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## **March 2021 Report: Examining the Impact of COVID-19 School Closures on Student Achievement in GVSU Charter Schools**

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# Examining the Impact of COVID-19 School Closures on Student Achievement in GVSU Charter Schools

*Kiel McQueen, PhD*

March 2021

Using NWEA MAP data across K-12 schools authorized by Grand Valley State University (GVSU), this report examines student learning amid the COVID-19 pandemic.

Key findings include:

- Students had similar reading achievement in fall 2020 as compared to prior years; reading growth amid the COVID-19 pandemic was comparable to a typical year.
- Math achievement was lower compared to prior years and mostly concentrated in earlier grades; math growth was lower since the onset of the pandemic compared to a typical year.

Recommendations include:

- Use ongoing assessment data to further understand the impact of the pandemic on student achievement.
- Prioritize students' access to high-quality mathematics instruction and interventions, particularly for Black or African American and Hispanic/Latinx students whose academic achievement and growth has been disproportionately impacted by COVID-19.

## Introduction

The COVID-19 pandemic challenged traditional forms of teaching and learning and placed immeasurable stress on the public education system. It is imperative districts and schools understand how the pandemic impacted students' learning and progress to help inform both policy and practice moving forward. This report provides insights into how the pandemic impacted student achievement and growth in GVSU schools at the onset of the 2020-21 school year.

## Research Questions

This report examines the following research questions:

1. How did GVSU students perform in fall 2020 relative to a typical school year?
2. How has student growth changed since COVID-19 school closures in March 2020?

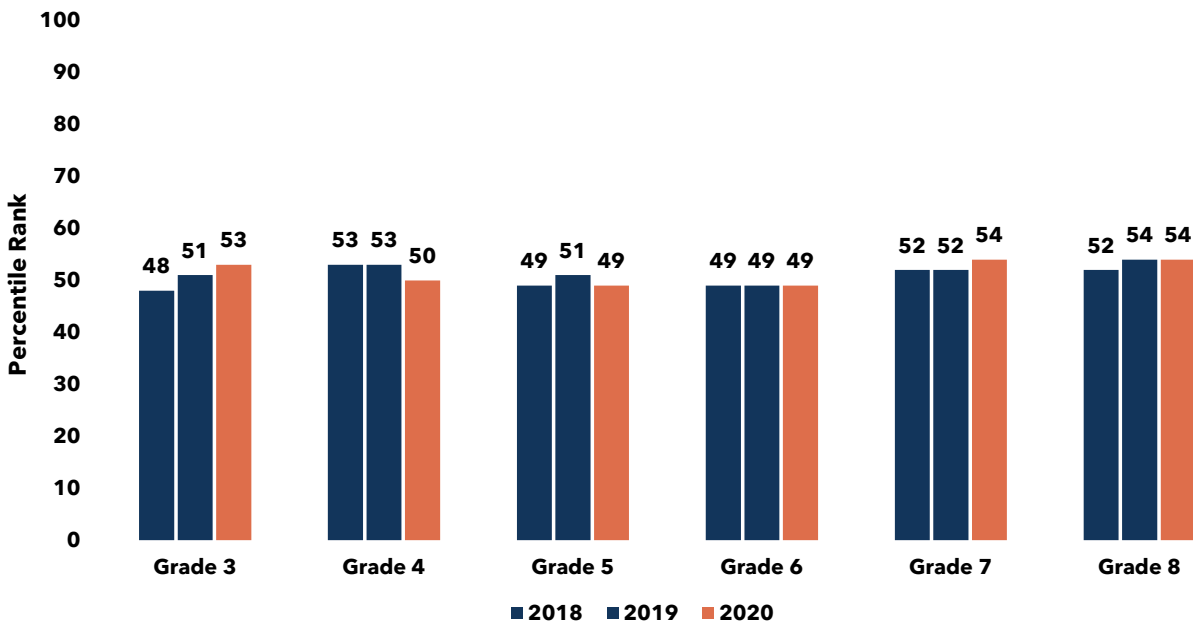
## How did GVSU students perform in fall 2020 relative to a typical school year?

Basis researchers examined how students in grades 3-8 scored in reading and math in fall 2020 compared to students in the same grade in prior years. This approach assumes prior years represent a more “typical” year as compared to fall 2020. We selected median achievement percentiles to represent how “typical” students (or students at the 50<sup>th</sup> percentile) scored year over year<sup>1,2</sup>. Moreover, we restricted the sample to GVSU schools who (a) administered the NWEA in fall 2018, 2019, and 2020 and (b) tested at least ten students in each grade-level participating in NWEA administration. The sample includes 37,280 students across 31 GVSU schools from fall 2018 to 2020<sup>3</sup>. Finally, student demographics by grade are comparable year over year (See Appendix A).

*Students had similar reading achievement in fall 2020 as compared to prior years.*

Figure 1 displays the median achievement percentiles in reading in fall 2018, 2019, and 2020. Results indicate students in fall 2020 scored at similar achievement percentiles relative to prior years. Moreover, students in third and seventh grade scored at higher achievement percentiles in 2020 relative to prior years. Finally, Figure B1 in Appendix B indicates median achievement percentiles in reading for different groups of students were also comparable across years.

**Figure 1: NWEA MAP achievement percentiles in reading by grade-level in fall 2018, 2019, and 2020**



Source: NWEA Map Growth, fall assessment; author’s analyses.

<sup>1</sup> We applied NWEA 2020 MAP Growth norms to all years included in the sample.

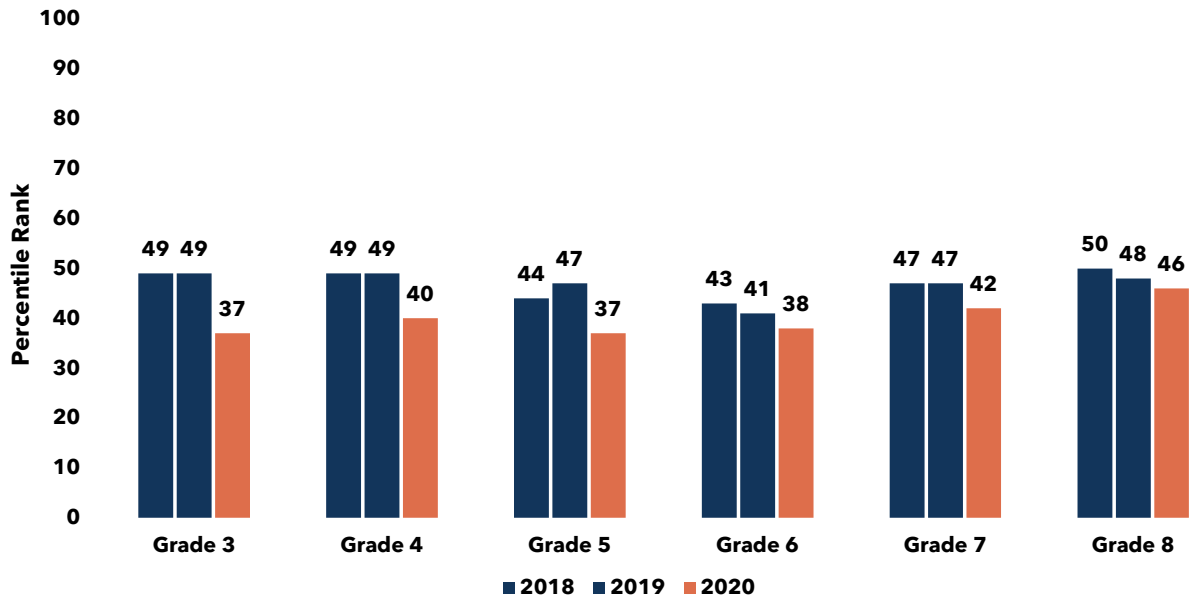
<sup>2</sup> Basis researchers consulted the fall 2020 NWEA Report to inform sample, measures, and analytic strategy. The NWEA Report can be accessed here: <https://www.nwea.org/content/uploads/2020/11/Collaborative-brief-Learning-during-COVID-19.NOV2020.pdf>

<sup>3</sup> The sample by year includes approximately 12,400 unique student identifiers.

*Math achievement in fall 2020 was lower compared to prior years; achievement differences were greater in earlier grades.*

Figure 2 displays the median achievement percentile in math since 2018. Achievement across grade levels in 2020 was lower compared to prior years. While math achievement is lower across all grades, achievement differences were particularly large in third through fifth grade. Specifically, median achievement percentile scores in 2020 were between 9 to 12 percentile points lower, on average, for students in grades three through five as compared to same-grade students in prior years. Moreover, results from GVSU schools are comparable to findings from NWEA’s nationwide analysis of fall assessment data (Kuhfeld et al., 2020).

