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# TRENDS IN SCHOOL INSTRUCTIONAL MODALITY DURING THE 2020-21 SCHOOL YEAR

## LEARNING DURING THE PANDEMIC IN ILLINOIS SERIES PART 1

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This report was reviewed by scholars to ensure that its contents are rigorous, accurate, and useful to educators and policymakers with varying levels of background knowledge. The reviewers of this report included:

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## EXECUTIVE SUMMARY

In March of 2020, in response to the onset of the COVID-19 pandemic, the state of Illinois mandated the transition to remote instruction for all schools. Although schools had the option to resume in-person instruction during the 2020-21 school year (SY21), the Illinois State Board of Education (ISBE) acknowledged that in-person instruction may not be safe or feasible for all schools and all students. In turn, districts and schools made decisions, conditional on the contexts of their schools and communities, to return to in-person instruction, remain in remote instruction, or employ a combination of in-person and remote instruction over the course of the SY21 (ISBE, 2020). Additionally, students and caregivers in schools that offered in-person instruction often had a choice to attend in-person or continue learning remotely.

In this report, the first in the *Learning During the Pandemic in Illinois* series, we ask: *What were the patterns in instructional modality throughout the SY21, and how did those patterns relate to school characteristics?* The second report describes the relationship between modality in schools and school average test scores in English Language Arts (ELA) and math. The third report examines how in-person attendance at the student level contributed to student learning.

In the current study, we grouped schools into four pathways based on movements across instructional modalities at four key time points: September 2020, December 2020, February 2021, and April 2021. These pathways varied in the amount of in-person instruction students received over the course of the year, ranging from substantially in-person to entirely remote across all four time points. We uncovered important differences in school characteristics across modality pathways.

## Key Takeaways

**Schools varied substantially in the modality of instruction students experienced during the 2020-21 school year.**

- Most Illinois schools (53%) began the year in remote instruction. However, just 14% of schools remained remote the entire year. The rest of schools that started the year remotely switched to instructional models with more in-person instruction as the year progressed.
- Chicago Public Schools (CPS) made up almost half of schools statewide that started and stayed remote all year.
- In another 33% of schools, students attended in-person for the majority of the year.
- About 12% of schools offered modalities that allowed some students to attend remotely and others to attend in-person for most of the school year.

## **Schools in various instructional modality pathways displayed different characteristics and attendance patterns.**

- Schools with higher proportions of White students experienced more in-person instruction, whereas schools with higher proportions of Black, Latinx, low-income, and English learner students experienced more remote instruction.
- Schools serving younger students (grades 3-8) were more likely than high schools serving grade 11 to start the year remotely and transition to instructional models with more in-person learning. In other words, high schools were more likely than elementary and middle schools to offer both remote and in-person options throughout the year.
- Schools that instructed remotely all year had decreased attendance rates in SY21 compared to SY19, on average.

## Learning During the Pandemic in Illinois

### Part 1: Trends in School Instructional Modality During the 2020-21 School Year

#### Background

The return to school after initial pandemic shutdowns was characterized by wide variation in learning modality nationwide. At the start of the SY21, around 60% of United States (U.S.) students received entirely remote instruction, with the remaining students approximately split between in-person and hybrid modalities (Dorn et al., 2021; Henderson et al., 2020; NCES, 2020). As the school year progressed, about one-third of school districts across the U.S. that started remotely began offering more in-person learning options, and one in five switched back and forth between remote and in-person modalities over the course of the year (Hodgman et al., 2021). Nationally, elementary schools were more likely to implement in-person instruction than middle and high schools (Haderlein et al., 2021), and many districts prioritized in-person learning for students with disabilities, students identified as in need of additional academic and/or socio-emotional supports, English learners, students with chronic absenteeism, and younger students (Hodgman et al., 2021).

Patterns of instructional modalities in the United States also differed across demographic groups. Students of color, students from low-income backgrounds, students in urban areas, students with low prior achievement, and students with limited English proficiency were all more likely to experience remote instruction (Darling-Aduana et al., 2022; Dorn et al., 2021; Kaufman & Diliberti, 2021). These demographic trends reflected a confluence of decision-making by school leaders, parents/caregivers, and students. Parents of Black and Latinx students were more likely to want and choose remote instruction for their children (Darling-Aduana et al., 2022; Dorn et al., 2021). This preference may reflect the fact that Black and Latinx communities are more at risk for severe illness and death from COVID-19 in Illinois (Holden et al., 2022) and nationally (CDC, 2020; Ford et al., 2020). Students who are affluent, White, receiving English learner or special education services, and with behavioral referrals have been found to prefer in-person instruction, or come from families that prefer in-person instruction (Darling-Aduana et al., 2022; NORC, 2020). Some of these demographic differences reflect partisan trends: Districts in areas that were more politically conservative were more likely to offer in-person learning, and they were also more White and more affluent (Camp & Zamarro, 2021; Grossmann et al., 2021).

