COLORADO'S MISSING YEAR

Assessing Colorado's K-12 Performance in the Wake of COVID

A REPORT BY KEYSTONE POLICY CENTER

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SUMMARY AND KEY FINDINGS

For students worldwide, the last year was arguably the most disruptive and difficult schooling experience for students, parents and educators in modern times due to the impacts of the COVID-19 pandemic. This included Colorado, where student well-being and achievement has been dramatically impacted by the pandemic. While there is somewhat limited publicly available data, there remains much in the data that can and should be used to inform state education policy and practice. The data shows that there are critical gaps in student learning across the state that must be addressed, as well as some bright spots. Some key takeaways, covered in more detail throughout the report, include:

- There was a substantive decline in assessment participation rates across the state combined with high variability in participation rates with ranges from below 10% to multiple districts with 100% participation.

- There were fewer assessments given in 2021 so there was accordingly less assessment data overall when compared to earlier years.

- Statewide 5th grade Literacy performance declined slightly, from 48.4% of students meeting or exceeding expectations in 2019 to 47.2% of students in 2021. The statewide declines in 4th grade Math were far greater, from 35.7% in 2019 to 28.5% in 2021.

- While it is challenging to compare SAT performance from 2019 to 2021, as 2021 performance data was reported differently than prior years, 11th grade SAT scores increased from 2019 to 2021 with 60% of 11th graders meeting or exceeding expectations in Literacy and 36.4% in Math.

- Math performance continues to lag Literacy performance at all education levels and must be a focus for future improvements to programming.

- Performance continues to correlate with student demographics, although the level of correlation varies dramatically across geographies, grade levels and subjects.

See www.centerforedpolicy.org for maps about Colorado's student demographics, assessment participation, and academic performance.

INTRODUCTION

The COVID-19 pandemic disrupted all aspects of life in Colorado and the world beginning in March, 2020. K-12 education was one of the most impacted sectors, with many Colorado schools closing abruptly and not fully reopening in person until Fall 2021. Some Colorado school districts reopened in Fall 2020, and many more in Spring 2021; most districts also offered virtual learning options so it still remains somewhat unclear what percentage of students returned to in-person learning this year.[1] Regardless, the last year was arguably the most disruptive and difficult schooling experience for students, parents and educators in modern times.

While there has been debate over the impacts of virtual school on student performance, we do know that some students and some schools thrived while most others struggled during the pandemic. How well virtual learning worked for students reflected both school-based delivery, technology and internet issues, as well as the social-emotional, health, and economic challenges faced by students, families and educators during the COVID-19 crisis. We also know that there was likely wide variation across districts, within districts, and by teacher in the quality of online learning that is not captured in any dataset. Yet, there are a multitude of ways to try and measure these impacts, and learn from the information we do have.

Nationally, there is early research and takeaways on the impacts of the pandemic on student learning:

- Data released by NWEA on MAP test results nationwide showed that students on average were three to six percentile points behind in reading and eight to 12 points behind in Math, with elementary students faring worse than older students. This data set also showed that students of color and students in schools with high poverty rates fell further behind than other students.[2]

1 https://assets.ctfassets.net/9fbw4onh0qc1/1pWkqPUpMgnZigrCXCXAYY/406d795e959abc822ae45ee523a0401f/Colorado_LearningModelData_Final.xlsx

2 https://www.nwea.org/research/publication/learning-during-covid-19-reading-and-Math-achievement-in-the-2020-2021-school-year/

- A report from McKinsey released in July 2021 based on the iReady assessment also showed substantive learning losses that were most acute among younger students, students of color, and students living in poverty. The analysis also considered impacts beyond academics, stating that "more than 35 percent of parents are very or extremely concerned about their children's mental health."[3]

- In July 2021, the Center for Reinventing Public Education released a review of available data on student academic progress during COVID, which concluded that while "gauging the academic impacts of the pandemic is hard…the average student mastered less academic content because of the pandemic and associated disruptions to schooling."[4]

- Survey results also indicated that parents of students in remote learning were more concerned than those whose students were participating in in-person learning.[5]

Many states, including Colorado, have paused state accountability which has in some cases limited the public data available. While other researchers have stepped in to address this gap, it is essential that governmental agencies continue to be trusted sources for information on both program offerings and student outcomes, both academic and otherwise.