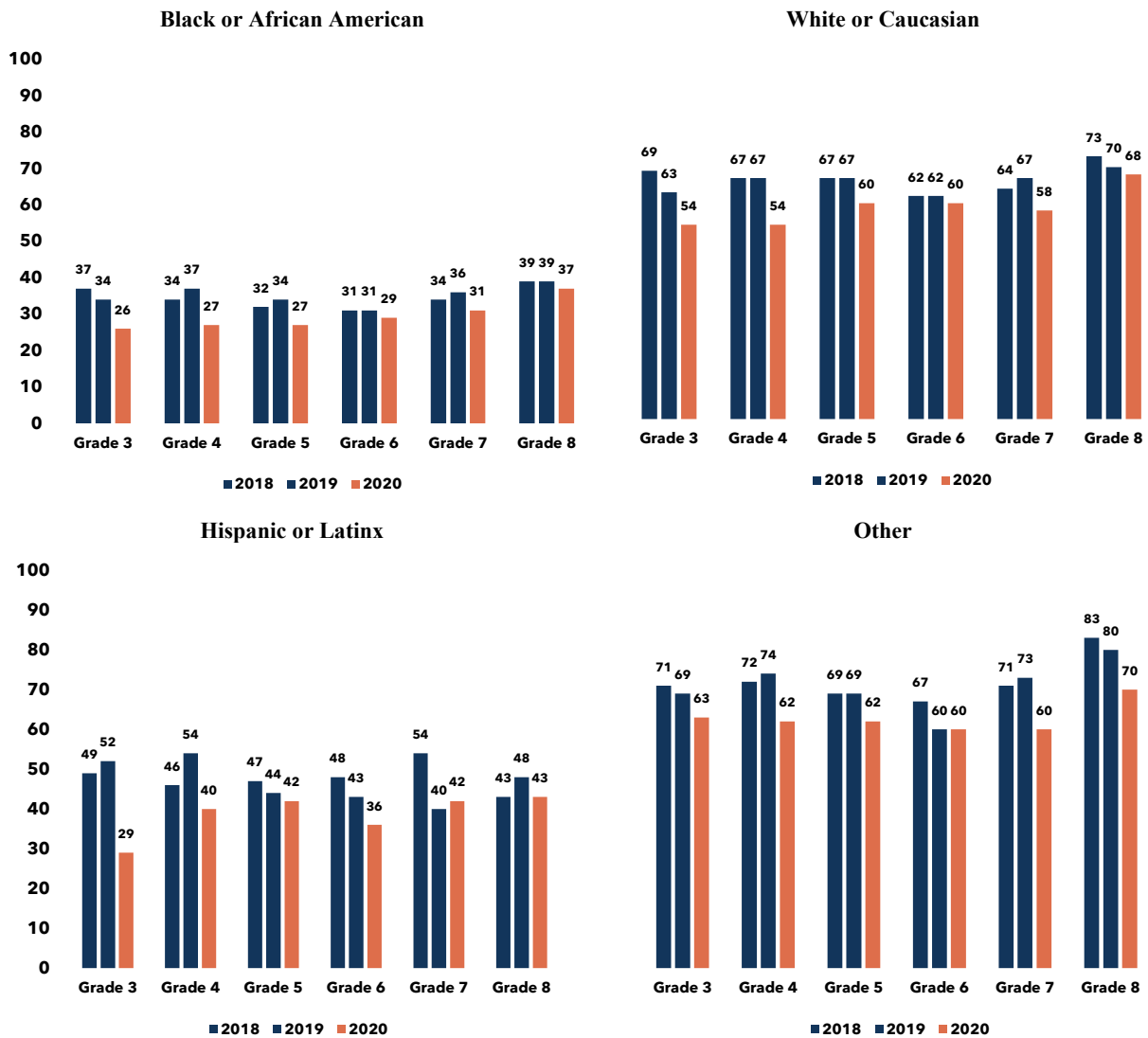
**Figure 2: NWEA MAP achievement percentiles in math by grade-level in fall 2018, 2019, and 2020**



Source: NWEA Map Growth, fall assessment; author’s analyses.

Finally, negative achievement trends in fall 2020 were consistent across different groups of students. While the negative trend is consistent across student groups, results in Figure 3 reinforce well-established historical inequities between student groups. Specifically, Black or African American students, across grades, are between 9 to 13 percentile points lower than other student groups; similarly, Hispanic or Latinx students have fallen further behind as compared to other students groups. This finding reinforces the urgency to provide Black or African American and Hispanic or Latinx students with equitable supports and services needed to improve academic outcomes.

**Figure 3: NWEA MAP achievement percentiles in math by grade-level and race/ethnicity in fall 2018, 2019, and 2020**



Source: NWEA Map Growth, fall assessment; author's analyses.

### How has student growth changed since COVID-19 school closures in March 2020?

Basis researchers also sought to understand how student growth changed amid the pandemic. We used two different analytic samples to answer this research question. First, we restricted the sample to GVSU schools who (a) administered the NWEA in winter 2019, fall 2019, winter 2020, and fall 2020, (b) tested the same grade-levels each year and term, and (c) tested more than ten students in each grade-level by year and term. This restriction created two cohorts of students, including 1,417 students who tested in winter 2019 and fall 2019 and 1,431 students who tested in winter 2020 and fall 2020. We then compared the distribution in scores between the pre- (winter 2019 to fall 2019) and mid-COVID periods (winter 2020 to fall 2020). To account for younger students growing at faster rates, we also explored changes in

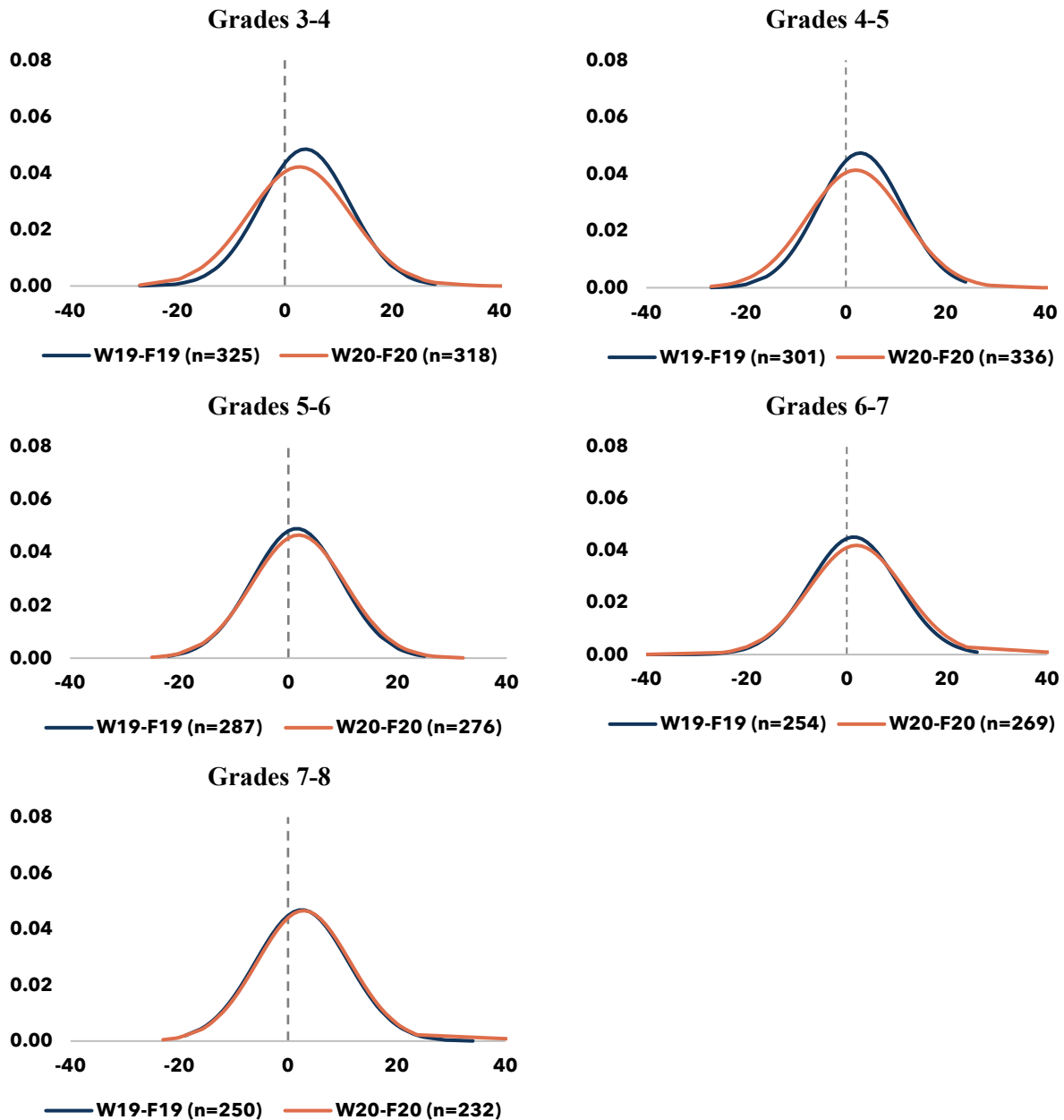
normative achievement status by grouping students into deciles (e.g., 1-10<sup>th</sup> percentile, 11-20<sup>th</sup> percentile, 21-30<sup>th</sup> percentile) using their percentile ranks in winter and fall terms. We then calculated the percentage of students who stayed in the same decile in fall 2020 compared to winter 2020 (“stayers”), the percentage of students moving up at least one decile in fall 2020 relative to winter 2020 (“movers”), and percentage of students moving down at least one decile in fall 2020 (“sliders”). We applied the same process to winter 2019 and fall 2019 data for comparison. A more detailed description of the analytic sample and strategy is included in Appendix A.

