Journal of Catholic Education

Volume 27 | Issue 2 Article 5

2024

# Student Achievement Growth Before and During COVID-19: Comparing In-Person and Remote Learning in Catholic and Public Schools

Stephen Ponisciak
*University of Notre Dame*

Julie W. Dallavis
*University of Notre Dame*



## Recommended Citation

Ponisciak, S.M., & Dallavis, J.W. (2024). Student achievement growth before and during COVID-19: Comparing in-person and remote learning in Catholic and public schools. Journal of Catholic Education, 27(2), 76–106. https://doi.org/10.15365/joce.2702052024

# Student Achievement Growth Before and During COVID-19: Comparing In-Person and Remote Learning in Catholic and Public Schools

## Cover Page Footnote

The authors thank Lindsay Haas and Eric Stickney of Renaissance Learning for providing Renaissance Star data, and for discussions and review; colleagues at NWEA for providing MAP Growth data files; and Kathy Mears, former president of the National Catholic Education Association, for facilitating this work. This research was supported in part by the Notre Dame Center for Research Computing.

*Journal of Catholic Education*
Fall 2024, Volume 27, Issue 2, 76–106

https://doi.org/10.15365/joce.2702052024

# Student Achievement Growth Before and During COVID-19: Comparing In-Person and Remote Learning in Catholic and Public Schools

*Stephen Ponisciak*[1] *and Julie W. Dallavis*[1,2]

**Abstract:** In response to COVID-19, U.S. students learned remotely from mid-March to June 2020. At the start of academic year 2020–21, many schools remained remote but others—primarily Catholic and other private schools—reopened. We consider Catholic schooling as a proxy for in-person instruction and use national data from Renaissance Star and MAP Growth assessments to compare the achievement of similar students pre-pandemic, during the height of mitigation strategies, and after most schools reopened. In a departure from pre-pandemic growth patterns, students in Catholic schools showed more growth than those in public schools during the height of mitigation strategies, suggesting the importance of in-person instruction.

**Keywords:** academic achievement, sector differences, Catholic schools, elementary schools, COVID-19, in-person instruction

In March 2020, the novel coronavirus COVID-19 led to global community lockdowns as health and public leaders attempted to provide the greatest safety for the public amid the spread of the virus. Schools across the U.S. closed their physical doors and learning shifted from in-person to virtual, with students learning from home, many over a computer, from mid-March to June 2020. During the following academic year 2020–21, many schools remained virtual (Henderson et al., 2021; Malkus & Christensen, 2022; Oster et al., 2021). Others—primarily Catholic and other private schools with local governance—reopened to students at the start of the school year

1 University of Notre Dame
2 Author order was determined randomly. Both authors contributed equally to this paper.

and remained open, returning to in-person instruction (Kowalski & Ponisciak, 2021; National Catholic Educational Association [NCEA], 2020; Reyes, 2020).

During that year, student achievement growth on interim assessments in public schools decreased on average compared to previous years in all grades and subjects (Dawson, 2021; Kuhfeld et al., 2022; Renaissance Learning, 2021). This decrease may be attributed to a number of pandemic-related issues, in particular students' socio-emotional, mental, and physical health (George et al., 2021; Hertz et al., 2022; Mayra et al., 2022), absenteeism (Santibañez & Guarino, 2021), and the mode of student instruction (Darling-Aduana et al., 2022; Fisher et al., 2022; Tomasik et al., 2021). Common wisdom would point to virtual or remote schooling—the closest of these issues to curriculum and instruction—as an important mechanism related to this decrease. Recent analyses have attempted to investigate differences between the academic performance of students who experienced in-person instruction versus remote online instruction during academic year 2020–21 (Darling-Aduana et al., 2022; Kogan & Lavertu, 2021; Sass & Goldring, 2022).

We contribute to this literature using national data to compare Catholic and public-school student achievement to examine whether the mode of instruction was related to student achievement in math and reading in the elementary and middle grades during the COVID-19 pandemic. We use data from two national formative assessments—NWEA MAP Growth and Renaissance Star—to estimate differences in performance between Catholic schools, which were more likely to be in-person during 2020–21, and public schools that remained largely virtual (Henderson et al., 2021; Malkus & Christensen, 2022; National Assessment of Educational Progress [NAEP], 2021; NCEA, 2020; Oster et al., 2021). Both before and during the pandemic, we examine similar students in similar schools and/or local contexts, which allows us to attempt to control for selection and to provide comparisons that account for previous student achievement and school context. Due to data limitations, we cannot directly match Catholic and public schools on the mode of instruction, but our analyses of two national tests suggest that on average, students in schools that were more likely to be in-person experienced more academic growth during the pandemic.

Our examination of mode of instruction for student academic success is relevant for several reasons. Although the COVID-19 virus is now endemic and no longer poses the same threat to public health, it exposed the population's relative vulnerability to novel contagions and the weaknesses that exist in global healthcare. Should another pandemic arise, understanding the effects of virtual and in-person schooling on academics, socio-emotional learning, and disease transmission may help policymakers and school and government leaders to make informed decisions related to the careful balance between education and health. Further, additional understanding of the mechanisms related to decreased learning during the pandemic can assist in making the case for the improvement of virtual instruction as well as a deeper consideration for the

value of the social and relational aspects of schooling. Continued attention to these issues in the field may better equip teachers for the possibility of a future shift to virtual learning.

## Background Literature

### Impact of COVID on Student Achievement

The pandemic left an indelible mark on education. Estimates of the effect on K-12 learning in public schools suggest declines in academic growth across subjects, levels, and region as well as at different time points of the pandemic period (Kogan & Lavertu, 2021; Sass & Goldring, 2022; West et al., 2021). Metro (Sass & Goldring, 2022), state (Kogan & Lavertu, 2021), and national analyses (Dawson, 2021; Kuhfeld et al., 2022; Renaissance Learning, 2021) all report an initial decline during the period of March-May 2020. These declines are a reduction in achievement growth, rather than a loss of knowledge, with some researchers estimating losses in terms of months of schooling (Kogan & Lavertu, 2021; West et al., 2021). Researchers have also found that younger students (König & Frey, 2022) and students from minority and marginalized populations experienced greater declines (Sass & Goldring, 2022; West et al., 2021). These declines have surfaced in summative assessments (Kogan & Lavertu, 2021), interim, formative assessments (Dawson, 2021; Kuhfeld et al., 2022; Renaissance Learning, 2021), and student grades (Fisher et al., 2022). On average, achievement growth remained lower than pre-pandemic levels during academic year 2020–21, with some evidence of greater variation among students (Kuhfeld et al., 2022).

Researchers have explored several contributing factors. Some have focused on health and well-being, exploring the effect of community lockdowns and remote learning on students' socio-emotional, mental, and physical health (George et al., 2021; Hertz et al., 2022; Mayra et al., 2022). Others examined student engagement with remote learning, including absenteeism (Chiu, 2021; Darling-Aduana et al., 2022; Domina et al., 2021; Santibañez & Guarino, 2021), as well as technological difficulties that hampered student progress (Domina et al., 2021). These factors all relate in some manner to the mode of schooling, specifically whether schools opened for in-person learning or relied on remote instruction during academic year 2020–21.

### Prevalence of In-Person and Remote Instruction during COVID

The nearly uniform move to emergency remote teaching and learning in March 2020 forced students and teachers to adapt quickly to considerable changes (Hodges et al., 2020). During the "emergency" period of March-May, teachers, students, and families did their best to respond to the COVID-19 crisis but faced many issues related to technological readiness, accessibility, resources, and competencies. How to facilitate communication between home and school, manage learning materials, support learning, and engage students in remote instruction had to be developed by teachers in real-time (Al Mazrooei et al., 2022). Without previous experience engaging students

in the behavioral, cognitive, and emotional aspects of online learning, teachers faced significant challenges in daily instruction (Chiu, 2021). Additionally, student engagement during this time varied by technological resources, social connections among families, and diverse learning opportunities (Domina et al., 2021). Research has found that on average, students scored lower during this period compared to non-pandemic cohorts, suggesting less than normal growth during the remote learning period (West et al., 2021).

Although schools closed fairly uniformly in March 2020, reopening for in-person instruction in academic year 2020–21 varied considerably (Malkus, 2020; NCEA, 2020; Oster et al., 2021; Porter-Magee et al., 2022). Several surveys found that only about 40% of U.S. public schools opened for in-person instruction in fall 2020 (Henderson et al., 2021; Oster et al., 2021; Malkus, 2020) and only 60% of public schools were open in-person by the end of the school year (NAEP, 2021; Oster et al., 2021). School opening data collected throughout this period suggests several trends by region, student age, and school type. Schools in the South were more likely to open in person (Oster et al., 2021), elementary schools were more likely to open than middle and high schools (NAEP, 2021; Oster et al., 2021), and private schools with local governance were more likely to be open than their public school neighbors (Henderson et al., 2021; Malkus & Christensen, 2022; NAEP, 2021).

In contrast, a survey of Catholic school leaders by the National Catholic Educational Association reported that 92% of U.S. K-12 Catholic schools opened for some form of in-person instruction in 2020–21 (NCEA, 2020; Porter-Magee et al., 2022; Reyes, 2020). The Institute for Education Sciences cited similar proportions of in-person Catholic schools in the NAEP 2021 School Survey, a nationally representative sample of public and private schools. They reported that 90% of Catholic schools serving fourth graders and 86% serving eighth graders were open in February 2021 compared to 51% and 46% of public schools respectively. These numbers climbed to 93% and 91% for Catholic schools and 62% and 64% for public schools in May 2021 (NAEP, 2021).

### Mode of Instruction Comparisons

Several studies have attempted to examine how these differences in the mode of instruction may have affected student achievement. Surveys of teachers during this time suggest that remote and in-person instruction placed students on different learning paths. Those teaching remotely reported less instructional time and less curricular content coverage compared to previous years (Kaufman & Diliberti, 2021; West et al., 2021). Roughly 90% of remote teachers reported teaching at least one synchronous, or live, class per day. Although there was considerable variation, on average, remote teachers reported less rigorous and less comprehensive instruction during the 2020–21 school year. Remote teachers also reported higher proportions of missing assignments and failing students compared to in-person teachers (Kaufman & Diliberti, 2021).

Online charter school achievement research offers insights from a similar form of instructional and material delivery. One study found that online charter schools provided less synchronous contact between teacher and student and that the primary mode of learning was independent study, with close to a third of online charter schools providing only self-paced learning (Gill et al., 2015). Student engagement in online charters was reported as one of the biggest challenges along with the high level of parent expectations for managing student learning (Gill et al., 2015), similar to findings from the pandemic (Chiu, 2021; Domina et al., 2021). Online charter students have experienced less academic growth compared to their traditional public-school peers (Ahn & McEachin, 2017; Fitzpatrick et al., 2020; Woodworth et al., 2015), suggesting that the mode of instruction—in-person versus remote—is important for how much students learn.