Darling-Aduana and colleagues (2022) further found that two primary predictors of students' and families' preferences for remote instruction were having more of a student's classmates attending remotely and experiencing higher COVID-19 case rates. Grossman et al. (2021) showed that districts with stronger teachers unions were more likely to offer only remote instruction.

To date, no studies have examined trends in instructional modality in Illinois schools specifically. Illinois schools serve families who are racially, socioeconomically, linguistically, and politically diverse and who live across urban, suburban, and rural regions. These regions experienced rates of COVID-19 illness and mortality unevenly (Holden et al., 2022). Schools also vary substantially in the strength of teachers unions. In turn, we expected to see a wide range of diversity in instructional modality patterns during the pandemic across the state.

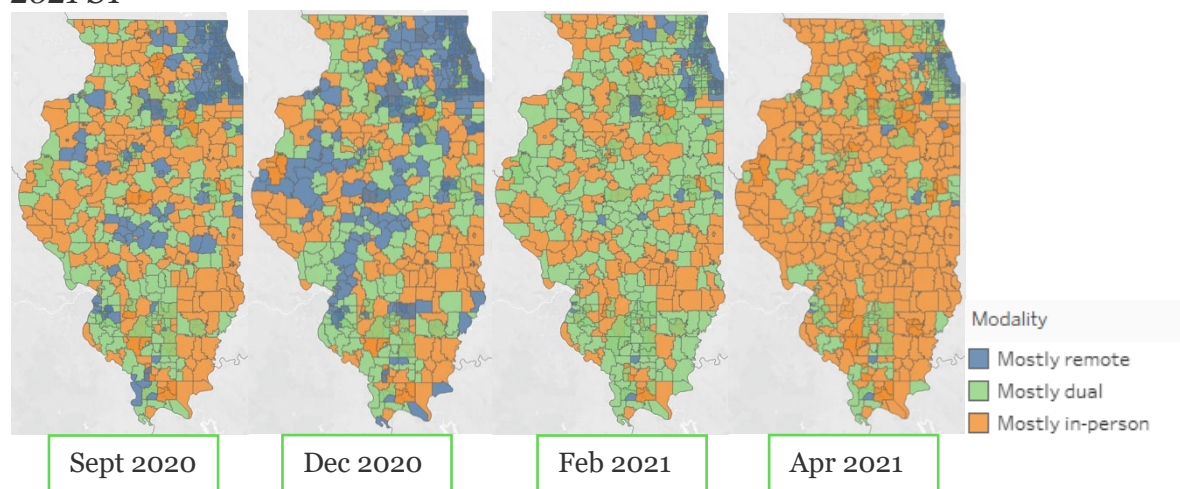
### **Instructional Modality in Illinois**

ISBE encouraged schools to offer in-person instruction during the SY21, especially for students with Individualized Education Programs (IEPs), English learners, and students under the age of 13 (ISBE, 2020). However, ISBE also recognized that districts and schools varied in terms of their community pandemic response, risk factors, preferences, and other characteristics. In turn, districts were encouraged to adapt their instructional modality plans accordingly. Schools may have offered a variety of instructional models that students could choose from, such as remote, in-person, or hybrid—where *hybrid* refers to a variety of instructional models that allow individual students to attend partly in-person and partly remote within a single school day, week, or even longer. Most schools adapted the modalities they offered over the course of the year in light of changing COVID-19 rates and new information about COVID-19 spread, among other factors. Within the set of options their schools offered, students and families made choices about the modality in which to attend school and when.

Figure 1 shows four maps that represent patterns in instructional modality for public school districts in Illinois over time. These maps are based on monthly modality data reported by schools to ISBE. Monthly modality data was aggregated from the student-level to determine the proportion of students in each school who were remote all month, in-person all month, or experienced both remote and in-person instruction within the month.

This final category, which we refer to as *dual*, includes students in hybrid instructional models as well as students who started the month in one modality and then transitioned to another later in the month. For ease of visualizing patterns statewide, we then aggregated this school-level data to districts in Figure 1. We categorized districts as “Mostly remote” if the majority of students in a district’s schools attended school remotely for the entirety of that month; “Mostly in-person” if the majority of district students attended school in-person for the entirety of that month, and “Mostly dual” if the majority of district students experienced dual instruction that month.<sup>a</sup>

**Figure 1**  
Changes in Modality Across Illinois Districts at Four Selected Time Points in the 2020-2021 SY



Based upon a qualitative analysis of the data, we uncovered four key time points of SY21 when many schools changed from one modality to another: September 2020, December 2020, February 2021, and April 2021. For example, February saw a high number of schools switching from remote to dual modalities. The maps display district modalities at precisely these time points. As shown, districts were most likely to be *Mostly remote* earlier in the school year, especially in more urban areas of the state. As the year progressed, dual modality became more common. By April, the majority of students attended school in-

<sup>a</sup> In rare cases where the proportion of students attending in-person or remotely was equal to the proportion of students attending as “dual,” we defaulted to “Mostly dual” as the district’s category. This school-level data was received from ISBE on January 24, 2022. Throughout these reports, we note dates of data receipt, as the available data in large-scale state data sets, by nature, can change over time as districts report new data or data are reviewed/corrected.

person in most districts. These maps spotlight the way instructional modality varied not only across districts but also over time. Based on this information, we constructed a measure of schools’ instructional modality that captures changes across these timepoints, as described in the next section.

