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EXPLORING THE RELATIONSHIP BETWEEN STUDENT LEARNING LOCATION AND STUDENT OUTCOMES IN MSAP-FUNDED SCHOOLS DURING THE COVID-19 PANDEMIC

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Exploring the Relationship Between Student Learning Location and Student Outcomes in MSAP-Funded Schools During the COVID-19 Pandemic

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Executive Summary

This study, conducted by the National Center for Research on Evaluation, Standards, and Student Testing (CRESST) in collaboration with American Education Solutions (AES), explores the goals of reducing isolation relating to minority groups and socioeconomic status and increasing student achievement in participating schools over the 5-year project in a consortium in the state of Connecticut. The consortium received funding starting in 2017 from the Magnet Schools Assistance Program (MSAP) in the U.S. Department of Education (ED) to develop new magnet themes at three middle schools and significantly revise the magnet themes at one elementary and one high school.

The current quasi-experimental design (QED) study explored how students' choice of learning location model (either predominantly remote or hybrid) impacted their outcomes on academic assessments and school attendance in the 2020–2021 school year. After establishing baseline equivalence, students choosing predominantly remote learning were compared to students in hybrid learning. This is a replacement study due to changes caused by the COVID-19 pandemic to the originally proposed program intervention. The study consists of two parallel sets of analyses examining the relationship between learning location and student outcomes: One set of analyses utilizes student data provided by the Connecticut State Department of Education, and the other set of analyses uses the student data provided by the project consortium.

The results of the state data and the consortium data were similar. For all three middle schools combined, the predominantly remote students scored significantly lower in Smarter Balanced Assessment Consortium (Smarter Balanced) math assessments than the hybrid

students, a result in favor of the hybrid condition. These predominantly remote students scored similarly to their hybrid comparison students on the Smarter Balanced English language arts (ELA) assessment, and had similar attendance rates and chronic absence rates. For the Grade 11 students at the one high school, no statistically significant differences were found between the predominantly remote and the hybrid students on their Grade 11 SAT ELA or math scores. Additionally, no statistically significant differences were found between these students' in-school attendance rates or chronic absence status. We also investigated to what extent the predominantly remote and hybrid difference in ELA and math scores related to student attendance rates. The attendance rates may be a significant predictor of student achievement, but the conclusion regarding the observed learning location difference remained the same.

This report provides empirical evidence regarding performance of predominantly remote students on state assessments and to what degree they attended or missed school days at four MSAP schools in the 2020–2021 school year during the COVID-19 pandemic, relative to hybrid students. We could not investigate how predominantly remote and hybrid students performed relative to the predominantly in-person students due to the limited number of predominantly in-person students at these schools.

Additional analyses based on the 2020–2021 data are in process to explore further the relationship between learning location and assessment scores. While our analysis of the middle school student study is designed to meet What Works Clearinghouse Standards with Reservations, our student sample is based on three middle schools. Repeating our rigorous study with a larger number of schools will be interesting and provide an even stronger basis for policy implication and discussion. Additionally, we are in discussion with the consortium about the possibility of conducting a follow-up analysis on the middle school students. We could investigate how these two groups of students (predominantly remote and hybrid students based on their 2020–2021 classification) perform on measures of academic achievement at the end of the 2021–2022 school year, when they will have been in school in person full time, despite the ongoing pandemic environment. We are also looking forward to conducting additional analyses using the 2021–2022 student data when they become available.

Exploring the Relationship Between Student Learning Location and Student Outcomes in MSAP-Funded Schools During the COVID-19 Pandemic[1]

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Abstract: The current quasi-experimental design study explored how students' choice of learning location model (either predominantly remote or hybrid) impacted their outcomes on academic assessments, school day attendance, and chronic absence in the 2020–2021 school year in the midst of the COVID-19 pandemic. Analyzing the student sample across three middle schools, we found that the predominantly remote students scored significantly lower in math assessments than the hybrid students. These predominantly remote students scored similarly to their hybrid comparison students in English language arts (ELA) and had similar attendance rates and chronic absence rates. For the Grade 11 students at the one high school, no statistically significant differences were found between the predominantly remote and the hybrid students on SAT ELA or math assessments, school attendance rates, or chronic absence rates.

Introduction

This project consortium received funding from the Magnet Schools Assistance Program (MSAP) in the U.S. Department of Education (ED) for 5 years, beginning in October 2017. The funding was used to expand school choice through the development and support of five inter- and intradistrict magnet schools across eastern Connecticut with the goals of reducing minority group and socioeconomic isolation and increasing student achievement in the participating schools over the 5-year project period. Among these five schools, three are new, intradistrict

[1] We want to take the opportunity to thank the LEARN staff, especially Ryan P. Donlon and Elizabeth (Liz) Binger for their support and sponsorship of this study. Our special thanks also go to Ajit Gopalakrishna and David M. Alexandro for their assistance with our data request and to Ajit Gopalakrishna and Briana Hennessy for their very detailed and thoughtful review and feedback on this report. Without their support, this study would not have been possible.

magnet middle schools; and the two remaining schools, one elementary and one high school, are interdistrict magnet schools that are significantly revising their magnet themes.

This report focuses on quasi-experimental design (QED) Study 1, investigating how students' choice of learning location impacted their educational outcomes at these MSAP schools in 2020–2021. The primary student educational measures include Smarter Balanced Assessment Consortium (Smarter Balanced) English language arts (ELA) and mathematics (math) assessments for students in Grades 3–8 and the SAT ELA and math assessments for students in Grade 11. The other student outcome measure examined is student school-day attendance rate and chronic absence rate. This learning location study compares the education outcomes of the predominantly remote students (intervention students) to those of the hybrid students (comparison students) who had more in-person school days during 2020–2021 at these same sets of MSAP schools.

In a separate study, QED Study 2, CRESST examined the magnet school impact on student achievement in five MSAP-funded schools. That magnet study compared students' achievements to the achievements of academically and demographically similar comparison students in *similar non-magnet schools* in the state of Connecticut (CT). QED Study 2 is described in a separate CRESST report (Wang et al., 2022). When the 2021–2022 school year student outcome data become available, CRESST will analyze them and prepare a new report on the impact of magnet school instruction on student achievement.

CRESST's QED studies meet ED's What Works Clearinghouse (WWC) Standard for Moderate Evidence (the Grades 6–8 analysis with students from three middle schools) or Promising Evidence (the Grade 11 analysis with students from one high school), by comparing intervention student outcomes with an identified group of students that is similar to the intervention group at the baseline using a propensity score matching approach.

Using a statistically rigorous, high-quality quasi-experimental design, this report answers Research Questions 1 and 2:

1. How did students attending the four MSAP-funded schools, who chose predominantly remote learning, perform on academic outcomes on state assessments in English language arts and math, relative to matched students at the same school who chose hybrid learning? How much of the difference was due to differences in attendance rates?
2. How did students attending the four MSAP-funded schools, who chose predominantly remote learning, differ on the non-academic outcomes of school-day attendance rate and chronic absence rate, relative to matched students at the same school who chose hybrid learning?

Before describing the study design and results, however, we provide some context for this study. First, we describe how the Connecticut State Department of Education (CSDE) defines learning location and chronic absence. Second, we provide a brief description of the MSAP

schools, followed by the presentation on the learning location choices the project consortium schools offered and what the students and their families selected at various timepoints in the 2020–2021 school year. Lastly, we describe student assessment participation rates in spring 2021 assessments and student demographic by their assessment participation status and by assessment.

We begin the Study Methodology section by discussing the data used for the analysis, followed by details on the methodology used to select comparison students and the results of our matching. We then discuss the methods used to estimate the impact of learning location on student outcomes. Then, we present two parallel sections of Analysis Results with one set using student data we received from CSDE and the other set using the student data the project consortium provided.

Defining Student Learning Location Categories and Chronic Absence

In the COVID-19 pandemic context of learning options, the CSDE increased its data collection of student attendance, placing additional emphasis on attendance by learning location model. The CSDE defines learning location model in relation to "membership days" (the number of days a student was enrolled) as follows: "predominantly remote" as 0% to less than 25% in person, "hybrid" as 25% to 75% in person, and "predominantly in-person" as greater than 75% in person (Chang et al., 2021).

The CSDE also closely examined chronic absence in the state's K–12 school system during the 2020–2021 school year (Chang et al., 2021). The CSDE defines chronic absence as a student missing 10% or more of the total enrolled days in a school year. Students are considered "present" if they attended half of the school day in any setting. Research on chronic absence from school has shown that it impacts student learning and social emotional outcomes adversely, leading to lower academic achievement (Gottfried, 2014). In one study of all Utah public school students in the school year 2010–2011, the Utah Education Policy Center (2012) found that chronic absence effects on student academic outcomes included an average decrease of 3.798 points on the criterion-referenced tests (CRT) language assessment and an average decrease of 5.861 points on the CRT math assessment. A second Utah study followed 35,508 eighth graders for 5 years to track the effects of chronic absence over time, which was found to increase the odds of dropping out to 7.4 times higher. In a review of the literature on chronic absenteeism, Gottfried (2014) found empirical research supporting more absences linked to lower academic achievement and higher school dropout rates. These findings are particularly strong as family socioeconomic status (SES) declines. Research on within-family, within-classroom, and within-school variation have all found that more absences resulted in lower scores on state-administered assessments. The other student outcome measures are student school-day attendance rate and chronic absence rate in addition to the academic outcome measures of student assessment scores.

Starting January 2022, after the student data for the 2020–2021 school year were made available by both the consortium and the CSDE, CRESST, AES, and the project consortium leadership team met several times to review the data on student distributions by the number of in-person membership days and the number of in-person attendance days, to make decisions about how students would be categorized by learning location model for this QED study. After much discussion, we collaboratively agreed to use the state of Connecticut's cutoff points of student learning location models: predominantly remote students with 0% to less than 25% in person, hybrid students with 25% to 75% in person, and predominantly in-person students with more than 75% in person, as defined by Chang et al. (2021). Additionally, we decided to conduct two sets of analyses, one set based on the state data, classifying student learning location by in-person membership days and total membership days; the other set of analyses based on project consortium data, classifying student learning location by in-person attendance days and total attendance days. These categories are explained further at the beginning of each Analysis Results section.

Overview of the MSAP Schools

The project consortium received MSAP funding to develop and support five MSAP schools: three middle schools, one elementary school, and one high school. Table 1 presents the school enrollment size, grade levels, and magnet program characteristics for each of the five MSAP schools funded by MSAP in 2017.

Table 1

MSAP School Information, 2020–2021

MSAP schools	School size	Grade span	Magnet themes
MSAP School 1	935	6–8	STEAM & International Baccalaureate Middle Years Programme
MSAP School 2	651	6–8	STEAM
MSAP School 3	405	6–8	Global Studies, World Languages, & Service Learning
MSAP School 4	477	K–5	International Baccalaureate Primary Years Programme
MSAP School 5	476	9–12	Environmental Science & Advanced Manufacturing

Note. Data provided by Connecticut State Department of Education.

Table 2 presents additional student demographics and achievement information for these five schools in 2020–2021. MSAP Schools 1 and 5 had slightly different student profiles in terms of race/ethnicity when compared to the other three schools. About half of MSAP School 1 students were White, with Hispanic/Latino students making up 23.4% of the student population. MSAP School 5 students were mainly Hispanic/Latino (55.9%), 23.3% were African

American, and 13.4% were White. At the other three schools, about one third of the students were Latino/Hispanic students and the combination of Latino/Hispanic and African American students exceeded 55% of each school's population. The White students in these three schools ranged from 25.7% to 27.7%.

Table 2

MSAP School Demographics, 2020–2021

School	Female %	White %	African American %	Latino/ Hispanic %	NSLP[a] %	Special Education %	EL[b] %
MSAP School 1	49.7	49.7	7.4	23.4	57.5	16.8	2.9
MSAP School 2	48.1	26.9	19.5	37.5	69.3	12.9	14.4
MSAP School 3	49.9	25.7	16.8	38.3	70.9	24.0	18.3
MSAP School 4	52.0	27.7	13.8	42.6	58.7	16.4	12.2
MSAP School 5	52.3	13.4	23.3	55.9	66.4	16.0	8.0

Note. Data provided by the Connecticut State Department of Education.

[a] NSLP=National School Lunch Program. [b] EL = English learner.