To examine differences in learning by mode of instruction during the pandemic, one study used a natural experiment to examine the impact of emergency distance learning (Tomasik et al., 2021). They compared 8 weeks of learning data pre-pandemic with data from the 8 weeks of closure in spring 2020 in Switzerland. They found that secondary students were largely unaffected but that learning in the primary grades slowed and the variance between students increased (Tomasik et al., 2021). Other studies have used matched analyses of student test scores, comparing students experiencing in-person instruction with those experiencing remote learning. Among these, analyses concluded that remote students demonstrated negative achievement growth compared to in-person students. In one state, a study of third grade students who were fully remote had summative test score declines that were 3 times greater than those who attended in person (Kogan & Lavertu, 2021). Remote students also demonstrated less growth compared to in-person students on interim, formative assessments (Darling-Aduana et al., 2022; Sass & Goldring, 2022).

### School Sector as a Proxy for Instruction

In this study, we use assessment data from two national formative assessments to further consider differences in performance between students who experienced in-person and remote schooling, using school sector as a proxy for mode of instruction. Although research from the 1990s suggests there may be a Catholic school effect on achievement at the high school level (Bryk et al., 1993; Coleman & Hoffer, 1987), research has not established this effect in elementary or middle school. Analyses of pre-pandemic achievement outcomes have found that, when researchers attempt to account for selection into schools, students in Catholic and public schools score similarly in elementary (Carbonaro, 2006) and middle school (Hallinan & Kubitschek, 2012). Further, matched analyses of formative assessment data just prior to the pandemic also demonstrate that similar students, in similar Catholic and public schools, on average score similarly (Ponisciak & Dallavis, 2022). As there were no differences between Catholic and public school scores pre-pandemic and because of the high proportion of Catholic schools that were open in-person compared to public schools, we use school sector as a proxy for in-person instruction to better

understand its association with student achievement outcomes. If Catholic school achievement growth outpaces public school growth during the year that nearly all Catholic schools were open and the majority of public schools were remote, these data can lend complementary and suggestive evidence that in-person learning is more conducive to student achievement in comparison to current methods of remote learning.

Although the current study cannot clarify what is effective about in-person learning or ineffective about remote learning, it can contribute to the growing evidence of differences in achievement associated with these modes of instruction. Because of research on online charter schools, the extensive challenges reported by remote teachers and students, and the existing comparisons between in-person and remote instruction, we expect that students in Catholic schools, who were more likely to attend school in-person during academic year 2020–21, experienced more academic growth compared to their public-school counterparts who were more likely to attend school remotely. We present descriptive data from NWEA MAP Growth and follow with more detailed analyses of Renaissance Star data.

## Data and Methods

We use national data from two popular formative assessments administered in K-8 schools in the US: NWEA MAP Growth and Renaissance Star. Unlike the commonly used, cross-sectional National Assessment of Educational Progress (NAEP), the MAP and Star tests are taken multiple times each year and allow us to follow individual students over time to estimate growth. These tests are also used by educators in the schools to track student progress over time. Both tests are adaptive, adjusting to each student's responses to match content to their estimated achievement level. Therefore, growth can be estimated on a comparable scale for all time periods and grades (Soland, 2019; Thum & Hauser, 2015). Scores for both tests are reported on the RIT (Rasch unIT) scale, a linear transformation of the logit scale units from the Rasch model (Rasch, 1960). Both tests provide teachers with real-time information on student progress related to targeted skill development. MAP Growth is administered to over 12 million students nationwide in primary and secondary grade levels, usually three times per school year (fall, winter, spring). The Star assessments are also administered throughout the school year. During the 2020–21 school year, about 31,000 schools in all 50 states and the District of Columbia administered Star, resulting in a total of about 50,000,000 test events. We examined data from 2018–19 to 2021–22; there was little data in spring 2020 due to the pandemic.

Because of the adaptive design, the reliability of scores for both tests is high. MAP Growth assessments are untimed, but generally require 40–60 minutes per subject, and students typically answer 40–53 items per session. Coupled with adaptivity, the test is long enough that student-specific standard errors of measurement are typically very small (Thum & Hauser, 2015), and

estimates of test-level reliabilities (Cronbach's alpha) for MAP Growth generally exceed 0.95 (Northwest Evaluation Association [NWEA], 2011). Star has a reliability of at least 0.90 in math in each grade (Renaissance Learning, 2019a) and at least 0.94 in reading in each grade (Renaissance Learning, 2019b). Star Reading and Star Math have received strong reviews as progress monitoring measures (National Center on Intensive Intervention [NCII], 2021), and have been independently reviewed and found to have fully convincing evidence of reliability, validity, and classification accuracy (NCII, 2021b), while MAP Growth is also acknowledged for its strong reliability, validity, and classification accuracy (NCII, 2021b).

Although these tests are similar in format, nature, reliability, and popularity, the datasets shared by the testing companies differ in important ways that dictate the types of analyses we were able to conduct. Using the MAP Growth data, we examined average growth for groups of similar students because individual student data were not available to us. With Star, we matched similar students in similar schools but had access to less student demographic information. In the following sections, we provide additional details on each dataset as well as the analyses conducted.

## Data Summary

### *MAP Growth*

MAP Growth data was provided by NWEA's research department as a data file containing the average gain, standard deviation, and number of students, for both public and Catholic schools (see Appendix for descriptive summary of data). Data were included for each group of students defined by year (Fall 2018–Spring 2019; Fall 2020–Spring 2021; Fall 2021–Spring 2022), grade (K-12), NCES urban location code (Large/mid-size/small city; large/mid-size/small suburb; distant/fringe/remote town; distant/fringe/remote rural), race/ethnicity (American Indian or Alaskan Native; Asian; Black or African American; Hispanic or Latino; Multi-ethnic; Not specified or other; White), subject, and 5-point range of pre-test (fall) scores. Groups with fewer than 10 students were not reported. This allowed us to examine differences in average growth between Catholic and public schools before and during the pandemic for students from different types of metropolitan areas, prior test scores, and demographics, but we could not follow individual students or schools over time.

The number of students taking MAP Growth in public schools decreased from 2019 to 2021, and rebounded in 2022, with many more students tested in public than in Catholic schools (see Table A1). Catholic schools saw slight declines in some grades, and slight increases in others, from 2019 to 2021, and further increases in 2022. Students in large suburban and large city settings comprised more of the sample than those in other locations, in both the Catholic and public sectors (see Table A2). Student demographics differed in Catholic and public schools; most students in Catholic schools were White, while White students comprised a smaller majority in public schools (see Table A3).

### *Renaissance Star*

Before providing the data, researchers from Renaissance matched Catholic schools to public schools exactly by metropolitan area (urban, suburban, town, or rural, determined by NCES locale code and ZIP code) and the minimum grade level offered in 2018–19. Potential school matches were not required to be physically near each other. Within the exact-matched schools, Renaissance researchers used nearest-neighbor propensity score matching, based on the average score (measured in NCE units) in 2018–19 and number of students per grade, to find the best match for each Catholic school. Schools were matched separately by grade range, with two groups—K-5 and 6-8—so a school could have multiple matches if they served more than one grade range. Schools were matched separately in reading and math. In reading, matches were found for 27% of Catholic schools serving grades 1-5, and 26% of Catholic schools serving grades 6-8. In math, matches were found for 52% of Catholic schools serving grades 1-5, and 51% of Catholic schools serving grades 6-8. We then used the matched schools in our student matching procedures.

Within the matched sample of schools, there were 893 Catholic schools with math scores and 847 with reading scores. Due to small samples in kindergarten, in all subsequent analyses, we examined results in grades 1-8. The number of students tested decreased from 2019 to 2022, with more students typically tested in math than in reading, and more students tested in public than in Catholic schools (see Appendix for a descriptive summary of data). Schools in suburban settings comprised more of the sample than those in urban, town, or rural/non-metro areas (see Table A4), and the percentages of students in these schools followed similar patterns. Student demographics differed in Catholic and public schools (see Table A5). Among students with available information, most students in Catholic schools were White, while most students in public schools were non-White. Information about student race/ethnicity and gender was more often missing in the Catholic school data.

## Data Analysis

### *MAP Growth*

The MAP Growth data allowed us to compare groups of students in Catholic schools to similar groups of students in public schools in similar contexts. If similar students with similar initial scores in similar contexts demonstrated different levels of average growth in Catholic and public schools, some of that difference may be due to school sector (during years not affected by a pandemic) or to the increased likelihood of schools in a sector offering in-person schooling.

We examined growth by comparing the average gain in each student group in Catholic schools in each year (defined by the fall test score in groups of 5 score points; student race/ethnicity; school year; and metro area type) to the average gain in the same student group in public schools in the same year. We made the same comparison for Catholic schools to public schools in 2018–19

and to Catholic schools in 2018–19 to provide baseline comparisons prior to COVID. For example, we compared the average math gain of Asian students in Catholic schools in 2020–21 in large urban metro areas with fall scores from 150-154 in grade 3 to the same group in public schools in 2020–21; in public schools in 2018–19; and in Catholic schools in 2018–19. We aggregated these by grade level, race/ethnicity, and metro area type, yielding results in the form of the percentage of the comparison group's gain made by the group of interest. Next, we made the same comparisons using a different reference group: we compared to the aggregate for each pretest score group (over all metro area types and race/ethnicity groups). Thus we compared the average math gain of Asian students in Catholic schools in 2020–21 in large urban metro areas with fall scores from 150-154 in grade 3 to the average gain of all students in public schools with fall scores from 150-154 in grade 3 in 2020–21; all students in public schools in 2018–19; and all students in Catholic schools in 2018–19. For reporting purposes, we combined the metro area types into four groups: city, suburban, town, and rural.

### *Renaissance Star*

Although we have student-level data in the Renaissance Star data, we lack a full picture of student demographics in Catholic schools due to the optional nature of the self-reported school data, which complicates efforts to address these issues. One way to partially mitigate the effects of these factors is by examining student growth percentiles (SGPs; Betebenner, 2009). Using this method, we compared students' scores to those of students with similar prior scores, with a similar amount of time between tests (Renaissance Learning, 2022). In Table 1, we show the median SGP from fall to spring in Catholic and matched public schools in both math and reading. We show results separately for grades 1-5 and 6-8, because the patterns are somewhat different, as well as by the type of metro area, since the reopening gap was larger in urban and suburban areas (NAEP, 2021). For example, in grades 1-5 math in suburban schools, the median SGP in Catholic schools remained at 46 in 2019 and 2021, and increased somewhat to 48 in 2022, while in public schools, it fell from 55 to 52, and then rebounded to 58 in 2022. Meanwhile, in schools that were in town settings, the median SGP in grades 1-5 math increased in both Catholic and public schools in 2021. In reading, we found similar outcomes: results in Catholic and public schools followed similar patterns in town and rural/non-metro settings, while in urban and suburban settings, public schools saw a decrease in SGP in 2021 when Catholic schools' SGPs remained steady.

However, these SGPs only account for prior test scores and time between tests. In addition, the population of tested students in both sectors declined over time. In order to provide a clearer picture of achievement and growth in Catholic and public schools, and to compare more directly to similar students in similar schools, we use student-level matching. As noted earlier, if students with similar initial scores (in similar schools) demonstrate different levels of growth in Catholic and public schools, some of that difference may be due to school sector differences.