## Method

### *Data*

Our instructional modality measure is based on school-reported data of individual student modality of attendance during the SY21 (see sidebar “Measuring Instructional Modality” for details about the validity of this measure). For each public school in Illinois, we aggregated student-level data to the school level, reporting the proportion of students who attended in-person, remotely, or any combination of both modalities for each month from August 2020 through June 2021. These proportions served as the indicator variables for our latent model.

We draw on publicly available data from the Illinois School Report Card from SY21 to describe the characteristics across schools by modality pathway. These data include information about demographic characteristics of students in these schools, including race/ethnicity, gender, eligibility for Free/Reduced-Price Lunch (FRPL), homelessness status, English learner (EL) status, and participation in an Individualized Education Program (IEP). They also include school-level attendance rates, testing participation rates, enrollment, and Evidence-Based Funding (EBF) Tier, a state categorization of districts that reflects the extent to which local financial resources meet students’ educational needs (ISBE, n.d.). Finally, the report card includes school scores on measures derived from the 5Essentials Survey, a survey of

### Measuring Instructional Modality

The validity of our instructional modality measures depends upon accurate reporting by schools about the modality of instruction in which their students attended during each month of the SY21. Thus, we checked a randomly selected subset of 100 schools, comparing the modality data they reported to ISBE with information about modality published in parent newsletters and other announcements during the course of the year. While a very small number of schools showed discrepancies, the vast majority of schools checked showed consistency between the modality data reported to ISBE and the modality options described in announcements.

- For example, Scales Mound Elementary School in Scales Mound School District reported in-person instruction all year. Their Facebook page shared announcements about in-person learning at the start of the school year and again referred to in-person learning later in the year.
- Oakwood High School reported a dual model of instruction. Their public reopening plan describes a hybrid learning plan where students attended two to four days per week in person at different points in the year.
- Mohawk Primary Center in Forest Park School District reported fully remote instruction at least until May 2021. Their Twitter page referred to all students learning virtually at multiple points throughout the year.



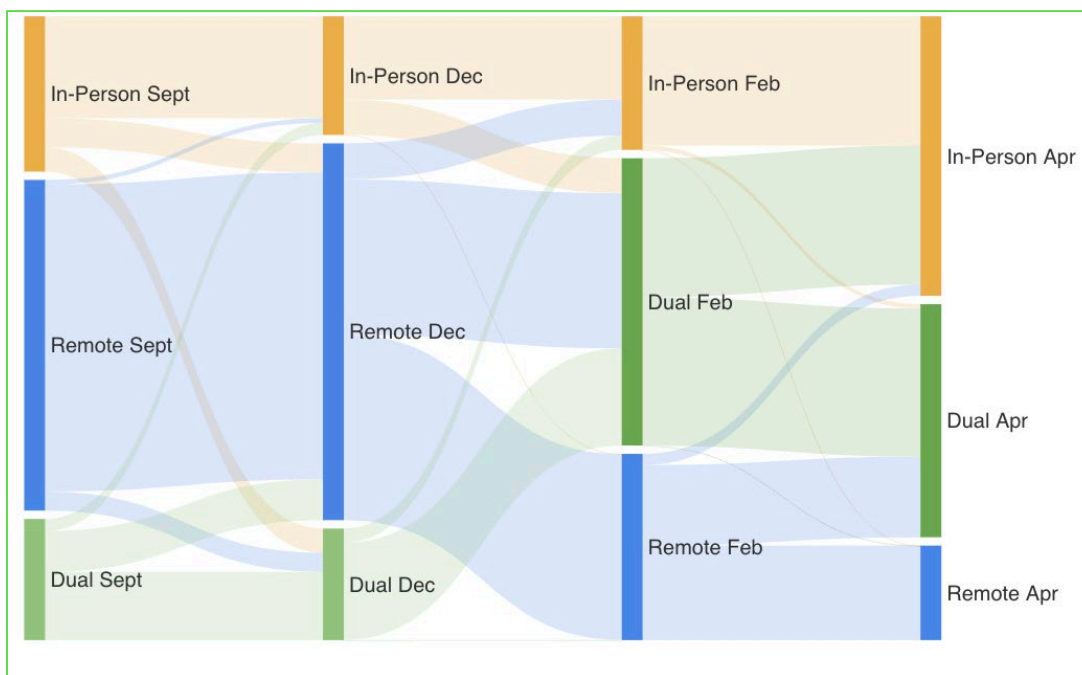
school organization administered annually in Illinois schools. For attendance, enrollment, and test participation, we also used data from the SY19 report card in order to calculate changes from SY19 to SY21.

