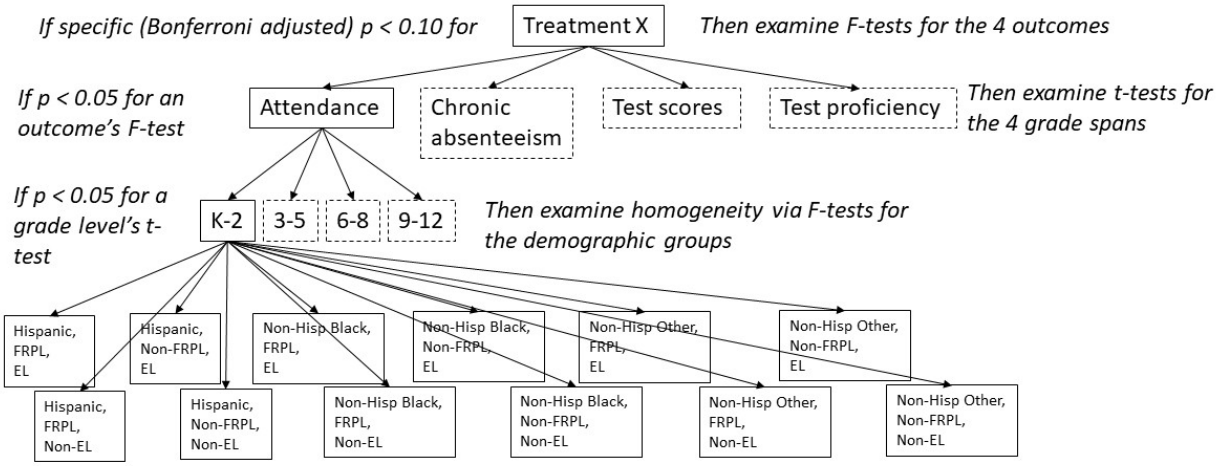


Figure B2: Exploratory analysis



Detailed Description of Inferential Analysis (see Figure B1)

Estimation of Treatment Effect Models

Students in our administrative data will be matched to district inventory data based on the district and the type of school (i.e., elementary, middle or high school) they attended as of October in a given academic year. We will use the administrative data to determine the grades for each school type within each district. We will classify schools with kindergarten or first grade as elementary school and schools with 11th and 12th grade as high school by default. For districts with uniform grade structure across all schools, we will then assign additional grades (e.g., 2nd, 3rd, etc.) to elementary school based on the grades contained in the schools that educate kindergarten and/or first grade students. Similarly, for high school, we will assign additional grades (e.g., 9th, 10th) to high school that are contained in the schools that educate 11th and 12th grade students. If only one additional type of school exists in a district in terms of grades served, that school will be assigned as a middle school. When different schools within the same district serve different combinations of grades (e.g., a large district with some K-8 schools and some K-5 schools), then we will rely on our district inventory to determine which schools or grades within schools the district classifies as elementary, middle, or high school. In cases where the district inventory is ambiguous, we will contact the districts directly for clarification. Students attending approved special education schools will be excluded from the analysis sample because these schools are very small, highly specialized, and implemented substantively different learning models during the pandemic, compared to traditional schools.

We will then construct longitudinal student samples for the school years of 2017-18 through 2020-21, pooling the cross-sections of students across these years. The use of longitudinal data allows us to control for lagged outcomes minimizing concerns of bias from selective attrition from the sample during the 2020-21 school year. For attendance, we restrict this sample to observing each student in the spring enrollment file for the previous year and in both the fall and spring enrollment files for the current year. If students change school during the year, we base treatment on their fall enrollment file school. These restrictions assure that we observe attendance rates for both the current year and the previous year and that students are exposed for the entire 2020-21 year to the calculated treatment of share of days offered in person. For

standardized assessment scores, we create subsamples of the two-year lagged attendance rate sample for ELA and Math assessment scores where students are only included in this sample if we observe an ELA or Math assessment score in both the 2020-21 year and two years earlier. The two-year restriction is imposed because these assessments were not administered in 2019-20, and this restriction implies that our ELA and Math assessment score samples are restricted to 5th, 6th, 7th and 8th grades.

Using the pooled samples, we will estimate separate models for each treatment-outcome pairing so that we can develop separate general p-values (prior to correcting for Type-1 error) that allow for different effects for different measures of student outcomes. This yields24 difference-in-differences models: one for each combination of 6 treatments and 4 outcomes. Models will consist of student i's attendance rate, chronic absenteeism status (0/1), asessment scale scores and assessment proficiency during grade g in school s and district d (Y_{igsdt}) that include controls for a pandemic year dummy (P_t) where t represents the academic year, the interaction of pandemic year with district d treatment (T_{sd}), the lagged student outcome and school s fixed effects. We will estimate different models for each grade or grade span by interacting all controls including the fixed effects with the grade or grade span. For performance outcomes (assessment scores and proficiency), models will be estimated separately by each grade. For attendance outcomes (attendance rate and chronic absenteeism status), models will be estimated separately by grade span (elementary, middle and high school), except that we will also allow for separate models for early elementary grades (kindergarten, 1st and 2nd grades) and later elementary school grades. For these analyses, students will be grouped into grade spans based on the school at which they are enrolled. As an example, 6th grade students attending a middle school will be included in the middle school model, while 6th grade students attending an elementary school will be included in the later elementary school model. For the two binary indicators, chronic absenteeism and assessment proficiency, we will estimate linear probability models to facilitate the use of high dimensional fixed effects.

$$Y_{igsdt} = \alpha_{gsd} + \gamma_{0g} Y_{igsdt-s} + \gamma_{1g} P_t + \gamma_{2g} P_t \, T_{sd} + \varepsilon_{igsdt}$$

where *s* represents the lag applied to the previous outcome control, which is one year for attendance outcomes and two years for performance outcomes. Standard errors will be clustered in two ways: at the school level and at the student level. School fixed effects yield estimates based on within school comparisons, and clustered robust standard errors are robust to general correlation and heteroscedasticity within clusters.

For all treatments except Improvements in Remote Learning 2020-21, we will use an F-test to assess the null hypothesis of whether $\gamma_{2g} = 0$ for all g.

In the case of the Improvements in Remote Learning 2020-21 treatment, these improvements are unlikely to matter if virtually all education within a school took place in person. Therefore, we will estimate an alternative model interacting the pandemic year dummy and treatment with a measure of the share of days during the school year where learning was required to be remote (S_{sd}) at the student's school.

$$Y_{igsdt} = \alpha_{gsd} + \gamma_{0g} Y_{idt-s} + \gamma_{1g} P_t + \gamma_{2g} P_t \, T_{sd} + \gamma_{3g} P_t S_{sd} + \gamma_{4g} P_t \, T_{sd} S_{sd} + \varepsilon_{igsdt}$$

We will then use an F-test to the null hypothesis of whether $\gamma_{4g} = 0$ for all g.

Testing the Null Hypothesis Separately for Each Treatment

Rather than using resampling approaches, we will stack the data pooling grades or grade spans and use interaction terms to allow for a separate model for each outcome. In the case of attendance data, we will combine the data for all students in each grade K-12. For assessment data, we will standardize all scores by assessment (Smarter Balance or SAT and ELA or math) by grade by year. Similar stacks will be created using binary outcomes associated with SBAC and SAT assessment proficiency (based on state established proficiency thresholds for scores) and chronic absenteeism (based on the state definition of missing 10% or more of enrolled days).

Then, separately for (1) attendance, (2) chronic absenteeism, (3) standardized assessment scores and (4) standardized assessment proficiency, we will estimate pooled sample models except that the school fixed effects will now be by school by grade (or grade span) and we will include interaction terms between our treatment variable (the treatment indicator interacted with the pandemic dummy) and each grade (or grade span) dummy, omitting the treatment variable itself so that all grade (or grade span) interaction estimates are relative to pre-pandemic levels. We will then use an F-test to test the null hypothesis above separately for the four regressions. These F-tests independently test four separate null hypotheses H_a^1 that the treatment considered has no positive influence on any of the grades (or grade spans) examined.

Unlike controls for the Family-Wise Error Rate (FWER), such as Bonferroni adjustments, we cannot ignore the correlation between tests. When combining results under a test for whether at least one null is rejected, correlation between those tests will reduce the certainty provided by multiple rejections of null hypotheses and yield a test that is too likely to reject the null. Too correct for correlations between tests without resampling, Conneely and Boehnke (2007) recommend assuming that the estimates are distributed as a multi-dimensional normal distribution and directly calculating the likelihood of a type 1 error using the estimated parameters and the correlation matrix between those estimates.

To estimate the average correlation across the tests in our four regressions, we will estimate two-equation, seemingly unrelated, regression models for pairs of outcome variables. Separate models of treatment effects on outcomes will be estimated for each grade (or grade span) that is common between the related dependent variables, again controlling for fixed effects and a pandemic year dummy. We will back out a correlation coefficient between the estimated treatment effect estimates in the two equations for each grade (or grade span) for each pair of treatments, and then for each pair we calculate a population weighted average of each set of estimated correlations averaged across the grades (or grade spans).

Under the null for each outcome, the p-values ($\hat{P}_k$) resulting from that F-test describe the Cumulative Distribution Function (CDF) of the distribution of F-tests over potential populations. Therefore, we can map these probabilities into a continuous latent variable ($\hat{Z}_k$) and if we use the

standard normal CDF to conduct that mapping then each variable will be distributed as standard normal under the null by construction. Specifically,

$$\hat{Z}_k = F^{-1}(\hat{P}_k)$$

where F is the CDF of the standard normal. Finally, we impose a very intuitive, but somewhat strong assumption, that the average correlations between the treatment effect estimates for each pair provide a good proxy for the correlation between the normally distributed latent variables. Then our calculation for the probability that none of the four null hypotheses are false (i.e., at least one alternative hypothesis is true) can be calculated as

$$Pr[H_a^1 \text{ or } H_a^2 \text{ or } H_a^3 \text{ or } H_a^4] = F[\hat{Z}_1, \hat{Z}_2, \hat{Z}_3, \hat{Z}_4 | \hat{\Sigma}]$$

where $\hat{\Sigma}$ is the estimated correlation matrix between the treatment effect estimates.

Type 1 Error Adjusted Tests for Whether a Treatment Matters

Turning to our six hypothesis tests regarding treatment effects on any outcome in any grade (or grade span), we wish to draw strong conclusions concerning which specific elements of district behavior or actions influenced student outcomes. Therefore, we must provide a correction for multiple hypothesis testing to control for the FWER. To do this, we will use the step-down Bonferroni correction as in Holm (1979). This approach orders the p-values from low to high, i.e. $\hat{P}_1$ to $\hat{P}_K$ where K is the number of tests and $\hat{P}_{k-1} \leq \hat{P}_k$ for all k, and adjust the standard Bonferroni correction. This test takes the following form for a corrected P-value

Holm-Sidak: $\tilde{P}_k = (K + 1 - k)\hat{P}_k$ for all k where $\tilde{P}_k \leq \alpha$

Considering Resampling Approaches

Null Hypothesis Separately for Each Treatment

We will generate 10,000 bootstrap samples conducting the hypotheses tests for every sample and counting the share of samples in which the null is rejected (Westfall and Young, 1993, p. 123). Specifically, since the null is rejected if the treatment matters for any outcome considered, a false rejection of the null in the bootstrap sample is only recorded if the estimated p-values for each outcome in a bootstrap sample is less than the estimated p-value for every outcome using the original sample. Then, the corrected p-value is the share of bootstrap samples that falsely reject the null.

Due to the clustered nature of our data and the use of school fixed effects, we will use a clustered bootstrap resampling schools with replacement. We will use a cluster bootstrap in pairs approach sampling with replacement jointly the controls and the outcome (and so sampling the controls and residual in pairs) associated with an observation. As shown by Cameron, Gelbach and Miller (2008), sampling residuals for a fixed population of observations can have poor size properties (i.e., reject the null far too often) when the unobservable is heteroscedastic, while both clustered standard errors and the pairs cluster bootstrap have proper size under heteroscedasticity, as long as the number of clusters is not too small, over 30 observations.

The bootstrap procedure for our null hypothesis is as follows:

1. Estimate all outcome models separately by grade (or grade span) for a given treatment. For assessment scores, each grade (or grade span) and subject (i.e. ELA or Math) will result in a separate regression. In the case of attendance, we will divide the sample into the following grade spans for estimation: early elementary (K-2), late elementary, middle school and high school. Save the treatment effect estimates ($\hat{\beta}_j$) and estimated standard errors ($\hat{\sigma}_j$) where j is the index for each model where there are J models.

2. Create bootstrap samples by sampling schools with replacement retaining all observations associated with each selected school, while preserving the number of schools in each bootstrap sample.

3. For each bootstrap sample i, re-estimate all outcome regression models for each grade (or grade span) collecting the bootstrap sample treatment estimates ($\hat{\gamma}_{ij}$) and standard errors ($\hat{\omega}_{ij}$).

4. Calculate the likelihood of a Type-1 error ($\hat{q}_{ij}$) (i.e. the standard p-value for the bootstrap sample) when rejecting the null hypothesis $\hat{\beta}_j = \hat{\gamma}_{ij}$ following the shift and pivot approach described by (Westfall and Young, 1993, p. 38).

5. For each bootstrap sample i, test whether $\hat{p}_j$ is greater than or equal to $\hat{q}_{ij}$ for all j and if so set $\delta_i = 1$, which is consistent with the rejection of all null hypotheses even though all null hypotheses are true. The generalized p-value is the fraction of bootstrap samples that satisfies this condition, i.e. the mean of δ_i ($\bar{\delta}$).

Type 1 Error Adjusted Tests for Whether a Treatment Matters

By choosing a very large bootstrap sample for the individual treatment analyses and using the same bootstrap sample for each treatment, we can resample among the bootstrap samples to conduct our Type-1 Error adjustment for the Family-Wise Error Rate. For example, if we drew a sample of 10,000 bootstrap samples based on sampling schools with replacement and saved the estimation results across all treatments for all 10,000 samples, then it would be reasonable to repeatedly draw 1,000 of these samples with replacement to obtain adjusted p-values.

1. Draw bootstrap samples with replacement from the full set of bootstrap samples from the previous step above where we have conducted regression estimates and calculated adjusted p-values for the generalized null associated with a treatment. Repeat this process L times so that we have many sets of bootstrap samples. Note that we do not need to draw all of the data. We only retain the dummy variable associated with each treatment and bootstrap sample for whether we falsely rejected all null hypotheses in step 5 above (δ_{ik}).

2. For every treatment k and sample of bootstraps l, calculate the mean of δ_{ik} for all bootstrap samples selected as part of l ($\bar{\delta}_{lk}$).

3. Identify every sample of bootstraps l where $\bar{\delta}_{lk}$ is less than the uncorrected p-value from step 5 above $\bar{\delta}_k$. The fraction of samples of bootstraps where this is true provides the adjusted p-value.

Detailed Description of Exploratory Analysis (see Figure B2)

For any district behaviors/actions where we find statistically significant impacts on some outcome in some grade (or grade span), we will examine the individual estimates on the treatment variable associated with each outcome and grade for test scores (or grade span for attendance). Specifically, we can look at the F-tests for assessment scores, assessment proficiency, attendance, and chronic absence, and only look at the set of estimates for an outcome if the specific F-test rejects at the 5% level. For performance outcomes (assessment scores and proficiency), we will look at each individual grade given State Department of Education concerns about pooling assessment data across grades (4 models). For attendance outcomes (attendance and chronic absenteeism), we will focus on pooled analyses by grade span: early elementary (K-2), late elementary, middle school and high school (10 models). While we may not have statistical precision to establish that treatment effects exist for a specific grade (or grade span) and outcome, it will be policy-relevant to know which grades and which outcomes are primarily driving the significant finding for a given district treatment.

We also may look at heterogeneous effects across schools or students for specific grades and outcomes where we observe sizable relationships between treatment and outcomes. In order to address concerns about Type-1 error in such investigations, we will only examine outcome by grade (or grade span) samples if we reject the null hypothesis of zero treatment effects for that sample at the 5% level. Then, we take an approach similar to the null hypothesis utilized in Gelman, Hill and Yajima (2012). Specifically, they specify the null hypothesis for whether the estimated effect is the same across all groups.

In our case, we will divide students or schools based on composition into observationally similar subgroups based on same racial/ethnic category (Non-Hispanic African American, Non-Hispanic all other races, Hispanic), free or reduced-price lunch status (eligible or ineligible), and English Learner status (EL or non-EL). We then implement this test for heterogeneous effects across the 12 resulting categories as an F-test interacting treatment with a dummy associated with each subgroup, omitting one subgroup, and then running an F-test of the full set of 11 interactions. As with our analysis on outcomes by grade (or grade span), we will only report the individual interactions if the overall F-test is significant at the 5% level for the purpose of documenting the specific groups that were most influential in the rejection of the null hypothesis of equal treatment effects.

References

Cameron, AC, Gelbach, A and Miller, DL (2008). Bootstrap-Based Improvements for Inference with Clustered Errors. *Review of Economics and Statistics* 90 (3): 414-427.

Conneely, KN. and Boehnke, M. (2007). So Many Correlated Tests, So Little Time! Rapid Adjustment of P Values for Multiple Correlated Tests. *The American Journal of Human Genetics* 81(6): 1158-1168.

Gelman, Andrew, Jennifer Hill, and Masanao Yajima (2012). Why We (Usually) Don't Have to Worry About Multiple Comparisons. *Journal of Research on Educational Effectiveness* 5(2): 189-211.

Holm, S. (1979). A simple sequentially rejective multiple test procedure. *Scandinavian Journal of Statistics*. **6** (2): 65–70.

Kaufman, J. H., Diliberti, M. K., Hunter, G. P., Snoke, J., Grant, D., Setodji, C. M., and Young, C.J. (2021). *COVID-19 and the State of K–12 Schools: Results and Technical Documentation from the Spring 2021 American Educator Panels COVID-19 Surveys*. Santa Monica, CA: RAND Corporation. Retrieved from https://www.rand.org/pubs/research_reports/RRA168-7.html.

Westfall, P.H. and Young, S.S. (1993). *Resampling-Based Multiple Testing: Examples and Methods for p-value Adjustment*. New York City: John Wiley & Sons, Inc.

Appendix C: Implementation of remote learning (Research Goal 1)

Research Question 1a. What remote learning formats did districts use and how did these learning formats vary by district type?

Table C1. In-Person Option Available in September

Controls	(1) Grades 1st through 5th	(2) Grades 6th through 8th	(3) Grades 9th through 12th
Percent of students high needs: FRPL, SWD, or ELL	-1.840***	-2.411***	-1.731***
in school attended	(0.316)	(0.383)	(0.510)
District is a RESC, Charter or CTECS	2.359	2.629*	0.184
	(1.484)	(1.505)	(1.159)
District RESC/Charter/CTECS*Percent of students	-3.871*	-3.667*	-0.0266
high needs in school	(2.007)	(1.963)	(1.611)
Observations	10,146	4,480	4,746
Fraction of Students with Sept In-person Option	0.914	0.925	0.902
25th Percentile Share High Needs Students	0.251	0.247	0.238
75th Percentile Share High Needss Students	0.703	0.694	0.606
Estimated Probability of In-person Option			
Traditional Public (25th percentile high needs)	0.977	0.989	0.958
Traditional Public (75th percentile high needs)	0.876	0.887	0.864
RESC/Charter/CTECS (25th percentile high needs)	0.847	0.916	0.956
RESC/Charter/CTECS (75th percentile high needs)	0.061	0.081	0.856

Note: The top panel shows the results of a probit model regressing in person/hybrid learning mode on school share of students who are high needs, whether the Local Education Agency represents a school choice option, and the interaction of these two variables. Columns 1 through 3 present results for elementary, middle and high school grades, respectively. The bottom panel presents the fraction of students with an in person/hybrid option in September, and the school share of high needs students at the 25th and 75th percentiles. The final rows in the bottom panel present the model based predicted likelihood of in person/hybrid option at the 25th and 75th percentiles of share high needs.

Table C1 presents the initial/September decision to offer hybrid or fully in-person learning as the primary learning mode. We divide the population of students into three subsamples by grade level: 1st-5th, 6th-8th, and 9th-12th following the most common grade configuration of elementary, middle and high schools in the state, but all results below are very similar if we analyze each grade separately.[1] The top panel presents the estimates showing that the likelihood of students having an in-person option in September falls with the share of high need students, and this relationship is even stronger for the subsample composed of students in charter schools and in

[1] Districts do vary in grade composition so that some middle schools will be represented in 1st-5th or 9th-12th and some elementary schools in 6th-8th. The use of school fixed effects helps to address this issue. Further, as noted, this problem will not arise with analyses at the individual grade level and all results are robust

schools managed by the RESCs and CTECS.[2] The bottom panel presents the fraction of students in the state that were provided with an in-person option in September for each of the three grade subsamples, as well as the 25th and 75th percentile school share of high need students within the state's student population. The share of students with an in-person option is 91% at the elementary school level, and 93% and 90% for middle and high school, respectively.

We then use these percentiles to predict the likelihood of a school providing an in-person option at a hypothetical school that was at the 25th and 75th percentiles of share of students with high needs. The 25th percentile is between 24% and 25% percent depending upon grade level, but the 75th percentile ranges more broadly between about 70% for elementary and middle school and 60% for high school. For traditional public schools, an in-person option in September was available to over 95% of students, 98% of elementary and middle school students, at the 25th percentile and available to 86% to 89% of students at the 75th percentile of share high needs. Looking at the RESCs, Charters and CTECS, percentages were relatively high at the 25th percentile ranging between 85% and 96%, but fall dramatically with share high needs in elementary and middle school with some in person being available to only 6% to 9% of students at the 75th percentile share.

[2] We combine public and regional school districts because regional school districts are traditional public schools that are jointly under the supervision of and locally funded by a combination of towns. We also include endowed schools with town school districts because those endowed schools traditionally were affiliated with a specific town and received and in some cases still receive support from that town.

Table C2. Share of Days in Person Available Through End of School Year

Controls	(1) Grades 1st through 5th	(2) Grades 6th through 8th	(3) Grades 9th through 12th
Percent of students high needs: FRPL, SWD, or ELL	-0.320***	-0.237***	-0.183***
in school attended	(0.0380)	(0.0507)	(0.0600)
Regional School District	0.293	0.0714	-0.00722
	(0.264)	(0.113)	(0.0766)
Regional School District*Percent of students high needs	-0.783	0.125	0.173
	(0.995)	(0.444)	(0.300)
Regional Education Service Centers or Charters	0.628***	0.685***	0.118
	(0.217)	(0.262)	(0.257)
Regional Education Service Centers or Charters*Percent	-0.901***	-0.912***	0.107
of students high needs	(0.305)	(0.338)	(0.381)
Endowed Schools		-0.241***	-0.284***
		(0.0135)	(0.0227)
Endowed Schools*Percent of students high needs			0.205***
			(0.0615)
Connecticut Technical Education Career System			-0.230***
			(0.0227)
Observations	9,657	3,469	3,859
Average Share of Days with In Person Option	0.720	0.649	0.567
Estimated Share of Days with In Person Option			
Traditional Public (25th percentile high needs)	0.776	0.696	0.605
Traditional Public (75th percentile high needs)	0.717	0.613	0.549
RESC and Charter (25th percentile high needs)	0.982	0.981	0.889
RESC and Charter (75th percentile high needs)	0.633	0.719	0.762
Endowed School (25th percentile high needs)		0.474	0.369
Endowed School (75th percentile high needs)		0.389	0.377

Note: The top panel shows the results of a tobit model regressing share of days in person offered for the entire school year on school share of students who are high needs, dummy variables for the type of Local Education Agency, and the interaction of these variables. Columns 1 through 3 present results for elementary, middle and high school grades, respectively. The bottom panel presents the average share of days in person. The rest of the rows in the bottom panel present model predicted share of days in person at the 25th and 75th percentiles of share high needs.

Table C2 presents the share of days that were offered in-person over the entire school year. Again, the estimates are shown in the top panel of the table. As in September, share of in person days available falls as the school share of high need students increases, although this effect weakens for higher grade levels. We cannot detect any differences between town based school districts and regional school districts, although estimates are very noisy at lower grade levels where regional school districts have minimal representation. The negative relationship between

share high needs and having in person opportunities is even stronger for the charter/RESC subsample in elementary and middle school grades, but the relationship is much weaker at endowed high schools.[3]

The bottom panel shows the average of share of days provided in-person: 72% for elementary, 70% for middle and 60% for high school grades and the expected share based on the 25th and 75th percentiles of share high need students separately for different types of schools. For traditional public schools, we observe approximately a 6 to 8 percentage point lower share of days provided in-person at the 75th percentile share high needs relative to the 25th percentile. These differences are even larger for RESCs and Charter schools: 35 percentage points for elementary, 26 points for middle and 13 points for high school grades. Endowed schools have on average substantially lower shares of in person days: 47% for middle school and 37% for high school at the 25th percentile, but for endowed high schools the share in person is unaffected by school share of high need students.

[3] CTECS is one district with a single value for share of in person days and so the estimate on share high needs across the technical high schools is meaningless, opposite in sign and identical in magnitude to level estimate. Only one endowed middle exists in the state so the effect of share high needs for that school is unidentified.

Table C3. Monthly In-Person Enrollment Days as a Share of Total Enrollment Days

VARIABLES	(1) Oct Dec	(2) Jan Mar	(3) Apr Jun
Share of Days Offered in Person for the Same Month	0.646***	0.651***	0.591***
	(0.0388)	(0.0316)	(0.0752)
Observations	1,401,411	1,388,433	1,279,065
R-squared	0.311	0.260	0.114
Share of Days Offered in Person for the Same Month	0.923***	0.849***	0.657***
	(0.0455)	(0.0537)	(0.141)
Percent of students high needs: FRPL, SWD, or ELL	0.0318	0.0413	-0.0804
	(0.0548)	(0.0796)	(0.280)
Share of Days in offered person* Percent of students high needs	-0.562***	-0.467***	-0.287
	(0.0900)	(0.0965)	(0.294)
Observations	1,398,156	1,385,238	1,276,179
R-squared	0.359	0.292	0.153
Average of Share Monthly In Person Enrollment Days	0.3741658	0.4145769	0.6823971
Average of Share of Days Offered in Person by Month	0.5316727	.6075055	0.8437183
Share days in person effect at 25th percentile high needs	0.756	0.710	0.572
Share days in person effect at 75th percentile high needs	0.519	0.514	0.451

Note: The top panel shows the results from a linear regression of share of days a student is enrolled in person during a given month on the share of days offered in person by that school in the same month. The second panel presents estimates adding controls for the share of students who are high needs and the interaction of share high needs with share of days offered in person. Columns 1 through 3 present results for Oct-Dec, Jan-Mar and Apr-Jun, respectively. The bottom panel presents the average share of enrollment days in person, the average share of days offered in person, and the estimated effect of share days offered in person calculated at the 25th and 75th percentiles using the estimates from panel 2.

Next, we examined rates at which students enroll in person as a function of the share of days offered in person. These results are shown in Table 3 separately for Oct-Dec, Jan-Mar and Apr-June in each column. The first panel presents the simple relationship between share enrolled and share available. The estimate ranges between 0.59 and 0.65 implying that if 10 additional days were available in person one would observe on average six to six and one half additional days of in-person enrollment per student. However, since virtually all districts required students to choose between all remote and the primary learning mode, a better interpretation of these estimates is that approximately six out of ten students enrolled in-person for all available days and four students continued with remote learning. The second panel estimates a model interacting the share of days in person with the school share of high needs students. Estimates on these interactions are strongly negative for the fall and winter, and the level estimate on share in person increases to 0.92 and 0.85 for elementary and middle school grades, where an estimate of one would be consistent with perfect take-up.

The first two rows of the bottom panel present the average of the student share of enrollment days that are recorded as in person and the average share of days available in-person based on the weekly learning mode. As the year progressed, the share of days available in person and the share of days students enrolled in person education increased, but there was a steady gap of

between 16 and 19 percentage points. The last two rows use the estimates from the second panel to predict the effect of share in-person provided for a hypothetical school at the 25th and 75th percentiles of share of students with high needs. For elementary and middle schools, we observe a sizable gap with 70% to 75% of students appearing to respond to a school offering more days in-person at the 25th percentile of share high needs, but just over 50% of students responding at the 75th percentile. In the spring, we observe less responsiveness overall to increases in in-person learning availability, but the influence of share high needs has declined with 57% of days in person at the 25th percentile of share high needs and 45% in person at the 75th percentile.

We also hypothesized that the students from schools with a larger share of high needs students might respond more slowly to the provision of more in person days, as opposed to simply having lower responsiveness overall. We did explore models that included lags to allow for such a delayed response to new in person offering, but we did not find evidence of such behavior. The data appears more consistent with simply a lower response rate among students in high needs schools to the provision of hybrid or in-person learning opportunities.

Table C5. District-reported learning models by grade level in May 2020

District Inventory Q5. As of May 1, 2020, what did learning look like when students from the following grade levels were learning from home?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	Fully asynchronous without technology	5	2.6	2	6.3	2	1.6	1	2.9
	Fully asynchronous with technology	30	15.5	5	15.6	23	18.0	2	5.9
	Partially synchronous	100	51.5	14	43.8	74	57.8	12	35.3
	Fully synchronous	59	30.4	11	34.4	29	22.7	19	55.9
	Total N	194	100.0	32	100.0	128	100.0	34	100.0
Middle School	Fully asynchronous without technology	3	1.6	1	3.2	1	.8	1	2.6
	Fully asynchronous with technology	29	15.4	4	12.9	22	18.5	3	7.9
	Partially synchronous	86	45.7	15	48.4	61	51.3	10	26.3
	Fully synchronous	70	37.2	11	35.5	35	29.4	24	63.2
	Total N	188	100.0	31	100.0	119	100.0	38	100.0
High School	Fully asynchronous without technology	2	1.2	1	3.3	1	1.0	0	.0
	Fully asynchronous with technology	28	16.3	4	13.3	18	18.4	6	13.6
	Partially synchronous	72	41.9	13	43.3	45	45.9	14	31.8
	Fully synchronous	70	40.7	12	40.0	34	34.7	24	54.5
	Total N	172	100.0	30	100.0	98	100.0	44	100.0

Please note that the response options were listed as follows: Fully asynchronous without technology: assignments were distributed in print format and no online/electronic learning materials were provided; Fully asynchronous with technology: students had no classes conducted in real time through video conferencing (for example, Google Meet or Zoom), but online/electronic learning materials were provided (e.g., online activities, instructional videos, etc.); Partially synchronous: students had at least one class meeting conducted in real time through video conferencing (for example, Google Meet or Zoom); Fully synchronous: the majority of students' classes took place in real time, through video conferencing (for example, Google Meet or Zoom)

Table C6. Teacher-reported use of learning models by grade level in spring 2020

Teacher Survey Q6. Which of the following models most closely describes how you taught the majority of your students in the first months of the COVID-19 pandemic? (March-June 2020). Please select all that apply.

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Fully in-person instruction	18	1.9	8	2.0	10	1.8
	Hybrid model, with in-person instruction and remote instruction at the same time	24	2.5	16	4.0	8	1.4
	Hybrid model, with in-person instruction and remote instruction at different times	17	1.8	10	2.5	7	1.2
	Fully remote instruction, where students received at least one real-time class each school day	467	48.7	173	43.6	294	52.3
	Fully remote instruction, where students received less than one real-time class each school day	487	50.8	212	53.4	275	48.9
	Unable to continue instruction	25	2.6	18	4.5	7	1.2
	Total N	959	100.0	397	100.0	562	100.0
Middle school	Fully in-person instruction	8	1.4	3	1.7	5	1.3
	Hybrid model, with in-person instruction and remote instruction at the same time	10	1.8	2	1.1	8	2.1
	Hybrid model, with in-person instruction and remote instruction at different times	7	1.3	4	2.3	3	.8
	Fully remote instruction, where students received at least one real-time class each school day	265	47.8	82	46.9	183	48.3
	Fully remote instruction, where students received less than one real-time class each school day	295	53.2	92	52.6	203	53.6
	Unable to continue instruction	6	1.1	3	1.7	3	.8
	Total N	554	100.0	175	100.0	379	100.0
High school	Fully in-person instruction	25	2.9	15	5.4	10	1.7
	Hybrid model, with in-person instruction and remote instruction at the same time	18	2.1	7	2.5	11	1.8
	Hybrid model, with in-person instruction and remote instruction at different times	10	1.1	6	2.2	4	.7
	Fully remote instruction, where students received at least one real-time class each school day	407	46.7	141	51.1	266	44.6
	Fully remote instruction, where students received less than one real-time class each school day	468	53.7	126	45.7	342	57.4
	Unable to continue instruction	11	1.3	4	1.4	7	1.2
	Total N	872	100.0	276	100.0	596	100.0
Multiple levels, ungraded, or unknown	Fully in-person instruction	6	1.8	4	3.7	2	.9
	Hybrid model, with in-person instruction and remote instruction at the same time	11	3.4	8	7.4	3	1.4
	Hybrid model, with in-person instruction and remote instruction at different times	4	1.2	2	1.9	2	.9
	Fully remote instruction, where students received at least one real-time class each school day	173	52.7	53	49.1	120	54.5
	Fully remote instruction, where students received less than one real-time class each school day	144	43.9	44	40.7	100	45.5
	Unable to continue instruction	12	3.7	5	4.6	7	3.2
	Total N	328	100.0	108	100.0	220	100.0

Please note that the response options were listed as follows: Fully in-person instruction; Hybrid model where I provided in-person instruction and remote instruction concurrently (i.e., at the same time); Hybrid model, where I provided in-person instruction and remote instruction at different times (not concurrently); Fully remote instruction, where my students received at least one synchronous/real-time class each school day (for example, classes via zoom); Fully remote instruction, where my students received less than one synchronous/real-time class each school day (i.e., instruction via paper workbooks or asynchronous videos); I was unable to continue instruction.

Table C7. District-reported learning models for fully remote students by grade level during the 2020-21 school year

District Inventory Q29. During the 2020-21 school year, what did learning look like for fully remote students at the following grade levels?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	Fully asynchronous without technology	3	1.6	0	.0	2	1.6	1	3.3
	Fully asynchronous with technology	9	4.8	2	6.1	5	4.0	2	6.7
	Partially synchronous	75	40.1	12	36.4	51	41.1	12	40.0
	Fully synchronous	100	53.5	19	57.6	66	53.2	15	50.0
	Total	187	100.0	33	100.0	124	100.0	30	100.0
Middle School	Fully asynchronous without technology	1	.6	0	.0	0	.0	1	2.9
	Fully asynchronous with technology	9	5.0	0	.0	7	6.1	2	5.7
	Partially synchronous	57	31.7	10	32.3	37	32.5	10	28.6
	Fully synchronous	113	62.8	21	67.7	70	61.4	22	62.9
	Total	180	100.0	31	100.0	114	100.0	35	100.0
High School	Fully asynchronous without technology	2	1.2	1	3.2	0	.0	1	2.3
	Fully asynchronous with technology	4	2.3	0	.0	3	3.1	1	2.3
	Partially synchronous	47	27.3	8	25.8	26	26.8	13	29.5
	Fully synchronous	119	69.2	22	71.0	68	70.1	29	65.9
	Total	172	100.0	31	100.0	97	100.0	44	100.0

Please note that the response options were listed as follows: Fully asynchronous without technology: assignments were distributed in print format and no online/electronic learning materials were provided; Fully asynchronous with technology: students had no classes conducted in real time through video conferencing (for example, Google Meet or Zoom), but online/electronic learning materials were provided (e.g., online activities, instructional videos, etc.); Partially synchronous: students had at least one class meeting conducted in real time through video conferencing (for example, Google Meet or Zoom); Fully synchronous: the majority of students' classes took place in real time, through video conferencing (for example, Google Meet or Zoom)

Table C8. District-reported learning models for hybrid students by grade level during the 2020-21 school year

District Inventory Q34. During the 2020-21 school year, what did learning look like for hybrid students from the following grade levels?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	Fully asynchronous without technology	3	2.0	2	6.9	0	.0	1	4.5
	Fully asynchronous with technology	13	8.7	3	10.3	9	9.1	1	4.5
	Partially synchronous	72	48.0	14	48.3	48	48.5	10	45.5
	Fully synchronous	62	41.3	10	34.5	42	42.4	10	45.5
	Total	150	100.0	29	100.0	99	100.0	22	100.0
Middle School	Fully asynchronous without technology	2	1.3	1	3.7	0	.0	1	3.6
	Fully asynchronous with technology	11	7.0	2	7.4	7	6.8	2	7.1
	Partially synchronous	56	35.4	9	33.3	36	35.0	11	39.3
	Fully synchronous	89	56.3	15	55.6	60	58.3	14	50.0
	Total	158	100.0	27	100.0	103	100.0	28	100.0
High School	Fully asynchronous without technology	2	1.3	1	3.7	0	.0	1	2.9
	Fully asynchronous with technology	8	5.2	1	3.7	4	4.3	3	8.8
	Partially synchronous	46	30.1	9	33.3	24	26.1	13	38.2
	Fully synchronous	97	63.4	16	59.3	64	69.6	17	50.0
	Total	153	100.0	27	100.0	92	100.0	34	100.0

Please note that the response options were listed as follows: Fully asynchronous without technology: assignments were distributed in print format and no online/electronic learning materials were provided; Fully asynchronous with technology: students had no classes conducted in real time through video conferencing (for example, Google Meet or Zoom), but online/electronic learning materials were provided (e.g., online activities, instructional videos, etc.); Partially synchronous: students had at least one class meeting conducted in real time through video conferencing (for example, Google Meet or Zoom); Fully synchronous: the majority of students' classes took place in real time, through video conferencing (for example, Google Meet or Zoom)

Table C9. Teacher-reported use of learning models by grade level in school year 2020-21

Teacher Survey Q9. Which of the following models did you use to teach your students during the 2020-21 school year? Please select all that apply.

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Fully in-person instruction	285	28.7	81	19.6	204	35.1
	Hybrid model, with in-person instruction and remote instruction at the same time	644	64.8	262	63.4	382	65.7
	Hybrid model, with in-person instruction and remote instruction at different times	305	30.7	138	33.4	167	28.7
	Fully remote instruction, where students received at least one real-time class each school day	298	30.0	136	32.9	162	27.9
	Fully remote instruction, where students received less than one real-time class each school day	44	4.4	17	4.1	27	4.6
	Total N	994	100.0	413	100.0	581	100.0
Middle school	Fully in-person instruction	136	23.8	31	16.8	105	27.1
	Hybrid model, with in-person instruction and remote instruction at the same time	487	85.1	144	78.3	343	88.4
	Hybrid model, with in-person instruction and remote instruction at different times	108	18.9	39	21.2	69	17.8
	Fully remote instruction, where students received at least one real-time class each school day	150	26.2	57	31.0	93	24.0
	Fully remote instruction, where students received less than one real-time class each school day	23	4.0	5	2.7	18	4.6
	Total N	572	100.0	184	100.0	388	100.0
High school	Fully in-person instruction	171	19.6	44	16.1	127	21.2
	Hybrid model, with in-person instruction and remote instruction at the same time	754	86.6	210	76.9	544	91.0
	Hybrid model, with in-person instruction and remote instruction at different times	161	18.5	66	24.2	95	15.9
	Fully remote instruction, where students received at least one real-time class each school day	265	30.4	99	36.3	166	27.8
	Fully remote instruction, where students received less than one real-time class each school day	35	4.0	12	4.4	23	3.8
	Total N	871	100.0	273	100.0	598	100.0
Multiple levels, ungraded, or unknown	Fully in-person instruction	72	21.1	15	13.5	57	24.8
	Hybrid model, with in-person instruction and remote instruction at the same time	237	69.5	82	73.9	155	67.4
	Hybrid model, with in-person instruction and remote instruction at different times	109	32.0	38	34.2	71	30.9
	Fully remote instruction, where students received at least one real-time class each school day	86	25.2	29	26.1	57	24.8
	Fully remote instruction, where students received less than one real-time class each school day	23	6.7	6	5.4	17	7.4
	Total N	341	100.0	111	100.0	230	100.0

Please note that the response options were listed as follows for learning models used during 2020-21 school year: Fully in-person instruction; Hybrid model where I provided in-person instruction and remote instruction concurrently (i.e., at the same time); Hybrid model, where I provided in-person instruction and remote instruction at different times (not concurrently); Fully remote instruction, where my students received at least one synchronous/real-time class each school day (for example, classes via zoom); Fully remote instruction, where my students received less than one synchronous/real-time class each school day (i.e., instruction via paper workbooks or asynchronous videos).

Table C10. Teacher-reported percentage of students by grade level in each learning model in 2020-21

Teacher Survey Q10. Approximately what percentage of your students attended school in each of the following ways for the majority of the 2020-21 school year?

		District Type								
		Overall			Alliance districts			Non-Alliance districts		
		N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
Elementary school	fully in-person learning	994	44.5	(38.0)	413	34.0	(34.6)	581	52.0	(38.5)
	hybrid learning	994	31.1	(35.5)	413	36.0	(35.0)	581	27.6	(35.5)
	fully remote learning	994	24.4	(28.6)	413	30.0	(30.0)	581	20.4	(26.8)
Middle school	fully in-person learning	572	33.5	(34.4)	184	26.5	(31.2)	388	36.9	(35.4)
	hybrid learning	572	45.3	(34.9)	184	43.5	(31.3)	388	46.2	(36.4)
	fully remote learning	572	21.2	(21.7)	184	30.0	(26.2)	388	17.0	(17.7)
High school	fully in-person learning	871	21.8	(28.3)	273	17.6	(24.7)	598	23.8	(29.6)
	hybrid learning	871	50.1	(33.0)	273	39.6	(31.5)	598	54.9	(32.5)
	fully remote learning	871	28.0	(26.6)	273	42.8	(32.2)	598	21.3	(20.4)
Multiple levels, ungraded, or unknown	fully in-person learning	341	41.9	(35.8)	111	32.8	(31.6)	230	46.3	(36.9)
	hybrid learning	341	33.3	(33.5)	111	35.7	(30.0)	230	32.1	(35.0)
	fully remote learning	341	24.8	(25.9)	111	31.5	(27.2)	230	21.6	(24.6)

Please note, mean percent describes the mean of each participating district's reported value.

Research Question 1b. What general curricular student learning outcomes were targeted?

Table C11. District-reported primary goal for core academic subjects in spring 2020

District Inventory Q6. During spring 2020, what was the district's primary learning goal for core academic subjects when students from the following grade levels were learning from home? Please select the best answer for each grade level.

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	Maintain contact with students	41	21.0	7	21.9	23	17.7	11	33.3
	Minimize learning loss	54	27.7	10	31.3	33	25.4	11	33.3
	Continue on-grade learning	99	50.8	15	46.9	74	56.9	10	30.3
	Provide enrichment opportunities for self-motivated students	0	.0	0	.0	0	.0	0	.0
	Remote learning did not occur in core academic subjects	1	.5	0	.0	0	.0	1	3.0
	Total	195	100.0	32	100.0	130	100.0	33	100.0
Middle School	Maintain contact with students	38	20.1	8	25.8	19	15.8	11	28.9
	Minimize learning loss	47	24.9	9	29.0	27	22.5	11	28.9
	Continue on-grade learning	102	54.0	14	45.2	73	60.8	15	39.5
	Provide enrichment opportunities for self-motivated students	0	.0	0	.0	0	.0	0	.0
	Remote learning did not occur in core academic subjects	2	1.1	0	.0	1	.8	1	2.6
	Total	189	100.0	31	100.0	120	100.0	38	100.0
High School	Maintain contact with students	35	20.1	7	23.3	15	15.2	13	28.9
	Minimize learning loss	43	24.7	8	26.7	21	21.2	14	31.1
	Continue on-grade learning	95	54.6	15	50.0	62	62.6	18	40.0
	Provide enrichment opportunities for self-motivated students	0	.0	0	.0	0	.0	0	.0
	Remote learning did not occur in core academic subjects	1	.6	0	.0	1	1.0	0	.0
	Total	174	100.0	30	100.0	99	100.0	45	100.0

Table C12. District-reported primary goal for music, art, health & PE in spring 2020

District Inventory Q7. During spring 2020, what was the district's primary learning goal for music, art, health, and PE classes when students from the following grade levels were learning from home? Please select the best answer for each grade level.

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	Maintain contact with students	71	37.2	13	41.9	42	33.1	16	48.5
	Minimize learning loss	24	12.6	5	16.1	14	11.0	5	15.2
	Continue on-grade learning	56	29.3	6	19.4	43	33.9	7	21.2
	Provide enrichment opportunities for self-motivated students	34	17.8	7	22.6	25	19.7	2	6.1
	Remote learning did not occur in these areas	6	3.1	0	.0	3	2.4	3	9.1
	Total	191	100.0	31	100.0	127	100.0	33	100.0
Middle School	Maintain contact with students	60	32.6	12	40.0	33	28.4	15	39.5
	Minimize learning loss	31	16.8	5	16.7	15	12.9	11	28.9
	Continue on-grade learning	61	33.2	6	20.0	48	41.4	7	18.4
	Provide enrichment opportunities for self-motivated students	28	15.2	7	23.3	19	16.4	2	5.3
	Remote learning did not occur in these areas	4	2.2	0	.0	1	.9	3	7.9
	Total	184	100.0	30	100.0	116	100.0	38	100.0
High School	Maintain contact with students	56	32.9	11	37.9	27	28.1	18	40.0
	Minimize learning loss	30	17.6	5	17.2	13	13.5	12	26.7
	Continue on-grade learning	64	37.6	7	24.1	48	50.0	9	20.0
	Provide enrichment opportunities for self-motivated students	14	8.2	6	20.7	7	7.3	1	2.2
	Remote learning did not occur in these areas	6	3.5	0	.0	1	1.0	5	11.1
	Total	170	100.0	29	100.0	96	100.0	45	100.0

Table C13. District-reported primary goal for special services in spring 2020

District Inventory Q8. During spring 2020, what was the district's primary goal for special services (special education services and English Learner services) when eligible students from the following grade levels were learning from home? Please select the best answer for each grade level.