**Table 1**

*Median Fall to Spring SGP in Catholic and Matched Public Schools by Subject, Metro Type, Grade Levels, and Year in Renaissance Star Data*

| | Metro Type | Year | Grades 1-5 | | | | Grades 6-8 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Catholic | | Public | | Catholic | | Public | |
| | | | N | SGP | N | SGP | N | SGP | N | SGP |
| Math | Rural/Non-Metro | 2019 | 3373 | 48 | 5653 | 55 | 1071 | 54 | 2064 | 52 |
| | | 2021 | 3361 | 53 | 4717 | 60 | 1050 | 56 | 1952 | 57.5 |
| | | 2022 | 2737 | 50 | 2373 | 60 | 839 | 51 | 490 | 54 |
| | Sub-urban | 2019 | 51983 | 46 | 113769 | 55 | 27909 | 51 | 132804 | 50 |
| | | 2021 | 48320 | 46 | 89103 | 52 | 26608 | 52 | 118408 | 47 |
| | | 2022 | 40536 | 48 | 80487 | 58 | 21562 | 53 | 114687 | 51 |
| | Town | 2019 | 6286 | 49 | 24793 | 53 | 3459 | 50 | 11031 | 51 |
| | | 2021 | 5849 | 55 | 18561 | 57 | 3521 | 54 | 10968 | 51 |
| | | 2022 | 5008 | 49 | 17544 | 56 | 3079 | 53 | 8197 | 52 |
| | Urban | 2019 | 9519 | 49 | 30483 | 55 | 5382 | 57 | 17731 | 48 |
| | | 2021 | 7694 | 49 | 28160 | 48 | 4826 | 56 | 19898 | 46 |
| | | 2022 | 6360 | 52 | 26575 | 55 | 3217 | 56 | 16125 | 50 |
| Reading | Rural/Non-Metro | 2019 | 2361 | 54 | 2444 | 57 | 605 | 54 | 628 | 49 |
| | | 2021 | 1815 | 52 | 2339 | 58 | 577 | 52 | 608 | 47 |
| | | 2022 | 1675 | 52 | 1948 | 57 | 421 | 52 | 480 | 48 |
| | Sub-urban | 2019 | 38224 | 54 | 88594 | 56 | 16241 | 53 | 74895 | 50 |
| | | 2021 | 35164 | 55 | 66831 | 52 | 15713 | 53 | 68243 | 45 |
| | | 2022 | 29676 | 52 | 63272 | 54 | 13196 | 48 | 62188 | 47 |
| | Town | 2019 | 4423 | 54 | 13923 | 56 | 2316 | 51.5 | 10920 | 49 |
| | | 2021 | 3579 | 56 | 9989 | 56 | 2480 | 48 | 9188 | 46 |
| | | 2022 | 3013 | 55 | 8854 | 56 | 1880 | 46 | 7155 | 46 |
| | Urban | 2019 | 10250 | 57 | 32625 | 55 | 5468 | 56 | 11975 | 48 |
| | | 2021 | 8657 | 57 | 27795 | 48 | 4917 | 55 | 12271 | 48 |
| | | 2022 | 6916 | 54 | 24193 | 52 | 3659 | 51 | 12305 | 47 |

Schools might use Renaissance Star in one subject but not both, or might use the reading and math tests differently (e.g., in different grades, or only for intervention; E. Stickney, 1/17/2023, personal communication). Therefore, a substantial proportion of students have data only in math or only in reading. Because many students in Catholic schools lacked demographic data, we used multiple pre-tests, which other authors consider a partial solution to missing demographics (Ballou et al., 2004; Ehlert et al., 2014; Johnson et al., 2015). We estimated models using several matching methods, using multiple pretests in the same subject from adjacent time periods, and using multiple pretests in different subjects from the same time period when available. We relied on two versions of Mahalanobis matching: kernel matching and nearest-neighbor matching. We only display results

from kernel pairwise matching for brevity. We used these methods because they are appropriate for normally distributed continuous variables and for datasets with relatively few matching variables (Stuart, 2010). We used the *kmatch* procedure in Stata (Jann, 2017) to implement these matches and to employ entropy balancing (Hainmueller, 2012; Hainmueller & Xu, 2013) for the mean and variance of the continuous matching variables to generate more comparable samples.

When measuring growth starting in the fall semester, we matched on the fall test score in the same subject and the other subject, and the time between the fall and spring tests, for students in the same grade and year, in the matched school previously determined by Renaissance. Thus, a student in grade 2 in the Catholic school in school pair A in 2019 is matched to students in grade 2 in the public school in 2019 in that school pair. We standardized all test scores by subject, grade, and year. When measuring growth starting in the winter, we matched on the prior winter and fall scores in the same subject.

We incorporated entropy balancing following the matching step, in order to remove any remaining imbalance in matching variables via weighting. We estimated hierarchical models (Raudenbush & Bryk, 2002) with a random effect for each school (separately for each year), regressing the current score on the student-level matching variables and the interaction of grade and prior test scores, including an indicator for whether the school was Catholic, and including weights determined in the entropy balancing step. As an equation,

$$Y_{ij} = \gamma_{00} + \gamma_{01} Catholic_j + \gamma_{10g} + \gamma_{11g} Y_{ij}^1 + \gamma_{12g} Y_{ij}^2 + \gamma_{13g} T_{ij} + u_{0j} + r_{ij}$$

where $Y_{ij}$ is the test score of interest in the current year for student $i$ in school $j$; $Catholic_j$ indicates whether the school was Catholic; $\gamma_{10g}$ is a grade-specific intercept; $Y_{ij}^1$ is the student's prior score in the same subject (with grade-specific slope $\gamma_{11g}$); $Y_{ij}^2$ is the prior score in the other subject, or the second previous score in the same subject, with grade-specific slope $\gamma_{12g}$; $T_{ij}$ is the number of days between the current and prior tests, with grade-specific slope $\gamma_{13g}$; $u_{0j}$ is a random effect for school j, and $r_{ij}$ is an error term. The coefficient of the Catholic indicator in this model is our estimate of the Catholic effect, adjusting for the potentially different slopes of pre-tests and time between tests in different grades.

## Results

### MAP Growth

Before the pandemic, Catholic schools' students' gains in 2018–19 were on average smaller than those of similar students in public schools: compared to public school students who had similar fall scores, the same race/ethnicity, and the same type of metro area, students in Catholic schools made gains that were 86.5% as large in math, and 89.3% as large in reading (see Table 2). In both subjects, gains in Catholic schools were larger relative to those in public schools for students

**Table 2**

*Sector Gains During COVID Years as Percentage of 2018–19 Gains*

| Subject | Grade | Sector Gain as Percentage of 2018–19 Public Gain | | | | |
|---|---|---|---|---|---|---|
| | | 2018–19 | 2020–21 | | 2021–22 | |
| | | Catholic* | Catholic | Public | Catholic | Public |
| Math | All | 86.5 | 86.8 | 81.4 | 83.2 | 99.0 |
| | K-5 | 86.5 | 84.5 | 80.7 | 82.4 | 99.3 |
| | 6-8 | 92.2 | 100.2 | 85.2 | 90.0 | 96.9 |
| Reading | All | 89.3 | 76.8 | 67.1 | 84.3 | 94.4 |
| | K-5 | 89.6 | 79.8 | 71.9 | 85.4 | 97.5 |
| | 6-8 | 99.3 | 70.2 | 40.3 | 90.1 | 85.1 |

* By definition, the values for 2018-19 Public schools are 100.0.

with lower fall scores. Math and reading gains in Catholic schools were lower on average than in public schools in all grade ranges but were more similar in the middle grades for math. Gains for all race/ethnicity groups were lower in Catholic schools in 2018–19 than in public schools. Gains in all types of metro areas were lower in Catholic schools in 2018–19 (see Table 3).

In 2020–21, when public schools were more likely to institute remote instruction, these results largely reversed. In both subjects, gains in Catholic schools were larger than in public schools in 2020–21 (see Table 2). However, growth in Catholic schools in 2020–21 did not reach the level of public-school growth in 2018–19: Catholic school gains in 2020–21 were 86.8% of 2018–19 public school gains in math and 76.8% in reading, and were similar to growth in Catholic schools in 2018–19 in math, and worse in reading. The largest differences in growth in 2020–21 between Catholic and public schools occurred in reading in grades 6-8. Compared to public school growth in 2020–21, Catholic school growth in 2020–21 was better in all grade ranges, for all racial/ethnic groups (see Table 3; although differences in math for white, Asian, and multi-racial students were small), and in all metro area types (except math in rural areas).

In 2021–22, when public schools had largely reopened for in-person instruction, growth differences mostly reverted to the pre-pandemic pattern (see Table 2). Growth in Catholic schools was lower than growth in public schools in 2021–22 (84% in math, 89% in reading), lower than growth in public schools in 2018–19 (83%, 84%), and slightly lower than growth in Catholic schools in 2018–19 (96% in math, 94% in reading). In one slight departure from the previous pattern, Catholic school growth in 2021–22 was better than 2021–22 public school growth in reading in grades 6-8, but not in math.

Catholic school growth in reading in 2021–22 was similar to public school growth in town areas (see Table 3); Catholic school growth in 2021–22 in town and rural settings outpaced

**Table 3**

*Sector Gains as Percentage of Same-Group and Total Public Gains in 2018–19*

| Subject | Subgroup | Sector Gain as Percentage of Same-Group 2018–19 Public Gain | | | | | Sector Gain as Percentage of 2018–19 Total Public Gain | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2018–19 | 2020–21 | | 2021–22 | | 2018–19 | 2020–21 | | 2021–22 | |
| | | Catholic | Catholic | Public | Catholic | Public | Catholic | Catholic | Public | Catholic | Public |
| Math | Asian/Pacific | 82.2 | 77.0 | 76.1 | 80.6 | 97.8 | 91.0 | 85.3 | 89.3 | 89.3 | 108.3 |
| | Black | 85.4 | 65.3 | 58.8 | 81.7 | 98.0 | 76.5 | 58.5 | 73.2 | 73.2 | 87.8 |
| | Hispanic/Latino | 89.2 | 74.7 | 67.9 | 84.3 | 99.9 | 86.5 | 72.4 | 81.7 | 81.7 | 96.8 |
| | Multiple | 86.3 | 77.4 | 75.2 | 81.4 | 98.9 | 84.6 | 75.9 | 79.8 | 79.8 | 96.9 |
| | Other/NA* | 83.8 | 86.7 | 79.5 | 80.4 | 96.5 | 85.2 | 88.2 | 81.8 | 81.8 | 98.1 |
| | White | 86.0 | 90.6 | 90.4 | 83.0 | 99.1 | 88.8 | 93.6 | 85.7 | 85.7 | 102.4 |
| | Urban | 86.7 | 83.4 | 72.7 | 83.9 | 99.3 | 84.1 | 80.9 | 70.5 | 81.3 | 96.3 |
| | Suburban | 85.8 | 86.5 | 77.1 | 81.4 | 98.6 | 86.9 | 87.6 | 78.2 | 82.5 | 99.9 |
| | Town | 91.9 | 99.8 | 96.6 | 90.2 | 100.5 | 93.0 | 101.1 | 97.8 | 91.4 | 101.7 |
| | Rural | 88.2 | 94.8 | 96.7 | 84.3 | 98.6 | 90.2 | 96.9 | 98.9 | 86.2 | 100.8 |
| Reading | Asian/Pacific | 85.4 | 68.7 | 60.9 | 82.0 | 91.7 | 96.9 | 77.9 | 69.1 | 93.0 | 104.1 |
| | Black | 86.4 | 56.5 | 43.4 | 80.8 | 93.1 | 73.7 | 48.1 | 37.0 | 68.9 | 79.4 |
| | Hispanic/Latino | 90.9 | 69.2 | 53.4 | 80.9 | 92.8 | 83.1 | 63.3 | 48.8 | 74.0 | 84.8 |
| | Multiple | 89.4 | 66.0 | 58.5 | 82.1 | 92.8 | 87.8 | 64.8 | 57.4 | 80.6 | 91.1 |
| | Other/NA* | 87.3 | 76.1 | 62.6 | 81.0 | 90.5 | 88.6 | 77.3 | 63.6 | 82.3 | 91.9 |
| | White | 89.5 | 80.6 | 76.8 | 86.1 | 96.0 | 95.7 | 86.2 | 82.2 | 92.0 | 102.7 |
| | Urban | 86.2 | 71.2 | 56.4 | 80.5 | 92.5 | 82.1 | 67.8 | 53.7 | 76.7 | 88.1 |
| | Suburban | 91.4 | 76.9 | 63.5 | 85.5 | 94.1 | 92.6 | 77.9 | 64.4 | 86.6 | 95.3 |
| | Town | 95.7 | 93.9 | 81.9 | 96.8 | 98.6 | 98.7 | 96.8 | 84.5 | 99.8 | 101.6 |
| | Rural | 91.2 | 87.6 | 84.2 | 86.3 | 96.9 | 95.9 | 92.1 | 88.5 | 90.7 | 101.9 |