This report details how these national themes have played out in Colorado as a single use case and analyzes the impact on student learning as measured by the state mandated assessments, the Colorado Measures of Academic Standards ("CMAS"), and Colorado PSAT and SAT. This year there were state administered assessments, although they were not required for all grades nor in all subjects. Statewide, students in elementary and middle grades took either Math or English Language Arts, while high school students in grades 9-11 took both the Math and Evidence-Based Reading and Writing tests. For ease of interpretation, this report refers to both the CMAS English Language Arts test and the SAT Evidence-Based Reading and Writing Test as Literacy. Unfortunately, there is limited or no information available about students' well-being more broadly in Colorado in the absence of surveys such as those used nationally. This makes it all the more imperative to analyze the constrained information we do have to unpack the impact of the last year. This report digs beyond the statewide averages in the data to look at student learning in school districts across Colorado.

3 https://www.mckinsey.com/industries/public-and-social-sector/our-insights/covid-19-and-education-the-lingering-effects-of-unfinished-learning#

4 https://www.crpe.org/sites/default/files/8_5_final_academic_impacts_report_2021.pdf

5 https://www.brookings.edu/blog/brown-center-chalkboard/2021/09/23/concerns-about-child-well-being-during-the-2020-21-school-year-were-greatest-among-parents-of-remote-learners/?utm_campaign=Brookings%20Brief&utm_medium=email&utm_content=162963173&utm_source=hs_email

ASSESSMENT PARTICIPATION

While prior analyses of academic performance have not focused on participation rates – typically because most students have taken the required assessments in Colorado schools – it is an important factor to consider this year for a range of reasons:

- Given the lack of information on student engagement during online learning, participation can be used as one proxy for student engagement in their learning.[6]

- Nationally, and locally, there is shifting sentiment about the purpose of some standardized assessments. Participation rates are one measure of how much this sentiment has filtered down to students' and families' views of these assessments.

- Given the decline in participation rates and variability across districts, it is important to understand participation rates in order to put performance data into appropriate context.

These are in addition to the traditional reasons that participation rates are important, primarily tied to ensuring outcomes are a representative sample of the school overall, and that students were not systematically excluded from the assessment. Statewide participation rates declined from 2019, and are shown in Figure 1.

Statewide SAT participation is also higher than CMAS, despite more high schools remaining virtual. This is likely a result of the importance the SAT plays in students' planning for programs after high school, but it is not possible to say this with certainty.

CMAS Participation

Within this statewide data there are several trends worth highlighting on CMAS participation rates at the school district level. First, while overall

Figure 1. Statewide Participation Rates			
	2019 Participation Rate	2021 Participation Rate	Change 2019 to 2021
CMAS 4th Grade Math	96.9	68.6	-28.3
COSAT 11th Grade Math	92.6	79.5	-13.1

participation declined, 38% of districts had participation rates of over 90% on 4th grade Math, and 78% of districts had rates over 80%. Only eight percent of districts had CMAS participation rates under 60%, including several large districts such as Denver and District 49. It is notable that there were relatively few districts with such low participation; without more information it is hard to understand why these particular districts had such low participation. As previously referenced, it could be a proxy for engagement or district and school messaging around the importance of testing, as well as health concerns.

SAT Participation

Within this statewide data, there are several trends worth highlighting on SAT participation rates. First, while overall participation declined compared to 2019, 51% of districts had participation rates of over 90% on 11th grade Math, and 72% of districts had rates over 80%. Six percent of districts however did have SAT participation rates under 60%, primarily small districts. Without more information it is hard to understand why these particular districts had such low participation. As previously referenced, it could be a proxy for engagement or district and school messaging, as well as health concerns.

6 https://nces.ed.gov/pubs2021/NFES2021058.pdf

Participation By Student Demographics

It is important to understand whether there is a relationship between student demographics and participation. To broadly understand the student body characteristics within a school district, we generate a District Demographic Index that includes measures that research shows can impact student engagement, learning, and performance. The District Demographic Index includes measures like the proportion of district students eligible for free or reduced-price lunch, the proportion of district students learning English as a second language, the proportion of district students receiving special education services, and proportion of district students who enter or leave the school district in the middle of the year. Districts with a higher score on the District Demographic Index serve higher proportions of these students than districts with lower scores

on the District Demographic Index (for more information, see the Appendix). We looked at the relationship between the District Demographic Index and student participation in assessments by district. We found little correlation between the demographics of a school district's student body, and the participation rate in that school district. Indeed, for every one-point increase in the District Demographic Index, the participation rate decreased by less than 0.1 percentage points in 4th grade (shown in Figure 2), and less than 0.2 percentage points in 11th grade (shown in Figure 3).