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	Maintain contact with students	39	20.0	7	21.9	21	16.3	11	32.4
	Minimize learning loss	66	33.8	13	40.6	43	33.3	10	29.4
	Continue on-grade learning	89	45.6	12	37.5	65	50.4	12	35.3
	Provide enrichment opportunities for self-motivated students	0	.0	0	.0	0	.0	0	.0
	Remote learning did not occur in these areas	1	.5	0	.0	0	.0	1	2.9
	Total	195	100.0	32	100.0	129	100.0	34	100.0
Middle School	Maintain contact with students	38	20.1	7	22.6	19	16.0	12	30.8
	Minimize learning loss	64	33.9	13	41.9	40	33.6	11	28.2
	Continue on-grade learning	86	45.5	11	35.5	60	50.4	15	38.5
	Provide enrichment opportunities for self-motivated students	0	.0	0	.0	0	.0	0	.0
	Remote learning did not occur in these areas	1	.5	0	.0	0	.0	1	2.6
	Total	189	100.0	31	100.0	119	100.0	39	100.0
High School	Maintain contact with students	39	22.5	6	20.0	18	18.4	15	33.3
	Minimize learning loss	59	34.1	12	40.0	33	33.7	14	31.1
	Continue on-grade learning	75	43.4	12	40.0	47	48.0	16	35.6
	Provide enrichment opportunities for self-motivated students	0	.0	0	.0	0	.0	0	.0
	Remote learning did not occur in these areas	0	.0	0	.0	0	.0	0	.0
	Total	173	100.0	30	100.0	98	100.0	45	100.0

Table C14. District-reported primary goal (overall) for fully remote students in 2020-21

District Inventory Q30. During the 2020-21 school year, what was the district's primary goal for teachers of fully remote students at each of the following levels?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	Maintain contact with students	12	6.3	1	3.0	7	5.6	4	13.3
	Minimize learning loss	26	13.8	5	15.2	14	11.1	7	23.3
	Continue on-grade learning	142	75.1	26	78.8	99	78.6	17	56.7
	Provide enrichment opportunities for self-motivated students	1	.5	0	.0	0	.0	1	3.3
	Other (please describe):	8	4.2	1	3.0	6	4.8	1	3.3
	Total	189	100.0	33	100.0	126	100.0	30	100.0
Middle School	Maintain contact with students	10	5.5	1	3.2	5	4.3	4	11.4
	Minimize learning loss	24	13.2	6	19.4	13	11.2	5	14.3
	Continue on-grade learning	143	78.6	24	77.4	95	81.9	24	68.6
	Provide enrichment opportunities for self-motivated students	1	.5	0	.0	0	.0	1	2.9
	Other (please describe):	4	2.2	0	.0	3	2.6	1	2.9
	Total	182	100.0	31	100.0	116	100.0	35	100.0
High School	Maintain contact with students	18	10.4	1	3.2	9	9.2	8	18.2
	Minimize learning loss	25	14.5	6	19.4	10	10.2	9	20.5
	Continue on-grade learning	125	72.3	23	74.2	77	78.6	25	56.8
	Provide enrichment opportunities for self-motivated students	0	.0	0	.0	0	.0	0	.0
	Other (please describe):	5	2.9	1	3.2	2	2.0	2	4.5
	Total	173	100.0	31	100.0	98	100.0	44	100.0

Table C15. District-reported primary goal (overall) for hybrid students in 2020-21

District Inventory Q35. During the 2020-21 school year, what was the district's primary goal teachers of hybrid students at the following levels on days when they were learning from home?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	Maintain contact with students	8	4.9	1	3.1	2	1.9	5	20.0
	Minimize learning loss	24	14.6	6	18.8	12	11.2	6	24.0
	Continue on-grade learning	108	65.9	21	65.6	78	72.9	9	36.0
	Provide enrichment opportunities for self-motivated students	2	1.2	0	.0	0	.0	2	8.0
	Other (please describe):	22	13.4	4	12.5	15	14.0	3	12.0
	Total	164	100.0	32	100.0	107	100.0	25	100.0
Middle School	Maintain contact with students	11	6.6	1	3.3	5	4.7	5	16.7
	Minimize learning loss	25	15.0	7	23.3	12	11.2	6	20.0
	Continue on-grade learning	116	69.5	19	63.3	83	77.6	14	46.7
	Provide enrichment opportunities for self-motivated students	2	1.2	0	.0	0	.0	2	6.7
	Other (please describe):	13	7.8	3	10.0	7	6.5	3	10.0
	Total	167	100.0	30	100.0	107	100.0	30	100.0
High School	Maintain contact with students	12	7.5	1	3.3	6	6.6	5	13.2
	Minimize learning loss	22	13.8	5	16.7	9	9.9	8	21.1
	Continue on-grade learning	114	71.7	21	70.0	74	81.3	19	50.0
	Provide enrichment opportunities for self-motivated students	1	.6	0	.0	0	.0	1	2.6
	Other (please describe):	10	6.3	3	10.0	2	2.2	5	13.2
	Total	159	100.0	30	100.0	91	100.0	38	100.0

Table C16. District-reported elementary school assessment practices prior to COVID-19

District Inventory Q42e_1. What data did your district use to assess how elementary students were doing prior to COVID-19?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Their attendance in class	179	93.7	33	100.0	117	92.9	29	90.6
Their completed classroom tasks or assignments	181	94.8	30	90.9	123	97.6	28	87.5
Their responses to a student survey (excluding social and emotional assessments)	82	42.9	12	36.4	61	48.4	9	28.1
Their performance on a social and emotional assessment	48	25.1	8	24.2	22	17.5	18	56.3
Their performance on classroom quizzes or tests	173	90.6	30	90.9	122	96.8	21	65.6
Diagnostic or benchmark schoolwide assessments in English language arts	168	88.0	30	90.9	116	92.1	22	68.8
Diagnostic or benchmark schoolwide assessments in mathematics	167	87.4	30	90.9	116	92.1	21	65.6
Other (please describe):	16	8.4	3	9.1	7	5.6	6	18.8
Total N	191	100.0	33	100.0	126	100.0	32	100.0

Table C17. District-reported middle school assessment practices prior to COVID-19

District Inventory Q42m_1. What data did your district use to assess how middle school students were doing prior to COVID-19?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Their attendance in class	179	97.3	31	100.0	114	98.3	34	91.9
Their completed classroom tasks or assignments	175	95.1	28	90.3	113	97.4	34	91.9
Their responses to a student survey (excluding social and emotional assessments)	73	39.7	12	38.7	53	45.7	8	21.6
Their performance on a social and emotional assessment	48	26.1	8	25.8	24	20.7	16	43.2
Their performance on classroom quizzes or tests	168	91.3	29	93.5	113	97.4	26	70.3
Diagnostic or benchmark schoolwide assessments in English language arts	146	79.3	28	90.3	94	81.0	24	64.9
Diagnostic or benchmark schoolwide assessments in mathematics	144	78.3	28	90.3	92	79.3	24	64.9
Other (please describe):	17	9.2	3	9.7	7	6.0	7	18.9
Total N	184	100.0	31	100.0	116	100.0	37	100.0

Table C18. District-reported high school assessment practices prior to COVID-19

District Inventory Q42h_1. What data did your district use to assess how high school students were doing prior to COVID-19?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Their attendance in class	168	97.1	31	100.0	95	96.9	42	95.5
Their completed classroom tasks or assignments	163	94.2	27	87.1	96	98.0	40	90.9
Their responses to a student survey (excluding social and emotional assessments)	75	43.4	15	48.4	51	52.0	9	20.5
Their performance on a social and emotional assessment	42	24.3	7	22.6	23	23.5	12	27.3
Their performance on classroom quizzes or tests	152	87.9	27	87.1	95	96.9	30	68.2
Diagnostic or benchmark schoolwide assessments in English language arts	122	70.5	25	80.6	74	75.5	23	52.3
Diagnostic or benchmark schoolwide assessments in mathematics	120	69.4	25	80.6	72	73.5	23	52.3
Other (please describe):	16	9.2	3	9.7	5	5.1	8	18.2
Total N	173	100.0	31	100.0	98	100.0	44	100.0

Table C19. District-reported elementary school assessment practices in spring 2020

District Inventory Q42e_2. What data did your district use to assess how elementary students were doing during spring 2020?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Their attendance in class	170	91.9	27	90.0	115	93.5	28	87.5
Their completed classroom tasks or assignments	168	90.8	28	93.3	115	93.5	25	78.1
Their responses to a student survey (excluding social and emotional assessments)	69	37.3	9	30.0	52	42.3	8	25.0
Their performance on a social and emotional assessment	44	23.8	9	30.0	23	18.7	12	37.5
Their performance on classroom quizzes or tests	128	69.2	21	70.0	90	73.2	17	53.1
Diagnostic or benchmark schoolwide assessments in English language arts	78	42.2	12	40.0	54	43.9	12	37.5
Diagnostic or benchmark schoolwide assessments in mathematics	77	41.6	12	40.0	54	43.9	11	34.4
Other (please describe):	12	6.5	2	6.7	4	3.3	6	18.8
Total N	185	100.0	30	100.0	123	100.0	32	100.0

Table C20. District-reported middle school assessment practices in spring 2020

District Inventory Q42m_2. What data did your district use to assess how middle school students were doing during spring 2020?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Their attendance in class	162	91.0	25	86.2	104	92.9	33	89.2
Their completed classroom tasks or assignments	164	92.1	26	89.7	107	95.5	31	83.8
Their responses to a student survey (excluding social and emotional assessments)	71	39.9	12	41.4	50	44.6	9	24.3
Their performance on a social and emotional assessment	41	23.0	7	24.1	21	18.8	13	35.1
Their performance on classroom quizzes or tests	132	74.2	21	72.4	89	79.5	22	59.5
Diagnostic or benchmark schoolwide assessments in English language arts	75	42.1	12	41.4	49	43.8	14	37.8
Diagnostic or benchmark schoolwide assessments in mathematics	74	41.6	12	41.4	48	42.9	14	37.8
Other (please describe):	14	7.9	2	6.9	5	4.5	7	18.9
Total N	178	100.0	29	100.0	112	100.0	37	100.0

Table C21. District-reported high school assessment practices in spring 2020

District Inventory Q42h_2. What data did your district use to assess how high school students were doing during spring 2020?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Their attendance in class	152	91.0	25	89.3	88	92.6	39	88.6
Their completed classroom tasks or assignments	156	93.4	26	92.9	93	97.9	37	84.1
Their responses to a student survey (excluding social and emotional assessments)	72	43.1	14	50.0	49	51.6	9	20.5
Their performance on a social and emotional assessment	34	20.4	5	17.9	17	17.9	12	27.3
Their performance on classroom quizzes or tests	126	75.4	21	75.0	78	82.1	27	61.4
Diagnostic or benchmark schoolwide assessments in English language arts	63	37.7	11	39.3	36	37.9	16	36.4
Diagnostic or benchmark schoolwide assessments in mathematics	62	37.1	11	39.3	35	36.8	16	36.4
Other (please describe):	11	6.6	1	3.6	3	3.2	7	15.9
Total N	167	100.0	28	100.0	95	100.0	44	100.0

Table C22. District-reported elementary school assessment practices in 2020-21

District Inventory Q42e_3. What data did your district use to assess how elementary students were doing during school year 2020-21?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Their attendance in class	182	95.3	33	100.0	120	95.2	29	90.6
Their completed classroom tasks or assignments	180	94.2	31	93.9	122	96.8	27	84.4
Their responses to a student survey (excluding social and emotional assessments)	96	50.3	16	48.5	70	55.6	10	31.3
Their performance on a social and emotional assessment	79	41.4	17	51.5	47	37.3	15	46.9
Their performance on classroom quizzes or tests	168	88.0	29	87.9	118	93.7	21	65.6
Diagnostic or benchmark schoolwide assessments in English language arts	167	87.4	31	93.9	114	90.5	22	68.8
Diagnostic or benchmark schoolwide assessments in mathematics	167	87.4	31	93.9	115	91.3	21	65.6
Other (please describe):	19	9.9	5	15.2	8	6.3	6	18.8
Overall	191	100.0	33	100.0	126	100.0	32	100.0

Table C23. District-reported middle school assessment practices in 2020-21

District Inventory Q42m_3. What data did your district use to assess how middle school students were doing during 2020-21?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Their attendance in class	179	97.3	29	93.5	115	99.1	35	94.6
Their completed classroom tasks or assignments	175	95.1	28	90.3	114	98.3	33	89.2
Their responses to a student survey (excluding social and emotional assessments)	93	50.5	19	61.3	62	53.4	12	32.4
Their performance on a social and emotional assessment	72	39.1	13	41.9	42	36.2	17	45.9
Their performance on classroom quizzes or tests	167	90.8	28	90.3	112	96.6	27	73.0
Diagnostic or benchmark schoolwide assessments in English language arts	148	80.4	29	93.5	95	81.9	24	64.9
Diagnostic or benchmark schoolwide assessments in mathematics	147	79.9	29	93.5	94	81.0	24	64.9
Other (please describe):	17	9.2	4	12.9	6	5.2	7	18.9
Overall	184	100.0	31	100.0	116	100.0	37	100.0

Table C24. District-reported high school assessment practices in 2020-21

District Inventory Q42h_3. What data did your district use to assess how high school students were doing during 2020-21?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Their attendance in class	169	97.1	30	96.8	96	97.0	43	97.7
Their completed classroom tasks or assignments	161	92.5	29	93.5	95	96.0	37	84.1
Their responses to a student survey (excluding social and emotional assessments)	93	53.4	21	67.7	60	60.6	12	27.3
Their performance on a social and emotional assessment	63	36.2	11	35.5	37	37.4	15	34.1
Their performance on classroom quizzes or tests	152	87.4	28	90.3	94	94.9	30	68.2
Diagnostic or benchmark schoolwide assessments in English language arts	127	73.0	28	90.3	76	76.8	23	52.3
Diagnostic or benchmark schoolwide assessments in mathematics	126	72.4	28	90.3	75	75.8	23	52.3
Other (please describe):	16	9.2	4	12.9	4	4.0	8	18.2
Overall	174	100.0	31	100.0	99	100.0	44	100.0

Table C25. Teacher-reported elementary school assessment practices in 2020-21

Teacher Survey Q26. What information was available to you during the 2020-21 school year to assess how your students were doing? Please select all that apply. (Elementary teachers)

	District Type					
	Overall		Alliance districts		Non-Alliance districts	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Their participation in class	803	92.7	331	89.9	472	94.8
Their work on assignments or exit tickets in my class	753	87.0	313	85.1	440	88.4
Their responses to a student survey (excluding social-emotional assessments)	283	32.7	106	28.8	177	35.5
Their performance on a social and emotional assessment	193	22.3	77	20.9	116	23.3
Their performance on classroom quizzes or tests	597	68.9	247	67.1	350	70.3
Their scores on diagnostic or benchmark schoolwide assessments in English language arts	561	64.8	239	64.9	322	64.7
Their scores on diagnostic or benchmark schoolwide assessments in mathematics	544	62.8	231	62.8	313	62.9
Their attendance	790	91.2	345	93.8	445	89.4
Input/communication from parents	585	67.6	236	64.1	349	70.1
Other (please describe):	31	3.6	13	3.5	18	3.6
Total N	866	100.0	368	100.0	498	100.0

Table C26. Teacher-reported middle school assessment practices in 2020-21

Teacher Survey Q26. What information was available to you during the 2020-21 school year to assess how your students were doing? Please select all that apply. (Middle school teachers)

	District Type					
	Overall		Alliance districts		Non-Alliance districts	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Their participation in class	473	91.5	155	95.1	318	89.8
Their work on assignments or exit tickets in my class	483	93.4	151	92.6	332	93.8
Their responses to a student survey (excluding social-emotional assessments)	292	56.5	88	54.0	204	57.6
Their performance on a social and emotional assessment	150	29.0	53	32.5	97	27.4
Their performance on classroom quizzes or tests	455	88.0	141	86.5	314	88.7
Their scores on diagnostic or benchmark schoolwide assessments in English language arts	273	52.8	79	48.5	194	54.8
Their scores on diagnostic or benchmark schoolwide assessments in mathematics	239	46.2	70	42.9	169	47.7
Their attendance	476	92.1	153	93.9	323	91.2
Input/communication from parents	333	64.4	105	64.4	228	64.4
Other (please describe):	25	4.8	10	6.1	15	4.2
Total N	517	100.0	163	100.0	354	100.0

Table C27. Teacher-reported high school assessment practices in 2020-21

Teacher Survey Q26. What information was available to you during the 2020-21 school year to assess how your students were doing? Please select all that apply. (High school teachers)

	District Type					
	Overall		Alliance districts		Non-Alliance districts	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Their participation in class	694	86.9	212	86.9	482	86.8
Their work on assignments or exit tickets in my class	721	90.2	215	88.1	506	91.2
Their responses to a student survey (excluding social-emotional assessments)	444	55.6	132	54.1	312	56.2
Their performance on a social and emotional assessment	175	21.9	58	23.8	117	21.1
Their performance on classroom quizzes or tests	695	87.0	201	82.4	494	89.0
Their scores on diagnostic or benchmark schoolwide assessments in English language arts	182	22.8	59	24.2	123	22.2
Their scores on diagnostic or benchmark schoolwide assessments in mathematics	158	19.8	48	19.7	110	19.8
Their attendance	738	92.4	223	91.4	515	92.8
Input/communication from parents	438	54.8	123	50.4	315	56.8
Other (please describe):	43	5.4	19	7.8	24	4.3
Total N	799	100.0	244	100.0	555	100.0

Table C28. Teacher-reported assessment practices in 2020-21 (mixed-level)

Teacher Survey Q26. What information was available to you during the 2020-21 school year to assess how your students were doing? Please select all that apply. (Teachers who selected multiple levels, no levels, or "ungraded")

	District Type					
	Overall		Alliance districts		Non-Alliance districts	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Their participation in class	264	89.2	92	92.0	172	87.8
Their work on assignments or exit tickets in my class	254	85.8	82	82.0	172	87.8
Their responses to a student survey (excluding social-emotional assessments)	128	43.2	35	35.0	93	47.4
Their performance on a social and emotional assessment	76	25.7	27	27.0	49	25.0
Their performance on classroom quizzes or tests	233	78.7	75	75.0	158	80.6
Their scores on diagnostic or benchmark schoolwide assessments in English language arts	120	40.5	39	39.0	81	41.3
Their scores on diagnostic or benchmark schoolwide assessments in mathematics	115	38.9	36	36.0	79	40.3
Their attendance	267	90.2	91	91.0	176	89.8
Input/communication from parents	181	61.1	52	52.0	129	65.8
Other (please describe):	8	2.7	3	3.0	5	2.6
Total N	296	100.0	100	100.0	196	100.0

Of the approximately 100 teachers who used the "other" open-text option to describe other information available to them during the 2020-21 school year to assess how their students were doing, the most-reported information source was the students themselves. Students were communicating their concerns digitally with their teachers through email, Google classroom chats, text messages, and Microsoft Teams. Furthermore, many teachers ensured that they had individual conversations (check-ins, advisory sessions, one-on-one conversations, etc.) with their students both in person and over Zoom to assess students' needs informally and allow for individual connection. Teachers also obtained information about how their students were doing indirectly. For example, some teachers observed the way students expressed themselves in their artwork or writing (i.e., journal entries), as well as their behavior and demeanor while engaging in lessons or interacting with their peers. Finally, some teachers reported that communication with other staff (via team meetings, SRBI meeting, IEPs, online gradebooks, etc.) was an important source of information about how their student were doing.

Table C29. District-reported use of an early warning system for elementary school students prior to COVID-19

District Inventory Q43e_1. Did your district use an early warning system (i.e., a system based on student-level data) prior to the COVID-19 pandemic to detect elementary students experiencing the following risks?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Academic failure	157	92.4	28	93.3	111	93.3	18	85.7
Chronic absenteeism	162	95.3	30	100.0	115	96.6	17	81.0
Emotional/behavioral health issues	131	77.1	22	73.3	91	76.5	18	85.7
School violence	85	50.0	16	53.3	57	47.9	12	57.1
Suicide risk	92	54.1	17	56.7	62	52.1	13	61.9
Total N	170	100.0	30	100.0	119	100.0	21	100.0

Table C30. District-reported use of an early warning system for elementary school students during spring 2020

District Inventory Q43e_2. Did your district use an early warning system (i.e., a system based on student-level data) during the spring of 2020 to detect elementary students experiencing the following risks?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Academic failure	119	77.3	21	87.5	84	77.1	14	66.7
Chronic absenteeism	134	87.0	22	91.7	94	86.2	18	85.7
Emotional/behavioral health issues	111	72.1	17	70.8	79	72.5	15	71.4
School violence	51	33.1	8	33.3	36	33.0	7	33.3
Suicide risk	69	44.8	12	50.0	46	42.2	11	52.4
Total N	154	100.0	24	100.0	109	100.0	21	100.0

Table C31. District-reported use of an early warning system for elementary school students during school year 2020-21

District Inventory Q43e_3. Did your district use an early warning system (i.e., a system based on student-level data) during the 2020-21 school year to detect elementary students experiencing the following risks?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Academic failure	155	91.7	27	90.0	110	93.2	18	85.7
Chronic absenteeism	159	94.1	30	100.0	112	94.9	17	81.0
Emotional/behavioral health issues	144	85.2	26	86.7	100	84.7	18	85.7
School violence	86	50.9	16	53.3	59	50.0	11	52.4
Suicide risk	98	58.0	17	56.7	68	57.6	13	61.9
Overall	169	100.0	30	100.0	118	100.0	21	100.0

Table C32. District-reported use of an early warning system for middle school students prior to COVID-19

District Inventory Q43m_1. Did your district use an early warning system (i.e., a system based on student-level data) prior to the COVID-19 pandemic to detect middle school students experiencing the following risks?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Academic failure	144	93.5	27	96.4	99	94.3	18	85.7
Chronic absenteeism	149	96.8	28	100.0	104	99.0	17	81.0
Emotional/behavioral health issues	118	76.6	18	64.3	82	78.1	18	85.7
School violence	82	53.2	17	60.7	53	50.5	12	57.1
Suicide risk	91	59.1	18	64.3	60	57.1	13	61.9
Total N	154	100.0	28	100.0	105	100.0	21	100.0

Table C33. District-reported use of an early warning system for middle school students during spring 2020

District Inventory Q43m_2. Did your district use an early warning system (i.e., a system based on student-level data) during the spring of 2020 to detect middle school students experiencing the following risks?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Academic failure	111	77.1	21	84.0	76	77.6	14	66.7
Chronic absenteeism	126	87.5	22	88.0	86	87.8	18	85.7
Emotional/behavioral health issues	103	71.5	17	68.0	71	72.4	15	71.4
School violence	50	34.7	8	32.0	35	35.7	7	33.3
Suicide risk	71	49.3	13	52.0	47	48.0	11	52.4
Total N	144	100.0	25	100.0	98	100.0	21	100.0

Table C34. District-reported use of an early warning system for middle school students during school year 2020-21

District Inventory Q43m_3. Did your district use an early warning system (i.e., a system based on student-level data) during the 2020-21 school year to detect middle school students experiencing the following risks?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Academic failure	142	92.2	26	92.9	98	93.3	18	85.7
Chronic absenteeism	146	94.8	28	100.0	101	96.2	17	81.0
Emotional/behavioral health issues	129	83.8	22	78.6	89	84.8	18	85.7
School violence	82	53.2	16	57.1	55	52.4	11	52.4
Suicide risk	98	63.6	19	67.9	66	62.9	13	61.9
Overall	154	100.0	28	100.0	105	100.0	21	100.0

Table C35. District-reported use of an early warning system for high school students prior to COVID-19

District Inventory Q43h_1. Did your district use an early warning system (i.e., a system based on student-level data) prior to the COVID-19 pandemic to detect high school students experiencing the following risks?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Academic failure	148	93.1	28	93.3	90	95.7	30	85.7
Chronic absenteeism	152	95.6	30	100.0	93	98.9	29	82.9
Emotional/behavioral health issues	119	74.8	20	66.7	70	74.5	29	82.9
School violence	87	54.7	17	56.7	53	56.4	17	48.6
Suicide risk	103	64.8	17	56.7	65	69.1	21	60.0
Total N	159	100.0	30	100.0	94	100.0	35	100.0

Table C36. District-reported use of an early warning system for high school students during spring 2020

District Inventory Q43h_2. Did your district use an early warning system (i.e., a system based on student-level data) during the spring of 2020 to detect high school students experiencing the following risks?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Academic failure	132	88.6	21	80.8	83	93.3	28	82.4
Chronic absenteeism	132	88.6	23	88.5	81	91.0	28	82.4
Emotional/behavioral health issues	115	77.2	20	76.9	66	74.2	29	85.3
School violence	57	38.3	10	38.5	36	40.4	11	32.4
Suicide risk	91	61.1	15	57.7	57	64.0	19	55.9
Total N	149	100.0	26	100.0	89	100.0	34	100.0

Table C37. District-reported use of an early warning system for high school students during school year 2020-21

District Inventory Q43h_3. Did your district use an early warning system (i.e., a system based on student-level data) during the 2020-21 school year to detect high school students experiencing the following risks?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Academic failure	147	92.5	27	90.0	89	94.7	31	88.6
Chronic absenteeism	149	93.7	30	100.0	90	95.7	29	82.9
Emotional/behavioral health issues	130	81.8	23	76.7	77	81.9	30	85.7
School violence	91	57.2	20	66.7	55	58.5	16	45.7
Suicide risk	112	70.4	20	66.7	71	75.5	21	60.0
Overall	159	100.0	30	100.0	94	100.0	35	100.0

Table C38. District-reported elementary school grading practices prior to the COVID-19 pandemic

District Inventory Q44e_1. On what basis did your elementary teachers report students' progress prior to COVID-19?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Pass/fail	22	11.8	5	16.1	14	11.1	3	10.3
Proficiency	159	85.5	27	87.1	113	89.7	19	65.5
Letter grades	69	37.1	14	45.2	39	31.0	16	55.2
Grading was suspended	4	2.2	0	.0	3	2.4	1	3.4
Other (please describe):	11	5.9	2	6.5	5	4.0	4	13.8
Total N	186	100.0	31	100.0	126	100.0	29	100.0

Table C39. District-reported elementary school grading practices in spring 2020

District Inventory Q44e_2. On what basis did your elementary teachers report students' progress during the spring of 2020?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Pass/fail	60	32.6	17	53.1	36	29.3	7	24.1
Proficiency	85	46.2	11	34.4	58	47.2	16	55.2
Letter grades	34	18.5	5	15.6	19	15.4	10	34.5
Grading was suspended	58	31.5	9	28.1	45	36.6	4	13.8
Other (please describe):	20	10.9	6	18.8	9	7.3	5	17.2
Total N	184	100.0	32	100.0	123	100.0	29	100.0

Table C40. District-reported elementary school grading practices in school year 2020-21

District Inventory Q44e_3. On what basis did your elementary teachers report students' progress during 2020-21?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Pass/fail	19	10.3	5	15.6	11	8.9	3	10.3
Proficiency	159	85.9	27	84.4	113	91.1	19	65.5
Letter grades	67	36.2	14	43.8	37	29.8	16	55.2
Grading was suspended	4	2.2	0	.0	4	3.2	0	.0
Other (please describe):	13	7.0	3	9.4	5	4.0	5	17.2
Overall	185	100.0	32	100.0	124	100.0	29	100.0

Table C41. District-reported middle school grading practices prior to the COVID-19 pandemic

District Inventory Q44m_1. On what basis did your middle school teachers report students' progress prior to COVID-19?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Pass/fail	34	19.3	7	25.9	21	18.4	6	17.1
Proficiency	81	46.0	13	48.1	49	43.0	19	54.3
Letter grades	138	78.4	25	92.6	89	78.1	24	68.6
Grading was suspended	3	1.7	0	.0	2	1.8	1	2.9
Other (please describe):	9	5.1	1	3.7	3	2.6	5	14.3
Total N	176	100.0	27	100.0	114	100.0	35	100.0

Table C42. District-reported middle school grading practices in spring 2020

District Inventory Q44m_2. On what basis did your middle school teachers report students' progress during the spring of 2020?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Pass/fail	91	51.1	21	72.4	61	53.0	9	26.5
Proficiency	54	30.3	9	31.0	28	24.3	17	50.0
Letter grades	78	43.8	16	55.2	46	40.0	16	47.1
Grading was suspended	36	20.2	0	.0	31	27.0	5	14.7
Other (please describe):	16	9.0	2	6.9	7	6.1	7	20.6
Total N	178	100.0	29	100.0	115	100.0	34	100.0

Table C43. District-reported middle school grading practices in school year 2020-21

District Inventory Q44m_3. On what basis did your middle school teachers report students' progress during 2020-21?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Pass/fail	38	21.1	9	30.0	24	20.9	5	14.3
Proficiency	83	46.1	13	43.3	50	43.5	20	57.1
Letter grades	142	78.9	26	86.7	90	78.3	26	74.3
Grading was suspended	6	3.3	0	.0	6	5.2	0	.0
Other (please describe):	11	6.1	2	6.7	3	2.6	6	17.1
Overall	180	100.0	30	100.0	115	100.0	35	100.0

Table C44. District-reported high school grading practices prior to the COVID-19 pandemic

District Inventory Q44h_1. On what basis did your high school teachers report students' progress prior to COVID-19?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Pass/fail	37	22.3	7	25.0	20	20.6	10	24.4
Proficiency	50	30.1	12	42.9	21	21.6	17	41.5
Letter grades	149	89.8	26	92.9	93	95.9	30	73.2
Grading was suspended	3	1.8	0	.0	2	2.1	1	2.4
Other (please describe):	10	6.0	1	3.6	4	4.1	5	12.2
Total N	166	100.0	28	100.0	97	100.0	41	100.0

Table C45. District-reported high school grading practices in spring 2020

District Inventory Q44h_2. On what basis did your high school teachers report students' progress during the spring of 2020?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Pass/fail	102	60.4	25	80.6	60	61.2	17	42.5
Proficiency	43	25.4	8	25.8	17	17.3	18	45.0
Letter grades	91	53.8	15	48.4	56	57.1	20	50.0
Grading was suspended	21	12.4	1	3.2	17	17.3	3	7.5
Other (please describe):	14	8.3	2	6.5	6	6.1	6	15.0
Total N	169	100.0	31	100.0	98	100.0	40	100.0

Table C46. District-reported high school grading practices in school year 2020-21

District Inventory 44h_3. On what basis did your high school teachers report students' progress during 2020-21?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Pass/fail	46	27.1	12	38.7	26	26.5	8	19.5
Proficiency	55	32.4	12	38.7	23	23.5	20	48.8
Letter grades	156	91.8	27	87.1	95	96.9	34	82.9
Grading was suspended	4	2.4	0	.0	4	4.1	0	.0
Other (please describe):	11	6.5	2	6.5	4	4.1	5	12.2
Overall	170	100.0	31	100.0	98	100.0	41	100.0

Research Question 1c. What did administrators and teachers say about the challenges of and strategies for different learning formats?

Table C47. District-reported student disengagement by grade level in May 2020

District Inventory Q27. As of May 1, 2020, approximately what percentage of students were accessing remote learning less than half the time for the following grade levels?

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
Elementary School	181	32.0	(29.0)	31	29.5	(23.0)	121	29.7	(30.2)	29	44.1	(27.2)
Middle School	179	34.7	(29.8)	31	36.8	(24.2)	115	31.5	(31.2)	33	44.2	(28.1)
High School	165	36.3	(29.3)	31	40.8	(24.2)	93	32.6	(30.2)	41	41.5	(30.2)

Please note, mean percent describes the mean of each participating district's reported value.

Table C48. District-reported reasons by grade level for student disengagement in May 2020

District Inventory Q28. As of May 1, 2020, of students accessing remote learning less than half the time, what were the most common reasons given for the following grade levels?

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N	Mean Ranking	(SD)	N	Mean Ranking	(SD)	N	Mean Ranking	(SD)	N	Mean Ranking	(SD)
Elementary School												
No/limited WiFi	152	2.7	(1.3)	30	2.2	(1.2)	102	2.9	(1.4)	20	2.4	(1.3)
No technology device (laptop, Chromebook, iPad)	152	3.4	(1.2)	30	3.4	(1.4)	102	3.6	(1.2)	20	2.7	(1.0)
Hardware issues (camera, mic, etc.)	152	2.8	(1.0)	30	2.9	(1.0)	102	2.7	(.9)	20	3.1	(1.0)
Incomplete/incorrect instructions	152	3.7	(1.2)	30	3.6	(1.1)	102	3.6	(1.2)	20	4.0	(1.1)
Other (please describe):	152	2.5	(1.8)	30	2.9	(1.9)	102	2.2	(1.8)	20	2.9	(2.0)
Middle School												
No/limited WiFi	149	2.8	(1.3)	27	2.8	(1.2)	98	2.9	(1.3)	24	2.5	(1.2)
No technology device (laptop, Chromebook, iPad)	149	3.4	(1.2)	27	3.6	(1.3)	98	3.5	(1.2)	24	3.1	(1.2)
Hardware issues (camera, mic, etc.)	149	2.8	(1.0)	27	2.8	(1.0)	98	2.7	(1.0)	24	3.0	(1.0)
Incomplete/incorrect instructions	149	3.8	(1.1)	27	3.6	(1.1)	98	3.7	(1.1)	24	3.9	(1.2)
Other (please describe):	149	2.2	(1.8)	27	2.2	(1.8)	98	2.1	(1.7)	24	2.4	(1.9)
High School												
No/limited WiFi	146	2.7	(1.3)	28	2.8	(1.3)	84	2.8	(1.3)	34	2.3	(1.3)
No technology device (laptop, Chromebook, iPad)	146	3.5	(1.2)	28	3.5	(1.2)	84	3.7	(1.2)	34	3.2	(1.1)
Hardware issues (camera, mic, etc.)	146	2.9	(1.0)	28	2.9	(1.0)	84	2.8	(1.0)	34	3.0	(1.1)
Incomplete/incorrect instructions	146	3.7	(1.1)	28	3.7	(1.1)	84	3.6	(1.1)	34	4.0	(1.0)
Other (please describe):	146	2.2	(1.8)	28	2.2	(1.8)	84	2.1	(1.7)	34	2.5	(1.8)

Please note, districts were asked to rank order the options listed above, with the highest ranked option receiving a score of 1 and the lowest ranked option receiving a score of 5.

Districts listed many other reasons why students were accessing remote learning less than half the time in May 2020. For elementary students, the primary reason (beyond the multiple-choice options offered) was inadequate parental support and/or supervision available; this was an issue reported by 76 districts. In many cases, parents were busy (working, taking care of other children, etc.) and couldn't supervise their children's online learning to ensure attendance and participation. In other cases, students were in some form of daycare or with other guardians, such as grandparents. As a result, these students weren't accessing remote instruction because their

caregiver didn't have the technology expertise to help them or weren't able to supervise their learning. A few districts reported that parents didn't want their children to participate in online learning and didn't cooperate for that reason.

The other factor most frequently reported by districts was that elementary students were simply disengaged from remote learning and unmotivated to participate. Districts reported that it was difficult for students to focus on remote instruction, and the short attention span of elementary students meant that many students needed substantial parent/caregiver support to engage with online learning. There were also some students who struggled to engage with remote learning because they had special needs and/or learning disabilities and were not receiving the necessary support to learn virtually. Finally, two districts reported disengagement due to language barriers between the school and the family.

For middle school students who were not accessing remote learning in the spring of 2020, the most common reason given by districts that elected to provide an additional answer was inadequate support/supervision from parents/caregivers to ensure that students were attending and participating virtually. As for elementary students, districts reported that some parents/caregivers were unable to monitor their middle school students' engagement with remote learning because they were busy taking care of other children. Some districts mentioned that some middle school students themselves were taking care of younger siblings and thus were unable to attend school at times. A general disengagement and lack of motivation among students was reported in conjunction with the lack of parent/caregiver support to keep students on track.

For high school students, student disengagement and lack of motivation were the primary reason beyond the multiple-choice options that districts said students were failing to access remote learning in the spring of 2020. Many districts reported that students refused to attend remote instruction or disengaged for a multitude of reasons. These include mental health problems, as some districts reported increases in student anxiety and depression, lack of motivation to engage with the new learning format, and social-emotional issues. This was compounded by inadequate parent/caregiver discipline or support to ensure that students were attending and participating in virtual schooling. An additional reason given for high school students not accessing online learning was a lack of housing stability. Furthermore, many high school students had to take on additional familial and/or job responsibilities when the pandemic began. Districts reported that high school students were employed and were working instead of attending school; some districts specifically noted that their high school students were working to provide additional income for their families. High school students also often acted as secondary caregivers and were disengaged from online learning because they were taking care of their younger siblings. Thus, there were a plethora of reasons that districts reported for the apathy and disengagement of high school students at the beginning of the pandemic.

Table C49. Teacher-reported rates of student disengagement by grade level in spring 2020

Teacher Survey Q7f and Q7g. When students were learning remotely during spring 2020 (start of COVID-pandemic), approximately what percent of your students were doing each of the following?

		District Type								
		Overall			Alliance districts			Non-Alliance districts		
		N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
Elementary school	logging into remote instruction less than half the time	910	39.7	(26.8)	368	46.9	(26.9)	542	34.8	(25.5)
	showing some evidence of digital cheating	831	11.4	(19.5)	333	13.9	(21.4)	498	9.8	(18.0)
Middle school	logging into remote instruction less than half the time	538	39.3	(25.8)	169	42.8	(27.8)	369	37.7	(24.7)
	showing some evidence of digital cheating	520	26.0	(25.5)	162	26.6	(26.5)	358	25.8	(25.1)
High school	logging into remote instruction less than half the time	833	42.8	(28.4)	255	46.9	(28.0)	578	41.0	(28.4)
	showing some evidence of digital cheating	825	38.6	(30.5)	252	34.0	(29.9)	573	40.6	(30.6)
Multiple levels, ungraded, or unknown	logging into remote instruction less than half the time	305	43.8	(28.3)	99	47.3	(28.1)	206	42.1	(28.4)
	showing some evidence of digital cheating	283	19.4	(25.4)	94	16.8	(22.2)	189	20.7	(26.8)

Please note, mean percent describes the mean of each participating teacher's reported value.

Table C50. Teacher-reported reasons for student disengagement by grade level in spring 2020

Teacher Survey Q8. For those of your students who were unable to access remote learning at least half the time in spring 2020, what do you think were the most common reasons?

		District Type								
		Overall			Alliance districts			Non-Alliance districts		
		N	Mean Ranking	(SD)	N	Mean Ranking	(SD)	N	Mean Ranking	(SD)
Elementary school	no/limited wifi	853	3.1	(1.6)	355	2.7	(1.5)	498	3.3	(1.6)
	no technology device	853	4.6	(1.7)	355	4.2	(1.8)	498	4.8	(1.6)
	hardware issues	853	4.0	(1.3)	355	4.1	(1.3)	498	3.8	(1.3)
	incomplete/incorrect connection instructions	853	4.7	(1.3)	355	4.8	(1.3)	498	4.6	(1.3)
	inadequate adult supervision	853	1.9	(1.3)	355	2.1	(1.4)	498	1.8	(1.3)
	other family responsibilities	853	3.8	(1.8)	355	3.9	(1.8)	498	3.7	(1.8)
	other reasons	853	6.1	(1.9)	355	6.1	(1.9)	498	6.1	(1.9)
Middle school	no/limited wifi	514	3.1	(1.6)	163	2.5	(1.5)	351	3.4	(1.6)
	no technology device	514	4.9	(1.6)	163	4.3	(1.8)	351	5.1	(1.5)
	hardware issues	514	4.2	(1.3)	163	4.4	(1.2)	351	4.1	(1.3)
	incomplete/incorrect connection instructions	514	4.9	(1.3)	163	5.0	(1.3)	351	4.8	(1.3)
	inadequate adult supervision	514	1.9	(1.3)	163	2.4	(1.6)	351	1.7	(1.2)
	other family responsibilities	514	3.2	(1.6)	163	3.3	(1.6)	351	3.1	(1.5)
	other reasons	514	5.8	(2.1)	163	6.2	(1.7)	351	5.7	(2.3)
High school	no/limited wifi	771	3.1	(1.7)	244	2.6	(1.5)	527	3.3	(1.7)
	no technology device	771	4.6	(1.7)	244	4.3	(1.7)	527	4.8	(1.7)
	hardware issues	771	4.2	(1.3)	244	4.4	(1.3)	527	4.1	(1.4)
	incomplete/incorrect connection instructions	771	5.1	(1.2)	244	5.1	(1.3)	527	5.1	(1.2)
	inadequate adult supervision	771	2.6	(1.7)	244	2.9	(1.8)	527	2.4	(1.6)
	other family responsibilities	771	2.9	(1.5)	244	2.7	(1.5)	527	3.0	(1.5)
	other reasons	771	5.5	(2.4)	244	5.9	(2.1)	527	5.3	(2.5)
Multiple levels, ungraded, or unknown	no/limited wifi	290	3.2	(1.7)	95	2.7	(1.6)	195	3.4	(1.7)
	no technology device	290	4.6	(1.7)	95	4.0	(1.8)	195	4.9	(1.6)
	hardware issues	290	4.0	(1.3)	95	4.3	(1.2)	195	3.9	(1.3)
	incomplete/incorrect connection instructions	290	4.9	(1.3)	95	5.0	(1.3)	195	4.9	(1.4)
	inadequate adult supervision	290	2.1	(1.5)	95	2.5	(1.8)	195	1.9	(1.3)
	other family responsibilities	290	3.5	(1.7)	95	3.4	(1.6)	195	3.5	(1.7)
	other reasons	290	5.6	(2.3)	95	6.1	(1.9)	195	5.4	(2.5)

Please note, teachers were asked to rank order the options listed above, with the highest ranked option receiving a score of 1 and the lowest ranked option receiving a score of 7.

Table C51. District-reported rates of student disengagement during the 2020-21 school year

District Inventory Q32emh. During the 2020-21 school year, approximately what percentage of fully remote students accessed instruction from home less than half the time?

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
Elementary School	158	20.2	(18.7)	30	22.5	(15.0)	104	17.4	(18.0)	24	29.6	(22.6)
Middle School	160	23.3	(20.2)	28	27.7	(18.9)	103	19.3	(16.4)	29	33.1	(28.3)
High School	155	24.9	(21.4)	31	30.8	(21.7)	85	21.2	(16.6)	39	28.5	(28.2)

Please note, mean percentage describes the mean of each participating district's reported value.

Table C52. District-reported reasons by grade level for student disengagement during 2020-21

District Inventory Q33emh. For those fully remote students who did not consistently access instruction from home during the 2020-21 school year, what were the most common reasons given for each of the following grade levels?

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N	Mean Ranking	(SD)	N	Mean Ranking	(SD)	N	Mean Ranking	(SD)	N	Mean Ranking	(SD)
Elementary												
No/limited WiFi	146	2.8	(1.4)	29	2.8	(1.3)	99	2.8	(1.4)	18	2.3	(1.3)
No technology device (laptop, Chromebook, iPad)	146	3.6	(1.2)	29	4.0	(.9)	99	3.6	(1.2)	18	2.8	(1.0)
Hardware issues (camera, mic, etc.)	146	2.8	(1.0)	29	2.8	(1.2)	99	2.7	(1.0)	18	3.2	(1.1)
Incomplete/incorrect instructions	146	3.5	(1.1)	29	3.1	(1.2)	99	3.6	(1.1)	18	3.9	(1.1)
Other (please describe):	146	2.3	(1.8)	29	2.4	(1.8)	99	2.2	(1.8)	18	2.8	(2.0)
Middle School												
No/limited WiFi	149	2.7	(1.2)	28	2.7	(1.0)	97	2.7	(1.3)	24	2.4	(1.1)
No technology device (laptop, Chromebook, iPad)	149	3.6	(1.1)	28	3.9	(1.0)	97	3.6	(1.2)	24	3.3	(1.1)
Hardware issues (camera, mic, etc.)	149	2.8	(1.0)	28	2.7	(1.3)	97	2.8	(1.0)	24	3.1	(1.0)
Incomplete/incorrect instructions	149	3.8	(1.1)	28	3.5	(1.2)	97	3.8	(1.1)	24	4.0	(1.1)
Other (please describe):	149	2.2	(1.8)	28	2.1	(1.8)	97	2.1	(1.8)	24	2.2	(1.8)
High School												
No/limited WiFi	144	2.7	(1.2)	28	2.8	(1.1)	84	2.9	(1.2)	32	2.3	(1.1)
No technology device (laptop, Chromebook, iPad)	144	3.6	(1.1)	28	3.8	(1.0)	84	3.7	(1.1)	32	3.2	(1.2)
Hardware issues (camera, mic, etc.)	144	2.8	(1.1)	28	2.9	(1.4)	84	2.7	(1.0)	32	3.0	(1.0)
Incomplete/incorrect instructions	144	3.8	(1.1)	28	3.6	(1.2)	84	3.7	(1.2)	32	4.1	(.9)
Other (please describe):	144	2.1	(1.8)	28	2.0	(1.7)	84	2.0	(1.7)	32	2.4	(1.9)

Please note, districts were asked to rank order the options listed above, with the highest ranked option receiving a score of 1 and the lowest ranked option receiving a score of 5.

Districts used the "other" open-text option to describe a variety of reasons that students were accessing remote learning less than half the time during the 2020/21 school year. Similar to district responses for spring 2020 (see Table C48 above), districts reported that inadequate parent/caregiver support and supervision was the main factor affecting student disengagement. Again, some districts reported that parents were unavailable to help their elementary students access remote learning or ensure that they were attending because parents were working or taking care of other children and couldn't devote time to managing online learning. A commonly reported issue was that students weren't under the care of their parents but rather grandparents, older siblings, or daycare providers and thus didn't have the support needed to access virtual instruction or materials. Other familial problems that districts reported were housing instability and mental or physical health concerns in the family. Many districts reported that in 2020-21, some elementary students were experiencing behavioral issues, felt disengaged from remote learning, or lacked the motivation and focus to participate in this format. Some districts reported that parents simply refused to cooperate with remote learning, especially because they didn't want their child participating in that amount of online work.

For middle school students who were accessing remote learning less than half of the time in the 2020-21 school year, districts that elected to provide additional reasons beyond the multiple-choice options reported two major reasons for students not accessing remote instruction: insufficient parental supervision/encouragement and disengagement of students from remote learning. Some districts simply mentioned that parents were not providing adequate support or supervision for their students, whereas others elaborated that parents were often working or caring for other children and couldn't devote time to supporting remote learning. The other issue reported was that students were unmotivated to learn in a remote format and thus disengaged from virtual learning altogether.

A number of districts elected to provide other reasons beyond the multiple choice options for why high school students were accessing remote learning less than half of the time during the 2020-21 school year. The primary explanation for high school students not accessing remote instruction was that they were unmotivated and disengaged from this learning format. Many districts reported that their students had experienced mental health issues, such as increases in depression and anxiety, and struggled with social-emotional problems. Districts said that students and their families also reported concerns about their physical health. Familial reasons for students not attending virtual instruction were also prevalent. Some parents elected to not have their students participate in remote learning, or they didn't support/supervise their students and ensure that they were attending. Other students were taking on additional responsibilities to help their families during the pandemic, including providing childcare for their siblings or working a job to provide extra income. Thus, general disengagement was the main reason that students did not attend remote instruction, but parental/familial factors played an influential role in this decision.

Table C53. Teacher-reported rates of student disengagement by grade level among fully remote learners in 2020-21

Teacher Survey Q11f & Q11g. You indicated that some of your students attended school remotely for the majority of 2020-21. Over the 2020-21 school year, approximately what percent of your fully remote students were doing each of the following?

		District Type								
		Overall			Alliance districts			Non-Alliance districts		
		N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
Elementary school	missing school more than half the time	724	25.7	(26.2)	318	31.8	(26.3)	406	21.0	(25.2)
	showing some evidence of digital cheating	688	12.7	(20.6)	294	15.8	(22.5)	394	10.4	(18.7)
Middle school	missing school more than half the time	483	31.0	(24.7)	160	33.8	(24.1)	323	29.7	(24.9)
	showing some evidence of digital cheating	471	26.1	(26.7)	155	25.7	(26.2)	316	26.3	(26.9)
High school	missing school more than half the time	757	35.0	(24.8)	238	41.2	(23.9)	519	32.2	(24.7)
	showing some evidence of digital cheating	748	39.6	(31.4)	230	36.1	(29.3)	518	41.1	(32.3)
Multiple levels, ungraded, or unknown	missing school more than half the time	274	34.0	(26.8)	96	41.8	(26.0)	178	29.8	(26.5)
	showing some evidence of digital cheating	249	22.0	(27.6)	87	19.2	(23.9)	162	23.5	(29.3)

Please note, mean percent describes the mean of each participating district's reported value.

Table C54. Teacher-reported rates of student disengagement by grade level among hybrid learners in 2020-21

Teacher Survey Q12f & Q12g. You indicated that some of your students were hybrid—scheduled to attend school in-person on some days and remotely on other days—for the majority of 2020-21. Over the 2020-21 school year, approximately what percent of your hybrid students were doing each of the following?

		District Type								
		Overall			Alliance districts			Non-Alliance districts		
		N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
Elementary school	missing school more than half the time	577	22.8	(21.6)	269	28.4	(21.9)	308	17.9	(20.2)
	showing some evidence of digital cheating	533	10.9	(18.8)	240	13.6	(21.2)	293	8.6	(16.3)
Middle school	missing school more than half the time	453	26.3	(21.0)	147	29.3	(20.6)	306	24.9	(21.0)
	showing some evidence of digital cheating	446	23.2	(23.3)	144	22.3	(23.7)	302	23.6	(23.2)
High school	missing school more than half the time	733	29.9	(22.4)	218	36.2	(23.9)	515	27.3	(21.2)
	showing some evidence of digital cheating	729	37.4	(29.3)	214	32.6	(27.5)	515	39.4	(29.8)
Multiple levels, ungraded, or unknown	missing school more than half the time	237	31.5	(24.9)	86	35.9	(22.8)	151	29.0	(25.8)
	showing some evidence of digital cheating	221	19.0	(23.8)	81	15.4	(20.5)	140	21.0	(25.4)

Please note, mean percent describes the mean of each participating district's reported value.

Table C55. Teacher-reported rates of student disengagement by grade level among fully in-person learners in 2020-21

TS Q13d and Q13e. You indicated that some of your students attended school in person for the majority of the 2020-21 school year. Over the 2020-21 school year, approximately what percent of your fully in-person students were doing each of the following?

		District Type								
		Overall			Alliance districts			Non-Alliance districts		
		N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
Elementary school	missing school more than half the time	643	16.0	(19.1)	237	23.2	(21.5)	406	11.8	(16.2)
	showing some evidence of digital cheating	595	5.6	(12.4)	212	8.0	(15.6)	383	4.3	(10.1)
Middle school	missing school more than half the time	361	18.7	(18.3)	105	23.0	(20.3)	256	16.9	(17.1)
	showing some evidence of digital cheating	352	18.0	(20.9)	104	20.0	(22.7)	248	17.1	(20.1)
High school	missing school more than half the time	498	23.7	(22.1)	144	30.3	(22.8)	354	21.0	(21.3)
	showing some evidence of digital cheating	492	27.5	(27.0)	141	28.7	(26.8)	351	27.0	(27.1)
Multiple levels, ungraded, or unknown	missing school more than half the time	241	25.3	(23.0)	73	32.5	(25.1)	168	22.1	(21.3)
	showing some evidence of digital cheating	221	16.8	(23.0)	69	18.7	(25.1)	152	16.0	(22.0)

Please note, mean percent describes the mean of each participating district's reported value.

Table C56. Teacher-reported reasons for student disengagement by grade level in 2020-21

Teacher Survey Q14. For your fully remote and/or hybrid students who accessed remote learning less than half the time during the 2020-21 school year, what do you think were the most common reasons?

		District Type								
		Overall			Alliance districts			Non-Alliance districts		
		N	Mean Ranking	(SD)	N	Mean Ranking	(SD)	N	Mean Ranking	(SD)
Elementary school	no/limited Wi-Fi	690	3.2	(1.5)	346	3.2	(1.5)	344	3.3	(1.5)
	no technology device	690	4.9	(1.4)	346	4.8	(1.4)	344	5.0	(1.4)
	hardware issues	690	3.7	(1.3)	346	3.8	(1.2)	344	3.7	(1.3)
	incomplete/incorrect connection instructions	690	4.7	(1.3)	346	4.8	(1.3)	344	4.7	(1.3)
	inadequate adult supervision	690	1.7	(1.2)	346	1.7	(1.3)	344	1.6	(1.2)
	other family responsibilities	690	3.6	(1.8)	346	3.5	(1.8)	344	3.7	(1.9)
	other reasons	690	6.1	(1.9)	346	6.2	(1.8)	344	6.0	(2.0)
Middle school	no/limited Wi-Fi	514	3.4	(1.4)	170	3.1	(1.3)	344	3.6	(1.4)
	no technology device	514	5.2	(1.3)	170	4.9	(1.4)	344	5.3	(1.3)
	hardware issues	514	4.1	(1.2)	170	4.4	(1.2)	344	4.0	(1.2)
	incomplete/incorrect connection instructions	514	5.1	(1.3)	170	5.2	(1.3)	344	5.1	(1.3)
	inadequate adult supervision	514	1.5	(1.0)	170	1.6	(1.1)	344	1.5	(.9)
	other family responsibilities	514	3.0	(1.5)	170	2.9	(1.4)	344	3.1	(1.6)
	other reasons	514	5.5	(2.3)	170	5.9	(2.0)	344	5.4	(2.4)
High school	no/limited Wi-Fi	793	3.4	(1.5)	261	3.0	(1.4)	532	3.6	(1.5)
	no technology device	793	5.0	(1.4)	261	4.7	(1.5)	532	5.1	(1.4)
	hardware issues	793	4.2	(1.3)	261	4.4	(1.3)	532	4.2	(1.3)
	incomplete/incorrect connection instructions	793	5.3	(1.3)	261	5.2	(1.3)	532	5.3	(1.3)
	inadequate adult supervision	793	2.2	(1.5)	261	2.5	(1.6)	532	2.0	(1.4)
	other family responsibilities	793	2.8	(1.6)	261	2.5	(1.6)	532	3.0	(1.6)
	other reasons	793	5.1	(2.6)	261	5.7	(2.3)	532	4.9	(2.7)
Multiple levels, ungraded, or unknown	no/limited Wi-Fi	287	3.3	(1.5)	104	3.0	(1.5)	183	3.4	(1.6)
	no technology device	287	5.0	(1.4)	104	4.6	(1.5)	183	5.2	(1.4)
	hardware issues	287	3.9	(1.3)	104	3.9	(1.3)	183	3.9	(1.3)
	incomplete/incorrect connection instructions	287	5.0	(1.4)	104	5.1	(1.3)	183	4.9	(1.4)
	inadequate adult supervision	287	1.9	(1.4)	104	2.1	(1.6)	183	1.8	(1.3)
	other family responsibilities	287	3.3	(1.7)	104	3.0	(1.7)	183	3.4	(1.7)
	other reasons	287	5.6	(2.3)	104	6.2	(1.8)	183	5.3	(2.5)

Please note, teachers were asked to rank order the options listed above, with the highest ranked option receiving a score of 1 and the lowest ranked option receiving a score of 7.