### *Analysis*

As described above, our input data corresponded to three distinct types of instructional modality—in-person, remote, and dual—that described how students were instructed during each month of SY21. To identify how schools’ modality changed over the course of the year, along with other nuances in modality pathways, we used a statistical technique called Latent Transition Analysis (LTA) (Lanza et al., 2013). Appendix A describes the LTA in detail. The LTA helped to identify modality pathways – the modalities in which schools started the year, and how they changed modalities over the course of the year. A total of 81 pathways occurred among Illinois schools. Figure 2 shows all 81 pathways, and the size of each band represents the proportion of Illinois schools in each. For example, most schools that started in-person remained mostly in-person throughout the SY21, while schools that started remotely eventually split into dual and remote modality pathways.

### **Figure 2**

*Schools’ Instructional Modalities Across Four Time Points of SY21*



From the 81 modality pathways uncovered through LTA, we collapsed schools into common patterns considering starting modality (September 2020), ending modality (April 2021), and the movements that occurred in between (December 2020 and February 2021). Transition probabilities (i.e., the likelihood to move from one group to another at each time point and/or remain in the same group) are shown in Table 1.

**Table 1**

*Latent Transition Probabilities Across Timepoints*

*A. Time 1- September 2020 (Rows) by Time 2 – December 2020 (Columns)*

	In-Person	Remote	Dual
In-Person	0.654	0.189	0.156
Remote	0.014	0.928	0.058
Dual	0.100	0.339	0.56

*B. Time 2 – December 2020 (Rows) by Time 3 – February 2021 (Columns)*

	In-Person	Remote	Dual
In-Person	0.700	0.004	0.296
Remote	0.095	0.490	0.415
Dual	0.129	0.004	0.867

*C. Time 3 – February 2021 (Rows) by Time 4 – April 2021 (Columns)*

	In-Person	Remote	Dual
In-Person	0.967	0.000	0.033
Remote	0.060	0.510	0.431
Dual	0.481	0.008	0.511

We condensed the 81 pathways into four common pathways: (1) Remote All Year; (2) Substantially Remote; (3) Mixed; and (4) Substantially In-Person instruction. These four pathways represent over 99% of schools statewide (less than 1% are not represented due to idiosyncratic modality patterns). Next, we describe the meaning and prevalence of each modality pathway. In interpreting the meaning of modality pathways, it is important to keep in mind that these patterns do not reflect top-down district policy; instead, they are based on a combination of district/school decision-making and student and family choices given the options their schools offered.

## Modality Group Descriptions

### *Remote All Year*

Students in schools that were *Remote All Year* (15% of schools) participated almost exclusively in remote instruction at all four time points. In this group, 49% of schools were part of City of Chicago School District 299, also known as Chicago Public Schools (CPS). These schools can be thought of as the most committed to remote instruction, as their attendance patterns suggest that they offered remote instruction continuously throughout

the year and did not offer in-person instruction to the majority of students. Other districts in this modality group included East Aurora School District 131 and Berwyn North School District 98.

### *Substantially Remote*

In this pathway of schools (38%), the vast majority of students started the school year in remote learning and spent a substantial part of the year learning remotely. However, over the course of the school year, schools transitioned into either dual or in-person modalities, with some or all students learning in-person by February or April. By April, none of the schools in this pathway were instructing students exclusively remotely. This pattern suggests that schools in this pathway offered only remote instruction early in the year, but later provided choices to students and families about whether to continue attending remotely or participate in a hybrid or in-person instructional model. The remaining schools from CPS were part of this modality group (19% of all schools in this pathway). Other school districts in this modality pathway included Naperville Community Unit School District 203, Bloomington Public Schools District 87, Carbondale Elementary School District 95, and Decatur Public Schools District 61.

### *Mixed*

This pathway of schools (12%) was largely characterized by dual instruction (both in-person and remote, in any combination) over the course of the SY21. Some schools in this pathway transitioned across entirely in-person and dual modalities through the year, while others were dual at all four time points. Based on these patterns, it is likely that schools in this pathway continuously offered students and families the choice to learn remotely or in an in-person or hybrid model. Therefore, most students in *Mixed* instruction schools likely received both in-person and remote instruction over the course of the year, although some students in some schools could have experienced in-person all year while others experienced remote all year. Public school districts in this modality group included, for example, Beardstown Community Unit School District 15, Cairo School District 1, and Collinsville Community Unit School District 10.

