



Analyzing Student Engagement during the COVID-19 Pandemic: What We Have Learned about Data Use



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In response to the COVID-19 pandemic, schools and districts have had to adapt their policies and practices. The pandemic has affected everything from how schools operate – such as offering virtual learning and implementing new attendance policies for virtual schooling – to how districts collect and analyze data. Changes to schooling and instruction have presented new challenges for tracking student engagement and assessing student academic progress.

To continue to inform pandemic recovery and address ongoing challenges, districts will need to carefully assess student engagement and learning from the 2020-21 school year and apply lessons learned to data collected over the next several years.

This report highlights key takeaways from TERA's work with six partner districts during the 2020-21 school year that demonstrate both the limitations of the data collected during a difficult and highly unpredictable school year, and how we adapted our approach to make use of available data to learn more about student engagement in a year of immense

change. We found that certain data practices, many of which represent best practices generally, were particularly important this past school year amid the data challenges that existed.

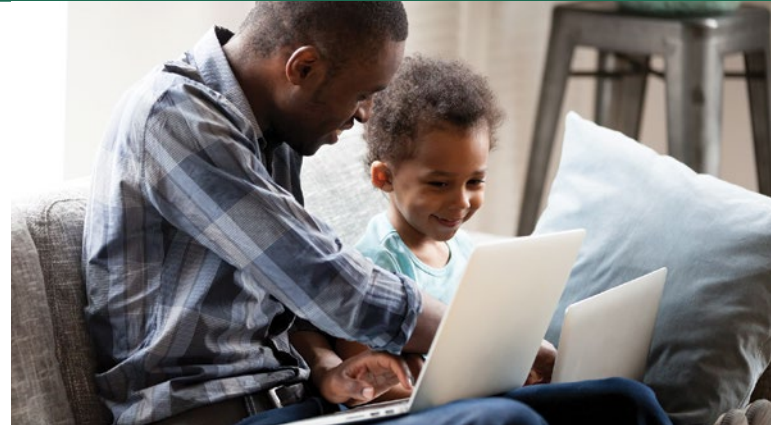
Specifically, we discuss three key recommendations for districts as they reflect on data use from the 2020-21 school year and make plans for future years.

- 1 *Examine students' and families' choice of instructional model during the 2020-21 school year to learn about those students and families rather than to judge the success of in-person or virtual instruction.*
- 2 *Combine multiple data sources to identify which students are most and least engaged.*
- 3 *To better understand general trends, examine multiple years of data, consider differences by school tier or student characteristics, and probe for more information when new trends emerge.*

1

Examine students' and families' choice of instructional model during the 2020-21 school year to learn about those students and families rather than to judge the success of in-person or virtual instruction.

In many districts, students and families were given some choice on their instructional model for the 2020-21 school year (an in-person, virtual, or hybrid option). Each student and family's choice of instructional model reflected a combination of educational preferences, health and safety concerns, and logistical constraints. In part because we do not know the extent to which each of these factors influenced any given family's ultimate choice, we cannot attribute differences in learning, attendance, or other outcomes to an instructional model itself. However, examining patterns of choice, either in isolation or in combination with associated educational outcomes, can be informative about how students experienced the 2020-21 school year and what needs students may have going forward. Analyzing data from our partner districts, we found differences in the instructional choices made by various students across subgroups of grade level, race, economic status, primary language, and disability status.



may be more likely to remain virtual than their non-disadvantaged peers, while the non-disadvantaged students of another race were more likely to remain virtual. This pattern would suggest that a difference in underlying preferences by race accounts for at least some of the overall difference in instructional model, something we would not be able to see when looking at race and economic status separately.

What This Means in Practice:

- **Where families had a choice of instructional model, examine choice patterns both across and within student subgroups to better understand preferences and constraints together.** It's important to recognize that families' ultimate choices of either virtual or in-person instruction were influenced by both their preferences as well as resource or logistical constraints. For example, when looking across economic status, a difference in the percentage of advantaged and disadvantaged students opting to remain virtual may arise despite similar preferences for in-person instruction within both groups because of inequality in families' abilities to act on those preferences. For a difference across racial groups, the underlying forces may not be as clear. A crosstab of race and economic status could reveal a pattern, known as "Simpson's paradox," in which choice of instructional model by economic status overall masks variation within racial groups. Specifically, economically-disadvantaged students of one race
- **When comparing outcomes from the 2020-21 school year by choice of instructional model, recognize that differences in outcomes may reveal more about the reasons behind families' choices than about the model itself.** This remains true even when looking at changes in outcomes from year to year, such as looking at achievement growth rather than levels.
- **Look at cohorts of students over time to identify grade levels or subject areas in which students were most likely to have fallen off track.** These types of patterns are the most likely to inform strategic decisions such as personnel needs or resource allocation.
- **Look at outliers as well as averages.** Because the burdens and disruptions of the pandemic may have fallen disproportionately across students, looking at average changes may hide or understate large effects concentrated among a few students. For instance, in addition to measuring an overall change in the average student attendance rate by instructional mode, look at changes in the rate or number of students who missed 10, 25, or 50 percent of all school days.

The Importance of Collecting Data at the Student Level

School districts are working hard to make up for lost instructional time over the past two years. Some of the interventions that districts will implement over the next few years could prove to have long term benefits for students, however, it will take careful analysis to understand potential impacts.

In order to best assess new interventions, it is critical for districts to collect data at the individual student level. As districts plan for future learning about interventions, such as remote learning, summer learning, tutoring, and other programs, they should think critically about what data is being collected at what level to ensure a more nuanced investigation of the efficacy of the intervention in question. Further, having data that captures individual student experiences over time is generally the most helpful



for future analyses. A good example of this is potential use of a marker for instructional mode, like the distance learning flag in Tennessee’s student information system, to better understand remote learning. Below, we illustrate a few examples of data collection at the student level.

	EXAMPLES: WHAT DISTRICTS ARE TRYING TO LEARN	BEST DATA COLLECTION PRACTICE	DATA QUESTIONS FOR DISTRICTS TO CONSIDER
Student-Level Data Collection	<p>Student Attendance: Identifying which students attended school in person, virtually, or in the hybrid model.</p> <p>Summer Learning: Identifying which students participated in tutoring or summer learning.</p>	<ul style="list-style-type: none"> • Collect data at the individual student level. • Best for districts that group students during an intervention without allowing changes throughout the entire semester, year, or time period. 	<ul style="list-style-type: none"> • Are the categories clearly defined and do they remain the same for the full semester/year? • Can students switch between groups?
Student-Over-Time Data Collection	<p>Student Attendance: Keeping track of whether a student was virtual or quarantined on a day-by-day basis (like the distance learning flag in EIS).</p> <p>Summer Learning: Keeping track of how many hours/days students received tutoring or participated in summer learning.</p>	<ul style="list-style-type: none"> • Collect data at the individual student level over time. • Best for districts where grouping students is more fluid or dynamic, and students can change between groups during semester, year, or time period. 	<ul style="list-style-type: none"> • Does the district have the capacity to collect daily data on students? • Is it being used consistently throughout the district?

2

Combine multiple data sources to identify students who are most or least engaged.

Using multiple data sources to capture engagement can help districts as they develop targeted interventions for students who were least engaged in the 2020-21 school year. Our partner districts varied in which measures of student engagement they collected in the 2020-21 school year. In addition to student attendance and enrollment data, we worked with districts to analyze student survey data, completion data from learning management systems, and social emotional screeners. Looking at multiple sources of data helped validate trends and add additional nuance to understanding student experiences.

What This Means in Practice:

- **Combine multiple sources of data (such as administrative data, survey data, and tools that measure student social-emotional well-being) to better capture student experiences when examining student engagement.**
- **When using student survey data, carefully consider response rates and representativeness of the respondents, especially across specific student subgroups.**
- **Learning management systems (LMS) can be a powerful tool to manage student engagement with learning and understand more about the relationship of learning to student outcomes. Consider the set-up of the LMS and data that can be extracted to help facilitate better progress monitoring of learning going forward.**



EXAMPLE 1: Combining attendance data and student surveys can reveal more information on students who struggled with attendance.