Second, we restricted the analytic sample to students with complete data from all four NWEA administrations (n=1,273). This restriction produced four longitudinal cohorts of students from third grade in 2018-19 to fifth grade in 2020-21 (n=393), fourth grade in 2018-19 to sixth grade in 2020-21 (n=349), fifth grade in 2018-19 to seventh grade in 2020-21 (n=307), and sixth grade in 2018-19 to eighth grade in 2020-21 (n=224). We then compared the median percentile rank for each cohort across the four NWEA administrations. This most restrictive analytic sample allows us to compare the same students over time.

***Reading growth amid the COVID-19 pandemic was comparable to a typical year.***

Figure 4 displays the distribution of within-student reading growth from winter 2019 to fall 2019 (blue) compared to winter 2020 to fall 2020 (orange) for students making the same grade transitions (e.g., 3<sup>rd</sup> to 4<sup>th</sup> grade). The distributions of RIT growth from 2019 to 2020 mostly overlapped, indicating comparable amounts of within-student growth from one grade to the next. Results presented in Figure 4 are equivalent to results found in NWEA’s nationwide study (Kuhfeld et al., 2020).

**Figure 4: Distribution of reading RIT score change from winter 2019 to fall 2019 and winter 2020 to fall 2020**



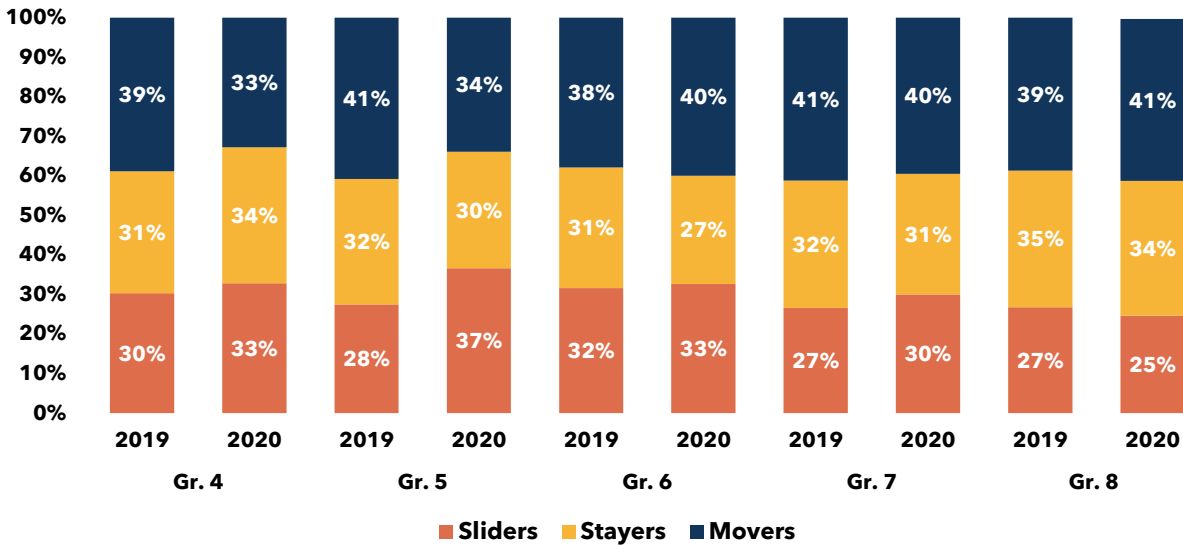
Source: NWEA Map Growth, fall assessment; author's analyses.

Note: The vertical grey dashed line represents zero growth. This translates to equivalent winter and fall test scores.

Alternatively, we examined differences in student growth patterns to understand if students changed their relative position in the NWEA percentile distribution since the onset of the pandemic. Figure 5 displays the percentage of students within each grade who moved down a decile or more (“sliders”), stayed in the same decile (“stayers”), or moved up a decile or more (“movers”) from one year to the next in reading. Results indicate the percentage of sliders, stayers, or movers from one year to the next were comparable from 2019 to 2020. In most grades, the percentage of sliders across years were within one to three percent

of each other. The one deviation depicted in Figure 5 is a nine percent increase of sliders in grade five in 2020.

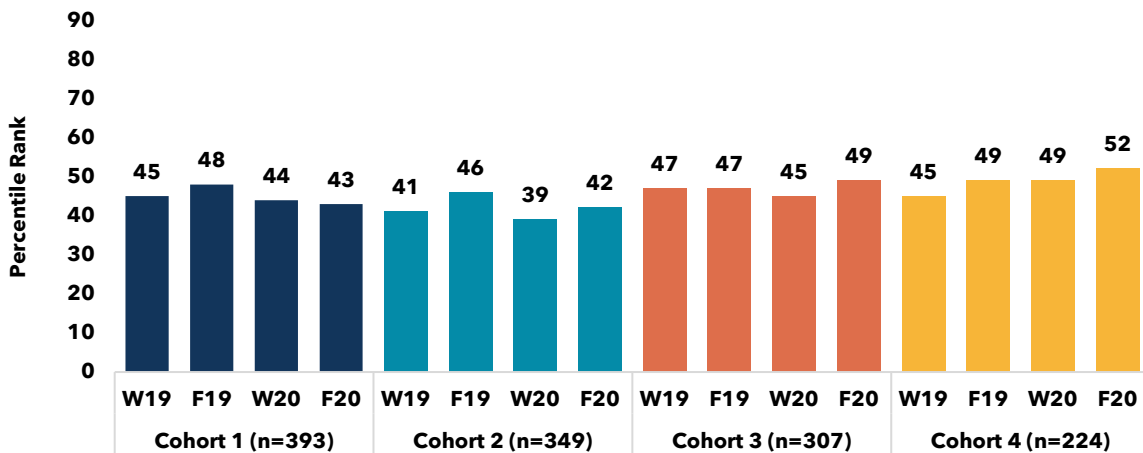
**Figure 5: Percentage of students shifting relative position in reading percentile from winter 2019-fall 2019 versus winter 2020-fall 2020**



Source: NWEA Map Growth, fall Assessment; author’s analyses.

Finally, we explored changes in normative achievement for students with valid test results for the four terms (winter 2019 – fall 2020) included in this report. This analytic sample allows us to explore within-student change over time. Results in Figure 6 indicate students’ normative position across cohorts remained relatively constant (Cohort 1) or improved slightly (Cohorts 2-4). These results are consistent with the prior finding that reading achievement amid the pandemic remained relatively comparable to prior years.

