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Virtual Tutoring Use and Student Achievement Growth

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June 2023

Background and Motivation

Motivation

Like many other districts throughout the United States, Clayton County Public Schools (CCPS) has sought ways to accelerate student achievement growth in the wake of the learning disruptions brought about by the COVID-19 pandemic, subsequent school closures, and the unplanned shift to remote learning. While intensive high-dosage in-person tutoring has the potential to significantly boost student achievement, CCPS and other districts faced significant challenges to staffing regular classrooms, and finding and training in-person tutors was not a viable option.[1] Consequently, CCPS contracted with Tutor.com to provide one-on-one, on-demand virtual tutoring sessions during school year (SY) 2021–22. CCPS wanted to understand patterns in usage and any impacts of this opportunity for students. In this report, we present evidence on usage of the Tutor.com platform and the relationship between usage and student achievement growth using formative assessment scores for SY 2021–22.

About the Program

Online tutoring was available to students beginning in October 2021 and access continued throughout the remainder of SY 2021–22. While many tutoring sessions occurred during school hours, the extent of Tutor.com usage was largely left up to the discretion of students.

To access the virtual tutoring, students had to log into the platform and specify what material with which they wanted help. The system would then link the student to an available tutor, though students could specify a "favorite tutor." Tutors were available 24 hours per day, seven days a week. The tutoring sessions had no video, other than a still picture of the tutor; they were essentially voice chats. Students were anonymous, only being identified to the tutor by their first name and last initial. The content of the sessions was student-directed, with students posing questions to their tutor.

Existing Literature

There is a substantial literature demonstrating the efficacy of in-person "high-dosage" small-group tutoring where a tutor meets with no more than three or four students at least three times a week (for a meta-analysis of studies, see Nickow et al., 2020).[2] By contrast, relatively little is currently known about the

efficacy of online tutoring platforms; just a few recent studies have attempted to measure the effectiveness of online tutoring.[3]

Carlana and Ferrara (2021) and Gortazar et al. (2022) conduct randomized trials of tutor-led, short-term high-intensity tutoring programs provided to middle-school students in Italy and Spain, respectively. In both studies, participants were randomly selected from a set of struggling students identified by their principals. In the Italian study, tutors were volunteer university students, whereas in the Spanish study, tutors were qualified math teachers. Both programs were intensive: The Spanish program included three 50-minute sessions per week over a period of eight weeks, while the median length of the program in Italy was five weeks, and tutors volunteered to work three to six hours per week. On average, students in the Italian program received 14 tutoring sessions for a total of 17 hours over 34 days. Both programs were "small group" tutoring with one tutor per student in Italy and two students per tutor in Spain. Both programs substantially increased student achievement—a gain of 0.26 SD in math scores in Spain and an equal 0.26 SD improvement in scores on a standardized exam covering math, Italian, and English in Italy.

Kraft et al. (2022) study a pilot tutoring program implemented in a single middle school in Illinois. Tutors were volunteer college students who were recruited from highly selective universities and provided with three hours of training. The one-on-one tutoring sessions were conducted twice a week during the school day and lasted 30 minutes. The program ran for a 12-week period, which included a week off for spring break and several days off for state testing. Tutors were instructed to begin each tutoring session with a personal check-in and then inquire if the students needed help with their schoolwork. If students did not request help, tutors were told to engage in guided instruction to build core skills in reading or math. The estimated impact of making the program available to students (i.e., the "intent-to-treat estimate") was much smaller than in the European studies: 0.07 SD in math and 0.04 for reading.

The only prior study to investigate on-demand, student-initiated tutoring is Robinson et al. (2022). They conduct a randomized trial in a public charter district in California to gauge the effect of information provision on usage of a virtual tutoring platform. All middle and high school students in the district in fall 2020 were given personal electronic devices and had free access to an on-demand tutoring platform for the spring 2021 semester. The control group consisted of students who received access but no communication to encourage usage. The three treatment arms involved communication to either the student only, the parent only, or both the student and parent. In the control group,