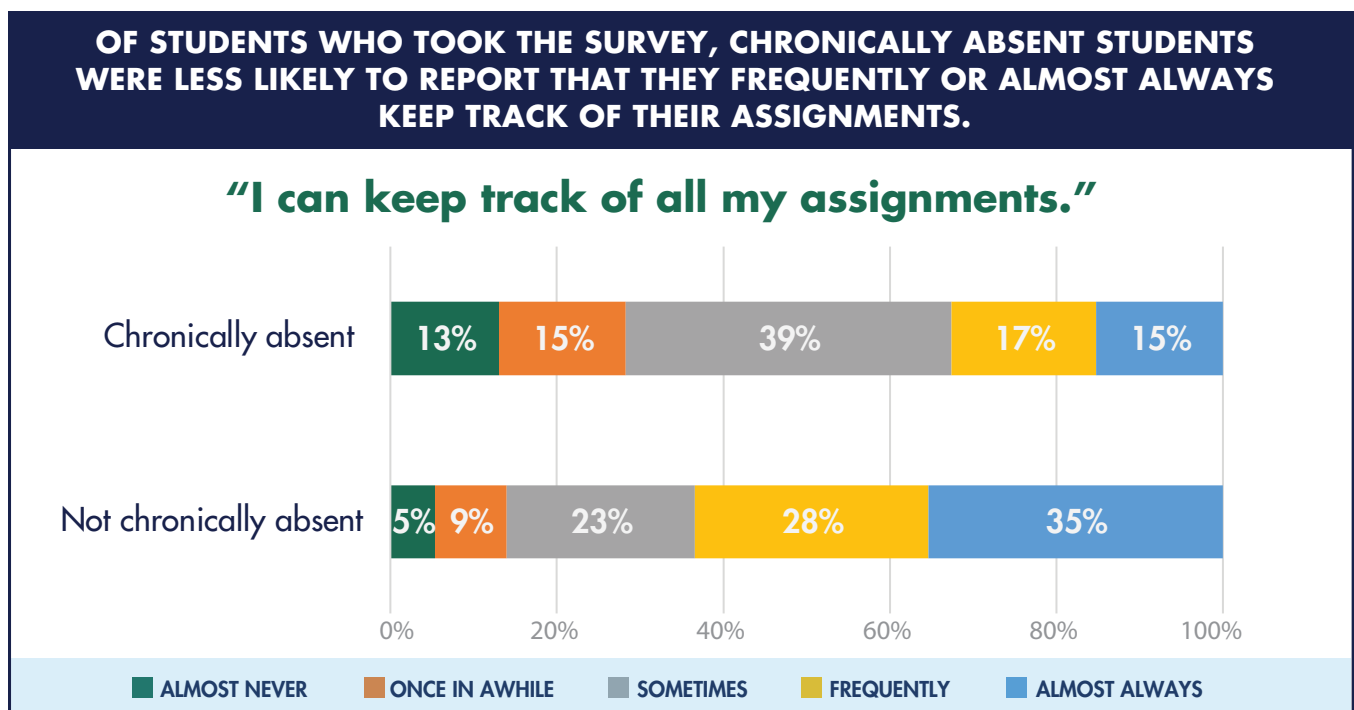
When looking at survey responses, we gained a deeper understanding of why certain students may have struggled when learning virtually. In one district, chronically absent students had a much lower response rate than other students. While the survey results likely do not represent all chronically absent students, those who participated reported lower levels of engagement and more difficulty with schoolwork than responding students who had not been chronically absent.

In our analysis, we looked at differences in responses on questions about academic engagement alongside student absence rates. For example, as shown in Figure 1, when asked how often they can keep track of their assignments, students who were chronically absent were much less likely than their peers to say “Frequently” or “Almost Always” and more than twice as likely to select “Almost Never.” Combining student survey data with attendance data provided a richer picture of engagement than if we had looked at each data source only independently of one another.

Districts should use caution in interpreting student survey results considering that certain types of students, like those who are chronically absent, could be underrepresented in the respondent sample.