**Figure 6: Change in students’ relative position in math percentile from winter 2019-fall 2020**



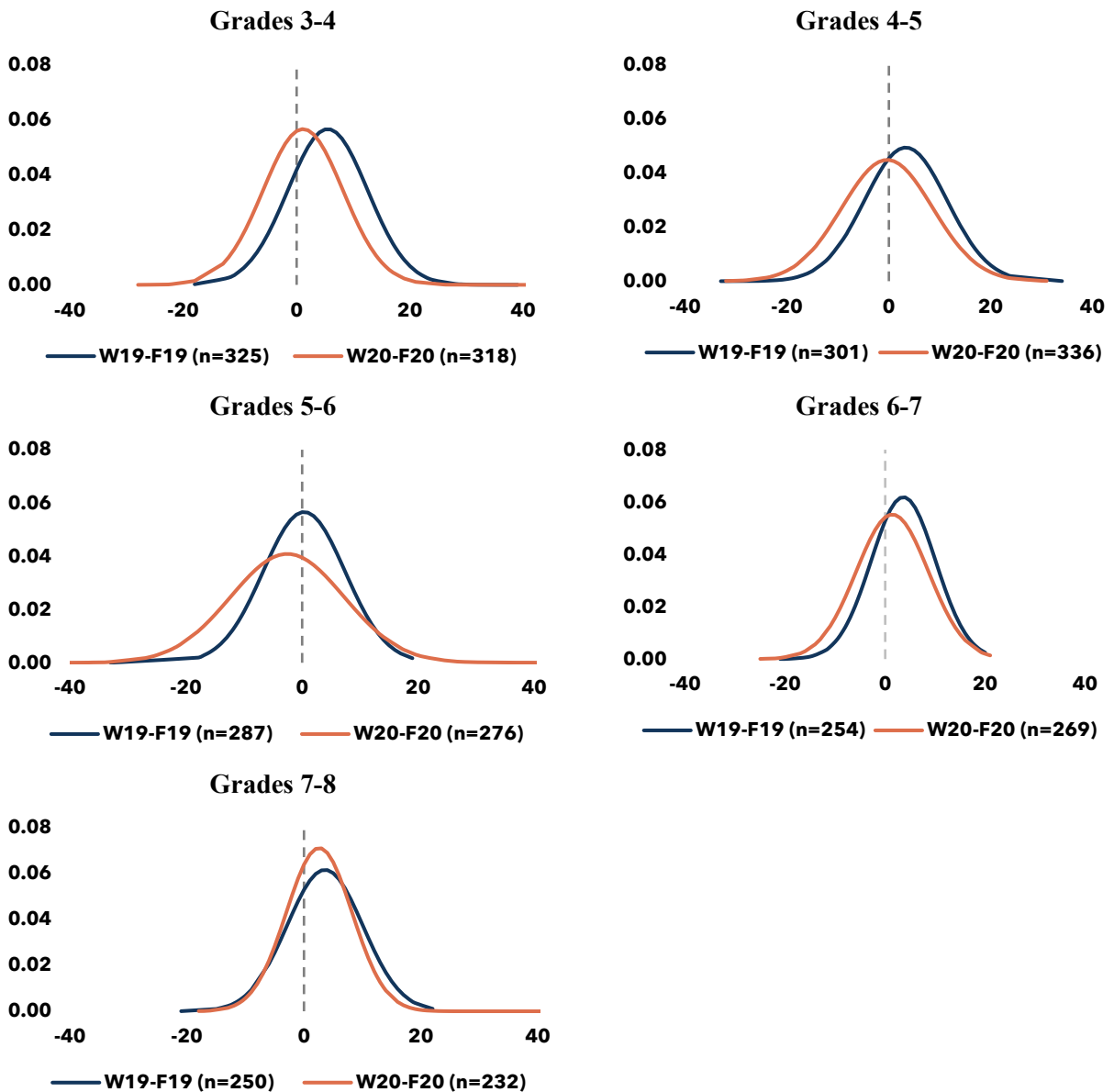
Source: NWEA Map Growth, fall assessment; author’s analyses.



*Math growth was lower since the onset of the COVID-19 pandemic compared to a typical year; less growth was particularly noticeable in earlier grades.*

Figure 7 displays the distribution of within-student math growth from winter 2019 to fall 2019 (blue) compared to winter 2020 to fall 2020 (orange) for students making the same grade transitions. Results indicate a smaller proportion of students demonstrated positive math growth amid the pandemic as compared to the same period in 2019. Moreover, the discrepancy is particularly noticeable in the earlier grades. For instance, median growth in Grades 3 to 4 constituted a 5 RIT point increase from winter to fall 2019 compared to 1 point increase in 2020.

**Figure 7: Distribution of math RIT score change from winter 2019 to fall 2019 and winter 2020 to fall 2020**

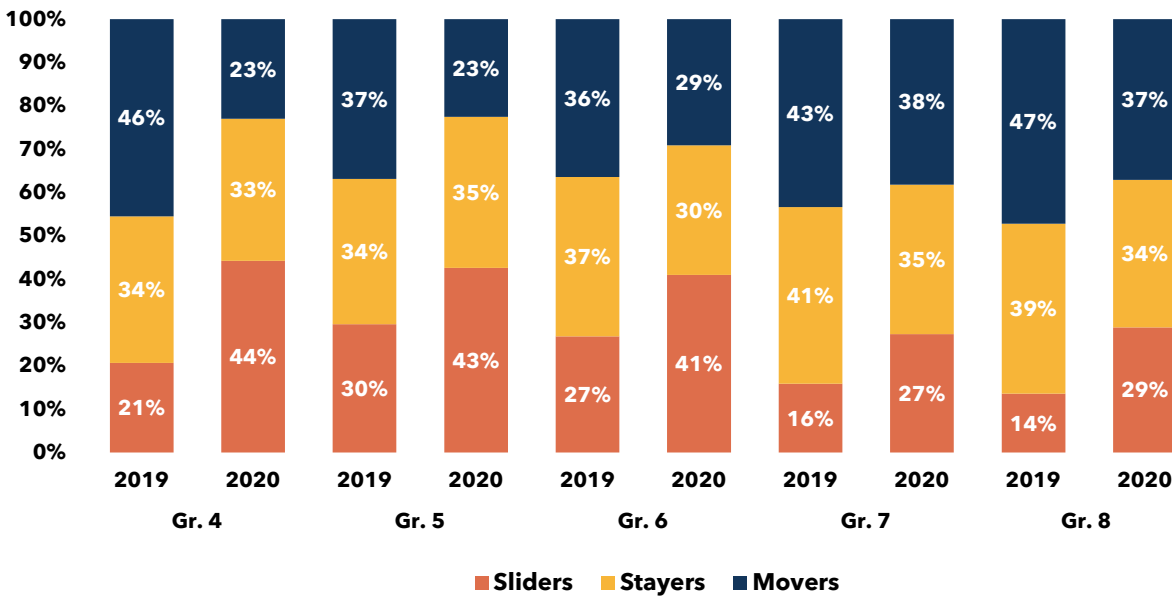


Source: NWEA Map Growth, fall assessment; author's analyses.

Note: The vertical grey dashed line represents zero growth. This translates to equivalent winter and fall test scores.

Lastly, when we explore the percentage of sliders, stayers, or movers from one year to the next in math, approximately 11 to 23 percent more students moved down at least one decile from winter 2020 to fall 2020 as compared to the prior year (See Figure 8). For instance, 21 percent of students in Grade 4 in 2019 slid down at least one decile with that number more than doubling (44 percent) since the start of the pandemic. Results presented in Figure 8 follow a comparable trend to results presented in the larger NWEA study using nationwide data (Kuhfeld et al., 2020). Finally, figures displaying the percentage of sliders, stayers, and movers by student race or ethnicity is included in Appendix C.

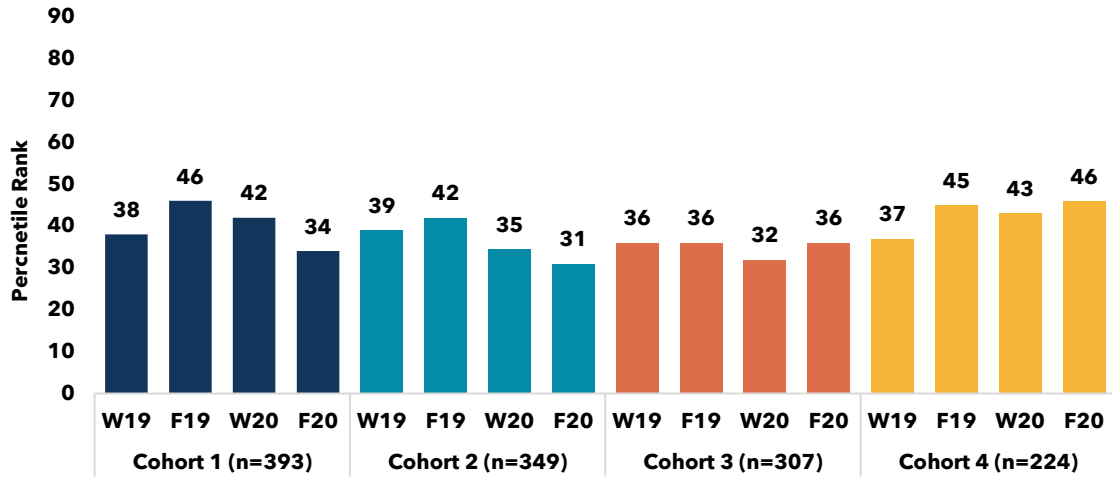
**Figure 8: Percentage of students shifting relative position in math percentile from winter 2019-fall 2019 versus winter 2020-fall 2020**



Source: NWEA Map Growth, fall assessment; author’s analyses.

Finally, results in Figure 9 indicate students’ normative position in Cohorts 1 (Grade 3 in W19 – Grade 5 F20) and 2 (Grade 4 in W19 – Grade 6 F20) fell since the onset of the pandemic. The decline is particularly noticeable in Cohort 1 whose 8 percentile point drop deviates considerably from prior term trends. In contrast, the winter to fall decline in Cohort 2 is slightly less than the decline from fall 19 to winter 20. These results are consistent with the prior finding that the pandemic was particularly detrimental to math achievement in earlier grades.