### *Substantially In-Person*

In this pathway of schools (33%), all students attended school in-person at multiple time points throughout the year. While some schools in this pathway reported 100% in-person instruction at all four time points, most schools in this pathway reported a combination of in-person and remote instruction during at least one of the time points. It is likely that some schools in this pathway were highly committed to in-person learning. At the same time, it could be the case that some schools in this pathway offered similar dual modality options as schools in the *Mixed* instruction pathway, but students and families who attended these schools were more likely to opt for in-person learning. Districts like Arlington Heights School District 25, Effingham Community Schools and Jacksonville School District 17 were part of this modality group.

### **Key Characteristics of Modality Pathways**

Modality pathways varied across key demographics and school characteristics during SY21. To describe student characteristics across schools with different modality patterns, we summarize student characteristics reported on the SY21 report card. Tables 2 and 3 display characteristics for schools in each modality pathway.<sup>b</sup> We limit our descriptives to schools serving these grades for the purpose of consistency across reports; in the second report for this series, we analyze test score data for these grade levels.

Table 2 displays the proportion of schools in each pathway. The majority of schools were categorized in either the *Substantially Remote* (38%) or the *Substantially In-Person* (33%) modality pathways. However, schools serving grade 11 had a higher representation in the *Mixed* category than schools serving grades 3-8 and a lower representation in the *Substantially Remote* category. CPS accounted for a high proportion of schools in the *Remote All Year* and *Substantially Remote* modality pathways. In order to understand how much these pathways' proportions were influenced by this single large district, we also examined modality pathways when excluding CPS. These proportions can be found in Appendix Table B.1. Without CPS, the proportion of schools serving grades 3-8 that were in

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<sup>b</sup> Note that the number of schools in each modality pathway was obtained from aggregating student level data to the school level, and, therefore, does not correspond to the number of schools with available data in the SY21 Report Card. The student level data set contained schools not found in the SY21 Report Card.

the *Remote All Year* group dropped by more than a third, while the proportion of schools in the *Substantially In-Person* group rose by 6 percentage points.

**Table 2**

*Proportion of Schools by Modality Group, All Illinois Schools Serving Grades 3-8, 11, SY21*

	Remote All Year (%)	Substantially Remote (%)	Mixed (%)	Substantially In- Person (%)
All schools	14.9	38.0	11.8	33.0
Schools serving grades 3-8	14.6	40.9	10.2	34.3
Schools serving grade 11	16.6	30.9	19.6	32.9
Chicago Public Schools	48.7	18.9	0.0	0.0

Demographic data in Table 3 represent within-modality pathway averages of *school* demographic averages, rather than averages of *student* demographic averages. This is an important distinction because the average of school demographic averages weighs each school equally regardless of differences in student enrollment; i.e., comparing large and small schools in the same way. We believe that the average of *school* demographic averages is an appropriate measure given that schools are the unit of analysis in the current report. Report Three of this series analyzes modality data at the student level, providing more detail about the proportions of students who experienced different modality patterns.

**Table 3**

*Mean School Characteristics by Modality Group, All Illinois Schools Serving Grades 3-8, 11, SY21*

	Remote All Year N=614	Substantially Remote N=1,534	Mixed N=472	Substantially In- Person N= 1,324
Race/ethnicity				
% White	14.4	45.8	69.4	81.5
% Black	50.1	26.1	15.2	12.6
% Hispanic/Latinx	53.2	30.1	20.6	13.2
% Two or more races	4.7	5.8	6.1	5.9
% Low Income	83.3	49.9	46.1	40.3
% Homeless	1.7	1.0	2.0	2.0
% English Learners	22.1	15.5	7.2	3.8
% IEP	17.2	17.3	16.3	16.7
% EBF Tier 4	1.9	15.4	15.1	16.4

Schools that offered *Remote All Year* instruction had significantly larger proportions of Black (50%) and Hispanic/Latinx (53%) students as well as low-income students (83%)

and English learners (22%) compared to other modality pathways. At the same time, schools that offered *Remote All Year* were the least likely to be in districts classified as EBF Tier 4. This state categorization refers to districts deemed to have sufficient local financial resources to meet students' educational needs. Schools that offered *Substantially In-Person* instruction served mostly White students (82%) and had the smallest proportions of students classified as low-income (40%) and English learners (4%). In summary, we observed that in-person instruction was more common in more advantaged schools. One characteristic in which we observe only very minor differences was the percentage of students with IEPs, which ranged from 16% to 17% across all pathways. Characteristics of modality pathways excluding CPS are shown in Appendix Tables B.2 and B.3.