* Other/NA includes students listed as “other,” those with no data, and American Indian or Alaska Native.

2018–19 public growth. Reading growth in Catholic schools in 2021–22 was similar to Catholic growth in 2018–19 in town settings. Growth in Catholic schools in 2021–22 was lower than in public schools in 2021–22 for all race/ethnicity groups, and Catholic schools' growth in 2021–22 was somewhat lower than public school growth in 2018–19 for all groups.

### *Interactions*

While within-group comparisons may be useful, it is also important to compare each group to the population; there is no reason to expect different growth for students of different race/ethnicity or students from different types of metro areas if they have the same test scores in the fall (see Table 3). Thus, we examined the same comparisons of Catholic and public-school growth where the reference group is all students in the score group, rather than just the students with the same demographic background. For example, Asian students in Catholic schools in 2018–19 achieved 85.4% of the reading growth of similar-scoring Asian students in public schools in 2018–19, but this result is 96.9% of the reading growth of all students in public schools in 2018–19. Meanwhile, Black students in Catholic schools in 2018–19 achieved 85.4% of the math growth of similar-scoring Black students in public schools in 2018–19 (and 86.4% of reading growth), but this figure amounted to just 76.5% of the math growth (73.7% of reading growth) of all similar-scoring students in public schools in 2018–19. Thus, the apparent Catholic effect that appears in 2020–21 is not the same for all groups.

As detailed in Table 3, Asian students in Catholic schools in 2020–21 outgrew similar-scoring Asian students in public schools in math and reading (achieving 77% and 68.7% of the gains made by Asian students in public schools in 2018–19 in math and reading respectively, compared with 76.1% and 60.9% for 2020–21 Asian students in public schools), and outgrew all similar-scoring students regardless of race/ethnicity in reading (77.9% vs. 69.1%), but not in math (85.3% vs. 89.3%). Meanwhile, Black students in Catholic schools in 2020–21 outgrew similar-scoring Black students in public schools in math and reading, while growing more than the average of all similar-scoring students in public schools in reading, but less in math; the same was true, to a lesser degree, for Hispanic/Latino students. This pattern shifted in 2021–22: Black and Hispanic/Latino students in Catholic schools did not perform as well as students of the same race/ethnicity in public schools, but still performed better relative to these students than to the population of all students. Thus, Black and Hispanic/Latino students' growth appears larger relative to similar-scoring Black and Hispanic/Latino peers in public schools than relative to similar-scoring students of all racial/ethnic groups; the reverse is typically true for Asian and White students. Because we lacked further information about the schools these students attended, we could not determine the effect of concentrated poverty, neighborhood segregation, or other factors, on these results.

**Table 4**

*Estimated Catholic Effect by Year, Subject, and Time Period in Renaissance Star Data*

| Term | Year | Math | | Reading | |
|---|---|---|---|---|---|
| | | Estimate | SE | Estimate | SE |
| Fall to Spring | 2019 | -0.067* | 0.022 | 0.017 | 0.013 |
| | 2021 | 0.003 | 0.028 | 0.094* | 0.017 |
| | 2022 | -0.111* | 0.027 | 0.062* | 0.017 |
| Fall to Winter | 2019 | -0.058* | 0.018 | 0.009 | 0.012 |
| | 2020 | -0.054* | 0.019 | 0.024* | 0.011 |
| | 2021 | 0.023 | 0.023 | 0.060* | 0.013 |
| | 2022 | -0.056* | 0.023 | 0.020 | 0.015 |
| Winter to Winter | 2020 | -0.007 | 0.011 | 0.024* | 0.012 |
| | 2021 | 0.055* | 0.011 | 0.098* | 0.010 |
| | 2022 | -0.013 | 0.015 | 0.011 | 0.014 |

*Note.* * Indicates statistical significance at $p < 0.05$.

## Renaissance Star

In Table 4, we report the estimated Catholic effect (from the statistical model detailed earlier) for each year and subject. We show results for fall to winter (matching on fall pretests in both subjects), fall to spring (matching on pretests in both subjects), and winter to winter (with pre-tests in the same subject, in winter and the immediately prior fall), with data from a kernel pairwise match (results with kernel cross-validated matching, and nearest-neighbor matching, follow similar patterns).

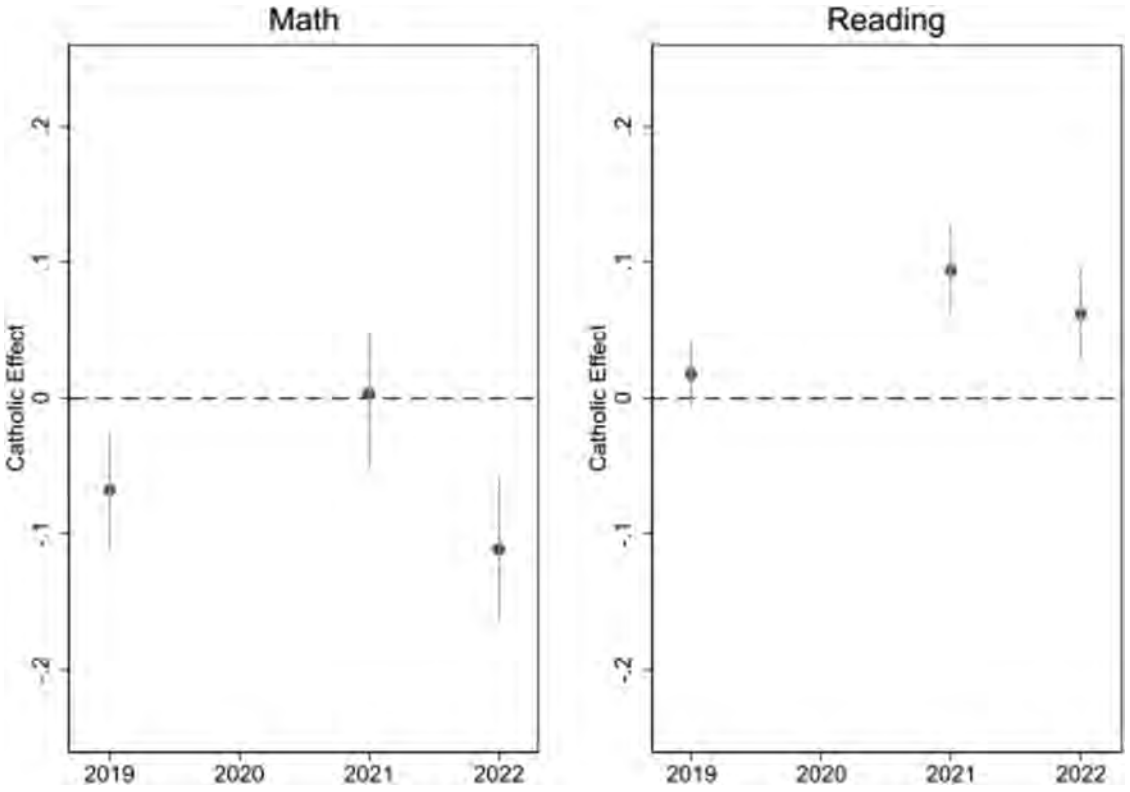
As shown in Table 4, and Figures 1 (fall to spring), 2 (fall to winter), and 3 (winter to winter), in pre-pandemic data, we found no difference between students in Catholic and public schools in math, or a small public school advantage; in pre-pandemic reading data, we saw no difference, or a small Catholic school advantage. During the height of pandemic mitigation efforts—fall to winter and fall to spring of the 2020–21 school year, and winter 2019–20 to winter 2020–21—the previous public-school advantage disappeared in math (and became a Catholic school advantage in the winter-to-winter measure), and in reading, the null or small Catholic school effect increased. Then, when we examined measures that included the 2021–22 school year, all Catholic effects declined, with almost all results returning to pre-pandemic levels.