School Attendance During COVID-19

As a result of the COVID-19 pandemic, the project consortium offered different learning location models across the 2020–2021 school year, taking into account dynamic health and safety factors. After schools set the hybrid/in-person model, parents were able to choose which learning location model was best for their child(ren); families were also allowed to switch across learning location models throughout the year. See Table 3 for the percentages of students by their learning location model and by school at three time points during the 2020–2021 school year. On September 15, 2020, across all five schools, about 30% of the students were learning remotely 100% of the time and two thirds were doing hybrid learning. By January 15, 2021, the percentage of students choosing 100% remote learning at four schools increased, ranging from 42% to 47.1%. At this same time, in contrast, MSAP School 4 saw only a 1.6% decrease in remote learning.

As of May 1, 2021, the percentage of students in remote learning dropped significantly for four schools (ranging from 15% to 26.2%) with one exception—MSAP School 5 dropped only 2%, from 47.1% remote to 45.3% remote. Another point to note regarding student/parent choices of learning location model is that most of the students at MSAP Schools 2 and 3 went back to physical schools, receiving in-person instruction full time around this time. At MSAP School 2, 15% of the students were full-time remote and 85% were full-time in person. At MSAP School 3, 26.2% of the students were full-time remote and 73.8% were full-time in person. The students at the other three schools had the option of attending either full-time remote or hybrid with four in-person days.

Table 3

2020–2021 Percentage of Students by Learning Location Model, by School

School/time	Full-time remote	Hybrid: 2 in-person days per week	Hybrid: 4 in-person days per week	Full-time In-person
MSAP School 1				
September 15, 2020 (%)	26.0	74.0	0.0	0.0
January 15, 2021 (%)	44.0	48.0	8.0	0.0
May 1, 2021 (%)	21.0	0.0	79.0	0.0
MSAP School 2				
September 15, 2020 (%)	30.7	69.3	0.0	0.0
January 15, 2021 (%)	45.8	54.2	0.0	0.0
May 1, 2021 (%)	26.2	0.0	0.0	73.8
MSAP School 3				
September 15, 2020 (%)	32.5	67.4	0.0	0.0
January 15, 2021 (%)	42.0	58.0	0.0	0.0
May 1, 2021 (%)	15.0	0.0	0.0	85.0
MSAP School 4				
September 15, 2020 (%)	34.4	58.8	6.8	0.0
January 15, 2021 (%)	32.8	53.9	13.3	0.0
May 1, 2021 (%)	16.5	0.0	83.5	0.0
MSAP School 5				
September 15, 2020 (%)	32.5	62.5	5.1	0.0
January 15, 2021 (%)	47.1	47.5	5.5	0.0
May 1, 2021 (%)	45.3	0.0	54.7	0.0

Note. Data provided by the project consortium in May 2021.

Student Assessment Participation During COVID-19

Due to the COVID-19 pandemic, for the 2019–2020 school year, the federal government gave permission for states to not administer end-of-year student assessments, and many states elected to forgo them. For the 2020–2021 school year, the federal government required states to administer end-of-year assessments, but allowed for flexibility in administration including a student testing participation rate of less than 95%; the option of administering different assessments, and/or shortened versions of assessments; and remote test-taking (U.S. Department of Education, 2021).

The descriptive profiles of students by their participation status in the spring 2021 ELA, math, and science assessments are reported in Table 4 through Table 8, one table per school. These tables illustrate, by school, the numbers of students who did and did not participate. Each of these tables identifies the similarities and differences between these two groups of students, while indirectly providing some insights into how representative the test-taking students were of the general pool of students in these MSAP schools. As reported, even given these federal government allowances, the ELA assessment participation rates for MSAP Schools 1–3 in this study were quite high, ranging from 90.6% in MSAP School 1 to 95.7% in School 2 to 95.1% in School 3. The corresponding math assessment participation rates were slightly lower—89.1%, 94.9%, and 93.1% for these three schools. Similar numbers were found for the science assessment participation. The assessment participation rates were lower for MSAP School 4 students, ranging from 80.8% for science to 87.6% for ELA. The rates were the lowest for MSAP School 5 students, at 60.5% for science and 71.6% for both ELA and math.

Table 4

Student Profile by Participation in the 2020–2021 Assessments: MSAP School 1

	Students took ELA assessment? (90.6%)		Students took math assessment? (89.1%)		Students took science assessment? (Grade 8) (89.5%)	
Characteristics	Yes	No	Yes	No	Yes	No
Number of students	847	88	833	102	274	32
Female (%)	50.6	40.9	50.3	45.1	50.4	46.9
Race/ethnicity:						
White (%)	51.1	36.4	50.8	41.2	52.2	40.6
African American (%)	6.6	14.8	7.1	9.8	8.0	9.4
Latino/Hispanic (%)	22.1	36.4	21.7	37.3	19.7	37.5
NSLP [a] (%)	56.4	68.2	56.4	66.7	59.9	75.0
English learner (%)	2.8	3.4	2.9	2.9	2.2	0.0
Special education (%)	15.5	29.5	15.1	30.4	18.6	25.0
Mean school membership days	174.2	166.1	174.1	168.8	174.5	166.0
Mean school days attended	154.3	132.5	154.6	132.9	151.5	132.3

Note. A difference of 10% or more is shaded.

[a] NSLP = National School Lunch Program.

Table 5

Student Profile by Participation in the 2020-2021 Assessments: MSAP School 2

Characteristics	Students took ELA assessment? (95.7%)		Students took math assessment? (94.9%)		Students took science assessment? (Grade 8) (94.2%)	
	Yes	No	Yes	No	Yes	No
Number of students	623	28	618	33	226	14
Female (%)	49.1	25.0	49.2	27.3	50.4	35.7
Race/ethnicity:						
White (%)	26.5	35.7	26.4	36.4	23.5	28.6
African American (%)	19.7	14.3	19.7	15.2	16.4	21.4
Latino/Hispanic (%)	37.1	46.4	37.2	42.4	42.9	28.6
NSLP [a] (%)	69.0	75.0	68.8	78.8	67.3	92.9
English learner (%)	14.0	25.0	14.1	21.2	11.9	28.6
Special education (%)	12.7	17.9	12.6	18.2	12.4	21.4
Mean school membership days	173.7	143.1	173.7	148.3	173.8	162.9
Mean school days attended	158.9	113.8	159.0	117.2	158.0	113.0

Note. A difference of 10% or more is shaded.

[a] NSLP = National School Lunch Program.

Table 6

Student Profile by Participation in the 2020-2021 Assessments: MSAP School 3

	Students took ELA assessment? (95.1%)		Students took math assessment? (93.1%)		Students took science assessment? (Grade 8) (92.5%)	
Characteristics	Yes	No	Yes	No	Yes	No
Number of students	385	20	377	28	136	11
Female (%)	49.9	50.0	49.9	50.0	47.1	45.5
Race/ethnicity:						
White (%)	25.5	30.0	25.5	28.6	27.9	36.4
African American (%)	16.6	20.0	16.7	17.9	16.2	9.1
Latino/Hispanic (%)	38.7	30.0	38.2	39.3	32.4	36.4
NSLP [a] (%)	71.2	65.0	70.8	71.4	69.9	63.6
English learner (%)	18.4	15.0	18.3	17.9	21.3	0.0
Special education (%)	21.3	75.0	20.2	75.0	18.4	72.7
Mean school membership days	172.2	167.1	172.1	170.0	172.4	152.6
Mean school days attended	162.2	143.1	162.4	145.7	163.4	125.6

Note. A difference of 10% or more is shaded.

[a] NSLP = National School Lunch Program.

Table 7

Student Profile by Participation in the 2020-2021 Assessments: MSAP School 4

	Students took ELA assessment? (87.6%)		Students took math assessment? (83.3%)		Students took science assessment? (80.8%)	
Characteristics	Yes	No	Yes	No	Yes	No
Number of students	204	29	194	39	59	14
Female (%)	50.5	62.1	50.5	59.0	40.7	50.0
Race/ethnicity:						
White (%)	29.9	17.2	29.9	20.5	39.0	28.6
African American (%)	15.7	24.1	15.5	23.1	15.3	21.4
Latino/Hispanic (%)	40.2	44.8	40.7	41.0	39.0	42.9
NSLP [a] (%)	52.5	65.5	51.5	66.7	49.2	50.0
English learner (%)	11.3	10.3	11.9	7.7	11.9	7.1
Special education (%)	19.1	27.6	19.1	25.6	16.9	28.6
Mean school membership days	176.9	177.0	176.9	177.0	177.0	177.0
Mean school days attended	163.2	157.1	163.5	157.0	163.0	161.5

Note. A difference of 10% or more is shaded.

[a] NSLP = National School Lunch Program.

Table 8

Student Profile by Participation in the 2020-2021 Assessments: MSAP School 5

	Grades 11–12 students took ELA assessment? (71.6%)		Grades 11–12 students took math assessment? (71.6%)		Grade 11 students took science assessment? (60.5%)	
Characteristics	Yes	No	Yes	No	Yes	No
Number of students	159	63	159	63	69	45
Female (%)	57.2	39.7	57.2	39.7	63.8	60.0
Race/ethnicity:						
White (%)	17.0	3.2	17.0	3.2	29.0	4.4
African American (%)	17.0	19.0	17.0	19.0	14.5	13.3
Latino/Hispanic (%)	58.5	76.2	58.5	76.2	50.7	80.0
NSLP [a] (%)	62.9	71.4	62.9	71.4	56.5	82.2
English learner (%)	6.3	12.7	6.3	12.7	7.2	11.1
Special education (%)	9.4	31.7	9.4	31.7	10.1	24.4
Mean school membership days	178.0	178.0	178.0	178.0	178.0	178.0
Mean school days attended	165.2	145.3	165.2	145.3	166.0	150.7

Note. A difference of 10% or more is shaded.

[a] NSLP = National School Lunch Program.

Reviewing the numbers in Table 4 through Table 8, we observe the following:

- Generally, across these 5 schools, more students participated in the ELA assessment than in the math assessment.
- Female students were more likely to take the assessments than miss them at MSAP Schools 1, 2, and 5.
- White students were more likely to take the assessments than miss them at MSAP Schools 1, 4, and 5.
- Hispanic/Latino students in MSAP Schools 1 and 5 were overrepresented in the group of students not taking the assessments when compared to the group of students who took the assessments, and the difference was over 10%.
- NSLP participants were overrepresented in the group of students not taking the assessments when compared to the group of students who took the assessments in all schools except MSAP School 3.
- Special education students were overrepresented in the group of students not taking the assessments when compared to the group of students who took the assessments.

- In Schools 1, 2, and 3, the mean membership days are higher for the group of students who took the assessments than the mean membership days for the group of studens who missed the assessments. The mean membership days are the same or almost identical for these two groups of students in MSAP Schools 4 and 5.
- In all five schools, the mean number of school days attended for the students who took the assessments was higher than the number for the students who missed the assessments. The largest difference was found in MSAP School 2, where the students who took the assessments attended about 40 more days than those who missed them. The smallest attendance difference was found for students in MSAP School 4, ranging from 1.5 days to 6.5 days.

Study Methodology

CRESST has pioneered the use of rigorous methodological approaches to the analysis of student outcome data in the field of evaluating choice schools, especially magnet schools. For our QED studies, we compare intervention students with a comparison group that is similar to the intervention group at the baseline by using a propensity score matching approach to establish baseline equivalence. In other words, it is a QED in the form of a comparison group pretest/posttest design. We use a regression-based approach to conduct the analysis and the average treatment effect on the treated, controlling for baseline indicators relevant to intervention status and achievement in both the matching model and the analysis model to increase the robustness of the estimates. CRESST uses STATA (https://www.stata.com/) to conduct both radius matching and data analysis. Graphics such as tables and charts are used to illustrate data analysis results.

Sampling Design and Definition (Study Contrast)

In this section, we describe how we define intervention and comparison students. When this study design was proposed in the period of December 2020 to January 2021, remote and hybrid were the two learning options available to students. Beginning in spring 2021, some MSAP schools also started offering full-time in-person learning. With that dynamic instructional context in mind, for this study, the intervention students are defined as those who remained predominantly remote over the entire 2020–2021 school year. The comparison students are those doing hybrid learning throughout the school year. The predominantly in-person students are excluded from the matching and our study because a very small number of students fall into this category. Additionally, due to only four elementary school students being classified as predominantly remote, the elementary school students are also excluded from the impact analysis.

In principle, all students enrolled in these MSAP schools in 2020–2021 were eligible to be included in the study as either intervention students (students who are predominantly remote in 2020–2021) or comparison students (students who are classified as doing hybrid learning in

2020–2021). However, since rigorous study design requires equivalent baselines, this study could only include intervention and comparison students who have outcome data in 2020–2021 and for whom we could also locate their baseline demographic data and assessment scores.