**Table 4**  
*Mean Attendance Rate (%) Patterns by Modality Group, All Illinois Schools Serving Grades 3-8 and 11*

	Remote All Year	Substantially Remote	Mixed	Substantially In-Person
Student Attendance Grades 3-8				
SY19	94.4	94.9	94.9	95.2
SY21	91.2	94.0	94.5	94.8
Difference in attendance rate SY19-21 (percentage points)	3.2	0.9	0.4	0.4
Student Attendance Grade 11				
SY19	87.4	92.3	93.3	94.2
SY21	81.4	89.7	92.3	93.1
Difference in attendance rate SY19-21 (percentage points)	6.0	2.6	1.0	1.1

We also observed slight differences in terms of student attendance. As shown in Table 4, students who attended *Remote All Year* schools had the largest decline in average attendance rate from 2019 to 2021—about 3 percentage points for grades 3-8 and 6 points for grade 11—whereas the decline for students in schools that were *Mixed* or *Substantially In-Person* was 0.4 percentage points for grades 3-8 and about one percentage point for grade 11.

Modality pathways also differed in terms of changes in student enrollment from SY19 to SY21. These are described in Table 5. For all grade bands, schools in the *Remote All Year* group declined in enrollment the most, although the magnitude of differences across pathways was relatively small. Meanwhile schools in the *Mixed* modality pathway had the

smallest drop. This pattern reflects differences in initial enrollment size; bigger schools were in the *Remote All Year* modality pathway and smaller schools were in the *Substantially In-Person* pathway.

**Table 5**  
*Enrollment Patterns by Modality Group, All Illinois Schools Serving Grades 3-8 and 11*

	Remote All Year	Substantially Remote	Mixed	Substantially In-Person
Student Enrollment Grades 3-8				
SY19	540.8	504.7	407.5	339.5
SY21	499.1	477.9	388.6	320.5
Difference	41.7	26.8	18.9	19.0
Average % change SY19-21	6.9	5.8	4.9	5.8
Student Enrollment Grade 11				
SY19	977.5	1422.7	776.6	313.3
SY21	966.4	1402.4	768.3	304.8
Difference	11.1	20.3	8.3	8.5
Average % change SY19-21	4.1	1.9	1.3	2.6

**Note:** Average percent change in student enrollment was calculated by taking the percent change for each school, then averaging within each modality group.

Finally, test participation rates varied substantially across modality pathways, as shown in Table 6. Schools in the *Remote All Year* modality pathway had lower rates of test participation in SY21 than any other modality pathway. Across the remaining three modality pathways, participation rates were higher in pathways that had higher rates of in-person instruction. A possible explanation could be that students who were in remote instruction would be less likely to attend schools for in-person testing. However, in the case of SAT, students and their families may have had more incentives to participate in such testing.

**Table 6**

*Mean Test Participation Rates by Modality Pathways, All Illinois Schools Serving Grades 3-8 and 11*

	Remote All Year	Substantially Remote	Mixed	Substantially In-Person
IAR Participation Rate (%)				
SY19	97.2	98.3	98.8	99.1
SY21	50.8	73.7	87.5	92.1
Change in participation rate SY19-21 (percentage points)	-46.4	-24.6	-11.3	-7.0
SAT Participation Rate (%)				
SY19	93.2	97.7	98.6	98.6
SY21	82.8	91.8	94.8	94.8
Change in participation rate SY19-21 (percentage points)	-10.4	-5.9	-3.8	-3.8

## Discussion

Schools nationally engaged in a wide range of instructional modalities over the course of the SY21, and Illinois schools serving grades 3-8 and 11 did as well. As found across the United States, the majority of Illinois schools began the year in remote instruction. However, few schools (one in seven) stayed remote throughout the entire year. As encouraged by ISBE, most schools that started the year remotely switched to instructional models with more in-person instruction as the year progressed. Meanwhile, another third of schools had students attending in-person for the majority of the year, while about 12% offered modalities that allowed some students to attend remotely and others in-person from the start of the year.

School leaders, students, and families made decisions about instructional modality during SY21 with a number of considerations in mind, not the least of which was risk of COVID-19 spread (Darling-Aduana et al., 2022; Rapaport et al., 2020). At the start of the SY21, when modality planning was taking place, little data existed on how in-person instruction affected COVID-19 rates in schools and in their surrounding communities. As the year progressed, COVID-19 rates changed, as did schools' instructional modalities. These modality pathways varied dramatically across schools with different characteristics.

Consistent with national trends (Haderlein et al., 2021; Halloran et al., 2021; Hodgman et al., 2021; Horowitz et al., 2020; Kogan & Lavertu, 2021; Parolin et al., 2021; Schwartz et al., 2021), we saw that schools with higher proportions of Black and Latinx



students, students who were low-income, and English learners had more remote instruction, on average. We also found that schools that instructed remotely all year had less funding, on average, than schools that instructed in-person for part or all of the year as shown by the proportion of schools in districts in EBF Tier 4. Research has demonstrated that Black and Latinx communities were more at risk for COVID-19 (CDC, 2020; Ford et al., 2020). In Illinois, these communities experienced higher per capita rates of COVID-19 illness and death (Holden et al., 2022). Additionally, schools with low funding have been more reliant on federal COVID relief spending in order to put in place major COVID mitigation measures such as ventilation and HVAC repairs (Jordan & DiMarco, 2022), and may have been slower to make these improvements (Godoy, 2022). Parents and school leaders in these communities in turn may have been weighing the risks of in-person schooling differently from their counterparts in whiter and more affluent school communities (Darling-Aduana et al., 2022).