only 18.7% of students ever accessed the platform and engaged in at least one tutoring session; participation averaged only 0.8 sessions. Among students who ever accessed the platform, the average number of sessions over the course of the semester was 4.3. Usage was substantially lower among students who were struggling academically. Only 12% of students who received a D or an F in at least one class in the fall semester participated in at least one tutoring session in the spring, whereas 23% of students who passed all their fall classes engaged in at least one online tutoring session. However, take up did not meaningfully differ by students' special education status, eligibility for subsidized meals, race, or primary home language. Sending personalized communications to both students and their parents increased use of the on-demand tutoring platform by 46%, but usage was still relatively low at just 27.3%. Similarly, sending information to both students and their parents increased the average number of sessions from 0.80 to 1.39. Using the randomly assigned level of communication as an instrument for usage, the authors find that any tutoring use has very large effects on a student's grades, raising their overall GPA by 0.77 and their math GPA by 1.37. Given the low number of sessions for tutoring participants, these estimated impacts seem implausibly large. No assessment data were available to measure impacts of tutoring on test scores.

Research Questions

We address the following research questions:

1. Which students used the Tutor.com online tutoring service?
2. When was usage highest?
3. Was there variation in usage by grade level?
4. Were there differential benefits for different kinds of students?
5. Was Tutor.com usage more effective at some schools and/or with certain teachers?

Data

We use individual tutoring session data from CCPS to determine the number, subject area, and duration of tutoring sessions. These data are combined with formative assessment data provided by the district to gauge the relationship between tutoring use and student achievement growth. The tutoring data

include all sessions occurring between October 1, 2021, and March 31, 2022. The assessment data include fall and winter formative assessments (iReady and MAP Growth) for SY 2021–22. The fall assessments occurred between the start of school and mid-September, and the district administered winter assessments between the end of November and early February.[4] To equate scores across exams, we measure student achievement in terms of national percentile rankings.

Methodology

To gauge student use of the Tutor.com virtual tutoring platform, we compute the proportion of students with any tutoring sessions and the average number of sessions per student. We also measure the average session length and the proportions of sessions falling within specific time bands.

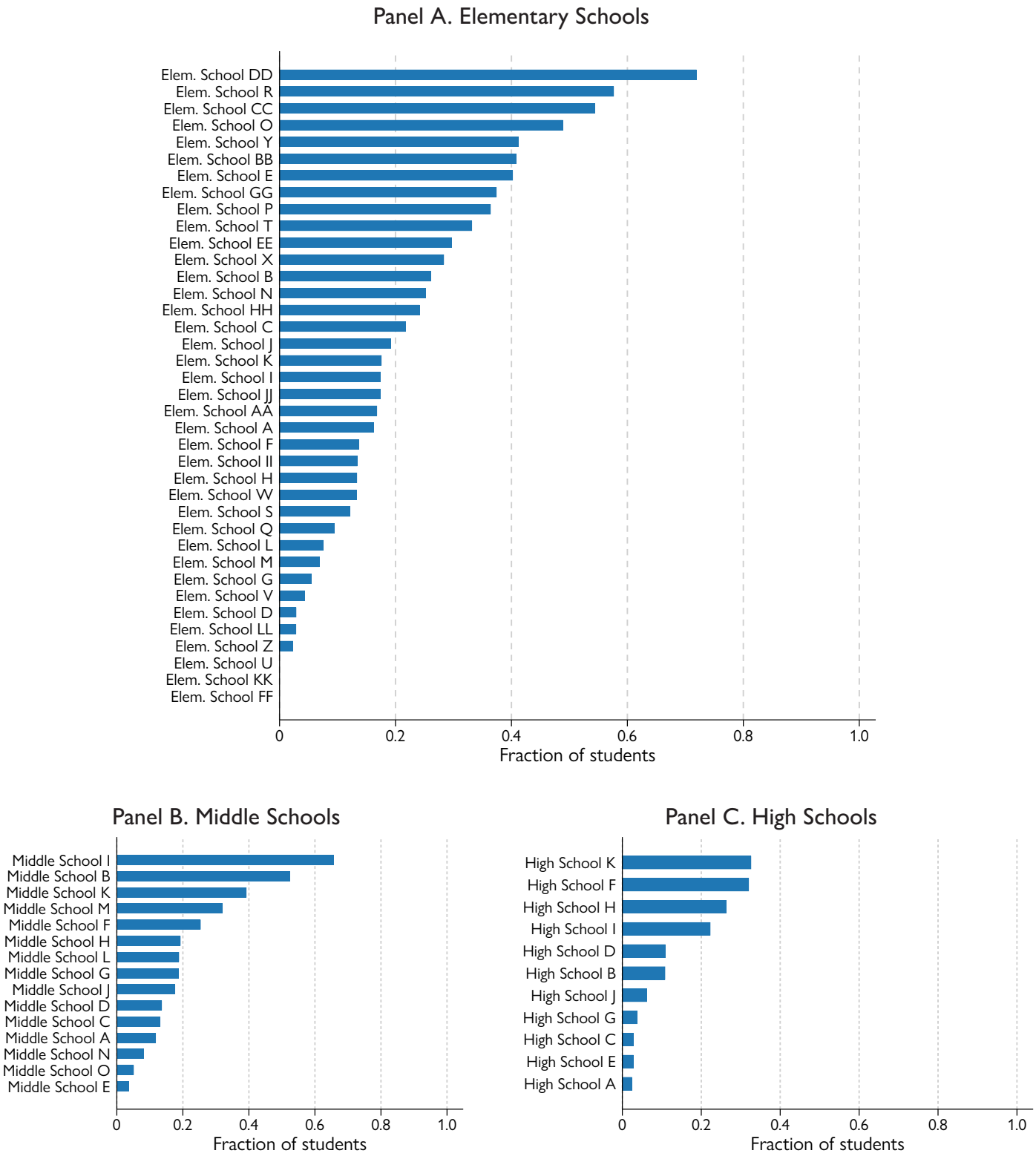
To determine the relationship between virtual tutoring use and student achievement growth, we estimate multivariate regression models that measure the correlation between winter SY 2021–22 national percentile rankings and the number of tutoring sessions a student engaged in between the days of their fall and winter assessments. Our primary model controls for each student's baseline achievement level (fall national percentile rank) and the number of instructional days between the fall and winter assessments for each student. In addition, we estimate models that also control for student grade level and the school a student attended.