Student Data

The analysis described in this report relies on student-level demographic and student outcome data from the 2017–2018, 2018–2019, and 2020–2021 school years. There was no student testing in spring 2020 due to the COVID-19 pandemic and its related school closures. In Connecticut, during typical school years, the Smarter Balanced assessments are administered to students in Grades 3–8, and the SAT assessments are administered to students in Grade 11. The specific student outcome measures examined in our study include:

1. Smarter Balanced ELA and mathematics assessments for students in Grades 6–8
2. SAT ELA and mathematics assessments for students in Grade 11
3. Other outcome measures: student attendance rate and chronic absence rate

CRESST standardized the assessment scores based on the mean and standard deviation for each subject test and each grade level, based on data received from the CSDE. Please refer to Appendix Table A1 for information on how many students and schools the standardization was based on for each grade level and for each assessment.

This standardization allows us to compare scores across grades, assessments, and years more easily and compatibly. A standardized scale score of zero, for example, indicates that the student scored at the mean for all other students in the district who took the same assessment. A standardized scale score of 1.0 means the student scored one standard deviation higher than the district mean. Conversely, a standardized scale score of -1.0 indicates that the student scored one standard deviation lower than the district mean. Using generally accepted benchmarks in statistical analysis, we consider a difference of 0.1 standard deviations or less to be minor, a difference of 0.1 to 0.3 standard deviations to be small, a difference of 0.3 to 0.5 standard deviations to be moderate, and a difference greater than 0.5 standard deviations to be large.

The reliability and validity information for these assessments can be found in the technical reports posted online by Smarter Balanced (https://validity.smarterbalanced.org/) and by SAT (https://collegereadiness.collegeboard.org/educators/higher-ed/test-validity-design).

Selection of Comparison Students Within Schools

To examine the effect of learning location on students' measurable outcomes, it is necessary to know not only how predominantly remote students fared on these outcomes, but also how they might have fared if they had not been predominantly remote (for an introduction to the literature on causal inference, see Holland, 1986; Morgan & Winship, 2007; Rubin, 2005; Schneider et al., 2007). One way to do this is to compare predominantly remote students to

demographically and academically similar peers (i.e., comparison students) in the same schools (e.g., three middle schools and one high school).

In this study, we accomplished this comparison by using a statistical technique known as radius matching (Huber et al., 2010), which employs both a propensity score and a Mahalanobis distance measure. A simulation study by Huber et al. (2012) validated the radius matching method and helped researchers using their technique choose suitable values for the fine-tuning parameters. Our study utilizes a STATA module developed by the creators of the radius matching technique which automates the entire estimation process, including the student-level matching, a regression-based bias adjustment to produce the estimated intervention effects, and a rigorous approach for estimating standard errors.

The radius matching approach computed a distance measure comprised of both a propensity score and a Mahalanobis distance score for all eligible comparison students. Students from each comparison sample were matched to predominantly remote students with similar distance measures using radius matching. In this matching process, any comparison student whose distance measure fell within a defined distance (radius) of a predominantly remote student was matched to that student.[2] Any single comparison student may be matched to multiple intervention students, and a trimming factor is used to ensure that any single comparison student is not weighted too heavily in the analysis (Huber et al., 2010).[3] If the propensity scores of multiple comparison students were sufficiently close to a single predominantly remote student, each comparison student received a weight inversely proportional to their difference measure. For example, two comparison students who had identical difference measures within the defined radius distance would each have received a weight of 0.5. Predominantly remote students were removed from the analytical sample when they could not be matched to any comparison student with a difference measure within the defined radius.

Through the use of this technique, CRESST was able to match intervention students to comparison students exactly on grade level (that is, no comparison students are in a different grade level than their intervention counterparts), and very closely on background characteristics, including grade level, gender, race/ethnicity, English learner status, National School Lunch Program (NSLP) participation status, special education participation status, and another indicator CRESST created to document recent mobility between schools. Most importantly, CRESST also matched students based on their baseline standardized assessment scores following the standard established by WWC (2020a, 2020b).

[2] We use a radius three times the distance of the 90th percentile of the distances calculated from pair-matching, which falls within the recommendation of Huber et al. (2012) that a large radius leads to a smaller root mean square error with little effect on the standard deviation.

[3] We generally use a trimming factor between 4 and 6% which falls within the recommendation of Huber et al. (2012). This would normally ensure that no single comparison student will represent more than 6% of the comparison sample after weighting.

Analysis Approach for Student Outcome Analysis

CRESST uses rigorous methods for estimating the effect of attending school predominantly remotely on student achievement. The primary research questions examine the effect of the intervention (i.e., predominantly remote learning) by comparing outcomes of intervention students to the counterfactual condition of how they would have fared if they had not been a part of the intervention. This effect is known in the literature as the average treatment effect on the treated (ATET) (Ho et al., 2007). To examine this effect for each of the student achievement outcomes, CRESST uses a regression-based approach with bias adjustment, which performed well in a simulation study as detailed in Huber et al. (2012). Specifically, CRESST first uses the following weighted ordinary least squares (WOLS) regression equation on the comparison student population to produce the coefficient estimates:

$$Y = ß_0 + ß_1X_{1i} + ß_2X_{2i} + ß_3X_{3i} \ldots\ldots\ldots + ß_nX_{ni} + \varepsilon_i \quad (1)$$

where Y is the dependent or outcome variable, $ß_0$ is the intercept, $ß_1$ is the coefficient applied to the propensity score, $ß_2$ is the coefficient applied to the square of the propensity score, $ß_3$… $ß_n$ are the coefficients associated with the list of additional variables (grade level, gender, race/ethnicity, English learner status, NSLP participation status, special education participation, and prior outcome scores) used to define the Mahalanobis distance, and ε_i is the random error term.

Secondly, a counterfactual estimate is then obtained by adding a bias adjustment from the regression results to the average observed score of the comparison population in an outcome year. This counterfactual represents an estimate of how intervention students might have fared if they had not been predominantly remote but had instead attended school in a hybrid model. The average treatment effect on the treated is determined by subtracting the counterfactual estimate from the actual average observed score of the predominantly remote students. Additionally, we control for prior indicators relevant to treatment status and achievement in the analysis model to increase the robustness of the estimates. This approach is known as a double-robust regression, as the estimator is said to be consistent if either one of the two models (propensity score or regression) is correctly specified (Huber et al., 2010). In other words, controlling for prior indicators relevant to intervention status and achievement in both the matching model and the analysis model increases the robustness of the estimates.

Analysis Results Based on State Data

Returning to the research questions, we explored how students performed academically and non-academically relating to their learning location in 2020–2021 after controlling for baseline demographics and achievement outcomes. In this section, we followed the CSDE definition and cutoff points to classify students by their learning location model, and we also used CSDE's in-person membership and total membership data (i.e., enrollment) to conduct the

analysis. Additionally, per agreement with CSDE, we will not report any data for groups of five or fewer students, and report no assessment data for groups of fewer than 20 students.

First, we present our definition of student variables related to learning locations and the supplemental outcome on chronic absence. This is followed by the descriptive profile of students by their choice of learning locations based on the in-person membership days. Next, we present the matching results for the analytical student samples used for the impact analysis for the middle school students and for the high school students. Finally, we present the primary impact analysis results for the combined middle school students, and the primary impact regression results for the high school students. Besides the primary impact analyses using the overall middle student sample, we also conducted additional analysis for the student subgroups of interest (e.g., race/ethnicity, NSLP participation, special education participation, English learner status, and gender), where this is feasible due to sufficient sample size. Please be advised that the subgroup analyses/results are considered as supplemental analyses/results in this report.

State Data: Student Variable Definition and Calculation

The CSDE shared with CRESST the standardized assessment data, student demographic data, membership days including overall membership days and membership days by location, and total attendance days. For the set of analysis using the state data, here are how the following variables are calculated:

- **% In-person Membership Days** (i.e., days enrolled) is calculated by dividing the number of in-person membership days by total number of membership days, which include both in-person and remote membership days, and then multiplying by 100;
- **Predominantly Remote Students** are those students with 0% to less than 25% in-person membership days;
- **Hybrid Students** are those students with 25% to less than 75% in-person membership days;
- **% Absence Rate** is calculated by dividing the difference between total membership days and total attendance days by the total membership days, and then multiplying by 100; and
- A student is **a chronic absent student** if they were absent 10% or more of the total membership days.

Elementary and Middle School Student Profiles by Learning Location

Table 9 presents student demographics and student achievement for students who were predominantly remote (<25% in-person membership days) and hybrid learners (25-74.9% in-person membership days) in one elementary and three middle schools. There are only four Grade 5 students (1.2%) who are predominantly remote in 2020–2021, which informed our

decision not to combine the elementary and middle school sample together for the impact analysis. (Please see Appendix Tables A2 and A3 for the student profile at MSAP School 4.) Table 9 also presents their 2018–2019 baseline demographic and achievement profiles.

Table 9

Grades 5–8 Student Profile by 2020–2021 % of In-Person Membership Days

Characteristics	% In-person membership days		
	<25%	25-74.9%	>=75%
2020–2021 Number of students	338	1,410	7
2020–2021 Average membership days	176.1	175.5	77.4
2020–2021 Average in-person membership days	10.9	74.9	82.0
2020–2021 Average remote membership days	148.8	84.8	15.1
2020–2021 Average attendance days	159.7	158.8	69.7
2020–2021 Average absence days	16.4	16.7	7.7
2020–2021 Remotely proctored Smarter Balanced ELA (%)[a]	34.1	0.0	0.0
2020–2021 Remotely proctored Smarter Balanced math (%)[b]	35.2	0.0	0.0
2018–2019 Baseline Year Variables			
Female (%)	56.2	48.7	42.9
Race/ethnicity:			
White (%)	30.8	40.4	28.6
African American (%)	10.1	12.8	14.3
Latino/Hispanic (%)	35.8	29.7	42.9
NSLP[c] (%)	67.8	63.3	71.4
English learner (%)	10.4	12.3	14.3
Special education (%)	14.2	16.1	57.1
Grade level:			
Grade 5 (%)	1.2	4.1	0.0
Grade 6 (%)	25.4	31.8	28.6
Grade 7 (%)	35.2	31.0	71.4
Grade 8 (%)	38.2	33.1	0.0
Mean Smarter Balanced ELA scale score[a]	0.079	0.024	--
Mean Smarter Balanced math scale Score[b]	0.012	0.036	--

Note. Per agreement with CSDE, no assessment data is reported for groups of fewer than 20 students. [a] The numbers of students with available information are 323 and 1,400. [b] The numbers of students with available information are 312 and 1,383. [c] NSLP = National School Lunch Program.

Among the 1,755 students at these four schools, 338 students were predominantly remote, 1,410 were hybrid, and only seven students were predominantly in person. Given this

small number of in-person students, we decided to focus our study on comparing predominantly remote students to hybrid students. Looking at their 2020–2021 school membership and attendance data, these two groups look quite similar. They both have about 176 membership days, while the days attended are 159.7 vs. 158.8, and the absence days are 16.4 vs. 16.7. Looking at the 2018–2019 student demographics, relatively speaking, predominantly remote students were more likely to be female, Latino/Hispanic, and NSLP, and they scored higher on ELA assessments than hybrid students did.

Another consideration was that the predominantly remote students fell into two categories with respect to the administration of the academic outcome measures in spring 2021. About one third of the predominantly remote students took the Smarter Balanced assessments remotely, while 100% of the hybrid students took the assessments in person at school. We explored the data further to examine the similarities and differences between these two groups of predominantly remote students, with different assessment-taking locations, with descriptive results presented in Table 10. As in Table 9, the students' 2018–2019 baseline demographic and achievement profiles are also presented.

Table 10

Grades 5–8 Predominantly Remote Student Profile by 2020–2021 Assessment Locations: Remotely Proctored or Not

Characteristics	Predominantly remote (ELA)		Predominantly remote (math)	
	Remotely proctored	Not remotely proctored	Remotely proctored	Not remotely proctored
2020–2021 Number of students	110	213	110	202
2020–2021 Average membership days	175.7	176.2	175.7	176.2
2020–2021 Average in-person membership days	6.0	13.7	5.4	14.4
2020–2021 Average remote membership days	154.0	145.9	154.6	145.1
2020–2021 Average attendance days	160.9	159.4	163.2	158.8
2020–2021 Average absence days	14.7	16.8	12.5	17.3
2018–2019 Baseline Year Variables				
Female (%)	56.4	57.3	56.4	56.4
Race/ethnicity:				
White (%)	41.8	25.4	37.3	26.7
African American (%)	6.4	10.3	11.8	9.4
Latino/Hispanic (%)	26.4	41.8	24.5	42.1
NSLP [a] (%)	60.0	71.4	61.8	70.3
English learner (%)	7.3	12.7	6.4	12.9
Special education (%)	13.6	14.6	14.5	13.4
Grade level:				
Grade 5 (%)	1.8	0.9	1.8	0.5
Grade 6 (%)	32.7	22.5	27.3	22.8
Grade 7 (%)	34.5	36.6	37.3	35.1
Grade 8 (%)	30.9	39.9	33.6	41.6
Mean Smarter Balanced ELA scale score	0.262	-0.022	0.280	-0.018
Mean Smarter Balanced math scale score	0.172	-0.085	0.186	-0.077

[a] NSLP = National School Lunch Program.