Secondly, we looked at the assessment participation rates of Colorado students who qualified for free and reduced-price lunch compared to students who did not qualify for free or reduced-price lunch. Those students who did qualify for free or reduced-price lunch generally had lower participation rates than their peers

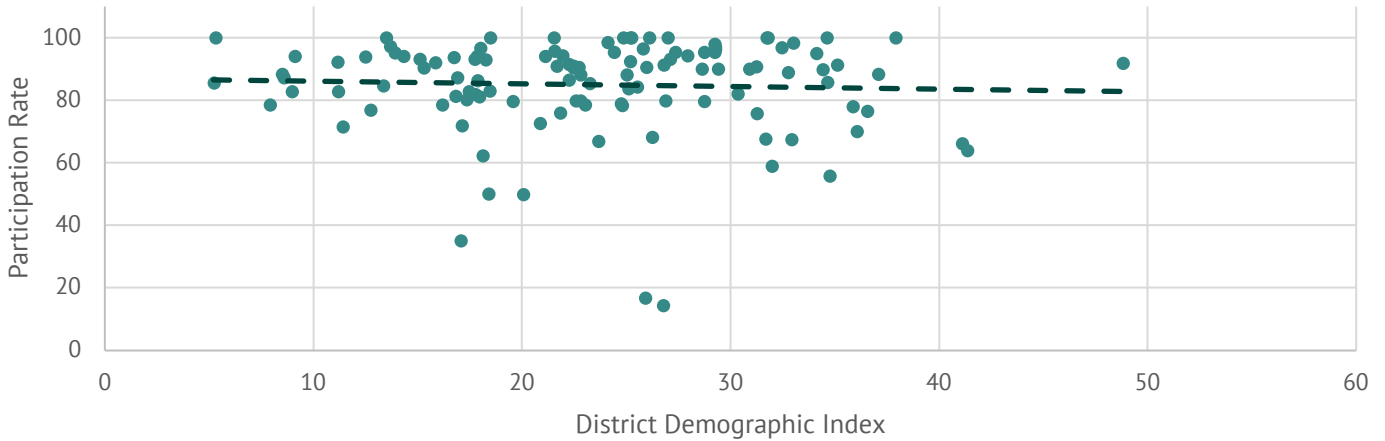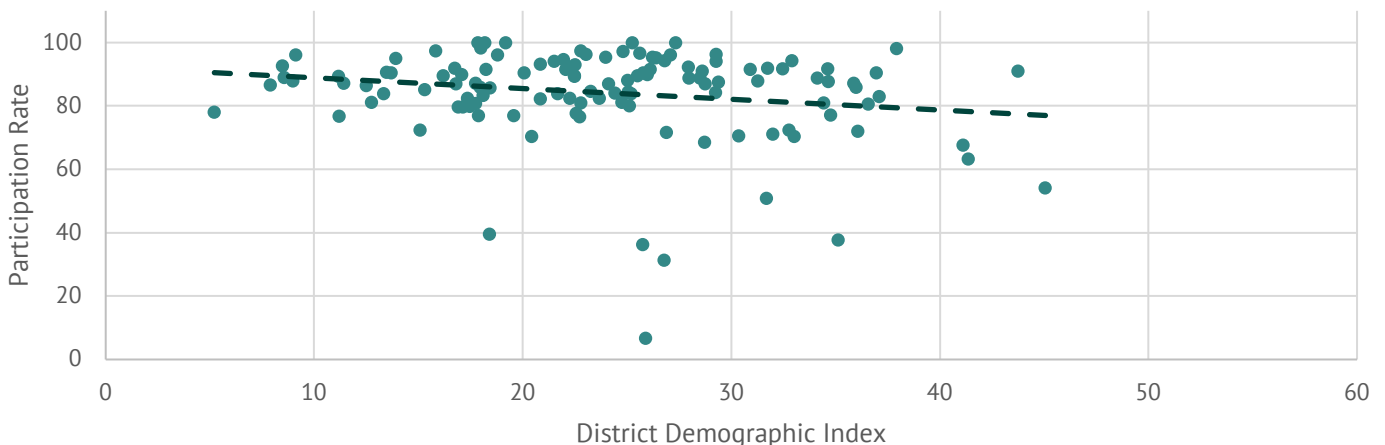**Figure 2. CMAS Participation: 4th Grade Math**

Figure 3. SAT Participation: 11th Grade Math

who didn't qualify for the program. Statewide the gap on 4th grade Math CMAS was 6.1 and on 11th grade SAT it was 12.1 percentage points. There was wide variation across districts. On CMAS there were 27 districts where students who qualified for free or reduced-price lunch had a higher participation rate than students who did not qualify, two districts where both groups had 100% participation, and the remaining 64 had higher rates for students who did not qualify for the program. Of those 64 districts the average difference was 4.9 percentage points, ranging from less than one percentage point to over 16 percentage points. On SAT, there were 8 districts where students who qualified for free or reduced-price lunch had higher participation rates than their peers, while the remaining 64 districts had lower rates of participation for students who qualified for the program, averaging 9 percentage points and ranging from less than a 1% difference to a 24 percentage point difference.