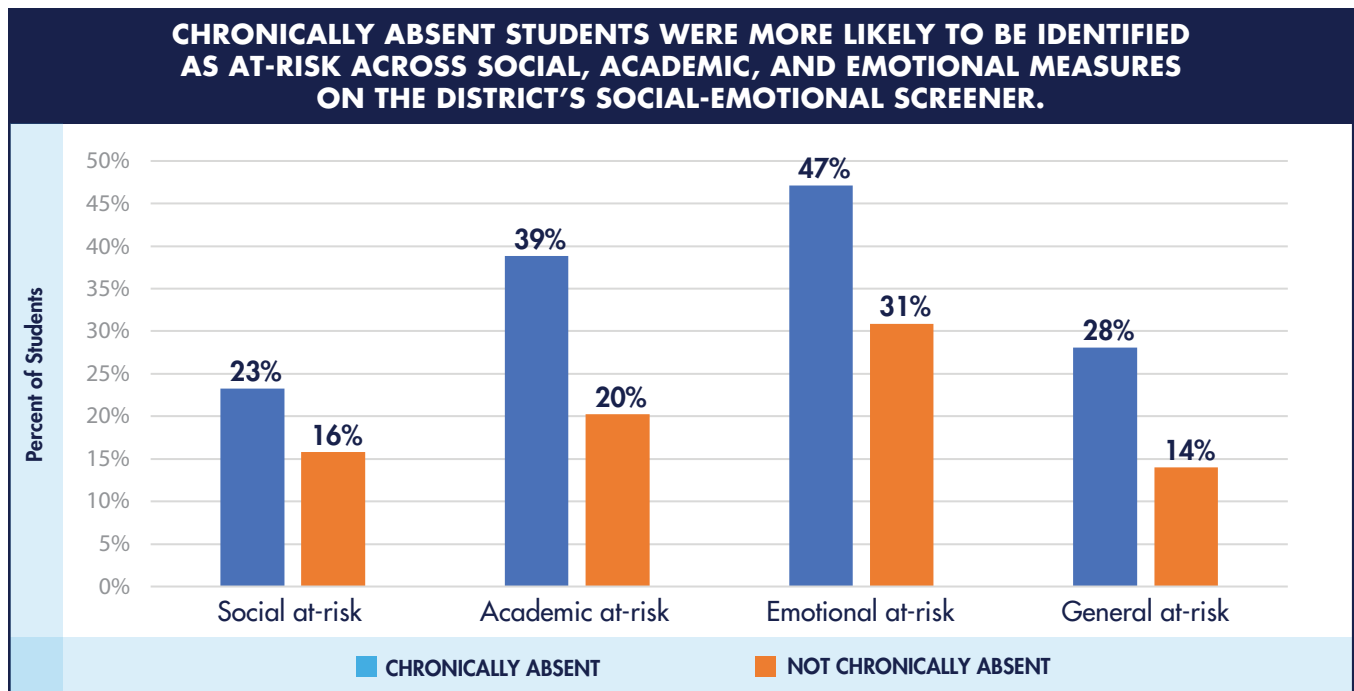
FIGURE 1



EXAMPLE 2: Combining attendance data and social emotional screeners can help target interventions for specific students.

One partner district collected data from both students and teachers using a screener that identified students as at risk in one of three areas (social, academic, emotional). We explored relationships between this screener, attendance data, and the district’s internal academic assessment data. When comparing students within the same school and accounting for certain student characteristics, students identified as at-risk by their teacher’s scores on the screener were five percentage points more likely to be chronically absent by the end of the first semester. Figure 2 shows that students were more likely to be identified as at-risk across all measures and more than twice as likely to be identified as generally at-risk when they were also identified as chronically absent. By identifying the relationship between chronic absence and student potential to be at-risk in multiple categories, schools and districts have more concrete data to use for potential interventions.