As reported in Table 10, among the 323 students who took the Smarter Balanced ELA assessments, 110 took them remotely and 213 took them in person at school. These two groups were similar or very similar to each other in terms of total membership days and total

attendance days. However, the remotely proctored students had fewer in-person membership days, higher remote membership days, and two fewer absence days over the whole school year. Similar observations were made about students by their test-taking location for math assessments.

Looking at the 2018–2019 baseline demographic information of these predominantly remote students by their test-taking location for ELA assessments, we observed that the students who took the ELA remotely were more likely to be White, were less likely to be Latino/Hispanic, and were less likely to be NSLP participants. The same pattern is found for the predominantly remote students by testing location for the math assessments. The students who took the math assessment remotely were more likely to be White, were less likely to be Latino/Hispanic, and were less likely to be NSLP participants. Due to these differences in student population and because none of the hybrid students took the assessments remotely, and in order to match intervention and comparison students to the greatest extent possible, we decided to exclude from the analysis the predominantly remote students who took the assessments remotely.

Exploring student absence further during the 2020–2021 school year, Table 11 reports the Grades 5–8 student school outcomes in 2020–2021 and their 2018–2019 baseline demographic and achievement profiles, by their absence rate in 2020–2021. The students can be grouped into four categories of absence rate, with the largest category of students falling below the 10% boundary for chronic absence. Most of the 1,242 students have an average 5.9 school day absence rate, which is lower than 10% for the 2020–2021 school year. These students had about 176 membership days and 170 attendance days, and they had higher assessment scores in both ELA and math than the pool of students we used to standardize the assessment scores. Appendix Table A1 provides information on how many students and schools the standardization was based on for each grade level and for each assessment. As mentioned, CRESST standardized the assessment scores based on the mean and standard deviation for each subject test and each grade level, based on data received from the CSDE.

In contrast to the students with less than 10% absence rate, 256 students were absent between 10% and 19.9% of the school days; they attended an average of 150 days and were absent for about 25 days. Another 117 students were absent between 20% and 29.9% of the school days; they attended an average of about 130 days and were absent for about 43 days. Finally, there were 133 students who were absent for more than or equal to 30% of the school days; they attended an average of about 97 days and were absent for about 78 days.

Table 11

Grades 5–8 Student Profile by Their Absence Rate in 2020–2021

Characteristics	% Absence rate			
	<10%	10-19.9%	20-29.9%	>=30%
2020–2021 Number of students	1,242	256	117	133
2020–2021 Average membership days	176.1	174.9	172.8	175.1
2020–2021 Average attendance days	170.2	150.0	130.1	97.4
2020–2021 Average absence days	5.9	24.9	42.7	77.8
2020–2021 Mean Smarter Balanced ELA scale score	0.163	-0.278	-0.379	-0.400
2020–2021 Mean Smarter Balanced math scale score	0.151	-0.324	-0.343	-0.455
2018–2019 Baseline Year Variables				
Female (%)	50.4	48.8	49.6	50.4
Race/ethnicity:				
White (%)	41.4	29.7	34.2	32.3
African American (%)	11.9	14.5	16.2	7.5
Latino/Hispanic (%)	28.2	38.3	35.0	38.3
NSLP [a] (%)	56.8	77.0	89.7	85.7
English learner (%)	12.3	13.3	8.5	9.0
Special education (%)	14.6	19.1	22.2	14.3
2020–2021 Grade level:				
Grade 5 (%)	3.7	4.3	2.6	1.5
Grade 6 (%)	31.2	29.3	35.0	22.6
Grade 7 (%)	32.2	34.0	24.8	30.1
Grade 8 (%)	32.9	32.4	37.6	45.9
Mean Smarter Balanced ELA scale score	0.151	-0.206	-0.254	-0.337
Mean Smarter Balanced math scale score	0.147	-0.236	-0.244	-0.291

[a] NSLP = National School Lunch Program.

Returning to Table 11, examining their 2018–2019 demographics and achievement, we noticed that the students with a lower absence rate were most likely to be White, least likely to be Latino/Hispanic, and least likely to be NSLP participants. We also observed that the students with higher absence rates scored the lowest on academic assessments in 2018–2019.

High School Student Profiles by Learning Location

Table 12 examines student demographics and student achievement for students who were predominantly remote (<25% in-person membership days) and hybrid learners (25-75% in-person membership days) in the MSAP high school. Among the 99 students at this school, 48 students were predominantly remote and 51 were hybrid. These two groups of students yielded very similar results. They both have about 178 membership days; the days attended are 162.7 vs. 162.3, and the absence days are 15.3 and 15.7. Demographically, predominantly remote students were more likely to be female, Latino/Hispanic, or NSLP participants, than hybrid students.

Table 12

Grade 11 Student Profile by 2020–2021 % of In-Person Membership Days

	% In-person membership days	
Characteristics	<25%	25-75%
2020–2021 Number of students	48	51
2020–2021 Total membership days	178.0	178.0
2020–2021 Total in-person membership days	13.6	58.0
2020–2021 Total remote membership days	147.4	103.0
2020–2021 Total attendance days	162.7	162.3
2020–2021 Total absence days	15.3	15.7
2017–2018 Baseline Year Variables		
Female (%)	68.8	58.8
Race/ethnicity:		
White (%)	18.8	21.6
African American (%)	12.5	15.7
Latino/Hispanic (%)	64.6	54.9
NSLP [a] (%)	83.3	64.7
English learner (%)	8.3	11.8
Special education (%)	8.3	17.6
Grade 8 Smarter Balanced ELA scale score	0.131	0.090
Grade 8 Smarter Balanced math scale score	0.181	0.162

[a] NSLP = National School Lunch Program.

Matching Results for Middle School Students

We used student data from MSAP Schools 1, 2, and 3 to conduct matching for the combined middle school analytical samples by student outcome. We decided to exclude the predominantly remote students who took the assessments remotely because none of the hybrid students took the assessments remotely. We conducted three separate sets of matching, one for each outcome measure (ELA scores, math scores, and attendance rate and chronic absence), to maximize the sample size for each analysis (See Table 13).

Table 13

2018–2019 Matching Profiles: Predominantly Remote Students in Grades 6–8 and Their Matched Comparison Students in MSAP Schools 1–3, by Student Outcome

	Analytical sample for ELA analysis		Analytical sample for math analysis		Analytical sample for attendance rate and chronic absence analysis	
Characteristics	Pre-dominantly remote	Hybrid	Pre-dominantly remote	Hybrid	Pre-dominantly remote	Hybrid
# of students in the matching pool	211	1,342	201	1,328	334	1,352
# of matched students	210	1,085	200	1,109	334	1,187
Female (%)	56.7	56.0	56.0	56.0	56.0	56.0
Race/ethnicity:						
White (%)	25.7	25.4	27.0	26.7	31.1	31.0
African American (%)	10.5	10.9	9.5	9.3	10.2	10.7
Latino/Hispanic (%)	41.4	41.4	42.0	42.4	35.6	36.1
NSLP [a] (%)	71.0	71.0	70.0	70.6	67.4	68.9
English learner (%)	12.9	12.9	13.0	13.0	10.5	10.5
Special education (%)	14.8	14.8	13.5	13.5	14.1	14.1
Baseline grade level:						
Grade 5 (%)	0.0	0.0	0.0	0.0	0.0	0.0
Grade 6 (%)	22.9	22.9	23.0	23.0	25.7	25.7
Grade 7 (%)	37.1	37.1	35.5	35.5	35.6	35.6
Grade 8 (%)	40.0	40.0	41.5	41.5	38.6	38.6
Prior mean Smarter Balanced ELA scale score	-0.016	-0.016	-0.013	-0.013	0.084	0.084
Prior mean Smarter Balanced math scale score	-0.070	-0.087	-0.066	-0.066	0.016	0.016
% in same school since 2018–2019	34.8	35.9	36.0	37.6	34.1	35.1

[a] NSLP = National School Lunch Program.

As can be seen in Table 13, the ELA analytical sample of middle school students starts with 211 predominantly remote students and 1,342 hybrid students, while our math analytical sample is a bit smaller with 201 predominantly remote students and 1,328 hybrid students, and

the attendance rate/chronic absence analytical sample has 334 predominantly remote students and 1,352 hybrid students. During the matching process, we lost one student for the ELA sample, one student for the math sample, and zero students for the attendance sample.

Among the matched predominantly remote students, Latino/Hispanic students (35.6% to 42.0%) made up the largest group of the students, slightly more than a quarter were White, and around 70% were NSLP participants. Over one tenth of the students were classified as English learners and about 13.5% to 14.8% were classified as special education students. As reported, the demographic characteristics of the selected matched sample of hybrid students[4] closely aligned with the demographics of the predominantly remote students for the baseline year in the combined sample. The baseline achievement score difference is zero or within the 0.05 standard deviations threshold set forth by WWC.

Matching Results for High School Students

The ELA and math analytical samples for Grade 11 students start with 47 predominantly remote students and 49 hybrid students, and the attendance rate/chronic absence analytical sample has 48 predominately remote students and 51 hybrid students (see Table 14). We did not lose any students in the ELA, math, and attendance rate analytical samples, and we lost only one hybrid student in each of the three matchings. Among the matched predominantly remote students, Latino/Hispanic students (63.8% to 64.6%) were the majority, about 19% were White, and around 83% were NSLP participants. About 8.3% to 8.5% were classified as English learners or special education students. The baseline achievement score difference is zero, below the 0.05 standard deviations threshold set forth by WWC.

[4] The number of comparison students after matching reflects those students whose background characteristics were close enough to an MSAP student to satisfy the common support requirements of propensity score matching. In some cases, a portion of this group of students eventually receive a weight of zero due to the additional constraints imposed by the Mahalanobis component of the radius matching approach.

Table 14

2018–2019 Matching Profiles: Predominantly Remote Students in Grade 11 and Their Matched Comparison Students in MSAP School 5, by Student Outcome

Characteristics	Analytical sample for ELA analysis		Analytical sample for math analysis		Analytical sample for attendance rate and chronic absence analysis	
	Pre-dominantly remote	Hybrid	Pre-dominantly remote	Hybrid	Pre-dominantly remote	Hybrid
# of students in the matching pool	47	49	47	49	48	51
# of matched students	47	48	47	48	48	50
Female (%)	68.1	68.1	68.1	68.1	68.8	68.8
Race/ethnicity:						
White (%)	19.1	19.4	19.1	19.4	18.8	18.8
African American (%)	12.8	12.8	12.8	12.8	12.5	12.5
Latino/Hispanic (%)	63.8	63.8	63.8	63.8	64.6	64.6
NSLP [a] (%)	83.0	83.0	83.0	83.0	83.3	83.3
English learner (%)	8.5	8.7	8.5	8.7	8.3	8.2
Special education (%)	8.5	8.5	8.5	8.5	8.3	8.3
Grade 8 mean Smarter Balanced ELA scale score	0.141	0.141	0.141	0.141	0.131	0.131
Grade 8 mean Smarter Balanced math scale score	0.187	0.187	0.187	0.187	0.181	0.181

[a] NSLP = National School Lunch Program.

Middle School Students Results: Overall

This section presents the primary results of analyzing the combined pool of students in all three MSAP middle schools together. For the QED analysis, we compared predominantly remote students' school outcomes in 2020–2021 to a counterfactual estimate of how they would have been likely to perform if they had attended the school in a hybrid model. The estimates were obtained via regression analysis, after controlling for students' baseline demographic characteristics and performance. We found predominantly remote students scored similarly in ELA, significantly lower in math, and had similar attendance and absence rates, when compared to the hybrid students (see Table 15).

Table 15

Combined MSAP Schools 1, 2, and 3 Estimated Average Treatment Effect on the Treated in Student Outcomes—Overall in 2020–2021

Student outcomes	# of predominantly remote students	# of hybrid students	Observed	Estimated	Predominantly remote effect	*p* value
Smarter Balanced ELA score	210	1,342	-0.006	-0.053	0.048	.316
Smarter Balanced math score	200	1,328	-0.252	-0.053	**-0.198**	**.000***
School attendance rate	334	1,352	90.86	90.25	0.612	.433
Chronic absence rate	334	1,352	29.34	29.11	0.236	.958

*$p < .05$.