Table C57. District-reported changes in digital cheating by grade level

District Inventory Q45emh_2. How problematic was digital cheating during the pandemic compared to before the pandemic?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	Much less of a problem	19	11.0	7	21.2	10	8.5	2	8.7
	Somewhat less of a problem	13	7.5	2	6.1	9	7.7	2	8.7
	About the same	100	57.8	13	39.4	69	59.0	18	78.3
	Somewhat more of a problem	33	19.1	5	15.2	27	23.1	1	4.3
	Much more of a problem	8	4.6	6	18.2	2	1.7	0	.0
	Total N	173	100.0	33	100.0	117	100.0	23	100.0
Middle School	Much less of a problem	9	5.3	1	3.1	6	5.5	2	6.9
	Somewhat less of a problem	10	5.8	4	12.5	4	3.6	2	6.9
	About the same	80	46.8	10	31.3	48	43.6	22	75.9
	Somewhat more of a problem	51	29.8	11	34.4	37	33.6	3	10.3
	Much more of a problem	21	12.3	6	18.8	15	13.6	0	.0
	Total N	171	100.0	32	100.0	110	100.0	29	100.0
High School	Much less of a problem	5	3.1	0	.0	4	4.2	1	2.9
	Somewhat less of a problem	8	4.9	3	9.7	2	2.1	3	8.6
	About the same	64	39.5	9	29.0	32	33.3	23	65.7
	Somewhat more of a problem	54	33.3	12	38.7	35	36.5	7	20.0
	Much more of a problem	31	19.1	7	22.6	23	24.0	1	2.9
	Total N	162	100.0	31	100.0	96	100.0	35	100.0

Table C58. Teacher-reported changes in digital cheating by grade level

Teacher Survey Q25_2. Based on your experience, how problematic was digital cheating for your students during the pandemic, compared to before the pandemic?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Much less of a problem	30	5.7	9	3.7	21	7.3
	Somewhat less of a problem	8	1.5	6	2.5	2	.7
	About the same	195	36.8	75	31.1	120	41.5
	Somewhat more of a problem	181	34.2	83	34.4	98	33.9
	Much more of a problem	116	21.9	68	28.2	48	16.6
	Total N	530	100.0	241	100.0	289	100.0
Middle school	Much less of a problem	2	.4	0	.0	2	.6
	Somewhat less of a problem	10	2.0	6	4.0	4	1.1
	About the same	137	27.6	43	28.9	94	27.0
	Somewhat more of a problem	177	35.6	47	31.5	130	37.4
	Much more of a problem	171	34.4	53	35.6	118	33.9
	Total N	497	100.0	149	100.0	348	100.0
High school	Much less of a problem	9	1.1	3	1.3	6	1.1
	Somewhat less of a problem	6	.8	2	.8	4	.7
	About the same	131	16.6	60	25.2	71	12.8
	Somewhat more of a problem	217	27.4	59	24.8	158	28.6
	Much more of a problem	428	54.1	114	47.9	314	56.8
	Total N	791	100.0	238	100.0	553	100.0
Multiple levels, ungraded, or unknown	Much less of a problem	4	1.7	1	1.3	3	1.9
	Somewhat less of a problem	3	1.3	0	.0	3	1.9
	About the same	75	31.5	29	36.7	46	28.9
	Somewhat more of a problem	88	37.0	29	36.7	59	37.1
	Much more of a problem	68	28.6	20	25.3	48	30.2
	Total N	238	100.0	79	100.0	159	100.0

Table C59. Teacher-reported of changes in school/homework avoidance by grade level

Teacher Survey Q25_1. Based on your experience, how problematic was school/homework avoidance for your students during the pandemic, compared to before the pandemic?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Much less of a problem	13	1.5	6	1.6	7	1.4
	Somewhat less of a problem	18	2.0	8	2.2	10	1.9
	About the same	201	22.7	66	17.8	135	26.3
	Somewhat more of a problem	311	35.2	117	31.6	194	37.7
	Much more of a problem	341	38.6	173	46.8	168	32.7
	Total N	884	100.0	370	100.0	514	100.0
Middle school	Much less of a problem	2	.4	2	1.2	0	.0
	Somewhat less of a problem	5	.9	1	.6	4	1.1
	About the same	50	9.4	17	10.1	33	9.0
	Somewhat more of a problem	148	27.7	44	26.2	104	28.4
	Much more of a problem	329	61.6	104	61.9	225	61.5
	Total N	534	100.0	168	100.0	366	100.0
High school	Much less of a problem	4	.5	0	.0	4	.7
	Somewhat less of a problem	11	1.3	5	2.0	6	1.0
	About the same	69	8.4	28	11.2	41	7.1
	Somewhat more of a problem	232	28.1	59	23.5	173	30.1
	Much more of a problem	509	61.7	159	63.3	350	61.0
	Total N	825	100.0	251	100.0	574	100.0
Multiple levels, ungraded, or unknown	Much less of a problem	4	1.3	2	2.0	2	1.0
	Somewhat less of a problem	4	1.3	2	2.0	2	1.0
	About the same	37	12.1	11	10.8	26	12.7
	Somewhat more of a problem	89	29.1	26	25.5	63	30.9
	Much more of a problem	172	56.2	61	59.8	111	54.4
	Total N	306	100.0	102	100.0	204	100.0

Table C60. Teacher-reported challenges and benefits of different learning formats

Teacher survey Q36. Is there anything else you'd like to share about your experiences as a Connecticut teacher during the COVID-19 pandemic?

Respondents used the open-ended question at the end of the teacher survey to share their perspectives on the challenges and benefits of different learning models. Teacher survey respondents said that for many students, remote learning was not an effective format for an extended period of time. Remote learning was particularly challenging for courses or subjects that have components of hands-on learning and movement. On the other hand, teacher survey respondents reported that remote learning worked well for a small subset of students who were highly motivated, had strong parental support, or had behavioral or mental health challenges. Teachers believed that remote learning could be an effective form of instruction with adequate resources, like stable internet and laptops. Many suggested the use of remote learning for snow days in lieu of extending the school year through the summer.

Teacher survey respondents reported that a major challenge of in-person learning was stress about getting sick. In addition, the transition back to in-person learning after being out of the classroom for an extended period of time was challenging for students and teachers alike. Returning to the pre-pandemic norm of in-person teaching was also difficult because of COVID-related constraints. For example, teachers reported that it was difficult to provide "support to struggling students from 6+ feet away." Some respondents indicated that scheduling changes (for example, longer blocks) that were introduced during remote learning made instruction more difficult after the return to in-person learning. However, many teacher survey respondents said believed that in-person learning was better overall for students. Teachers said that in-person learning provided fewer chances for students to avoid doing work and more opportunities for student socialization and connection to other school services. Teacher survey participants reported that students performed better academically and emotionally when learning in person. Many respondents emphasized in-person learning should be the instructional format of choice as long as a safe school environment could be maintained.

Overall, teacher survey respondents overwhelmingly reported that hybrid instruction was the least effective instructional format. In the case of dual instruction (hybrid instruction where a teacher delivers instruction to in-person and remote students simultaneously), many respondents stated it was hard to focus on both groups of learners at the same time. They felt like they were "neglecting one group while trying to balance everyone's needs." Others compared hybrid learning to working two jobs at the same time. One teacher said "you would not expect a teacher to teach in two classrooms (across the hall from each other) at the same time while physically in the building with students. Yet, that is what we were doing while teaching with our hybrid model." Teachers said they could not do their job effectively in the hybrid model, which added to the stress they already felt. However, some teachers reported that they appreciated some components of alternating hybrid models (hybrid instruction where teachers instruct students in-person at some times and remotely at other times), for example, hybrid models with one or more fully remote day, which provided planning time.

Research Question 1d. How did approaches to remote learning change over time, and how did these changes affect teachers and students?

Table C61. District-reported virtual learning opportunities for elementary students prior to the COVID-19 pandemic

District Inventory: Q4_1e - Q4_3e. Which of the following accurately describes learning opportunities for your district's elementary school students prior to the COVID-19 pandemic (before March 2020)? Please select all that apply.

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Some students were learning virtually (for example, through online platforms or video conferencing)	17	8.8	3	9.4	10	7.7	4	12.9
Some teachers were teaching virtually	9	4.7	1	3.1	5	3.8	3	9.7
The district had the capability to manage & deliver virtual/remote learning	35	18.1	5	15.6	25	19.2	5	16.1
None of the above	150	77.7	25	78.1	99	76.2	26	83.9
Total N	193	100.0	32	100.0	130	100.0	31	100.0

Table C62. District-reported virtual learning opportunities for middle school students prior to the COVID-19 pandemic

District Inventory: Q4_1m - Q4_3m. Which of the following accurately describes learning opportunities for your district's middle school students prior to the COVID-19 pandemic (before March 2020)? Please select all that apply.

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Some students were learning virtually (for example, through online platforms or video conferencing)	19	10.1	4	12.9	11	9.0	4	11.1
Some teachers were teaching virtually	9	4.8	1	3.2	5	4.1	3	8.3
The district had the capability to manage & deliver virtual/remote learning	48	25.4	5	16.1	36	29.5	7	19.4
None of the above	135	71.4	23	74.2	83	68.0	29	80.6
Total N	189	100.0	31	100.0	122	100.0	36	100.0

Table C63. District-reported virtual learning opportunities for high school students prior to the COVID-19 pandemic

District Inventory: Q4h_1 - Q4h_3. Which of the following accurately describes learning opportunities for your district's high school students prior to the COVID-19 pandemic (before March 2020)? Please select all that apply.

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Some students were learning virtually (for example, through online platforms or video conferencing)	52	30.1	13	43.3	33	32.7	6	14.3
Some teachers were teaching virtually	18	10.4	1	3.3	12	11.9	5	11.9
The district had the capability to manage & deliver virtual/remote learning	55	31.8	9	30.0	36	35.6	10	23.8
None of the above	93	53.8	13	43.3	49	48.5	31	73.8
Total N	173	100.0	30	100.0	101	100.0	42	100.0

Table C64. Teacher-reported pre-COVID teaching experience by grade level with learning models

Teacher Survey Q5. Which of the following models had you used to teach students before the COVID-19 pandemic? Please select all that apply.

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Fully in-person instruction	992	99.6	410	99.5	582	99.7
	Hybrid model, with in-person instruction and remote instruction at the same time	10	1.0	6	1.5	4	.7
	Hybrid model, with in-person instruction and remote instruction at different times	4	.4	2	.5	2	.3
	Fully remote instruction, where students received at least one real-time class each school day	4	.4	2	.5	2	.3
	Fully remote instruction, where students received less than one real-time class each school day	4	.4	3	.7	1	.2
	Total N	996	100.0	412	100.0	584	100.0
Middle school	Fully in-person instruction	563	99.8	178	100.0	385	99.7
	Hybrid model, with in-person instruction and remote instruction at the same time	1	.2	1	.6	0	.0
	Hybrid model, with in-person instruction and remote instruction at different times	2	.4	1	.6	1	.3
	Fully remote instruction, where students received at least one real-time class each school day	3	.5	1	.6	2	.5
	Fully remote instruction, where students received less than one real-time class each school day	6	1.1	2	1.1	4	1.0
	Total N	564	100.0	178	100.0	386	100.0
High school	Fully in-person instruction	875	99.7	271	99.6	604	99.7
	Hybrid model, with in-person instruction and remote instruction at the same time	9	1.0	5	1.8	4	.7
	Hybrid model, with in-person instruction and remote instruction at different times	6	.7	4	1.5	2	.3
	Fully remote instruction, where students received at least one real-time class each school day	4	.5	3	1.1	1	.2
	Fully remote instruction, where students received less than one real-time class each school day	6	.7	3	1.1	3	.5
	Total N	878	100.0	272	100.0	606	100.0
Multiple levels, ungraded, or unknown	Fully in-person instruction	332	98.5	108	98.2	224	98.7
	Hybrid model, with in-person instruction and remote instruction at the same time	4	1.2	3	2.7	1	.4
	Hybrid model, with in-person instruction and remote instruction at different times	4	1.2	1	.9	3	1.3
	Fully remote instruction, where students received at least one real-time class each school day	5	1.5	2	1.8	3	1.3
	Fully remote instruction, where students received less than one real-time class each school day	5	1.5	0	.0	5	2.2
	Total N	337	100.0	110	100.0	227	100.0

Please note that the response options were listed as follows for learning models used before the COVID-19 pandemic: Fully in-person instruction; Hybrid model where I provided in-person instruction and remote instruction concurrently (i.e., at the same time); Hybrid model, where I provided in-person instruction and remote instruction at different times (not concurrently); Fully remote instruction, where my students received at least one synchronous/real-time class each school day (for example, classes via zoom); Fully remote instruction, where my students received less than one synchronous/real-time class each school day (i.e., instruction via paper workbooks or asynchronous videos).

Table C65. District-reported improvements to remote learning for elementary students

District Inventory Q36e. In what ways did remote learning improve for elementary students from 2019-20 to 2020-21?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
It did not change	2	1.1	0	.0	0	.0	2	7.1
Better learning management system in place	116	62.7	23	69.7	78	62.9	15	53.6
Better apps in place	133	71.9	24	72.7	92	74.2	17	60.7
Improved accessibility for students	127	68.6	28	84.8	80	64.5	19	67.9
Teacher fluency with remote learning technologies	178	96.2	32	97.0	121	97.6	25	89.3
Teachers' integration of recommended apps/tools	160	86.5	30	90.9	109	87.9	21	75.0
Improved technical support for teachers	123	66.5	26	78.8	80	64.5	17	60.7
Increased implementation of on-grade curriculum	108	58.4	22	66.7	76	61.3	10	35.7
Other (please describe):	17	9.2	4	12.1	13	10.5	0	.0
Overall	185	100.0	33	100.0	124	100.0	28	100.0

Of the 17 districts that used the open-text option to describe other ways that remote learning for elementary students improved from 2019-2020 to 2020-2021, responses primarily focused on changes in learning format, better understanding of remote learning models, and integration of parent/teacher feedback. Several districts reported that in the 2020-21 school year, there was a shift to more synchronous learning as opposed to completely asynchronous/remote learning. This shift was accompanied by better instructional strategies to benefit both students and staff, such as more breaks in instructional time and better screen-time expectations. Some districts also reported that in the 2020-21 school year, they completely separated remote and in-person learners and assigned different teachers to these respective virtual and in-person classrooms, thus maximizing the effectiveness of the teachers' instructional time. Furthermore, a heightened understanding and more realistic expectations for student learning over remote platforms emerged as districts became more accustomed to this learning format. They recognized that the development of both social-emotional and academic skills is different when it occurs through remote learning platforms, and staff began to gain a better understanding of how to support student learning during the 2020-21 year. Districts reported that they conducted listening sessions with teachers, parents, and students and used their feedback to inform improvements in remote learning.

Table C66. District-reported improvements to remote learning for middle school students

District Inventory Q36m. In what ways did remote learning improve for middle school students from 2019-20 to 2020-21?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
It did not change	2	1.1	0	.0	0	.0	2	6.1
Better learning management system in place	108	60.0	23	74.2	68	58.6	17	51.5
Better apps in place	130	72.2	27	87.1	84	72.4	19	57.6
Improved accessibility for students	115	63.9	24	77.4	73	62.9	18	54.5
Teacher fluency with remote learning technologies	170	94.4	30	96.8	111	95.7	29	87.9
Teacher's integration of recommended apps/tools	154	85.6	28	90.3	102	87.9	24	72.7
Improved technical support for teachers	119	66.1	23	74.2	78	67.2	18	54.5
Increased implementation of on-grade curriculum	99	55.0	20	64.5	70	60.3	9	27.3
Other (please describe):	12	6.7	2	6.5	9	7.8	1	3.0
Overall	180	100.0	31	100.0	116	100.0	33	100.0

Of the 12 districts that used the open-text option to describe other ways that remote learning for middle school students improved from 2019-2020 to 2020-2021, responses primarily focused on changes in learning format, better understanding of remote learning models, better access to a variety of approved online platforms, and a better understanding of supporting SEL during remote learning. Several districts reported that in the 2020-21 school year, there was a shift to more in-person learning for those that were previously hybrid and to more synchronous learning for those who were still learning remotely. This shift was accompanied by better instructional strategies to benefit both students and staff, such as more breaks in instructional time and more reasonable screen-time expectations. Furthermore, a heightened understanding and more realistic expectations for student learning over remote platforms emerged as districts became more accustomed to this learning format. They recognized that the development of both social-emotional and academic skills is different when it occurs through remote learning platforms, and staff began to gain a better understanding of how to support students' learning during the 2020-21 year.

Table C67. District-reported improvements to remote learning for high school students

District Inventory Q36h. In what ways did remote learning improve for high school students from 2019-20 to 2020-21?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
It did not change	2	1.2	0	.0	0	.0	2	4.7
Better learning management system in place	102	59.3	25	80.6	52	53.1	25	58.1
Better apps in place	120	69.8	28	90.3	71	72.4	21	48.8
Improved accessibility for students	115	66.9	26	83.9	65	66.3	24	55.8
Teacher fluency with remote learning technologies	162	94.2	30	96.8	96	98.0	36	83.7
Teacher's integration of recommended apps/tools	146	84.9	29	93.5	88	89.8	29	67.4
Improved technical support for teachers	116	67.4	24	77.4	69	70.4	23	53.5
Increased implementation of on-grade curriculum	91	52.9	20	64.5	59	60.2	12	27.9
Other (please describe):	8	4.7	1	3.2	6	6.1	1	2.3
Overall	172	100.0	31	100.0	98	100.0	43	100.0

Of the 8 districts that used the open-text option to describe other ways that remote learning for high school students improved from 2019-2020 to 2020-2021, responses largely focused on adjustments to the learning format and attempts to increase student engagement and accountability. Districts reported that instructional formats changed between spring 2020 and fall 2020, and over the 2020-21 school year. An increase in synchronous learning was repeatedly mentioned as schools sought to improve the effectiveness of remote learning models. Districts reported schedule adjustments, such as transitioning hybrid students to in-person learning and separating in-person learners from fully remote learnings by creating a remote academy. Districts also reported that they allocated more time to teachers in the 2020-21 school year for training, planning, and meeting with remote students. Several districts discussed attempts to increase student engagement and accountability. One district reported that they tried to require teachers and students to have their cameras on during instructional time, but that this effort was met with resistance from the staff. Another district reported that they improved student accountability by improving their attendance tracking.

Table C68. Teacher-reported improvements to remote/hybrid instruction for elementary school students

Teacher Survey Q23. In what ways did your approach to remote/hybrid instruction improve from 2019-20 to 2020-21? (Elementary teachers)

	District Type					
	Overall		Alliance districts		Non-Alliance districts	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
I became more knowledgeable about available learning technologies	691	88.0	284	86.3	407	89.3
I became more comfortable using available learning technologies	723	92.1	301	91.5	422	92.5
I became more knowledgeable about the effective integration of learning technologies	519	66.1	207	62.9	312	68.4
I now consider accessibility by all students when selecting learning technologies	351	44.7	139	42.2	212	46.5
I became more comfortable designing lessons that could be completed remotely	602	76.7	241	73.3	361	79.2
I became more comfortable communicating with students when they were learning from home	571	72.7	234	71.1	337	73.9
I became more comfortable communicating with the parents of remote/hybrid students	530	67.5	226	68.7	304	66.7
Other (please describe):	34	4.3	13	4.0	21	4.6
Total N	785	100.0	329	100.0	456	100.0

Table C69. Teacher-reported improvements to remote/hybrid instruction for middle school students

Teacher Survey Q23. In what ways did your approach to remote/hybrid instruction improve from 2019-20 to 2020-21? (Middle school teachers)

	District Type					
	Overall		Alliance districts		Non-Alliance districts	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
I became more knowledgeable about available learning technologies	435	86.3	134	84.8	301	87.0
I became more comfortable using available learning technologies	445	88.3	140	88.6	305	88.2
I became more knowledgeable about the effective integration of learning technologies	337	66.9	106	67.1	231	66.8
I now consider accessibility by all students when selecting learning technologies	254	50.4	82	51.9	172	49.7
I became more comfortable designing lessons that could be completed remotely	407	80.8	126	79.7	281	81.2
I became more comfortable communicating with students when they were learning from home	351	69.6	113	71.5	238	68.8
I became more comfortable communicating with the parents of remote/hybrid students	268	53.2	86	54.4	182	52.6
Other (please describe):	21	4.2	9	5.7	12	3.5
Total N	504	100.0	158	100.0	346	100.0

Table C70. Teacher-reported improvements to remote/hybrid instruction for high school students

Teacher Survey Q23. In what ways did your approach to remote/hybrid instruction improve from 2019-20 to 2020-21? (High school teachers)

	District Type					
	Overall		Alliance districts		Non-Alliance districts	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
I became more knowledgeable about available learning technologies	634	83.0	185	80.1	449	84.2
I became more comfortable using available learning technologies	662	86.6	196	84.8	466	87.4
I became more knowledgeable about the effective integration of learning technologies	513	67.1	151	65.4	362	67.9
I now consider accessibility by all students when selecting learning technologies	331	43.3	114	49.4	217	40.7
I became more comfortable designing lessons that could be completed remotely	605	79.2	184	79.7	421	79.0
I became more comfortable communicating with students when they were learning from home	490	64.1	150	64.9	340	63.8
I became more comfortable communicating with the parents of remote/hybrid students	326	42.7	103	44.6	223	41.8
Other (please describe):	44	5.8	13	5.6	31	5.8
Total N	764	100.0	231	100.0	533	100.0

Table C71. Teacher-reported improvements to remote/hybrid instruction for students (mixed-level teachers)

Teacher Survey Q23. In what ways did your approach to remote/hybrid instruction improve from 2019-20 to 2020-21? (Teachers who selected multiple levels, no levels, or "ungraded")

	District Type					
	Overall		Alliance districts		Non-Alliance districts	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
I became more knowledgeable about available learning technologies	250	90.9	75	87.2	175	92.6
I became more comfortable using available learning technologies	246	89.5	74	86.0	172	91.0
I became more knowledgeable about the effective integration of learning technologies	187	68.0	57	66.3	130	68.8
I now consider accessibility by all students when selecting learning technologies	150	54.5	43	50.0	107	56.6
I became more comfortable designing lessons that could be completed remotely	215	78.2	66	76.7	149	78.8
I became more comfortable communicating with students when they were learning from home	188	68.4	63	73.3	125	66.1
I became more comfortable communicating with the parents of remote/hybrid students	158	57.5	51	59.3	107	56.6
Other (please describe):	17	6.2	6	7.0	11	5.8
Total N	275	100.0	86	100.0	189	100.0

Of all the teachers who used the open-text option to share other ways their approach to remote/hybrid instruction improved from 2019-20 to 2020-21, a substantial number of teachers reported that remote teaching remained extremely challenging. At the same time, many teachers were able to describe specific ways that remote/hybrid instruction had improved, including increased familiarity with the learning format and available technologies, along with a better understanding of how to engage students virtually. Teachers reported that they had become more comfortable using apps and technology tools like Zoom and learning management platforms like Google Classroom, as well as troubleshooting when technology issues arose. Teachers reported that they learned better strategies for monitoring and increasing student engagement, such as how to monitor student devices, how to implement small group work and breakout rooms, and how to create individual connections with their students virtually. Teachers said they had improved at creating engaging digital content for their students; by the end of 2020-21, teachers had spent a great deal of time adapting their lessons and resources to a virtual format. As they gained experience with remote teaching, teacher reported that they could better provide personalized instruction and feedback to students virtually. Teachers also reported that they developed more realistic expectations for

the benefits and limitations of how students learn virtually; for example, several teachers mentioned that they adjusted the focus or pace of instruction. Remote learning enabled teachers to gain a better understanding of students' home life and more appreciation for the value of interpersonal interactions, whether in-person or virtual; many reported that they embedded social-emotional learning into their online lessons. Many teachers reported that collaboration with peers was invaluable as they worked to improve remote/hybrid instruction, especially when formal professional development was inadequate or inaccessible. Teachers also said they learned to be extremely adaptable in their teaching.

Multiple teachers reported that technology access for all students in the 2020-21 school year was a game-changer for remote learning. Other teachers reported policy changes that allowed them to require participation in synchronous classes, meaning that there was more accountability for student participation in remote instruction. Outside of student-related improvements, several teachers said that they strived to better manage expectations for themselves and maintain a healthier work-life balance. However, of the 116 teachers that used the open-text option, 22 reported that there were no improvements in their approach to remote/hybrid learning. Some of these teachers said that they were extremely overwhelmed, frustrated, and burned out; some noted that this frustration stemmed from inadequate support or unrealistic expectations from their district or school leaders, while others mentioned decreased student and parental engagement in the 2020-21 school year.

Table C72. Teacher-reported changes by grade level in the proportion of the curriculum they were able to cover

Teacher Survey Q15. Of the curriculum content you would have typically covered across the school year before the pandemic, approximately what proportion were you able to cover in the following time periods?

		District Type								
		Overall			Alliance districts			Non-Alliance districts		
		N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
Elementary school	2019-20	928	68.5	(17.6)	380	65.4	(19.5)	548	70.6	(15.8)
	2020-21	963	72.9	(18.5)	398	69.2	(19.3)	565	75.6	(17.5)
	2021-22	902	88.0	(14.4)	377	86.6	(14.6)	525	89.1	(14.2)
Middle school	2019-20	541	72.0	(17.5)	170	71.1	(19.1)	371	72.4	(16.8)
	2020-21	560	72.1	(18.2)	178	69.2	(19.4)	382	73.4	(17.5)
	2021-22	532	85.0	(15.9)	166	84.2	(15.9)	366	85.4	(15.9)
High school	2019-20	853	72.9	(17.2)	266	70.3	(18.9)	587	74.1	(16.2)
	2020-21	850	69.2	(17.3)	262	65.9	(18.2)	588	70.6	(16.7)
	2021-22	830	83.6	(15.0)	250	80.8	(16.3)	580	84.7	(14.3)
Multiple levels, ungraded, or unknown	2019-20	313	65.9	(21.5)	102	62.1	(24.1)	211	67.7	(20.0)
	2020-21	325	65.9	(20.5)	104	58.3	(22.4)	221	69.5	(18.6)
	2021-22	305	84.6	(16.6)	100	79.7	(20.6)	205	86.9	(13.6)

Please note, mean percent describes the mean of each participating district's reported value.

Table C73. Teacher-reported changes in different learning models

Teacher survey Q36. Is there anything else you'd like to share about your experiences as a Connecticut teacher during the COVID-19 pandemic?

Many teacher survey respondents used the open-ended question at the end of the survey to reflect on changes in learning models between the 2019-2020 and 2020-2021 school years. Teachers reported that at the start of the 2020-21 school year, they felt the impact of minimal learning near the end of the 2019-2020 school year. When school re-opened with hybrid or fully in-person models, some teachers said that their schools had no plan for instruction. Other teachers reported that once in-person instruction began, they began to feel more prepared and found that learning was much more effective. Teachers also reported that having even a small amount of in-person learning during the 2020-2021 academic year improved students' mental health.

Teacher survey respondents reflected on many changes in learning models that occurred during the 2020-2021 school year. One teacher described starting the year in person, then switching to non-concurrent hybrid, then to remote, then to concurrent hybrid. Teachers reported that the constant changes between learning models were exhausting and stressful. Teachers also noted that teachers and students were constantly moving in and out of quarantine during the 2020-2021 academic year, which was very disruptive to learning. Students were often at different stages in learning material, and teachers found it challenging to monitor each student's academic progress.

Appendix D: Supports for students (Research Goal 2)

Research Question 2a. What do administrators and teachers say about the pandemic's effects on students and their families?

Table D1. Teacher-reported student academic behaviors by grade level in 2020

Teacher Survey Q7a - Q7e. When students were learning remotely during spring 2020 (start of COVID-pandemic), approximately what percent of your students were doing each of the following?

		District Type								
		Overall			Alliance districts			Non-Alliance districts		
		N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
Elementary school	progressing with grade-level learning	921	45.9	(25.0)	374	38.7	(24.0)	547	50.8	(24.5)
	completing the majority of your assignments	921	50.7	(24.4)	372	43.3	(23.1)	549	55.7	(24.0)
	in contact with you nearly every day	918	54.6	(30.0)	372	48.1	(28.2)	546	59.0	(30.4)
	completing advanced or enrichment content	872	13.0	(18.6)	343	12.6	(18.1)	529	13.2	(18.9)
	performing better than they had in person	849	9.0	(14.9)	333	9.2	(16.1)	516	8.8	(14.1)
Middle school	progressing with grade-level learning	542	51.5	(25.3)	170	46.0	(24.9)	372	54.1	(25.0)
	completing the majority of your assignments	543	55.2	(24.5)	170	48.2	(25.7)	373	58.4	(23.3)
	in contact with you nearly every day	537	46.6	(29.5)	168	46.8	(30.3)	369	46.5	(29.2)
	completing advanced or enrichment content	508	14.4	(20.5)	160	13.8	(22.4)	348	14.7	(19.6)
	performing better than they had in person	510	13.1	(15.6)	158	14.9	(17.3)	352	12.3	(14.8)
High school	progressing with grade-level learning	840	52.6	(25.9)	256	47.8	(24.9)	584	54.7	(26.1)
	completing the majority of your assignments	841	55.4	(24.8)	257	48.7	(23.4)	584	58.4	(24.8)
	in contact with you nearly every day	839	41.9	(30.6)	256	40.6	(28.2)	583	42.4	(31.6)
	completing advanced or enrichment content	815	18.3	(24.7)	250	17.2	(22.7)	565	18.8	(25.5)
	performing better than they had in person	820	15.1	(19.7)	253	13.4	(17.4)	567	15.9	(20.6)
Multiple levels, ungraded, or unknown	progressing with grade-level learning	311	45.0	(26.4)	100	39.0	(25.6)	211	47.9	(26.4)
	completing the majority of your assignments	311	46.9	(25.0)	100	42.0	(24.1)	211	49.2	(25.2)
	in contact with you nearly every day	307	44.5	(31.3)	99	41.7	(30.2)	208	45.9	(31.8)
	completing advanced or enrichment content	286	12.7	(20.3)	93	14.9	(22.6)	193	11.6	(19.1)
	performing better than they had in person	290	11.8	(15.8)	94	10.9	(14.8)	196	12.2	(16.2)

Please note, mean percent describes the mean of each participating district's reported value.

Table D2. Teacher-reported academic behaviors of fully remote students by grade level in 2020-21

Teacher Survey Q11a - Q11e. You indicated that some of your students attended school remotely for the majority of the 2020-21 school year. Over the 2020-21 school year, approximately what percent of your fully in-person students were doing each of the following?

		District Type								
		Overall			Alliance districts			Non-Alliance districts		
		N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
Elementary school	progressing with grade-level learning	761	48.0	(30.5)	329	41.9	(29.2)	432	52.7	(30.7)
	completing the majority of your assignments	761	52.2	(29.8)	329	46.7	(28.3)	432	56.3	(30.2)
	in contact with you nearly every day	747	60.7	(34.6)	323	56.8	(33.0)	424	63.6	(35.6)
	completing advanced or enrichment content	709	16.4	(25.1)	299	14.1	(21.0)	410	18.1	(27.5)
	performing better than they had in person	699	12.6	(22.6)	308	12.9	(22.4)	391	12.4	(22.9)
Middle school	progressing with grade-level learning	485	45.4	(27.8)	160	42.9	(26.5)	325	46.7	(28.4)
	completing the majority of your assignments	485	49.2	(27.0)	160	46.6	(26.3)	325	50.5	(27.3)
	in contact with you nearly every day	482	51.4	(31.4)	159	50.5	(30.5)	323	51.9	(31.8)
	completing advanced or enrichment content	460	11.9	(18.7)	153	15.0	(21.9)	307	10.4	(16.6)
	performing better than they had in person	451	12.1	(18.5)	148	14.4	(17.9)	303	11.0	(18.7)
High school	progressing with grade-level learning	764	45.8	(27.1)	237	42.8	(25.4)	527	47.1	(27.7)
	completing the majority of your assignments	765	49.9	(25.6)	238	46.6	(24.1)	527	51.5	(26.1)
	in contact with you nearly every day	758	44.6	(30.8)	236	42.8	(29.1)	522	45.3	(31.6)
	completing advanced or enrichment content	732	16.4	(23.7)	229	15.5	(20.9)	503	16.9	(24.9)
	performing better than they had in person	736	15.6	(22.1)	230	15.3	(19.6)	506	15.8	(23.1)
Multiple levels, ungraded, or unknown	progressing with grade-level learning	280	43.4	(29.5)	94	35.6	(27.0)	186	47.3	(30.1)
	completing the majority of your assignments	282	47.2	(27.9)	95	39.8	(26.1)	187	50.9	(28.1)
	in contact with you nearly every day	274	48.9	(33.8)	93	40.4	(31.3)	181	53.3	(34.3)
	completing advanced or enrichment content	257	12.6	(20.3)	86	10.9	(14.9)	171	13.5	(22.6)
	performing better than they had in person	258	15.0	(21.8)	89	13.0	(16.9)	169	16.1	(24.0)

Please note, mean percent describes the mean of each participating district's reported value.

Table D3. District-reported academic behaviors of fully remote students by grade level during the 2020-21 school year

District Inventory Q31emh. During the 2020-21 school year, approximately what percentage of fully remote students were...

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
Elementary												
In contact with their teacher every day	187	80.9	(22.9)	32	77.8	(17.3)	126	83.5	(22.4)	29	72.8	(28.3)
Working on grade-level content	183	82.4	(23.3)	32	81.2	(18.9)	125	87.3	(18.3)	26	60.0	(34.8)
Completing advanced or enrichment content	148	34.2	(30.9)	26	21.2	(17.9)	105	35.4	(31.5)	17	47.1	(36.5)
Middle School												
In contact with their teacher every day	180	77.6	(23.3)	30	68.0	(18.4)	116	81.8	(22.4)	34	71.8	(27.0)
Working on grade-level content	176	81.6	(23.3)	30	80.7	(20.8)	115	87.7	(16.6)	31	60.0	(33.0)
Completing advanced or enrichment content	149	34.5	(28.0)	27	18.5	(12.5)	102	38.3	(29.3)	20	37.0	(29.9)
High School												
In contact with their teacher every day	171	74.9	(23.8)	31	67.1	(18.8)	97	80.5	(21.9)	43	67.9	(27.9)
Working on grade-level content	164	79.7	(22.7)	31	80.6	(18.9)	97	85.7	(18.0)	36	62.8	(28.3)
Completing advanced or enrichment content	140	34.7	(26.3)	29	23.4	(20.9)	88	39.3	(27.9)	23	31.3	(22.0)

Please note, mean percentage describes the mean of each participating district's reported value.

Table D4. Teacher-reported academic behaviors of hybrid students by grade level in 2020-21

Teacher Survey Q12a and Q12e. You indicated that some of your students were hybrid for the majority of the 2020-21 school year. Over the 2020-21 school year, approximately what percent of your fully in-person students were doing each of the following?

		District Type								
		Overall			Alliance districts			Non-Alliance districts		
		N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
Elementary school	progressing with grade-level learning	595	56.1	(24.8)	273	50.9	(24.4)	322	60.5	(24.2)
	completing the majority of your assignments	594	58.1	(25.0)	273	52.8	(24.1)	321	62.6	(25.0)
	in contact with you nearly every day	589	67.0	(30.1)	271	61.5	(28.8)	318	71.6	(30.5)
	completing advanced or enrichment content	558	15.8	(21.5)	253	16.0	(19.8)	305	15.7	(22.8)
	performing better than they had in person	555	10.2	(18.0)	254	11.4	(19.2)	301	9.2	(17.0)
Middle school	progressing with grade-level learning	455	58.4	(23.6)	147	55.2	(24.2)	308	59.9	(23.2)
	completing the majority of your assignments	454	60.9	(22.2)	147	57.2	(22.3)	307	62.6	(22.0)
	in contact with you nearly every day	453	63.4	(28.8)	147	61.5	(28.2)	306	64.3	(29.1)
	completing advanced or enrichment content	436	16.9	(20.9)	140	19.0	(23.6)	296	15.9	(19.5)
	performing better than they had in person	436	13.7	(17.7)	142	16.8	(19.5)	294	12.2	(16.7)
High school	progressing with grade-level learning	741	59.6	(22.5)	217	54.1	(23.3)	524	61.8	(21.7)
	completing the majority of your assignments	741	62.4	(21.5)	218	56.1	(22.3)	523	65.0	(20.6)
	in contact with you nearly every day	738	57.7	(29.8)	216	52.0	(29.5)	522	60.1	(29.6)
	completing advanced or enrichment content	717	22.3	(25.8)	213	22.0	(23.3)	504	22.5	(26.8)
	performing better than they had in person	717	15.9	(21.0)	215	16.9	(22.4)	502	15.5	(20.4)
Multiple levels, ungraded, or unknown	progressing with grade-level learning	237	50.9	(27.2)	86	45.5	(27.3)	151	54.0	(26.7)
	completing the majority of your assignments	238	53.5	(25.9)	87	52.0	(26.8)	151	54.4	(25.4)
	in contact with you nearly every day	233	54.8	(32.8)	84	52.9	(31.3)	149	56.0	(33.7)
	completing advanced or enrichment content	218	17.2	(25.1)	78	22.1	(27.8)	140	14.6	(23.2)
	performing better than they had in person	223	15.0	(21.9)	80	17.6	(21.9)	143	13.5	(21.8)

Please note, mean percent describes the mean of each participating district's reported value.

Table D5. Teacher-reported academic behaviors of fully in-person students by grade level in 2020-21

Teacher Survey Q13a and Q13e. You indicated that some of your students attended school fully in-person for the majority of the 2020-21 school year. Over the 2020-21 school year, approximately what percent of your fully in-person students were doing each of the following?

		District Type								
		Overall			Alliance districts			Non-Alliance districts		
		N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
Elementary school	progressing with grade-level learning	671	72.9	(22.0)	243	66.0	(24.0)	428	76.8	(19.7)
	completing the majority of your assignments	670	80.8	(19.3)	243	74.7	(21.4)	427	84.2	(17.1)
	completing advanced or enrichment content	649	28.1	(28.4)	228	23.8	(25.7)	421	30.4	(29.6)
Middle school	progressing with grade-level learning	366	70.4	(22.8)	107	67.1	(24.0)	259	71.7	(22.1)
	completing the majority of your assignments	366	73.3	(20.4)	107	71.8	(20.0)	259	73.9	(20.5)
	completing advanced or enrichment content	351	25.4	(26.0)	104	27.4	(28.2)	247	24.5	(25.1)
High school	progressing with grade-level learning	504	71.5	(21.9)	144	66.5	(23.7)	360	73.5	(20.8)
	completing the majority of your assignments	504	73.5	(21.1)	144	68.9	(22.8)	360	75.3	(20.2)
	completing advanced or enrichment content	495	30.2	(29.3)	142	29.2	(29.0)	353	30.6	(29.5)
Multiple levels, ungraded, or unknown	progressing with grade-level learning	244	66.3	(27.1)	73	58.2	(28.8)	171	69.8	(25.7)
	completing the majority of your assignments	245	71.1	(24.6)	74	64.6	(27.6)	171	73.9	(22.7)
	completing advanced or enrichment content	227	25.8	(30.0)	69	28.3	(31.0)	158	24.7	(29.6)

Please note, mean percent describes the mean of each participating district's reported value.

Table D6. Teacher-reported school support by grade level for student learning in 2020-21

Teacher Survey Q24_2. In your opinion, how adequately did your school support students' academic learning during the 2020-21 school year?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Support was extremely inadequate	61	7.1	37	10.2	24	4.8
	Support was somewhat inadequate	177	20.5	88	24.2	89	17.9
	Support was neither adequate nor inadequate	129	15.0	64	17.6	65	13.1
	Support was somewhat adequate	381	44.2	141	38.7	240	48.2
	Support was extremely adequate	114	13.2	34	9.3	80	16.1
	Total N	862	100.0	364	100.0	498	100.0
Middle school	Support was extremely inadequate	37	7.2	20	12.3	17	4.8
	Support was somewhat inadequate	116	22.6	37	22.7	79	22.5
	Support was neither adequate nor inadequate	86	16.7	28	17.2	58	16.5
	Support was somewhat adequate	207	40.3	58	35.6	149	42.5
	Support was extremely adequate	68	13.2	20	12.3	48	13.7
	Total N	514	100.0	163	100.0	351	100.0
High school	Support was extremely inadequate	68	8.5	28	11.5	40	7.2
	Support was somewhat inadequate	208	26.1	77	31.6	131	23.7
	Support was neither adequate nor inadequate	145	18.2	44	18.0	101	18.3
	Support was somewhat adequate	314	39.4	77	31.6	237	42.9
	Support was extremely adequate	62	7.8	18	7.4	44	8.0
	Total N	797	100.0	244	100.0	553	100.0
Multiple levels, ungraded, or unknown	Support was extremely inadequate	22	7.5	12	12.0	10	5.2
	Support was somewhat inadequate	57	19.4	18	18.0	39	20.1
	Support was neither adequate nor inadequate	54	18.4	18	18.0	36	18.6
	Support was somewhat adequate	130	44.2	40	40.0	90	46.4
	Support was extremely adequate	31	10.5	12	12.0	19	9.8
	Total N	294	100.0	100	100.0	194	100.0

Table D7. District-reported changes in student behavior by grade level: cyberbullying

District Inventory Q45emh_1. How problematic was cyberbullying during the pandemic compared to before the pandemic?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	Much less of a problem	23	12.8	7	21.9	14	11.4	2	8.0
	Somewhat less of a problem	20	11.1	4	12.5	13	10.6	3	12.0
	About the same	95	52.8	12	37.5	70	56.9	13	52.0
	Somewhat more of a problem	28	15.6	3	9.4	22	17.9	3	12.0
	Much more of a problem	14	7.8	6	18.8	4	3.3	4	16.0
	Total N	180	100.0	32	100.0	123	100.0	25	100.0
Middle School	Much less of a problem	11	6.3	1	3.1	8	7.1	2	6.5
	Somewhat less of a problem	18	10.3	5	15.6	10	8.9	3	9.7
	About the same	91	52.0	14	43.8	60	53.6	17	54.8
	Somewhat more of a problem	39	22.3	6	18.8	29	25.9	4	12.9
	Much more of a problem	16	9.1	6	18.8	5	4.5	5	16.1
	Total N	175	100.0	32	100.0	112	100.0	31	100.0
High School	Much less of a problem	9	5.5	0	.0	7	7.3	2	5.4
	Somewhat less of a problem	15	9.1	4	12.9	8	8.3	3	8.1
	About the same	80	48.8	14	45.2	44	45.8	22	59.5
	Somewhat more of a problem	46	28.0	8	25.8	31	32.3	7	18.9
	Much more of a problem	14	8.5	5	16.1	6	6.3	3	8.1
	Total N	164	100.0	31	100.0	96	100.0	37	100.0

Table D8. Teacher-reported changes in student behavior by grade level: cyberbullying

Teacher Survey Q25_3. Based on your experience, how problematic was cyberbullying for your students during the pandemic, compared to before the pandemic?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Much less of a problem	39	7.8	19	8.1	20	7.5
	Somewhat less of a problem	12	2.4	6	2.6	6	2.3
	About the same	215	42.9	91	38.7	124	46.6
	Somewhat more of a problem	149	29.7	77	32.8	72	27.1
	Much more of a problem	86	17.2	42	17.9	44	16.5
	Total N	501	100.0	235	100.0	266	100.0
Middle school	Much less of a problem	6	1.3	5	3.5	1	.3
	Somewhat less of a problem	14	3.0	6	4.2	8	2.5
	About the same	177	38.1	46	31.9	131	40.8
	Somewhat more of a problem	126	27.1	34	23.6	92	28.7
	Much more of a problem	142	30.5	53	36.8	89	27.7
	Total N	465	100.0	144	100.0	321	100.0
High school	Much less of a problem	10	1.7	3	1.7	7	1.8
	Somewhat less of a problem	28	4.9	12	6.6	16	4.1
	About the same	266	46.5	84	46.4	182	46.5
	Somewhat more of a problem	156	27.3	47	26.0	109	27.9
	Much more of a problem	112	19.6	35	19.3	77	19.7
	Total N	572	100.0	181	100.0	391	100.0
Multiple levels, ungraded, or unknown	Much less of a problem	6	2.8	5	6.3	1	.7
	Somewhat less of a problem	8	3.8	2	2.5	6	4.5
	About the same	81	38.0	29	36.7	52	38.8
	Somewhat more of a problem	69	32.4	24	30.4	45	33.6
	Much more of a problem	49	23.0	19	24.1	30	22.4
	Total N	213	100.0	79	100.0	134	100.0

Table D9. District-reported changes in student behavior by grade level: excessive screen time

District Inventory Q45emh_4r. How problematic was excessive screen time during the pandemic compared to before the pandemic?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	Much less of a problem	2	1.1	0	.0	2	1.7	0	.0
	Somewhat less of a problem	2	1.1	0	.0	1	.8	1	3.4
	About the same	20	10.9	3	9.1	12	9.9	5	17.2
	Somewhat more of a problem	72	39.3	12	36.4	50	41.3	10	34.5
	Much more of a problem	87	47.5	18	54.5	56	46.3	13	44.8
	Total N	183	100.0	33	100.0	121	100.0	29	100.0
Middle School	Much less of a problem	1	.6	0	.0	1	.9	0	.0
	Somewhat less of a problem	2	1.1	0	.0	1	.9	1	3.0
	About the same	21	12.0	2	6.3	13	11.8	6	18.2
	Somewhat more of a problem	69	39.4	14	43.8	47	42.7	8	24.2
	Much more of a problem	82	46.9	16	50.0	48	43.6	18	54.5
	Total N	175	100.0	32	100.0	110	100.0	33	100.0
High School	Much less of a problem	1	.6	0	.0	1	1.0	0	.0
	Somewhat less of a problem	0	.0	0	.0	0	.0	0	.0
	About the same	20	12.0	3	9.7	11	11.5	6	15.4
	Somewhat more of a problem	65	39.2	13	41.9	39	40.6	13	33.3
	Much more of a problem	80	48.2	15	48.4	45	46.9	20	51.3
	Total N	166	100.0	31	100.0	96	100.0	39	100.0

Table D10. Teacher-reported changes in student behavior by grade level: excessive screen time

Teacher Survey Q25_5r. Based on your experience, how problematic was excessive screen time for your students during the pandemic, compared to before the pandemic?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Much less of a problem	6	.7	4	1.1	2	.4
	Somewhat less of a problem	8	.9	2	.5	6	1.2
	About the same	49	5.6	20	5.5	29	5.7
	Somewhat more of a problem	215	24.6	81	22.3	134	26.2
	Much more of a problem	597	68.2	257	70.6	340	66.5
	Total N	875	100.0	364	100.0	511	100.0
Middle school	Much less of a problem	2	.4	1	.6	1	.3
	Somewhat less of a problem	4	.8	0	.0	4	1.1
	About the same	34	6.5	11	6.7	23	6.4
	Somewhat more of a problem	102	19.4	30	18.3	72	19.9
	Much more of a problem	383	73.0	122	74.4	261	72.3
	Total N	525	100.0	164	100.0	361	100.0
High school	Much less of a problem	7	.9	2	.9	5	.9
	Somewhat less of a problem	3	.4	1	.4	2	.4
	About the same	58	7.4	13	5.7	45	8.2
	Somewhat more of a problem	157	20.1	45	19.6	112	20.4
	Much more of a problem	555	71.2	169	73.5	386	70.2
	Total N	780	100.0	230	100.0	550	100.0
Multiple levels, ungraded, or unknown	Much less of a problem	4	1.4	2	2.1	2	1.1
	Somewhat less of a problem	2	.7	1	1.1	1	.5
	About the same	23	8.1	8	8.4	15	7.9
	Somewhat more of a problem	66	23.2	19	20.0	47	24.7
	Much more of a problem	190	66.7	65	68.4	125	65.8
	Total N	285	100.0	95	100.0	190	100.0

Table D11. District-reported changes in student behavior by grade level: lack of connection to school

District Inventory Q45_5r. How problematic was lack of connection to school during the pandemic compared to before the pandemic?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	Much less of a problem	1	.5	0	.0	1	.8	0	.0
	Somewhat less of a problem	4	2.1	0	.0	3	2.4	1	3.4
	About the same	18	9.6	3	9.1	10	8.0	5	17.2
	Somewhat more of a problem	83	44.4	10	30.3	67	53.6	6	20.7
	Much more of a problem	81	43.3	20	60.6	44	35.2	17	58.6
	Total N	187	100.0	33	100.0	125	100.0	29	100.0
Middle School	Much less of a problem	2	1.1	0	.0	2	1.7	0	.0
	Somewhat less of a problem	4	2.2	0	.0	2	1.7	2	5.7
	About the same	14	7.7	1	3.1	7	6.0	6	17.1
	Somewhat more of a problem	83	45.4	12	37.5	63	54.3	8	22.9
	Much more of a problem	80	43.7	19	59.4	42	36.2	19	54.3
	Total N	183	100.0	32	100.0	116	100.0	35	100.0
High School	Much less of a problem	1	.6	0	.0	1	1.0	0	.0
	Somewhat less of a problem	2	1.2	0	.0	0	.0	2	4.9
	About the same	16	9.4	2	6.5	6	6.1	8	19.5
	Somewhat more of a problem	67	39.4	10	32.3	49	50.0	8	19.5
	Much more of a problem	84	49.4	19	61.3	42	42.9	23	56.1
	Total N	170	100.0	31	100.0	98	100.0	41	100.0

Table D12. Teacher-reported changes in student behavior by grade level: lack of connection to school

Teacher Survey Q25_6r. Based on your experience, how problematic was lack of connection to school for your students during the pandemic, compared to before the pandemic?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Much less of a problem	10	1.1	5	1.3	5	1.0
	Somewhat less of a problem	19	2.1	8	2.1	11	2.1
	About the same	146	16.3	52	13.9	94	18.1
	Somewhat more of a problem	349	39.1	124	33.2	225	43.3
	Much more of a problem	369	41.3	184	49.3	185	35.6
	Total N	893	100.0	373	100.0	520	100.0
Middle school	Much less of a problem	4	.7	3	1.8	1	.3
	Somewhat less of a problem	6	1.1	1	.6	5	1.4
	About the same	55	10.3	15	8.9	40	10.9
	Somewhat more of a problem	172	32.2	49	29.2	123	33.6
	Much more of a problem	297	55.6	100	59.5	197	53.8
	Total N	534	100.0	168	100.0	366	100.0
High school	Much less of a problem	3	.4	2	.8	1	.2
	Somewhat less of a problem	9	1.1	2	.8	7	1.2
	About the same	55	6.7	20	8.0	35	6.1
	Somewhat more of a problem	251	30.6	55	22.1	196	34.3
	Much more of a problem	502	61.2	170	68.3	332	58.1
	Total N	820	100.0	249	100.0	571	100.0
Multiple levels, ungraded, or unknown	Much less of a problem	5	1.6	2	2.0	3	1.5
	Somewhat less of a problem	7	2.3	1	1.0	6	3.0
	About the same	31	10.2	13	12.9	18	8.9
	Somewhat more of a problem	105	34.5	34	33.7	71	35.0
	Much more of a problem	156	51.3	51	50.5	105	51.7
	Total N	304	100.0	101	100.0	203	100.0

Table D13. District-reported changes in student behavior by grade level: sexting

District Inventory Q45emh_3r. How problematic was sexting during the pandemic compared to before the pandemic?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	Much less of a problem	27	16.6	9	29.0	16	14.7	2	8.7
	Somewhat less of a problem	10	6.1	1	3.2	7	6.4	2	8.7
	About the same	109	66.9	15	48.4	79	72.5	15	65.2
	Somewhat more of a problem	9	5.5	2	6.5	6	5.5	1	4.3
	Much more of a problem	8	4.9	4	12.9	1	.9	3	13.0
	Total N	163	100.0	31	100.0	109	100.0	23	100.0
Middle School	Much less of a problem	13	7.9	2	6.5	9	8.7	2	6.7
	Somewhat less of a problem	12	7.3	3	9.7	7	6.7	2	6.7
	About the same	108	65.5	17	54.8	70	67.3	21	70.0
	Somewhat more of a problem	23	13.9	6	19.4	15	14.4	2	6.7
	Much more of a problem	9	5.5	3	9.7	3	2.9	3	10.0
	Total N	165	100.0	31	100.0	104	100.0	30	100.0
High School	Much less of a problem	7	4.5	1	3.2	5	5.5	1	2.9
	Somewhat less of a problem	12	7.7	1	3.2	8	8.8	3	8.8
	About the same	102	65.4	19	61.3	59	64.8	24	70.6
	Somewhat more of a problem	27	17.3	7	22.6	16	17.6	4	11.8
	Much more of a problem	8	5.1	3	9.7	3	3.3	2	5.9
	Total N	156	100.0	31	100.0	91	100.0	34	100.0

Table D14. Teacher-reported services provided to IEP students by grade level

Teacher Survey Q16. During the 2020-21 school year, to what extent do you believe your students with IEPs received the services specified in their IEPs?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Not at all	38	5.8	33	12.0	5	1.3
	Somewhat	313	47.6	146	53.1	167	43.7
	Mostly	231	35.2	81	29.5	150	39.3
	Completely	75	11.4	15	5.5	60	15.7
	Total N	657	100.0	275	100.0	382	100.0
Middle school	Not at all	19	5.1	13	10.5	6	2.4
	Somewhat	195	52.1	72	58.1	123	49.2
	Mostly	133	35.6	36	29.0	97	38.8
	Completely	27	7.2	3	2.4	24	9.6
	Total N	374	100.0	124	100.0	250	100.0
High school	Not at all	41	7.0	21	12.1	20	4.8
	Somewhat	316	53.8	101	58.0	215	52.1
	Mostly	195	33.2	43	24.7	152	36.8
	Completely	35	6.0	9	5.2	26	6.3
	Total N	587	100.0	174	100.0	413	100.0
Multiple levels, ungraded, or unknown	Not at all	21	9.1	12	14.8	9	6.0
	Somewhat	118	51.3	45	55.6	73	49.0
	Mostly	74	32.2	20	24.7	54	36.2
	Completely	17	7.4	4	4.9	13	8.7
	Total N	230	100.0	81	100.0	149	100.0

Table D15. Teacher-reported services provided to EL students by grade level

Teacher Survey Q17. During the 2020-21 school year, to what extent do you believe your English learner (EL) students received the services normally provided?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Not at all	90	13.7	54	19.6	36	9.4
	Somewhat	315	47.8	142	51.6	173	45.1
	Mostly	183	27.8	62	22.5	121	31.5
	Completely	71	10.8	17	6.2	54	14.1
	Total N	659	100.0	275	100.0	384	100.0
Middle school	Not at all	49	13.0	20	16.1	29	11.5
	Somewhat	211	56.1	77	62.1	134	53.2
	Mostly	94	25.0	24	19.4	70	27.8
	Completely	22	5.9	3	2.4	19	7.5
	Total N	376	100.0	124	100.0	252	100.0
High school	Not at all	92	15.6	29	16.7	63	15.2
	Somewhat	338	57.5	113	64.9	225	54.3
	Mostly	119	20.2	26	14.9	93	22.5
	Completely	39	6.6	6	3.4	33	8.0
	Total N	588	100.0	174	100.0	414	100.0
Multiple levels, ungraded, or unknown	Not at all	31	13.5	13	16.0	18	12.1
	Somewhat	120	52.2	44	54.3	76	51.0
	Mostly	54	23.5	16	19.8	38	25.5
	Completely	25	10.9	8	9.9	17	11.4
	Total N	230	100.0	81	100.0	149	100.0

Table D16. Teacher-reported changes in resources/supports needed by elementary students

Teacher Survey Q27_1r to Q27_11r. Based on your experience, how much of a need did your students have for the following resources/supports during the pandemic compared to before the pandemic? (Elementary teachers)

	District Type								
	Overall			Alliance districts			Non-Alliance districts		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
One-on-one meetings with me	582	4.1	(.9)	240	4.1	(1.0)	342	4.1	(.9)
Free tutoring (1:1 or small group)	523	4.1	(.9)	221	4.2	(.9)	302	4.1	(.9)
Meetings with reading specialist	494	4.0	(.9)	201	4.0	(.9)	293	3.9	(.9)
Meetings with math specialist	486	4.0	(.9)	194	4.1	(.9)	292	3.9	(.9)
Extra online materials for students to use on their own	553	4.0	(.9)	228	4.0	(1.0)	325	4.0	(.9)
Special courses	292	3.7	(1.0)	131	3.8	(1.0)	161	3.6	(1.0)
Technology devices	583	4.4	(.9)	245	4.5	(.9)	338	4.4	(.9)
Improved Wi-Fi access	579	4.4	(.9)	247	4.5	(.8)	332	4.3	(.9)
Food assistance	503	4.2	(.9)	227	4.4	(.8)	276	4.1	(.9)
Behavioral health services	535	4.4	(.8)	218	4.4	(.8)	317	4.4	(.8)
Other	87	4.3	(1.0)	41	4.4	(.9)	46	4.2	(1.0)

Please note, these items range from 1-5, with 1 = Much less of a need to 5 = Much more of a need.