FIGURE 2



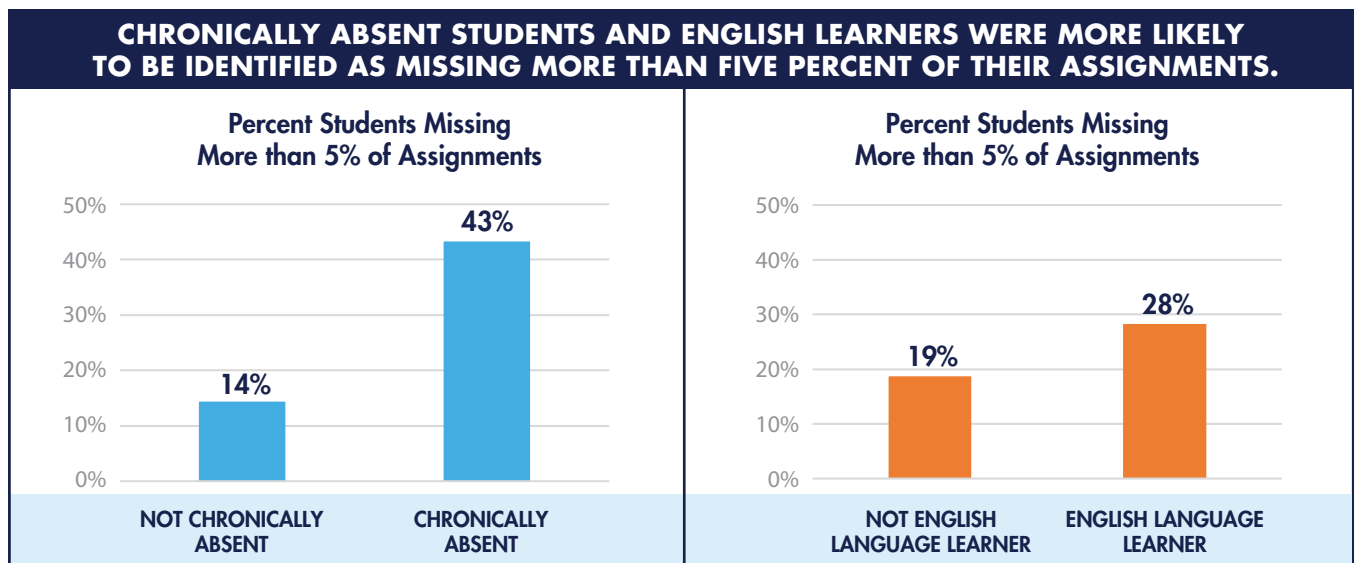
EXAMPLE 3: Combining attendance data and learning management system data can show which students completed assignments during the school year.

For another district partner, we explored student engagement using data from their learning management system (LMS). While LMS data can be powerful, it is often complex and difficult to analyze. Depending on the LMS, there may be opportunities to take a deeper look into student participation, assignments, and grades. For our analysis, we looked at the percentage of incomplete assignments and percentage of students with a grade of D or F on class assignments. In Figure 3, we illustrate how chronically absent students and English Learners were more likely to be identified as missing more than five percent of assignments.

As with the previous data on screeners, by looking at the LMS data in combination with absence data and cutting the data by student groups, districts and schools have more information on the types of students that need more urgent intervention.



FIGURE 3



3

To better understand general trends, examine multiple years of data, consider differences by school tier or student characteristics, and probe for more information when new trends emerge.

Examining student data over time and disaggregating data by student characteristics are both common practices for schools and districts, however, the pandemic has showed us that they are more important than ever. Because of challenges unique to the 2020-21 school year, it was critical to use multiple years of data to determine if the trends seen this year were similar or different than trends in prior years that did not experience the same disruption. Additionally, breaking down the data by school tier and student demographics further illuminated whether differences by grade-level or student subgroup were specific to this year or were persistent across years, and this analysis provided insights for districts to best target supports.

What This Means in Practice:

- **When exploring the extent to which certain issues (such as increased chronic absenteeism) are particular to the pandemic, construct data sets in a way to make consistent comparisons across multiple years of data.**
- **When examining trends, break down results in specific ways, such as by school tier and student characteristics, to help identify inequities that may have deepened because of the pandemic or shed light on an ongoing issue.**
- **Don't take different emerging trends at face value. As districts implement interventions and look toward the future, it will be important to ask "why" and to keep investigating when different trends emerge from previous years.**