These data show participation rates were not an issue in many communities across the state, but there were large disparities in some communities and it is important to keep this in mind when interpreting performance data. It is an important issue to continue to explore in the future so as to preserve the usefulness of academic performance data.

Interpreting Regression

This report uses regression analysis to discuss the relationship ("correlation") between 2 variables (demographics and either participation or performance.) There are a range of ways to think about the results of these analyses, including the correlation co-efficient (provided throughout), and the slope of the regression line, or what a change in demographics by one point would mean for a change in participation or performance.

STUDENT PERFORMANCE

While there are numerous indicators of student performance, academic outcomes as measured by standardized state or national assessments are important indicators for what populations of students know and can do. There are strong links between academic performance and post-secondary success, and, most importantly, assessment data can shed light on how different groups of students are supported to reach Colorado's academic standards. Considering these assessment results is especially important this year, given the uneven quality of schooling as well as the gap in time since the last standardized exams. The results can then be used to help schools, districts and the state to direct resources and build capacity to support students that are most in need of academic supports. Overall, performance declined statewide, with declines more substantive at elementary grades as well as in Math where performance continues to lag Literacy performance.

CMAS 4th Grade Math

Fourth grade Math is a real point of concern statewide due to only 28.5% of students meeting or exceeding grade-level expectations, down from 33.6% in 2019. Additionally, 35% of districts had fewer than 20% of students meeting or exceeding expectations. While there were some districts with strong performance, only 8.6% of districts had 50% or more of students meeting or exceeding expectations. Looking at performance relative to the District Demographic Index, where districts with higher scores on the Index serve higher proportions of students eligible for free or reduced price lunch, receiving special education services, emerging multilingual students, and more mobile students, there is a stronger correlation at -0.48 with some substantive outliers, primarily in districts with lower percentages of specific student

Figure 4. CMAS Performance: 4th Grade Math
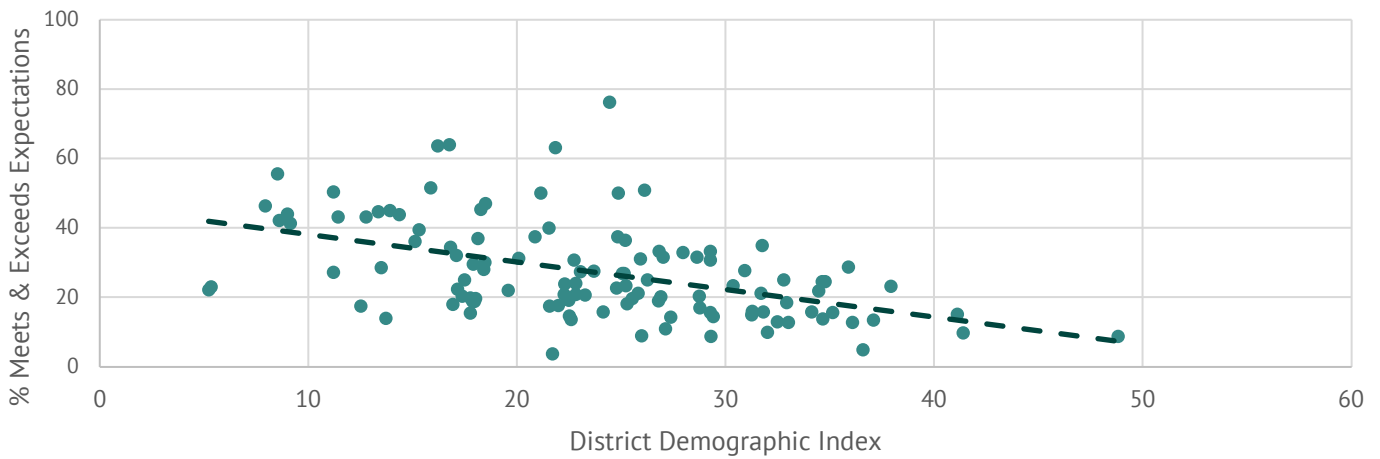
subgroups. For every point increase in the District Demographic Index, the percentage of 4th graders who met or exceeded expectations decreased by 0.8 percentage points on average.

There is also a large gap statewide of 27.6 percentage points between the performance of students who qualified for free or reduced-price lunch and students who did not; only 11.3% of students who qualified for free or reduced-price lunch statewide met the benchmark. Only 9% of districts saw more than 30% of these students meeting the benchmark, with 87.7% of districts' students that are eligible for free and reduced lunch performing below the state average for that population.