A substantial proportion of schools that started the year in remote instruction and stayed there all year belonged to Chicago Public Schools. Given CPS's demographics, this finding is not surprising. CPS is an ethnically diverse district where the majority of students are non-white and low-income. Additionally, Chicago is politically liberal, and CPS teachers belong to one of the strongest teachers unions in the nation (Winkler et al., 2012). All of these factors make it more likely that the district would offer more remote and less in-person instruction (Camp & Zamarro, 2021; Darling-Aduana et al., 2022; Dorn et al., 2021; Grossmann et al., 2021).

We also found that schools serving younger students (grades 3-8) were more prevalent in the *Substantially Remote* modality pathway than high schools serving grade 11, which were more likely to offer in-person alongside remote options from the start of the year. This finding somewhat contrasts with trends observed nationally, where elementary schools tended to offer the most in-person instruction and high schools tended to be the most remote (Haderlein et al., 2021).

Testing participation rates also varied dramatically between schools. While a number of factors could have contributed to these differences, it is likely that remote learning itself contributed to lower participation rates among schools with remote instruction in the spring of 2021. In order to participate in testing, students had to attend in-person on the days of

testing, even if they otherwise learned remotely. Coordinating in-person testing in otherwise remote schools may have presented unique organizational challenges for administrators, teachers, and working caregivers. Testing in-person in these schools may also have been perceived negatively by students and/or parents with concerns about COVID-19 spread.

Schools in the *Remote All Year* pathway had the lowest average attendance rates in SY19, and they declined the most in average attendance by SY21. These schools also had the greatest average declines in enrollment in grades 3-8 from the fall of SY19 to the fall of SY21.<sup>c</sup> It is important to keep in mind that the differences we observe in SY21 attendance and enrollment across schools reflect a variety of school characteristics in addition to modality pathways. It may not be instructional modality that is *causing* lower attendance or enrollment declines. Instead, it could be the case that schools with lower attendance rates and greater enrollment declines were more likely to have remote instruction for other reasons.

Similarly, understanding the relationship between instructional modality and student achievement is complicated by the many differences in characteristics between schools in different modality pathways. The lower rate of test participation in schools with more remote learning makes this task particularly challenging. In *Report 2* of this series, *Does School Instructional Modality Predict Average School Achievement?*, we unpack these relationships with statistical models that allow us to compare achievement outcomes across modality pathways in schools with similar characteristics.

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<sup>c</sup> ISBE's school enrollment counts are based on the number of students enrolled as of the last day of September in each school year.

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## Appendix A

### Latent Transition Analysis

In early 2022, we received data from ISBE with the number of days each student spent in remote or in-person instruction during each month of SY21 (reported by schools). We then used these data to aggregate the proportion of students in schools each month who received entirely remote instruction, entirely in-person instruction, or any combination of remote or in-person instruction, which we called dual. Upon a qualitative analysis of the data, we observed several time points that represented key months of the year when many schools changed from one modality to another: September 2020, December 2020, February 2021, and April 2021. Using Latent Transition Analysis (LTA: Lanza et al., 2013), we constructed a measure of schools' instructional modality that captures changes across timepoints.

The indicator variables we used as inputs in the model were the percentages of students in each modality of instruction (remote, in-person, or dual) at each timepoint. LTA translates observed school differences in modality into underlying subgroups and provides each school's probability of transitioning across subgroups over time (Hickendorff et al., 2018). Given the large number of schools, using LTA is easier and less error-prone than processing the data and defining instructional modalities by hand, and it also allowed us to obtain transition probabilities, as well as select a model (different combinations of school classes and time points) based on model fit indices. Moreover, using LTA we were able to identify patterns in changes in instructional modality sequentially over the school year.

We ran our analyses using the Maximum Likelihood Estimator with robust standard errors (MLR) in the Mplus 8 software (Muthén & Muthén, 2017). LTA assumes a large sample size and a sufficient number of indicators associated with the latent variable, which in this case is modality of instruction. We ran the LTA for 3-class models across different time periods that reflected the beginning, middle, and end months of the school year where we observed widespread modality changes. We also considered 4-class models, but due to software output limitations we were unable to explore modality patterns for these models (i.e., MPLUS was unable to yield transitions across four classes and four time points). We used three primary fit indices to select the most appropriate model: the Bayesian

Information Criterion (BIC), the Akaike Information Criterion (AIC), and entropy, which is available overall and for each time point. Results are shown in Table A.1.