**Figure 9: Change in students relative position in math percentile from winter 2019-fall 2020**



Source: NWEA Map Growth, fall Assessment; author's analyses.

## Discussion and Recommendations

Findings from this report provide emerging insights into how COVID-19 disruptions impacted student achievement in GVSU authorized schools. Results show uneven declines across subjects and grade-levels, thus deviating from the prevailing assumption there would be consistent declines. In reading, achievement percentiles for students entering GVSU schools in fall 2020 were mostly comparable, on average, to same grade students from prior years. Moreover, reading growth amid the pandemic was equivalent across grades to winter to fall growth in 2019. In contrast, math achievement in fall 2020 was lower compared to prior years, especially in the earlier grades, where students entered between 9 to 12 percentile points lower than same grade peers from prior years. Additionally, and of equal concern, math growth since the onset of pandemic was less compared to a typical year. Lower growth was particularly noticeable in earlier grades where approximately 41 to 44 percent of students moved down at least one decile in math.

Findings also highlight inequities across student groups. While math achievement declined across racial or ethnic groups, the pandemic has disproportionately impacted Black or African American students. Specifically, Black or African American students, across grades, are between 9 to 13 percentile points lower than other student groups in math. This finding emphasizes the urgency for providing Black or African American and Hispanic or Latinx students with necessary supports needed to improve academic outcomes.

This study used restrictive criterion to produce samples mostly comparable year over year; however, findings should be interpreted within the context of the study's main limitations. Specifically, only eight schools met the criteria for inclusion in the analytic sample addressing the second research question. Thus, the external validity of results is limited to the schools included in the sample. Moreover, remote NWEA administration might have impeded certain students from completing the fall 2020 assessment. Thus, it is possible results might not reflect the true impact of the COVID-19 on student achievement in GVSU schools. Considering these findings and limitations, we suggest the GVSU CSO and its stakeholders consider the following three recommendations when planning future research or network support.

### ***Use ongoing assessment data to further understand the impact of the pandemic on student achievement.***

Student growth analyses featured in this report included a limited sample of schools due to the availability of winter NWEA MAP data. Including spring assessment data in future analyses would allow GVSU to understand what student growth looks like in a larger percentage of schools. For instance, GVSU could analyze how student growth from fall 2020 to spring 2021 compares to the same terms from prior years. These analyses would assist GVSU in understanding how the pandemic and ongoing implementation of hybrid learning continues to impact student achievement. Moreover, findings would help us understand if results from this report continue to persist over time.

### ***Prioritize students' access to high quality mathematics instruction and interventions.***

While fall 2020 reading achievement is comparable to prior years, math achievement, particularly in earlier grades, is lower. Thus, districts and schools should consider how students will access quality math instruction or interventions. Moreover, equitable access to high quality math instruction is imperative given Black or African American and Hispanic or Latinx achievement is lower than same grade peers.

Finally, the GVSU CSO might focus resources around supporting schools' capacity to implement high quality math instruction or interventions.

***Differentiate support to individual needs of network schools.***

This report features network wide student achievement and growth. However, results vary by school and grade level. Thus, it is important for the CSO to understand performance and trends by school to inform how supports could be tailored to unique needs of individual schools.

# Appendices

## Appendix A: Methods

**Data Sources.** Findings are based on student-level NWEA MAP data provided by the GVSU CSO. The CSO shared fall and winter assessment data from 2018-19 to 2020-21, resulting in five testing administrations. Basis researchers did not request spring NWEA data to account for school closures in March 2020. Assessment data included students' school name, term (e.g., fall, winter), subject, RIT (Rasch uNIT) score and test percentile. Finally, Basis researchers applied NWEA 2020 norms to 2018-19 and 2019-20 assessment data to ensure students' percentile ranks were based on same norms.

**Sample.** In total, 55,833 students in grades 3-8 had valid math and reading test data across five NWEA administrations. Basis researchers defined different analytic samples to reduce the degree to which changes to schools and students included in the sample influence changes in observed results for each research question. We discuss each analytic sample below.

*Analytic Sample 1.* The first research question explores within-grade comparisons between fall 2018 and fall 2020. Thus, we restricted the first sample to GVSU schools who (a) administered the NWEA in fall 2018, 2019, and 2020 and (b) tested at least ten students in each grade-level participating in NWEA administration. This analytic sample sought to reduce the extent changes in observed results is influenced by differences in students and schools who tested in fall 2020. In total, the first analytic sample includes 37,280 students across 31 GVSU schools from fall 2018 to 2020. Table A1 compares students in the fall 2018, 2019, and 2020 analytic sample by grade. In general, the sample of student tested in 2018, 2019, and 2020 by grade-level were mostly comparable in terms of gender and race/ethnicity. Moreover, the number of students tested each fall were mostly comparable.

*Analytic Sample 2.* Basis researchers developed two analytic samples to answer the second research question. First, we restricted the first analytic sample to GVSU schools who (a) administered the NWEA in winter 2019, fall 2019, winter 2020, and fall 2020, (b) tested the same grade-levels each year and term, and (c) tested more than ten students in each grade-level by year and term. This restriction created two cohorts of students, including those who tested in winter 2019 and fall 2019 and those who tested in winter 2020 and fall 2020. Table A2 provides the demographic characteristics of students tested in each cohort and grade-level. In total, 2,848 students comprised the first cohort (winter 2019 to fall 2019) and second cohorts (winter 2020 to fall 2020).. Moreover, the number and type of students by grade-level were mostly comparable across cohorts. The most salient difference was students moving from grade five to six in cohort two comprised nine percent more Black or African American students compared to the same grade-level combination the year prior. Moreover, we use student growth from winter 2019 to fall 2019 to estimate "typical" growth by grade pair (e.g., grades 6 to 7, grades 7 to 8) in pre-COVID settings.

Second, we restricted the second analytic sample to 1,273 students with complete data from all four NWEA administrations. This restriction produced four longitudinal cohorts of students from third grade in 2018-19 to fifth grade in 2020-21 (n=393), fourth grade in 2018-19 to sixth grade in 2020-21 (n=349), fifth grade in 2018-19 to seventh grade in 2020-21 (n=307), and sixth grade in 2018-19 to eighth grade in 2020-21 (n=224). This most restrictive analytic sample allows us to compare the same students over time. Table A3 provides an overview of students' demographic characteristics included in the second analytic

sample. Students included in this sample were mostly comparable to students from this first analytic sample.

**Measures.** Basis researchers used NWEA MAP Growth reading and mathematics assessment scores in this report. We include student RIT (Rasch unit) scores for fall and winter assessments and corresponding achievement percentiles. Achievement percentiles for each test administration were calculated using NWEA 2020 MAP growth norms.

**Analytic Strategy.** Below we describe the analytic strategy for each research question included in this report.

### **How did GVSU students perform in fall 2020 relative to a typical school year?**

Basis researchers calculated the median student percentile in fall 2018, fall 2019, and fall 2020 by grade-level and subject to answer this research question. Moreover, we also analyzed results by student race/ethnicity.

### **How has student growth changed since COVID-19 school closures in March 2020?**

Basis researchers measured student growth in two ways. First, we calculated a RIT difference score by subtracting students' winter 2019 and winter 2020 scores from their fall 2019 and fall 2020 scores. We then compared the distribution in scores between the pre- (winter 2019 to fall 2019) and mid-COVID periods (winter 2020 to fall 2020). This approach highlights students' raw growth but likely conceals growth for older students due to younger students growing at higher rates on NWEA assessments. To account for this, we explored changes in normative achievement status by grouping students into deciles (e.g., 1-10<sup>th</sup> percentile, 11-20<sup>th</sup> percentile, 21-30<sup>th</sup> percentile) using their percentile ranks in winter and fall terms. We then calculated the percentage of students who stayed the same in the same decile in fall 2020 compared to winter 2020 ("stayers"), the percentage of students moving up at least one decile in fall 2020 relative to winter 2020 ("movers"), and percentage of students moving down at least one decile in fall 2020 ("sliders"). We applied the same process to winter 2019 and fall 2019 NWEA data to serve as a reference point.