CMAS 5th Grade Literacy

Elementary students perform better on Literacy assessments than Math (similar to other years), but performance still declined slightly between 2019 and 2021. In 2021, 47.2% of 5th graders statewide met expectations, compared to 48.4% in 2019. There was also great variation across districts in terms of 5th grade Literacy performance; 12% of districts had less than 25% of students meeting or exceeding expectations, whereas 32% of districts had more than 50% of students at that level, and 5.6% of (7) districts had more than 70% of students reaching the benchmark. There was also a strong correlation between demographics and performance, with a correlation of -0.667, meaning demographics were more tightly related

Figure 5. CMAS Performance: 5th Grade Literacy
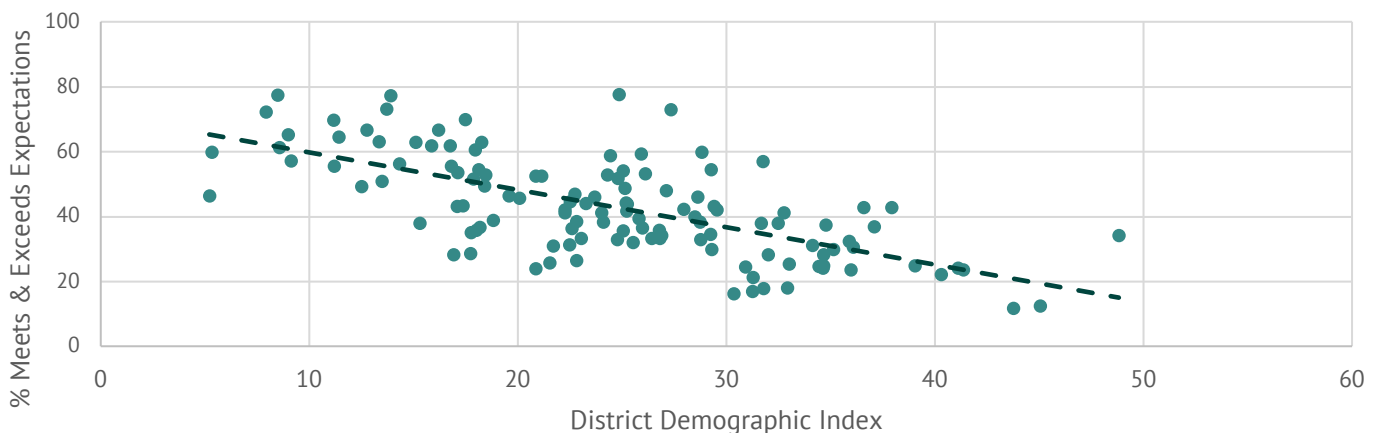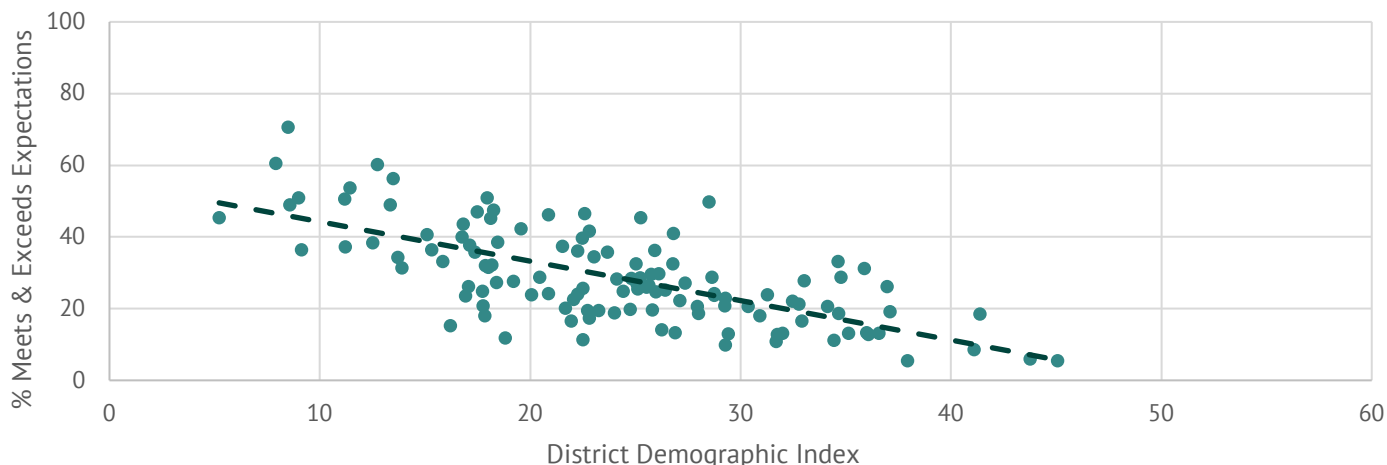
Figure 6. SAT Performance: 11th Grade Math