### *Interactions*

Prior research has found that Catholic schools may be differentially effective for some groups of students. Lacking student demographic data, we examined whether the measured Catholic school effects were consistent across grade levels, and across levels of incoming achievement. We did this

**Figure 1**

*Catholic Effect by Year and Subject in Renaissance Star Data, Fall to Spring, Matching on Other-Subject Fall Score*



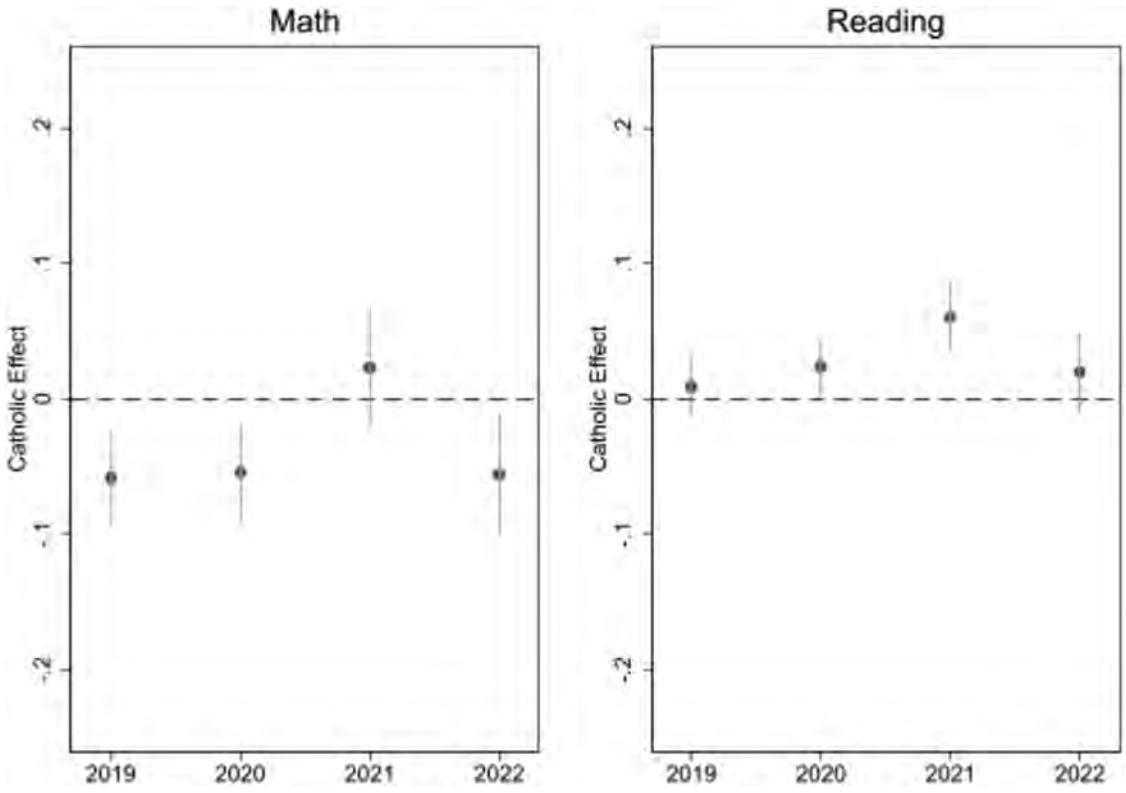

by adding an interaction term to the model, allowing for a separate Catholic school effect for students in upper grades, or for students whose prior test score was at or above the 50th percentile. Students in grades 6-8 in Catholic schools either scored similarly to, or better than, their matched peers in these grades in public schools, as shown in Table 5. We show estimates for one matching method, kernel pairwise matching, because results for the other methods were similar.

Students with initial scores at or above the 50th percentile in Catholic schools either scored similarly to, or slightly worse than, their matched peers in public schools, as shown in Table 6. We again show estimates for one matching method, kernel pairwise matching, because results for the other methods were very similar.

The above results suggest that Catholic schools demonstrated more growth during the 2020–21 school year. This may be due to the greater likelihood that Catholic schools offered in-person instruction. We examine this more closely by following students who had complete data: test scores in fall 2018, winter 2018–19, spring 2019, fall 2019, winter 2019–20, fall 2020, spring

**Figure 2**

*Catholic Effect by Year and Subject in Renaissance Star Data, Fall to Winter, Matching on Other-Subject Fall Score*



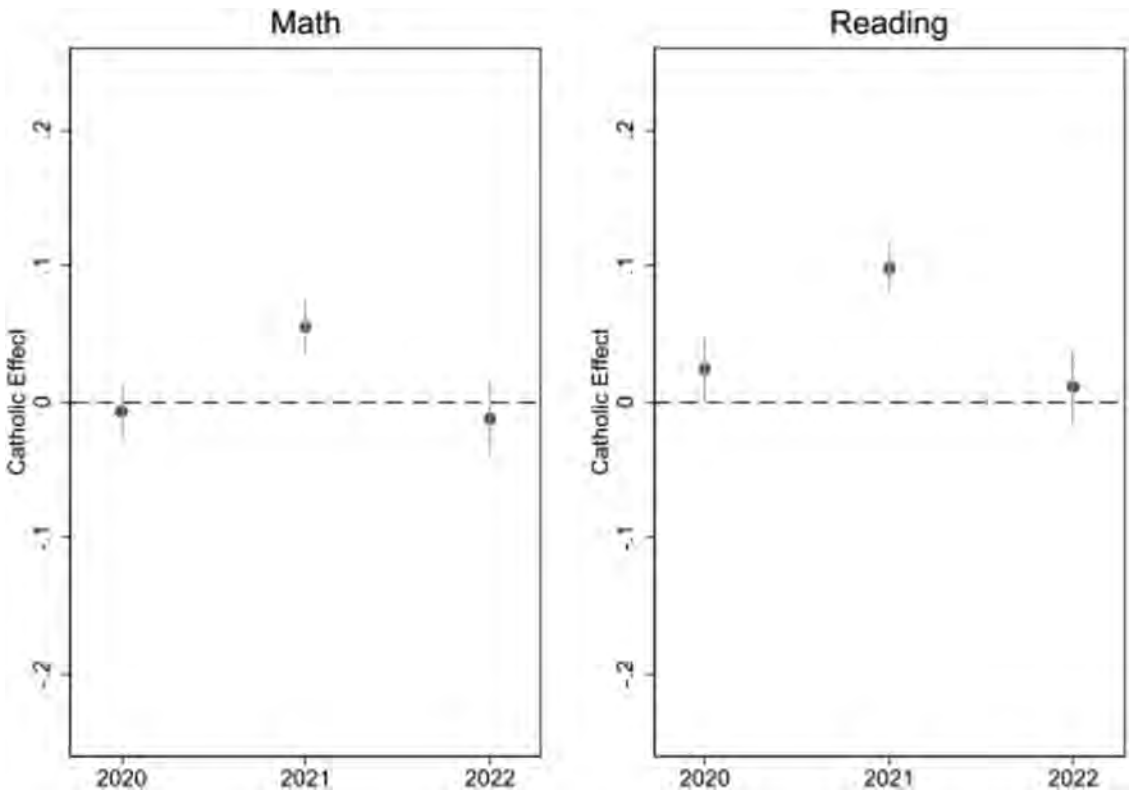

2021, fall 2021, and spring 2022. We used the same matching procedures and statistical models to estimate differences for this cohort, and found that the gap between initially similar students in matched Catholic and public schools widened during 2020–21 and began to shrink back to its pre-pandemic size in 2021–22, as shown in Figure 4 and Table 7.

## Discussion

Our descriptive analyses of NWEA MAP Growth data, comparing groups of similarly achieving students in similar school contexts, suggest a positive impact on student achievement on these assessments in math and reading in grades K-8 in Catholic schools during the 2020–21 school year, when Catholic schools were more likely to offer in-person instruction than public schools. This positive impact appears to have shrunk or disappeared during the 2021–22 school year as public schools reopened for in-person instruction. These effects were not felt by all groups equally, however, illustrating the importance of comparisons that are not just group-to-same-group, but group-to-other-groups as well: absent any mitigating factors, students with

**Figure 3**

*Catholic Effect by Year and Subject in Renaissance Star Data, Winter to Winter, Matching on Same-Subject Fall Score*




similar pretest scores should show similar rates of growth, and if this is not the case, the resulting differences should be examined. Per our analyses, there are greater growth gaps over this time for Black, Hispanic/Latino, and multi-race students, compared to the growth rates of White and Asian students. This suggests that more attention should be devoted to closing growth gaps in Catholic schools. These findings also emphasize the importance of collecting student demographic data, which is often incomplete in private school data collection; without it, such comparisons cannot be made.

Our matched student analyses of Renaissance Star data, where we compared similarly achieving students in similar school contexts, also suggest a positive impact on student achievement on the Star assessments in math and reading in grades 1-8 in Catholic schools during the 2020–21 school year, which then shrunk or disappeared during the 2021–22 school year as public schools fully reopened. These findings provide suggestive evidence of the importance of in-person instruction for achievement growth, complementing findings from previous examinations of in-person versus remote learning (Darling-Aduana et al., 2022; Kogan & Lavertu, 2021; Sass & Goldring,

**Table 5**

*Catholic Effect and Upper Grades Catholic Effect by Year, Subject, and Test Pair in Renaissance Star Data*

| Term | Year | Math | | | | Reading | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Catholic | | Catholic*Upper Grades | | Catholic | | Catholic*Upper Grades | |
| | | Estimate | SE | Estimate | SE | Estimate | SE | Estimate | SE |
| Fall to Spring | 2019 | -0.088* | 0.029 | 0.053 | 0.052 | -0.009 | 0.016 | 0.068* | 0.024 |
| | 2021 | -0.033 | 0.038 | 0.088 | 0.059 | 0.045 | 0.025 | 0.112* | 0.036 |
| | 2022 | -0.150* | 0.035 | 0.108* | 0.053 | 0.038 | 0.020 | 0.060 | 0.031 |
| Fall to Winter | 2019 | -0.092* | 0.024 | 0.092* | 0.034 | -0.015 | 0.016 | 0.060* | 0.025 |
| | 2020 | -0.061* | 0.025 | 0.019 | 0.039 | -0.005 | 0.014 | 0.070* | 0.022 |
| | 2021 | 0.003 | 0.031 | 0.051 | 0.047 | 0.050* | 0.022 | 0.023 | 0.034 |
| | 2022 | -0.094* | 0.025 | 0.099 | 0.051 | 0.005 | 0.019 | 0.038 | 0.030 |
| Winter to Winter | 2020 | -0.074* | 0.013 | 0.168* | 0.018 | -0.003 | 0.014 | 0.090* | 0.025 |
| | 2021 | 0.006 | 0.016 | 0.127* | 0.023 | 0.077* | 0.012 | 0.078* | 0.022 |
| | 2022 | -0.097* | 0.019 | 0.173* | 0.027 | 0.004 | 0.017 | 0.039 | 0.027 |

*Note.* * Indicates statistical significance at $p < 0.05$.

**Table 6**

*Catholic Effect and Higher-Scoring Catholic Effect by Year, Subject, and Test Pair in Renaissance Star Data*

| Term | Year | Math | | | | Reading | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Catholic | | Catholic*At or above 50th | | Catholic | | Catholic*At or above 50th | |
| | | Estimate | SE | Estimate | SE | Estimate | SE | Estimate | SE |
| Fall to Spring | 2019 | -0.027 | 0.034 | -0.058* | 0.029 | 0.022 | 0.019 | -0.006 | 0.018 |
| | 2021 | 0.049 | 0.036 | -0.070* | 0.031 | 0.117* | 0.022 | -0.040 | 0.022 |
| | 2022 | -0.097* | 0.035 | -0.021 | 0.028 | 0.077* | 0.025 | -0.026 | 0.022 |
| Fall to Winter | 2019 | -0.081* | 0.026 | 0.032 | 0.029 | 0.010 | 0.017 | -0.001 | 0.015 |
| | 2020 | -0.057* | 0.027 | 0.004 | 0.024 | 0.044* | 0.017 | -0.035* | 0.017 |
| | 2021 | 0.043 | 0.029 | -0.030 | 0.025 | 0.078* | 0.017 | -0.031 | 0.020 |
| | 2022 | -0.037 | 0.032 | -0.028 | 0.026 | 0.011 | 0.022 | 0.015 | 0.021 |
| Winter to Winter | 2020 | 0.016 | 0.015 | -0.036* | 0.014 | 0.040* | 0.015 | -0.031* | 0.013 |
| | 2021 | 0.101* | 0.018 | -0.062* | 0.017 | 0.126* | 0.016 | -0.044* | 0.015 |
| | 2022 | -0.005 | 0.020 | -0.029 | 0.018 | 0.014 | 0.019 | 0.002 | 0.017 |

*Note.* * Indicates statistical significance at $p < 0.05$.