Finding 1: Usage of Virtual Tutoring

Student usage of the Tutor.com service during SY 2021–22 was modest in terms of the number of students who used the platform and the frequency of use.

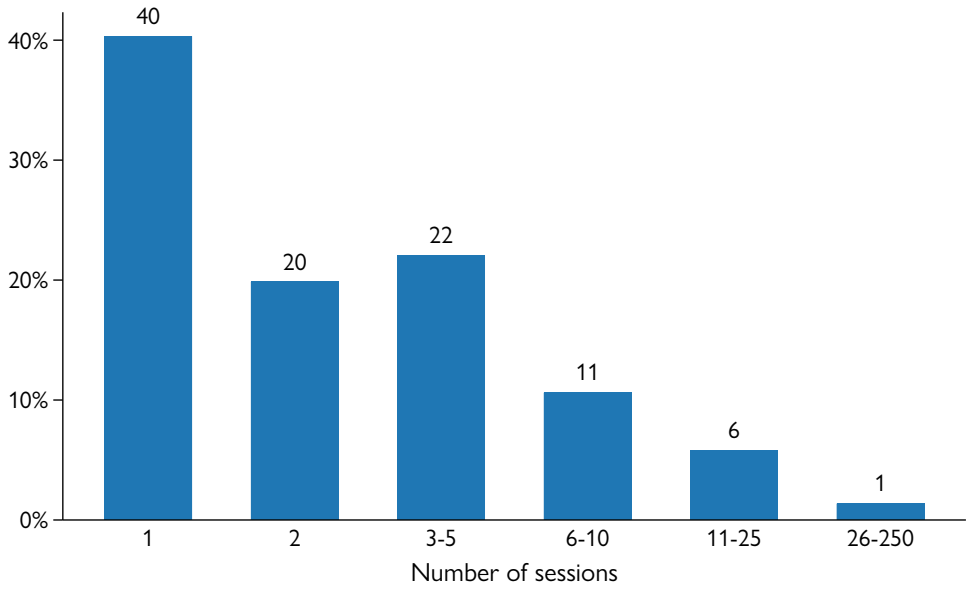
A total of 8,434 students used the Tutor.com platform for at least one tutoring session over the period October 1, 2021, to March 31, 2022. This represents 16.1% of all students enrolled in CCPS in October 2021. For the subset of 39,329 students who took a formative assessment (iReady or MAP Growth) in fall or winter of SY 2021–22, 7,988 or 20.3% of students participated in at least one tutoring session. Excluding small alternative schools, career academies, and virtual learning programs, there was considerable variation in usage across