to performance in Literacy than they were in Math. Further the relationship was more negative; for every point increase in the District Demographic Index, the percentage of 5th graders meeting or exceeding expectations decreased by 1.2 percentage points on average. There was a fair amount of variation from the trend line within this in both directions, some districts performing better than expected based on demographics and others falling short of expectations.
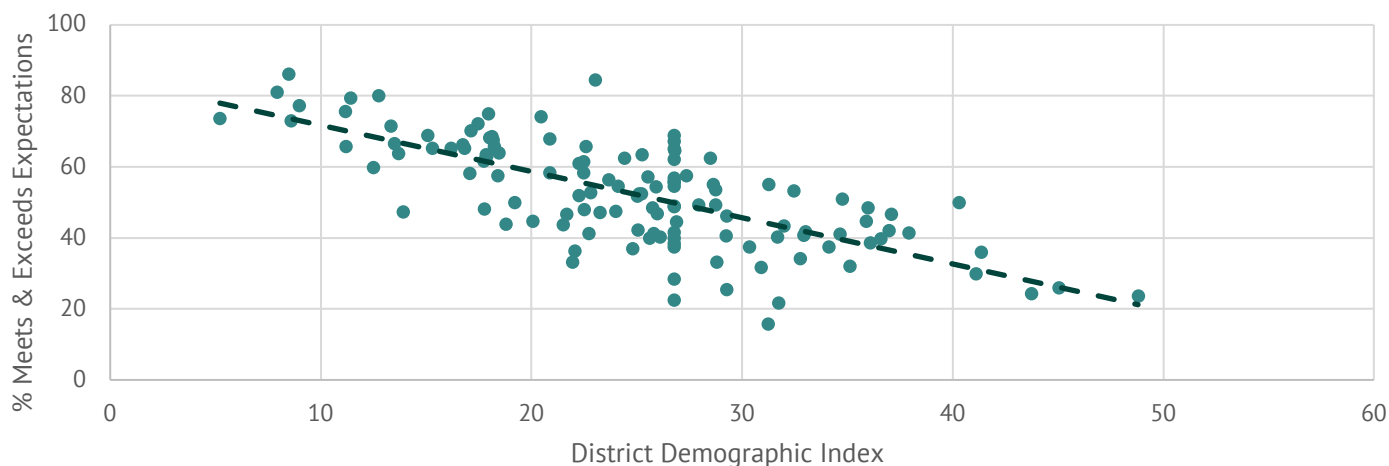
There also is a large gap statewide between the performance of students who are eligible for free or reduced-price lunch and students who are not eligible at 33.5 percentage points, and only 26.6% of students who are eligible for free or reduced-price lunch statewide met the benchmark. Only 15.6% of districts had more than 40% of students eligible for free or reduced-price lunch meeting the benchmark, with 45.5% of districts under the state proficiency rate for eligible students.

11th Grade SAT Math

Statewide, 44.2% of 11th graders met or exceeded expectations in SAT Math which is below 11th grade Literacy, though not as low as elementary Math proficiency rates. Within this there is once again a great deal of variation, with 26.4% of districts having less than 20% of students proficient, and only 7.4% of districts having 50% or more of students meeting the benchmark. There is a high correlation (-0.69) between demographics and performance as well, and higher than the correlation in Math at the elementary level. This stronger correlation indicates that district

Figure 7. SAT Performance: 11th Grade Literacy

demographics were slightly more related with student performance at the high school level than for elementary students, though neither case fully explains the variation in student performance across the state.