Table D17. Teacher-reported changes in resources/supports needed by middle school students

Teacher Survey Q27_1r to Q27_11r. Based on your experience, how much of a need did your students have for the following resources/supports during the pandemic compared to before the pandemic? (Middle school teachers)

	District Type								
	Overall			Alliance districts			Non-Alliance districts		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
One-on-one meetings with me	340	3.9	(.9)	111	4.0	(1.0)	229	3.9	(.9)
Free tutoring (1:1 or small group)	316	3.9	(1.0)	101	3.9	(1.0)	215	3.9	(.9)
Meetings with reading specialist	240	3.7	(.9)	66	3.9	(1.1)	174	3.7	(.9)
Meetings with math specialist	239	3.8	(.9)	66	4.0	(1.0)	173	3.8	(.9)
Extra online materials for students to use on their own	319	3.8	(1.0)	103	3.7	(1.0)	216	3.8	(.9)
Special courses	217	3.8	(.9)	69	4.0	(.9)	148	3.7	(.9)
Technology devices	337	4.2	(.9)	112	4.3	(.9)	225	4.2	(1.0)
Improved Wi-Fi access	332	4.4	(.8)	114	4.5	(.7)	218	4.4	(.8)
Food assistance	296	4.1	(.9)	108	4.4	(.9)	188	4.0	(.9)
Behavioral health services	314	4.4	(.8)	105	4.5	(.9)	209	4.4	(.8)
Other	49	4.2	(.9)	15	4.3	(1.0)	34	4.1	(.9)

Please note, these items range from 1-5, with 1 = Much less of a need to 5= Much more of a need.

Table D18. Teacher-reported changes in resources/supports needed by high school students

Teacher Survey Q27_1r to Q27_11r. Based on your experience, how much of a need did your students have for the following resources/supports during the pandemic compared to before the pandemic? (High school teachers)

	District Type								
	Overall			Alliance districts			Non-Alliance districts		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
One-on-one meetings with me	522	3.8	(1.0)	149	3.9	(1.1)	373	3.8	(1.0)
Free tutoring (1:1 or small group)	475	3.9	(.9)	134	3.9	(1.0)	341	3.8	(.9)
Meetings with reading specialist	246	3.6	(1.0)	68	3.9	(1.1)	178	3.5	(.9)
Meetings with math specialist	241	3.7	(1.0)	70	4.0	(1.0)	171	3.6	(1.0)
Extra online materials for students to use on their own	471	3.8	(1.0)	132	3.8	(1.0)	339	3.8	(.9)
Special courses	399	4.2	(.9)	128	4.4	(.8)	271	4.2	(.9)
Technology devices	523	4.2	(1.0)	150	4.3	(1.0)	373	4.2	(1.0)
Improved Wi-Fi access	523	4.3	(.9)	149	4.5	(.8)	374	4.3	(.9)
Food assistance	408	4.2	(.8)	135	4.4	(.8)	273	4.1	(.9)
Behavioral health services	453	4.5	(.8)	130	4.6	(.7)	323	4.4	(.8)
Other	78	3.9	(1.1)	27	4.0	(1.1)	51	3.9	(1.1)

Please note, these items range from 1-5, with 1 = Much less of a need to 5= Much more of a need.

Table D19. Teacher-reported changes in resources/supports needed by students (mixed-level)

Teacher Survey Q27_1r to Q27_11r. Based on your experience, how much of a need did your students have for the following resources/supports during the pandemic compared to before the pandemic? (Teachers who selected multiple levels, no levels, or "ungraded")

	District Type								
	Overall			Alliance districts			Non-Alliance districts		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
One-on-one meetings with me	200	3.9	(1.0)	67	3.9	(1.1)	133	4.0	(1.0)
Free tutoring (1:1 or small group)	183	4.0	(1.0)	66	4.0	(1.0)	117	4.0	(1.0)
Meetings with reading specialist	129	3.8	(1.0)	43	3.8	(1.1)	86	3.8	(.9)
Meetings with math specialist	134	3.9	(1.0)	44	3.9	(1.0)	90	3.8	(.9)
Extra online materials for students to use on their own	185	3.9	(.9)	60	3.7	(1.1)	125	4.0	(.8)
Special courses	133	4.0	(1.0)	47	3.9	(1.0)	86	4.0	(1.0)
Technology devices	198	4.3	(1.0)	66	4.4	(1.0)	132	4.3	(1.0)
Improved Wi-Fi access	198	4.4	(.9)	67	4.6	(.8)	131	4.3	(1.0)
Food assistance	166	4.1	(.9)	59	4.2	(1.0)	107	4.0	(.9)
Behavioral health services	176	4.4	(.9)	61	4.2	(1.1)	115	4.5	(.7)
Other	31	3.8	(1.1)	12	3.7	(1.3)	19	3.8	(1.0)

Please note, these items range from 1-5, with 1 = Much less of a need to 5= Much more of a need.

Of the approximately 150 teachers who used the "other" open-text option to share resources and supports needed by students during the pandemic, the most common theme was ***support for students' social-emotional development***, including an increased focus on social-emotional learning. Many teachers mentioned that students needed connections with teachers and peers, time to socialize with their peers, and opportunities develop their interpersonal skills. Teachers reported that students needed support with mental health and motivation. Many teachers also said their school needed additional staff to support students social-emotionally as well as academically, both during the school day and outside school hours.

In terms of academic learning, teachers reported that students needed additional learning resources, technology support, and modified academic instruction (including smaller class sizes, flexible learning models, re-teaching, and a modified learning pace) to account for the effects of the pandemic. Students also needed help connecting to resources and completing assignments remotely, especially when using unfamiliar devices, platforms, or apps. Other teachers focused on the need for student accountability in the areas of attendance and completion of assignments, to ensure that students were actively participating in their learning. Many teachers reported that increased parental engagement and supervision was necessary for students to be successful with remote instruction. Some teachers talked about the need for more effective behavioral management and discipline during in-person learning, while others described the

importance of routines and structure to help students remain engaged in learning. Other teachers also mentioned the need for hands-on activities, play-based learning, and breaks from constant online instruction.

Table D20. Teacher-reported effects of pandemic on students and their families
Teacher survey Q36. Is there anything else you'd like to share about your experiences as a Connecticut teacher during the COVID-19 pandemic?

Impacts on Students: Learning/Academic.
Through the open-ended question at the end of the teacher survey, respondents reported substantial learning loss among their students. One teacher commented that, "students covered up their lack of progress/mastery during fully remote that are discovered once we returned to school." Respondents said that students were passed on to the next grade level at the end of the 2019-20 academic year, despite being academically behind by at least one grade level. Another teacher explained "at the high school level, over half the population of our student cannot do basic math or write a grammatically correct sentence." Much of the foundational knowledge required to learn new subject material was forgotten. Students seemed to forget how to be students due to the pandemic, with teachers revealing student difficulty in following classroom routines and poor handwriting skills. At the same time, many teacher survey respondents agreed that students who were dedicated to learning were able to learn throughout the pandemic. Respondents also noted that students became more knowledgeable about technology, which aided student learning. Some teacher survey respondents said that students were more open to trying new learning techniques and exhibited increased patience.

Impacts on Students: Effects of pandemic on student conduct/behavior/engagement/work ethic
Of the teachers that responded to the open-ended teacher survey question, the most-reported effect of the pandemic on students was severe behavioral issues. Many teachers shared that students returning to the in-person environment after remote learning lacked empathy, struggled with conflict resolution, and displayed disrespectful and argumentative behavior. Furthermore, many noted that students became increasingly dependent on devices and social media, leading to ongoing digital cheating and a lack of focus and engagement on academic tasks. This lack of focus and motivation was reported frequently by teachers as a result of remote learning. Returning students struggled to acclimate to a structured school environment and were easily distracted, couldn't manage their time, unable to collaborate effectively with others, and unmotivated to perform. This was compounded by a lack of academic accountability that arose during the pandemic and remained in many districts even after the return to fully in-person learning; teachers reported that students were not held accountable for their behavior, and that it bred a lack of academic development and personal responsibility.

According to the end-of-survey open-ended teacher question, some students' engagement, conduct, and/or behavior was positively impacted by the pandemic. For example, some teachers noted that students with special needs or mental health issues participated more freely in the remote environment and performed better without classroom distractions. Furthermore, students became more

technologically literate and flexible in their learning. They had to learn time management skills to complete assignments remotely, they became more willing to try new things, and they learned to collaborate patiently and effectively with other students. Teachers noted that students that were dedicated to their learning excelled during remote instruction.

Impacts on Students: Socio-emotional and Interpersonal

Teacher survey respondents commented about increases in several negative emotions, including frustration and anger. Respondents noted that the pandemics made students more socially isolated than in the past. Some respondents stated that students had lost the ability to interact with peers, could not engage in productive conflict resolution, and exhibited poor coping skills. Teachers pointed to students' dependence on technology and social media as reasons for underdeveloped interpersonal skills. One teacher noted "students lack more empathy … There are constant bullying, fights, and crying students with drama." Teachers observed a mismatch between students' grade level and maturity level, with many referencing teaching students behaving 2-3 years below their grade level. In addition, many respondents commented about the number of students who experienced severe mental health crises during the pandemic, including depression and anxiety. One teacher said they "had more students hospitalized for psych issues in the last 2 years than in the previous 14 combined."

Impacts on Parents: Family Engagement and Support

In their responses to the open-ended question at the end of the teacher survey, teachers expressed concern about inadequate parental involvement and supervision of student's learning during the pandemic. Respondents noted that parents' work obligations affected the extent to which students participated in school. One teacher said, "Work and food were top priorities. Schoolwork was not." Language barriers made it difficult for some parents to engage with teachers or help their children with schoolwork. Teachers also noted that some parents took advantage of the lenient attendance policies, allowing their children to stay home and learn remotely even when they had the ability to attend in-person classes. Teachers also described an unexpected benefit of remote and hybrid learning: the pandemic exposed parents to what a school day is like, garnering more appreciation for teachers and more recognition of the importance of parent involvement in students' academics. Remote learning also provided opportunities for teachers to connect with parents in ways that hadn't been possible previously. Overall, actively involved parents supported remote learning and made teachers feel more connected to their students.

Impacts on Students: Family Relationships & Responsibilities

Finally, teacher survey respondents noted that their students experienced an array of family situations that impacted learning and school engagement. Many teachers saw students taking on parent/caregiver roles. One teacher explained that some "students became sole breadwinners of their families. Others had to take care of younger siblings while parents or guardians juggled whatever jobs they

could find. Survival came first, schoolwork second." Some respondents noted that for some students who had family obligations, online learning formats were beneficial.

Impacts on Students: Services for Special Education Students

Via the open-ended question at the end of the teacher survey, teachers expressed concern about the lack of resources for teachers to use with students' emerging needs for learning support. Some students who might qualify for special education services, including Birth to Three, were not assessed because of the pandemic. Respondents also voiced a need for more teacher training in special education, along with increased access to intervention services and support to help teachers meet Individualized Education Program (IEP) accommodations.

Impacts on Students: Services for English Learner Students

Similarly, responses to the open-ended teacher survey question indicated that ESL services were minimal or nonexistent during the pandemic, which made it difficult for English Learner students to engage with classroom material.

Research Question 2b. What technological and other resources did districts provide to support student learning during the pandemic, and what technology challenges did students experience?

Table D21. District-reported access to electronic devices for elementary school students prior to the COVID-19 pandemic
District Inventory: Q4_7e - Q4_9e. Which of the following accurately describes the following learning opportunities for your district's elementary school students prior to the COVID-19 pandemic (before March 2020)? Please select all that apply.

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Each student had access to a school-provided device for use in school as needed for class (e.g., Chromebook cart)	134	69.4	25	78.1	92	70.8	17	54.8
Each student had a personal school-provided device for use at home or school	35	18.1	5	15.6	27	20.8	3	9.7
Each student could bring their own device or select to use a school-provided device	29	15.0	4	12.5	17	13.1	8	25.8
None of the above	51	26.4	7	21.9	31	23.8	13	41.9
Total N	193	100.0	32	100.0	130	100.0	31	100.0

Table D22. District-reported mean percentage of elementary students with access to digital devices as of March 1, 2020.
District Inventory Q41.1e. Please estimate the percentage of elementary students who had access to digital devices at home as of March 1, 2020.

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)
Chromebooks, laptops, or iPads provided by the district	170	60.1	(38.6)	24	56.7	(43.3)	116	61.9	(39.3)	30	56.0	(32.0)
Chromebooks, laptops, or iPads provided by the student/family	156	49.5	(29.8)	27	35.6	(27.8)	98	54.4	(29.4)	31	46.1	(29.4)
Smartphones only	84	33.1	(27.5)	16	45.6	(26.3)	55	27.1	(23.4)	13	43.1	(37.5)
No mobile device	66	18.3	(21.3)	12	30.0	(29.5)	44	15.0	(19.5)	10	19.0	(12.9)

**District response rates were sometimes low for these questions, and it is unclear if the response should have been a "no", is truly missing, or that districts did not know. Please note, mean percent describes the mean of each participating district's reported value.*

Table D23. District-reported mean percentage of elementary students with access to digital devices as of May 1, 2020

District Inventory: Q41.2e. Please estimate the percentage of elementary students who had access to digital devices at home as of May 1, 2020.

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)
Chromebooks, laptops, or iPads provided by the district	194	87.2	(21.4)	33	88.5	(18.7)	129	87.7	(22.2)	32	83.8	(21.1)
Chromebooks, laptops, or iPads provided by the student/family	163	50.5	(30.7)	31	32.9	(28.2)	101	56.2	(29.8)	31	49.4	(30.3)
Smartphones only	62	21.3	(26.1)	16	29.4	(32.1)	37	16.8	(21.2)	9	25.6	(31.3)
No mobile device	39	14.6	(20.2)	8	23.7	(27.2)	26	13.5	(19.2)	5	6.0	(5.5)

**District response rates were sometimes low for these questions, and it is unclear if the response should have been a "no", is truly missing, or that districts did not know. Please note, mean percent describes the mean of each participating district's reported value.*

Table D24. District-reported mean percentage of elementary students with access to digital devices as of November 1, 2020

District Inventory Q41.3e. Please estimate the percentage of elementary students who had access to digital devices at home as of November 1, 2020.

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)
Chromebooks, laptops, or iPads provided by the district	193	94.6	(15.5)	32	98.1	(4.7)	130	95.2	(15.6)	31	88.4	(20.3)
Chromebooks, laptops, or iPads provided by the student/family	162	51.6	(31.2)	31	34.8	(27.6)	100	58.0	(30.3)	31	47.7	(31.4)
Smartphones only	44	25.5	(30.5)	11	36.4	(33.2)	25	18.0	(23.6)	8	33.8	(41.7)
No mobile device	29	13.8	(20.9)	7	25.7	(28.8)	18	11.1	(18.4)	4	5.0	(5.8)

**District response rates were sometimes low for these questions, and it is unclear if the response should have been a "no", is truly missing, or that districts did not know. Please note, mean percent describes the mean of each participating district's reported value.*

Table D25. District-reported access to electronic devices middle school students prior to the COVID-19 pandemic

District Inventory: Q4_7m - Q4_9m. Which of the following accurately describes the following learning opportunities for your district's middle school students prior to the COVID-19 pandemic (before March 2020)? Please select all that apply.

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Each student had access to a school-provided device for use in school as needed for class (e.g., Chromebook cart)	146	77.2	25	80.6	99	81.1	22	61.1
Each student had a personal school-provided device for use at home or school	74	39.2	10	32.3	59	48.4	5	13.9
Each student could bring their own device or select to use a school-provided device	57	30.2	6	19.4	40	32.8	11	30.6
None of the above	32	16.9	5	16.1	15	12.3	12	33.3
Total N	189	100.0	31	100.0	122	100.0	36	100.0

Table D26. District-reported mean percentage of middle school students with access to digital devices as of March 2020

District Inventory Q41.1m. Please estimate the percentage of middle school students who had access to digital devices at home as of March 1, 2020.

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)
Chromebooks, laptops, or iPads provided by the district	176	70.2	(36.7)	26	62.3	(40.7)	114	76.2	(35.1)	36	56.9	(35.0)
Chromebooks, laptops, or iPads provided by the student/family	143	48.7	(32.0)	22	36.8	(27.8)	89	54.2	(33.1)	32	41.9	(28.3)
Smartphones only	68	37.1	(31.0)	16	54.4	(29.7)	39	29.7	(27.1)	13	37.7	(36.8)
No mobile device	47	18.3	(21.1)	9	16.7	(17.3)	28	19.3	(24.3)	10	17.0	(14.9)

**District response rates were sometimes low for these questions, and it is unclear if the response should have been a "no", is truly missing, or that districts did not know. Please note, mean percent describes the mean of each participating district's reported value.*

Tables D27. District-reported mean percentage of middle school students with access to digital devices as of May 2020

District Inventory Q41.2m. Please estimate the percentage of middle school students who had access to digital devices at home as of May 1, 2020.

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)
Chromebooks, laptops, or iPads provided by the district	192	87.7	(22.8)	31	89.7	(17.2)	123	89.5	(21.9)	38	80.3	(27.9)
Chromebooks, laptops, or iPads provided by the student/family	144	50.9	(32.1)	23	37.4	(26.7)	89	55.8	(33.4)	32	46.9	(29.5)
Smartphones only	43	28.6	(33.4)	12	44.2	(38.7)	22	22.3	(29.1)	9	23.3	(32.4)
No mobile device	30	14.0	(19.2)	9	10.0	(7.1)	16	18.1	(25.4)	5	8.0	(4.5)

**District response rates were sometimes low for these questions, and it is unclear if the response should have been a "no", is truly missing, or that districts did not know. Please note, mean percent describes the mean of each participating district's reported value.*

Tables D28. District-reported mean percentage of middle school students with access to digital devices as of Nov 2020

District Inventory Q41.3m. Please estimate the percentage of middle school students who had access to digital devices at home as off November 1, 2020.

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)
Chromebooks, laptops, or iPads provided by the district	192	93.0	(18.9)	31	97.7	(5.0)	124	94.2	(17.3)	37	84.9	(27.7)
Chromebooks, laptops, or iPads provided by the student/family	144	51.7	(32.9)	23	40.4	(27.4)	89	57.0	(34.2)	32	45.3	(30.4)
Smartphones only	31	35.8	(38.0)	9	56.7	(36.7)	15	22.7	(32.2)	7	37.1	(43.9)
No mobile device	26	11.9	(19.2)	8	10.0	(5.3)	13	15.4	(26.7)	5	6.0	(5.5)

**District response rates were sometimes low for these questions, and it is unclear if the response should have been a "no", is truly missing, or that districts did not know. Please note, mean percent describes the mean of each participating district's reported value.*

Table D29. District-reported access to electronic devices for high school students prior to the COVID-19 pandemic

District Inventory: Q4_7h - Q4_9h. Which of the following accurately describes the following learning opportunities for your district's high school students prior to the COVID-19 pandemic (before March 2020)? Please select all that apply.

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Each student had access to a school-provided device for use in school as needed for class (e.g., Chromebook cart)	124	71.7	24	80.0	75	74.3	25	59.5
Each student had a personal school-provided device for use at home or school	78	45.1	16	53.3	54	53.5	8	19.0
Each student could bring their own device or select to use a school-provided device	80	46.2	9	30.0	56	55.4	15	35.7
None of the above	26	15.0	4	13.3	10	9.9	12	28.6
Total N	173	100.0	30	100.0	101	100.0	42	100.0

Table D30. District-reported mean percentage high school students with access to digital devices as of March 2020

District Inventory Q41.1h. Please estimate the percentage of high school students who had access to digital devices at home as of March 1, 2020.

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)
Chromebooks, laptops, or iPads provided by the district	165	71.9	(37.5)	27	67.0	(37.5)	96	77.2	(36.1)	42	63.1	(39.3)
Chromebooks, laptops, or iPads provided by the student/family	131	50.6	(33.7)	21	35.7	(24.4)	76	55.1	(35.1)	34	49.7	(33.4)
Smartphones only	60	34.3	(32.9)	15	60.0	(34.8)	29	26.9	(29.7)	16	23.8	(24.5)
No mobile device	39	12.1	(12.8)	6	11.7	(11.7)	20	12.5	(14.8)	13	11.5	(10.7)

**District response rates were sometimes low for these questions, and it is unclear if the response should have been a "no", is truly missing, or that districts did not know. Please note, mean percent describes the mean of each participating district's reported value.*

Table D31. District-reported mean percentage high school students with access to digital devices as of May 2020

District Inventory Q41.2h. Please estimate the percentage of high school students who had access to digital devices at home as of May 1, 2020.

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)
Chromebooks, laptops, or iPads provided by the district	180	86.7	(25.7)	31	92.5	(12.9)	105	89.3	(24.2)	44	76.4	(32.6)
Chromebooks, laptops, or iPads provided by the student/family	133	52.0	(33.7)	22	35.5	(23.9)	76	56.3	(35.1)	35	53.1	(33.2)
Smartphones only	38	32.9	(36.2)	10	53.0	(41.1)	15	29.3	(34.5)	13	21.5	(30.0)
No mobile device	28	10.7	(8.6)	6	11.7	(7.5)	15	10.7	(9.6)	7	10.0	(8.2)

**District response rates were sometimes low for these questions, and it is unclear if the response should have been a "no", is truly missing, or that districts did not know. Please note, mean percent describes the mean of each participating district's reported value.*

Table D32. District-reported mean percentage high school students with access to digital devices as of Nov 2020

District Inventory Q41.3h. Please estimate the percentage of high school students who had access to digital devices at home as of November 1, 2020.

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)	N*	Mean Percent	(SD)
Chromebooks, laptops, or iPads provided by the district	179	91.2	(22.4)	31	98.1	(4.8)	105	91.0	(23.0)	43	86.7	(27.4)
Chromebooks, laptops, or iPads provided by the student/family	133	52.7	(33.6)	22	38.6	(24.9)	76	56.6	(35.3)	35	53.1	(33.1)
Smartphones only	31	38.7	(39.1)	8	63.7	(38.9)	13	33.1	(39.0)	10	26.0	(33.1)
No mobile device	25	8.8	(8.3)	6	8.3	(4.1)	13	9.2	(10.4)	6	8.3	(7.5)

**District response rates were sometimes low for these questions, and it is unclear if the response should have been a "no", is truly missing, or that districts did not know. Please note, mean percent describes the mean of each participating district's reported value.*

Table D33. Teacher-reported access to 1:1 devices for students by grade level: spring 2020

Teacher Survey Q19_1a. How adequate was your access to 1:1 devices for students in spring 2020?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Extremely inadequate	71	11.5	47	17.8	24	6.8
	Somewhat inadequate	80	13.0	44	16.7	36	10.2
	Neither adequate nor inadequate	21	3.4	8	3.0	13	3.7
	Somewhat adequate	155	25.1	75	28.4	80	22.7
	Extremely adequate	290	47.0	90	34.1	200	56.7
	Total N	617	100.0	264	100.0	353	100.0
Middle school	Extremely inadequate	25	6.8	12	10.2	13	5.2
	Somewhat inadequate	35	9.5	16	13.6	19	7.6
	Neither adequate nor inadequate	8	2.2	2	1.7	6	2.4
	Somewhat adequate	89	24.1	31	26.3	58	23.1
	Extremely adequate	212	57.5	57	48.3	155	61.8
	Total N	369	100.0	118	100.0	251	100.0
High school	Extremely inadequate	42	7.3	21	11.8	21	5.3
	Somewhat inadequate	64	11.1	28	15.7	36	9.1
	Neither adequate nor inadequate	26	4.5	6	3.4	20	5.1
	Somewhat adequate	158	27.5	53	29.8	105	26.5
	Extremely adequate	284	49.5	70	39.3	214	54.0
	Total N	574	100.0	178	100.0	396	100.0
Multiple levels, ungraded, or unknown	Extremely inadequate	16	7.9	11	16.9	5	3.6
	Somewhat inadequate	26	12.8	7	10.8	19	13.8
	Neither adequate nor inadequate	10	4.9	5	7.7	5	3.6
	Somewhat adequate	50	24.6	23	35.4	27	19.6
	Extremely adequate	101	49.8	19	29.2	82	59.4
	Total N	203	100.0	65	100.0	138	100.0

Table D34. Teacher-reported access to 1:1 devices for students by grade level: school year 2020-21

Teacher Survey Q19_1a. How adequate was your access to 1:1 devices for students in 2020-21?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Extremely inadequate	21	3.3	10	3.7	11	3.0
	Somewhat inadequate	28	4.4	19	7.0	9	2.5
	Neither adequate nor inadequate	16	2.5	5	1.8	11	3.0
	Somewhat adequate	121	18.9	65	23.8	56	15.3
	Extremely adequate	453	70.9	174	63.7	279	76.2
	Total N	639	100.0	273	100.0	366	100.0
Middle school	Extremely inadequate	4	1.0	3	2.4	1	.4
	Somewhat inadequate	15	3.9	8	6.5	7	2.7
	Neither adequate nor inadequate	9	2.4	5	4.1	4	1.6
	Somewhat adequate	61	16.0	21	17.1	40	15.5
	Extremely adequate	292	76.6	86	69.9	206	79.8
	Total N	381	100.0	123	100.0	258	100.0
High school	Extremely inadequate	13	2.3	6	3.4	7	1.8
	Somewhat inadequate	21	3.7	12	6.8	9	2.3
	Neither adequate nor inadequate	19	3.3	9	5.1	10	2.5
	Somewhat adequate	119	20.8	39	22.0	80	20.3
	Extremely adequate	400	69.9	111	62.7	289	73.2
	Total N	572	100.0	177	100.0	395	100.0
Multiple levels, ungraded, or unknown	Extremely inadequate	2	.9	2	3.0	0	.0
	Somewhat inadequate	9	4.3	4	6.0	5	3.5
	Neither adequate nor inadequate	7	3.3	4	6.0	3	2.1
	Somewhat adequate	53	25.1	24	35.8	29	20.1
	Extremely adequate	140	66.4	33	49.3	107	74.3
	Total N	211	100.0	67	100.0	144	100.0

Table D35. District-reported changes over time in the mean percent of students with sufficient internet access to participate in online learning

District Inventory: Q23. Please provide your best guess for what percentage of students had sufficient internet access for full participation in online learning as of the following dates.

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
March 1, 2020	217	78.8	(19.5)	29	69.0	(25.3)	140	82.7	(14.4)	48	73.3	(24.8)
May 1, 2020	220	88.4	(14.7)	32	79.5	(18.4)	140	91.0	(11.3)	48	86.5	(18.3)
November 1, 2020	219	94.5	(10.0)	32	93.0	(9.1)	139	96.3	(5.7)	48	90.2	(16.8)

Please note, Mean Percent describes the mean of each participating district's reported value.

Table D36. District-reported changes over time in the mean percent of students who would have had sufficient internet access for full participation in online learning without district action

District Inventory: Q25. Please provide your best guess for what percentage of students would have had sufficient internet access for full participation in online learning as of the following dates without district action.

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
March 1, 2020	216	76.1	(20.2)	29	63.8	(23.7)	139	79.8	(17.0)	48	72.7	(23.1)
May 1, 2020	220	78.5	(20.8)	32	63.4	(25.4)	140	81.8	(18.1)	48	79.0	(21.2)
November 1, 2020	219	81.0	(20.2)	32	65.9	(26.3)	139	84.4	(17.0)	48	81.2	(19.9)

Please note, mean percent describes the mean of each participating district's reported value.

Table D37. District-reported efforts to improve internet access in students' homes

District Inventory: Q24. Describe what your district has done since the beginning of the pandemic, if anything, to improve internet access in students' homes.

Following the transition to remote learning, school districts worked to ensure that all students had adequate internet access to participate. As reported by 122 districts, the primary method of doing so was to purchase and provide mobile hotspots for students that needed them. The specific program mentioned most often was a collaboration with the company Kajeet, which aided in providing

mobile hotspots to households in need. Some districts reported that although they had hotspots available, there wasn't a great need for them, and many were never used. Another way that districts contributed to increasing internet connectivity was through collaboration with local companies and programs, an effort that was communicated by 64 districts. Districts made use of CT state programs, such as the Everybody Learns initiative, to increase their students' connectivity and engagement. Another common strategy was collaboration with cable/internet providers, including but not limited to Xfinity, Charter, Optimum, Atlantic Broadband, Spectrum, and more. An additional area of interest was increasing the amount of public Wi-Fi areas within the district's domain for students that didn't have and couldn't get Wi-Fi in their homes. Schools also provided waivers for free or low-cost internet to students, and districts made sure to share information about the availability of free or low-cost internet programs. Despite these resources, there were several districts that discussed barriers to access. Some homes were too far into rural areas to be connected to the internet or covered by cell service. Some families who lacked internet access did not qualify for support. In addition to efforts to increase students' internet access, districts also contributed other resources to support remote learning. There were 14 districts that mentioned they provided devices for students, primarily Chromebooks, to ensure that they could have a 1:1 connection with students.

Table D38. Teacher-reported technology challenges

Teacher survey Q36. Is there anything else you'd like to share about your experiences as a Connecticut teacher during the COVID-19 pandemic?

Teacher survey respondents indicated a variety of concerns about student access to technology through the open-ended question at the end of the survey. Some teachers said that students had access to outdated computers or no access to computers making it difficult for students to learn. Teachers reported that unreliable internet connections also negatively impacted the student experience. Respondents noted that learning how to use new technology was especially difficult for younger students, with many teachers stating that teaching students to use technology took time away from teaching curriculum material. Other teachers raised concerns about the long-term effect of students' inappropriate use of technology to do their homework. One teacher stated that technology was affecting "students' attention spans and their ability to think, reason, and interact with challenging material." Another teacher reported that "students no longer have the patience nor the motivation to engage with curriculum on a deeper and more meaningful level." While this teacher believes there are benefits to using technology for student learning, they caution that "an over-reliance on using computers in the classroom and at home … incentivizes cheating, depersonalizes instruction, promotes distractions and precipitates social/emotional anxiety." Other teachers reported that school districts provided students with adequate computers and ensured they had free internet access when needed. Some respondents said that students learned how to use a variety of technologies to engage with academic material.

Research Question 2c. What resources were available to support students' physical and emotional well-being during the pandemic, compared to before the pandemic?

Table D39. District-reported availability of free meals by grade level prior to the COVID-19 pandemic

District Inventory: Q4_10emh. For which of the following grade levels did your district offer free meals to all students prior to the COVID-19 pandemic (before March 2020)? Please select all that apply.

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	65	29.4	27	84.4	26	18.3	12	25.5
Middle school	64	29.0	25	78.1	25	17.6	14	29.8
High School	58	26.2	22	68.8	18	12.7	18	38.3
None of the above/Not applicable	145	65.6	5	15.6	112	78.9	28	59.6
Total N	221	100.0	32	100.0	142	100.0	47	100.0

Table D40. District-reported strategies for providing nutrition support to students during spring 2020

District Inventory: Q11. During spring 2020, which of the following strategies, if any, did your district use to provide nutrition support for students?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Offered free take-away meals to all students	156	71.2	30	93.8	122	87.8	4	8.3
Delivered school meals or groceries to students' homes	75	34.2	19	59.4	46	33.1	10	20.8
Supported enrollment in TANIF, etc.	11	5.0	3	9.4	7	5.0	1	2.1
Other (please describe):	36	16.4	4	12.5	16	11.5	16	33.3
None of the above	23	10.5	0	.0	1	.7	22	45.8
Total N	219	100.0	32	100.0	139	100.0	48	100.0

The 36 districts that used the open-text option to describe "other" strategies they used to provide nutrition support to students during spring 2020 emphasized collaboration and referrals. Some districts used this open-text option to note that they were providing free take-away meals for those students eligible for free and reduced meals, rather than for all students. Some districts reported that they

offered grocery pickup or collaborated with food pantries or with other local towns and districts that were distributing food. When districts were not providing nutrition themselves, they often referred students and families to other programs available in the community; this was particularly common among APSEPs, RESCs, and charter districts.

Table D41. District-reported strategies for providing nutrition support to students during the 2020-21 school year
District Inventory: Q19. During the 2020-21 school year, which of the following strategies, if any, did your district use to provide nutrition support for students?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Offered free in-school meals to all students	177	81.6	31	96.9	126	92.0	20	41.7
Offered free take-away meals to all students	104	47.9	25	78.1	77	56.2	2	4.2
Offered free take-away meals to students who were learning remotely	135	62.2	30	93.8	103	75.2	2	4.2
Delivered school meals or groceries to students' homes	54	24.9	16	50.0	33	24.1	5	10.4
Supported enrollment in TANIF, etc.	14	6.5	4	12.5	9	6.6	1	2.1
Other (please describe):	26	12.0	2	6.3	8	5.8	16	33.3
None of the above	19	8.8	0	.0	3	2.2	16	33.3
Total N	217	100.0	32	100.0	137	100.0	48	100.0

The 26 districts that used the open-text option to describe "other" strategies they used to provide nutrition support to students during the 2020-21 school year provided a variety of responses. Just as in the spring of 2020, some districts mentioned they only provided free meals to students that qualified for free and reduced meals, not all students. As in the spring, several districts reported that they collaborated with local food pantries to provide for their families. Some districts emphasized creative or unique methods of ensuring nutrition support for students. For example, one district reported that bus stops throughout the city were used to deliver meals to students as they attended school from home. Another district reported that they gave students breakfast foods to take home and eat before coming to school because the district couldn't ensure adequate social distancing for students to eat breakfast at school.

Table D42. District-reported allocation of resources for social services referrals in spring 2020

District Inventory: Q12. In spring 2020, how did your district's allocation of resources for referrals to social services (for example, physical or behavioral health care, nutrition assistance, housing assistance) compare to before the pandemic?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Allocated a lot less resources	6	2.7	1	3.1	4	2.9	1	2.0
Allocated somewhat less resources	16	7.2	3	9.4	10	7.2	3	6.0
Allocated a similar amount of resources	121	54.8	12	37.5	77	55.4	32	64.0
Allocated somewhat more resources	53	24.0	11	34.4	34	24.5	8	16.0
Allocated a lot more resources	25	11.3	5	15.6	14	10.1	6	12.0
Total N	221	100.0	32	100.0	139	100.0	50	100.0

Table D43. District-reported number of social services referrals in spring 2020

District Inventory: Q13. In spring 2020, how did the number of students referred for social services (for example, physical or behavioral health care, nutrition assistance, housing assistance) compare to before the pandemic?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
A lot fewer students	15	6.9	1	3.1	11	8.0	3	6.1
Somewhat fewer students	22	10.1	9	28.1	10	7.3	3	6.1
About the same number of students	106	48.6	4	12.5	67	48.9	35	71.4
Somewhat more students	56	25.7	14	43.8	39	28.5	3	6.1
A lot more students	19	8.7	4	12.5	10	7.3	5	10.2
Total N	218	100.0	32	100.0	137	100.0	49	100.0

Table D44. District-reported efforts to connect students to social services in spring 2020
District Inventory: Q14. During spring 2020, what was your district doing to connect students to social services agencies?

Districts reported that their efforts to connect students to social services in the spring of 2020 typically involved following their normal processes, but with an increase in personal outreach from staff to students and families due to the shift to virtual learning. For example, referrals conducted through 211 and referrals to outside agencies followed the typical processes. There were 38 districts that mentioned collaborations with local agencies, especially with their local youth and family services agency. To maintain mental health services during this period, a number of districts reported that they partnered with local agencies for mental health and medical support or supported students through school-based health centers and clinicians; virtual services like telehealth appointments were made available in many cases. That being said, four districts explicitly noted that due to the pandemic, social services in their area were limited as a result of local agencies being closed or only offering minimal services. In terms of informing students and families about available resources, 29 districts reported that they conducted active personal outreach to their students and families and 11 reported passive personal outreach, such as robocalls, email newsletters, and resources listed on the district website. Active outreach was a commonly mentioned strategy for maintaining personal connections with students and families; many districts utilized teachers, counselors, and social workers to directly email and call students and families (especially for disengaged or absent students) and ensure that they were connected to the appropriate resources. Some districts (11 responses) indicated that social workers and counselors attempted to carry out home visits to students that were disengaged, while other districts reported that home visits were not feasible due to health concerns and unwilling families. For the spring of 2020, several districts mentioned that the COVID-19 shutdowns made it challenging for students to access social services.

Table D45. District-reported allocation of resources for social services referrals in school year 2020-21

District Inventory: Q20. During the 2020-21 school year, how did your district's allocation of resources for referrals to social services (for example, physical or behavioral health care, nutrition assistance, housing assistance) compared to spring 2020?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Allocated a lot less resources	1	.5	1	3.2	0	.0	0	.0
Allocated somewhat less resources	3	1.4	0	.0	0	.0	3	6.1
Allocated a similar amount of resources	94	43.7	7	22.6	53	39.3	34	69.4
Allocated somewhat more resources	89	41.4	15	48.4	66	48.9	8	16.3
Allocated a lot more resources	28	13.0	8	25.8	16	11.9	4	8.2
Total N	215	100.0	31	100.0	135	100.0	49	100.0

Table D46. District-reported number of social services referrals in school year 2020-21

District Inventory: Q21. During the 2020-21 school year, how did the number of students referred for social services (for example, physical or behavioral health care, nutrition assistance, housing assistance) compare to spring 2020?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
A lot fewer students	2	.9	1	3.2	0	.0	1	2.0
Somewhat fewer students	4	1.9	1	3.2	2	1.5	1	2.0
About the same number of students	78	36.1	6	19.4	35	25.7	37	75.5
Somewhat more students	97	44.9	14	45.2	77	56.6	6	12.2
A lot more students	35	16.2	9	29.0	22	16.2	4	8.2
Total N	216	100.0	31	100.0	136	100.0	49	100.0

Table D47. District-reported efforts to connect students to social services during school year 2020-21
District Inventory: Q22. During the 2020-21 school year, what was your district doing to connect students to social services agencies?

Via the district inventory, districts reported that 2020-21 school year efforts to connect students to social services were largely focused on mental health support and often relied on individualized outreach. For example, 47 districts reported collaborating with or making referrals to local social service agencies. Districts reported a heightened emphasis on implementing school-based mental healthcare on the school level and partnering with local mental health support agencies at the district level. Districts reported that mental health services were embedded within the school system in the form of counseling teams, mental health clinicians, and school-based health centers. Whereas the COVID-19 shutdowns made it challenging for students to access social services in the spring of 2020, districts reported that limited resources available in rural areas of Connecticut were the main barrier to access to social services during the 2020-21 school year. Districts that discussed referrals stressed the importance of social workers, teachers, and counselors maintaining active communications and individual connections with students, and then using existing processes to refer them to any necessary services. In terms of the dissemination of information about available resources, districts reported that beyond sharing information through newsletters and the district and school websites, they asked teachers, counselors, and social workers to actively seek out students that they thought needed additional support and personally reach out to students and families, sometimes even daily. There were 12 districts that mentioned conducting home visits. In general, home visits were completed primarily by school social workers and counselors. Some districts reported that they increased home visits during this time period, and some reported issues with conducting home visits, such as concerns for health or unwillingness from the family.