To help the reader contextualize the statistically significant effect on math scores, we utilize an approach developed by Hill et al. (2008), which involves benchmarking against average student gains over the course of a school year. The authors reviewed annual achievement gains in seven nationally normed reading assessments: CAT5, SAT9, Terra Nova-CTBS, Gates-MacGinitie, MAT8, Terra Nova-CAT, and SAT10. They found that students gained an average of 0.32 standard deviations from Grades 5 to 6, 0.23 standard deviations from Grades 6 to 7, and 0.26 standard deviations from Grades 7 to 8. A simple mean of these three average gains is 0.27. Using this benchmark, and assuming a 9-month school year, the -0.198 effect estimate is of similar magnitude to **6.6 months of learning difference against the predominantly remote students during the COVID-19 pandemic** using Hill et al.'s (2008) meta-analysis methodology [(0.198/0.27)*9=6.6].

CSDE developed and published a White Paper on growth model for Smarter Balanced Assessments (CSDE, 2016) with two growth targets for each performance level in ELA and math, by grade level. We calculated the average targets for ELA and math to be 45.9 and 38.1 for Grade 6; and the targets are 39.4 and 37.6 for Grade 7 students. Then based on the standard errors we reported in Appendix Table A1 for these two grades, we converted these target numbers into standard deviations of 0.47 and 0.37 in ELA and math for sixth-graders; and 0.38 and 0.37 for seventh-graders. If we were using these numbers as benchmarks, the learning differences would be relatively smaller.

We also explored conducting an additional analysis on student assessments by including student attendance rate as a covariate in addition to the baseline demographic and performance variables. While attendance rate is statistically significantly related to student assessments scores in ELA and math, its inclusion in the analysis model changed the effect estimates slightly (ELA effect reduced to .020 and the math effect increased to -.199) but the

significance effect on math scores and the nonsignificant effect on ELA scores remained. Predominantly remote students scored similarly to their comparison students in ELA and significantly lower in math.

Lastly, we followed the WWC guidelines in multiple comparison adjustments and ran the Benjamini-Hochberg adjustment methods for the primary effects by domain. As reported, we have four outcome measures: ELA, math, attendance rate, and chronic absence rate. These outcomes are in three domains: ELA, math, and attendance/absence. As we ran parallel analyses for middle school and high school students, we consider

- middle school student scores in Smarter Balanced ELA and high school student scores in SAT ELA as in one ELA domain despite being two independent assessments;
- middle school student scores in Smarter Balanced math and high school student scores in SAT math as in one math domain despite being two independent assessments; and
- middle school and high school student outcomes in school attendance and absence as in one domain.

After running the Benjamini-Hochberg adjustments, the significant effect in math for middle school students remained.

Middle School Students Results: Subgroups

This section presents results for the subgroup analysis using the combined middle school student sample. The estimates were obtained via regression analysis, after controlling for students' baseline demographic characteristics and performance. While we will only attempt analysis when there are at least 30 intervention students, these subgroup analysis results should still be considered with caution as the sample size is small and we ran multiple subgroup analyses with the same alpha level of .05.

The ELA score difference between the predominantly remote students and hybrid students is not significant for the overall sample, and it is not significant for all but one student subgroup (Table 16). The exception is the predominantly remote students who are also special education students, who scored significantly higher than hybrid students in ELA, with an effect size of .302, which is considered moderate in educational studies.

Table 16

Combined MSAP School 1, 2, and 3 Estimated Average Treatment Effect on the Treated in ELA Scores: Overall and for Demographic Subgroups

Characteristics	# of predominantly remote students	# of hybrid students	Observed	Estimated	Predominantly remote effect	*p* value
Overall	210	1,342	-0.006	-0.053	0.048	.316
Race/Ethnicity						
White	51	492	0.144	0.198	-0.053	.660
African American	22	170	--	--	--	--
Latino/Hispanic	87	392	-0.306	-0.332	0.026	.738
NSLP participants						
NSLP	149	852	-0.160	-0.237	0.078	.221
Non-NSLP	59	433	0.391	0.439	-0.049	.554
English learner status						
English learner	27	163	--	--	--	--
Non-English learner	183	1,179	0.105	0.060	0.046	.417
Special education status						
Special education	30	205	-0.712	-1.015	0.302	.015*
Non-special education	179	1,125	0.114	0.101	0.013	.844
Gender						
Female	119	659	0.056	0.002	0.054	.436
Male	91	683	-0.086	-0.149	0.063	.508

Notes. -- No impact analysis was conducted because of the small sample size and/or difficulty in establishing baseline equivalence. NSLP = National School Lunch Program.
*$p < .05$.

The math score difference between the predominantly remote students and hybrid students is significant for the overall sample in favor of hybrid students. The same is observed for all subgroups for which we were able to conduct the analysis due to sufficient sample size, except for one student subgroup (female students) (Table 17). The exception is the predominantly remote female students, who scored similarly to the hybrid female students.

Table 17

Combined MSAP School 1, 2, and 3 Estimated Average Treatment Effect on the Treated in Math Scores: Overall and for Demographic Subgroups

Characteristics	# of predominantly remote students	# of hybrid students	Observed	Estimated	Predominantly remote effect	*p* value
Overall	200	1,328	-0.252	-0.053	-0.198	.000*
Race/ethnicity						
White	54	518	-0.098	0.210	-0.308	.003*
African American	19	169	--	--	--	--
Latino/Hispanic	84	384	-0.500	-0.334	-0.166	.020*
NSLP participants						
NSLP	140	841	-0.414	-0.277	-0.137	.016*
Non-NSLP	58	431	0.133	0.408	-0.275	.000*
English learner status						
English learner	26	162	--	--	--	--
Non-English learner	174	1,166	-0.170	0.050	-0.221	.000*
Special education status						
Special education	27	210	--	--	--	--
Non-special education	173	1,118	-0.130	0.063	-0.194	.000*
Gender						
Female	112	649	-0.207	-0.103	-0.104	.073
Male	88	676	-0.308	-0.032	-0.276	.000*

Notes. -- No impact analysis was conducted because of the small sample size and/or difficulty in establishing baseline equivalence. NSLP = National School Lunch Program.
*$p < .05$.

The attendance rate difference between the predominantly remote students and hybrid students is not significant for the overall sample. It is also not significant for all the student subgroups for which we were able to conduct the analysis (see Table 18) due to sufficient sample size.

Table 18

Combined MSAP School 1, 2, and 3 Estimated Average Treatment Effect on the Treated in School Attendance Rate: Overall and for Demographic Subgroups

Characteristics	# of predominantly remote students	# of hybrid students	Observed	Estimated	Predominantly remote effect	*p* value
Overall	334	1,352	90.86	90.25	0.612	.433
Race/Ethnicity						
White	103	544	91.13	90.87	0.260	.857
African American	30	157	90.85	88.38	2.468	.609
Latino/Hispanic	118	397	89.40	88.65	0.749	.616
NSLP participants						
NSLP	224	857	88.74	88.61	0.131	.913
Non-NSLP	109	495	95.44	94.26	1.187	.259
English learner status						
English learner	30	107	89.89	91.79	-1.896	.516
Non-English learner	299	1,187	90.84	90.04	0.802	.371
Special education status						
Special education	45	201	92.03	88.38	3.652	.112
Non-special education	287	1,134	90.64	90.11	0.521	.599
Gender						
Female	187	663	91.26	89.60	1.660	.173
Male	147	689	90.36	90.68	-0.320	.825

Note. NSLP = National School Lunch Program.

Table 19 reports the chronic absence results. The chronic absence difference between the predominantly remote students and hybrid students is not significant for the overall sample. It is also not significant for all the student subgroups for which we were able to conduct the analysis (see Table 19) due to sufficient sample size with one exception. The exception is the predominantly remote special education students had significantly lower chronic absence rates when compared to the hybrid special education students.

Table 19

Combined MSAP Schools 1, 2, and 3 Estimated Average Treatment Effect on the Treated in School Chronic Absence: Overall and for Demographic Subgroups

Characteristics	# of predominantly remote students	# of hybrid students	Observed	Estimated	Predominantly remote effect	*p* value
Overall	334	1,352	29.34	29.11	0.236	.958
Race/ethnicity						
White	103	544	25.24	25.32	-0.075	.993
African American	30	157	33.33	34.36	-1.025	.936
Latino/Hispanic	118	397	37.29	34.03	3.261	.577
NSLP participants						
NSLP	224	857	37.50	36.08	1.419	.760
Non-NSLP	109	495	11.93	14.83	-2.907	.526
English learner status						
English learner	30	107	40.00	23.66	16.338	.288
Non-English learner	299	1,187	28.76	30.09	-1.332	.702
Special education status						
Special education	45	201	20.00	47.32	-27.317	.006*
Non-special education	287	1,134	31.01	27.62	3.394	.324
Gender						
Female	187	663	28.34	30.61	-2.272	.624
Male	147	689	30.61	26.95	3.662	.527

Note. NSLP = National School Lunch Program.
*$p < .05$.

High School Students Results: Overall

Table 20 summarizes the analysis results for the Grade 11 students. The estimates were obtained via regression analysis, after controlling for students' baseline demographic characteristics and performance. The estimated predominantly remote effects for MSAP School 5 are mixed, sometimes positive and sometimes negative, but none of the effects were statistically significant (see Table 20). There is no significant difference between Grade 11 predominantly remote students and hybrid students on their ELA scores, math scores, school attendance rates, and chronic absence. We were not able to conduct subgroup analysis due to the small overall sample size.

Table 20

MSAP School 5 Estimated Average Treatment Effect on the Treated in ELA, Math, and Science Scores

Student outcomes	# of predominantly remote students	# of hybrid students	Observed	Estimated	Predominantly remote effect	*p* value
SAT ELA	47	48	-0.259	-0.082	-0.177	.247
SAT math	47	48	-0.246	-0.190	-0.056	.530
School attendance rate	48	50	91.40	91.33	0.070	.976
Chronic absence rate	48	50	33.33	31.95	1.380	.924

We also explored conducting an additional analysis on student assessments by including student attendance rate as a covariate in addition to the baseline demographic and performance variables. Including the attendance rate does not significantly alter the estimated predominantly remote effect on student assessments scores in SAT ELA and math. For ELA, the inclusion of the attendance rate in the analysis model only changed the predominately remote effect reported in Table 20 from -.177 to -.130. For math, the inclusion of the attendance rate in the analysis model only changed the predominately remote effect reported in Table 20 from -.056 to -.066. In both analysis of student ELA and math scores, including the attendance rate, the differences between predominantly remote and hybrid students remained not statistically significant. In other words, Grade 11 predominantly remote students remained to score similarly to their comparison students in both SAT ELA and math even after controlling for their attendance rate.

Analysis Results Based on Project Consortium Data

Returning to the research questions, we explored how students performed academically and nonacademically by their learning location in 2020–2021 after controlling for baseline demographics and achievement scores. In this part of the study, instead of using the data from the CSDE, we took advantage of the more detailed student attendance and absence data by learning location collected by the MSAP schools.

Before diving into the impact analysis results, we first present a summary of how students at these MSAP schools attended schools in 2020–2021 by looking at their attendance and absence by location. Then we present the descriptive profile of students by their choice of learning locations based on the in-person attendance days. Next, we present the matching results for the analytical student samples used for the impact analysis for the middle school students and for the high school students. Finally, we present the impact analysis results for the combined middle school students, and the impact regression results for the high school

students. The combined analysis based on the Grades 6–8 students estimates effects for the overall student population, as well as subgroups (i.e., race/ethnicity, NSLP participation, special education participation, English learner status, and gender) whenever it is feasible due to sufficient sample size.

Consortium Data: Student Variable Definition and Calculation

The project consortium shared with CRESST the standardized assessment data, student demographic data, membership days including overall membership days and membership days by location, and attendance days including overall attendance days and attendance days by location. We calculated the student learning location by their in-person attendance days, with the predominantly remote students to be those who have less than 25% of their school attendance days attending schools in person and the hybrid students to be those who have more than 25% but less than 75% of their school attendance days attending schools in person in 2020–2021. Chronic absence, as defined previously, means a student missed 10% or more of the days they were enrolled in school. Specially, here are how the following variables are calculated:

- **% In-person attendance days** (i.e., days attended) is calculated by dividing the number of in-person attendance days by the total number of attendance days, which include both in-person and remote attendance days, and then multiplying by 100;
- **Predominantly remote students** are those students with 0% to less than 25% in person attendance days;
- **Hybrid students** are those students with 25% to 75% in person attendance days;
- **% Absence rate** is calculated by dividing the absence days by total membership days, and then multiplying by 100; and
- A student is **a chronic absent student** if they were absent 10% or more of the total membership days.