**Table A1: Demographic Characteristics of Analytic Sample Used in First Research Question**

Grade	Students	Schools	Male	Black	White	Hispanic	Other	
Fall 2018	3	2,223	31	0.51	0.56	0.26	0.08	0.10
	4	2,264	31	0.50	0.53	0.29	0.07	0.11
	5	2,211	31	0.49	0.57	0.28	0.07	0.08
	6	2,167	31	0.50	0.55	0.29	0.08	0.09
	7	1,966	31	0.52	0.50	0.32	0.08	0.09
	8	1,855	31	0.51	0.49	0.33	0.08	0.09
Grade	Students	Schools	Male	Black	White	Hispanic	Other	
Fall 2019	3	2,140	31	0.51	0.56	0.25	0.08	0.11
	4	2,141	31	0.51	0.56	0.26	0.07	0.09
	5	2,172	31	0.49	0.54	0.27	0.08	0.10
	6	2,051	31	0.49	0.55	0.28	0.08	0.09
	7	1,936	31	0.50	0.51	0.31	0.09	0.10
	8	1,850	31	0.53	0.49	0.34	0.09	0.08
Grade	Students	Schools	Male	Black	White	Hispanic	Other	
Fall 2020	3	2,117	31	0.49	0.59	0.24	0.07	0.10
	4	2,177	31	0.51	0.56	0.26	0.08	0.10
	5	2,187	31	0.52	0.55	0.27	0.09	0.09
	6	2,097	31	0.49	0.56	0.27	0.08	0.09
	7	1,915	31	0.49	0.53	0.30	0.09	0.09
	8	1,811	31	0.51	0.51	0.31	0.09	0.09

*Note: Percentages might not equal 100 due to rounding.*

Source: NWEA Map Growth, fall assessment; author's analyses.



**Table A2: Demographic Characteristics of First Analytic Sample Used in Second Research Question**

	W19	F19	Students	Schools	Male	Black	White	Hispanic	Other
Grade	3	4	325	8	0.51	0.77	0.17	0.04	0.02
	4	5	301	8	0.53	0.74	0.19	0.03	0.03
	5	6	287	7	0.46	0.70	0.21	0.04	0.04
	6	7	254	6	0.49	0.71	0.22	0.04	0.04
	7	8	250	6	0.52	0.66	0.27	0.02	0.05
	W20	F20	Students	Schools	Male	Black	White	Hispanic	Other
Grade	3	4	318	8	0.50	0.81	0.17	0.04	0.03
	4	5	336	8	0.52	0.76	0.17	0.04	0.03
	5	6	276	7	0.53	0.79	0.14	0.03	0.03
	6	7	269	6	0.47	0.68	0.21	0.06	0.05
	7	8	232	6	0.50	0.74	0.22	0.01	0.03

*Note: Percentages might not equal 100 due to rounding.*  
Source: NWEA Map Growth, fall assessment; author's analyses.

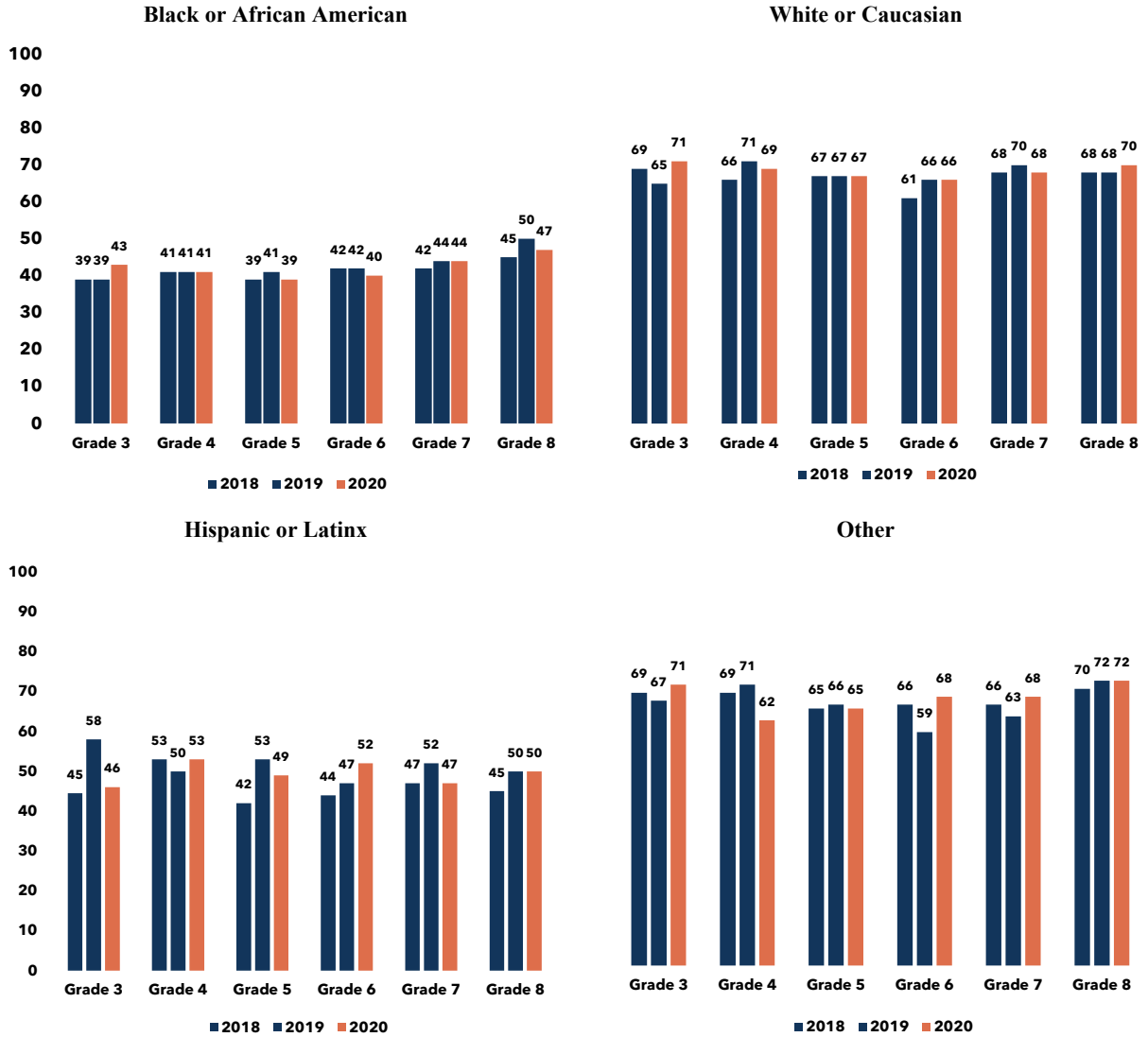
**Table A3: Demographic Characteristics of Second Analytic Sample Used in Second Research Question**

	W19	F20	Students	Male	Black	White	Hispanic	Other
Grade	3	5	393	0.52	0.80	0.15	0.03	0.02
	4	6	349	0.50	0.81	0.13	0.03	0.03
	5	7	307	0.51	0.77	0.16	0.03	0.03
	6	8	234	0.50	0.74	0.21	0.01	0.03

*Note: Percentages might not equal 100 due to rounding.*  
Source: NWEA Map Growth, fall assessment; author's analyses.

## Appendix B

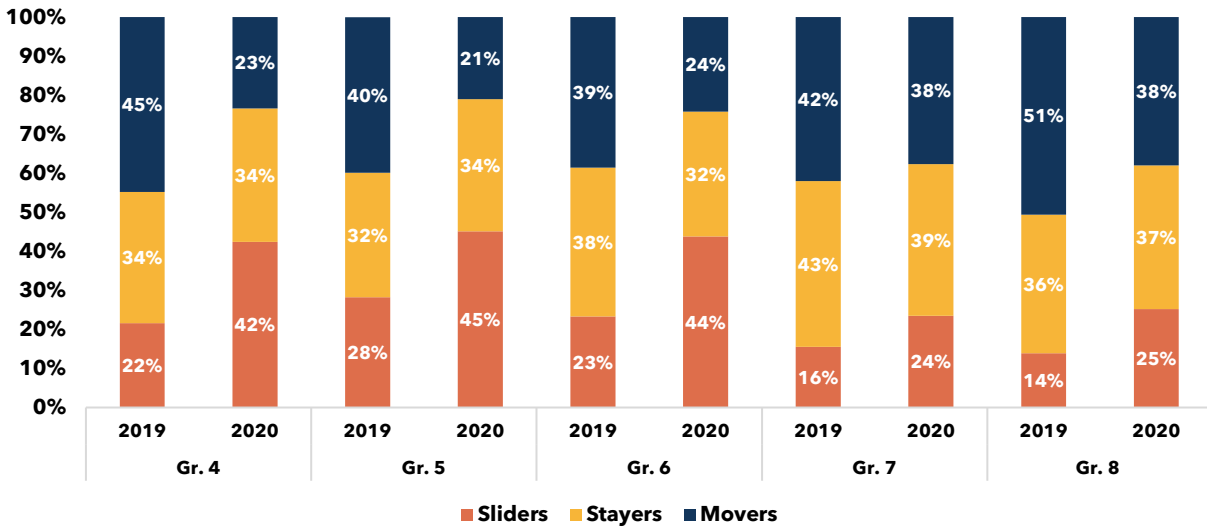
**Figure B1: NWEA MAP achievement percentiles in reading by grade-level and race/ethnicity in fall 2018, 2019, and 2020**



Source: NWEA Map Growth, fall Assessment; author's analyses.