Table D48. District-reported changes by grade level in students' participation in counseling meetings

District Inventory: Q46emh_1r. To the best of your knowledge, how common were counseling meetings (e.g., virtual or in-person meetings of counselors, social workers, or therapists and students to provide mental health services) with students from the following grade levels during the pandemic, compared to before the pandemic?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	Much less common	2	1.1	0	.0	0	.0	2	6.9
	Somewhat less common	13	7.0	1	3.1	9	7.2	3	10.3
	About the same	73	39.2	10	31.3	46	36.8	17	58.6
	Somewhat more common	65	34.9	14	43.8	46	36.8	5	17.2
	Much more common	33	17.7	7	21.9	24	19.2	2	6.9
	Total N	186	100.0	32	100.0	125	100.0	29	100.0
Middle School	Much less common	2	1.1	0	.0	0	.0	2	5.9
	Somewhat less common	8	4.5	2	6.5	4	3.5	2	5.9
	About the same	64	35.8	10	32.3	35	30.7	19	55.9
	Somewhat more common	63	35.2	10	32.3	46	40.4	7	20.6
	Much more common	42	23.5	9	29.0	29	25.4	4	11.8
	Total N	179	100.0	31	100.0	114	100.0	34	100.0
High School	Much less common	1	.6	0	.0	0	.0	1	2.4
	Somewhat less common	9	5.4	2	6.7	4	4.2	3	7.3
	About the same	54	32.3	10	33.3	24	25.0	20	48.8
	Somewhat more common	60	35.9	9	30.0	40	41.7	11	26.8
	Much more common	43	25.7	9	30.0	28	29.2	6	14.6
	Total N	167	100.0	30	100.0	96	100.0	41	100.0

Table D49. District-reported SEL programs/approaches used by elementary schools during 2019-20 and 2020-21

District Inventory: Q47e_1. What social and emotional learning (SEL) program/approach were your elementary schools using, if any, during the following school years?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
2019-20	4Rs	2	1.1	1	3.0	0	.0	1	3.8
	MindUp	5	2.8	0	.0	5	4.1	0	.0
	PATHS	1	.6	0	.0	1	.8	0	.0
	PBIS	102	56.4	25	75.8	63	51.6	14	53.8
	Responsive Classroom	84	46.4	14	42.4	66	54.1	4	15.4
	Restorative Practices	78	43.1	17	51.5	50	41.0	11	42.3
	RULER	49	27.1	14	42.4	35	28.7	0	.0
	Second Step	85	47.0	22	66.7	61	50.0	2	7.7
	Other (please describe):	32	17.7	8	24.2	15	12.3	9	34.6
	None	2	1.1	0	.0	1	.8	1	3.8
	Total N	181	100.0	33	100.0	122	100.0	26	100.0
2020-21	4Rs	2	1.1	1	3.0	0	.0	1	3.8
	MindUp	5	2.7	0	.0	5	4.0	0	.0
	PATHS	1	.5	0	.0	1	.8	0	.0
	PBIS	93	50.8	24	72.7	58	46.8	11	42.3
	Responsive Classroom	84	45.9	15	45.5	65	52.4	4	15.4
	Restorative Practices	83	45.4	18	54.5	54	43.5	11	42.3
	RULER	57	31.1	15	45.5	41	33.1	1	3.8
	Second Step	88	48.1	24	72.7	62	50.0	2	7.7
	Other (please describe):	43	23.5	8	24.2	25	20.2	10	38.5
	None	2	1.1	0	.0	1	.8	1	3.8
	Total N	183	100.0	33	100.0	124	100.0	26	100.0

Table D50. District-reported SEL programs/approaches used by middle schools during 2019-20 and 2020-21

District Inventory: Q47m_1. What social and emotional learning (SEL) program/approach were your middle schools using, if any, during the following school years?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
2019-20	4Rs	1	.6	0	.0	0	.0	1	3.3
	MindUp	3	1.8	0	.0	2	1.9	1	3.3
	PATHS	2	1.2	0	.0	1	1.0	1	3.3
	PBIS	78	47.9	17	58.6	45	43.3	16	53.3
	Responsive Classroom	37	22.7	5	17.2	26	25.0	6	20.0
	Restorative Practices	88	54.0	22	75.9	52	50.0	14	46.7
	RULER	37	22.7	11	37.9	26	25.0	0	.0
	Second Step	39	23.9	8	27.6	29	27.9	2	6.7
	Other (please describe):	33	20.2	6	20.7	16	15.4	11	36.7
	None	5	3.1	0	.0	5	4.8	0	.0
	Total N	163	100.0	29	100.0	104	100.0	30	100.0
2020-21	4Rs	1	.6	0	.0	0	.0	1	3.2
	MindUp	3	1.8	0	.0	2	1.9	1	3.2
	PATHS	2	1.2	0	.0	1	.9	1	3.2
	PBIS	73	43.2	17	54.8	42	39.3	14	45.2
	Responsive Classroom	39	23.1	6	19.4	27	25.2	6	19.4
	Restorative Practices	100	59.2	24	77.4	61	57.0	15	48.4
	RULER	44	26.0	12	38.7	31	29.0	1	3.2
	Second Step	42	24.9	10	32.3	30	28.0	2	6.5
	Other (please describe):	39	23.1	6	19.4	20	18.7	13	41.9
	None	5	3.0	0	.0	5	4.7	0	.0
	Total N	169	100.0	31	100.0	107	100.0	31	100.0

Table D51. District-reported SEL programs/approaches used by high schools during 2019-20 and 2020-21

District Inventory: Q47h 1. What social and emotional learning (SEL) program/approach were your high schools using, if any, during the following school years?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
2019-20	4Rs	0	.0	0	.0	0	.0	0	.0
	MindUp	2	1.4	0	.0	0	.0	2	5.7
	PATHS	3	2.1	0	.0	1	1.2	2	5.7
	PBIS	62	43.1	13	48.1	30	36.6	19	54.3
	Responsive Classroom	17	11.8	2	7.4	7	8.5	8	22.9
	Restorative Practices	79	54.9	20	74.1	44	53.7	15	42.9
	RULER	27	18.8	7	25.9	20	24.4	0	.0
	Second Step	15	10.4	6	22.2	7	8.5	2	5.7
	Other (please describe):	28	19.4	3	11.1	14	17.1	11	31.4
	None	6	4.2	0	.0	6	7.3	0	.0
	Total N	144	100.0	27	100.0	82	100.0	35	100.0
2020-21	4Rs	0	.0	0	.0	0	.0	0	.0
	MindUp	2	1.3	0	.0	0	.0	2	5.4
	PATHS	3	2.0	0	.0	1	1.1	2	5.4
	PBIS	60	39.2	13	44.8	28	32.2	19	51.4
	Responsive Classroom	19	12.4	3	10.3	8	9.2	8	21.6
	Restorative Practices	89	58.2	21	72.4	53	60.9	15	40.5
	RULER	33	21.6	8	27.6	25	28.7	0	.0
	Second Step	16	10.5	6	20.7	7	8.0	3	8.1
	Other (please describe):	33	21.6	3	10.3	17	19.5	13	35.1
	None	6	3.9	0	.0	6	6.9	0	.0
	Total N	153	100.0	29	100.0	87	100.0	37	100.0

Table D52. Teacher-reported school support by grade level for students' physical health in 2020-21

Teacher Survey Q24_1. In your opinion, how adequately did your school support students' physical health during the 2020-21 school year?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Support was extremely inadequate	88	10.2	50	13.7	38	7.6
	Support was somewhat inadequate	140	16.2	67	18.4	73	14.7
	Support was neither adequate nor inadequate	216	25.1	99	27.2	117	23.5
	Support was somewhat adequate	277	32.1	108	29.7	169	33.9
	Support was extremely adequate	141	16.4	40	11.0	101	20.3
	Total N	862	100.0	364	100.0	498	100.0
Middle school	Support was extremely inadequate	34	6.6	13	8.0	21	6.0
	Support was somewhat inadequate	107	20.8	40	24.5	67	19.0
	Support was neither adequate nor inadequate	137	26.6	42	25.8	95	27.0
	Support was somewhat adequate	147	28.5	44	27.0	103	29.3
	Support was extremely adequate	90	17.5	24	14.7	66	18.8
	Total N	515	100.0	163	100.0	352	100.0
High school	Support was extremely inadequate	84	10.6	37	15.2	47	8.5
	Support was somewhat inadequate	169	21.2	64	26.2	105	19.0
	Support was neither adequate nor inadequate	212	26.6	64	26.2	148	26.8
	Support was somewhat adequate	231	29.0	53	21.7	178	32.2
	Support was extremely adequate	100	12.6	26	10.7	74	13.4
	Total N	796	100.0	244	100.0	552	100.0
Multiple levels, ungraded, or unknown	Support was extremely inadequate	23	7.8	13	13.1	10	5.2
	Support was somewhat inadequate	51	17.4	18	18.2	33	17.0
	Support was neither adequate nor inadequate	85	29.0	30	30.3	55	28.4
	Support was somewhat adequate	79	27.0	28	28.3	51	26.3
	Support was extremely adequate	55	18.8	10	10.1	45	23.2
	Total N	293	100.0	99	100.0	194	100.0

Table D53. Teacher-reported school support by grade level for students' social-emotional well-being in 2020-21

Teacher Survey Q24_3. In your opinion, how adequately did your school support students social and emotional well-being during the 2020-21 school year?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Support was extremely inadequate	111	12.9	67	18.4	44	8.9
	Support was somewhat inadequate	222	25.8	92	25.3	130	26.2
	Support was neither adequate nor inadequate	140	16.3	63	17.3	77	15.5
	Support was somewhat adequate	286	33.2	105	28.8	181	36.4
	Support was extremely adequate	102	11.8	37	10.2	65	13.1
	Total N	861	100.0	364	100.0	497	100.0
Middle school	Support was extremely inadequate	80	15.5	34	20.9	46	13.1
	Support was somewhat inadequate	133	25.8	44	27.0	89	25.3
	Support was neither adequate nor inadequate	90	17.5	23	14.1	67	19.0
	Support was somewhat adequate	158	30.7	45	27.6	113	32.1
	Support was extremely adequate	54	10.5	17	10.4	37	10.5
	Total N	515	100.0	163	100.0	352	100.0
High school	Support was extremely inadequate	99	12.4	47	19.3	52	9.4
	Support was somewhat inadequate	211	26.5	70	28.7	141	25.5
	Support was neither adequate nor inadequate	155	19.5	44	18.0	111	20.1
	Support was somewhat adequate	255	32.0	63	25.8	192	34.8
	Support was extremely adequate	76	9.5	20	8.2	56	10.1
	Total N	796	100.0	244	100.0	552	100.0
Multiple levels, ungraded, or unknown	Support was extremely inadequate	40	13.6	15	15.0	25	12.9
	Support was somewhat inadequate	66	22.4	24	24.0	42	21.6
	Support was neither adequate nor inadequate	45	15.3	14	14.0	31	16.0
	Support was somewhat adequate	111	37.8	35	35.0	76	39.2
	Support was extremely adequate	32	10.9	12	12.0	20	10.3
	Total N	294	100.0	100	100.0	194	100.0

Table D54. Teacher-reported support for students' physical and emotional well-being
Teacher survey Q36. Is there anything else you'd like to share about your experiences as a Connecticut teacher during the COVID-19 pandemic?

Impacts on Students: Basic Needs
Responses to the open-text question at the end of the teacher survey revealed that students had difficulty accessing basic needs like housing and food. One teacher highlighted that families were uncomfortable accessing support for meeting their basic needs, even when supports were available to students. Other teachers reported that their schools did a great job in ensuring all students' basic needs were met.

Student Impacts: Socio-Emotional Well-Being and Mental Health
In their responses to the open-text teacher survey question, some teachers reported inadequate support for students' emotional well-being. One teacher said, "schools have started SEL initiatives to be able to say that they are doing something but eventually have stopped any programs they do because it has been checked off the list." Another teacher described the inadequate support by commenting, "my school has 2 guidance counselors, 1 school psychologist and 0 social workers…for 3 grades of middle school. It is not enough!"

Appendix E: Supports for teachers (Research Goal 3)

Research Question 3a. What do administrators and teachers say about how the pandemic and the resources provided affected teaching and teacher well-being?

Table E1. District-reported staffing adjustments/reassignments in spring 2020
District Inventory Q9. Please describe any adjustments/reassignments you made to staffing to accommodate the pivot to remote learning in March of 2020 due to the emergency response to COVID-19.

When asked to describe staffing adjustments in the spring of 2020, the topic referenced most frequently (by 49 districts) was shifts in job responsibilities or reassignments to new job roles as a result of the sudden shift to remote learning. Because all learning was remote in spring 2020, teachers generally remained in their roles whereas auxiliary staff were reassigned. For example, interventionists and paraeducators prepared class materials, provided online classroom support, and maintained 1-on-1 contact with individual students. Media specialists, IT staff, and technology coaches were often shifted to support teachers and students in working with remote-learning technology. Nine districts mentioned an increase in professional development and technology training for these auxiliary staff to allow them to support instruction, and six districts reported providing devices (such as Chromebooks) to certain staff to support remote learning. Other responsibilities of these staff included the delivery of classroom materials, technology, and meals to student homes. Outside of the districts that reported these reassignments, 17 districts explicitly mentioned that no staffing adjustments were necessary or occurred in the spring of 2020. Five districts described hiring of new staff, primarily substitute teachers or technology supports. Several districts noted that the majority of staffing changes resulting from the pandemic did not occur in the immediate emergency response, but rather in the following school year as districts adjusted to new learning models. There were also some adjustments to the schedule noted, primarily a shortened school day or a shortened amount of instructional time. When instructional time was shortened, the remainder of the time was dedicated to small group interaction or asynchronous work.

Table E2. District-reported staffing adjustments/reassignments in fall 2020
District Inventory Q17. Please describe any adjustments/reassignments you made to staffing to accommodate remote learning in fall 2020.

As opposed to the spring of 2020, the primary fall 2020 staffing adjustment theme reported by districts was the hiring of new staff, which was discussed by 54 districts. Additional teachers were hired primarily to take on the responsibility of teaching fully remote students, although some districts reported hiring additional substitute and floater teachers to support quarantined teachers. Additional support staff were also hired to support remote learners, such as paraeducators, tutors, and technology specialists. Some districts hired extra security guards and custodians to promote COVID-19 safety. Staff reassignments were also common during this period, as was

referenced by 32 districts. Many teachers were reassigned from in-person teaching positions to remote teaching positions, and some teachers were assigned to cover additional sections. Many auxiliary staff members, like library media specialists, technology specialists, interventionists, and arts/PE teachers were reassigned to both virtual and in-person teaching positions. These employees were sometimes assigned to individual students to provide academic and social-emotional support. Some districts that attempted to fill new positions to support virtual learning reported that hiring was unsuccessful. Eight districts reported schedule adjustments, primarily to support hybrid/remote models of learning. Multiple districts reported that the school day or instructional time was shortened to provide time for small-group interaction or time for teachers to connect with remote students.

Table E3. District-reported summer 2020 preparation for fall 2020: safety-related activities

District Inventory Q15_1, Q15_2, Q15_5, Q15_6. Which of the following activities did your district conduct between the last student day of spring 2020 and students' return to school in fall 2020? Please select all that apply.

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Building improvements (ventilation, air purification devices, directional signs)	206	92.4	31	96.9	132	93.6	43	86.0
Purchase of safety equipment (PPE, e.g., shields, masks)	222	99.6	32	100.0	141	100.0	49	98.0
Hiring additional personnel (e.g., tutors, counselors, etc.)	127	57.0	26	81.3	92	65.2	9	18.0
COVID safety training for school personnel	213	95.5	32	100.0	133	94.3	48	96.0
Other (please describe):	45	20.2	11	34.4	29	20.6	5	10.0
None of the above	21	9.4	4	12.5	11	7.8	6	12.0
Total N	223	100.0	32	100.0	141	100.0	50	100.0

Of the 45 districts that indicated that they used other strategies to prepare for the 2020-21 school year, several reported safety-related activities that supported teacher well-being. For example, a number of districts reported that they engaged stakeholders (mainly staff and parents) in planning for the fall semester. This included forming committees of any interested parties, conducting listening sessions with families and staff, and holding virtual parent presentations to ensure that parent, student, and staff feedback was considered. It was important to many districts that they create a district-wide return plan for maximizing safety while returning to in-person learning.

Table E4. Teacher-reported teaching challenges in 2020-21 (elementary school teachers)

Teacher Survey Q18. Rate each of the following areas in terms of how difficult it was to achieve during the 2020-2021 school year, compared to before the pandemic.

	District Type								
	Overall			Alliance districts			Non-Alliance districts		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Facilitating student engagement	956	5.6	(1.3)	396	5.5	(1.5)	560	5.6	(1.2)
Eliciting student participation during instruction	956	5.5	(1.3)	399	5.5	(1.4)	557	5.4	(1.2)
Motivating students to complete assignments	951	5.6	(1.3)	397	5.6	(1.4)	554	5.6	(1.2)
Ensuring student access to instructional materials (for example, textbooks, videos, other media, etc.)	956	5.4	(1.3)	399	5.3	(1.4)	557	5.4	(1.3)
Learning about each student's individual interests, strengths, and needs	957	5.0	(1.4)	398	5.0	(1.5)	559	5.1	(1.4)
Setting learning goals	958	5.1	(1.2)	396	5.0	(1.3)	562	5.1	(1.2)
Viewing, collecting, or analyzing student work (e.g., student math solutions, student writing pieces)	952	5.4	(1.4)	396	5.4	(1.5)	556	5.4	(1.3)
Conducting formative assessments (for example, to guide daily teaching, student personalization, etc.)	952	5.5	(1.4)	396	5.4	(1.5)	556	5.5	(1.3)
Preparing students for summative assessments (high stakes tests and unit tests)	949	5.6	(1.3)	396	5.6	(1.4)	553	5.6	(1.2)
Adjusting instruction to accommodate individualized education plans (IEPs)	957	5.5	(1.3)	399	5.5	(1.4)	558	5.5	(1.3)
Accessing resources, supports, and specialized assistance and services to meet students learning differences or needs (for example, students with disabilities or English learners)	953	5.5	(1.3)	396	5.5	(1.4)	557	5.5	(1.3)
Establishing and using small group instruction (for example, breakout groups, reading groups, stations, jigsaw, etc.)	955	5.7	(1.5)	397	5.5	(1.6)	558	5.8	(1.3)
Delivering course content (for example, direct instruction, presentations)	956	5.4	(1.3)	397	5.3	(1.4)	559	5.5	(1.3)
Establishing and maintaining classroom norms and behavior expectations	952	5.2	(1.4)	397	5.1	(1.5)	555	5.4	(1.3)
Lesson planning (including selecting/securing resources, preparing materials, coordinating with colleagues, etc.)	952	5.4	(1.5)	397	5.1	(1.6)	555	5.6	(1.4)
Adjusting instruction in real-time to respond to student needs and reactions	952	5.5	(1.3)	396	5.4	(1.4)	556	5.5	(1.3)
Coping with unexpected challenges or interruptions during teaching (for example, technology issues, student illness, etc.)	956	5.9	(1.2)	397	5.8	(1.3)	559	6.0	(1.2)
Promoting social and emotional learning	955	5.5	(1.4)	396	5.5	(1.5)	559	5.5	(1.4)
Collaborating with families to promote learner growth and development	958	4.9	(1.5)	395	4.9	(1.5)	563	4.9	(1.4)
Collaborating with colleagues to promote learner growth and development	959	5.0	(1.4)	399	4.8	(1.5)	560	5.1	(1.4)

Please note, these items range from 1-7, with 1 = Immensely easier to 7 = Immensely harder

Table E5. Teacher-reported teaching challenges in 2020-21 (middle school teachers)

Teacher Survey Q18. Rate each of the following areas in terms of how difficult it was to achieve during the 2020-2021 school year, compared to before the pandemic.

	District Type								
	Overall			Alliance districts			Non-Alliance districts		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Facilitating student engagement	554	5.8	(1.3)	177	5.6	(1.5)	377	5.9	(1.2)
Eliciting student participation during instruction	558	5.8	(1.3)	178	5.6	(1.6)	380	5.9	(1.2)
Motivating students to complete assignments	558	5.9	(1.3)	178	5.6	(1.5)	380	6.0	(1.2)
Ensuring student access to instructional materials (for example, textbooks, videos, other media, etc.)	558	4.8	(1.5)	178	4.7	(1.7)	380	4.9	(1.4)
Learning about each student's individual interests, strengths, and needs	557	5.4	(1.3)	177	5.1	(1.6)	380	5.5	(1.2)
Setting learning goals	556	5.0	(1.2)	177	4.7	(1.4)	379	5.1	(1.1)
Viewing, collecting, or analyzing student work (e.g., student math solutions, student writing pieces)	555	4.9	(1.5)	177	4.7	(1.7)	378	5.0	(1.4)
Conducting formative assessments (for example, to guide daily teaching, student personalization, etc.)	556	5.1	(1.4)	176	4.9	(1.7)	380	5.2	(1.2)
Preparing students for summative assessments (high stakes tests and unit tests)	554	5.6	(1.2)	175	5.4	(1.4)	379	5.6	(1.1)
Adjusting instruction to accommodate individualized education plans (IEPs)	554	5.3	(1.4)	176	5.2	(1.7)	378	5.4	(1.2)
Accessing resources, supports, and specialized assistance and services to meet students learning differences or needs (for example, students with disabilities or English learners)	554	5.3	(1.4)	176	5.2	(1.6)	378	5.3	(1.2)
Establishing and using small group instruction (for example, breakout groups, reading groups, stations, jigsaw, etc.)	555	5.7	(1.5)	177	5.4	(1.8)	378	5.8	(1.3)
Delivering course content (for example, direct instruction, presentations)	555	5.3	(1.4)	177	5.1	(1.5)	378	5.4	(1.3)
Establishing and maintaining classroom norms and behavior expectations	557	5.1	(1.6)	176	4.7	(1.8)	381	5.3	(1.4)
Lesson planning (including selecting/securing resources, preparing materials, coordinating with colleagues, etc.)	558	5.2	(1.5)	176	4.8	(1.7)	382	5.3	(1.3)
Adjusting instruction in real-time to respond to student needs and reactions	558	5.3	(1.4)	178	4.9	(1.6)	380	5.5	(1.2)
Coping with unexpected challenges or interruptions during teaching (for example, technology issues, student illness, etc.)	559	5.7	(1.3)	178	5.5	(1.5)	381	5.9	(1.2)
Promoting social and emotional learning	556	5.4	(1.5)	177	5.0	(1.8)	379	5.6	(1.4)
Collaborating with families to promote learner growth and development	557	5.1	(1.4)	176	4.9	(1.6)	381	5.2	(1.2)
Collaborating with colleagues to promote learner growth and development	557	4.8	(1.4)	177	4.6	(1.6)	380	4.9	(1.3)

Please note, these items range from 1-7, with 1 = Immensely easier to 7 = Immensely harder

Table E6. Teacher-reported teaching challenges in 2020-21 (high school teachers)

Teacher Survey Q18. Rate each of the following areas in terms of how difficult it was to achieve during the 2020-2021 school year, compared to before the pandemic.

	District Type								
	Overall			Alliance districts			Non-Alliance districts		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Facilitating student engagement	840	6.1	(1.2)	257	6.0	(1.3)	583	6.1	(1.2)
Eliciting student participation during instruction	840	6.1	(1.3)	255	6.0	(1.4)	585	6.1	(1.2)
Motivating students to complete assignments	839	6.0	(1.2)	256	6.0	(1.3)	583	6.0	(1.1)
Ensuring student access to instructional materials (for example, textbooks, videos, other media, etc.)	840	4.9	(1.4)	258	4.8	(1.5)	582	5.0	(1.4)
Learning about each student's individual interests, strengths, and needs	844	5.6	(1.4)	258	5.5	(1.4)	586	5.7	(1.3)
Setting learning goals	842	5.1	(1.2)	259	5.0	(1.3)	583	5.1	(1.2)
Viewing, collecting, or analyzing student work (e.g., student math solutions, student writing pieces)	840	4.9	(1.5)	257	4.8	(1.6)	583	5.0	(1.5)
Conducting formative assessments (for example, to guide daily teaching, student personalization, etc.)	841	5.4	(1.3)	258	5.2	(1.4)	583	5.4	(1.3)
Preparing students for summative assessments (high stakes tests and unit tests)	840	5.7	(1.2)	258	5.6	(1.2)	582	5.7	(1.1)
Adjusting instruction to accommodate individualized education plans (IEPs)	836	5.4	(1.3)	256	5.3	(1.4)	580	5.4	(1.3)
Accessing resources, supports, and specialized assistance and services to meet students learning differences or needs (for example, students with disabilities or English learners)	839	5.3	(1.3)	256	5.3	(1.4)	583	5.3	(1.3)
Establishing and using small group instruction (for example, breakout groups, reading groups, stations, jigsaw, etc.)	840	5.7	(1.4)	258	5.5	(1.6)	582	5.8	(1.3)
Delivering course content (for example, direct instruction, presentations)	842	5.3	(1.4)	257	5.1	(1.5)	585	5.4	(1.3)
Establishing and maintaining classroom norms and behavior expectations	840	5.3	(1.5)	257	5.1	(1.6)	583	5.5	(1.5)
Lesson planning (including selecting/securing resources, preparing materials, coordinating with colleagues, etc.)	838	5.3	(1.4)	257	5.1	(1.5)	581	5.4	(1.3)
Adjusting instruction in real-time to respond to student needs and reactions	837	5.5	(1.4)	256	5.3	(1.4)	581	5.6	(1.3)
Coping with unexpected challenges or interruptions during teaching (for example, technology issues, student illness, etc.)	842	5.7	(1.3)	260	5.5	(1.5)	582	5.8	(1.2)
Promoting social and emotional learning	839	5.6	(1.4)	258	5.4	(1.5)	581	5.7	(1.3)
Collaborating with families to promote learner growth and development	841	5.2	(1.3)	257	5.1	(1.4)	584	5.2	(1.3)
Collaborating with colleagues to promote learner growth and development	840	5.1	(1.4)	256	5.1	(1.5)	584	5.1	(1.4)

Please note, these items range from 1-7, with 1 = Immensely easier to 7 = Immensely harder

Table E7. Teacher-reported teaching challenges in 2020-21 (mixed level teachers)

Teacher Survey Q18. Rate each of the following areas in terms of how difficult it was to achieve during the 2020-2021 school year, compared to before the pandemic.

	District Type								
	Overall			Alliance districts			Non-Alliance districts		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Facilitating student engagement	322	5.7	(1.3)	103	5.9	(1.2)	219	5.7	(1.4)
Eliciting student participation during instruction	322	5.6	(1.3)	102	5.8	(1.3)	220	5.6	(1.3)
Motivating students to complete assignments	321	5.8	(1.3)	101	5.9	(1.2)	220	5.7	(1.3)
Ensuring student access to instructional materials (for example, textbooks, videos, other media, etc.)	322	5.1	(1.5)	101	5.3	(1.4)	221	5.0	(1.5)
Learning about each student's individual interests, strengths, and needs	321	5.1	(1.5)	102	5.2	(1.5)	219	5.1	(1.4)
Setting learning goals	321	5.1	(1.2)	103	5.2	(1.2)	218	5.0	(1.2)
Viewing, collecting, or analyzing student work (e.g., student math solutions, student writing pieces)	322	5.1	(1.4)	103	5.1	(1.5)	219	5.1	(1.3)
Conducting formative assessments (for example, to guide daily teaching, student personalization, etc.)	319	5.2	(1.4)	102	5.3	(1.4)	217	5.2	(1.4)
Preparing students for summative assessments (high stakes tests and unit tests)	318	5.6	(1.3)	102	5.6	(1.3)	216	5.6	(1.2)
Adjusting instruction to accommodate individualized education plans (IEPs)	322	5.3	(1.3)	102	5.4	(1.3)	220	5.3	(1.3)
Accessing resources, supports, and specialized assistance and services to meet students learning differences or needs (for example, students with disabilities or English learners)	323	5.3	(1.4)	103	5.4	(1.4)	220	5.3	(1.3)
Establishing and using small group instruction (for example, breakout groups, reading groups, stations, jigsaw, etc.)	323	5.5	(1.5)	104	5.6	(1.5)	219	5.5	(1.5)
Delivering course content (for example, direct instruction, presentations)	323	5.3	(1.4)	103	5.5	(1.3)	220	5.2	(1.5)
Establishing and maintaining classroom norms and behavior expectations	320	5.4	(1.5)	102	5.4	(1.5)	218	5.3	(1.4)
Lesson planning (including selecting/securing resources, preparing materials, coordinating with colleagues, etc.)	321	5.3	(1.4)	102	5.3	(1.5)	219	5.3	(1.4)
Adjusting instruction in real-time to respond to student needs and reactions	321	5.5	(1.4)	103	5.5	(1.3)	218	5.4	(1.4)
Coping with unexpected challenges or interruptions during teaching (for example, technology issues, student illness, etc.)	321	5.7	(1.4)	103	5.7	(1.4)	218	5.7	(1.4)
Promoting social and emotional learning	321	5.5	(1.4)	102	5.5	(1.4)	219	5.6	(1.4)
Collaborating with families to promote learner growth and development	323	5.0	(1.4)	104	5.1	(1.5)	219	5.0	(1.4)
Collaborating with colleagues to promote learner growth and development	320	5.0	(1.4)	101	5.1	(1.5)	219	4.9	(1.4)

Please note, these items range from 1-7, with 1 = Immensely easier to 7 = Immensely harder

Table E8. Teacher-reported support for staff's physical health and emotional well-being in 2020-21 (elementary school teachers)

Teacher Survey Q24_4 & Q24_5. In your opinion, how adequately did your school support school staff's physical health and social and emotional well-being during the 2020-21 school year?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
School staff physical health	Support was extremely inadequate	205	23.8	105	28.8	100	20.1
	Support was somewhat inadequate	233	27.1	99	27.2	134	27.0
	Support was neither adequate nor inadequate	172	20.0	75	20.6	97	19.5
	Support was somewhat adequate	188	21.8	65	17.9	123	24.7
	Support was extremely adequate	63	7.3	20	5.5	43	8.7
	Total N	861	100.0	364	100.0	497	100.0
School staff social and emotional well-being	Support was extremely inadequate	324	37.6	148	40.8	176	35.3
	Support was somewhat inadequate	237	27.5	99	27.3	138	27.7
	Support was neither adequate nor inadequate	99	11.5	44	12.1	55	11.0
	Support was somewhat adequate	156	18.1	55	15.2	101	20.3
	Support was extremely adequate	45	5.2	17	4.7	28	5.6
	Total N	861	100.0	363	100.0	498	100.0

Table E9. Teacher-reported support for staff's physical health and emotional well-being in 2020-21 (middle school teachers)
Teacher Survey Q24_4 & Q24_5. In your opinion, how adequately did your school support school staff's physical health and social and emotional well-being during the 2020-21 school year?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
School staff physical health	Support was extremely inadequate	115	22.3	43	26.4	72	20.4
	Support was somewhat inadequate	160	31.0	48	29.4	112	31.7
	Support was neither adequate nor inadequate	102	19.8	28	17.2	74	21.0
	Support was somewhat adequate	97	18.8	30	18.4	67	19.0
	Support was extremely adequate	42	8.1	14	8.6	28	7.9
	Total N	516	100.0	163	100.0	353	100.0
School staff social and emotional well-being	Support was extremely inadequate	199	38.6	60	36.8	139	39.4
	Support was somewhat inadequate	149	28.9	47	28.8	102	28.9
	Support was neither adequate nor inadequate	75	14.5	26	16.0	49	13.9
	Support was somewhat adequate	68	13.2	22	13.5	46	13.0
	Support was extremely adequate	25	4.8	8	4.9	17	4.8
	Total N	516	100.0	163	100.0	353	100.0

Table E10. Teacher-reported support for staff's physical health and emotional well-being in 2020-21 (high school teachers)
Teacher Survey Q24_4 & Q24_5. In your opinion, how adequately did your school support school staff's physical health and social and emotional well-being during the 2020-21 school year?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
School staff physical health	Support was extremely inadequate	216	27.1	79	32.4	137	24.8
	Support was somewhat inadequate	230	28.9	63	25.8	167	30.3
	Support was neither adequate nor inadequate	146	18.3	47	19.3	99	17.9
	Support was somewhat adequate	146	18.3	37	15.2	109	19.7
	Support was extremely adequate	58	7.3	18	7.4	40	7.2
	Total N	796	100.0	244	100.0	552	100.0
School staff social and emotional well-being	Support was extremely inadequate	323	40.6	110	45.1	213	38.6
	Support was somewhat inadequate	205	25.8	54	22.1	151	27.4
	Support was neither adequate nor inadequate	103	12.9	35	14.3	68	12.3
	Support was somewhat adequate	125	15.7	32	13.1	93	16.8
	Support was extremely adequate	40	5.0	13	5.3	27	4.9
	Total N	796	100.0	244	100.0	552	100.0

Table E11. Teacher-reported support for staff's physical health and emotional well-being in 2020-21 (mixed level teachers)
Teacher Survey Q24_4 & Q24_5. In your opinion, how adequately did your school support school staff's physical health and social and emotional well-being during the 2020-21 school year?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
School staff physical health	Support was extremely inadequate	74	25.3	30	30.0	44	22.9
	Support was somewhat inadequate	81	27.7	27	27.0	54	28.1
	Support was neither adequate nor inadequate	63	21.6	19	19.0	44	22.9
	Support was somewhat adequate	50	17.1	17	17.0	33	17.2
	Support was extremely adequate	24	8.2	7	7.0	17	8.9
	Total N	292	100.0	100	100.0	192	100.0
School staff social and emotional well-being	Support was extremely inadequate	99	33.7	35	35.0	64	33.0
	Support was somewhat inadequate	77	26.2	20	20.0	57	29.4
	Support was neither adequate nor inadequate	46	15.6	15	15.0	31	16.0
	Support was somewhat adequate	54	18.4	24	24.0	30	15.5
	Support was extremely adequate	18	6.1	6	6.0	12	6.2
	Total N	294	100.0	100	100.0	194	100.0

Table E12. Teacher-reported resources/supports needed during the pandemic (elementary teachers)

Teacher Survey Q28_1r to Q28_10r. How much of a need did you have for the following resources/supports during the pandemic, compared to before the pandemic?

	District Type								
	Overall			Alliance districts			Non-Alliance districts		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Remote and/or hybrid lesson plans	594	4.6	(.8)	241	4.5	(.9)	353	4.7	(.7)
Social and emotional learning lesson plans or strategies	596	4.3	(.9)	241	4.2	(1.0)	355	4.3	(.8)
Strategies for addressing the trauma that students have experienced	595	4.4	(.9)	241	4.4	(.9)	354	4.4	(.9)
Strategies to keep students engaged and motivated	599	4.4	(.8)	243	4.4	(.9)	356	4.4	(.8)
Strategies to catch students up to grade level	591	4.4	(.9)	237	4.4	(.9)	354	4.3	(.9)
Strategies to assess students' academic learning	596	4.0	(1.0)	242	4.0	(1.0)	354	4.0	(.9)
Additional school staff who can address students' social and emotional needs	587	4.5	(.8)	241	4.5	(.8)	346	4.5	(.8)
Additional school or district staff who can address students' difficulties in using technology	592	4.4	(.8)	240	4.5	(.8)	352	4.4	(.9)
Additional staff or technology to help me teach students concurrently	577	4.4	(.8)	236	4.5	(.8)	341	4.4	(.9)
Other	111	4.2	(1.0)	41	4.1	(1.1)	70	4.3	(1.0)

Please note, these items range from 1-5, with 1 = Much less of a need to 5= Much more of a need.

Table E13. Teacher-reported resources/supports needed during the pandemic (middle school teachers)

Teacher Survey Q28_1r to Q28_10r. How much of a need did you have for the following resources/supports during the pandemic, compared to before the pandemic?

	District Type								
	Overall			Alliance districts			Non-Alliance districts		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Remote and/or hybrid lesson plans	353	4.6	(.8)	108	4.4	(.9)	245	4.6	(.7)
Social and emotional learning lesson plans or strategies	349	4.3	(.9)	108	4.2	(.9)	241	4.3	(.8)
Strategies for addressing the trauma that students have experienced	345	4.4	(.8)	105	4.3	(.9)	240	4.4	(.8)
Strategies to keep students engaged and motivated	354	4.5	(.8)	108	4.5	(.7)	246	4.5	(.8)
Strategies to catch students up to grade level	348	4.4	(.8)	106	4.4	(.8)	242	4.3	(.9)
Strategies to assess students' academic learning	351	3.9	(.9)	106	4.0	(.9)	245	3.9	(.9)
Additional school staff who can address students' social and emotional needs	346	4.4	(.8)	106	4.5	(.8)	240	4.4	(.8)
Additional school or district staff who can address students' difficulties in using technology	352	4.3	(.8)	108	4.4	(.8)	244	4.2	(.8)
Additional staff or technology to help me teach students concurrently	337	4.3	(.9)	105	4.2	(1.0)	232	4.4	(.8)
Other	67	4.2	(1.0)	22	4.0	(1.0)	45	4.3	(1.1)

Please note, these items range from 1-5, with 1 = Much less of a need to 5= Much more of a need.

Table E14. Teacher-reported resources/supports needed during the pandemic (high school teachers)

Teacher Survey Q28_1r to Q28_10r. How much of a need did you have for the following resources/supports during the pandemic, compared to before the pandemic?

	District Type								
	Overall			Alliance districts			Non-Alliance districts		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Remote and/or hybrid lesson plans	534	4.5	(.8)	174	4.4	(.8)	360	4.5	(.9)
Social and emotional learning lesson plans or strategies	518	4.1	(.9)	166	4.2	(.9)	352	4.1	(.9)
Strategies for addressing the trauma that students have experienced	514	4.2	(.9)	169	4.2	(.9)	345	4.2	(.9)
Strategies to keep students engaged and motivated	532	4.5	(.7)	174	4.5	(.8)	358	4.6	(.7)
Strategies to catch students up to grade level	526	4.3	(.9)	173	4.3	(.9)	353	4.3	(.9)
Strategies to assess students' academic learning	524	4.0	(.9)	172	3.9	(.9)	352	4.0	(.9)
Additional school staff who can address students' social and emotional needs	514	4.3	(.9)	168	4.3	(.9)	346	4.3	(.9)
Additional school or district staff who can address students' difficulties in using technology	523	4.2	(.9)	170	4.3	(.8)	353	4.2	(.9)
Additional staff or technology to help me teach students concurrently	518	4.2	(.9)	171	4.1	(1.0)	347	4.2	(.9)
Other	98	4.0	(1.1)	36	4.1	(1.1)	62	3.9	(1.2)

Please note, these items range from 1-5, with 1 = Much less of a need to 5= Much more of a need.

Table E15. Teacher-reported resources/supports needed during the pandemic (mixed-level teachers)

Teacher Survey Q28_1r to Q28_10r. How much of a need did you have for the following resources/supports during the pandemic, compared to before the pandemic?

	District Type								
	Overall			Alliance districts			Non-Alliance districts		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Remote and/or hybrid lesson plans	209	4.5	(.9)	63	4.4	(.8)	146	4.5	(.9)
Social and emotional learning lesson plans or strategies	204	4.1	(.9)	61	3.9	(1.0)	143	4.1	(.9)
Strategies for addressing the trauma that students have experienced	202	4.3	(.9)	61	4.3	(1.0)	141	4.3	(.9)
Strategies to keep students engaged and motivated	210	4.5	(.8)	64	4.5	(.8)	146	4.4	(.8)
Strategies to catch students up to grade level	205	4.3	(.9)	62	4.3	(.9)	143	4.3	(.8)
Strategies to assess students' academic learning	208	4.0	(.9)	62	4.0	(.9)	146	4.0	(.8)
Additional school staff who can address students' social and emotional needs	200	4.4	(.9)	59	4.2	(1.1)	141	4.4	(.8)
Additional school or district staff who can address students' difficulties in using technology	208	4.3	(.8)	63	4.4	(.8)	145	4.3	(.8)
Additional staff or technology to help me teach students concurrently	199	4.3	(.9)	59	4.3	(.8)	140	4.2	(1.0)
Other	38	4.0	(1.0)	12	4.0	(1.1)	26	4.0	(1.0)

Please note, these items range from 1-5, with 1 = Much less of a need to 5= Much more of a need.

Table E16. Teacher-reported effects of pandemic and resources provided on teaching and teacher well-being

Teacher survey Q36. Is there anything else you'd like to share about your experiences as a Connecticut teacher during the COVID-19 pandemic?

Impacts on Teachers: Physical Health

In the open-ended question at the end of the teacher survey, respondents reported that the pandemic took a huge toll on their physical health. Teachers mentioned vision changes, weight gain, and increased physical illnesses, as well as chronic neck, shoulder, and back pain.

Impacts on Teachers: Mental Health

Responses to the open-ended teacher survey question indicated that teachers experienced an increase in negative mental health due to the pandemic. Teachers felt stressed, overwhelmed, and defeated daily not only worrying about themselves but about their students, co-workers, and family members. Others reported crying at least once a day while working. Teachers lost colleagues due to the

immense stress. Some teachers were diagnosed with anxiety, PTSD, and depression because of the pandemic. Many teachers reported that administration was not doing enough to support teacher mental health, while other described how difficult it was to support students' mental health when they themselves were suffering. A smaller proportion of teachers indicated that they had found ways to cope with the emotional impacts of the pandemic. Some respondents said they strived to maintain a positive outlook during a challenging time, while others reflected on the ways they became adaptive and resilient as strategies to stay optimistic about the future. Some respondents talked about their pride in their work, while others reported experiencing professional and personal growth.

Impacts on Teachers: Workload

In response to the open-ended teacher survey question, teachers reported the constant changes to the learning format and curriculum resulted in a workload that was difficult to manage. Lesson planning took 2-3 times longer during online learning formats. Grading assignments also took longer. Teachers reported working up to 16 hours a day while others said they regularly were awake past midnight working.

Impacts on Teachers: Work-life Balance

The responses from the open-ended teacher survey question revealed that teachers found it challenging to balance their work and their personal life. Teachers found it difficult and stressful to manage personal responsibilities like caring for children and older parents during the pandemic. Some respondents discussed the frustration they felt about the boundary between work-life and home-life becoming obsolete during the pandemic. One teacher highlighted how they had minimal home responsibilities unlike their colleagues, enabling them to spend more time learning new technology resources and plan excellent class lessons.

Impacts on Teachers: Burnout, Intention to Quit, Retention

Responses to the open-ended teacher survey question indicated that many teachers quit their jobs, moved their retirement date to an earlier time, or were seriously considering leaving the profession. Respondents reported feeling less safe, an increased workload without fair compensation, increasing work-related stress, and the mistreatment of teachers as reasons for burnout and the desire to quit. Of the teachers actively considering leaving their profession, losing their retirement and other benefits was the main thing discouraging them from quitting.

District/School Support for Teachers: District/school policies about learning (attendance, participation, grading)

In response to the open-ended teacher survey question, teachers reported that their administrations' decisions to lower expectations for students created more problems for teachers. Attendance policies during the pandemic encouraged negative behaviors from students, including increased absenteeism and disengagement. As one teacher noted "if they [students] logged in and off for only 5 minutes and didn't do any work, she [the administrator] had us mark them present." Teachers also reported many students were promoted to the next grade level when school policies indicated they should not have been.

Teacher Experiences: Effects of student engagement/conduct/behavior on teaching

In their responses to the open-ended teacher survey question, many teacher respondents said that they struggled with teaching remote students who were disengaged or undisciplined. One teacher said, "Students who were remote were despondent, apathetic, and unmotivated. They struggled academically and needed constant adult supervision to keep them on task." Many teachers reported that students were distracted by chaotic home environments, other activities on their computers, and social media. Furthermore, there was little accountability for remote learners, and students often refused to turn on their cameras during synchronous instruction or cheated on assignments by using online software or help from their peers. Overall, many teachers reported that students were disengaged or unmotivated, which made it hard to teach effectively. Several respondents noted that it was extremely difficult to implement special education accommodations remotely, which left these students struggling and disengaged. On the other hand, some teacher respondents reported that because hybrid learning led to fewer students in class, there were fewer behavioral issues and teachers were able to provide more personalized instruction to each student. Similarly, some remote teachers reported fewer behavioral issues and more personalized learning, which improved instruction. Remote teachers reported that they no longer had to manage physical behavioral issues or deal with classroom disruptions such as assemblies and fire drills. Respondents reported that students that were engaged and whose parents supported their academic development were successful in remote learning. One teacher said they were "motivated and encouraged by the support from parents and the self-efficacy of the students who did the work and adapted to this new way of learning." Respondents said that there were fewer pressures and expectations placed on their students in a remote environment and that they could get to know their students better. Many teachers reported that motivated students (especially those with engaged parents) thrived during remote learning, which made remote instruction more manageable and rewarding.

District/School Support for Teachers: School Discipline

In responses to the open-ended teacher survey question, some teachers indicated the lack of support from administration about school discipline made teaching difficult. Some teachers reported that their administrations attempted to ease the impact of the pandemic on students by relaxing school rules and lowering expectations for student conduct, which caused negative student behaviors to become unmanageable. Respondents said that students argued and ignored teacher instructions daily, which took a significant amount of time away from actual instruction.

District/School Support for Teachers: Social-emotional Support

Responses to the open-ended teacher survey question indicated that many teachers felt they lacked social-emotional support at work. Some respondents said that school leaders and administrators were uncaring, while others pointed to district leadership as the reason for lack of support. The lack of social-emotional support made teaching more stressful and exhausting. One of the very few teachers who reported receiving social-emotional support from their administration or district said this support helped them "professionally adapt and emotionally deal with the situation."

District/School Support for Teachers: Time

In response to the open-ended teacher survey question, teachers overwhelmingly reported receiving minimal time for lesson planning. One teacher commented "the contracted prep period [is not] long enough to adequately plan for that kind of instruction," going on to say "expecting educators to continue at this pace is unacceptable and a disservice to the very students we're committed to teaching because the only thing they're going to get is exhausted teachers and minimally planned/thrown together lessons." There were a few teachers who said they benefitted from an early-release/half-day each week so they had time without students to plan and prepare for instruction.

District/School Support for Teachers: Staffing, Duties, Job Responsibilities

A number of teachers who responded to the open-ended teacher survey question reported that the inadequate staffing during the pandemic meant that teachers were assigned an increased number of duties and job responsibilities. Teachers reported that staff shortages and not enough substitute teachers meant they were asked to cover other classes. Other teachers reported that class sizes were increased without additional staff support, which made teaching difficult. Other tasks teachers became responsible for included daily COVID-19 wellness surveys/checks, breakfast and lunch duty, recording meal orders, and cleaning of desks, chairs, and surfaces. Teachers also reported that they needed to support students as mental health professionals, despite lacking training in that field. These additional responsibilities took time away from instruction.

District/School Support for Teachers: Other

Through the open-ended teacher survey question, teachers reported that they did not feel supported by their schools/districts in terms of COVID-19 safety. Many teachers reported that there were very few protective measures in place, and teachers had to advocate for their own safety and buy their own protective equipment. Teachers said safety protocols that were officially in place were sometime ineffective (such as defective air filters) or were not practiced (such as cleaning protocols). Some respondents said their districts asked teachers to interact closely with student populations without adequate safety protocols, and then required teachers to use their personal sick time when to quarantine after exposure. Other teachers reported that their districts kept up to date with COVID safety measures and made proactive choices to create the safest and most effective environment for staff and students.

Many teachers described other types of support their districts and schools did and didn't provide. Some respondents reported that ineffective communication between administration and teachers made them feel unsupported. Other respondents emphasized that administrators could make an enormous difference in teachers' experiences—for the better or for the worse. Some teachers shared that their leaders showed understanding of the difficulties of remote instruction. Other teachers said their districts created opportunities for teachers to connect with their students in a meaningful way. One teacher said that her leaders "worked to create a sense of shared challenge and community to overcome difficulties".

Teacher Experiences: Collegiality/Collaboration

Through the open-ended teacher survey question, some teachers reported challenges to collaboration among teachers. Some teachers reported that they were not allowed to collaborate with other colleagues in person, even while wearing masks. Others said that virtual meetings were less effective for collaboration. One teacher noted "it was extremely challenging and time consuming to create effective lessons and to coordinate with colleagues." Another teacher reported that differences in workload among teachers from different subject areas created tension among teachers. At the same time, other teachers respondents said were proud of the ways they were able to collaborate with their colleagues. Colleagues shared helpful resources and taught each another how to use new teaching tools. As one teacher commented, "this was the greatest time for teacher collaboration." Several teachers expressed appreciation for their colleagues, with one teacher saying they "could not have lived through these last two years without the support of my colleagues." These teachers reported that they were thankful to have fellow teachers to lean on for support despite the hardships they faced.

Research Question 3b. What technological resources did districts/schools provide to teachers to support remote and hybrid learning, and what technology challenges and strategies did teachers report?

Table E17. District-reported use of technology by elementary school teachers prior to the COVID-19 pandemic

District Inventory: Q4_4 - Q4_6. Which of the following best describes learning opportunities for your district's elementary school students prior to the COVID-19 pandemic (before March 2020)?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
In general, teachers had access to technology integration support (classroom tech coaches)	102	52.8	14	43.8	75	57.7	13	41.9
In general, teachers were using learning management platforms to support instruction (for example, Google Classroom, Schoology, etc.)	97	50.3	7	21.9	78	60.0	12	38.7
In general, teachers were using technology platforms to communicate with parents (for example, Remind, Class Dojo)	133	68.9	25	78.1	96	73.8	12	38.7
None of the above	29	15.0	5	15.6	15	11.5	9	29.0
Total N	193	100.0	32	100.0	130	100.0	31	100.0

Table E18. District-reported use of technology by middle school teachers prior to the COVID-19 pandemic

District Inventory: Q4_4 - Q4_6. Which of the following best describes learning opportunities for your district's middle school students prior to the COVID-19 pandemic (before March 2020)?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
In general, teachers had access to technology integration support (classroom tech coaches)	98	51.9	13	41.9	70	57.4	15	41.7
In general, teachers were using learning management platforms to support instruction (for example, Google Classroom, Schoology, etc.)	127	67.2	15	48.4	94	77.0	18	50.0
In general, teachers were using technology platforms to communicate with parents (for example, Remind, Class Dojo)	116	61.4	19	61.3	86	70.5	11	30.6
None of the above	28	14.8	7	22.6	11	9.0	10	27.8
Total N	189	100.0	31	100.0	122	100.0	36	100.0

Table E19. District-reported use of technology by high school teachers prior to the COVID-19 pandemic

District Inventory: Q4_4 - Q4_6. Which of the following best describes learning opportunities for your district's high school students in each of the following grade levels prior to the COVID-19 pandemic (before March 2020)?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
In general, teachers had access to technology integration support (classroom tech coaches)	88	50.9	13	43.3	61	60.4	14	33.3
In general, teachers were using learning management platforms to support instruction (for example, Google Classroom, Schoology, etc.)	124	71.7	18	60.0	84	83.2	22	52.4
In general, teachers were using technology platforms to communicate with parents (for example, Remind, Class Dojo)	100	57.8	18	60.0	67	66.3	15	35.7
None of the above	25	14.5	5	16.7	8	7.9	12	28.6
Total N	173	100.0	30	100.0	101	100.0	42	100.0

Table E20. District-reported technology provided to elementary school teachers to support remote learning

District Inventory: Q37e. What technologies were provided to elementary school teachers to support remote teaching during the two timeframes listed?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Spring 2020	Chromebooks	136	72.0	28	84.8	89	70.6	19	63.3
	iPads	66	34.9	12	36.4	42	33.3	12	40.0
	Laptops (other than Chromebooks)	102	54.0	18	54.5	65	51.6	19	63.3
	Smartphones	6	3.2	0	.0	5	4.0	1	3.3
	Wifi hotspot devices	72	38.1	15	45.5	53	42.1	4	13.3
	Other (please describe):	15	7.9	2	6.1	13	10.3	0	.0
	Total N	189	100.0	33	100.0	126	100.0	30	100.0
2020-2021	Chromebooks	138	72.6	25	78.1	93	73.2	20	64.5
	iPads	64	33.7	13	40.6	38	29.9	13	41.9
	Laptops (other than Chromebooks)	112	58.9	22	68.8	71	55.9	19	61.3
	Smartphones	3	1.6	0	.0	2	1.6	1	3.2
	Wifi hotspot devices	72	37.9	16	50.0	50	39.4	6	19.4
	Other (please describe):	22	11.6	3	9.4	19	15.0	0	.0
	Total N	190	100.0	32	100.0	127	100.0	31	100.0

Of districts that used the open-choice option to describe other technologies provided to elementary school teachers to support remote learning, the most-reported technologies were for broadcasting remote instruction to students. These technologies include webcams, document cameras, and sound equipment like microphones and headsets to support teachers' virtual broadcasting of lessons and learning materials. A few districts also provided interactive whiteboards to further support remote instruction. Finally, multiple districts reported providing additional devices to elementary teachers if needed, including extra PCs, computer monitors, and tablets.

Table E21. District-reported technology provided to middle school teachers to support remote learning

District Inventory: Q37m. What technologies were provided to middle school teachers to support remote teaching during the two timeframes listed?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Spring 2020	Chromebooks	124	67.4	21	67.7	84	71.8	19	52.8
	iPads	35	19.0	4	12.9	19	16.2	12	33.3
	Laptops (other than Chromebooks)	110	59.8	21	67.7	63	53.8	26	72.2
	Smartphones	9	4.9	1	3.2	4	3.4	4	11.1
	Wifi hotspot devices	60	32.6	11	35.5	47	40.2	2	5.6
	Other (please describe):	10	5.4	1	3.2	7	6.0	2	5.6
	Total N	184	100.0	31	100.0	117	100.0	36	100.0
2020-2021	Chromebooks	124	67.8	19	61.3	85	73.3	20	55.6
	iPads	38	20.8	5	16.1	21	18.1	12	33.3
	Laptops (other than Chromebooks)	115	62.8	24	77.4	66	56.9	25	69.4
	Smartphones	9	4.9	1	3.2	4	3.4	4	11.1
	Wifi hotspot devices	65	35.5	15	48.4	46	39.7	4	11.1
	Other (please describe):	22	12.0	3	9.7	16	13.8	3	8.3
	Total N	183	100.0	31	100.0	116	100.0	36	100.0

Of districts that used the open-choice option to describe other technologies provided to middle school teachers to support remote learning in spring 2020, the most mentioned technologies were webcams, document cameras, and audio equipment like speakers, microphones, and headsets; it is clear that districts prioritized the provision of these technologies to aid the remote broadcast of instructional materials. A multitude of districts also reported that they provided additional desktop computers, PCs, and monitors.