There is also a large gap statewide between the performance of students eligible for free or reduced- price lunch and students not eligible at 29.2 percentage points, and only 15.3% of students eligible for free or reduced-price lunch statewide met the benchmark. Only 7.7% of districts had more than 30% of students eligible for free or reduced-price lunch meeting the benchmark, with 49.2% of districts under the state proficiency rate for eligible students.
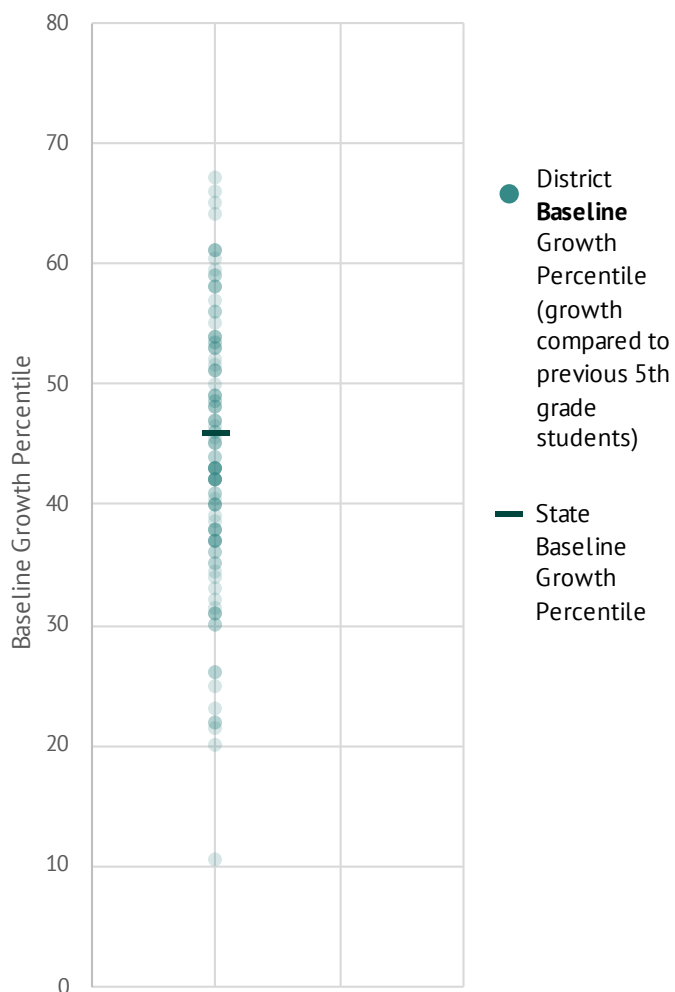
11th Grade SAT Literacy

11th grade students statewide also do better in Literacy than Math, with 60% of students meeting or exceeding expectations statewide. Eleven percent of districts had 70% or more of students meeting expectations, while 18.3% of districts had fewer than 40% of students meeting the benchmark. There is a stronger correlation between demographics and performance in SAT Literacy when compared to both elementary school Literacy and high school math at -0.72.

There is also a large gap statewide between the performance of students eligible for free or reduced price lunch and students that are not eligible at 31.1 percentage points, and only 37.3% of students eligible for free or reduced-price lunch statewide met the benchmark. Only 13.7% of districts had more than 50% of students eligible for free or reduced-price lunch meeting the benchmark, with 94% of districts under the state proficiency rate for eligible students.

STUDENT GROWTH

While the percent at or above proficient on a standardized assessment is a key indicator of student learning and mastery of grade-level content, it does not necessarily communicate the progress a student has made through the year, regardless of whether or not they met state standards. Growth measures allow us to look at the impact a school has had on a particular student's performance over the course of the year and is typically less correlated with student background. Historically, Colorado has measured

Figure 8. Student Growth - 5th Grade Literacy

Legend:
- District **Baseline** Growth Percentile (growth compared to previous 5th grade students)
- State Baseline Growth Percentile

student growth by comparing the achievement of a student relative to their academic peers -- students across the state who they had scored similarly to in prior year(s). Yet, as a group, the students who took the 2021 assessment participated less than in previous years and scored lower than in previous years making this type of analysis challenging. In order to understand how Colorado students did this year during the disruptions of COVID relative to a more normal school year, the Colorado Department of Education calculated a student's progress this year relative to the progress of their academic peers in a non-COVID disrupted year. This new measure is called "Baseline Growth." Baseline Growth, similar to previous measures of growth, is a percentile. The median Baseline Growth Percentile tells us the average growth that a student in the group made compared to non-COVID disrupted students in previous years. Statewide, the Baseline Growth Percentiles were lower than the growth percentiles calculated that just compared this year's students to other students who also experienced COVID.

Considering the newness of this data and the uncertainty of how to use it given the disruptions to schooling over the last two years, we looked at 5th Grade Literacy growth as an example. The distribution looked similar in other grades and content areas. We saw two main themes in this data: 1) on average students grew less this year than their academic peers in previous years; 2) there's significant variation – growth in some districts appears less impacted by this year than for others. Without more data and increased use of this metric there are few conclusions to be drawn but it is an important data point to keep in mind as we think about policy implications and should be a metric used in future years.

POLICY CONSIDERATIONS

Acknowledging that there are substantive limitations to the data presented within this report, based both on the pandemic and due to limits on data reporting that have existed previously, it is still important for policy makers to consider when deliberating on key issues of education policy. Some potential areas for consideration are identified below.