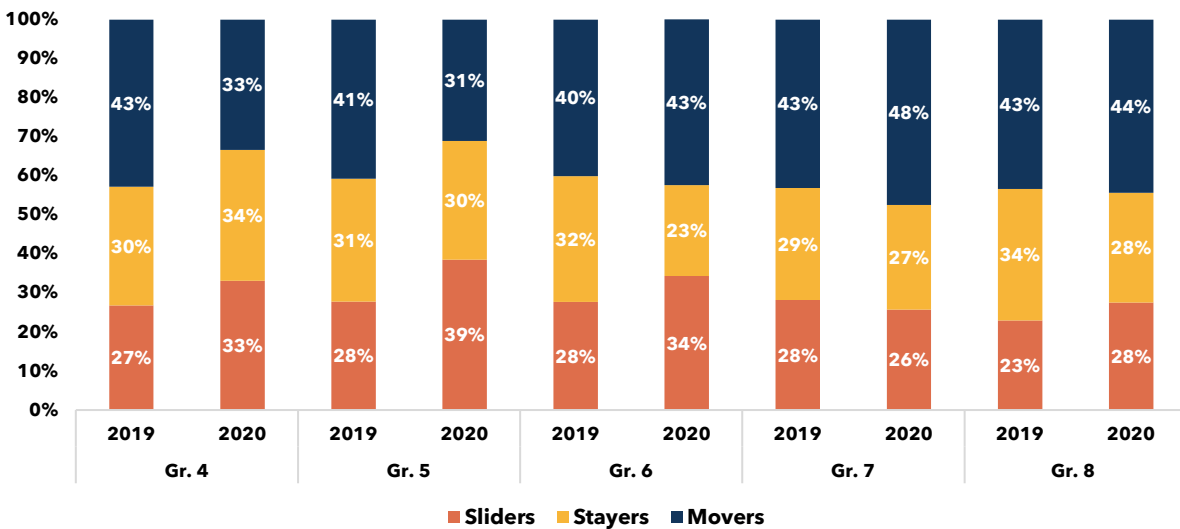
## Appendix C

**Figure C1: Percentage of Black or African American students shifting relative position in math percentile from winter 2019-fall 2019 versus winter 2020-fall 2020**



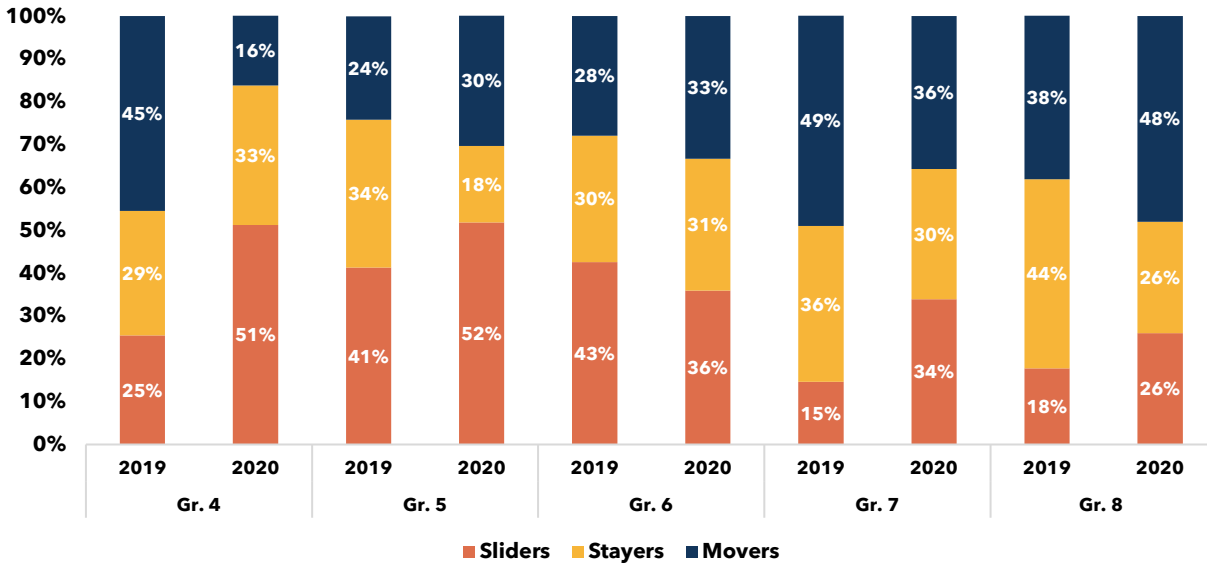
Source: NWEA Map Growth, fall assessment; author's analyses.

**Figure C2: Percentage of Black or African American students shifting relative position in reading percentile from winter 2019-fall 2019 versus winter 2020-fall 2020**



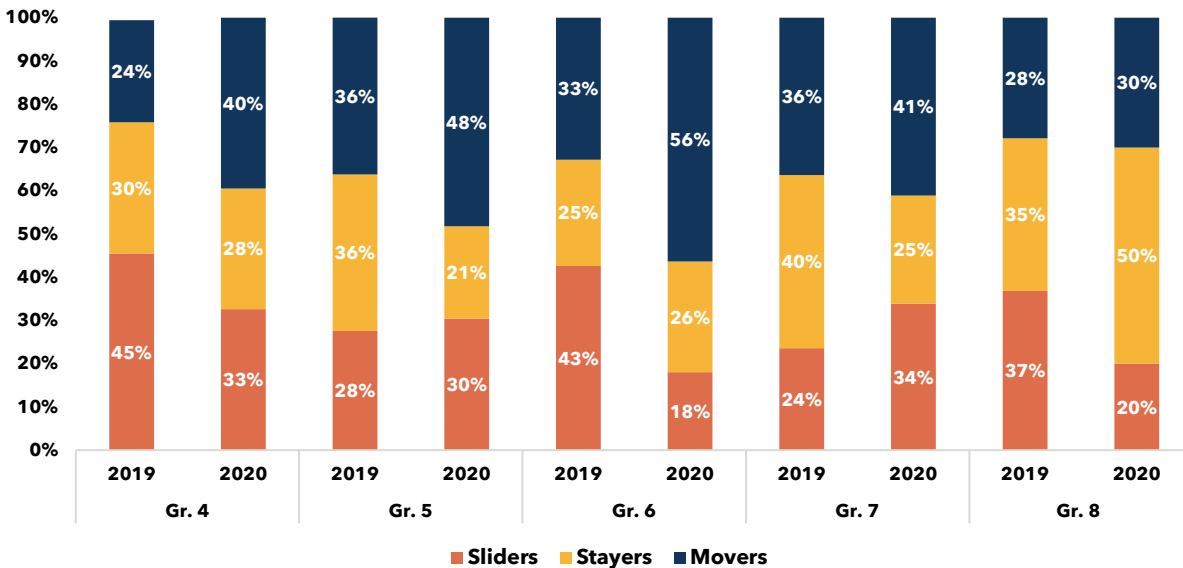
Source: NWEA Map Growth, fall assessment; author's analyses.

**Figure C3: Percentage of White or Caucasian students shifting relative position in math percentile from winter 2019-fall 2019 versus winter 2020-fall 2020**



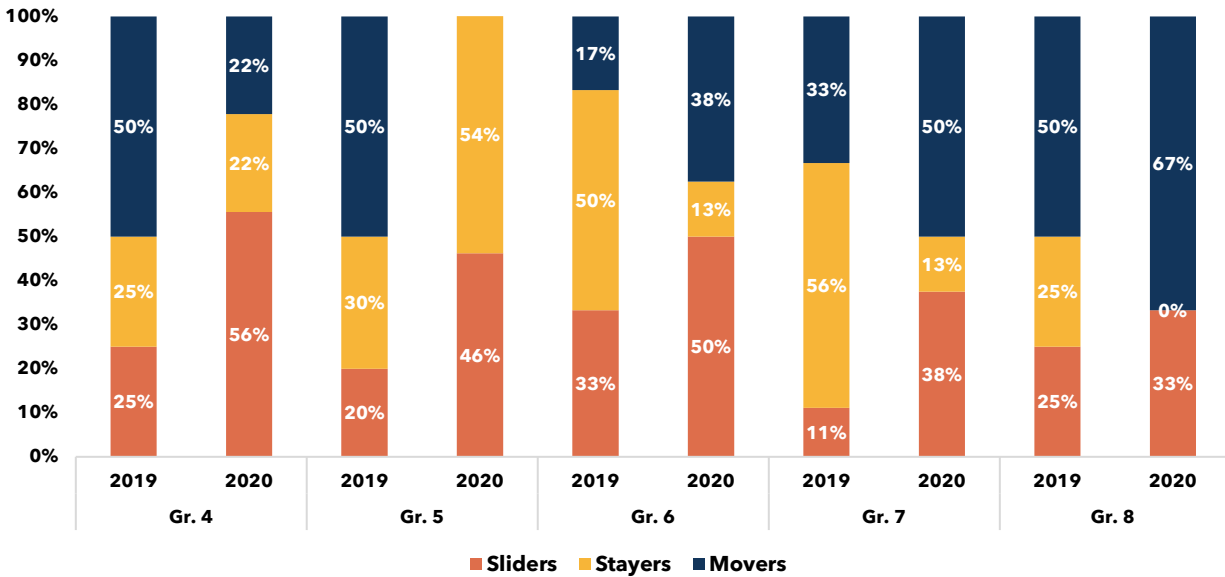
Source: NWEA Map Growth, fall assessment; author's analyses.