Table E22. District-reported technology provided to high school teachers to support remote learning

District Inventory: Q37h. What technologies were provided to high school teachers to support remote teaching during the two timeframes listed?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Spring 2020	Chromebooks	108	63.9	20	64.5	70	72.2	18	43.9
	iPads	23	13.6	3	9.7	10	10.3	10	24.4
	Laptops (other than Chromebooks)	104	61.5	22	71.0	51	52.6	31	75.6
	Smartphones	8	4.7	1	3.2	4	4.1	3	7.3
	Wifi hotspot devices	49	29.0	10	32.3	38	39.2	1	2.4
	Other (please describe):	13	7.7	2	6.5	9	9.3	2	4.9
	Total N	169	100.0	31	100.0	97	100.0	41	100.0
2020-2021	Chromebooks	110	64.0	18	58.1	70	72.2	22	50.0
	iPads	26	15.1	4	12.9	11	11.3	11	25.0
	Laptops (other than Chromebooks)	116	67.4	26	83.9	57	58.8	33	75.0
	Smartphones	8	4.7	1	3.2	4	4.1	3	6.8
	Wifi hotspot devices	56	32.6	13	41.9	40	41.2	3	6.8
	Other (please describe):	22	12.8	4	12.9	15	15.5	3	6.8
	Total N	172	100.0	31	100.0	97	100.0	44	100.0

Of districts that used the open-choice option to describe other technologies provided to high school teachers to support remote learning in spring 2020, the most-reported technologies were those used to broadcast virtual instruction, such as webcams, document cameras, microphones, headsets, and speakers to ensure quality streaming. Some districts also mentioned that they supplied additional desktop computers and monitors. Finally, it was reported by two districts that drawing/writing tablets were provided to some teachers to bolster instruction.

Table E23. District-reported learning management systems provided to elementary school teachers to support remote learning
District Inventory: Q38e. What learning management systems were provided to elementary school teachers to support remote teaching during the two timeframes listed?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Spring 2020	Google Suite/Classroom	170	89.5	27	81.8	119	93.7	24	80.0
	Schoology	7	3.7	0	.0	7	5.5	0	.0
	Moodle	1	.5	0	.0	1	.8	0	.0
	ClassDojo	48	25.3	10	30.3	33	26.0	5	16.7
	SeeSaw	89	46.8	12	36.4	73	57.5	4	13.3
	Other (please describe):	17	8.9	4	12.1	7	5.5	6	20.0
	Total N	190	100.0	33	100.0	127	100.0	30	100.0
2020-2021	Google Suite/Classroom	169	88.9	26	78.8	119	93.0	24	82.8
	Schoology	9	4.7	0	.0	9	7.0	0	.0
	Moodle	1	.5	0	.0	1	.8	0	.0
	ClassDojo	44	23.2	9	27.3	30	23.4	5	17.2
	SeeSaw	98	51.6	19	57.6	75	58.6	4	13.8
	Other (please describe):	21	11.1	7	21.2	8	6.3	6	20.7
	Total N	190	100.0	33	100.0	128	100.0	29	100.0

Of those districts that that used the open-text option to describe other learning management systems (LMS) provided to elementary school teachers to support remote learning, the most-reported LMS was Microsoft Teams, which can be used to facilitate the sharing of information and instructional materials. Another LMS mentioned was Nearpod (https://nearpod.com/), which allows teachers to assign interactive lessons, activities and assessments remotely. An additional LMS reported that covers multiple subjects was IXL (https://www.ixl.com/), which can be used to assign assignments and assessments over a wide variety of topics. Some districts reported LMS that are subject-specific, such as ASSISTments (https://www.youtube.com/watch?v=8t62Aj-VGig), a learning platform for math where teachers can assign homework and assessments and provide feedback. A final learning management system discussed was Transparent Classroom for Montessori (https://www.transparentclassroom.com/); this platform allows teachers to plan lessons, manage students and record their progress, and communicate with parents in real-time.

Table E24. District-reported learning management systems provided to middle school teachers to support remote learning
District Inventory: Q38m. What learning management systems were provided to middle school teachers to support remote teaching during the two timeframes listed?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Spring 2020	Google Suite/Classroom	164	91.1	26	83.9	109	94.0	29	87.9
	Schoology	14	7.8	3	9.7	11	9.5	0	.0
	Moodle	7	3.9	3	9.7	4	3.4	0	.0
	ClassDojo	22	12.2	3	9.7	17	14.7	2	6.1
	SeeSaw	35	19.4	3	9.7	30	25.9	2	6.1
	Other (please describe):	19	10.6	5	16.1	9	7.8	5	15.2
	Total N	180	100.0	31	100.0	116	100.0	33	100.0
2020-2021	Google Suite/Classroom	162	89.0	25	83.3	108	90.8	29	87.9
	Schoology	17	9.3	3	10.0	14	11.8	0	.0
	Moodle	8	4.4	3	10.0	5	4.2	0	.0
	ClassDojo	21	11.5	3	10.0	16	13.4	2	6.1
	SeeSaw	35	19.2	4	13.3	29	24.4	2	6.1
	Other (please describe):	21	11.5	6	20.0	9	7.6	6	18.2
	Total N	182	100.0	30	100.0	119	100.0	33	100.0

Of those districts that used the open-text option to describe other learning management systems provided to middle school teachers to support remote learning, districts mentioned Microsoft Teams for facilitating communication and Nearpod for providing interactive lessons, activities, and assessments (https://nearpod.com/). One district mentioned the use of Unified Classroom (https://www.powerschool.com/blog/what-is-unified-classroom-2020/), which combines a learning management system with assessments and student performance analytics. Edgenuity is a learning management system that was reported on both the middle school and high school level, as it provides middle and high school courses to students fully-online, including access to teachers, assignments, and assessments (https://www.edgenuity.com/online-courses/). Finally, Transparent Classroom (https://www.transparentclassroom.com/) was mentioned for Montessori classrooms, and it can be used to plan lessons, manage students and track their progress, and communicate with parents in real time. There was one subject-specific learning management system that a district reported providing to middle school teachers, called ASSISTments, a math-specific platform where teachers can assign homework and assessments and provide feedback to students (https://www.youtube.com/watch?v=8t62Aj-VGig).

Table E25. District-reported learning management systems provided to high school teachers to support remote learning
District Inventory: Q38h. What Learning management systems were provided to high school teachers to support remote teaching during the two timeframes listed?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Spring 2020	Google Suite/Classroom	147	88.6	26	83.9	91	92.9	30	81.1
	Schoology	20	12.0	3	9.7	15	15.3	2	5.4
	Moodle	7	4.2	3	9.7	4	4.1	0	.0
	ClassDojo	7	4.2	0	.0	6	6.1	1	2.7
	SeeSaw	10	6.0	0	.0	9	9.2	1	2.7
	Other (please describe):	22	13.3	6	19.4	9	9.2	7	18.9
	Total N	166	100.0	31	100.0	98	100.0	37	100.0
2020-2021	Google Suite/Classroom	146	86.4	25	83.3	89	89.9	32	80.0
	Schoology	21	12.4	3	10.0	17	17.2	1	2.5
	Moodle	8	4.7	3	10.0	5	5.1	0	.0
	ClassDojo	7	4.1	0	.0	6	6.1	1	2.5
	SeeSaw	9	5.3	0	.0	8	8.1	1	2.5
	Other (please describe):	25	14.8	8	26.7	8	8.1	9	22.5
	Total N	169	100.0	30	100.0	99	100.0	40	100.0

Of the districts that used the open-text option to describe other learning management systems (LMS) provided to high school teachers to support remote learning, 6 mentioned Microsoft Teams and 4 mentioned Nearpod. Microsoft Teams is used to facilitate the sharing of information and instructional materials. Whereas, Nearpod provides interactive lessons, activities, and students assessments (https://nearpod.com/). Unified Classroom was mentioned as a tool for combining the functions of an LMS with assignments, assessments, and student performance analytics (https://www.powerschool.com/blog/what-is-unified-classroom-2020/). Edgenuity was also reported; it provides credited courses across a wide range of subjects and allows students to have virtual access to teachers, coursework, and assessments (https://www.edgenuity.com/online-courses/). One district reported that they provided Buzz, which allows teachers to track progress, personalize learning, and administer assessments. (https://agilix.com/buzz-learning-delivery-platform/#:~:text=Buzz%20supports%20successful%20learning%20and,your%20ideas%20for%20transforming%20education)

Table E26. District-reported apps and tools used by elementary school teachers during spring 2020 and school year 2020-2021
District Inventory: Q39e. Which of these were the most-used apps and tools for elementary school teachers during the two timeframes listed?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Spring 2020	YouTube video	130	70.3	23	71.9	85	69.1	22	73.3
	Desmos	12	6.5	5	15.6	7	5.7	0	.0
	Edpuzzle	43	23.2	10	31.3	31	25.2	2	6.7
	Google Forms	138	74.6	23	71.9	96	78.0	19	63.3
	Kahoot	86	46.5	12	37.5	60	48.8	14	46.7
	ClassDojo	73	39.5	19	59.4	47	38.2	7	23.3
	Mentimeter	2	1.1	0	.0	2	1.6	0	.0
	Quizlet	67	36.2	9	28.1	48	39.0	10	33.3
	Padlet	56	30.3	10	31.3	44	35.8	2	6.7
	Screencastify	87	47.0	16	50.0	69	56.1	2	6.7
	Padlet/Jamboard	76	41.1	15	46.9	56	45.5	5	16.7
	Other (please describe):	50	27.0	9	28.1	33	26.8	8	26.7
	Total N	185	100.0	32	100.0	123	100.0	30	100.0
2020-2021	YouTube video	131	70.1	21	63.6	87	70.2	23	76.7
	Desmos	18	9.6	7	21.2	11	8.9	0	.0
	Edpuzzle	54	28.9	12	36.4	41	33.1	1	3.3
	Google Forms	146	78.1	24	72.7	103	83.1	19	63.3
	Kahoot	91	48.7	13	39.4	64	51.6	14	46.7
	ClassDojo	74	39.6	21	63.6	45	36.3	8	26.7
	Mentimeter	4	2.1	2	6.1	2	1.6	0	.0
	Quizlet	77	41.2	9	27.3	56	45.2	12	40.0
	Padlet	73	39.0	14	42.4	57	46.0	2	6.7
	Screencastify	101	54.0	17	51.5	81	65.3	3	10.0
	Padlet/Jamboard	102	54.5	19	57.6	76	61.3	7	23.3
	Other (please describe):	54	28.9	11	33.3	35	28.2	8	26.7
	Total N	187	100.0	33	100.0	124	100.0	30	100.0

Table E27. District-reported apps and tools used by middle school teachers during spring 2020 and school year 2020-2021

District Inventory: Q39m. Which of these were the most-used apps and tools for middle school teachers during the two timeframes listed?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Spring 2020	YouTube video	146	81.1	26	83.9	92	80.7	28	80.0
	Desmos	31	17.2	6	19.4	24	21.1	1	2.9
	Edpuzzle	65	36.1	14	45.2	49	43.0	2	5.7
	Google Forms	140	77.8	23	74.2	93	81.6	24	68.6
	Kahoot	95	52.8	14	45.2	66	57.9	15	42.9
	ClassDojo	32	17.8	5	16.1	23	20.2	4	11.4
	Mentimeter	5	2.8	1	3.2	4	3.5	0	.0
	Quizlet	75	41.7	11	35.5	53	46.5	11	31.4
	Padlet	54	30.0	12	38.7	41	36.0	1	2.9
	Screencastify	79	43.9	17	54.8	61	53.5	1	2.9
	Padlet/Jamboard	70	38.9	14	45.2	51	44.7	5	14.3
	Other (please describe):	50	27.8	9	29.0	31	27.2	10	28.6
	Total N	180	100.0	31	100.0	114	100.0	35	100.0
2020-2021	YouTube video	149	82.3	27	87.1	93	80.9	29	82.9
	Desmos	38	21.0	6	19.4	31	27.0	1	2.9
	Edpuzzle	75	41.4	13	41.9	58	50.4	4	11.4
	Google Forms	147	81.2	24	77.4	99	86.1	24	68.6
	Kahoot	98	54.1	14	45.2	68	59.1	16	45.7
	ClassDojo	30	16.6	5	16.1	20	17.4	5	14.3
	Mentimeter	6	3.3	2	6.5	4	3.5	0	.0
	Quizlet	82	45.3	13	41.9	55	47.8	14	40.0
	Padlet	75	41.4	18	58.1	55	47.8	2	5.7
	Screencastify	101	55.8	18	58.1	81	70.4	2	5.7
	Padlet/Jamboard	97	53.6	20	64.5	71	61.7	6	17.1
	Other (please describe):	54	29.8	11	35.5	34	29.6	9	25.7
	Total N	181	100.0	31	100.0	115	100.0	35	100.0

Table E28. District-reported apps and tools used by high school teachers during spring 2020 and 2020-21

District Inventory: Q39h. Which of these were the most-used apps and tools for high school teachers during the two timeframes listed?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Spring 2020	YouTube video	139	84.2	27	87.1	79	83.2	33	84.6
	Desmos	41	24.8	6	19.4	34	35.8	1	2.6
	Edpuzzle	63	38.2	16	51.6	44	46.3	3	7.7
	Google Forms	130	78.8	23	74.2	82	86.3	25	64.1
	Kahoot	90	54.5	13	41.9	63	66.3	14	35.9
	ClassDojo	15	9.1	1	3.2	11	11.6	3	7.7
	Mentimeter	6	3.6	1	3.2	5	5.3	0	.0
	Quizlet	76	46.1	12	38.7	52	54.7	12	30.8
	Padlet	50	30.3	12	38.7	37	38.9	1	2.6
	Screencastify	73	44.2	18	58.1	53	55.8	2	5.1
	Padlet/Jamboard	72	43.6	16	51.6	50	52.6	6	15.4
	Other (please describe):	39	23.6	10	32.3	19	20.0	10	25.6
	Total N	165	100.0	31	100.0	95	100.0	39	100.0
2020-2021	YouTube video	144	85.2	28	90.3	82	85.4	34	81.0
	Desmos	46	27.2	6	19.4	38	39.6	2	4.8
	Edpuzzle	77	45.6	17	54.8	55	57.3	5	11.9
	Google Forms	139	82.2	24	77.4	88	91.7	27	64.3
	Kahoot	96	56.8	14	45.2	65	67.7	17	40.5
	ClassDojo	13	7.7	1	3.2	9	9.4	3	7.1
	Mentimeter	8	4.7	3	9.7	5	5.2	0	.0
	Quizlet	88	52.1	15	48.4	59	61.5	14	33.3
	Padlet	74	43.8	18	58.1	53	55.2	3	7.1
	Screencastify	95	56.2	22	71.0	70	72.9	3	7.1
	Padlet/Jamboard	92	54.4	20	64.5	64	66.7	8	19.0
	Other (please describe):	44	26.0	12	38.7	23	24.0	9	21.4
	Total N	169	100.0	31	100.0	96	100.0	42	100.0

Table E29. District-reported single sign-on/app management systems used during spring 2020 by grade level

District Inventory Q40emh_1. During the two timeframes listed, did your district use a single sign-on or similar app management system (for example, Clever SSO) that can track teachers' and students' use of learning apps/tools at the following levels?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	No, we did not have that type of system	114	60.6	12	36.4	76	61.3	26	83.9
	Yes, we had that type of system, but we didn't use the analytics	30	16.0	9	27.3	19	15.3	2	6.5
	Yes, we had that type of system, and we used the analytics to some extent	33	17.6	8	24.2	22	17.7	3	9.7
	Yes, we had that type of system, and we used the analytics extensively	11	5.9	4	12.1	7	5.6	0	.0
	Total N	188	100.0	33	100.0	124	100.0	31	100.0
Middle School	No, we did not have that type of system	9	47.4	2	28.6	7	58.3	0	.0
	Yes, we had that type of system, but we didn't use the analytics	6	31.6	3	42.9	3	25.0	0	.0
	Yes, we had that type of system, and we used the analytics to some extent	3	15.8	1	14.3	2	16.7	0	.0
	Yes, we had that type of system, and we used the analytics extensively	1	5.3	1	14.3	0	.0	0	.0
	Total N	19	100.0	7	100.0	12	100.0	0	.0
High School	No, we did not have that type of system	97	58.1	11	36.7	55	56.7	31	77.5
	Yes, we had that type of system, but we didn't use the analytics	32	19.2	9	30.0	19	19.6	4	10.0
	Yes, we had that type of system, and we used the analytics to some extent	33	19.8	8	26.7	20	20.6	5	12.5
	Yes, we had that type of system, and we used the analytics extensively	5	3.0	2	6.7	3	3.1	0	.0
	Total N	167	100.0	30	100.0	97	100.0	40	100.0

Table E30. District-reported single sign-on/app management systems used during 2020-21 by grade level

District Inventory Q40emh_2. During the two timeframes listed, did your district's EDUs use a single sign-on or similar app management system (for example, Clever SSO) that can track teachers' and students' use of learning apps/tools?

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	No, we did not have that type of system	84	44.9	8	24.2	54	43.5	22	73.3
	Yes, we had that type of system, but we didn't use the analytics	32	17.1	7	21.2	23	18.5	2	6.7
	Yes, we had that type of system, and we used the analytics to some extent	51	27.3	13	39.4	32	25.8	6	20.0
	Yes, we had that type of system, and we used the analytics extensively	20	10.7	5	15.2	15	12.1	0	.0
	Total N	187	100.0	33	100.0	124	100.0	30	100.0
Middle School	No, we did not have that type of system	7	36.8	2	28.6	5	41.7	0	.0
	Yes, we had that type of system, but we didn't use the analytics	5	26.3	2	28.6	3	25.0	0	.0
	Yes, we had that type of system, and we used the analytics to some extent	6	31.6	2	28.6	4	33.3	0	.0
	Yes, we had that type of system, and we used the analytics extensively	1	5.3	1	14.3	0	.0	0	.0
	Total N	19	100.0	7	100.0	12	100.0	0	.0
High School	No, we did not have that type of system	83	49.4	9	29.0	44	45.8	30	73.2
	Yes, we had that type of system, but we didn't use the analytics	24	14.3	6	19.4	16	16.7	2	4.9
	Yes, we had that type of system, and we used the analytics to some extent	51	30.4	12	38.7	30	31.3	9	22.0
	Yes, we had that type of system, and we used the analytics extensively	10	6.0	4	12.9	6	6.3	0	.0
	Total N	168	100.0	31	100.0	96	100.0	41	100.0

Table E31. District-reported summer 2020 preparation for fall 2020: Online resources and learning management platforms

District Inventory: Q15_3, Q15_4. Which of the following activities did your district conduct between the last student day of spring 2020 and the students return to school in fall 2020?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Creating online resources for teachers	206	92.4	31	96.9	131	92.9	44	88.0
Adopting new learning management platforms	163	73.1	23	71.9	104	73.8	36	72.0
None of the above	9	4.0	1	3.1	4	2.8	4	8.0
Total N	223	100.0	32	100.0	141	100.0	50	100.0

Table E32. Teacher-reported access to instructional technology in spring 2020 (elementary teachers)

Teacher Survey Q19_2a - Q19_4a. How adequate was your access to each of the following technologies during spring 2020?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Learning management system(s)	Extremely inadequate	84	13.6	46	17.4	38	10.8
	Somewhat inadequate	109	17.7	48	18.2	61	17.3
	Neither adequate nor inadequate	30	4.9	20	7.6	10	2.8
	Somewhat adequate	201	32.6	84	31.8	117	33.1
	Extremely adequate	193	31.3	66	25.0	127	36.0
	Total N	617	100.0	264	100.0	353	100.0
Learning apps	Extremely inadequate	80	13.0	44	16.7	36	10.2
	Somewhat inadequate	132	21.4	61	23.1	71	20.2
	Neither adequate nor inadequate	67	10.9	36	13.6	31	8.8
	Somewhat adequate	192	31.2	74	28.0	118	33.5
	Extremely adequate	145	23.5	49	18.6	96	27.3
	Total N	616	100.0	264	100.0	352	100.0
Hardware/software for concurrent hybrid instruction	Extremely inadequate	166	27.0	93	35.2	73	20.8
	Somewhat inadequate	159	25.9	66	25.0	93	26.5
	Neither adequate nor inadequate	72	11.7	39	14.8	33	9.4
	Somewhat adequate	124	20.2	41	15.5	83	23.6
	Extremely adequate	94	15.3	25	9.5	69	19.7
	Total N	615	100.0	264	100.0	351	100.0

Table E33. Teacher-reported access to instructional technology in 2020-21 (elementary teachers)

Teacher Survey Q19_2b - Q19_4b. How adequate was technology access for elementary school teachers in 2020-21?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Learning management system(s)	Extremely inadequate	18	2.8	9	3.3	9	2.5
	Somewhat inadequate	55	8.6	27	9.9	28	7.7
	Neither adequate nor inadequate	42	6.6	21	7.7	21	5.7
	Somewhat adequate	199	31.1	101	37.0	98	26.8
	Extremely adequate	325	50.9	115	42.1	210	57.4
	Total N	639	100.0	273	100.0	366	100.0
Learning apps	Extremely inadequate	17	2.7	10	3.7	7	1.9
	Somewhat inadequate	58	9.1	33	12.1	25	6.8
	Neither adequate nor inadequate	75	11.7	34	12.5	41	11.2
	Somewhat adequate	233	36.5	108	39.6	125	34.2
	Extremely adequate	256	40.1	88	32.2	168	45.9
	Total N	639	100.0	273	100.0	366	100.0
Hardware/software for concurrent hybrid instruction	Extremely inadequate	64	10.0	44	16.1	20	5.5
	Somewhat inadequate	107	16.7	57	20.9	50	13.7
	Neither adequate nor inadequate	83	13.0	32	11.7	51	13.9
	Somewhat adequate	191	29.9	83	30.4	108	29.5
	Extremely adequate	194	30.4	57	20.9	137	37.4
	Total N	639	100.0	273	100.0	366	100.0

Table E34. Teacher-reported access to instructional technology in spring 2020 (middle school teachers)

Teacher Survey Q19_2a - Q19_4a. How adequate was your access to each of the following technologies during spring 2020?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Learning management system(s)	Extremely inadequate	17	4.6	8	6.8	9	3.6
	Somewhat inadequate	40	10.8	19	16.1	21	8.4
	Neither adequate nor inadequate	18	4.9	7	5.9	11	4.4
	Somewhat adequate	111	30.1	33	28.0	78	31.1
	Extremely adequate	183	49.6	51	43.2	132	52.6
	Total N	369	100.0	118	100.0	251	100.0
Learning apps	Extremely inadequate	28	7.6	17	14.4	11	4.4
	Somewhat inadequate	55	14.9	21	17.8	34	13.5
	Neither adequate nor inadequate	41	11.1	14	11.9	27	10.8
	Somewhat adequate	122	33.1	35	29.7	87	34.7
	Extremely adequate	123	33.3	31	26.3	92	36.7
	Total N	369	100.0	118	100.0	251	100.0
Hardware/software for concurrent hybrid instruction	Extremely inadequate	59	16.0	23	19.5	36	14.3
	Somewhat inadequate	93	25.2	29	24.6	64	25.5
	Neither adequate nor inadequate	59	16.0	18	15.3	41	16.3
	Somewhat adequate	98	26.6	30	25.4	68	27.1
	Extremely adequate	60	16.3	18	15.3	42	16.7
	Total N	369	100.0	118	100.0	251	100.0

Table E35. Teacher-reported access to instructional technology in 2020-21 (middle school teachers)

Teacher Survey Q19_2b - Q19_4b. How adequate was technology access for middle school teachers in 2020-21?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
learning management system(s)	Extremely inadequate	7	1.8	3	2.4	4	1.6
	Somewhat inadequate	11	2.9	6	4.9	5	1.9
	Neither adequate nor inadequate	14	3.7	6	4.9	8	3.1
	Somewhat adequate	102	26.8	34	27.6	68	26.5
	Extremely adequate	246	64.7	74	60.2	172	66.9
	Total N	380	100.0	123	100.0	257	100.0
learning apps	Extremely inadequate	8	2.1	5	4.1	3	1.2
	Somewhat inadequate	20	5.2	9	7.3	11	4.3
	Neither adequate nor inadequate	26	6.8	9	7.3	17	6.6
	Somewhat adequate	145	38.1	46	37.4	99	38.4
	Extremely adequate	182	47.8	54	43.9	128	49.6
	Total N	381	100.0	123	100.0	258	100.0
hardware/software for concurrent hybrid instruction	Extremely inadequate	24	6.3	11	8.9	13	5.0
	Somewhat inadequate	60	15.7	22	17.9	38	14.7
	Neither adequate nor inadequate	40	10.5	16	13.0	24	9.3
	Somewhat adequate	132	34.6	32	26.0	100	38.8
	Extremely adequate	125	32.8	42	34.1	83	32.2
	Total N	381	100.0	123	100.0	258	100.0

Table E36. Teacher-reported access to instructional technology in spring 2020 (high school teachers)

Teacher Survey Q19_2a - Q19_4a. How adequate was your access to each of the following technologies during spring 2020?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
learning management system(s)	Extremely inadequate	31	5.4	19	10.7	12	3.0
	Somewhat inadequate	52	9.1	16	9.0	36	9.1
	Neither adequate nor inadequate	29	5.1	13	7.3	16	4.1
	Somewhat adequate	189	33.0	57	32.0	132	33.5
	Extremely adequate	271	47.4	73	41.0	198	50.3
	Total N	572	100.0	178	100.0	394	100.0
learning apps	Extremely inadequate	38	6.6	22	12.4	16	4.0
	Somewhat inadequate	68	11.8	23	12.9	45	11.4
	Neither adequate nor inadequate	83	14.5	22	12.4	61	15.4
	Somewhat adequate	194	33.8	66	37.1	128	32.3
	Extremely adequate	191	33.3	45	25.3	146	36.9
	Total N	574	100.0	178	100.0	396	100.0
hardware/software for concurrent hybrid instruction	Extremely inadequate	104	18.2	48	27.0	56	14.2
	Somewhat inadequate	118	20.6	39	21.9	79	20.0
	Neither adequate nor inadequate	89	15.5	28	15.7	61	15.4
	Somewhat adequate	158	27.6	43	24.2	115	29.1
	Extremely adequate	104	18.2	20	11.2	84	21.3
	Total N	573	100.0	178	100.0	395	100.0

Table E37. Teacher-reported access to instructional technology in 2020-21 (for high school teachers)

Teacher Survey Q19_2b - Q19_4b. How adequate was technology access for high school teachers in 2020-21?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
learning management system(s)	Extremely inadequate	12	2.1	5	2.8	7	1.8
	Somewhat inadequate	25	4.4	9	5.1	16	4.1
	Neither adequate nor inadequate	20	3.5	11	6.2	9	2.3
	Somewhat adequate	162	28.3	61	34.5	101	25.6
	Extremely adequate	353	61.7	91	51.4	262	66.3
	Total N	572	100.0	177	100.0	395	100.0
learning apps	Extremely inadequate	17	3.0	9	5.1	8	2.0
	Somewhat inadequate	36	6.3	14	7.9	22	5.6
	Neither adequate nor inadequate	53	9.3	19	10.7	34	8.6
	Somewhat adequate	207	36.2	72	40.7	135	34.2
	Extremely adequate	259	45.3	63	35.6	196	49.6
	Total N	572	100.0	177	100.0	395	100.0
hardware/software for concurrent hybrid instruction	Extremely inadequate	49	8.6	24	13.6	25	6.3
	Somewhat inadequate	86	15.0	33	18.6	53	13.4
	Neither adequate nor inadequate	63	11.0	15	8.5	48	12.2
	Somewhat adequate	199	34.8	66	37.3	133	33.7
	Extremely adequate	175	30.6	39	22.0	136	34.4
	Total N	572	100.0	177	100.0	395	100.0

Table E38. Teacher-reported access to instructional technology in spring 2020 (mixed-level teachers)

Teacher Survey Q19_2a - Q19_4a. How adequate was your access to each of the following technologies during spring 2020?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
learning management system(s)	Extremely inadequate	12	5.9	9	13.8	3	2.2
	Somewhat inadequate	27	13.3	11	16.9	16	11.6
	Neither adequate nor inadequate	17	8.4	9	13.8	8	5.8
	Somewhat adequate	56	27.6	17	26.2	39	28.3
	Extremely adequate	91	44.8	19	29.2	72	52.2
	Total N	203	100.0	65	100.0	138	100.0
learning apps	Extremely inadequate	17	8.4	8	12.3	9	6.5
	Somewhat inadequate	31	15.3	13	20.0	18	13.0
	Neither adequate nor inadequate	28	13.8	11	16.9	17	12.3
	Somewhat adequate	67	33.0	21	32.3	46	33.3
	Extremely adequate	60	29.6	12	18.5	48	34.8
	Total N	203	100.0	65	100.0	138	100.0
hardware/software for concurrent hybrid instruction	Extremely inadequate	32	15.8	14	21.5	18	13.1
	Somewhat inadequate	43	21.3	12	18.5	31	22.6
	Neither adequate nor inadequate	36	17.8	13	20.0	23	16.8
	Somewhat adequate	52	25.7	19	29.2	33	24.1
	Extremely adequate	39	19.3	7	10.8	32	23.4
	Total N	202	100.0	65	100.0	137	100.0

Table E39. Teacher-reported access to instructional technology in 2020-21 (mixed-level teachers)

Teacher Survey Q19_2b - Q19_4b. How adequate was technology access for mixed-level teachers in 2020-21?

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
learning management system(s)	Extremely inadequate	3	1.4	1	1.5	2	1.4
	Somewhat inadequate	13	6.2	7	10.4	6	4.2
	Neither adequate nor inadequate	8	3.8	5	7.5	3	2.1
	Somewhat adequate	66	31.3	25	37.3	41	28.5
	Extremely adequate	121	57.3	29	43.3	92	63.9
	Total N	211	100.0	67	100.0	144	100.0
learning apps	Extremely inadequate	3	1.4	1	1.5	2	1.4
	Somewhat inadequate	17	8.1	10	14.9	7	4.9
	Neither adequate nor inadequate	26	12.3	11	16.4	15	10.4
	Somewhat adequate	67	31.8	23	34.3	44	30.6
	Extremely adequate	98	46.4	22	32.8	76	52.8
	Total N	211	100.0	67	100.0	144	100.0
hardware/software for concurrent hybrid instruction	Extremely inadequate	11	5.2	7	10.4	4	2.8
	Somewhat inadequate	23	11.0	10	14.9	13	9.1
	Neither adequate nor inadequate	32	15.2	12	17.9	20	14.0
	Somewhat adequate	71	33.8	26	38.8	45	31.5
	Extremely adequate	73	34.8	12	17.9	61	42.7
	Total N	210	100.0	67	100.0	143	100.0

Table E40. Teacher-reported technological resources provided by districts/schools to support remote and hybrid learning
Teacher survey Q36. Is there anything else you'd like to share about your experiences as a Connecticut teacher during the COVID-19 pandemic?

Through the open-ended teacher survey question, teacher survey respondents reported that their districts provided a variety of technology resources including Google Classroom, Seesaw, Google Translate, IXL, Kahoot, Google Meet, and Screencastify. In general, respondents reported that they did not receive adequate training on these technologies, which made implementing them in the classroom challenging. Despite this, many teachers reported that they became more proficient with using various technologies over time. Other respondents reported that they received no technology resources. Some of these teachers used their personal funds to buy the equipment needed to instruct students. Teachers who received minimal technological resources from their districts reported utilizing, they utilized free online resources like Edpuzzle and Kahoot. One teacher said, "Canva, The New York Times, Penny Kittle, Kelly Gallagher, and many researchers on Twitter offered amazing insight and ideas." Responses indicate that access to the internet and technology devices was uneven among districts. Some teachers said that the WiFi in their school building was unstable, leading to frequent interruptions. Other teachers reported that those districts who were already using instructional technology before the pandemic fared better than those that weren't. Several teachers reported that their district grew to use instructional technology more effectively during the pandemic. One teacher said, "Our district was moving towards incorporating more technology in the classroom prior to Covid. Covid sped the process up (e.g., we now have 1 to 1 devices, more student-paced learning, etc.) which does benefit us now that we are seeing a more normal school year. It was painful, but I think in the long run, instruction will benefit."

Research Question 3c. What types and amount of professional development did districts/schools provide to teachers to support remote and hybrid learning (e.g., training on education technology, pedagogy of virtual teaching, etc.)?

Table E41. District-reported hours of paid professional development devoted to remote/virtual learning during spring 2020

District Inventory Q10. During spring 2020, approximately how many hours of district-provided paid teacher professional development/training were devoted to strategies and skills for remote/virtual learning? Please consider only PD/training provided by the district during paid time and select the best response below that includes the total number of hours per teacher.

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
None	18	8.3	4	13.3	11	8.0	3	6.0
1-6 hours	61	28.0	6	20.0	33	23.9	22	44.0
7-12 hours	56	25.7	11	36.7	34	24.6	11	22.0
13-18 hours	37	17.0	3	10.0	25	18.1	9	18.0
19-30 hours	20	9.2	3	10.0	14	10.1	3	6.0
31+ hours	26	11.9	3	10.0	21	15.2	2	4.0
Total N	218	100.0	30	100.0	138	100.0	50	100.0

Table E42. District-reported summer 2020 preparation for fall 2020: paid professional and voluntary development

District Inventory: Q15_7, Q15_8, Q15_9, Q15_10. Which of the following activities did your district conduct between the last student day of spring 2020 and the students return to school in fall 2020?

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Paid professional development related to learning technology	163	73.1	27	84.4	105	74.5	31	62.0
Paid professional development related to strategies for remote teaching	158	70.9	26	81.3	102	72.3	30	60.0
Voluntary workshops related to learning technology	130	58.3	21	65.6	93	66.0	16	32.0
Voluntary workshops related to strategies for remote teaching	122	54.7	19	59.4	86	61.0	17	34.0
Other (please describe)	45	20.2	11	34.4	29	20.6	5	10.0
None of the above	21	9.4	4	12.5	11	7.8	6	12.0
Total N	223	100.0	32	100.0	141	100.0	50	100.0

Of the 45 districts that indicated that they used other strategies to prepare for the 2020-21 school year, several reported activities related to teacher professional development. Districts reported that they offered webinars and workshops on social-emotional learning, trauma support, technology, and other topics. Other districts reported using online sessions and lists of resources to help prepare staff for the new year. Some districts reported that they made adjustments to the school schedule or the curriculum to account for changes in learning format. Some districts reported that they extended the school year in person and offered summer school and credit recovery both remotely and in-person.

Table E43. District-report hours of paid professional development devoted to remote and/or hybrid instruction in 2020-21 by grade level

District Inventory Q18emh. During the 2020-21 contract year, approximately how many hours of district-provided paid teacher professional development were devoted to strategies for remote and/or hybrid instruction? Please consider only PD/training provided by the district during paid time and select the best response below that includes the total number of hours per teacher for each school level.

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	None	10	5.2	2	6.3	5	4.0	3	9.1
	1-6 hours	48	25.1	6	18.8	24	19.0	18	54.5
	7-12 hours	43	22.5	6	18.8	34	27.0	3	9.1
	13-18 hours	35	18.3	4	12.5	27	21.4	4	12.1
	19-30 hours	26	13.6	6	18.8	16	12.7	4	12.1
	31+ hours	29	15.2	8	25.0	20	15.9	1	3.0
	Total N	191	100.0	32	100.0	126	100.0	33	100.0
Middle School	None	7	3.8	2	6.7	3	2.6	2	5.4
	1-6 hours	46	25.3	5	16.7	19	16.5	22	59.5
	7-12 hours	44	24.2	5	16.7	35	30.4	4	10.8
	13-18 hours	30	16.5	4	13.3	22	19.1	4	10.8
	19-30 hours	23	12.6	5	16.7	14	12.2	4	10.8
	31+ hours	32	17.6	9	30.0	22	19.1	1	2.7
	Total N	182	100.0	30	100.0	115	100.0	37	100.0
High School	None	5	3.0	1	3.4	2	2.1	2	4.8
	1-6 hours	41	24.7	6	20.7	11	11.6	24	57.1
	7-12 hours	37	22.3	5	17.2	26	27.4	6	14.3
	13-18 hours	31	18.7	3	10.3	23	24.2	5	11.9
	19-30 hours	20	12.0	5	17.2	11	11.6	4	9.5
	31+ hours	32	19.3	9	31.0	22	23.2	1	2.4
	Total N	166	100.0	29	100.0	95	100.0	42	100.0

Tables E44. Teacher-reported professional development over the past 5 years (elementary teachers)

Teacher Survey Q22. How would you rate the amount of professional development you completed in the following areas over the past 5 years? (Consider professional development you completed on your own as well as professional development offered by your district.)

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Learning management system	Much less than I needed	234	23.9	103	25.1	131	23.0
	Somewhat less than I needed	237	24.2	92	22.4	145	25.5
	About the amount I needed	372	38.0	144	35.1	228	40.1
	Somewhat more than I needed	90	9.2	47	11.5	43	7.6
	Much more than I needed	46	4.7	24	5.9	22	3.9
	Total N	979	100.0	410	100.0	569	100.0
Online instructional materials for your curriculum content	Much less than I needed	256	26.2	105	25.7	151	26.5
	Somewhat less than I needed	295	30.2	121	29.7	174	30.6
	About the amount I needed	314	32.1	132	32.4	182	32.0
	Somewhat more than I needed	71	7.3	29	7.1	42	7.4
	Much more than I needed	41	4.2	21	5.1	20	3.5
	Total N	977	100.0	408	100.0	569	100.0
Supporting social-emotional learning during remote/hybrid instruction	Much less than I needed	349	35.7	140	34.2	209	36.8
	Somewhat less than I needed	276	28.2	117	28.6	159	28.0
	About the amount I needed	253	25.9	105	25.7	148	26.1
	Somewhat more than I needed	63	6.4	30	7.3	33	5.8
	Much more than I needed	36	3.7	17	4.2	19	3.3
	Total N	977	100.0	409	100.0	568	100.0
Other strategies and skills for remote/hybrid instruction (please describe):	Much less than I needed	260	39.1	104	38.5	156	39.5
	Somewhat less than I needed	138	20.8	56	20.7	82	20.8
	About the amount I needed	215	32.3	86	31.9	129	32.7
	Somewhat more than I needed	34	5.1	17	6.3	17	4.3
	Much more than I needed	18	2.7	7	2.6	11	2.8
	Total N	665	100.0	270	100.0	395	100.0

Tables E45. Teacher-reported professional development over the past 5 years (middle school teachers)

Teacher Survey Q22. How would you rate the amount of professional development you completed in the following areas over the past 5 years? (Consider professional development you completed on your own as well as professional development offered by your district.)

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Learning management system	Much less than I needed	93	16.6	29	16.1	64	16.8
	Somewhat less than I needed	130	23.2	39	21.7	91	23.9
	About the amount I needed	266	47.5	89	49.4	177	46.6
	Somewhat more than I needed	46	8.2	16	8.9	30	7.9
	Much more than I needed	25	4.5	7	3.9	18	4.7
	Total N	560	100.0	180	100.0	380	100.0
Online instructional materials for your curriculum content	Much less than I needed	119	21.3	34	18.9	85	22.4
	Somewhat less than I needed	160	28.6	52	28.9	108	28.4
	About the amount I needed	225	40.2	82	45.6	143	37.6
	Somewhat more than I needed	38	6.8	6	3.3	32	8.4
	Much more than I needed	18	3.2	6	3.3	12	3.2
	Total N	560	100.0	180	100.0	380	100.0
Supporting social-emotional learning during remote/hybrid instruction	Much less than I needed	172	30.8	57	31.8	115	30.3
	Somewhat less than I needed	164	29.3	45	25.1	119	31.3
	About the amount I needed	154	27.5	55	30.7	99	26.1
	Somewhat more than I needed	42	7.5	12	6.7	30	7.9
	Much more than I needed	27	4.8	10	5.6	17	4.5
	Total N	559	100.0	179	100.0	380	100.0
Other strategies and skills for remote/hybrid instruction (please describe):	Much less than I needed	129	33.9	35	30.7	94	35.3
	Somewhat less than I needed	94	24.7	25	21.9	69	25.9
	About the amount I needed	135	35.5	44	38.6	91	34.2
	Somewhat more than I needed	14	3.7	6	5.3	8	3.0
	Much more than I needed	8	2.1	4	3.5	4	1.5
	Total N	380	100.0	114	100.0	266	100.0

Tables E46. Teacher-reported professional development over the past 5 years (high school teachers)

Teacher Survey Q22. How would you rate the amount of professional development you completed in the following areas over the past 5 years? (Consider professional development you completed on your own as well as professional development offered by your district.)

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Learning management system	Much less than I needed	156	18.2	60	22.5	96	16.2
	Somewhat less than I needed	187	21.8	65	24.3	122	20.6
	About the amount I needed	399	46.4	107	40.1	292	49.3
	Somewhat more than I needed	72	8.4	20	7.5	52	8.8
	Much more than I needed	45	5.2	15	5.6	30	5.1
	Total N	859	100.0	267	100.0	592	100.0
Online instructional materials for your curriculum content	Much less than I needed	209	24.3	72	26.8	137	23.2
	Somewhat less than I needed	257	29.9	79	29.4	178	30.1
	About the amount I needed	316	36.7	89	33.1	227	38.4
	Somewhat more than I needed	55	6.4	21	7.8	34	5.8
	Much more than I needed	23	2.7	8	3.0	15	2.5
	Total N	860	100.0	269	100.0	591	100.0
Supporting social-emotional learning during remote/hybrid instruction	Much less than I needed	247	28.7	79	29.4	168	28.3
	Somewhat less than I needed	242	28.1	75	27.9	167	28.2
	About the amount I needed	232	26.9	75	27.9	157	26.5
	Somewhat more than I needed	81	9.4	21	7.8	60	10.1
	Much more than I needed	60	7.0	19	7.1	41	6.9
	Total N	862	100.0	269	100.0	593	100.0
Other strategies and skills for remote/hybrid instruction (please describe):	Much less than I needed	203	33.7	65	33.5	138	33.8
	Somewhat less than I needed	122	20.3	42	21.6	80	19.6
	About the amount I needed	232	38.5	75	38.7	157	38.5
	Somewhat more than I needed	29	4.8	5	2.6	24	5.9
	Much more than I needed	16	2.7	7	3.6	9	2.2
	Total N	602	100.0	194	100.0	408	100.0

Tables E47. Teacher-reported professional development over the past 5 years (mixed-level teachers)

Teacher Survey Q22. How would you rate the amount of professional development you completed in the following areas over the past 5 years? (Consider professional development you completed on your own as well as professional development offered by your district.)

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Learning management system	Much less than I needed	61	18.3	25	22.5	36	16.2
	Somewhat less than I needed	75	22.5	26	23.4	49	22.1
	About the amount I needed	154	46.2	44	39.6	110	49.5
	Somewhat more than I needed	24	7.2	7	6.3	17	7.7
	Much more than I needed	19	5.7	9	8.1	10	4.5
	Total N	333	100.0	111	100.0	222	100.0
Online instructional materials for your curriculum content	Much less than I needed	85	25.5	27	24.3	58	26.1
	Somewhat less than I needed	89	26.7	27	24.3	62	27.9
	About the amount I needed	114	34.2	41	36.9	73	32.9
	Somewhat more than I needed	26	7.8	8	7.2	18	8.1
	Much more than I needed	19	5.7	8	7.2	11	5.0
	Total N	333	100.0	111	100.0	222	100.0
Supporting social-emotional learning during remote/hybrid instruction	Much less than I needed	98	29.3	28	25.2	70	31.4
	Somewhat less than I needed	88	26.3	25	22.5	63	28.3
	About the amount I needed	104	31.1	38	34.2	66	29.6
	Somewhat more than I needed	28	8.4	12	10.8	16	7.2
	Much more than I needed	16	4.8	8	7.2	8	3.6
	Total N	334	100.0	111	100.0	223	100.0
Other strategies and skills for remote/hybrid instruction (please describe):	Much less than I needed	65	28.0	21	27.3	44	28.4
	Somewhat less than I needed	50	21.6	11	14.3	39	25.2
	About the amount I needed	96	41.4	39	50.6	57	36.8
	Somewhat more than I needed	7	3.0	2	2.6	5	3.2
	Much more than I needed	14	6.0	4	5.2	10	6.5
	Total N	232	100.0	77	100.0	155	100.0

Over 500 teachers selected the "other strategies and skills for remote/hybrid instruction" option and used the open-text field to describe other professional development they completed in the past five years; as shown above, the majority of these teachers described areas in which they needed more professional development. Many teachers reported that their district had not provided adequate training or support on how to adapt to remote/hybrid learning; when remote learning began in the spring of 2020; they lacked

the technology, technology skills, remote teaching skills, and engagement strategies needed to implement virtual instruction. Some teachers said that their districts provided technology for remote instruction (for example, learning management systems, apps and websites, cameras and other hardware, etc.) but did not provide adequate training on how to use these resources. Many teachers reported that they needed professional development related to learning management systems, specific apps and websites, video and document cameras, and general technology troubleshooting. And many teachers reported that they needed professional development that focused on technology integration—learning how to structure instruction and use technology to make remote learning effective. For example, teachers said they needed support in learning how to open and close breakout rooms in Zoom or Google Meet, but even more said they needed to learn how to use breakout rooms to facilitate small group instruction, peer learning, and student engagement. Teachers reported that with so many learning apps available, they needed support in deciding which apps to use for what purposes—live instruction, pre-recorded instruction, guided practice, formative assessment, summative assessment, etc.—not simply tutorials in how specific apps work. Overall, teachers acknowledged that when translating their lesson plans and instructional materials to a remote format, they needed to learn how to use technology to make instruction engaging and effective. In some cases, teachers wanted support with novel ways of interacting with students, especially disengaged students, while in other cases, teachers wanted support with finding or creating new digital content, such as remote science experiments, art projects, and field trips.

Classroom management was also a commonly mentioned area where professional development was needed, for example managing student behavior virtually, monitoring student devices, and controlling cheating, especially when using new strategies and platforms for student assessment. For teachers who were tasked with dual instruction, in which they taught both in-person and remote students at the same time, strategies were needed for keeping both groups engaged simultaneously. Some teachers said they needed professional development that focused on their setting (for example, self-contained special education classrooms), specific student groups (for example, English learners or students with IEPs), or their content area (for example, science or music). For example, teachers said they need training on how to implement individualized education programs (IEPs) for special education students in a virtual format, as well as how to teach English learners and use interpretation services during remote lessons to ensure equitable instruction. Many teachers reported that they needed support with family engagement—communicating with families about expectations for remote/hybrid learning, ways that the family could support student learning, and student progress, including concerns about attendance, engagement, and performance. Some teachers also reported that they needed professional development focused on work-life balance and personal well-being.

Importantly, many teachers reported that their districts allotted inadequate time to professional development. Some said that the professional development they completed was entirely self-taught and on their own time. Many teachers reported that the most valuable form of professional development they completed was collaboration with other staff members, either informal, with teachers taking the initiative to support and train each other, or formal, with schools training led by teachers or specialists. Some teachers

reported that they took the initiative to participate in online courses and certifications to improve their digital literacy. While many teachers said their districts did not meet their professional development needs, other teachers reported that their districts provided personalized learning platforms, support systems, and resource lists for professional development and training related to apps, technology tools, and blended learning.

Table E48. Teacher-reported professional development to support remote and hybrid learning
Teacher survey Q36. Is there anything else you'd like to share about your experiences as a Connecticut teacher during the COVID-19 pandemic?

Through the open-ended teacher survey question, some teachers reported that the professional development they received to prepare for remote and hybrid learning was adequate and effective. One teacher reported that when the pandemic began, teachers were given time to adapt to and deal with the situation both professionally and emotionally before beginning remote instruction. Multiple teachers reported that 2-4 days of professional development training was enough to complete extensive training on new technologies and teaching strategies. Some teachers reported that they received training on teaching during a pandemic and how to use online platforms. A number of teachers mentioned that they grew in their ability to effectively use technology to teach, with one teacher specifically mentioning using technology effectively for teaching English learners remotely. Multiple teachers reported that they hope to continue receiving professional development on digital literacy and different learning models to stay knowledgeable and be prepared to integrate remote learning into their teaching practices in the future, if needed.

At the same time, responses to the open-ended teacher survey question indicated that other teachers had many professional development needs that were not met by their districts. Respondents emphasized that there wasn't enough time dedicated to preparing teachers for remote instruction, and that they were thrown into remote, hybrid, and/or concurrent learning models without adequate training. Many teachers reported that they were given new apps, devices, and learning management without any training on how to implement these technologies. Some teachers who received professional development from their district shared the training was too broad and didn't meet their individual needs, especially for specific disciplines and for special education teachers. Some teachers said they sought professional development from sources outside their district or learned the new technologies by collaborating with other teachers. Teachers also reported that they received inadequate professional development in preparation for the return to in-person instruction. Some teachers reported that they received no health and safety training for in-person teaching, nor did their students. Teachers reported that they wanted more professional development focused on teaching post-pandemic or post-remote student populations. A multitude of teachers posited that students returning to in-person instruction were behind socially-emotionally, as well as academically, and teachers needed more professional development and training related to mental health and trauma.

Research Question 3d. What tools and strategies introduced during the pandemic do administrators and teachers say they will continue to use in their practice?

Table E49. District-reported remote/hybrid practices to continue after the pandemic has passed

District Inventory: Q26_1 - Q26_13. Do you plan to use any of the following online practices after the pandemic has passed? Please select all that apply.

	District Type							
	Overall		Alliance districts		Non-Alliance districts		APSEPs	
	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Remote instruction for all students during isolated events (e.g., inclement weather days)	63	28.9	11	34.4	40	29.0	12	25.0
Remote instruction for any students whose families request it	15	6.9	5	15.6	2	1.4	8	16.7
Remote instruction for students with special circumstances (e.g., student illness)	99	45.4	16	50.0	61	44.2	22	45.8
One or more stand-alone online courses (e.g., credit recovery, certain advanced coursework)	112	51.4	26	81.3	74	53.6	12	25.0
Learning Management System and/or digital learning tools or platforms	145	66.5	24	75.0	102	73.9	19	39.6
Blended learning courses that include a combination of (but not concurrent) in-person instruction and online instruction	59	27.1	14	43.8	38	27.5	7	14.6
Blended learning courses where teachers instruct some students in person and some students online concurrently (e.g., simulcasting)	25	11.5	5	15.6	15	10.9	5	10.4
Virtual teacher trainings or professional development	178	81.7	27	84.4	114	82.6	37	77.1
Virtual meetings with students (e.g., counselors, social workers, or therapists meeting with students to provide services)	139	63.8	25	78.1	91	65.9	23	47.9
Virtual meetings with parents (e.g., parent-teacher conferences, events for parents)	204	93.6	30	93.8	130	94.2	44	91.7
Online diagnostic or benchmark assessments	136	62.4	25	78.1	99	71.7	12	25.0
Other online practice (please describe):	36	16.5	6	18.8	24	17.4	6	12.5
Additional comments:	24	11.0	3	9.4	17	12.3	4	8.3
Total N	218	100.0	32	100.0	138	100.0	48	100.0

Some districts elected to discuss additional online practices (beyond the multiple-choice options provided) that they plan to continue after the pandemic has passed. A common theme was the desire to continue online practices in certain circumstances to minimize learning loss, but that CT state policy has limited the options available for remote instruction, and thus it is not currently possible for districts to use remote learning days for isolated events. As a result, the majority of the other online practices mentioned are unrelated to instructional purposes. Some districts discussed that they would like to continue holding staff meetings and community meetings (such as board meetings) virtually, though the level of enthusiasm with this suggestion was mixed. Some districts wanted virtual staff/community meetings to be the default. Whereas, other districts said that they would continue virtual meetings only if other options were not available. Another use of online practices mentioned was providing academic resources to students virtually. For example, districts indicated that virtual practices could be used to share college opportunities with students, or to get access to more guest speakers that can't physically attend the class. Furthermore, virtual tutoring, skill development, and academic reinforcement were mentioned as potential virtual practices. Regardless of these online options, the most referenced concern about continuing online practices was that districts feel limited by state policy in what remote options they are allowed to provide for their students and their community.