Program Monitoring • It is important that policy makers are collecting sufficient information about school programming to evaluate and understand conditions leading to student performance trends, as well as test those hypotheses.

School Funding • Given the challenges with student performance statewide in Colorado, particularly for students from low-income backgrounds, Colorado policy makers should consider revisiting school funding formulas. Some considerations should include the weightings used, how stimulus dollars are being allocated to accelerate student learning, and other ways to more effectively fund schools.

Differentiated Supports • The wide variation in student performance by district is one indicator of the varying needs in districts across Colorado. Policy makers should consider more systematically using data to differentiate supports, both financial and otherwise, to both districts and schools.

Data Transparency • Policy makers should push for more transparent, high-quality data on Colorado student performance that can be used to inform decision-making. This was certainly an issue prior to the pandemic and continues to be exacerbated by the current context.

School Level Transparency • In addition to the need for policy makers to have access to high quality data, it is important for students and families to have access to high-quality school and district-level data to inform decisions about enrollment, programs, and other education related items.

This data makes clear there is much work to be done in Colorado to ensure students are mastering the information needed, and that the pandemic has exacerbated many of the gaps historically seen across the state. Additionally, it is evident that as a state Colorado must recommit to the value of data and transparency in order to make informed decisions about how to best meet the needs of students. This analysis merely scratches the surface and there are many more questions to explore as part of the work to improve academic outcomes in Colorado, including:

- How did the learning environment – whether virtual, hybrid, or in-person—impact performance?

- How did particular groups of students perform? Were there differences in performance between Black, Latino, white, Asian, Native American or multiracial students? Students receiving special education services? Students in gifted programs?

- Are there large differences in performance at the school level that we can learn from?

- How does participation relate to other more traditional measures of engagement (i.e., attendance)?

- How did student growth this year compare to previous years? (i.e., how do we make sense of growth data?)

We encourage policy makers to use the data presented here, as well as other analyses, to make strategic, high-impact decisions this year and in the years to come to support students across Colorado as well as nationally.

APPENDIX: METHODOLOGY

Outcome Data Availability

In 2020-21, Colorado (like many states) limited the number of standardized tests students were required to take, particularly at the elementary and middle school levels. The following tests were required:

CMAS English Language Arts ("ELA")

• 3rd Grade (Note students also had the Colorado Spanish Language Assessment as an option)

• 5th Grade

• 7th Grade

CMAS Math

• 4th Grade

• 6th Grade

• 8th Grade

PSAT Evidence Based Reading and Writing ("EBRW")

• 9th Grade

• 10th Grade

PSAT Math

• 9th Grade

• 10th Grade

SAT EBRW

• 11th Grade

SAT Math

• 11th Grade

This factor alone means that there is less data available to understand the performance of Colorado students. This was further exacerbated in the 2020-21 school years by lower participation rates, both overall and in some specific districts. Finally, our ability to understand student performance continues to be limited by the Colorado Department of Education's ("CDE") data reporting rules which limit data availability when n sizes are low in any category.

Analyses

Given the scope of this paper, we have selected representative assessments to focus on in our analyses. These are:

• CMAS 4th Grade Math

• CMAS 5th Grade ELA

• 11th Grade SAT Math

• 11th Grade SAT EBRW

This gives us a sense of performance at elementary school and high school in both subjects while keeping the report more reading and focused on the critical transition to secondary schools in Grades 4/5 and to college in Grade 11. For these assessments we have looked at state and district level data, in part because data suppression rules substantively limit the amount of school level data available. Both participation rates and percent of students meeting or exceeding expectations are the primary data points considered throughout the report. While some analyses rely on mean scale score, we believe that the percent of students meeting or exceeding expectations gives a better understanding of how students are performing relative to grade level standards. Given the large gap between the 2021 assessments and prior assessments in 2019, we did not consider performance over time; however, there is a brief analysis of baseline growth calculated by CDE included in the report.

To put this information better in context of the students being served, we have also considered participation and performance relative to demographics as well as looked at disaggregated participation and performance for Free and Reduced Lunch students. To look at demographics, we have calculated a Demographic Data Index (DDI), including District's Free and Reduced Lunch (FRL) rate, Emerging Multilingual (EML) rate, Special Education rate, and student mobility rate. Mobility rate is not yet available for 2020-21 so 2019-20 was used as a proxy; for districts with missing data points, the state average was included.[1]

1 Specific DDI Formula: [(40% * SY 2020-2021 District FRPL Eligible Rate) + (20% * SY 20-21 District Emerging Multilingual Rate) + (20% * SY 20-21 District SPED Rate) + (20% * SY 2019-20 Inter-district Student Mobility Rate)] * 100