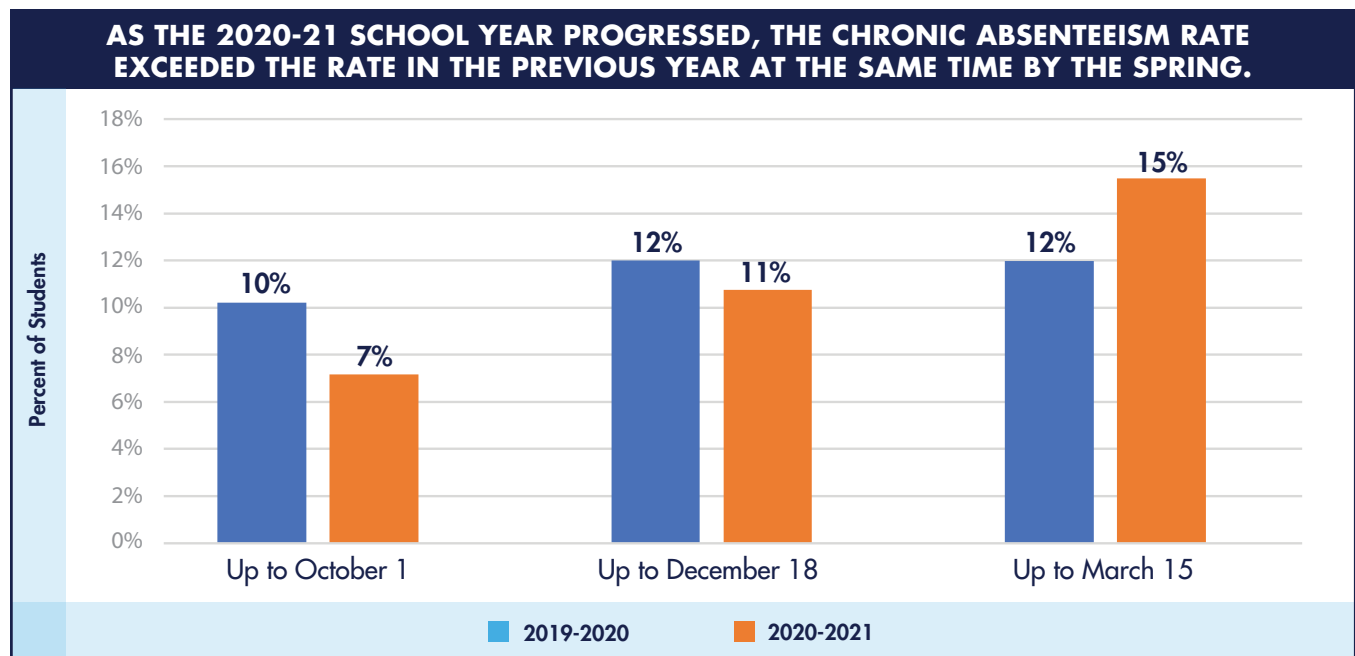
EXAMPLE 1: Examining multiple years of data and comparing consistent time periods across data sets can help show differences unique to a given school year.

The onset of the pandemic led to changes in school schedules at the end of the 2019-20 school year and the beginning of the 2020-21 school year. Because of school closures that started in March 2020, there were fewer instructional days in 2019-20. Additionally, some districts and schools experienced delays at the beginning of the 2020-21 school year to adjust to challenges brought on to the pandemic.

One important part of our analysis was to look at chronic absenteeism, which we constructed as missing 10 percent or more of instructional days. To work within these new data challenges, we set time parameters around the data and compared time periods that would contain consistent data from year to year. Additionally, we checked trends at multiple points throughout the year.

For example, one district started this school year weeks later than previous years. We monitored the chronic absenteeism rate at three points in the year – up to October 1st, after the fall semester, and up to March 15th. As demonstrated by Figure 4, the chronic absenteeism rate by October 1st appeared to be lower than last year, which may have been due to fewer instructional days up to that point because of the delayed school start. As the year went on, we saw the chronic absenteeism rate match, and then exceed, last year’s rate. Looking across different years and across different periods within a dataset facilitated conversation with our district partners to understand about what may have influenced higher chronic absenteeism this year, such as different approaches to virtual learning, pandemic-specific attendance policies, or greater student disengagement.

FIGURE 4



EXAMPLE 2: Breaking down data in specific ways, such as by school tier, can reveal new trends.