Figure 1. Virtual Tutoring Use by School



Notes. This figure shows the fraction of test-taking students who participated in at least one Tutor.com session in SY 2021–22, by school. A test-taking student took at least one formative assessment (iReady or MAP Growth) in SY 2021–22. Small alternative schools, career academies, and virtual learning programs are not included in the figure.

Figure 2. Percentage of Students by Session Count Category



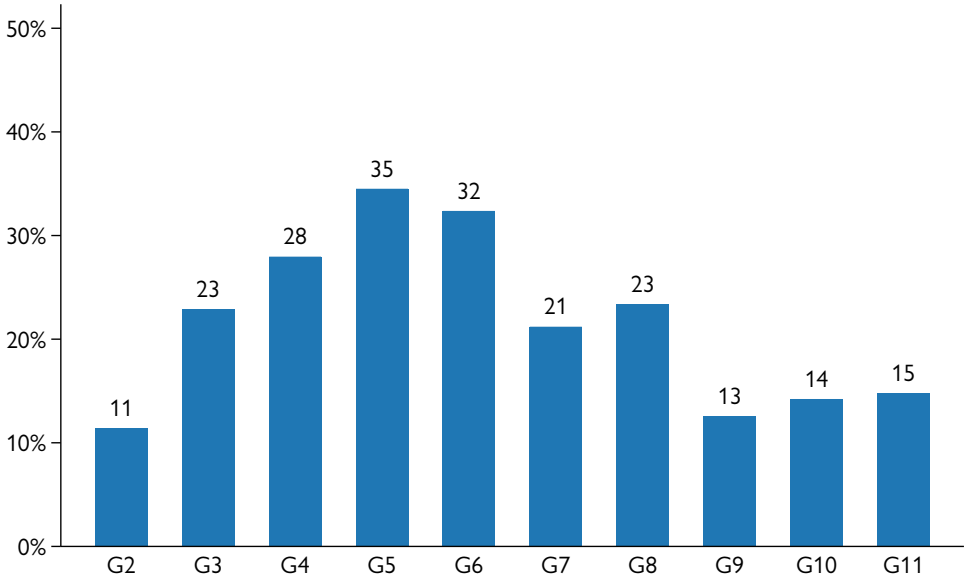
Notes. This figure shows the percentage of students who were Tutor.com users in SY 2021–22 by the number of sessions they participated in for students who participated in at least one tutoring session.

schools (see Figure 1). Nearly three-fourths (72%) of test-taking students at Elementary School DD engaged in at least one Tutor.com session, while no students used Tutor.com at three elementary schools.

Among Tutor.com users, 40% only participated in a single session, and another 20% only participated in two sessions from October through March in SY 2021–22 (see Figure 2). Over 82% of participants engaged in five or fewer sessions, less than one session per month. Only 115 students (0.3% of participants) used Tutor.com intensively, participating in more than 25 sessions over the span of six months.

For students who used Tutor.com at least once, average session duration was 17 minutes. Over one-fourth (26.5%) of sessions were brief, lasting five minutes or less. Just over half (53.5%) of the sessions exceeded 10 minutes in length.

Figure 3. Percentage of Students Participating in Tutor.com by Grade Level



Notes. This figure shows the percentage of test-taking students who participated in at least one Tutor.com session in SY 2021–22 by grade level. A test-taking student took at least one formative assessment (iReady or MAP Growth) in SY 2021–22. G2 is Grade 2, etc., and refers to students' grade level in SY 2021–22.