**Figure 4**

*Catholic Effect by Term and Subject in Renaissance Star Data: Students Tested at All Time Points Beginning in Fall 2018*

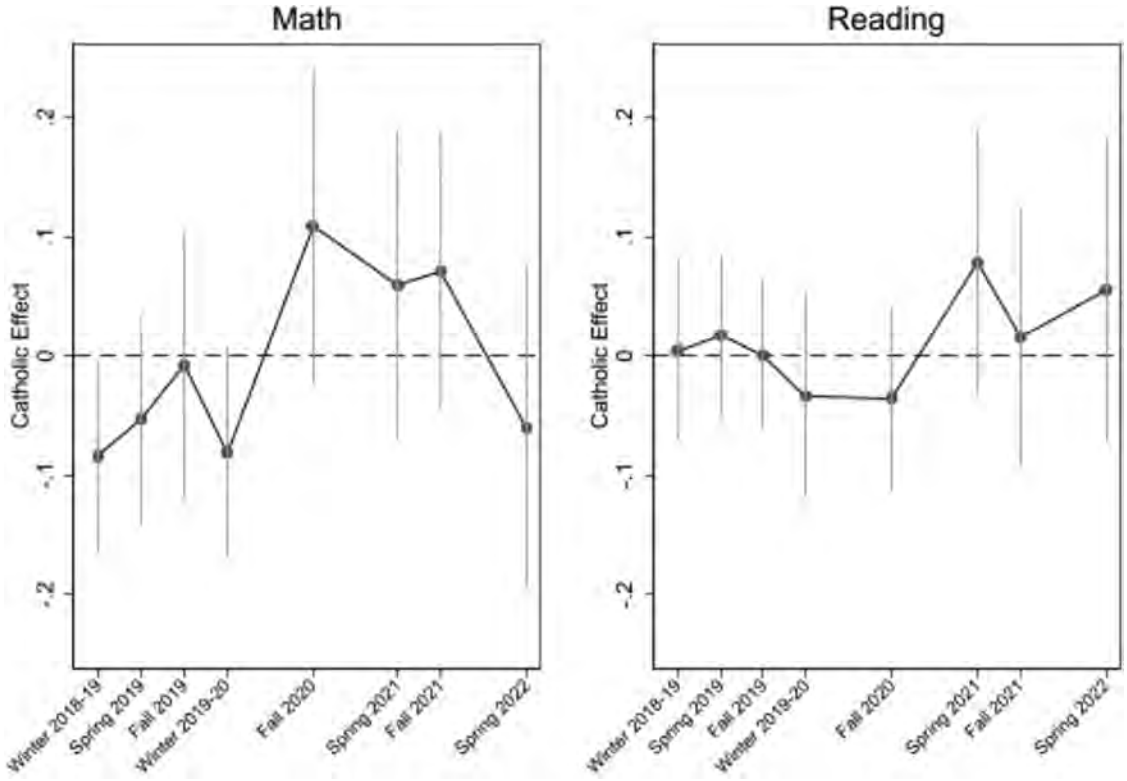



**Table 7**

*Catholic Effect by Term and Subject in Renaissance Star Data: Students Tested at All Listed Time Points Beginning in Fall 2018*

| Term | Math | | Reading | |
|---|---|---|---|---|
| | Estimate | SE | Estimate | SE |
| Winter 2018–19 | -0.084* | 0.042 | 0.005 | 0.039 |
| Spring 2019 | -0.053 | 0.045 | 0.018 | 0.035 |
| Fall 2019 | -0.008 | 0.058 | 0.001 | 0.032 |
| Winter 2019–20 | -0.081 | 0.045 | -0.033 | 0.045 |
| Fall 2020 | 0.109 | 0.068 | -0.035 | 0.040 |
| Spring 2021 | 0.059 | 0.066 | 0.078 | 0.057 |
| Fall 2021 | 0.071 | 0.060 | 0.016 | 0.055 |
| Spring 2022 | -0.060 | 0.069 | 0.055 | 0.065 |

*Note.* * Indicates statistical significance at $p < 0.05$.

2022; Tomasik et al., 2021). These analyses also echo previous findings of lower achievement in online charter schools compared to brick-and-mortar charter schools (Ahn & McEachin, 2017; Fitzpatrick et al., 2020).

When Catholic schools returned to in-person learning, despite necessary changes to the learning environment to meet health and safety protocols (Kowalski & Ponisciak, 2021), these analyses suggest that students, particularly middle grades students, experienced more growth than public school students who were primarily learning remotely. Further, when public schools returned to in-person learning in 2021–22, students returned to similar levels of growth as Catholic school students, providing further support for the benefits of in-person instruction.

In retrospect, the decision to reopen schools for in-person learning seems to be a positive decision from an educational standpoint. However, several studies have offered mixed evidence on whether there were tradeoffs for community health outcomes and an increase in pandemic spread related to resuming in-person instruction (Chernozhukov et al., 2021; Ertem et al., 2021; Fukumoto et al., 2021).

Although schools have reopened and COVID-19 no longer poses the same threat to public health, this study provides support for continued attention toward improving remote learning. With remote learning in its infancy, available primarily in online charter schools in 2020, educators were not prepared to make the sudden switch to teaching remotely. Through trial and error, teachers had to assist students in learning while encountering issues related to technology, parent availability, and student engagement (Chiu, 2021; Domina et al., 2021). Online learning platforms, the Internet, and technological devices make learning in the home feasible and an attractive option for some students and families. Educators should continue to pursue improving this mode of instruction in non-pandemic times, allowing for experimentation under more stable conditions to determine what is successful and what aspects of remote instruction need improvement in preparation for future uncertainty.

While these matched analyses attempt to account for selection into Catholic schools, they are still aggregate findings that may obscure important group differences in student achievement during the different phases of the pandemic. In order to consider whether pandemic learning introduced greater variation among students as some analyses have demonstrated (Kuhfeld et al., 2022), more demographic information is needed. Additional data entered in the optional data fields during the interim test registration process at the school level, particularly for Catholic schools, can assist in advancing future research on group differences.

This work is subject to several limitations. First, we examine interim test data and to be included in the analysis, students needed test data at multiple time points. On average, we have found that students with more test scores usually have higher scores. Thus, our estimates may not capture the full range of students. In addition, because of the requirement of data at multiple

time points, our analyses do not take into account students who moved from a public school to a Catholic school during this period. Further, during this time some public school students took interim tests remotely and therefore had possibly less supervision, but potentially greater help from adults compared to in-school test administration. In addition, although Star assessments are used nationally, the tested students may not be fully representative of either Catholic or public schools and students. Finally, we were unable to match closed and open schools due to data limitations; therefore, our findings are only suggestive of an in-person difference in achievement during this time. To further investigate this question from a causal perspective, students attending in-person would need to be matched directly with students attending remotely.

## Conclusion

The decision to shift the format of instruction in a school to remote learning for reasons of health and safety are complex and rely on data from multiple perspectives. Unfortunately, weighing the ultimate positive and negative consequences of actions in real time is not usually possible. However, careful examination of previous decisions can assist with similar choices and situations in the future. Our analyses suggest that student learning suffers when schools use remote instruction. The academic progress of students, while perhaps second to health, is important for policymakers, school and district leaders, and parents to consider in the event of a similar health event affecting the population.

Because of the importance of health safety, educators should continue to develop, strengthen, and improve the content and delivery of remote instruction to better serve students in the event that remote instruction again becomes necessary. Although traditional instruction appears to outpace remote instruction, further innovation, technology, and experience may result in improved outcomes for remote learning over time.

## References

Ahn, J., & McEachin, A. (2017). Student enrollment patterns and achievement in Ohio's online charter schools. *Educational Researcher*, *46*(1), 44–57. https://doi.org/10.3102/0013189X17692999

Al Mazrooei, A. K., Almaki, S. H., Gunda, M., Alnoor, A., & Sulaiman, S. M. (2022). A systematic review of K-12 education responses to emergency remote teaching during the COVID-19 pandemic. *International Review of Education*, *68*, 811–841. https://doi.org/10.1007/s11159-023-09986-w

Ballou, D., Sanders, W., & Wright, P. (2004). Controlling for student background in value-added assessment of teachers. *Journal of Educational and Behavioral Statistics*, *29*(1), 37–65. https://doi.org/10.3102/10769986029001037

Betebenner, D. (2009). Norm- and criterion-referenced student growth. *Educational Measurement: Issues and Practice, 28*(4), 42–51. https://doi.org/10.1111/j.1745-3992.2009.00161.x

Bryk, A., Lee, V., & Holland, P. (1993). *Catholic schools and the common good.* Harvard University Press.

Carbonaro, W. (2006). Public-private differences in achievement among kindergarten students: Differences in learning opportunities and student outcomes. *American Journal of Education*, *113*(1), 31–65. https://doi.org/10.1086/506493

Chernozhukov, V., Kasahara, H., & Schrimpf, P. (2021). The association of opening K-12 schools with the spread of COVID-19 in the United States: County-level panel data analysis. *PNAS*, *118*(42), 1–12. https://doi.org/10.1073/pnas.2103420118

Chiu, T. K. F. (2021). Student engagement in K-12 online learning amid COVID-19: A qualitative approach from a self-determination theory perspective. *Interactive Learning Environments*, *31*(6), 3326–3339. https://doi.org/10.1080/10494820.2021.1926289

Coleman, J., & Hoffer, T. (1987). *Public and private high schools compared: The impact of communities.* Basic Books.