Descriptive Results of Student Attendance and Absence

Based on the year-end data we received from the project consortium, Table 21 presents the percentages of overall attendance rate and the absence rate by learning location. Across these five MSAP schools, the overall student attendance rates ranged from 87.8% to 94.0%. Out of the days the MSAP students were enrolled for in-person attendance, they attended at least 92.5% of these days. The students in MSAP School 4 had the highest in-person attendance rate, at 97.3%. Out of the days the MSAP students enrolled for remote learning attendance, they attended at least 84.1% of these remote days. The MSAP students at MSAP School 4 have the highest remote attendance rate, at 93.6%.

Table 21

2020–2021 Student Attendance and Absence Rates, Overall and by Learning Location, by School

Schools	Overall attendance rate	% Days attended in person	% Days absent in person	% Days attended remotely	% Days absent remotely
MSAP School 1	87.8	93.8	6.2	84.1	15.9
MSAP School 2	91.1	92.5	7.5	90.2	9.8
MSAP School 3	94.0	94.1	5.9	93.6	6.4
MSAP School 4	92.0	97.3	2.7	88.2	11.8
MSAP School 5	91.3	93.6	6.4	91.1	8.9

Note. Data provided by the Consortium.

Table 22 summarizes the attendance distribution by percentage of enrolled in-person school days by learning location during the 2020–2021 school year. As found with the state data, there are very few students who attended more than 75% of their school days in person. With the exception of the high school students, the majority of the students at the other four schools attended school in person between 25% and 75% of the time. The high school students either attended predominantly remotely or attended hybrid. Please note that the later impact analysis is based on a small sample size, as our QED study design requires baseline equivalence based on students' 2017–2018 data as well as the 2020–2021 educational outcome data.

Table 22

2020–2021 Student Distribution on Percent of School Days Attended In-Person Out of All Days Attended

	% Attendance days in-person			
Schools	<25%	25-49.9%	50-75%	>75%
MSAP School 1	22.1	59.9	16.7	1.3
MSAP School 2	23.2	19.1	56.7	1.0
MSAP School 3	14.7	17.0	65.7	2.6
MSAP School 4	14.3	50.0	35.7	0.0
MSAP School 5	51.5	48.5	0.0	0.0

Note. Data provided by the Consortium.

Elementary and Middle School Student Profiles by Learning Location

Table 23 examines student demographics and student achievement for students who were predominantly remote (<25% in-person attendance days), hybrid learners (25-75% in-

person attendance days), and predominantly in-person learners (>75% in-person attendance days) in one elementary and three middle schools. Among the 1,688 students at these four schools, 308 students were predominantly remote, 1,355 were hybrid, and 25 students were predominantly in person. Since there were only 25 predominantly in-person students across the four schools, we proceeded to compare only the predominantly remote students to hybrid students. While these two groups of students are similar, hybrid students were more likely to be White, less likely to be Latino/Hispanic, and less likely to be NSLP participants, and they scored similarly in ELA and math to the predominantly remote students in 2018–2019. The 2020–2021 school membership and attendance data show predominantly remote students and hybrid learners had the same mean number of enrollment days (176.5), while days attended are almost identical: 160.6 days and 159.7 days. Their total absence days are also almost the same, at 15.9 and 16.7.

Another consideration was that the predominantly remote students fell into two categories with respect to the administration of the academic outcome measures in spring 2021. About one third of the predominantly remote students took the Smarter Balanced assessments remotely, while 100% of the hybrid students took the assessments in person at school. We explored the data further to examine the similarities and differences between these two groups of predominantly remote students, with different assessment-taking locations, with descriptive results presented in Table 24. Among the 296 predominantly remote students who took the Smarter Balanced ELA assessments, 104 took them remotely and 192 took them in person at school. These two groups are similar or very similar to each other in terms of total enrollment days, total attendance days, and total absence days. However, the remotely proctored students had fewer in-person enrollment days, about half, and higher remote enrollment days over the whole school year. Similar observations were made about students by their test-taking location for math assessments.

Table 23

Elementary and Middle School Student Profile by 2020–2021 % of In-Person Attendance Days: MSAP Schools 1-4

Characteristics	% In-person attendance days		
	<25%	25-75%	>75%
2020–2021 Number of students	308	1,355	25
2020–2021 Average enrollment days	176.5	176.5	127.9
2020–2021 Average in-person enrollment days	20.7	86.7	78.5
2020–2021 Average in-person days attended	19.1	81.4	68.1
2020–2021 Average remote enrollment days	155.8	89.8	49.4
2020–2021 Average remote days attended	141.5	78.3	12.9
2020–2021 Average attendance days	160.6	159.7	81.0
2020–2021 Average absence days	15.9	16.7	46.9
2020–2021 Remotely proctored Smarter Balanced ELA (%)	35.1 (*n* = 296)	0 (*n* = 1349)	0
2020–2021 Remotely proctored Smarter Balanced math (%)	35.6 (*n* = 281)	0 (*n* = 1331)	0
2018–2019 Baseline Year Variables			
Female (%)	57.1	48.9	48.0
Race/ethnicity:			
White (%)	31.2	39.7	16.0
African American (%)	9.7	13.1	16.0
Latino/Hispanic (%)	35.7	29.8	40.0
NSLP [a] (%)	68.2	63.5	84.0
English learner (%)	11.4	12.3	20.0
Special education (%)	14.9	15.7	32.0
Grade level:			
Grade 5 (%)	1.0	4.4	0.0
Grade 6 (%)	26.0	32.8	32.0
Grade 7 (%)	37.0	31.9	36.0
Grade 8 (%)	36.0	31.0	32.0
Mean Smarter Balanced ELA scale score	0.055	0.027	-0.313
Mean Smarter Balanced math scale score	0.011	0.032	-0.413

Note. When the sample size deviates from the overall sample, we added the actual sample size info for the variable.

[a] NSLP = National School Lunch Program.

Table 24

MSAP Schools 1–4 Grade 5–8 Predominantly Remote Student Profile by 2020–2021 Assessment Locations: Remotely Proctored or Not

Characteristics	Remotely proctored (ELA)	Not Remotely proctored (ELA)	Remotely proctored (math)	Not remotely proctored (math)
2020–2021 Number of students	104	192	100	181
2020–2021 Average enrollment days	177.0	176.1	177.0	176.1
2020–2021 Average in-person enrollment days	12.8	25.4	12.0	26.6
2020–2021 Average in-person days attended	12.2	23.5	11.4	24.6
2020–2021 Average remote enrollment days	164.3	150.7	165.0	149.5
2020–2021 Average remote days attended	150.2	137.4	152.2	136.2
2020–2021 Average attendance days	162.4	160.8	163.6	160.8
2020–2021 Average absence days	14.6	15.3	13.4	15.3
2020–2021 Remotely proctored Smarter Balanced ELA (%)	100.0	0.0	87.9	3.4
2020–2021 Remotely proctored Smarter Balanced math (%)	93.0	6.0	100.0	0.0
2018–2019 Baseline Year Variables				
Female (%)	56.7	57.8	57.0	57.5
Race/ethnicity:				
White (%)	42.3	24.5	39.0	26.0
African American (%)	6.7	10.4	10.0	9.9
Latino/Hispanic (%)	26.0	42.2	25.0	42.0
NSLP [a] (%)	59.6	72.4	61.0	71.3
English learner (%)	7.7	14.1	7.0	14.4
Special education (%)	14.4	15.6	15.0	14.4
Grade level:				
Grade 5 (%)	1.9	0.5	2.0	0.0
Grade 6 (%)	34.6	21.9	30.0	22.1
Grade 7 (%)	35.6	38.5	41.0	36.5
Grade 8 (%)	27.9	39.1	27.0	41.4
Mean Smarter Balanced ELA scale score	0.254	-0.071	0.293	-0.066
Mean Smarter Balanced math scale score	0.174	-0.099	0.195	-0.084

[a] NSLP = National School Lunch Program.

Looking at the 2018–2019 baseline demographic information of these predominantly remote students by their test-taking location for ELA assessments, we observed that the students who took the ELA remotely were more likely to be White, and were less likely to be Latino/Hispanic or to be NSLP participants. The same pattern was found for the predominantly remote students by testing location for the math assessments. The students who took the math assessment remotely were more likely to be White, and were less likely to be Latino/Hispanic or to be NSLP participants. Because of these differences in student population and none of the hybrid students took the assessments remotely, and in order to match intervention and comparison students to the greatest extent possible, we decided to exclude from the analysis the predominantly remote students who took the assessments remotely.

Exploring student absence further during the 2020–2021 school year, Table 25 reports the Grades 5–8 student school outcomes in 2020–2021 and their 2018–2019 baseline demographic and achievement profiles, by their absence rate in 2020–2021. The students can be grouped into four categories of absence rate, with the largest category of students falling below the 10% boundary for chronic absence. The majority of the students, 1,197 students, have an average 6.1 school absence days and average absence rate below 10% for the 2020–2021 school year. These students had about 176 enrollment days, about 170 attendance days, and they had higher assessment scores in both ELA and math than the pool of students we used to standardize the assessment scores. Please see Appendix Table A1 for information on how many students and schools the standardization was based on for each grade level and for each assessment. As mentioned, CRESST standardized the assessment scores based on the mean and standard deviation for each subject test and each grade level, based on data received from the CSDE.

Returning to Table 25, in contrast to the students with less than 10% absence rate, 242 students were absent between 10% and 19.9% of the school days; they attended an average of about 151 days and were absent for 25 days. Another 113 students were absent between 20% and 29.9% of the school days; they attended an average of about 133 days and were absent for about 43 days. Finally, there were 136 students who were absent for more than or equal to 30% of the school days; they attended an average of about 98 days and were absent for an average of about 77 days.

Examining their 2018–2019 demographics and achievement, we noticed that these students with lower absence rate are most likely to be White, least likely to be Latino/Hispanic, and less likely to be NSLP participants. We also observed that the students with higher absence rates scored the lowest in 2018–2019.

Table 25

MSAP Schools 1–4 Grades 5–8 Student Profile by Their Absence Rate in 2020–2021

Characteristics	% Absence rate			
	<10%	10-19.9%	20-29.9%	>=30%
2020–2021 Number of students	1197	242	113	136
2020–2021 Average enrollment days	175.8	176.3	175.8	174.6
2020–2021 Average in-person enrollment days	77.0	72.0	65.9	64.8
2020–2021 Average in-person days attended	74.2	65.2	57.6	50.3
2020–2021 Average remote enrollment days	98.8	104.2	109.9	109.8
2020–2021 Average remote days attended	95.5	86.0	75.1	47.2
2020–2021 Average attendance days	169.7	151.2	132.7	97.5
2020–2021 Average absence days	6.1	25.0	43.1	77.1
2020–2021 Remotely proctored Smarter Balanced ELA (%)	6.4	5.9	7.1	6.2
2020–2021 Remotely proctored Smarter Balanced math (%)	6.5	6.4	6.5	2.5
2018–2019 Baseline Year Variables				
Female (%)	50.6	49.2	49.6	50.7
Race/ethnicity:				
White (%)	40.7	28.1	34.5	32.4
African American (%)	12.1	15.3	15.9	8.8
Latino/Hispanic (%)	28.4	38.4	34.5	38.2
NSLP [a] (%)	57.1	77.7	92.9	85.3
English learner (%)	12.7	14.5	6.2	9.6
Special education (%)	14.9	19.0	21.2	14.0
2020–2021 Grade level:				
Grade 5 (%)	3.8	4.5	2.7	1.5
Grade 6 (%)	32.4	31.0	32.7	23.5
Grade 7 (%)	33.3	35.5	24.8	30.9
Grade 8 (%)	30.4	28.9	39.8	44.1
Mean Smarter Balanced ELA scale score	0.144	-0.229	-0.239	-0.328
Mean Smarter Balanced math scale score	0.138	-0.244	-0.256	-0.295

[a] NSLP = National School Lunch Program.

High School Student Profiles by Learning Location

Table 26 presents the corresponding information for Grade 11 students at MSAP School 5. Among the 99 Grade 11 students at the high school, 51 students were predominantly remote and 48 were hybrid learners. Compared to hybrid students, predominantly remote students were more likely to be Latino/Hispanic and NSLP participants, less likely to be a special education student, and likely to score similarly in ELA and lower in math in 2017–2018 on their Grade 8 assessments. Looking at their 2020–2021 school membership and attendance data, these two groups also look quite similar; they both have 178 membership days, days attended are about 161.9 vs. 163.1, and the absence days are 16.1 vs. 14.9.