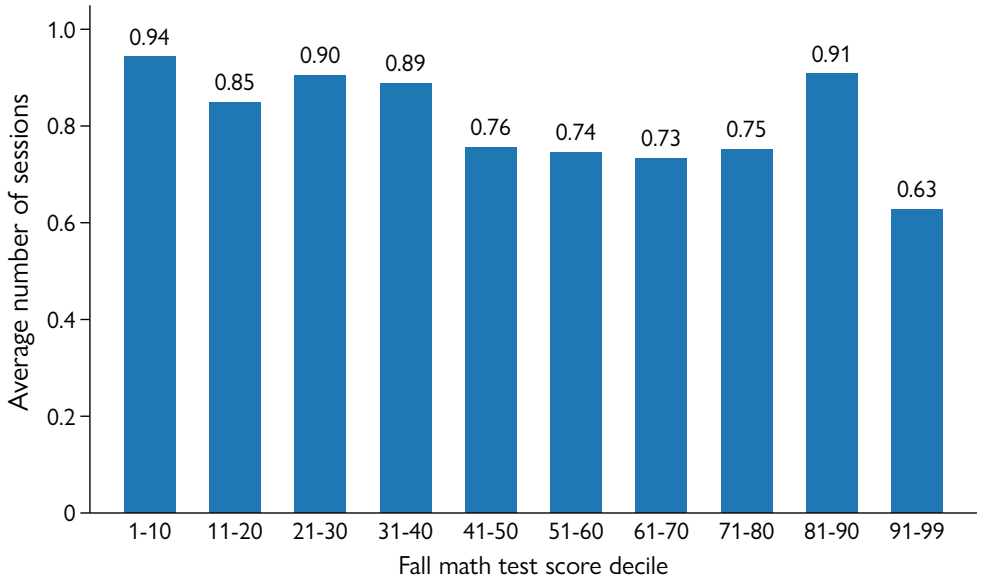
Finding 2: Variation in Tutor.com Usage Across Students

Usage was substantially lower among high-school students than elementary and middle-school students. Tutor.com was used by students at all achievement levels, though usage was generally lower among higher-achieving students.

Usage varied by grade level (see Figure 3). Usage was substantially lower among high-school students than elementary- and middle-school students. Among MAP Growth test-taking students in Grade 5, 34.5% participated in at least one online tutoring session; in Grade 6, the participation rate was 32.2%. In contrast, only 12.6% of Grade 9 students and 14.4% of Grade 10 students participated.

In fall of SY 2021–22, over half of tested students (56.9%) had a math national percentile rank (NPR) of 30 or less. For these students, Tutor.com usage was relatively high, varying from 0.94 sessions per student for students in the

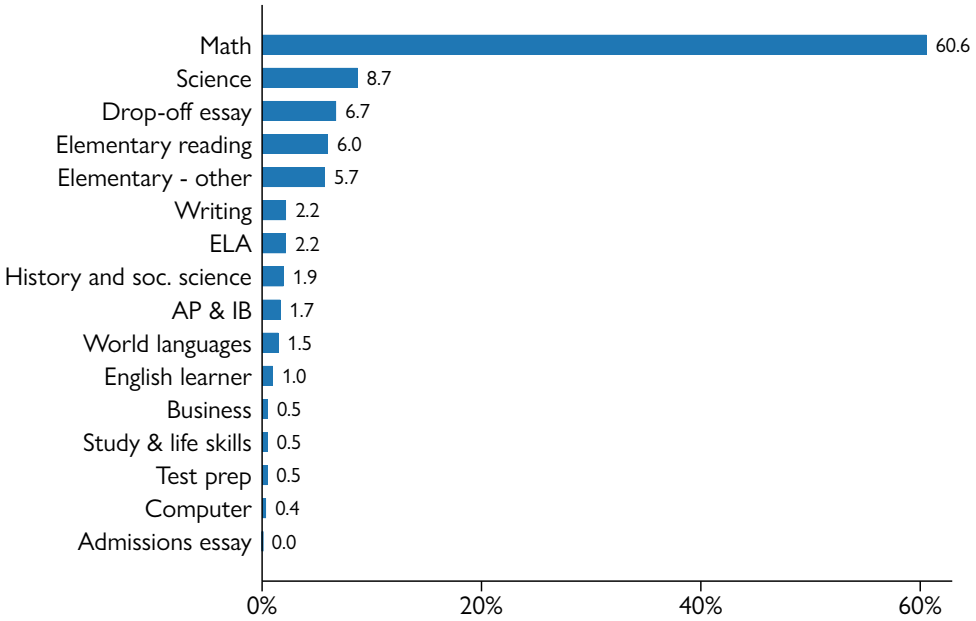
Figure 4. Average Number of Sessions per Student, by Math Test Score Decile