Darling-Aduana, J., Woodyard, H. T., Sass, T. R., & Barry, S. S. (2022). Learning-mode choice, student engagement, and achievement growth, during the COVID-19 pandemic. *AERA Open*, *8*(1), 1–18. http://doi.org/10.1177/23328584221128035

Dawson, M. (2021). *The impact of COVID-19 on student academic growth in 2020-2021*. Curriculum Associates. https://www.curriculumassociates.com/-/media/mainsite/files/i-ready/iready-covid-growth-research-paper-2021.pdf

Domina, T., Renzulli, L., Murray, B., Garza, A. N., & Perez, L. (2021). Remote or removed: Predicting successful engagement with online learning during COVID-19. *Socius*, *7*, 1–15. https://doi.org/10.1177/2378023120988200

Ehlert, M., Koedel, C., Parsons, E., & Podgursky, M. J. (2014). The sensitivity of value-added estimates to specification adjustments: Evidence from school- and teacher-level models in Missouri. *Statistics and Public Policy*, *1*(1), 19–27. https://doi.org/10.1080/2330443X.2013.856152

Ertem, Z., Schechter-Perkins, E. M., Oster, E., van den Berg, P., Epshtein, I., Chaiyakunapruk, N., Wilson, F. A., Perencevich, E., Pettey, W. P. B., Branch-Elliman, W., & Nelson, R. E. (2021). The impact of school opening model on SARS-CoV-2 community incidence and mortality. *Nature Medicine*, *27*, 2120–2126. https://doi.org/10.1038/s41591-021-01563-8

Fisher, H. H., Hawkins, G. T., Hertz, M., Sliwa, S., & Beresovsky, V. (2022). Student and school characteristics associated with COVID-19-related learning decline among middle and high school students in K-12 schools. *Journal of School Health*, *92*(11), 1027–1039. https://doi.org/10.1111/josh.13243

Fitzpatrick, B. R., Berends, M., Ferrare, J. J., & Waddington, R. J. (2020). Virtual illusion: Comparing student achievement and teacher and classroom characteristics in online and brick-and-mortar charter schools. *Educational Researcher*, *49*(3), 161–175. https://doi.org/10.3102/0013189X20909814

Fukumoto, K., McClean, C. T., & Nakagawa, K. (2021). No causal effect of school closures in Japan on the spread of COVID-19 in spring 2020. *Nature Medicine*, *27*, 2111–2119. https://doi.org/10.1038/s41591-021-01571-8

George, G., Dilworth-Bart, J., & Herringa, R. (2021). Potential socioeconomic effects of the COVID-19 pandemic on neural development, mental health, and K-12 educational achievement. *Policy Insights from the Behavioral and Brain Sciences*, *8*(2), 111–118. https://doi.org/10.1177/23727322211032248

Gill, B., Walsh, L., Wulsin, C. S., Matulewicz, H., Severn, V., Grau, E., Lee, A., & Kerwin, T. (2015). *Inside online charter schools: A report of the national study of online charter schools*. Mathematica Policy Research. https://eric.ed.gov/?id=ED560967

Hainmueller, J. (2012). Entropy balancing for causal effects: A multivariate reweighting method to produce balanced samples in observational studies. *Political Analysis*, *20*(1), 25–46. https://doi.org/10.1093/pan/mpr025

Hainmueller, J., & Xu, Y. (2013). ebalance: A Stata package for entropy balancing. *Journal of Statistical Software*, *54*(7), 1–18. https://doi.org/10.18637/jss.v054.i07

Hallinan, M., & Kubitschek, W. N. (2012). A comparison of academic achievement and adherence to the common school ideal in public and Catholic schools. *Sociology of Education*, *85*(1), 1–22. https://doi.org/10.1177/0038040711431586

Henderson, M. B., Peterson, P. E., & West, M. R. (2021). Pandemic parent survey finds perverse pattern: Students are more likely to be attending school in person where Covid is spreading more rapidly. *Education Next*, *21*(2), 34–49. https://www.educationnext.org/pandemic-parent-survey-finds-perverse-pattern-students-more-likely-to-be-attending-school-in-person-where-covid-is-spreading-more-rapidly/

Hertz, M. F., Kilmer, G., Verlenden, J., Liddon, N., Rasberry, C. N., Barrios, L. C., & Ethier, K. A. (2022). Adolescent mental health, connectedness, and mode of school instruction during COVID-19. *Journal of Adolescent Health*, *70*(1), 57–63. https://doi.org/10.1016/j.jadohealth.2021.10.021

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020, March 27). The difference between emergency remote teaching and online learning. *Educause Review*. https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning

Jann, B. (2017). *kmatch: Stata module for multivariate-distance and propensity-score matching, including entropy balancing, inverse probability weighting, (coarsened) exact matching, and regression adjustment* [Computer software]. Statistical Software Components S458346, Boston College Department of Economics, revised 19 Sep 2020. https://ideas.repec.org/c/boc/bocode/s458346.html

Johnson, M. T., Lipscomb, S., & Gill, B. (2015). Sensitivity of teacher value-added estimates to student and peer control variables. *Journal of Research on Educational Effectiveness*, *8*(1), 60–83. https://doi.org/10.1080/19345747.2014.967898

Kaufman, J. H., & Diliberti, M. K. (2021). *Divergent and inequitable teaching and learning pathways during (and perhaps beyond) the pandemic: Key findings from the American Educator Panels Spring 2021 COVID-19 surveys*. RAND Corporation. https://www.rand.org/pubs/research_reports/RRA168-6.html

Kogan, V., & Lavertu, S. (2021). *How the COVID-19 pandemic affected student learning in Ohio.* The Ohio State University. https://glenn.osu.edu/how-covid-19-pandemic-affected-student-learning-ohio

König, C., & Frey, A. (2022). The impact of COVID-19-related school closures on student achievement—A meta-analysis. *Educational Measurement: Issues and Practice*, *41*(1), 16–22. https://doi.org/10.1111/emip.12495

Kowalski, M. J., & Ponisciak, S. M. (2021). No good options: Analysis of Catholic school reopening plans in Fall 2020. *Journal of Catholic Education*, *24*(1). http://dx.doi.org/10.15365/joce.2401122021

Kuhfeld, M., Soland, J., Lewis, K., Ruzek, E., & Johnson, A. (2022). The COVID-19 school year: Learning and recovery across 2020-2021. *AERA Open*, *8*(1), 1–15. https://doi.org/10.1177/23328584221099306

Malkus, N. (2020). *Reopening in the shadow of COVID-19: Beginning the first full coronavirus school year.* American Enterprise Institute. https://www.aei.org/research-products/report/reopening-in-the-shadow-of-covid-19-beginning-the-first-full-coronavirus-school-year/

Malkus, N., & Christensen, C. (2022). *Public school instructional offerings and enrollment changes: Evidence from two years after the pandemic*. American Enterprise Institute. https://www.aei.org/research-products/report/public-school-instructional-offerings-and-enrollment-changes-evidence-from-two-years-after-the-pandemic/

Mayra, S. T., Kandiah, J., & McIntosh, C. E. (2022). COVID-19 and health in children and adolescents in the US: A narrative systematic review. *Psychology in the Schools*, *60*(5), 1–18. https://doi.org/10.1002/pits.22723

National Assessment of Educational Progress. (2021). Measure up for private schools: NAEP news for the private school community. https://nces.ed.gov/nationsreportcard/subject/participating/pdfs/measure_up_private_schools_summer_fall_2021.pdf

National Catholic Educational Association. (2020, October). *Operational vitality survey*. Presented at the NCEA Catholic Leadership Summit [virtual]. https://drive.google.com/file/d/1I-FQG78m1okDbZvSKaLjdV3Le1Ptqs2G/view

National Center on Intensive Intervention. (2021). *Academic Progress Monitoring Tools Chart*. https://charts.intensiveintervention.org/aprogressmonitoring

National Center on Intensive Intervention. (2022). *Academic Screening Tools Chart*. https://charts.intensiveintervention.org/ascreening

Northwest Evaluation Association [NWEA] (2011). Technical Manual: For Measures of Academic Progress (MAP) and Measures of Academic Progress (MPG). NWEA Research Report. Portland, OR: NWEA.

Oster, E., Jack, R., Halloran, C., Schoof, J., McLeod, D., Yang, H., Roche, J., & Roche, D. (2021). Disparities in learning mode access among K-12 students during the COVID-19 pandemic, by race/ethnicity, geography, and grade level—United States, September 2020–April 2021. *Morbidity and Mortality Weekly Report*, *70*(26), 953–958. Centers for Disease Control and Prevention. https://www.cdc.gov/mmwr/volumes/70/wr/mm7026e2.htm

Ponisciak, S. M., & Dallavis, J. W. (2022). Student performance on Renaissance Star assessments in Catholic and public schools. *Religion & Education*, *49*(2), 212–233. https://www.doi.org/10.1080/15507394.2022.2069453

Porter-Magee, K., Smith, A., & Klausmeier, M. (2022). *Catholic school enrollment boomed during Covid. Let's make it more than a one-time bump*. Manhattan Institute. https://www.manhattan-institute.org/catholic-school-enrollment-boomed-during-covid

Rasch, G. (1960). *Probabilistic models for some intelligence and attainment tests* (Reprint, with Foreword and Afterword by B. D. Wright, University of Chicago Press, 1980). Danmarks Paedogogiske Institut.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Sage.

Renaissance Learning. (2019a). *Star Assessments™ for math technical manual*. https://help.renaissance.com/US/PDF/SM/SMRPTechnicalManual.pdf

Renaissance Learning. (2019b). *Star Assessments™ for reading technical manual.* https://help.renaissance.com/US/PDF/SR/SRRPTechnicalManual.pdf

Renaissance Learning. (2021). How kids are performing: Tracking the school-year impact of COVID-19 on reading and mathematics achievement. https://research.renaissance.com/research/660

Renaissance Learning. (2022). *Student growth percentile in Star Assessments™*. https://doc.renlearn.com/KMNet/R00571375CF86BBF.pdf

Reyes, J. (2020, October 27). Running towards the danger: Early learnings from Catholic schools in the midst of the pandemic [Blog post]. *NCEA Talk*. https://nceatalk.org/2020/10/running-towards-the-danger-early-learnings-from-catholic-schools-in-the-midst-of-the-pandemic/

Santibañez, L., & Guarino, C. M. (2021). The effects of absenteeism on academic and social-emotional outcomes: Lessons for COVID-19. *Educational Researcher*, *50*(6), 392–400. https://doi.org/10.3102/0013189X21994488

Sass, T., & Goldring, T. (2022). Student achievement growth during the COVID-19 pandemic: Fall 2021 update. *Georgia Policy Labs Reports.* https://doi.org/10.57709/30728971

Soland, J. (2019). Modeling academic achievement and self-efficacy as joint developmental processes: Evidence for education, counseling, and policy. *Journal of Applied Developmental Psychology*, *65*. https://doi.org/10.1016/j.appdev.2019.101076

Stuart, E. A. (2010). Matching methods for causal inference: A review and a look forward. *Statistical Science*, *25*(1), 1–21. https://doi.org/10.1214/09-STS313

Thum, Y. M., & Hauser, C. H. (2015). *NWEA 2015 MAP norms for student and school achievement status and growth.* NWEA Research Report.

Tomasik, M. J., Helbling, L. A., & Moser, U. (2021). Educational gains of in-person vs. distance learning in primary and secondary schools: A natural experiment during the COVID-19 pandemic school closures in Switzerland. *International Journal of Psychology*, *56*(4), 566–576. http://doi.org/10.1002/ijop.12728

West, M. R., Lake, R., Betts, J., Cohodes, S., Gill, B., Ho, A., Loeb, S., McRae, B., Schwartz, H., Soland, J., & Walker, M. (2021). *How much have students missed academically because of the pandemic? A review of the evidence to date*. Center for Reinventing Public Education. https://crpe.org/wp-content/uploads/8_5_final_academic_impacts_report_2021.pdf.

Woodworth, J. L., Raymond, M. E., Chirbas, K., Gonzalez, M., Negassi, Y., Snow, W., & Van Donge, C. (2015). *Online charter school study*. Center for Research on Education Outcomes, Stanford University.