Table 26

High School Student Profile by 2020–2021 % of In-Person Attendance Days

Characteristics	% In-person attendance days		
	<25%	25-75%	>75%
2020–2021 Number of students	51	48	0
2020–2021 Total enrollment days	178.0	178.0	--
2020–2021 Total in-person enrollment days	18.1	63.9	--
2020–2021 Total in-person days attended	16.2	59.4	--
2020–2021 Total remote enrollment days	159.9	114.1	--
2020–2021 Total remote days attended	145.7	103.7	--
2020–2021 Total attendance days	161.9	163.1	--
2020–2021 Total absence days	16.1	14.9	--
2017–2018 Baseline Year Variables			--
Female (%)	66.7	60.4	--
Race/ethnicity:			--
White (%)	17.6	22.9	--
African American (%)	11.8	16.7	--
Latino/Hispanic (%)	64.7	54.2	--
NSLP [a] (%)	82.4	64.6	--
English learner (%)	7.8	12.5	--
Special education (%)	7.8	18.8	--
Mean Smarter Balanced ELA scale score	0.129	0.090	--
Mean Smarter Balanced math scale score	0.140	0.204	--

Note. -- No impact analysis was conducted because of the small sample size and/or difficulty in establishing baseline equivalence.

[a] NSLP = National School Lunch Program.

Matching Results for Middle School Students

Table 27 details the matching results for the combined analytical samples by student outcome, using student data from MSAP Schools 1, 2, and 3. As before, we decided to exclude MSAP School 4 because it only has three predominantly remote students. We also decided to exclude the predominantly remote students who took the assessments remotely, because none of the hybrid students took the assessments remotely.

Table 27

2018–2019 Grade 5–8 Students Matching Profiles: Predominantly Remote Students and Their Matched Comparison Students by Outcome

	Analytical sample for ELA analysis		Analytical sample for math analysis		Analytical sample for attendance rate and chronic absence analysis	
Characteristics	Predominantly remote	Hybrid	Predominantly remote	Hybrid	Predominantly remote	Hybrid
# of students in the matching pool	191	1,288	181	1,330	305	1,296
# of matched students	191	1044	180	997	305	1,056
Female (%)	57.6	57.6	57.5	56.9	57.0	57.0
Race/ethnicity:						
White (%)	24.6	25.6	26.0	27.0	31.5	31.5
African American (%)	10.5	9.0	9.9	9.9	9.8	10.0
Latino/Hispanic (%)	41.9	42.5	42.0	41.4	35.4	35.0
NSLP [a] (%)	72.3	72.3	71.3	71.4	67.9	67.9
English learner (%)	14.1	14.1	14.4	14.4	11.5	11.5
Special education (%)	15.7	15.7	14.4	14.4	14.8	14.8
2020–2021 Grade level:						
Grade 5 (%)	0.0	0.0	0.0	0.0	0.0	0.0
Grade 6 (%)	22.0	22.0	22.1	22.1	26.2	26.2
Grade 7 (%)	38.7	38.7	36.5	36.5	37.4	37.4
Grade 8 (%)	39.3	39.3	41.4	41.4	36.4	36.4
Prior mean Smarter Balanced ELA scale score	-0.070	-0.070	-0.066	-0.064	0.059	0.059
Prior mean Smarter Balanced math scale score	-0.095	-0.095	-0.084	-0.091	0.015	0.016
% in same school since 2018–2019	34.0	35.6	35.9	38.0	32.5	32.7

[a] NSLP = National School Lunch Program.

We conducted three separate sets of matching, one for each outcome measure (ELA scores, math scores, and attendance rate and chronic absence), to maximize the sample size for each analysis. The ELA analytical sample starts with 191 predominantly remote students and 1,288 hybrid students, while our math analytical sample is a bit smaller with 181 predominantly

remote students and 1,330 hybrid students. The attendance rate/chronic absence analytical sample has 305 predominantly remote students and 1,296 hybrid students. We did not lose any predominantly remote students for the ELA, science, and attendance/absence samples, but we lost one student in the math sample during the matching process.

Among the matched predominantly remote students, 35.4% to 42.0% were Latino/Hispanic, 24.6% to 31.5% were White, and around 70% were NSLP participants. Over one tenth of the students were classified as English learners and about 14.4% to 15.7 % were classified as special education students. As reported, the demographic characteristics of the selected matched sample of hybrid students[5] closely aligned with the demographics of the treated predominantly remote students for the baseline year in the combined sample. The baseline achievement score difference is either identical or within the 0.05 standard deviations threshold set forth by WWC for moderate evidence.

Matching Results for High School Students

The ELA analytical sample for Grade 11 students starts with 50 predominately remote students and 46 hybrid students, while the math analytical sample is the same with 50 predominately remote students and 46 hybrid students, and the attendance rate analytical sample has 51 predominately remote students and 48 hybrid students. As reported in Table 28, during the matching process, we lost six predominantly remote students for the ELA sample, six for the math sample, and four for the attendance/absence sample. Among the matched predominately remote students, Latino/Hispanic students were the majority (59.1% to 61.7%), about 20% were White, and around 80% to 81% were NSLP participants. About 8.5% to 9.1% were classified as English learners or special education students. The intervention and hybrid students matched exactly on baseline ELA and math assessment scores.

[5] The number of comparison students after matching reflects those students whose background characteristics were close enough to an MSAP student to satisfy the common support requirements of propensity score matching. In some cases, a portion of this group of students eventually receive a weight of zero due to the additional constraints imposed by the Mahalanobis component of the radius matching approach.

Table 28

2018–2019 Grade 11 Student Matching Profiles: Predominantly Remote Students and Their Matched Comparison Students by Outcome

Characteristics	Analytical sample for ELA analysis		Analytical sample for math analysis		Analytical sample for attendance rate and chronic absence analysis	
	Predominantly remote	Hybrid	Predominantly remote	Hybrid	Predominantly remote	Hybrid
# of students in the matching pool	50	46	50	46	51	48
# of matched students	44	43	44	43	47	46
Female (%)	65.9	65.9	65.9	65.9	63.8	63.8
Race/ethnicity:						
White (%)	20.5	20.5	20.5	20.5	19.1	19.1
African-American (%)	13.6	13.6	13.6	13.6	12.8	12.8
Latino/Hispanic (%)	59.1	59.1	59.1	59.1	61.7	61.7
NSLP [a] (%)	79.5	79.5	79.5	79.5	80.9	80.9
English learner (%)	9.1	8.5	9.1	8.5	8.5	8.2
Special education (%)	9.1	9.1	9.1	9.1	8.5	8.5
Grade 8 mean Smarter Balanced ELA scale score	0.119	0.119	0.119	0.119	0.112	0.112
Grade 8 mean Smarter Balanced math scale score	0.263	0.263	0.263	0.263	0.209	0.209

[a] NSLP = National School Lunch Program.

Middle School Students Results: Overall

This section presents the results of analyzing the combined pool of Grades 6–8 students in all three MSAP middle schools together. For the QED analysis, we compared predominantly remote students' school outcomes in 2020–2021 to a counterfactual estimate of how they would have been likely to perform if they had attended the school in a hybrid mode. The estimates were obtained via regression analysis, after controlling for students' baseline demographic characteristics and performance. We found predominantly remote students scored similarly in ELA, significantly lower in math, and had similar attendance rates and absence rates, when compared to the hybrid students (see Table 29). Using this benchmark established by Hill et al. (2008) and assuming a 9-month school year, the -0.167 effect estimate is of similar magnitude to **5.6 months of learning difference against the predominantly remote**

students during the COVID-19 pandemic using Hill et al.'s (2008) meta-analysis methodology [(0.167/0.27)*9=5.6].

Table 29

Combined MSAP School 1, 2, and 3 Estimated Average Treatment Effect on the Treated in Student Outcomes—Overall

Student outcomes	# of predominantly remote students	# of hybrid students	Observed	Estimated	Predominantly remote effect	*p* value
Smarter Balanced ELA scores	191	1,288	-0.014	-0.069	0.055	.342
Smarter Balanced math scores	181	1,330	-0.250	-0.083	**-0.167**	**.000***
School attendance rate	305	1,296	91.05	90.65	0.391	.668
Chronic absence rate	305	1,296	29.18	27.21	1.969	.582

*$p < .05$.

We also explored conducting an additional analysis on student assessments by including student attendance rate as a covariate in addition to the baseline demographic and performance variables. While attendance rate is statistically significantly related to student assessments scores in SAT ELA and math, its inclusion in the analysis model changed the effect estimates slightly (ELA effect increased to 0.071 and the math effect increased to -0.173) while the significance effect on math scores and the nonsignificant effect on ELA scores remained. Predominantly remote students scored similarly to their comparison students in ELA and significantly lower in math even after controlling for the additional attendance rate.

Lastly, we followed the WWC guidelines in multiple comparison adjustments and ran the Benjamini-Hochberg adjustment methods for the primary effects by domain. As reported, we have four outcome measures: ELA, math, attendance rate, and chronic absence rate. These outcomes are in three domains: ELA, math, and attendance/absence. As we ran parallel analyses for middle school and high school students, we consider:

- Middle school student scores in Smarter Balanced ELA and high school student scores in SAT ELA as in one ELA domain despite being two independent assessments;
- Middle school student scores in Smarter Balanced math and high school student scores in SAT math as in one math domain despite being two independent assessments; and
- Middle school and high school student outcomes in school attendance and absence as in one domain.

After running the Benjamini-Hochberg adjustments, the significant effect in math for middle school students remained while the other effects remained nonsignificant.

Middle School Students Results: Subgroups

The following section presents the results of conducting the subgroup analysis using the combined middle school student sample. For the QED analysis, we compared predominantly remote students' school outcomes in 2020–2021 to a counterfactual estimate of how they would have been likely to perform if they had attended the school in a hybrid mode. The estimates were obtained via regression analysis, after controlling for students' baseline demographic characteristics and performance. Table 30 reports the analysis results for ELA assessment scores. The ELA score difference between the predominantly remote students and hybrid students is not significant for the overall sample. It is also not significant for all but one student subgroup (of those where it was possible to conduct an analysis due to sufficient sample size). The exception is the predominantly remote students who are also NSLP participants, who scored significantly higher than hybrid students in ELA, with an effect size of .161, which is considered small to moderate in educational studies.

Table 30

Combined MSAP Schools 1, 2, and 3 Estimated Average Treatment Effect on the Treated in ELA Scores: Overall and for Demographic Subgroups

Characteristics	# of predominantly remote students	# of hybrid students	Observed	Estimated	Predominantly remote effect	*p* value
Overall	191	1,288	-0.014	-0.069	0.055	.342
Race/ethnicity						
White	44	463	0.156	0.181	-0.025	.831
African American	20	168	--	--	--	--
Latino/Hispanic	80	377	-0.331	-0.347	0.017	.859
NSLP participants						
NSLP	138	819	-0.157	-0.318	0.161	.015*
Non-NSLP	52	436	0.381	0.434	-0.052	.637
English learner status						
English learner	27	157	--	--	--	--
Non-English learner	164	1,131	0.109	0.045	0.064	.296
Special education status						
Special education	29	181	--	--	--	--
Non-special education	161	1,084	0.111	0.088	0.023	.707
Gender						
Female	110	636	0.062	0.006	0.057	.456
Male	80	652	-0.103	-0.192	0.089	.330

Notes. --No impact analysis was conducted for two student subgroups because of the small sample size and/or difficulty in establishing baseline equivalence. NSLP=National School Lunch Program.
*$p < .05$.

The difference between the predominantly remote students and hybrid students is significant in math scores for the overall sample in favor of the hybrid students. This same result is observed for all but one student subgroup, NSLP participants (see Table 31). The exception is the predominantly remote NSLP students, who scored similarly to the hybrid NSLP students.

Table 31

Combined MSAP Schools 1, 2, and 3 Estimated Average Treatment Effect on the Treated in Math Scores: Overall and for Demographic Subgroups

Characteristics	# of predominantly remote students	# of hybrid students	Observed	Estimated	Predominantly remote effect	*p* value
Overall	181	1,330	-0.250	-0.083	-0.167	.000*
Race/ethnicity						
White	45	475	-0.087	0.212	-0.299	.005*
African American	18	167	--	--	--	--
Latino/Hispanic	76	372	-0.530	-0.334	-0.196	.037*
NSLP participants						
NSLP	128	810	-0.392	-0.270	-0.121	.089
Non-NSLP	51	424	0.164	0.399	-0.235	.048*
English learner status						
English learner	26	154	--	--	--	--
Non-English learner	155	1,118	-0.158	0.052	-0.210	.000*
Special education status						
Special education	26	198	--	--	--	--
Non-special education	155	1,076	-0.126	0.043	-0.168	.013*
Gender						
Female	104	627	-0.188	-0.048	-0.140	.036*
Male	76	647	-0.314	-0.066	-0.247	.011*

Note. -- No impact analysis was conducted for two student subgroups because of the small sample size and/or difficulty in establishing baseline equivalence. NSLP = National School Lunch Program.
*$p < .05$.