Some districts provided additional comments regarding online practices they plan to continue after the pandemic has passed. There were again a multitude of districts that reported that they would like to have the option of doing remote instructional days during isolated events, but that they are currently limited by state policy; these limitations placed on remote instruction by CT state policy was a common theme throughout these comments. There were a couple of districts that reported that they are considering blended learning options to provide increased flexibility for their students in certain circumstances, such as to allow high school students to take on job opportunities. Another common comment was the use of online practices to increase engagement in the community. There were multiple districts that reported that they're planning to offer their events and programming both in-person and virtually to ensure that these events are accessible to all parents. In general, a plan to continue holding virtual meetings with parents was discussed by a few districts, in addition to holding virtual staff and community meetings. The goal expressed by many districts was to continue using online practices to increase accessibility and ease of involvement for parents and staff within their district.

Table E50. Teacher-reported instructional technologies introduced during the pandemic by grade level

Teacher Survey Q20. Since the pandemic started, which new online instructional materials or technologies have you used that you had not used before the pandemic? Please select all that apply.

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary school	Learning management system	485	77.7	211	79.3	274	76.5
	Online instructional materials for your curriculum content	497	79.6	210	78.9	287	80.2
	Online instructional materials for SEL	383	61.4	171	64.3	212	59.2
	Other	125	20.0	56	21.1	69	19.3
	Total N	624	100.0	266	100.0	358	100.0
Middle school	Learning management system	160	45.7	67	58.8	93	39.4
	Online instructional materials for your curriculum content	244	69.7	78	68.4	166	70.3
	Online instructional materials for SEL	174	49.7	67	58.8	107	45.3
	Other	92	26.3	27	23.7	65	27.5
	Total N	350	100.0	114	100.0	236	100.0
High school	Learning management system	246	45.6	81	50.0	165	43.8
	Online instructional materials for your curriculum content	346	64.2	92	56.8	254	67.4
	Online instructional materials for SEL	241	44.7	81	50.0	160	42.4
	Other	145	26.9	41	25.3	104	27.6
	Total N	539	100.0	162	100.0	377	100.0
Multiple levels, ungraded, or unknown	Learning management system	124	63.3	40	63.5	84	63.2
	Online instructional materials for your curriculum content	147	75.0	49	77.8	98	73.7
	Online instructional materials for SEL	108	55.1	35	55.6	73	54.9
	Other	39	19.9	12	19.0	27	20.3
	Total N	196	100.0	63	100.0	133	100.0

Table E51. Teacher-reported plans for instructional technology introduced during the pandemic (elementary teachers)

Teacher Survey Q21. Of the new online instructional materials or technologies you have been using since the pandemic started, which would you like to continue using and which would you like to stop using after the pandemic? (Elementary school teachers)

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Learning management system	Would like to stop using	174	36.6	75	36.6	99	36.7
	Would like to continue using	301	63.4	130	63.4	171	63.3
	Total N	475	100.0	205	100.0	270	100.0
Online instructional materials for your curriculum content	Would like to stop using	98	20.0	40	19.4	58	20.4
	Would like to continue using	392	80.0	166	80.6	226	79.6
	Total N	490	100.0	206	100.0	284	100.0
Online instructional materials for SEL	Would like to stop using	108	28.6	52	30.8	56	26.8
	Would like to continue using	270	71.4	117	69.2	153	73.2
	Total N	378	100.0	169	100.0	209	100.0
Other	Would like to stop using	18	14.9	6	11.3	12	17.6
	Would like to continue using	103	85.1	47	88.7	56	82.4
	Total N	121	100.0	53	100.0	68	100.0

Table E452. Teacher-reported plans for instructional technology introduced during the pandemic (middle school teachers)

Teacher Survey Q21. Of the new online instructional materials or technologies you have been using since the pandemic started, which would you like to continue using and which would you like to stop using after the pandemic? (Middle school teachers)

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Learning management system	Would like to stop using	22	14.1	11	16.9	11	12.1
	Would like to continue using	134	85.9	54	83.1	80	87.9
	Total N	156	100.0	65	100.0	91	100.0
Online instructional materials for your curriculum content	Would like to stop using	38	15.8	12	15.6	26	16.0
	Would like to continue using	202	84.2	65	84.4	137	84.0
	Total N	240	100.0	77	100.0	163	100.0
Online instructional materials for SEL	Would like to stop using	55	32.7	20	30.3	35	34.3
	Would like to continue using	113	67.3	46	69.7	67	65.7
	Total N	168	100.0	66	100.0	102	100.0
Other	Would like to stop using	20	22.5	3	11.5	17	27.0
	Would like to continue using	69	77.5	23	88.5	46	73.0
	Total N	89	100.0	26	100.0	63	100.0

Table E53. Teacher-reported plans for instructional technology introduced during the pandemic (high school teachers)

Teacher Survey Q21. Of the new online instructional materials or technologies you have been using since the pandemic started, which would you like to continue using and which would you like to stop using after the pandemic? (High school teachers)

		District Type					
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Learning management system	Would like to stop using	43	18.1	13	16.9	30	18.6
	Would like to continue using	195	81.9	64	83.1	131	81.4
	Total N	238	100.0	77	100.0	161	100.0
Online instructional materials for your curriculum content	Would like to stop using	46	13.5	11	12.2	35	13.9
	Would like to continue using	295	86.5	79	87.8	216	86.1
	Total N	341	100.0	90	100.0	251	100.0
Online instructional materials for SEL	Would like to stop using	85	36.0	23	29.5	62	39.2
	Would like to continue using	151	64.0	55	70.5	96	60.8
	Total N	236	100.0	78	100.0	158	100.0
Other	Would like to stop using	37	26.1	12	31.6	25	24.0
	Would like to continue using	105	73.9	26	68.4	79	76.0
	Total N	142	100.0	38	100.0	104	100.0

Table E54. Teacher-reported plans for instructional technology introduced during the pandemic (mixed level teachers)

Teacher Survey Q21. Of the new online instructional materials or technologies you have been using since the pandemic started, which would you like to continue using and which would you like to stop using after the pandemic? (Teachers who selected multiple grade levels, no grade levels, or "ungraded")

				District Type			
		Overall		Alliance districts		Non-Alliance districts	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Learning management system	Would like to stop using	20	17.4	7	18.4	13	16.9
	Would like to continue using	95	82.6	31	81.6	64	83.1
	Total N	115	100.0	38	100.0	77	100.0
Online instructional materials for your curriculum content	Would like to stop using	18	12.6	9	18.4	9	9.6
	Would like to continue using	125	87.4	40	81.6	85	90.4
	Total N	143	100.0	49	100.0	94	100.0
Online instructional materials for SEL	Would like to stop using	31	29.8	8	23.5	23	32.9
	Would like to continue using	73	70.2	26	76.5	47	67.1
	Total N	104	100.0	34	100.0	70	100.0
Other	Would like to stop using	4	10.5	0	.0	4	15.4
	Would like to continue using	34	89.5	12	100.0	22	84.6
	Total N	38	100.0	12	100.0	26	100.0

Research Question 3e. What lessons do administrators and teachers say they learned regarding teaching and learning during the pandemic and how the state could improve in a future pivot to remote learning?

Table E55. Teacher-reported rankings by grade level of preferred learning model post-pandemic

Teacher Survey Q29. After the pandemic, please rank the following instructional models in terms of how you would you prefer to teach, if you had a choice?

		District Type								
		Overall			Alliance districts			Non-Alliance districts		
		N	Mean Ranking	(SD)	N	Mean Ranking	(SD)	N	Mean Ranking	(SD)
Elementary school	Fully in-person instruction	610	1.1	(.5)	246	1.2	(.5)	364	1.1	(.5)
	Hybrid model where I provide in-person and remote instruction concurrently	610	3.8	(1.2)	246	3.7	(1.2)	364	3.9	(1.2)
	Hybrid model where I provide in-person instruction and remote instruction not concurrently	610	2.7	(.9)	246	2.8	(1.0)	364	2.7	(.9)
	Fully remote instruction, where my students receive at least one synchronous/real-time class each school day	610	3.2	(1.0)	246	3.2	(1.0)	364	3.1	(.9)
	Fully remote instruction, where my students receive less than one synchronous/real-time class each school day	610	4.2	(1.0)	246	4.2	(1.0)	364	4.2	(.9)
Middle school	Fully in-person instruction	361	1.1	(.5)	111	1.2	(.7)	250	1.1	(.5)
	Hybrid model where I provide in-person and remote instruction concurrently	361	3.6	(1.3)	111	3.5	(1.3)	250	3.7	(1.3)
	Hybrid model where I provide in-person instruction and remote instruction not concurrently	361	2.8	(1.0)	111	2.7	(.9)	250	2.9	(1.0)
	Fully remote instruction, where my students receive at least one synchronous/real-time class each school day	361	3.3	(1.0)	111	3.4	(.9)	250	3.2	(1.0)
	Fully remote instruction, where my students receive less than one synchronous/real-time class each school day	361	4.2	(1.0)	111	4.2	(1.1)	250	4.1	(1.0)
High school	Fully in-person instruction	540	1.2	(.7)	183	1.3	(.8)	357	1.1	(.6)
	Hybrid model where I provide in-person and remote instruction concurrently	540	3.5	(1.2)	183	3.7	(1.3)	357	3.5	(1.2)
	Hybrid model where I provide in-person instruction and remote instruction not concurrently	540	3.0	(1.0)	183	2.9	(1.1)	357	3.0	(1.0)
	Fully remote instruction, where my students receive at least one synchronous/real-time class each school day	540	3.2	(1.0)	183	3.1	(1.0)	357	3.2	(1.0)
	Fully remote instruction, where my students receive less than one synchronous/real-time class each school day	540	4.1	(1.1)	183	4.0	(1.1)	357	4.2	(1.1)
Multiple levels, ungraded, or unknown	Fully in-person instruction	217	1.1	(.5)	67	1.1	(.4)	150	1.1	(.5)
	Hybrid model where I provide in-person and remote instruction concurrently	217	3.5	(1.2)	67	3.5	(1.2)	150	3.6	(1.2)
	Hybrid model where I provide in-person instruction and remote instruction not concurrently	217	2.9	(1.0)	67	2.7	(.8)	150	2.9	(1.0)
	Fully remote instruction, where my students receive at least one synchronous/real-time class each school day	217	3.3	(1.0)	67	3.3	(1.0)	150	3.3	(1.0)
	Fully remote instruction, where my students receive less than one synchronous/real-time class each school day	217	4.2	(1.0)	67	4.4	(.9)	150	4.1	(1.0)

Please note, teachers were asked to rank order the options listed above, with the highest ranked option receiving a score of 1 and the lowest ranked option receiving a score of 5.

Table E56. Teacher-reported rankings by grade level of how prepared they feel to teach each of the learning models

Teacher Survey Q30. Considering the current point in time, please rank the following instructional models in terms of how prepared you feel to use them as a teacher.

		District Type								
		Overall			Alliance districts			Non-Alliance districts		
		N	Mean Ranking	(SD)	N	Mean Ranking	(SD)	N	Mean Ranking	(SD)
Elementary school	Fully in-person instruction	610	1.0	(.2)	246	1.0	(.2)	364	1.0	(.2)
	Hybrid model where I provide in-person and remote instruction concurrently	610	3.6	(1.3)	246	3.5	(1.3)	364	3.7	(1.3)
	Hybrid model where I provide in-person instruction and remote instruction not concurrently	610	3.0	(1.0)	246	3.0	(1.0)	364	3.0	(1.0)
	Fully remote instruction, where my students receive at least one synchronous/real-time class each school day	610	3.3	(.9)	246	3.3	(.9)	364	3.3	(.8)
	Fully remote instruction, where my students receive less than one synchronous/real-time class each school day	610	4.1	(1.0)	246	4.2	(1.0)	364	4.1	(1.0)
Middle school	Fully in-person instruction	361	1.1	(.3)	111	1.0	(.2)	250	1.1	(.4)
	Hybrid model where I provide in-person and remote instruction concurrently	361	3.4	(1.3)	111	3.4	(1.3)	250	3.5	(1.3)
	Hybrid model where I provide in-person instruction and remote instruction not concurrently	361	3.0	(1.0)	111	3.0	(1.0)	250	3.0	(1.0)
	Fully remote instruction, where my students receive at least one synchronous/real-time class each school day	361	3.3	(.9)	111	3.4	(.8)	250	3.3	(.9)
	Fully remote instruction, where my students receive less than one synchronous/real-time class each school day	361	4.2	(1.0)	111	4.2	(1.0)	250	4.2	(1.0)
High school	Fully in-person instruction	540	1.1	(.3)	183	1.1	(.4)	357	1.0	(.3)
	Hybrid model where I provide in-person and remote instruction concurrently	540	3.4	(1.3)	183	3.5	(1.3)	357	3.3	(1.2)
	Hybrid model where I provide in-person instruction and remote instruction not concurrently	540	3.2	(1.0)	183	3.2	(1.0)	357	3.2	(1.0)
	Fully remote instruction, where my students receive at least one synchronous/real-time class each school day	540	3.3	(.9)	183	3.1	(.9)	357	3.3	(.9)
	Fully remote instruction, where my students receive less than one synchronous/real-time class each school day	540	4.1	(1.1)	183	4.0	(1.1)	357	4.1	(1.0)
Multiple levels, ungraded, or unknown	Fully in-person instruction	217	1.0	(.3)	67	1.0	(.1)	150	1.1	(.4)
	Hybrid model where I provide in-person and remote instruction concurrently	217	3.6	(1.3)	67	3.8	(1.3)	150	3.5	(1.3)
	Hybrid model where I provide in-person instruction and remote instruction not concurrently	217	3.0	(.9)	67	2.9	(.9)	150	3.1	(1.0)
	Fully remote instruction, where my students receive at least one synchronous/real-time class each school day	217	3.2	(.9)	67	3.2	(.9)	150	3.3	(.9)
	Fully remote instruction, where my students receive less than one synchronous/real-time class each school day	217	4.1	(1.1)	67	4.1	(1.0)	150	4.1	(1.1)

Please note, teachers were asked to rank order the options listed above, with the highest ranked option receiving a score of 1 and the lowest ranked option receiving a score of 5.

Table E57. Teacher-reported rankings by grade level of how effective the learning models are for students

Teacher Survey Q31. In your opinion, please rank the following instructional models in terms of how effective you believe they are for the average student.

		District Type								
		Overall			Alliance districts			Non-Alliance districts		
		N	Mean Ranking	(SD)	N	Mean Ranking	(SD)	N	Mean Ranking	(SD)
Elementary school	Fully in-person instruction	610	1.0	(.2)	246	1.0	(.3)	364	1.0	(.2)
	Hybrid model where I provide in-person and remote instruction concurrently	610	3.4	(1.2)	246	3.3	(1.2)	364	3.5	(1.2)
	Hybrid model where I provide in-person instruction and remote instruction not concurrently	610	2.6	(.8)	246	2.7	(.8)	364	2.6	(.8)
	Fully remote instruction, where my students receive at least one synchronous/real-time class each school day	610	3.4	(.8)	246	3.4	(.8)	364	3.4	(.8)
	Fully remote instruction, where my students receive less than one synchronous/real-time class each school day	610	4.5	(.7)	246	4.6	(.7)	364	4.5	(.7)
Middle school	Fully in-person instruction	361	1.0	(.3)	111	1.1	(.4)	250	1.0	(.2)
	Hybrid model where I provide in-person and remote instruction concurrently	361	3.3	(1.2)	111	3.1	(1.2)	250	3.3	(1.2)
	Hybrid model where I provide in-person instruction and remote instruction not concurrently	361	2.7	(.8)	111	2.6	(.8)	250	2.7	(.8)
	Fully remote instruction, where my students receive at least one synchronous/real-time class each school day	361	3.5	(.8)	111	3.5	(.7)	250	3.4	(.8)
	Fully remote instruction, where my students receive less than one synchronous/real-time class each school day	361	4.6	(.7)	111	4.6	(.8)	250	4.5	(.7)
High school	Fully in-person instruction	540	1.1	(.4)	183	1.1	(.5)	357	1.0	(.3)
	Hybrid model where I provide in-person and remote instruction concurrently	540	3.2	(1.2)	183	3.3	(1.2)	357	3.1	(1.1)
	Hybrid model where I provide in-person instruction and remote instruction not concurrently	540	2.9	(1.0)	183	2.9	(1.0)	357	2.9	(.9)
	Fully remote instruction, where my students receive at least one synchronous/real-time class each school day	540	3.4	(.9)	183	3.3	(.9)	357	3.5	(.8)
	Fully remote instruction, where my students receive less than one synchronous/real-time class each school day	540	4.4	(.9)	183	4.3	(.9)	357	4.5	(.8)
Multiple levels, ungraded, or unknown	Fully in-person instruction	217	1.0	(.3)	67	1.0	(.2)	150	1.0	(.3)
	Hybrid model where I provide in-person and remote instruction concurrently	217	3.4	(1.2)	67	3.5	(1.3)	150	3.3	(1.2)
	Hybrid model where I provide in-person instruction and remote instruction not concurrently	217	2.8	(.9)	67	2.6	(.7)	150	2.9	(.9)
	Fully remote instruction, where my students receive at least one synchronous/real-time class each school day	217	3.4	(.8)	67	3.4	(.7)	150	3.4	(.8)
	Fully remote instruction, where my students receive less than one synchronous/real-time class each school day	217	4.5	(.9)	67	4.6	(.7)	150	4.4	(.9)

Please note, teachers were asked to rank order the options listed above, with the highest ranked option receiving a score of 1 and the lowest ranked option receiving a score of 5.

Table E58. Teacher-reported "lessons learned" about teaching and learning during a crisis
Teacher survey Q36. Is there anything else you'd like to share about your experiences as a Connecticut teacher during the COVID-19 pandemic?

State-Level Policies
Many teacher survey respondents used the open-ended question at the end of the survey to share "lessons learned" about teaching and learning during the pandemic. Respondents described the accumulating effects of multiple years of disruptions to learning—the unplanned shift to remote learning in spring 2020, the constant and rapid changes among learning models in 2020-21, and the pressure to return to "business as usual" in 2021-22. Respondents noted the wide variation in how districts implemented remote learning at the start of the pandemic and the return to in-person school in 2020-21, with some districts returning to full-time in-person learning at the start of fall 2020 and other districts returning to in-person learning later in the school year and sometimes in a hybrid format. Teacher respondents described the enormous gaps in academic and social-emotional development that resulted from the disruptions over the first 16 months of the pandemic, with some teachers pointing out that students continued to miss large chunks of instruction in 2021-22 as the result of absences related to illness or quarantine.

Accountability/Standardized Testing
Many teacher survey respondents expressed frustration with the idea that teachers could return to normal instruction during 2021-22 as students and teachers coped with learning loss and ongoing COVID-related disruptions. Some teachers said that while their districts were understanding and flexible with teachers and students at the start of the pandemic, school and district leadership became much less supportive as time went on. Teachers reported that in the 2020-21 and 2021-22 school years, districts prioritized curriculum coverage and standardized assessment scores over mental health for students and staff. One teacher said, "We jumped *back to normal* too quickly." Many teachers mentioned that leaders' expectations of teachers and students were unreasonable, with several proposing that curriculum and assessment expectations needed to be adjusted at the local, state, and/or national level to address learning loss and accommodate social-emotional challenges. One teacher said "…students are developmentally & academically behind and all we are being told is *fix it* with no plan. This is a national issue that needs to be looked at; either add on years to our education system or revamp what needs to be taught in the Common Core curriculum. Teachers cannot just *fix it!*" Another voiced a common theme by saying, "Stop the state mandates for testing, let us teach our students and help them get back on grade level along with dealing with their social-emotional needs." Other teachers said that evaluating teachers during an ongoing crisis was unreasonable and added unnecessary stress, while others noted that teachers were evaluated unfairly for being unable to remediate learning loss or behavior challenges quickly enough. One teacher said, "teachers are leaving because it is impossible to do their jobs."

Funding for Public Education

Teacher survey respondents who used the open-ended question at the end of the survey to reflect on funding for public education generally said that funding was inadequate. A number of respondents said that their districts had not given them the materials or tools they needed for remote, hybrid, or social-distanced in-person instruction; several teachers said they purchased equipment and supplies with their own money. Some teachers said that more funding was needed to increase staffing, for example, more teachers to reduce class sizes, additional paraprofessionals to support student learning, and more social workers to help students cope with the effects of the pandemic. Other teachers said their districts did not have adequate funding to address students' complex needs. One teacher said, "Students who were behind fell further behind, which was often not the fault of teachers or the school districts, but rather the fault of not having fully funded budgets to support staff, not having high quality materials, not having social supports in place for mental health, child care, and providing for basic needs like housing and food."

Other respondents reflected on the equity of funding for public education; most of these respondents agreed that inequitable funding of school districts was an issue throughout the pandemic. These teachers described substantial differences between affluent districts and less affluent districts, in terms of devices for 1:1 computing and other instructional technology, reliable internet access at students' homes and in school, and district preparedness for the shift to remote learning in March 2020. One teacher said, "The inequities between urban school students and students in well-funded districts have grown dramatically. I teach in a priority district and my children teach/live in [affluent towns]. It was sickening the difference in resources my grandchildren in [affluent town] received and the lack of resources my students in [city] had. My students had weak or non-existent internet/wi-fi which caused excessive absences and parents just giving up." Another teacher said, "the pandemic exposed gross and shameless educational inadequacies throughout the state of Connecticut. Poor and disenfranchised students in this wealthy state have very separate, and very unequal schools. The students have many more needs, and those needs should be met with adequate staffing and funding."

Respect for teachers

Over 10% of those teachers who responded to the open-ended teacher survey question commented on respect for teachers. A large number of teachers expressed frustration that they had to work much harder during the pandemic without appreciation or increased compensation. Many of these responses related to lack of acknowledgement of teachers' hard work, dedication, and acceptance of personal risk during the pandemic. Many teacher survey respondents said they felt like no one cared about teachers' health or emotional wellbeing, with teachers commenting on inadequate safety protocols and unrealistic expectations for teaching and learning. One teacher said, "Teacher voice was not heard concerning physical distancing, class sizes," while another talked about the premature end of mask requirements, and a third said, "Just as other professionals were protected, so should we have been." From the perspective of spring 2022, many teacher survey respondents used the open-ended question to expressed dismay that teachers were overlooked for hazard pay, COVID sick time, or increased compensation, with a very large number saying that they were disappointed that legislation

had not passed to give teachers credit toward retirement for two extra years of service. Many respondents shared this sentiment expressed by one: “Find a way to compensate school employees and essential workers who did their best to keep schools open and students engaged in learning during the pandemic.”

Many respondents reported feeling criticized by leaders and the general public for their work during the pandemic; for example, teachers said they were criticized for district decisions not to return to full-time in-person instruction in fall 2020 or blamed unfairly for student learning loss. One teacher said, “The public opinion of teachers in the pandemic swayed very quickly from heroes to zeroes as people became more frustrated with the pandemic.” Another teacher said, “No one seems to recognize what we went through. People recognize what nurses and doctors went through. … We did not feel taken care of or valued.” A fourth teacher said, “the community, government, and district leaders have done a terrible job at taking care of their teachers. … We were heroes and now we are the enemy expected to teach content and SEL. This is not what education is supposed to be.”

Many respondents talked about the lack of respect for teachers that was demonstrated by failure to engage teachers’ expertise and feedback throughout the pandemic. One teacher said, “Our school boards and government officials need to start listening to teachers, who are highly educated professionals, about what the needs are in the classrooms.” Another wrote, “Teaching is always hard, but it got harder, and we don't expect next year [2022-23] to be any easier. At the end of the day, we would take a bullet to protect our students, despite any disrespect from families or our districts. Teachers are not trusted to be experts in their fields despite multiple master’s degrees and certifications.” Teachers expressed frustration about leadership structures and inflexible policies that prevented them from teaching in ways they believe would best serve students. For example, one teacher said, “I feel as if we lost an opportunity during the pandemic to reevaluate and redesign how we teach to meet the needs of more students. Instead, our concerns and suggestions as the teachers in the classroom were often ignored if not outright ridiculed.”

Many teachers talked about the effects of disrespect on teacher morale and teacher attrition. “Teachers have come out of this embattled, embittered, and empty. We take pride in being educators but that is not what was happening during *the Covid years*. We were forced to be babysitters. The teachers and kids are not okay.” Many respondents expressed concern about the large number of people leaving the profession and the small number people entering it. One respondent said, “I worry about future generations of people not entering the teaching field due to the complications, public opinions and political effects of the pandemic.” Another said, “This country needs to rethink the treatment of the teaching profession. In order to sustain our public schools, there needs to be additional financial incentive to teach, better working conditions, and a shared community commitment to educating our youth.” A third teacher said, “I actually lose sleep with concerns of where we are headed as an institution. I went into teaching because I felt our youth was the most valuable resource we had in this world and any effort to help them become their best had meaning. I do not feel that way especially after this year. … the level of respect for teachers and the power of learning is non-existent.”

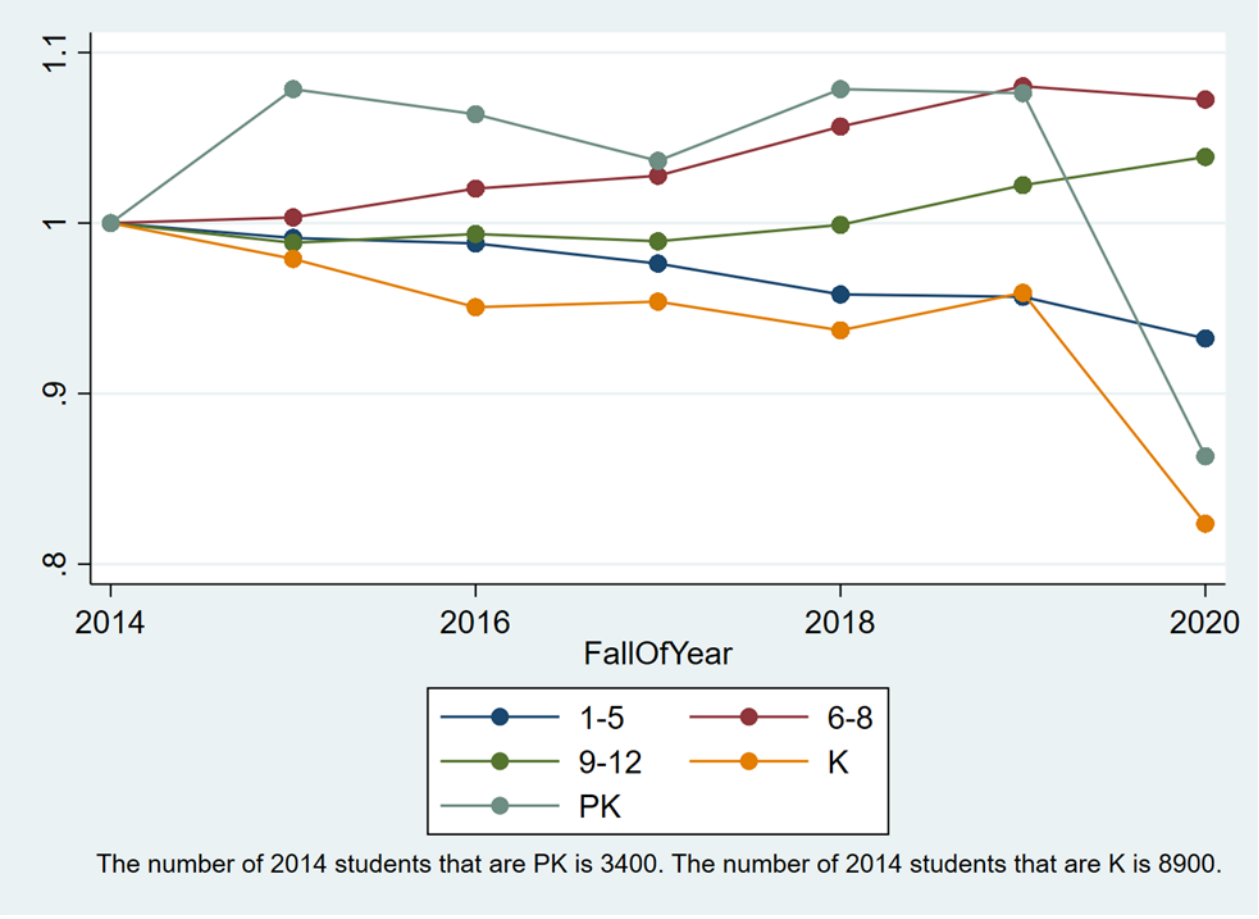
Appendix F: Student outcomes (Research Goal 4)

Q4a. To what extent were students able to access remote learning?

Detailed findings from administrative data analysis: Effects on Student Enrollment in 2020-21

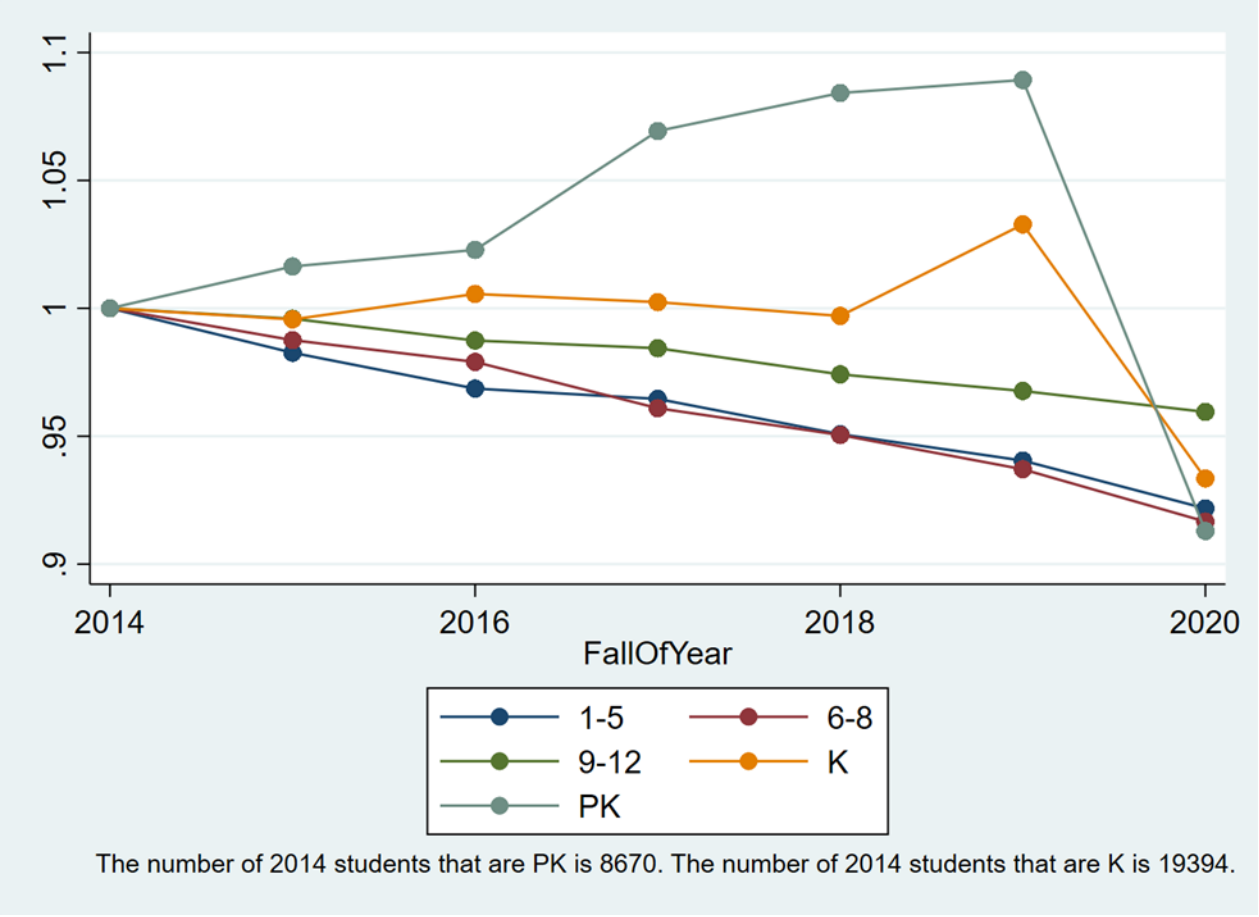
In order to examine changes in fall enrollment, we first plotted total state enrollment year by year separately for public pre-school, kindergarten, 1st-5th grade, 6th-8th grade and 9th-12th grade initializing all enrollment by dividing by 2014 enrollment levels. In Figure 1, we show these trends for Alliance Opportunity districts, the 10 districts in the state that are lowest performing on standardized tests. While 1st-5th grade fall enrollment fell between 2019-20 and 2020-21, the decline in enrollment was very similar in magnitude to declines in the preceding years, and there is no evidence of a decline due to the pandemic. However, for public pre-school and for kindergarten, enrollments drop dramatically between fall 2019-20 and 2020-21, declines much larger than the declines in previous years. In general, across all district types, we observe minimal deviation from trends in pandemic enrollment patterns, except in kindergarten and pre-school where we observe substantial declines. Figure 2 presents similar results for all non-Alliance districts and LEA's. Comparing Figures 1 and 2 shows that Alliance Opportunity districts experienced larger declines in kindergarten enrollment.

Figure F1. Enrollment Patterns for Alliance Opportunity Districts



The figure presents the average of enrollment in district and year as a fraction of district's 2014 enrollment. PK stands for public pre-school and K stands for kindergarten. All numbers on the legend refer to grades. Alliance Opportunity districts are the 10 lowest scoring public school districts in the state.

Figure F2. Enrollment Patterns for Non-Alliance Districts



The figure presents the average of enrollment in district and year as a fraction of district's 2014 enrollment. PK stands for public pre-school and K stands for kindergarten. All numbers on the legend refer to grades. Non-Alliance districts represent all LEAs except for the 36 lowest test scoring public school districts.

Next, we more closely examine kindergarten enrollment, which is relatively universal within the state, while we do not examine public pre-school, which represents a much more selected population. For kindergarten, we do not observe the full population of students eligible to enroll in kindergarten, and instead we use whether the school provided an in=person option in September as a dependent variable in a student sample to capture changes in enrollment patterns. Table F1 shows these results for kindergarten, as well as 1st and 2nd grade for comparability. Panel one presents results for the pandemic effect on the composition of students between schools that provided an in-person option in September of 2020 and those that did not. Estimates suggest a small decline of approximately ½ of one percentage point in kindergarten enrollment loss, significant at the 10% level, with no significant effects for 1st or 2nd grade. This effect is quite small given the 10 percentage point or more declines in October 2020 kindergarten enrollment. Further, the noisily estimated effect on the interaction of the pandemic variable with share high needs students is negative. Therefore, at the 75th percentile share of high needs students, our best estimate is that there is no improvement in October enrollment, even though kindergarten enrollment losses were stronger for more disadvantaged schools.

As a second approach, we use the sample of students enrolled in first grade in the fall of 2021-22 as a baseline and examine whether those students are observed as enrolled in kindergarten in the previous year. We estimate this model for September enrollment in kindergarten based on share of days offered in person in September, October to December enrollment (observed enrolled in any of the three months) based on share of days during the same period, and same for both January to March and April to June. These results are shown in Table F2. The first row presents the estimate on share of days in person and the second row presents the estimated constant, which captures the fraction or share of first grade students observed as enrolled at the state average share of days offered in person. The second panel also includes a propensity score control for share of days interacted with the pandemic dummy. Results are similar across both panels. In person offerings do not appear to have any effect on kindergarten enrollment either initially or throughout the year. Looking at the intercept, we observe that approximately 87% of first graders in the following year were not enrolled in kindergarten in September. The share enrolled by the end of the year climbs to 91% when measured at the average share of days offered in person.

Next, Table F3 presents estimates of our difference-in-differences model of continued enrollment separately by column for 1st through 5th, 6th through 8th, and 9th and 12th grades. The top panel presents the unweighted results and the second panel presents results using the overlap propensity score weights based on the estimates presented in Table 1. The interaction term estimates in the top panel suggest that the in person option minimizes pandemic year enrollment loss by over a percentage point in elementary and by about two-thirds of a percentage point for middle school, but these effects are eroded substantially (especially in elementary school) by the use of overlap weights. These findings suggest that the effect of providing an in person option on enrollment in panel 1 was spurious and likely driven by differences between schools that offered a September in person option and those that did not. Table F4 presents continued enrollment estimates after including interactions with share of high need students. Most estimates are

insignificant, and we do not observe any systematic relationship between an in-person option and continued enrollment.

Table F1. In-Person Option in September as Dependent Variable

Controls	(2) Kindergarten	(3) Grade 1	(4) Grade 2
Pandemic year	0.00499*	-0.00106	0.000661
	(0.00262)	(0.00217)	(0.00238)
Observations	251,767	258,433	261,228
R-squared	0.000	0.000	0.000
Pandemic year	0.00990*	0.00248	0.00266
	(0.00558)	(0.00485)	(0.00499)
Pandemic year*Share of high need students	-0.0150	-0.00971	-0.00450
	(0.0123)	(0.00967)	(0.00980)
Observations	250,146	256,762	259,238
R-squared	0.038	0.059	0.065
2019-20 Mean School Enrollment w/ In Person Option	77.8	76.0	76.8
2020-21 Mean School Enrollment w/ In Person Option	69.6	75.2	74.9
2019-20 Mean School Enrollment w/out In Person Option	65.4	65.4	66.3
2020-21 Mean School Enrollment w/out In Person Option	55.9	64.5	64.6
25th Percentile High Needs Pandemic Effects on Relative Enrollment In-Person Option	0.00578**	-0.0002	0.0014
75th Percentile High Needs Pandemic Effects on Relative Enrollment In-Person Option	0.00004	-0.0046	-0.0007

Note: The top panel shows the results of regressing in person/hybrid learning mode offered in September on a pandemic dummy variable and a linear trend. The columns present estimates for kindergarten, 1st and 2nd grades. The second panel presents results based on adding controls for the school share of students who are high needs, and the interaction of this variable with the pandemic dummy. The bottom panel presents mean enrollment in districts with and without a pandemic in person option both for periods prior to and during the pandemic. The final two rows in the bottom panel present the estimated effect of the pandemic based on the estimates in panel 2 measured at the 25th and 75th percentiles of share high need students.

Table F2: Enrolled in Kindergarten if Observed in First Grade Next Year

Observed Enrollment	(1) September	(2) Oct-Dec	(3) Jan-Mar	(4) Apr-Jun
		No Propensity Score		
Share of Days in Person	0.00793	0.0234	0.0242	0.0260
	(0.0229)	(0.0169)	(0.0169)	(0.0198)
Share Present at the Mean	0.869***	0.897***	0.909***	0.911***
	(0.0125)	(0.0124)	(0.0132)	(0.0161)
Observations	33,797	33,797	33,797	33,797
R-squared	0.000	0.001	0.000	0.000
		Conditional on Centered Propensity Score		
Share of Days in Person	0.00793	0.0234	0.0242	0.0260
	(0.0229)	(0.0169)	(0.0169)	(0.0198)
Share Present at the Mean	0.874***	0.912***	0.925***	0.930***
	(0.00528)	(0.00349)	(0.00326)	(0.00317)
Observations	33,797	33,797	33,797	33,797
R-squared	0.000	0.001	0.000	0.000
Mean Non-Remote share for each time period	0.6267112	0.6433241	0.6774023	0.729346

The table shows the results of whether a first-grade student in the next year is enrolled in kindergarten during the pandemic year on share of days in person. The columns present estimates for enrollment observed any time in September, October to December, January to March and April to the end of the school year and share of days in person are calculated for each column in the same month. The share of present at the mean row shows the intercept because the share of days in person variables are mean differenced. The top panel presents the OLS estimates, and the bottom panel presents estimates including a control for the propensity score that is centered with a mean zero.

Table F3. Fall Enrollment if Enrolled in the Previous Year

Controls	(1) Grades 1st through 5th	(2) Grades 6th through 8th	(3) Grades 9th through 12th
	Unweighted Model		
Pandemic year	-0.00288	0.00139	0.00315*
	(0.00221)	(0.00128)	(0.00172)
Pandemic year*In person learning option in Sept	-0.0125***	-0.00691***	-2.66e-06
	(0.00242)	(0.00150)	(0.00179)
Observations	726,758	468,726	636,613
R-squared	0.015	0.272	0.417
	Propensity Score Weights		
Pandemic year	-0.00367	0.00185	0.00397**
	(0.00251)	(0.00124)	(0.00155)
Pandemic year*In person learning option in Sept	-0.00249	-0.00479**	0.00127
	(0.00280)	(0.00225)	(0.00184)
Observations	726,758	468,726	636,613
R-squared	0.016	0.271	0.264
Fall Re-enrollment 2017-2019 w/ In-Person Option	0.978	0.978	0.969
Fall Re-enrollment 2017-2019 Remote Only	0.978	0.983	0.972
Fall Re-enrollment 2020-2021 w/ In-Person Option	0.963	0.973	0.973
Fall Re-enrollment 2020-2021 Remote Only	0.975	0.983	0.977

The top panel presents the estimates of regressing whether a student is observed enrolled in October of each year on a dummy variable for the pandemic year, the interaction of the pandemic dummy with a dummy variable for in person/hybrid option provided in September, and school fixed effects. Columns 1 through 3 present results for elementary, middle and high school grades, respectively. The second panel presents overlap propensity score weighted estimates based on the model presented in Table 1. The bottom panel presents student re-enrollment rates year to year separately for schools with and without a pandemic in person/hybrid option both for the pre-pandemic period and during 2020-21.

Table F4. Fall Enrollment and Share High Need Students

Controls	(1) Grades 1st through 5th	(2) Grades 6th through 8th	(3) Grades 9th through 12th
	Unweighted Model		
Pandemic year*Share high need students	0.0201	-0.00260	0.0106*
	(0.0191)	(0.0168)	(0.00549)
Pandemic year*Share high need students*	0.0116	0.0134	-0.00254
In Person learning option	(0.0196)	(0.0171)	(0.00625)
Observations	726,758	468,726	636,613
R-squared	0.015	0.272	0.417
	Propensity Score Weights		
Pandemic year*Share high need students	0.0150	0.00550	0.00960*
	(0.0223)	(0.0184)	(0.00509)
Pandemic year*Share high need students*	0.0222	0.0108	0.00413
In Person learning option	(0.0228)	(0.0196)	(0.00682)
Observations	726,758	468,726	636,613
R-squared	0.016	0.271	0.264
25th Percentile High Needs			
Pandemic Effects Remote	-0.0098	-0.0007	0.0006
Pandemic Effects In-Person Option	-0.0205	-0.0102	0.0007
75th Percentile High Needs			
Pandemic Effects Remote	-0.0028	0.0017	0.0041
Pandemic Effects In-Person Option	-0.0030	-0.0029	0.0056

The top panel presents the estimates of regressing whether a student is observed enrolled in October of each year on a dummy variable for the pandemic year, the interaction of the pandemic dummy with a dummy variable for in person/hybrid option provided in September, the interaction of the pandemic dummy with school share of high needs students, the three way interaction between pandemic-in person/hybrid-share high needs, and school fixed effects. Columns 1 through 3 present results for elementary, middle and high school grades, respectively. The second panel presents overlap propensity score weighted estimates based on the model presented in Table 1. The bottom panel presents estimated effects of the pandemic on re-enrollment based on the estimates in panel 2, separately for in-person/hybrid and fully remote at the 25th and 75th percentiles of school share of high needs students.

Detailed findings from administrative data analysis: Effects on Attendance in 2020-21

Table F5 presents estimates of the effect of in person learning availability on attendance using similar models to enrollment except including a student level control for two year lagged past attendance rates. Models using samples with one-year lags with attendance through March in 2019-20 yield very similar results. The top panel presents the results without the interaction between propensity score and the pandemic variable, and the second panel presents the results after conditioning on this interaction. In both panels, we observe very large declines in attendance during the pandemic of between 2.5 to 4.5 percentage points with larger declines in earlier grades. Further, schools that provide a greater share of days in person experience less enrollment loss at all grade levels, especially in elementary and middle school. The inclusion of the propensity score leads to a reduction in the effect of in person share, and the high school estimates are substantially smaller and insignificant. However, pandemic effect estimates also erode in magnitude so that providing an in-person option ameliorates a similar share of the learning loss in elementary and middle school whether or not models include the propensity score. The bottom panel presents predicted attendance rates at the 10th and 90th percentiles of share of in person using the propensity score model: 46% vs. 100% in person for elementary, 44% vs. 94% for middle and 41% vs. 82% for high school. In elementary, a school at the 90th percentile of in person share is predicted to have a 2 percentage point lower decline in attendance during the pandemic relative to the 10th percentile. Improvements are 1 percentage point for middle school and only half a point for high school.

Table F6 presents the results allowing effects to differ between schools with a low versus high share of high need students. In both models with and without propensity score, we observe that attendance outcomes during the pandemic are substantially worse in schools that have a larger share of high need students across all grade levels. Comparing attendance rates for the 25th and 75th percentiles of share high needs, the bottom panel shows 2 to 3 percentage point worse attendance rates for schools at the 75th percentile. However, the positive significant estimate on the interaction between share days in person and share high needs in panel 1, which is consistent with the previous findings of Halloran et al. (2021) and Goldhaber et al. (2022) for test scores, is not robust to the inclusion of propensity score control (Panel 2). The estimate declines by 35 percent and is no longer significant. In the bottom panel for elementary school, we do observe a one percentage point difference based on remote versus in person learning at the 75th percentile that is not observed at the 25th percentile, and at the 75th percentile the estimate on the interaction between share in person and share in high needs is statistically significant,[4] but overall our propensity score models provide minimal evidence that in person learning has differential effects between schools based on the share of high needs students.

All models have been estimated grade by grade, and results for pooled elementary, middle and high school grades above are replicated at the individual grade level.

[4] Specifically, the coefficient on this interaction is significant in a model where the share high needs variable takes the value of zero at the 75th percentile, negative below and positive above.

Table F5. Attendance conditional on previous year attendance

Controls	(1) Grades 2nd through 5th	(2) Grades 6th through 8th	(3) Grades 9th through 12th
	No Propensity Score		
Lagged Attendance	0.404***	0.655***	0.660***
	(0.0302)	(0.0125)	(0.0197)
Pandemic year	-0.0468***	-0.0371***	-0.0276***
	(0.00372)	(0.00606)	(0.00986)
Pandemic year*Share of days in person	0.0487***	0.0318***	0.0198
	(0.00447)	(0.00825)	(0.0166)
Observations	584,085	444,062	592,910
R-squared	0.208	0.244	0.291
	Conditional on Centered Propensity Score		
Lagged Attendance	0.404***	0.655***	0.659***
	(0.0301)	(0.0125)	(0.0196)
Pandemic year	-0.0382***	-0.0325***	-0.0256***
	(0.00349)	(0.00581)	(0.00860)
Pandemic year*Share of days in person	0.0354***	0.0223***	0.0125
	(0.00422)	(0.00828)	(0.0139)
Pandemic year*Centered propensity score	0.0609***	0.0526***	0.342***
	(0.00854)	(0.0165)	(0.0607)
Observations	584,085	444,062	592,910
R-squared	0.215	0.248	0.297
Average Attendance Rates 2017-2018, 2018-2019, 2019-20	0.956	0.953	0.938
Average Attendance Rates 2020-21	0.944	0.934	0.919
10th Percentile Share of In Person Days Available	0.456	0.441	0.414
90th Percentile Share of In Person Days Available	1.000	0.943	0.818
Pandemic Effects at 10th Percentile Share In Person	-0.022	-0.023	-0.020
Pandemic Effects at 90th Percentile Share In Person	-0.003	-0.011	-0.015

The top panel presents the estimates of regressing student annual attendance rates on one year lagged student attendance rates, a dummy variable for the pandemic year, the interaction of the pandemic dummy with the share of days offered in person during the school year, and school fixed effects. Columns 1 through 3 present results for elementary, middle and high school grades, respectively. The second panel presents results of a model that also includes the propensity score from the estimates in Table 2 interacted with the pandemic dummy. The bottom panel presents average attendance rates pre-pandemic and during 2020-21. Share of days offered in person at the 10th and 90th percentiles, and estimates effects of the pandemic based on the estimates in panel 2 calculated at the 10th and 90th percentile share of days.