# Appendix

**Table A1**

*Number of Students by Sector, Year, Subject, and Grade*

| MAP Growth | | Catholic | | | | Public | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Grade | 2019 | 2020 | 2021 | 2022 | 2019 | 2020 | 2021 | 2022 |
| Math | K | 14220 | | 14565 | 19005 | 380514 | | 251302 | 404617 |
| | 1 | 19574 | | 18881 | 26154 | 518832 | | 367518 | 564354 |
| | 2 | 24095 | | 24035 | 30863 | 616091 | | 450776 | 639893 |
| | 3 | 25636 | | 25580 | 32509 | 615571 | | 477719 | 616127 |
| | 4 | 26580 | | 25691 | 32267 | 608051 | | 482831 | 616742 |
| | 5 | 26960 | | 25705 | 32361 | 619500 | | 485848 | 617938 |
| | 6 | 26697 | | 25718 | 32009 | 604540 | | 446221 | 576925 |
| | 7 | 23712 | | 23460 | 30323 | 527456 | | 414958 | 565080 |
| | 8 | 21390 | | 19340 | 25572 | 466085 | | 352009 | 485516 |
| | K | 14448 | | 14142 | 18582 | 383529 | | 241891 | 353736 |
| Reading | 1 | 19776 | | 18692 | 25597 | 493292 | | 357848 | 494547 |
| | 2 | 24018 | | 23561 | 30396 | 607324 | | 442297 | 579793 |
| | 3 | 25261 | | 25285 | 32097 | 602055 | | 467345 | 588262 |
| | 4 | 26181 | | 25682 | 31993 | 587521 | | 464816 | 591994 |
| | 5 | 26463 | | 25488 | 32114 | 604351 | | 465029 | 593088 |
| | 6 | 26377 | | 25540 | 31820 | 581264 | | 434246 | 559133 |
| | 7 | 23325 | | 23482 | 30229 | 520022 | | 411055 | 550668 |
| | 8 | 21248 | | 21703 | 28088 | 468992 | | 392632 | 539137 |
| Renaissance Star | | Catholic | | | | Public | | | |
| | Grade | 2019 | 2020 | 2021 | 2022 | 2019 | 2020 | 2021 | 2022 |
| Math | 1 | 16358 | 14485 | 14782 | 9543 | 42953 | 43099 | 37173 | 23831 |
| | 2 | 18859 | 18128 | 17538 | 13000 | 49833 | 49059 | 45020 | 32278 |
| | 3 | 19081 | 18599 | 17997 | 13224 | 45332 | 46147 | 41893 | 30580 |
| | 4 | 19057 | 18340 | 18038 | 13521 | 42108 | 42357 | 39664 | 28437 |
| | 5 | 19279 | 18111 | 17784 | 12460 | 35355 | 35653 | 33449 | 25106 |
| | 6 | 16517 | 15951 | 15280 | 11117 | 87677 | 86362 | 82277 | 62950 |
| | 7 | 15473 | 15079 | 14821 | 10176 | 71127 | 72827 | 70319 | 54505 |
| | 8 | 14985 | 14731 | 14317 | 11124 | 64195 | 66746 | 66850 | 52613 |
| Reading | 1 | 14159 | 12452 | 12679 | 7609 | 33222 | 28879 | 23471 | 14867 |
| | 2 | 16429 | 16075 | 15333 | 11670 | 43786 | 43069 | 37786 | 29389 |
| | 3 | 16289 | 16243 | 15629 | 12040 | 41790 | 41558 | 36220 | 28702 |
| | 4 | 16396 | 15742 | 15504 | 11746 | 39786 | 39919 | 35415 | 26356 |
| | 5 | 16368 | 15871 | 15142 | 10817 | 36949 | 36125 | 31582 | 24895 |
| | 6 | 13099 | 12891 | 12226 | 9308 | 63268 | 63019 | 55253 | 43172 |
| | 7 | 11855 | 11567 | 11407 | 8085 | 45915 | 46797 | 42674 | 31759 |
| | 8 | 11353 | 11210 | 10721 | 8289 | 47026 | 48117 | 44511 | 35922 |

**Table A2**

*Number of Students by Metropolitan Type in MAP Growth data*

| | Metro Type | Catholic | | | Public | | |
|---|---|---|---|---|---|---|---|
| | | 2019 | 2021 | 2022 | 2019 | 2021 | 2022 |
| Math | City, Large | 60594 | 44805 | 68747 | 990522 | 684655 | 1014946 |
| | City, Mid-size | 17165 | 17231 | 21455 | 278666 | 219218 | 313233 |
| | City, Small | 21286 | 25886 | 31091 | 378868 | 258129 | 348069 |
| | Rural, Distant | 3346 | 3056 | 3224 | 247182 | 198557 | 238844 |
| | Rural, Fringe | 4503 | 4923 | 5832 | 467966 | 393865 | 485334 |
| | Rural, Remote | 971 | 1031 | 794 | 63580 | 58053 | 54525 |
| | Suburb, Large | 72797 | 74010 | 93036 | 1850688 | 1374226 | 1972948 |
| | Suburb, Mid-size | 6051 | 6064 | 7306 | 134921 | 104497 | 129842 |
| | Suburb, Small | 1637 | 1749 | 2830 | 57588 | 44933 | 62705 |
| | Town, Distant | 10228 | 13293 | 14345 | 253308 | 204743 | 238717 |
| | Town, Fringe | 3709 | 3335 | 3923 | 105225 | 84165 | 102479 |
| | Town, Remote | 6587 | 7592 | 8480 | 128145 | 104141 | 125550 |
| Reading | City, Large | 60600 | 45198 | 67910 | 915979 | 675296 | 932043 |
| | City, Mid-size | 16851 | 17251 | 21320 | 266670 | 208540 | 294485 |
| | City, Small | 20773 | 25943 | 31474 | 371226 | 242578 | 330177 |
| | Rural, Distant | 3247 | 3057 | 3251 | 247262 | 200241 | 240675 |
| | Rural, Fringe | 4535 | 4850 | 5860 | 460505 | 398873 | 469401 |
| | Rural, Remote | 960 | 993 | 713 | 61383 | 59042 | 53584 |
| | Suburb, Large | 72511 | 74486 | 93569 | 1866888 | 1367878 | 1882837 |
| | Suburb, Mid-size | 5750 | 5865 | 7204 | 123794 | 94632 | 125528 |
| | Suburb, Small | 1600 | 1762 | 2822 | 56818 | 44694 | 60632 |
| | Town, Distant | 10110 | 13349 | 14565 | 247275 | 202426 | 239905 |
| | Town, Fringe | 3709 | 3288 | 3836 | 105044 | 83206 | 99322 |
| | Town, Remote | 6451 | 7533 | 8416 | 125506 | 99753 | 121769 |

**Table A3**

*Student Demographics in Catholic and Public Schools in MAP Growth Data*

| | Race/Ethnicity | Catholic | | | Public | | |
|---|---|---|---|---|---|---|---|
| | | 2019 | 2021 | 2022 | 2019 | 2021 | 2022 |
| Math | Total N | 208874 | 202975 | 261063 | 4956659 | 3729182 | 5087192 |
| | American Indian or Alaska Native | 0.2 | 0.0 | 0.1 | 0.3 | 0.0 | 0.1 |
| | Asian | 2.6 | 2.0 | 2.7 | 3.1 | 2.8 | 3.4 |
| | Black | 8.5 | 5.9 | 7.2 | 14.5 | 11.1 | 12.9 |
| | Hispanic/Latino | 12.8 | 11.1 | 13.5 | 18.4 | 20.3 | 22.2 |
| | Multiple | 3.9 | 4.2 | 4.6 | 2.9 | 3.4 | 3.8 |
| | NA/Other | 12.5 | 14.1 | 14.2 | 5.3 | 4.5 | 4.4 |
| | White | 59.4 | 62.6 | 57.7 | 55.5 | 57.9 | 53.1 |
| Reading | Total N | 207097 | 203575 | 260940 | 4848350 | 3677159 | 4850358 |
| | American Indian or Alaska Native | 0.2 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 |
| | Asian | 2.6 | 2.1 | 2.8 | 3.1 | 3.1 | 3.7 |
| | Black | 8.4 | 5.8 | 7.0 | 14.6 | 11.1 | 13.0 |
| | Hispanic/Latino | 12.8 | 11.1 | 13.4 | 17.4 | 19.2 | 20.7 |
| | Multiple | 3.9 | 4.2 | 4.5 | 2.8 | 3.3 | 3.6 |
| | NA/Other | 12.7 | 14.0 | 14.2 | 5.3 | 4.5 | 4.6 |
| | White | 59.5 | 62.8 | 58.1 | 56.4 | 58.8 | 54.3 |

**Table A4**

*Number of Schools and Proportion of Students by Metropolitan Type in Renaissance Star Data*

| | Math | | | | Reading | | | |
|---|---|---|---|---|---|---|---|---|
| | Number of Schools | | Percentage of Students | | Number of Schools | | Percentage of Students | |
| | Catholic | Public | Catholic | Public | Catholic | Public | Catholic | Public |
| Metropolitan Type | | | | | | | | |
| Urban | 152 | 152 | 12 | 16 | 183 | 183 | 18 | 20 |
| Suburban | 521 | 521 | 72 | 71 | 481 | 481 | 68 | 68 |
| Town | 140 | 140 | 10 | 11 | 130 | 130 | 9 | 10 |
| Rural | 80 | 80 | 6 | 2 | 53 | 53 | 4 | 1 |

**Table A5**

*Student Demographics in Renaissance Star Catholic and Public School Data, Average over Years 2018–19 to 2021–22*

| | | Catholic | | | | Public | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Math | | Reading | | Math | | Reading | |
| | Grades | 1-5 | 6-8 | 1-5 | 6-8 | 1-5 | 6-8 | 1-5 | 6-8 |
| | N | 328184 | 169571 | 284193 | 132011 | 769327 | 838448 | 673766 | 567433 |
| Race/Ethnicity | Asian | 3.3 | 4.1 | 1.6 | 2.3 | 7.8 | 5.9 | 6.2 | 5.1 |
| | Black | 1.1 | 1.0 | 0.7 | 0.8 | 4.2 | 6.7 | 2.8 | 4.2 |
| | Hispanic | 7.3 | 9.6 | 1.6 | 2.5 | 6.5 | 9.5 | 10.0 | 11.0 |
| | Multiple | 2.3 | 2.6 | 0.9 | 1.4 | 2.5 | 2.3 | 2.1 | 2.0 |
| | Native American | 0.1 | 0.1 | 0.0 | 0.0 | 0.8 | 1.0 | 0.6 | 0.9 |
| | Native Hawaiian | 0.4 | 0.2 | 0.2 | 0.1 | 1.1 | 0.2 | 0.8 | 0.1 |
| | White | 14.2 | 17.0 | 9.7 | 12.0 | 39.6 | 44.0 | 33.6 | 36.2 |
| | Unknown or Other | 71.3 | 65.4 | 85.3 | 80.9 | 37.4 | 30.5 | 44.0 | 40.3 |
| Gender | Female | 32.4 | 32.6 | 28.8 | 29.7 | 39.2 | 40.6 | 38.0 | 39.0 |
| | Male | 31.7 | 31.9 | 28.4 | 29.0 | 40.8 | 42.3 | 39.5 | 40.8 |
| | Unknown | 35.8 | 35.4 | 42.8 | 41.3 | 19.9 | 17.1 | 22.5 | 20.2 |