Table 32 reports the impact analysis results for student attendance rate. The attendance rate difference between the predominantly remote students and hybrid students is not significant for the overall sample. It is also not significant for all student subgroups for which we were able to conduct the analysis due to sufficient sample size (see Table 32).

Table 32

Combined MSAP Schools 1, 2, and 3 Estimated Average Treatment Effect on the Treated in School Attendance Rate: Overall and for Demographic Subgroups

Characteristics	# of predominantly remote students	# of hybrid students	Observed	Estimated	Predominantly remote Effect	*p* value
Overall	305	1,296	91.05	90.65	0.391	.661
Race/ethnicity						
White	96	513	89.97	91.70	-1.729	.324
African American	30	158	89.93	90.32	-0.387	.876
Latino/Hispanic	108	382	90.96	89.38	1.577	.260
NSLP participants						
NSLP	207	824	88.81	88.71	0.092	.939
Non-NSLP	98	468	95.77	93.84	1.930	.111
English learner status						
English learner	34	127	90.86	92.53	-1.664	.427
Non-English learner	270	1,138	91.05	90.03	1.020	.270
Special education status						
Special education	42	180	91.61	88.14	3.462	.112
Non-special education	260	1,092	90.88	91.09	-0.211	.839
Gender						
Female	174	638	91.14	90.57	0.575	.615
Male	131	658	90.92	90.69	0.226	.856

Note. NSLP = National School Lunch Program.

Table 33 reports the chronic absence results. The chronic absence difference between the predominantly remote students and hybrid students is not significant for the overall sample. It is also not significant for all the student subgroups for which we were able to conduct the analysis (see Table 19) due to sufficient sample size, with one exception. The exception is the predominantly remote special education students had significantly lower chronic absence rates when compared to the hybrid special education students.

Table 33

Combined MSAP Schools 1, 2, and 3 Estimated Average Treatment Effect on the Treated in School Chronic Absence: Overall and for Demographic Subgroups

Characteristics	# of Predominantly remote students	# of hybrid students	Observed	Estimated	Predominantly remote effect	*p* value
Overall	305	1,296	29.18	27.21	1.969	.582
Race/ethnicity						
White	96	513	28.13	21.95	6.172	.304
African American	30	158	36.67	33.93	2.737	.819
Latino/Hispanic	108	382	34.26	31.74	2.523	.687
NSLP participants						
NSLP	207	824	38.65	35.37	3.282	.484
Non-NSLP	98	468	9.18	15.45	-6.269	.197
English learner status						
English learner	34	127	35.29	25.85	9.439	.433
Non-English learner	270	1,138	28.52	29.35	-0.833	.794
Special education status						
Special education	42	180	23.81	43.87	-20.060	.025*
Non-special education	260	1,092	30.38	25.36	5.025	.186
Gender						
Female	174	638	28.16	28.25	-0.085	.987
Male	131	658	30.53	26.31	4.224	.427

Note. NSLP = National School Lunch Program.

High School Students Results: Overall

The estimated predominantly remote effects for MSAP School 5 were mixed, sometimes positive and sometimes negative, but none of the effects were statistically significant (see Table 34). The estimates were obtained via regression analysis, after controlling for students' baseline demographic characteristics and performance. As reported, there is no significant difference in ELA and math assessment scores between predominantly remote students and their comparison student scores. They also have similar attendance rates and chronic absence rates.

Table 34

MSAP School 5 Estimated Average Treatment Effect on the Treated in ELA, Math, and Attendance Scores

Student outcomes	# of predominantly remote students	# of hybrid students	Observed	Estimated	Predominantly remote effect	*p* value
SAT ELA	44	33	-0.246	-0.006	-0.241	.157
SAT math	44	43	-0.227	-0.166	-0.061	.566
School attendance rate	47	46	91.62	91.16	0.459	.871
Chronic absence rate	47	46	31.91	32.65	-0.733	.958

We also explored conducting an additional analysis on student assessments by including student attendance rate as a covariate in addition to the baseline demographic and performance variables. The attendance rate is significantly related to student assessments scores even after controlling for all the baseline demographic and achievement scores. Its inclusion changes the ELA effect to -0.248 and the math effect to -0.081, but did not change enough for the effects to be statistically significant. Predominantly remote students scored similarly as their comparison students in both ELA and math even after controlling for attendance rate besides the baseline demographic and achievement scores.

Summary and Discussions

This is the first report in UCLA CRESST's rigorous evaluation of the project consortium's MSAP grant funded in 2017. The current report focuses on QED Study 1, investigating how students' choice of learning location impacted their school outcomes at the project consortium's four MSAP schools in 2020–2021 during the COVID-19 pandemic. This learning location study compares the education outcomes of the predominantly remote students and those of the hybrid students who had more in-person days during 2020–2021 at these same four MSAP schools. We conducted separate impact analyses for students in Grades 6–8 and for students in Grade 11 as they require different baseline years: 2017–2018 data for Grade 11 students and 2018–2019 data for Grades 6–8 students. The primary student educational outcomes include Smarter Balanced ELA and math assessments for students in Grades 6–8 and SAT ELA and math assessments for students in Grade 11. The other student outcome measure we examined is student school day attendance rate and chronic absence.

We recognize that the 2020–2021 school year was unique in many respects, and even if schools close down again, it will never be with the same compressed timeline and limited information that families and schools had to work with at that time. We acknowledge that school decisions were largely made by families with health and financial considerations in mind. We were fortunate to have had research infrastructure already in place to collect both

quantitative and qualitative data, and we attempted to take advantage of that while working within our own compressed timeline and our prior, and ongoing, research framework. We offer our results, theories, and questions as a snapshot of a particular moment in time for this group of schools using a rigorous methodology so that future decisions and research can be better informed.

Whether classifying predominantly remote students by their in-person membership days (provided by CSDE) or by their in-person attendance days (provided by the project consortium), the analysis reached the same overall conclusions: (a) For the Grades 6–8 students, the predominantly remote students scored significantly lower in math than their matched comparison students; and there was no statistically significant difference in their ELA scores, attendance rates, and chronic absence rates. The predominantly remote students experienced about 6 months of learning loss in math when compared to hybrid students based on Hill et al.'s (2008) benchmark. (b) For Grade 11 students, we found no statistically significant difference between predominantly remote students and hybrid students in their ELA scores, math scores, attendance rates, and chronic absence rates.

The significant difference in math score between predominantly remote students and hybrid students during the 2020–2021 school year is confirmed by other studies (e.g., Halloran et al., 2021; Lewis et al., 2021; Maldonado & De Witte, 2022; Schult et al., 2022). We wondered why there was a difference in math, but not in ELA. We considered what we knew of the instructional experiences of both groups and hypothesized that one explanation for the similar ELA scores may be that the literacy demands of remote instruction were as demanding, and perhaps even more so, than for in-person instruction. All students relied heavily on written assignments and directions. The literacy demands for the remote students, who had to work through their assignments primarily on their own and submit their responses in writing versus in-class discussion, may have been even greater. This may be an area of interest to study further. In addition, we consider the possibility that if the recreational use of digital media, in the form of reading articles of interest, watching videos of interest, and so forth, may also have helped students retain some of their ELA skills. Related, students who had more time at home may also have more time to read independently and engage in literacy events that were not related to school. Again, we point this out as an area of potential further research.

We also considered possible explanations to account for the different findings on ELA scores between the middle school and high school students. One possible explanation is that the assessments for these two groups, though standardized appropriately here for purposes of statistical comparison, are qualitatively different. The middle school students took the Smarter Balanced, which are end-of-year assessments for which students do not typically prepare. That is, they do not independently study for the test by looking at item types and sample questions. On the other hand, the high school students took the SAT. High school juniors typically are aware of not only SAT item types and content areas, but also the plentiful and freely available resources such as books, online courses, in-person courses, and so forth, that are targeted

towards improving scores. These resources were likely available equally to both in-person and remote students.

Even though we conducted subgroup analyses and presented our results and findings, they should be taken with caution due to the relatively smaller sample size and the fact that we ran multiple significance tests. Because the subgroup analyses and results are supplemental, we followed WWC guidelines and did not conduct the Benjamini-Hochberg adjustments as we did with the main outcome measures of ELA, math, school attendance, and chronic absence.

This report provides empirical evidence about the impact of predominantly remote learning on student outcomes in four MSAP schools during the COVID-19 pandemic. However, there are some limitations. As documented here, the 2020–2021 student assessment scores and analysis results based on these assessment scores should be considered with caution because the student testing participation is relatively lower than during normal nonpandemic school years. Additionally, we observed some demographic differences between the group of students who took the assessments and the group that did not that may have influenced our findings.

Furthermore, we also made some data exclusion decisions for our analysis to minimize the observation differences and maximize the baseline equivalence. These exclusions further limit the generalizability of our results. First, we excluded the elementary school from the analysis as it has very few students who were predominantly remote, and it was not possible to run the analysis for them by themselves or technically reasonable to combine them with Grades 6–8 students. Secondly, we excluded the predominantly remote students who took the assessments remotely with proctors as all hybrid students took the assessments at school to control for observational differences as much as possible.

Additional analyses based on the 2020–2021 data are in process to explore further the relationship between learning location and assessment scores. While our analysis of the middle school student study is designed to meet WWC Standards with Reservations, our student sample is based on three middle schools. Repeating our rigorous study with a larger number of MSAP and nonmagnet schools will be interesting and provide an even stronger basis for policy implication and discussion. Additionally, we are in discussion with the project consortium about the possibility of conducting a follow-up analysis on the middle school students. We could investigate how these two groups of students (predominantly remote and hybrid students based on their 2020–2021 classification) perform on measures of academic achievement at the end of the 2021–2022 school year, when they will have been in school in person full time, despite the ongoing pandemic environment. We are looking forward to conducting more analyses using both 2020–2021 and 2021-2022 student data when the latter data set becomes available.

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Appendix:
Supplemental Tables

Appendix Table A1

2020–2021 Student Assessment Scores Used to calculate Standardized Scale Scores

Characteristics	# of schools	# of students	Mean	Standard deviation
Smarter Balanced ELA				
Grade 5 students	6	491	2467.5	97.603
Grade 6 students	21	3559	2489.0	97.954
Grade 7 students	23	4245	2517.2	104.945
Grade 8 students	23	4387	2532.2	103.522
Smarter Balanced math				
Grade 5 students	6	480	2447.6	86.195
Grade 6 students	21	3503	2459.2	101.938
Grade 7 students	23	4170	2492.7	102.714
Grade 8 students	23	4296	2495.0	109.276
SAT ELA				
Grade 11 students	6	913	458.0	93.420
SAT math				
Grade 11 students	6	913	439.2	130.739

Appendix Table A2

2020–2021 Student Distribution on Percent In-Person Membership Days: MSAP School 4

	% Enrolled in-person days			
School	<25%	25-49.9%	50-75%	>75%
MSAP School 4	6.5	56.5	37.1	0.0

Note. MSAP School 4 has 62 students who took a 2020–2021 assessment and who also took the 2018–2019 Smarter Balanced assessments in Grade 8.

Appendix Table A3

2020–2021 Student Profile by % In-Person Membership Days: MSAP School 4

Characteristics	% In-person membership days	
	<25%	25-75%
2020–2021 Number of students	4	58
2020–2021 Total membership days	--	177.0
2020–2021 Total in-person membership days	--	75.0
2020–2021 Total remote membership days	--	85.0
2020–2021 Total attendance days	--	164.3
2020–2021 Total absence days	--	12.7
2020–2021 Remotely proctored Smarter Balanced ELA (%)	--	0.0
2020–2021 Remotely proctored Smarter Balanced math (%)	--	0.0
2018–2019 Baseline Year Variables		
Female (%)	--	39.7
Race/ethnicity:		
White (%)	--	39.7
African American (%)	--	17.2
Latino/Hispanic (%)	--	37.9
NSLP (%)	--	62.1
English learner (%)	--	15.5
Special education (%)	--	15.5
Grade level:		
Grade 5 (%)	--	100.0
Mean Smarter Balanced ELA scale score	--	-0.030
Mean Smarter Balanced math scale score	---	-0.044

Note. Per agreement with CSDE, no data is reported for groups of five or fewer students; and no assessment data is reported for groups of fewer than 20 students.

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