Table F6. Attendance conditional on previous year attendance

Controls	(1) Grades 2nd through 5th	(2) Grades 6th through 8th	(3) Grades 9th through 12th
	No Propensity Score		
Lagged Attendance	0.404***	0.655***	0.659***
	(0.0301)	(0.0124)	(0.0196)
Pandemic year*Share high need students	-0.0994***	-0.0732***	-0.0376
	(0.0127)	(0.0216)	(0.0402)
Pandemic year*Share high need students*	0.0340**	-0.0260	-0.0848
In Person learning option	(0.0162)	(0.0321)	(0.0655)
Observations	584,085	444,062	592,910
R-squared	0.225	0.261	0.297
	Conditional on Centered Propensity Score		
Lagged Attendance	0.404***	0.655***	0.659***
	(0.0301)	(0.0124)	(0.0196)
Pandemic year*Share high need students	-0.0840***	-0.0808***	-0.00416
	(0.0131)	(0.0225)	(0.0369)
Pandemic year*Share high need students*	0.0224	-0.0203	-0.0868
In Person learning option	(0.0163)	(0.0306)	(0.0647)
Pandemic year*Centered propensity score	0.0170**	-0.00916	0.168***
	(0.00754)	(0.0194)	(0.0637)
Observations	584,085	444,062	592,910
R-squared	0.225	0.262	0.298
25th Percentile High Needs			
Pandemic Effects 10th Percentile In-Person	0.004	0.006	-0.011
Pandemic Effects 90th Percentile In-Person	0.0067	0.0057	-0.0011
In-Person Option Interaction Significance			
75th Percentile High Needs			
Pandemic Effects 10th Percentile In-Person	-0.0310	-0.0336	-0.0252
Pandemic Effects 90th Percentile In-Person	-0.0222	-0.0383	-0.0283
In-Person Option Interaction Significance	***		

The top panel presents the estimates of regressing student annual attendance rates on one year lagged student attendance rates, a dummy variable for the pandemic year, the interaction of the pandemic dummy with the share of days offered in person during the school year, the interaction of the pandemic dummy with school share of high needs students, the three-way interaction between pandemic-share of days in person-share high needs, and school fixed effects. Columns 1 through 3 present results for elementary, middle, and high school grades, respectively. The second panel presents results of a model that also includes the propensity score from the estimates in Table 2 interacted with the pandemic dummy. The bottom panel presents estimated effects of the pandemic on attendance based on the estimates in panel 2, separately for the 10th and 90th percentiles of share of days offered in person for both the 25th and 75th percentiles of school share of high needs students. The bottom rows under the 25th and 75th percentiles on share high needs represents the statistical significance of the share of days in person interaction with the pandemic dummy when share of high need students has been centered to take a value of zero at the 25th and 75th percentiles, respectively.

Detailed findings from administrative data analysis: Effects on Standardized Test Scores in 2020-21

Tables F7 and F8 present the results for English Language Arts (ELA) and Mathematics (MATH) Smarter Balance test scores and universally administered SAT tests for 11th grade, respectively, using similar models to attendance except including a two-year lag of past test scores and three year lagged for 8th grade Smarter Balance scores for SAT. For both smarter balance ELA and Math tests, the pandemic has negative effects on test scores ranging from about 30% and 40% of a standard deviation decline for ELA and 40% and 60% for MATH for an entirely remote school with larger losses in the lower grades. The losses for the 11th grade SAT tests are substantially smaller at 15% and 25% of a standard deviation for ELA and Math. As with attendance, a higher share of days in person leads to significant reductions in these performance losses, except for the 11th grade SAT tests, with a modest erosion of these improvements in the model that includes the propensity score. Turning to the bottom panel, we used the estimates in panel 2 to compare the negative effects of the pandemic between schools at the 10th and 90th percentiles. At the 10th percentile, the losses range from 17% to 26% of a standard deviation for Smarter Balance ELA and 34% to 44% for Smarter Balance MATH again with larger losses in lower grades, and these losses fall to between 11% and 15% for ELA and 27% and 31% for MATH at the 90th percentile.

Tables F9 and F10 present the share high needs interaction models for ELA and MATH, respectively. Table F9 shows substantially larger learning losses on the ELA test for schools with a larger share of high needs students, but the results are a little more unstable when we add the propensity score control. Nonetheless, the bottom panel of Table F9 shows substantial differences of 8 percent of a standard deviation larger decline in 5th and 6th grade ELA scores and 5 percent larger decline for 8th grade ELA at the 75th percentile of school share high needs compared to the 25th percentile, when measured at the 10th percentile of share of days in person. As shown in Table F10, we did not find evidence of such differences between schools on the MATH test. Next, we looked at the triple interaction of pandemic, share days in person and share high needs as a test of whether in person learning matters more for high needs schools. The estimates on this interaction are only significant for one grade for one test, 6th grade ELA, out of eight estimates, and so that estimate should likely be discounted given the risk of type one error. Further, even though Panel 1 for ELA shows sizable, noisy estimates on ELA for other grades in the same direction as the significant 6th grade estimate, these other estimates erode in magnitude substantially when the propensity score interaction is added and no clear pattern remains. Again, we find minimal evidence that the positive effects of share of days offered in person are greater in Connecticut schools with larger shares of high need students.

Table F7. English Language Arts Test Score Effects

Controls	(1) Grade 5	(2) Grade 6	(3) Grade 7	(4) Grade 8	(5) Grade 11
	No Propensity Score				
Lagged Score	0.835***	0.784***	0.815***	0.822***	0.796***
	(0.00286)	(0.00295)	(0.00317)	(0.00339)	(0.00719)
Pandemic year	-39.95***	-28.48***	-27.07***	-24.31***	-15.47***
	(2.495)	(2.514)	(2.885)	(3.225)	(2.718)
Pandemic year*Share of days in person	28.70***	15.24***	14.79***	14.41***	-4.711
	(3.480)	(3.816)	(4.720)	(5.153)	(5.036)
Observations	138,378	139,262	140,129	143,337	93,322
R-squared	0.686	0.674	0.671	0.663	0.661
	Conditional on Centered Propensity Score				
Lagged Score	0.835***	0.784***	0.815***	0.822***	0.796***
	(0.00284)	(0.00294)	(0.00317)	(0.00338)	(0.00719)
Pandemic year	-37.22***	-27.71***	-25.33***	-22.74***	-15.70***
	(2.412)	(2.408)	(2.795)	(3.035)	(2.710)
Pandemic year*Share of days in person	23.92***	13.84***	11.60**	11.41**	-4.336
	(3.373)	(3.634)	(4.536)	(4.906)	(5.031)
Pandemic year*Centered propensity score	23.58***	8.907**	16.83***	19.65**	16.87
	(4.082)	(4.300)	(4.810)	(7.649)	(11.00)
Observations	138,378	139,262	140,129	143,337	93,322
R-squared	0.687	0.674	0.671	0.664	0.661
Average ELA Test Scores 2016-17, 2017-18, 2018-19	2519.2	2539.7	2561.7	2577.6	520.5
Standard Deviation of ELA Test Scores Control Years	97.0	96.6	101.3	100.8	104.7
Average ELA Test Scores 2020-21	2501.4	2522.5	2547.4	2565.7	512.2
Standard Deviation of ELA Test Scores 2020-21	103.5	99.5	104.8	106.1	103.9
10th Percentile Share In-Person Days through April	0.414	0.397	0.414	0.414	0.400
90th Percentile Share In-Person Days through April	1.000	0.964	0.933	0.933	0.783
Pandemic Effects at 10th Percentile Share In-Person Days	-27.32	-22.17	-20.69	-18.18	-17.43
Pandemic Effects at 90th Percentile Share In-Person Days	-13.30	-14.80	-14.51	-12.09	-19.09

The top panel presents the estimates of regressing Smarter Balance ELA scale scores on two year lagged ELA scores, a dummy variable for the pandemic year, the interaction of the pandemic dummy with the share of days offered in person through April of the school year, and school fixed effects. Columns 1 through 4 present results for 5th, 6th, 7th and 8th grades, respectively. The second panel presents results of a model that also includes the propensity score from the estimates in Table 2 interacted with the pandemic dummy. The bottom panel present the average

and standard deviation of ELA scores both pre-pandemic and in 2020-21, the 10th and 90th percentiles of share of days offered in person through April, and estimated effects of the pandemic based on the estimates in panel 2 calculated at the 10th and 90th percentile share of days.

Table F8. Mathematics Test Score Effects

Controls	(1) Grade 5	(2) Grade 6	(3) Grade 7	(4) Grade 8	Grade 11
	No Propensity Score				
Lagged Score	0.888***	1.032***	0.996***	0.928***	0.759***
	(0.00435)	(0.00422)	(0.00512)	(0.00711)	(0.0102)
Pandemic year	-56.26***	-60.33***	-47.21***	-44.82***	-24.72***
	(2.941)	(3.279)	(3.318)	(4.028)	(2.838)
Pandemic year*Share of days in person	31.80***	28.63***	18.54***	12.91**	-2.925
	(4.062)	(4.903)	(5.185)	(5.963)	(5.327)
Observations	137,887	138,486	138,971	141,927	93,163
R-squared	0.734	0.754	0.750	0.744	0.717
	Conditional on Centered Propensity Score				
Lagged Score	0.888***	1.032***	0.996***	0.928***	0.759***
	(0.00433)	(0.00421)	(0.00512)	(0.00711)	(0.0102)
Pandemic year	-53.49***	-59.25***	-46.41***	-43.50***	-24.89***
	(2.781)	(3.238)	(3.103)	(3.756)	(2.836)
Pandemic year*Share of days in person	26.92***	26.65***	17.04***	10.36*	-2.653
	(3.855)	(4.757)	(4.916)	(5.554)	(5.325)
Pandemic year*Centered propensity score	24.37***	12.47***	7.825	16.19**	13.23
	(4.991)	(4.276)	(6.352)	(7.812)	(10.90)
Observations	137,887	138,486	138,971	141,927	93,163
R-squared	0.735	0.754	0.750	0.744	0.717
Average of Math Test Scores 2018-19	2512.3	2532.2	2547.7	2561.7	506.7
Standard Deviation of Math Test Scores 2018-19	91.7	105.2	111.4	119.6	111.1
Average of Math Test Scores 2020-21	2487.1	2504.1	2529.3	2539.7	498.5
Standard Deviation of Math Test Scores 2020-21	96.4	109.3	109.6	119.7	109.9
10th Percentile Share In-Person Days through April	0.414	0.400	0.414	0.414	0.400
90th Percentile Share In-Person Days through April	1.000	0.964	0.933	0.933	0.783
Pandemic Effects at 10th Percentile In-Person	-42.35	-48.59	-39.59	-39.36	-25.95
Pandemic Effects at 90th Percentile In-Person	-26.57	-34.39	-30.51	-33.83	-26.97

The top panel presents the estimates of regressing Smarter Balance Math scale test scores on two year lagged Math scores, a dummy variable for the pandemic year, the interaction of the pandemic dummy with the share of days offered in person through April of the school year, and school fixed effects. Columns 1 through 4 present results for 5th, 6th, 7th and 8th grades, respectively. The second panel presents results of a model that also includes the propensity score from the estimates in Table 2 interacted with the pandemic dummy. The bottom panel present the average and standard deviation of ELA test scores both pre-pandemic and in 2020-21, the 10th and 90th percentiles of share of days offered in person through April, and estimated effects of the pandemic based on the estimates in panel 2 calculated at the 10th and 90th percentile share of days.

Table F9. English Language Arts Test Score Effects by Share High Needs

Controls	(1) Grade 5	(2) Grade 6	(3) Grade 7	(4) Grade 8	(5) Grade 11
		No Propensity Score			
Lagged Score	0.835***	0.784***	0.815***	0.822***	0.796***
	(0.00286)	(0.00295)	(0.00317)	(0.00338)	(0.00719)
Pandemic year*Share high need students	-30.36**	-37.46***	-18.91	-30.77**	-14.18
	(11.80)	(11.32)	(11.61)	(15.15)	(14.58)
Pandemic year*Share high need students*	14.73	44.99***	17.05	28.78	32.60
In Person learning option	(16.02)	(16.40)	(18.65)	(22.71)	(24.89)
Observations	138,378	139,262	140,129	143,337	93,322
R-squared	0.687	0.674	0.671	0.664	0.661
		Conditional on Centered Propensity Score			
Lagged Score	0.835***	0.784***	0.815***	0.822***	0.796***
	(0.00285)	(0.00294)	(0.00317)	(0.00338)	(0.00719)
Pandemic year*Share high need students	-19.66*	-33.46***	-1.860	-18.31	-1.883
	(11.87)	(10.58)	(12.76)	(15.03)	(12.87)
Pandemic year*Share high need students*	6.962	41.55***	2.425	18.78	32.34
In Person learning option	(15.52)	(15.33)	(18.61)	(21.68)	(22.53)
Pandemic year*Centered propensity score	12.89***	3.968	16.56***	14.82*	43.67***
	(4.672)	(4.716)	(5.785)	(8.924)	(11.65)
Observations	138,378	139,262	140,129	143,337	93,322
R-squared	0.687	0.674	0.671	0.664	0.661
25th Percentile High Needs					
Pandemic Effects 10 Percentile In-Person	-21.68	-16.53	-20.40	-14.79	-19.44
Pandemic Effects 90th Percentile In-Person	-11.46	-16.44	-14.62	-12.39	-22.00
In Person Option Interaction Significance	***		*		
75th Percentile High Needs					
Pandemic Effects 10 Percentile In-Person	-30.00	-24.81	-20.80	-19.378	-15.96
Pandemic Effects 90th Percentile In-Person	-17.76	-13.82	-14.44	-12.72	-14.63
In-Person Option Interaction Significance	***	***	**	**	

The top panel presents the estimates of regressing Smarter Balance ELA scale test scores on two year lagged ELA scores, a dummy variable for the pandemic year, the interaction of the pandemic dummy with the share of days offered in person through April, the interaction of the pandemic dummy with school share of high needs students, the three-way interaction between pandemic-share in person-share high needs, and school fixed effects. Columns 1 through 4

present results for 5th, 6th, 7th and 8th grades, respectively. The second panel presents results of a model that also includes the propensity score from the estimates in Table 2 interacted with the pandemic dummy. The bottom panel presents estimated effects of the pandemic on attendance based on the estimates in panel 2, separately for the 10th and 90th percentiles of share of days offered in person for both the 25th and 75th percentiles of school share of high needs students. The bottom rows under 25th and 75th percentiles share high needs represents the statistical significance of the share of days interaction with the pandemic dummy when share high needs has been centered to take a value of zero at the 25th and 75th percentiles, respectively.

Table F10. Math Test Score Effects by Share High Needs

Controls	(1) Grade 5	(2) Grade 6	(3) Grade 7	(4) Grade 8	(5) Grade 11
		No Propensity Score			
Lagged Score	0.888***	1.032***	0.996***	0.928***	0.759***
	(0.00435)	(0.00422)	(0.00513)	(0.00712)	(0.0102)
Pandemic year*Share high need students	-6.163	-15.05	3.193	-15.64	3.308
	(15.10)	(13.92)	(16.23)	(20.12)	(15.63)
Pandemic year*Share high need students*	-14.05	14.57	9.914	36.90	-0.654
In Person learning option	(20.44)	(19.97)	(25.86)	(29.50)	(26.83)
Observations	137,887	138,486	138,971	141,927	93,163
R-squared	0.735	0.754	0.750	0.744	0.717
		Conditional on Centered Propensity Score			
Lagged Score	0.887***	1.032***	0.996***	0.928***	0.759***
	(0.00434)	(0.00421)	(0.00513)	(0.00712)	(0.0102)
Pandemic year*Share high need students	10.70	-2.801	19.72	6.628	8.316
	(13.39)	(14.26)	(13.92)	(16.82)	(15.47)
Pandemic year*Share high need students*	-26.30	3.944	-4.301	18.83	2.083
In Person learning option	(17.90)	(19.50)	(22.81)	(25.14)	(26.15)
Pandemic year*Centered propensity score	20.30***	12.17**	16.06**	26.45***	28.10**
	(6.110)	(4.850)	(6.926)	(8.119)	(10.84)
Observations	137,887	138,486	138,971	141,927	93,163
R-squared	0.735	0.754	0.750	0.744	0.717
25th Percentile High Needs					
Pandemic Effects 10 Percentile In-Person	-42.64	-48.16	-54.06	-43.17	-27.87
Pandemic Effects 90th Percentile In-Person	-23.76	-34.58	-32.61	-37.86	-27.86
	***	***	***		
75th Percentile High Needs					
Pandemic Effects 10 Percentile In-Person	-42.73	-48.77	-45.15	-37.14	-25.01
Pandemic Effects 90th Percentile In-Person	-31.44	-34.15	-25.51	-27.55	-24.75
In Person Option Interaction Significance	***	***	**	**	

The top panel presents the estimates of regressing Smarter Balance Math scale test scores on two year lagged Math scores, a dummy variable for the pandemic year, the interaction of the pandemic dummy with the share of days offered in person through April, the interaction of the pandemic dummy with school share of high needs students, the three-way interaction between pandemic-share in person-share high needs, and school fixed effects. Columns 1 through 4 present results for 5th, 6th, 7th and 8th grades, respectively. The second panel presents results of a model that also includes the propensity score from the estimates in Table 2 interacted with the pandemic dummy. The bottom panel presents estimated effects of the pandemic on attendance based on the estimates in panel 2, separately for the 10th and 90th percentiles of share of days offered in person for both the 25th and 75th percentiles of school share of high needs students. The bottom rows under 25th and 75th percentiles shares high needs represents

the statistical significance of the share of days in person with the pandemic dummy when share high needs has been centered to take a value of zero at the 25th and 75th percentiles, respectively.

Detailed findings from administrative data analysis: Falsification Tests

In this section, we present falsification tests for the main results on enrollment from Table F3, attendance from Table F5, and ELA and Math test scores from Tables F7 and F8. We treated 2019-20 as the fake pandemic year for enrollment, and 2018-19 as the fake pandemic year for other outcomes. The sample sizes are reduced in the falsification as compared to the main analyses except for the enrollment falsification because we do not have a full three years of data with lagged outcomes prior to the 2018-2019 fake pandemic year.

Table F11 presents falsification tests for enrollment. All estimates are insignificant and very small, ranging between 0.1 and 0.2 percentage points. Table F12 presents the falsification tests for attendance. Only one estimate out of the 12 estimates on the pandemic dummy and the dummy interacted with share in person is significant and only at the 10% level. All estimates are substantially smaller than the estimates in Table F5 and the largest estimates are in the opposite direction of our main estimates.

Turning to the falsification tests for test scores, Table F13 for ELA and Table F14 for Math, we do observe that there are trends in test score performance that lead to a significant effect of the fake pandemic year on test scores, but again these estimates are modest in size in terms of estimates of actual test score losses during the pandemic and in the opposite direction for ELA. Therefore, at worst, the estimated losses during the pandemic are understated somewhat for ELA and overstated somewhat for Math, which might explain part of the larger losses during the pandemic in Math test scores relative to ELA scores. Turning to the estimated effects of in person learning opportunities on test scores, all but one of 20 estimates are insignificant and the one significant estimate is only at the 10% level of significance. This marginally significant estimate is substantially larger than most of the falsification estimates for test scores and is still only about ¼ the size of the actual estimate from Table F8.

Therefore, we conclude that our results cannot be explained by pre-existing differences in trends between districts that tended to provide more in person learning options and those that did not.

Table F11. Falsification of In-Person Learning Effects on Enrollment

Controls	(1) Grades 1st through 5th	(2) Grades 6th through 8th	(3) Grades 9th through 12th
	Unweighted Model		
Pandemic year	-0.000806	-0.00119	-0.00193
	(0.00152)	(0.00116)	(0.00138)
Pandemic year*In person learning option in Sept	0.000997	0.000766	0.00192
	(0.00161)	(0.00129)	(0.00150)
Observations	733,573	471,798	636,971
R-squared	0.012	0.282	0.407
	Propensity Score Weight		
Pandemic year	-0.00112	-0.00122	-0.00112
	(0.00170)	(0.00120)	(0.00128)
Pandemic year*In person learning option in Sept	0.000992	0.00159	0.00129
	(0.00184)	(0.00158)	(0.00175)
Observations	733,573	471,798	636,971
R-squared	0.015	0.264	0.259

The table presents falsification tests dropping the pandemic year and treating 2018-19 as a fake pandemic year. The top panel presents the estimates of regressing whether students enrolled at the beginning of previous school year also enrolled for the current year (including the pandemic year) on a dummy variable for the pandemic year, the interaction of the pandemic dummy with the share of days offered in person through April of the school year, and school fixed effects. Columns 1 through 4 present results for 5th, 6th, 7th and 8th grades, respectively. The second panel presents results of a model that that is weighted by the inverse of the propensity score from the estimates in Table 1.

Table F12. Falsification Tests for In-Person Learning Effects on Attendance

Controls	Grades 2nd through 5th	Grades 6th through 8th	Grades 9th through 12th
	No Propensity Score		
Lagged Attendance	0.346***	0.591***	0.602***
	(0.0220)	(0.0134)	(0.0235)
Pandemic year	-0.00143	-0.00235	0.00495
	(0.000990)	(0.00149)	(0.00394)
Pandemic year*Share of days in person	-0.000531	0.00167	-0.0105
	(0.00135)	(0.00218)	(0.00653)
Observations	293,937	223,552	297,085
R-squared	0.223	0.272	0.31
	Centered Propensity Score		
Lagged Attendance	0.346***	0.590***	0.601***
	(0.0219)	(0.0134)	(0.0235)
Pandemic year	-0.000662	-0.00162	0.00503
	(0.00104)	(0.00148)	(0.00397)
Pandemic year*Share of days in person	-0.00175	0.000203	-0.0111*
	(0.00143)	(0.00218)	(0.00662)
Pandemic year*Centered propensity score	0.00514***	0.00616**	0.0509
	(0.00185)	(0.00294)	(0.0335)
Observations	293,937	223,552	297,085
R-squared	0.224	0.272	0.310

The table presents falsification tests dropping the pandemic year and treating 2018-19 as a fake pandemic year. The top panel presents the estimates of regressing attendance rates on two year lagged rates, a dummy variable for the pandemic year, the interaction of the pandemic dummy with the share of days offered in person through April of the school year, and school fixed effects. Columns 1 through 4 present results for 5th, 6th, 7th and 8th grades, respectively. The second panel presents results of a model that also includes the propensity score from the estimates in Table 2 interacted with the pandemic dummy.

Table F13. Falsification Tests for In-person Learning Effects on ELA Test Scores

Controls	(1) Grade 5	(2) Grade 6	(3) Grade 7	(4) Grade 8	(5) Grade 11
	No Propensity Score				
Lagged Score	0.844***	0.790***	0.823***	0.839***	0.803***
	(0.00350)	(0.00343)	(0.00373)	(0.00414)	(0.00666)
Pandemic year	7.144***	2.014	8.001***	9.236***	-7.263***
	(2.503)	(2.289)	(2.647)	(2.971)	(2.605)
Pandemic year*Share of days in person	1.566	4.055	-2.033	-2.228	4.994
	(3.494)	(3.370)	(4.186)	(4.261)	(4.717)
Observations	69,648	71,274	71,188	72,653	64,237
R-squared	0.694	0.678	0.682	0.669	0.665
	Centered Propensity Score				
Lagged Score	0.843***	0.790***	0.822***	0.838***	0.803***
	(0.00352)	(0.00343)	(0.00373)	(0.00413)	(0.00665)
Pandemic year	5.824**	1.774	6.530**	9.203***	-7.262***
	(2.558)	(2.365)	(2.548)	(2.946)	(2.608)
Pandemic year*Share of days in person	3.935	4.424	0.595	-2.272	4.991
	(3.652)	(3.532)	(4.127)	(4.193)	(4.720)
Pandemic year*Centered propensity score	-14.38***	-2.357	-13.22***	-1.024	-3.456
	(5.048)	(3.635)	(4.038)	(5.692)	(17.66)
Observations	69,817	71,439	71,369	72,855	64,237
R-squared	0.695	0.679	0.683	0.670	0.665

The table presents falsification tests dropping the pandemic year and treating 2018-19 as a fake pandemic year. The top panel presents the estimates of regressing Smarter Balance ELA scale test scores on two year lagged ELA scores, a dummy variable for the pandemic year, the interaction of the pandemic dummy with the share of days offered in person through April of the school year, and school fixed effects. Columns 1 through 4 present results for 5th, 6th, 7th and 8th grades, respectively. The second panel presents results of a model that also includes the propensity score from the estimates in Table 2 interacted with the pandemic dummy.

Table F14. Falsification Tests for In-person Learning Effects on Math Test Scores

Controls	(1) Grade 5	(2) Grade 6	(3) Grade 7	(4) Grade 8	(5) Grade 11
	No Propensity Score				
Lagged Score	0.902***	1.041***	1.012***	0.942***	0.765***
	(0.00493)	(0.00507)	(0.00525)	(0.00753)	(0.00997)
Pandemic year	-6.535**	-7.849**	-6.014**	-6.794*	-13.85***
	(3.067)	(3.390)	(2.822)	(3.699)	(2.871)
Pandemic year*Share of days in person	6.367	-0.141	1.605	-1.747	5.713
	(4.146)	(5.092)	(4.210)	(5.555)	(5.301)
Observations	69,666	71,208	71,013	72,429	64,149
R-squared	0.738	0.757	0.760	0.748	0.718
	Centered Propensity Score				
Lagged Score	0.900***	1.040***	1.011***	0.941***	0.765***
	(0.00496)	(0.00507)	(0.00526)	(0.00753)	(0.00997)
Pandemic year	-7.131**	-7.640**	-6.306**	-7.019*	-13.83***
	(3.106)	(3.424)	(2.886)	(3.712)	(2.863)
Pandemic year*Share of days in person	7.505*	-0.469	2.077	-1.322	5.679
	(4.258)	(5.173)	(4.317)	(5.562)	(5.238)
Pandemic year*Centered propensity score	-6.766	1.332	-2.562	-3.791	15.48
	(5.604)	(5.436)	(4.299)	(6.411)	(19.02)
Observations	69,831	71,368	71,191	72,620	64,149
R-squared	0.739	0.758	0.760	0.749	0.718

The table presents falsification tests dropping the pandemic year and treating 2018-19 as a fake pandemic year. The top panel presents the estimates of regressing Smarter Balance ELA scale test scores on two year lagged Math scores, a dummy variable for the pandemic year, the interaction of the pandemic dummy with the share of days offered in person through April of the school year, and school fixed effects. Columns 1 through 4 present results for 5th, 6th, 7th and 8th grades, respectively. The second panel presents results of a model that also includes the propensity score from the estimates in Table 2 interacted with the pandemic dummy.

District Inventory Indicators of Remote Learning Conditions

Table F15. Remote learning conditions: Access to synchronous instruction in spring 2020 (district inventory indicator 1)

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent	Valid Count	Valid Percent
Elementary School	Fully asynchronous	35	18.0	7	21.9	25	19.5	3	8.8
	Partially or fully synchronous	159	82.0	25	78.1	103	80.5	31	91.2
	Total	194	100.0	32	100.0	128	100.0	34	100.0
Middle School	Fully asynchronous	32	17.0	5	16.1	23	19.3	4	10.5
	Partially or fully synchronous	156	83.0	26	83.9	96	80.7	34	89.5
	Total	188	100.0	31	100.0	119	100.0	38	100.0
High School	Fully asynchronous	30	17.4	5	16.7	19	19.4	6	13.6
	Partially or fully synchronous	142	82.6	25	83.3	79	80.6	38	86.4
	Total	172	100.0	30	100.0	98	100.0	44	100.0

Please note that response options in this table were created by combining data from district inventory Q5; detailed results for Q5 are available in Table C5. In this table, Asynchronous is a combination of "Fully Asynchronous without Technology" with "Fully Asynchronous with Technology"; Synchronous is a combination of "Partially Synchronous" with "Fully Synchronous". (Derived variables: Q5e_r, Q5m_r, Q5h_r).

Table F16. Remote learning conditions: Access to remote learning technology in spring 2020 (district inventory indicator 2)

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)	N	Mean Percent	(SD)
Elementary School	180	75.6	(20.1)	27	65.4	(25.5)	124	79.8	(16.7)	29	67.4	(22.3)
Middle School	174	78.7	(19.2)	25	68.8	(26.8)	115	83.4	(14.3)	34	70.0	(21.5)
High School	164	79.8	(18.8)	26	70.8	(24.3)	97	84.6	(12.8)	41	74.0	(23.1)

Please note that the data in this table were created by combining data from district inventory Q23 (percentage of students with adequate internet access as of March 1, 2020; detailed results in Table D35) and Q41 (percentage of students with access to a digital device for remote learning as of March 1, 2020; detailed results in Tables D22, D26, and D30); for Q41, we used the higher value of two options: district-provided Chromebooks, laptops, or iPads or family-provided Chromebooks, laptops, or iPads. The values in this table represent the mean of each participating district's reported values for these two items. (Derived variables: SAC1e_p, SAC1m_p, SAC1h_p.)

Table F17. Remote learning conditions: Summer 2020 preparation for fall (district inventory indicator 3)

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Number of Districts	Valid Percent of Districts	Valid Number of Districts	Valid Percent of Districts	Valid Number of Districts	Valid Percent of Districts	Valid Number of Districts	Valid Percent of Districts
Number of Activities	1	0	.0	0	.0	0	.0	0	.0
	2	2	.9	0	.0	1	.7	1	2.0
	3	2	.9	0	.0	0	.0	2	4.0
	4	13	5.8	1	3.1	5	3.5	7	14.0
	5	15	6.7	3	9.4	10	7.1	2	4.0
	6	26	11.7	0	.0	16	11.3	10	20.0
	7	43	19.3	6	18.8	22	15.6	15	30.0
	8	31	13.9	3	9.4	22	15.6	6	12.0
	9	42	18.8	7	21.9	29	20.6	6	12.0
	10	49	22.0	12	37.5	36	25.5	1	2.0
	Total N	223	100.0	32	100.0	141	100.0	50	100.0

Please note that the data in this table represent the number of 10 listed activities conducted between the last student day of spring 2020 and students' return to school in fall 2020, as reported by districts in District Inventory Q15; detailed data for Q15 is presented in Tables E3, E31 and E42. (Derived variable: Q15count).

Table F18. Remote learning conditions: District improvements in remote learning (district inventory indicator 4)

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Number of Districts	Valid Percent of Districts	Valid Number of Districts	Valid Percent of Districts	Valid Number of Districts	Valid Percent of Districts	Valid Number of Districts	Valid Percent of Districts
Number of Elementary School Activities	0	2	1.1	0	.0	0	.0	2	7.1
	1	3	1.6	1	3.0	2	1.6	0	.0
	2	14	7.6	3	9.1	7	5.6	4	14.3
	3	18	9.7	0	.0	14	11.3	4	14.3
	4	25	13.5	1	3.0	20	16.1	4	14.3
	5	33	17.8	6	18.2	24	19.4	3	10.7
	6	35	18.9	10	30.3	21	16.9	4	14.3
	7	55	29.7	12	36.4	36	29.0	7	25.0
	Total N	185	100.0	33	100.0	124	100.0	28	100.0
Number of Middle School Activities	0	3	1.7	0	.0	0	.0	3	9.1
	1	6	3.3	1	3.2	4	3.4	1	3.0
	2	9	5.0	1	3.2	4	3.4	4	12.1
	3	19	10.6	1	3.2	12	10.3	6	18.2
	4	25	13.9	2	6.5	18	15.5	5	15.2
	5	40	22.2	6	19.4	30	25.9	4	12.1
	6	32	17.8	9	29.0	20	17.2	3	9.1
	7	46	25.6	11	35.5	28	24.1	7	21.2
	Total N	180	100.0	31	100.0	116	100.0	33	100.0
Number of High School Activities	0	3	1.7	0	.0	0	.0	3	7.0
	1	8	4.7	1	3.2	3	3.1	4	9.3
	2	7	4.1	0	.0	3	3.1	4	9.3
	3	17	9.9	1	3.2	9	9.2	7	16.3
	4	27	15.7	1	3.2	18	18.4	8	18.6
	5	34	19.8	7	22.6	23	23.5	4	9.3
	6	31	18.0	8	25.8	17	17.3	6	14.0
	7	45	26.2	13	41.9	25	25.5	7	16.3
	Total N	172	100.0	31	100.0	98	100.0	43	100.0

Please note that the data in this table represent a count of improvements in remote learning from 2019-20 to 2020-21, as reported by districts in District Inventory Q36; detailed results for Q36 are available in Tables C65, C66, and C67. (Derived variables: Q36e_c, Q36m_c, Q36h_c.)

Table F19. Remote learning conditions: Rigor of student assessment in 2020-21 (district inventory indicator 5)

		District Type							
		Overall		Alliance districts		Non-Alliance districts		APSEPs	
		Valid Number of Districts	Valid Percent of Districts	Valid Number of Districts	Valid Percent of Districts	Valid Number of Districts	Valid Percent of Districts	Valid Number of Districts	Valid Percent of Districts
Number of Elementary School Assessments	0	2	1.1	0	.0	1	.8	1	3.4
	1	2	1.1	1	3.1	0	.0	1	3.4
	2	2	1.1	0	.0	1	.8	1	3.4
	3	6	3.2	0	.0	4	3.2	2	6.9
	4	16	8.6	3	9.4	9	7.1	4	13.8
	5	21	11.2	5	15.6	13	10.3	3	10.3
	6	138	73.8	23	71.9	98	77.8	17	58.6
	Total N	187	100.0	32	100.0	126	100.0	29	100.0
Number of Middle School Assessments	0	1	.6	0	.0	0	.0	1	2.9
	1	1	.6	0	.0	0	.0	1	2.9
	2	3	1.7	2	6.7	1	.9	0	.0
	3	12	6.7	0	.0	7	6.1	5	14.3
	4	23	12.8	4	13.3	14	12.2	5	14.3
	5	33	18.3	6	20.0	23	20.0	4	11.4
	6	107	59.4	18	60.0	70	60.9	19	54.3
	Total N	180	100.0	30	100.0	115	100.0	35	100.0
Number of High School Assessments	0	2	1.2	0	.0	0	.0	2	4.9
	1	0	.0	0	.0	0	.0	0	.0
	2	7	4.1	2	6.5	1	1.0	4	9.8
	3	13	7.6	1	3.2	6	6.1	6	14.6
	4	27	15.9	3	9.7	17	17.3	7	17.1
	5	43	25.3	9	29.0	26	26.5	8	19.5
	6	78	45.9	16	51.6	48	49.0	14	34.1
	Total N	170	100.0	31	100.0	98	100.0	41	100.0

Please note that this table reports a weighted count of up to 6 based on district-reported student assessment practices (District Inventory Q42; detailed data in Tables C22, C23, and C24) and grading practices (District Inventory Q44; detailed data in Tables C40, C43, and C46) during the 2020-21 school year. Specifically, we assigned 1 point for each of the following assessment types reported by districts: in-class assignments, quizzes/tests, diagnostic ELA assessments, and diagnostic math assessments (up to 4 points) and we assigned a score of 0-2 for the rigor of grading practices (0 if a district selected "Grading was suspended" and/or "Pass/fail" AND neither "Proficiency" and/or "Letter grades" was selected; 1 if a district selected "Proficiency" and/or "Letter grades" AND "Grading was suspended" and/or "Pass/fail"; and 2 if a district selected "Proficiency" and/or "Letter grades" was selected AND did not select "Grading was suspended" or "Pass/fail.") (Derived variables: SA3e_c, SA3m_c, SA3h_c.)

Table F20. Remote learning conditions: Social services referrals for students in 2020-21 (district inventory indicator 6)

	District Type											
	Overall			Alliance districts			Non-Alliance districts			APSEPs		
	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)	N	Mean	(SD)
Non-Academic/Social Supports referrals for students in school year 2020-21	215	3.7	(.7)	31	3.9	(.9)	135	3.8	(.6)	49	3.2	(.7)

Please note that the means in this table present the average of two variables: district inventory Q20 (the amount of resources allocated to social services referrals during 2020-21, compared to before the pandemic) and Q21 (the number of students referred for social services in 2020-21 compared to before the pandemic). 1 = a lot less resources/students to 5 = a lot more resources/students. Details results for Q20 and Q21 are presented in Tables D45 and D46. (Derived variable: NASS.)

Q4b. What do teachers say about the association of learning models and conditions with student attendance and performance?

See narrative for results.

Q4c. How were remote learning models and conditions associated with changes in student attendance and performance on standardized assessments?

As described in the pre-analysis plan, we pooled all data and grades for each of the four outcomes considered estimating separate coefficients on the district inventory indicator for each outcome. For attendance and chronic absence, we pooled all grades 1st-12th, but estimated separate estimates on the district inventory indicator for 1st & 2nd grades, 3rd grade through the end of elementary school, middle school and high school, where the grades associated with each grade span were based on the reports in the district inventory. For test scores, we pooled all scores treating ELA and Math scores for the same grade and year as separate observations and estimated a separate estimate on the inventory indicator for each grade between 5th and 8th plus 11th grade for both ELA and Math scores, a total of 10 separate estimates. We then conducted an F-test for whether we could reject the null hypothesis that all of the estimates associated with a specific indicator and student outcome are zero.

Table F21 presents the results of these F-test along with Bonferroni corrections to these F-tests to address concerns about type I error given the large number of hypotheses being tested, as discussed in the pre-analysis plan above. Each column represents one of our six indicators created based on the district inventory data. The first column is an indicator whether learning in spring 2020 was synchronous with a 1 representing partially or fully synchronous and a 0 representing fully asynchronous learning. Approximately 75 percent of districts offered partially or fully synchronous. The second column captures the self-report of the fraction of students that had online access during spring 2020. Across districts, the estimates range between 20 and 100% of students, and on average districts reported approximately 75 percent of students had access. The third indicator is summer preparation which represents a sum from 2 to 10 of the number of actions selected by districts as activities undertaken in the summer of 2020 in preparation for the 2020-21 school year with a mean across districts of 8.5 activities, including activities like building improvements, new online resources, or teacher training. The fourth indicator captures information on the rigor of assessment models used by districts in 2020-21. This index ranges between 0 and 6 where 0 is all grading suspended or pass fail and minimal evaluation of assignments, tests or other assessments, and 6 is no use of pass/fail or suspension of grading and use of a full range of assessment tools. The average across all districts was 5.4. Indicator 5 is based on averaging Likert scales for increases in resources allocated to identifying and referring students to social services and for increases in the number of students referred. The scale runs from 1 to 5 with a 1 representing the largest increase and 5 representing large decreases, and the district mean is 2. The final column (indicator 6) is for reported improvements in online learning for the 2020-21 school year with the index ranging from 1 to 7 with a mean of 5.7 and a higher number implying greater improvements.

The statistical models are difference-in-differences models as described in the pre-analysis plan conditioned on school fixed effects for each grade or grade span and in the case of test scores by ELA vs Math. However, we departed from the basic difference-in-differences models for both *online access in spring 2020* and *improvements in online learning in 2020-21*. The reason for the departure is illustrated in the second panel of Table F21, which shows the correlation between the district inventory indicator and both share of days offered in person and share of high needs students. For both of these indicators, the correlation with share high needs is quite high. Therefore, following the approaches for administrative data analysis (described at the start of this appendix), we developed propensity scores for online access spring 2020 and improvements in online learning as a function of the type of Local Educational Authority (LEA) and the share of high needs students, allowing the influence of share high needs to vary with the type of LEA. We estimated a two-sided Tobit for *online access* since access is bound between 0% and 100% of students, and an ordered probit for *improvements in online learning* given the discrete values between 1 and 7. Given continuous treatment for *online access*, we included the propensity score interacted with the pandemic dummy. For the ordered probit, we could use inverse propensity score weighting except we regularized the weights by scaling by the unconditional probability of each outcome, which preserves the original sample distribution of outcomes across the 7 possible values. For all other district inventory indicators, the correlation with share high needs and share of days offered in person is small.

As described in our pre-analysis plan, we had intended to allow the effect of improvements in online learning to vary with the share of days that were offered in person. However, those estimates were very unstable due to multicollinearity between the pandemic effect of improvements in online learning and a control for how the effect of these improvements varied with the share of days offered online by districts. Essentially, the direct effect of improvements and the interaction of improvements with share of days online were always opposite in sign, and switching from negative to positive across grades with no discernable pattern. As a result, we made a second departure from our pre-analysis plan: we dropped the triple interaction term and focused solely on the interaction of *improvements in online learning* with the pandemic dummy, which is the same model used for the other five district inventory indicators.

The resulting F-tests are shown in the third panel of Table 21. We can immediately rule out any correlation between three indicators—*synchronous spring 2020*, *summer preparation*, and *improvements in online learning*—because none of the individual F-tests were significant at the 5% level of confidence even before any corrections associated with the many hypothesis tests conducted. These three columns received an X in the last row of the table indicating that the results are clearly insignificant.

The *social services referrals* indicator yielded the F-test that rejects the null hypothesis of no effects with the most confidence. Following our pre-analysis plan, we first corrected for type 1 error within each column or for each district inventory indicator, as shown in the fourth panel of Table F21. Multiplying the p-value on test score proficiency by 4 for the social services referrals indicator yielded a p-value of 0.0004. Then, across indicators, we multiplied this p-value by 6 for the six indicators, yielding a p-value of 0.0024. This p-value is very conservative because it

ignores correlations across indicators that would reduce the multiplication factor below 6 and assumes a perfect correlation between tests within the indicators that would add additional confidence based on rejection for multiple outcomes, in this case a rejection for test scale scores as well at the 0.05 p-value.

The next high level of confidence arises for *online access in spring 2020*. We conducted the same exercise multiplying the lowest p-value by 4, and then multiplying the resulting p-value by 5 given the 5 remaining indicators, since the null hypothesis has already been rejected for the first indicator (following a step-down Bonferroni approach). The last indicator where we observed some statistical evidence of a relationship is *assessment rigor*. In this case, we note that we have very similar p-values for both attendance rate and chronic absence. Even if these tests were perfectly correlated, we could conclude that there are results for attendance overall with a maximum p-value of 0.027 and that we failed to find results for test scores overall. Therefore, we multiplied this p-value by 2 to capture the fact that we examined both attendance and test performance, and then multiplied the resulting p-value by 4 because there are only four district inventory indicators remaining after the null hypothesis has been rejected for the first two. These corrections yielded a p-value of 0.224 when using these very conservative approaches. Therefore, once the correlations between tests are considered, this p-value could fall considerably and meet reasonable threshold of confidence. However, at present, we will only discuss the results on this variable as suggestive of effects.

Next, we moved to the exploratory analyses described in our pre-analysis plan and examined the individual outcome and grade span estimates for each indicator. Table F22 starts by presenting the test scale score and test proficiency estimates for *social services referrals* and test proficiency for *online access in spring 2020* (the test scale score F-test is not significant for *online access*). We observe lower math test scale scores and proficiency levels across the board, especially in lower grades, with larger increases in resources for referrals and more student referrals relative to pre-pandemic levels; we also observe some evidence of higher ELA scores and proficiency for 6th grade. In terms of magnitude, a one-point increase in this five-point scale is associated with declines proficiency in math by 1 to 2.5 percentage points of students for 5th-8th grades (for example, the percentage of a district's fifth grade students proficient in math might fall from 50% to 48%). In terms of ELA proficiency, we observed declines of about one percentage point for 6th grade. Math and ELA test scale scores for the same grades decline by between 2.5 and 3.5 percent of a standard deviation.

Given that the *social service referrals* indicator (number of students referred for social services and resources allocated for social services referrals) is associated with lower test scores, it is important to discuss potential mechanisms behind these effects. Given the low correlation with student share high needs, we do not anticipate that these results are caused by pre-pandemic differences between districts. Rather, one possible explanation is a type of reverse causality where conditional on the pre-pandemic needs of students, the students in some districts faced larger shocks and were in much more need of referrals, leading to more resources allocated for making more referrals. These same schools saw substantially larger declines in test scores, especially math test scores, during the pandemic. A natural policy implication to draw from these

results is that standard measures of district need and disadvantage (for example, those used to identify Alliance districts) may not fully capture the heterogeneous impacts of a crisis on a district's student body. Ongoing monitoring during a crisis may be required to identify districts where due to unforeseen circumstances learning losses are likely to be especially large.

The district inventory indicator with the second lowest p-value is *online access in spring 2020*. Only the F-test for test proficiency is highly significant. However, like assessment models, we have two results for attendance rate and chronic absence that are near significant at the five percent level. Starting with proficiency in column 3 of Table 22, we observe that most of the estimates are positive, but only two are statistically significant: 6th grade proficiency in math and 11th grade proficiency in ELA using the state established proficiency threshold for the SAT test each year. In terms of magnitude, a 20% increase in the percentage of students with online access (equivalent to a one standard deviation increase) implies a 1.5 percentage point increase in the share of 6th grade students proficient in Math in the spring of 2021 and a 1 percentage point increase in the share of 11th grade students proficient in the ELA test. Given the lack of any specific pattern in the grade and subject matter affected, one might reasonably conclude that there are test score effects, but they are sufficiently small that one can only detect effects when estimation errors lead to large magnitude estimates and one cannot reliably determine whether these estimated effects are concentrated in a specific grade or in a specific topic area.

Finally, Table F23 presents attendance effect estimates for both *online access* and *assessment rigor*. For online access, chronic absence and attendance effects are unexpectedly negative with better access in spring 2020 being associated with worse attendance in 2020-21, but the estimates are quite small, less than 0.002 in terms of attendance rates and at most just over ½ a percentage point in terms of rates of chronic absence in 2020-21. These effects may arise simply because good online access in spring 2020 is consistent with better ability to manage hybrid and online learning in 2020-21 and therefore may have led to better tracking of student attendance.

More rigorous student assessment practices are also associated with differences in attendance and chronic absence during the pandemic. In this case, more rigorous assessment is associated with better attendance in middle school, but the effects are small in magnitude. A 1-point improvement in the 6-point assessment index has effects of less than 0.002 in terms of increasing attendance rates and only ½ of one percentage point reduction in chronic absence.

Table F21. Results of Inferential Analysis: Association of Remote Learning Conditions with Student Outcomes

	Remote learning conditions (i.e. district inventory indicators)					
	Synchronous Spring 2020	**Online Access Spring 2020**	**Summer Preparation**	**Assessment Rigor 2020-2021**	**Social Services Referrals**	**Improvements in Online Learning**
Mean	0.747	74.8	8.51	5.38	3.92	5.67
Min/Max	0/1	20/100	2/10	0/6	1/5	1/7
Correlations with						
Days In Person Sept-June	0.17	**0.34**	-0.24	0.05	-0.03	**-0.18**
Days In Person Sept-April	0.19	**0.31**	-0.22	0.06	-0.03	**-0.18**
Share High Need	-0.15	**-0.60**	0.09	-0.03	+0.13	**0.35**
Outcomes in 2020-21	F-Test [p-value]	F-Test [p-value]	F-Test [p-value]	F-Test [p-value]	F-Test [p-value]	F-Test [p-value]
Attendance Rate	1.31 [0.265]	2.39 [0.058]	0.17 [0.956]	**2.59 [0.036]**	1.36 [0.244]	1.75 [0.138]
w/ in outcome Bonferroni						
Chronic Absence	2.04 [0.086]	2.34 [0.053]	0.76 [0.552]	**2.75 [0.027]**	0.68 [0.609]	2.29 [0.058]
w/ in outcome Bonferroni				**[0.054]#**		
Scale Score	1.30 [0.228]	1.30 [0.225]	1.12 [0.340]	0.89 [0.541]	2.27 [0.0128]	1.28 [0.238]
w/ in outcome Bonferroni					[0.0512]	
Proficiency	0.98 [0.458]	**2.77 [0.0023]**	0.99 [0.453]	1.46 [0.148]	**3.64 [0.0001]**	0.75 [0.682]
w/ in outcome Bonferroni		**[0.0092]**			**[0.0004]**	
Treatment Bonferroni 6 tests using most significant outcome	**X**	**[0.046]**	**X**	**[0.224]#**	**[0.0024]**	**X**

Notes: Difference-in-Difference models estimated with pooled grades and/or grade spans and school fixed effects. Models for *online access spring 2020* are estimated interacting a propensity score for the district inventory item with a pandemic dummy due to the high correlation of the item with school share of students with high needs. Similarly, the model for *improvements in online learning* are estimated using inverse propensity score weights associated with the scores on the district item. F-tests conducted for significant of all estimates across grades/grade spans. Within outcome Bonferroni conducted by multiplying p-value of most significant result by four with the exception of *assessment rigor* where combined results for Chronic Absence and Attendance are compared to overall results for test score variables by multiplying lowest p-value by two and conservatively assuming perfect correlation between estimates for Attendance Rate and Chronic Absence. The last row shows the combined Bonferroni significance level across the six tests using a step-down approach multiplying the p-value for the item with the lowest p-value by six for the six items considered, the next by five, etc. An X in this row implies that estimates are far from any reasonable significance level.

Table F22. Individual test and grade estimates for remote learning conditions

	Remote learning conditions (i.e. district inventory indicators)		
	Social Services Referrals		**Online Access Spring 2020**
Outcomes	**Test Scores**	**Test Proficiency**	**Test Proficiency**
Math 5th Grade	-0.0339***	-0.0248***	0.0069
	(0.0123)	(0.00593)	(0.0339)
Math 6th Grade	-0.0256**	-0.0232***	0.0723***
	(0.0106)	(0.00530)	(0.0276)
Math 7th Grade	-0.0367***	-0.0137***	0.0211
	(0.0107)	(0.00489)	(0.0267)
Math 8th Grade	-0.0243*	-0.0172**	-0.0454
	(0.0134)	(0.00679)	(0.0419)
Math 11th Grade	-0.0062	0.00301	0.0054
	(0.0121)	(0.00525)	(0.0307)
ELA 5th Grade	-0.0134	-0.0057	0.0377
	(0.00912)	(0.00423)	(0.0231)
ELA 6th Grade	-0.0254**	-0.0117**	0.0054
	(0.0106)	(0.00473)	(0.0304)
ELA 7th Grade	-0.0154	-0.0085	0.0175
	(0.0118)	(0.00535)	(0.0254)
ELA 8th Grade	-0.0149	-0.0075	0.0361
	(0.0118)	(0.00480)	(0.0257)
ELA 11th Grade	-0.0060	-0.0062	0.0499*
	(0.0111)	(0.00531)	(0.0302)

Notes: Each column represents the estimates on the interaction between the district inventory indicator and dummy variables for each student test subject and grade. The first row of column headers indicate the district inventory indicator and the second row indicates the student outcome.

Table F23. Individual grade span attendance estimates for remote learning conditions

	Remote learning conditions (i.e. district inventory indicators)			
	Online Access Spring 2020		**Assessment Models 2020-2021**	
Outcomes	**Attendance Rate**	**Chronic Absence**	**Attendance Rate**	**Chronic Absence**
Early Elementary	-0.00733**	0.0319**	0.000173	0.00143
	(0.00318)	(0.0132)	(0.000458)	(0.00286)
Late Elementary	-0.00713***	0.0178**	-8.75e-05	0.00259**
	(0.00247)	(0.00815)	(0.000298)	(0.00127)
Middle School	0.00222	0.0162	0.00158***	-0.00496**
	(0.00277)	(0.0136)	(0.000507)	(0.00219)
High School	0.00102	-0.00345	0.000224	0.00278
	(0.00538)	(0.0141)	(0.000826)	(0.00238)

Notes: Each column represents the estimates on the interaction between the district inventory indicator and dummy variables for each grade span. The first row of column headers indicate the district inventory indicator and the second row indicates the student outcome.