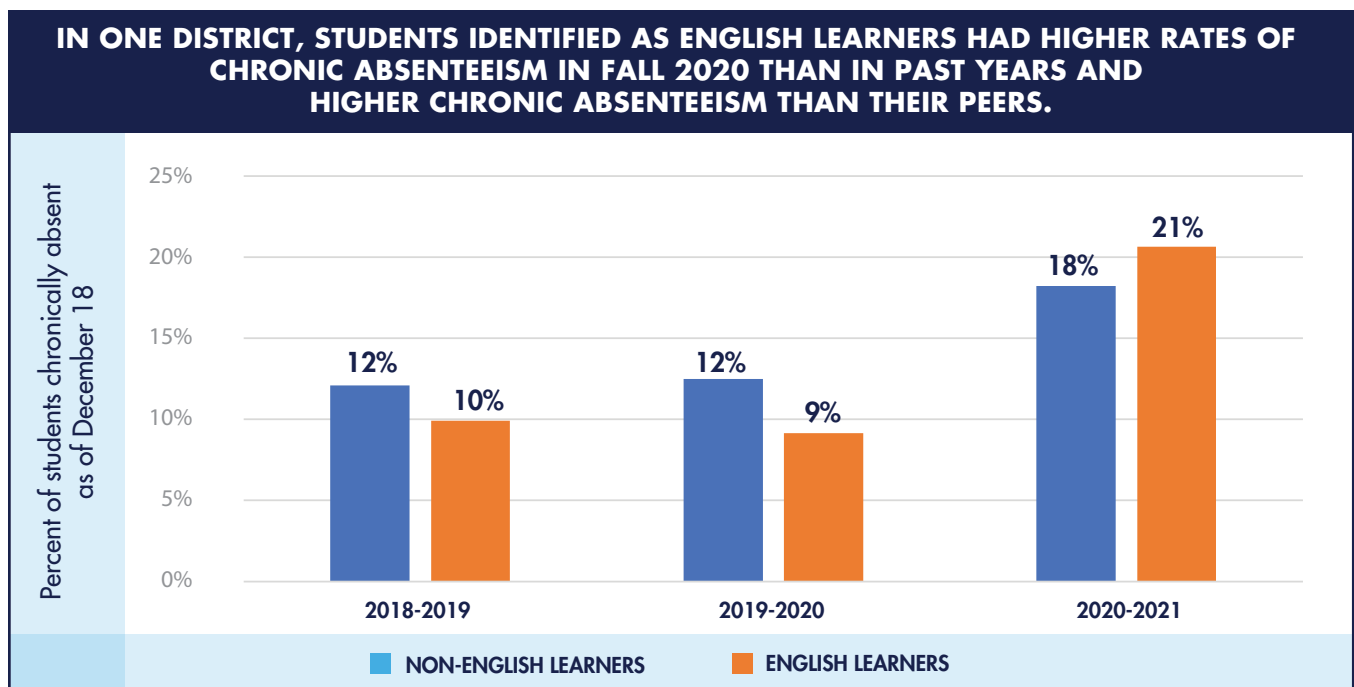
In our analysis of attendance patterns across each partner district, we also looked at how trends across time varied within the district. While most schools experienced an increase in absenteeism this year, there were some schools that saw their chronic absence rates quadruple between 2019-20 and 2020-21. When examining chronic absence by school tier, we saw that high schools tended to have the highest rates of chronic absence in prior years, which was also true during the pandemic. However, elementary and middle schools saw an extraordinary increase in the number of chronically absent students in the 2020-21 school year.

CHRONIC ABSENCE RATE			
Level	2019-20	2020-21	Percent Change
Elementary	8%	23%	186%
Middle	14%	29%	108%
High	39%	43%	8%

EXAMPLE 3: Breaking down data by student characteristics can reveal new trends.

When looking at chronic absenteeism, we found concerning trends across different student characteristics. For example, in most of our partner districts, we identified an increasing rate of chronic absence among English Learners. In one of our partner districts, the percent of English Learners who were chronically absent this year doubled in comparison to previous years. Additionally, English Learners in this district had lower rates of chronic absenteeism than their peers in previous years, but they had higher rates than their peers this year.

FIGURE 5



EXAMPLE 4: Probing for more information when new trends emerge can reveal important data changes, missing data, and unusual outliers in the data.