**Figure C4: Percentage of White or Caucasian students shifting relative position in reading percentile from winter 2019-fall 2019 versus winter 2020-fall 2020**



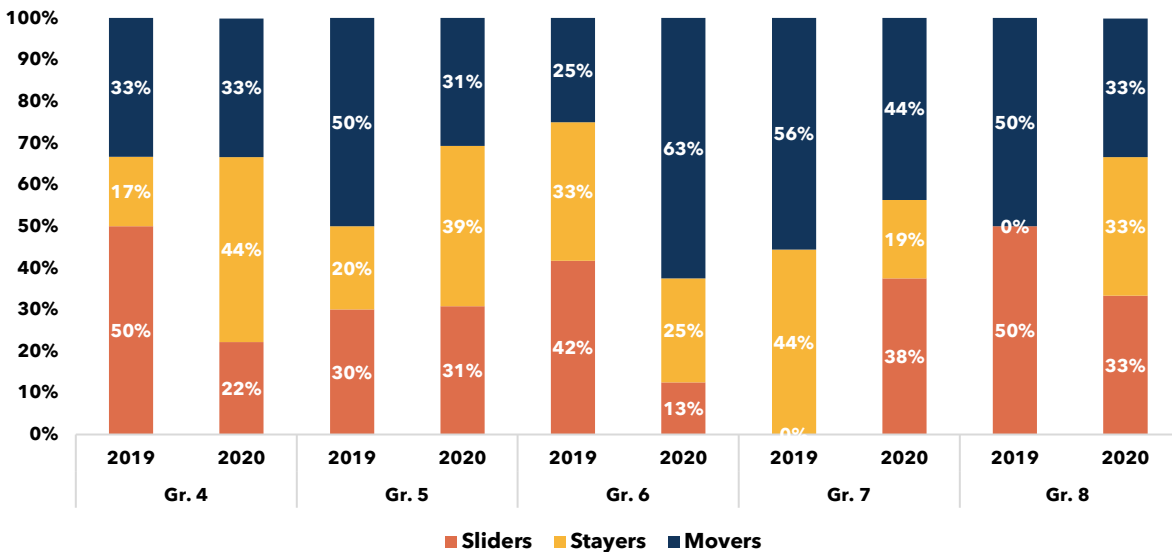
Source: NWEA Map Growth, fall assessment; author's analyses.

**Figure C5: Percentage of Hispanic or Latinx students shifting relative position in math percentile from winter 2019-fall 2019 versus winter 2020-fall 2020**



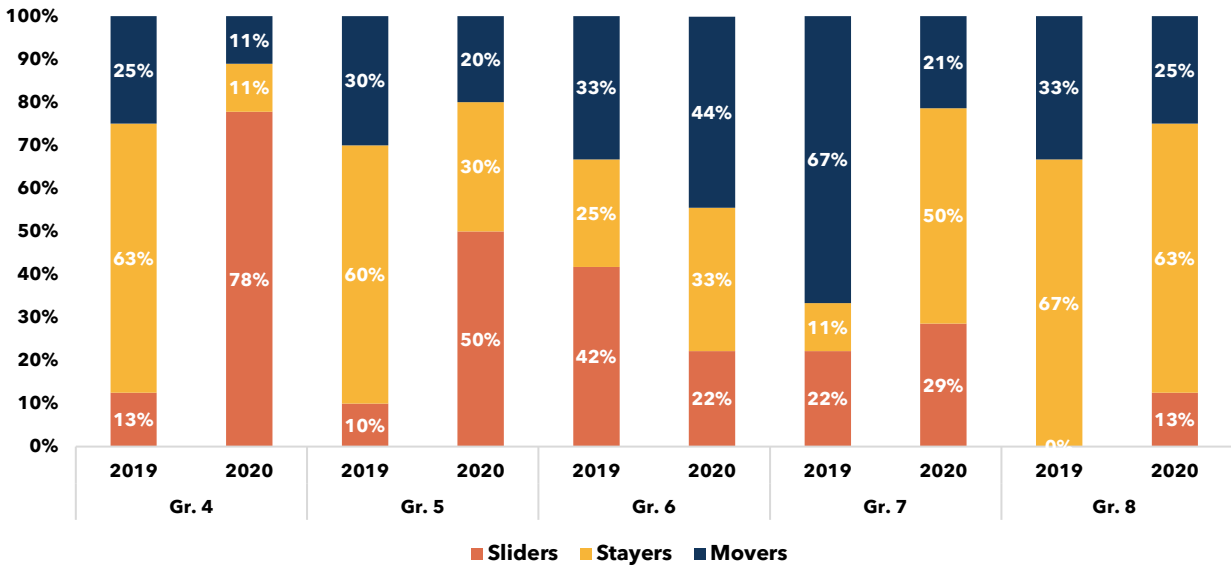
Source: NWEA Map Growth, fall assessment; author's analyses.

**Figure C6: Percentage of Hispanic or Latinx students shifting relative position in math percentile from winter 2019-fall 2019 versus winter 2020-fall 2020**



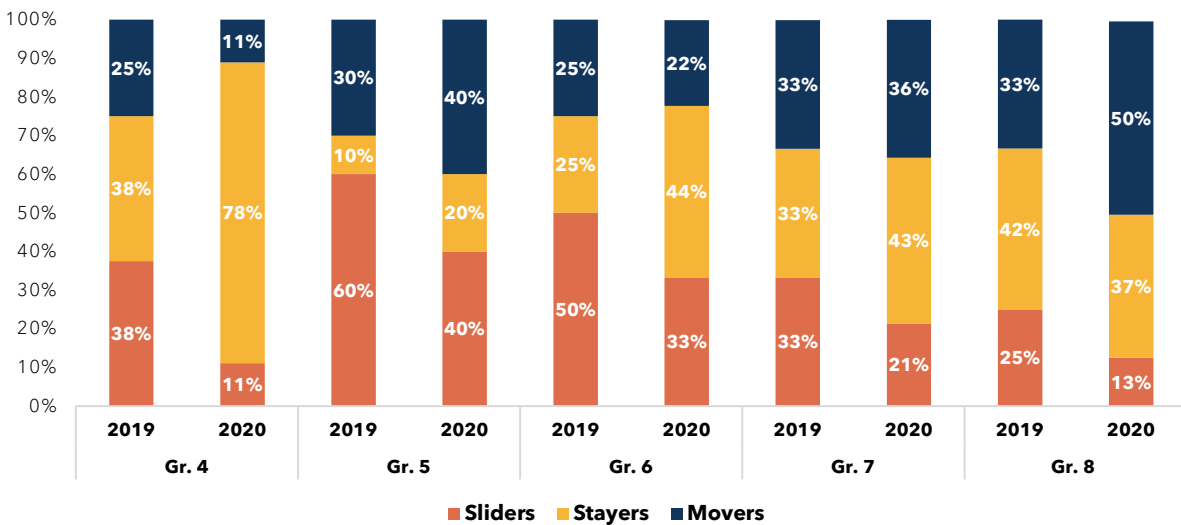
Source: NWEA Map Growth, fall assessment; author's analyses.

**Figure C7: Percentage of Other students shifting relative position in math percentile from winter 2019-fall 2019 versus winter 2020-fall 2020**



Source: NWEA Map Growth, fall assessment; author's analyses.

**Figure C7: Percentage of Other students shifting relative position in reading percentile from winter 2019-fall 2019 versus winter 2020-fall 2020**



Source: NWEA Map Growth, fall assessment; author's analyses.

## References

Kuhfeld, M., Tarasawa, B., Johnson, A., Ruzek, E., & Lewis, K. (2020). *Learning during COVID-19: Initial findings on students' reading and math achievement and growth*. NWEA.