**Table A.1**  
*Goodness of Fit Statistics for LTA Models*

	Model 1	Model 2	Model 3	Model 4	<b>Model 5</b>	Model 6
Classes	3	3	3	4	<b>3</b>	4
Time points	3 August, January & May	4 August, November, February & April	3 August, January & April	3 December, February & April	<b>4 September, December, February &amp; April</b>	3 September, February & April
AIC	-25563.23	-37971.81	-25692.82	-41965.38	<b>-45146.65</b>	-38565.05
BIC	-25362.08	-37714.10	-25491.67	-41707.66	<b>-44888.92</b>	-37659.86
Entropy Overall	0.95	0.96	0.95	0.94	<b>0.98</b>	0.96
Entropy Time point 1	0.91	0.92	0.91	0.85	<b>0.99</b>	0.91
Entropy Time point 2	0.99	0.99	0.99	0.99	<b>0.99</b>	0.98
Entropy Time point 3	0.95	0.95	0.95	0.95	<b>0.98</b>	0.94

Results showed that the best fitting model consisted of 3 classes at 4 time points: September 2020, December 2020, February 2021, and April 2021. This model (*Model 5*) had the smallest—furthest from zero—AIC and BIC, as well as high entropy across all time points. We also determined this model to have the most practical utility in terms of differentiating between qualitatively different instructional modality patterns. Satisfied with these groupings, we retained the 3-class, 4-time-point model (*Model 5*) for our analyses.

Results from *Model 5* identified 81 possible pathways (3 classes in September x 3 classes in December x 3 classes in February x 3 classes in April). Based on the descriptive characteristics and movements across modalities of each class, we then grouped these 81 pathways into the four modality pathways used in this report: *Remote All Year*, *Substantially Remote*; *Mixed*; and *Substantially In-Person*.



## Appendix B

**Table B.1**

*School Proportions by Modality Pathway, Excluding Chicago Public Schools Grades 3-8, 11, SY21*

	Remote All Year (%)	Substantially Remote (%)	Mixed (%)	Substantially In-Person (%)
All schools	9.2	37.0	14.2	39.6
Schools serving grades 3-8	8.1	38.8	12.2	40.9
Schools serving grade 11	6.6	27.3	24.4	41.7

**Table B.2**

*Mean School Characteristics by Modality Pathway, Excluding Chicago Public Schools Grades 3-8, 11, SY21*

	Remote All Year	Substantially Remote	Mixed	Substantially In-Person
Race/ethnicity				
% White	19.0	48.4	69.7	81.5
% Black	41.3	19.5	15.2	12.8
% Hispanic/Latinx	49.6	27.2	20.6	13.1
% Two or more races	5.0	6.0	6.1	5.9
% Low Income	74.9	44.1	46.2	40.4
% Homeless	2.8	1.2	2.0	2.0
% English Learners	22.9	15.6	7.2	3.8
% IEP	17.2	17.4	16.3	16.7
% EBF Tier 4	3.8	19.0	15.1	16.4

**Table B.3**

*Mean Attendance Rates, Enrollment and Test Participation Rate Patterns by Modality Pathway, Excluding Chicago Public Schools*

	Remote All Year	Substantially Remote	Mixed	Substantially In-Person
Attendance Grades 3-8				
Student attendance SY19	93.8	94.9	94.9	95.3
Student attendance SY21	91.5	94.2	94.5	94.9
Difference in student attendance rate SY19-21 (percentage points)	2.3	0.7	0.4	0.4
Attendance Grade 11				
Student attendance SY19	90.7	93.3	93.3	94.0
Student attendance SY21	85.9	92.4	93.0	92.8
Difference in student attendance rate SY19-21 (percentage points)	4.8	0.9	0.3	1.2
Enrollment Grades 3-8				
Student enrollment SY19	485.5	489.9	386.7	325.8
Student enrollment SY21	449.5	464.1	369.0	307.5
Average % change in student enrollment SY19-21	7.4	5.2	4.5	5.6
Enrollment Grade 11				
Student enrollment SY19	1528.1	1712.0	857.5	334.2
Student enrollment SY21	1521.9	1687.3	854.2	323.8
Average % change in student enrollment SY19-21	0.4	1.4	0.4	3.1
IAR Participation Rate				
Participation rate SY19	98.6	99.0	98.8	99.1
Participation rate SY21	56.2	75.9	87.5	92.1
Change in student participation rate SY19-21 (percentage points)	-42.4	-23.1	-11.3	-7.0
SAT Participation Rate				
Participation rate SY19	95.7	98.3	98.6	98.7
Participation rate SY21	85.3	92.5	94.8	96.0
Change in student participation rate SY19-21 (percentage points)	-10.4	-5.8	-3.8	-2.7

**Note:** Average percent change in student enrollment was calculated by taking the percent change for each school, then averaging within each modality group.