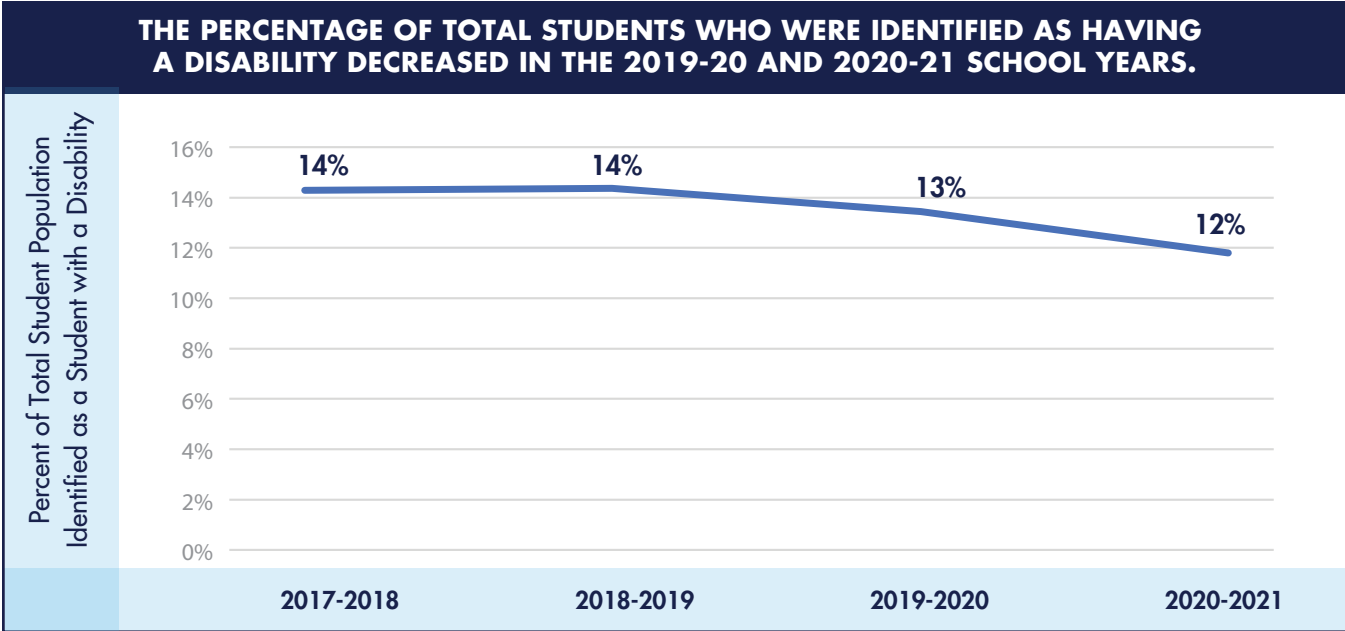
Considering the administration challenges brought on by the pandemic, there were important patterns of data changes, missing data, and unusual outliers particular to this year. Therefore, it was critical to ask “why” when different than expected patterns emerged.

For example, in one of our partner districts, there was a notable decrease in the overall percent of students with disabilities. Typically, the identification process and testing happen at the end of the year, which was halted last spring due to school closures. Because of this disruption, we saw a lower overall number of students with disabilities and lower identification of new students. Additionally, students with disabilities were not withdrawing at higher rates in this district.

Figure 6 shows the percent of students with a disability of the total student population in this district. In both 2019-20 and 2020-21, there were decreases in the percentage of total students who are identified as having a disability. Upon further investigation, we found that students with disabilities were not leaving the district at rates higher than students without disabilities but rather noticed a lower rate of students newly identified as having a disability and a higher rate of students who switched classification status between years (i.e., switching from being identified as having a disability in the prior year to not being identified as having a disability in the current year). Between 2019-20 and 2020-21, there was a 95 percent increase in the number of students who had been identified in a prior year as having a disability and were no longer classified as a student with disability in the current year. There was also a 57 percent drop in the number of students newly identified as having a disability between 2019-20 and 2020-21. This discovery encouraged district data staff to check with their colleagues in special education to see if they had also seen this trend and to begin to understand the issue more closely.

Given our further analysis and discussions of the data with this district, this drop in the overall percent of students with disabilities was likely due to delays in testing and issues with information/data collection rather than a true decrease. Checking the data quality provided important context for how we could interpret subsequent trends looking at these subgroups.

FIGURE 6



LOOKING AHEAD



Educators at all levels can benefit from having useful data to make decisions about student engagement and instruction. TERA's work demonstrates that using common sense data analysis practices and data from the 2020-21 school year can be extraordinarily useful to learning more about student experience during the pandemic and to target student supports as needed. As districts continue to grapple with the ongoing pandemic, implementing good data practices in schools and districts will remain an important piece of recovery in the coming years.

In particular, as school and district leaders analyze data in the upcoming year, it will be beneficial to:



- **Examine who opted into different instructional models to fully understand differences that may emerge in student learning outcomes.**



- **Combine multiple sources of data to help validate and add insight to emerging trends found in analyses examining student outcomes.**



- **Look across different time periods, different school contexts, and different student characteristics to contextualize trends and uncover data irregularities. When doing so, construct “apples-to-apples” comparisons across the data sets.**