Notes. This figure shows the average number of Tutor.com sessions that students participated in in SY 2021-22 by their position in the fall SY 2021-22 math formative assessment score distribution. "1-10" refers to students whose national percentile rank (NPR) ranged from 1 to 10. NPR is calculated using formative assessment scores relative to the national student performance in SY 2016-17 (MAP Growth) or SY 2018-19 (iReady).

bottom decile (NPR of 1-10) to 0.85 sessions per student in the second decile (see Figure 4). For students in the fourth through eighth deciles (NPR of 41-80), usage was lower—ranging from 0.73 sessions per student for students in the seventh decile to 0.89 for students in the fourth decile. Usage by students in the top-two deciles (NPR of 81-99) was mixed, with students in the ninth decile engaging in 0.91 sessions per student on average and students in the top decile (91-99 NPR) engaging in 0.63 sessions per student.

Figure 5. Percentage of Tutoring Sessions by Subject Area



Notes. This figure shows the percentage of Tutor.com sessions in SY 2021-22 by subject area.

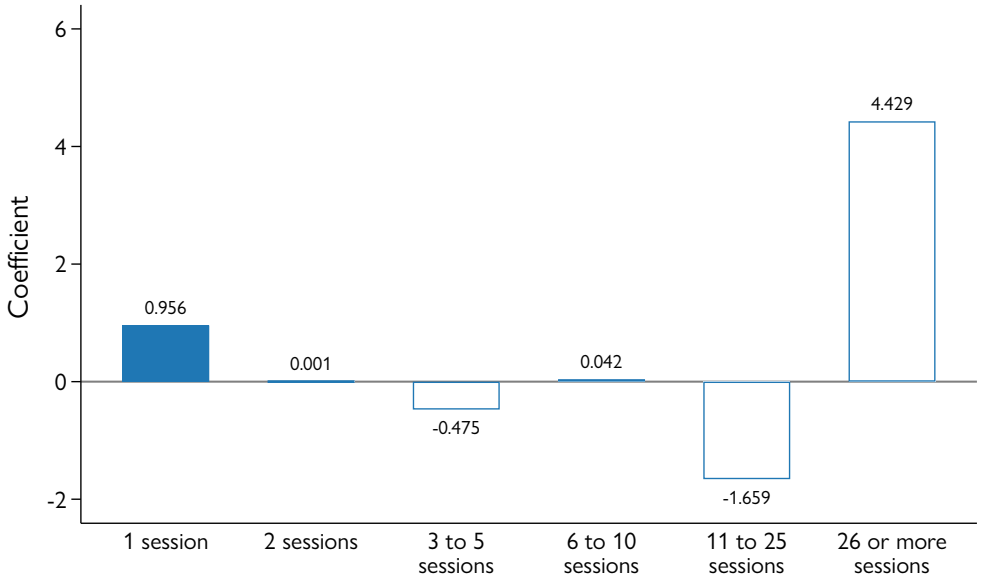
Finding 3: Timing and Subject Matter

About half of Tutor.com usage occurred during the school day, and one-time users' only exposure was primarily during the school day. Tutor.com was used most frequently for help in math, the subject area where pandemic-era achievement declines have been the greatest.

Over half (53%) of online tutoring sessions were initiated during school hours on an instructional day. Among those students who only participated in a single tutoring session, 70% of students started their lone session during school hours on an instructional day. Thus, for many students, simply introducing them to the Tutor.com platform at school did not yield any usage outside of school hours.

Of the 33,871 tutoring sessions that occurred between October and March, by far, the most common use (60.6% of all sessions) was for help in math (see Figure 5). The second-most frequent subject area for tutoring was science (8.7%), followed by "drop off" submission of essays for review (6.8%) and elementary reading (6.0%).

Figure 6. Estimated Partial Correlation Between Number of Tutor.com Sessions in Math and Change in Math National Percentile Rank



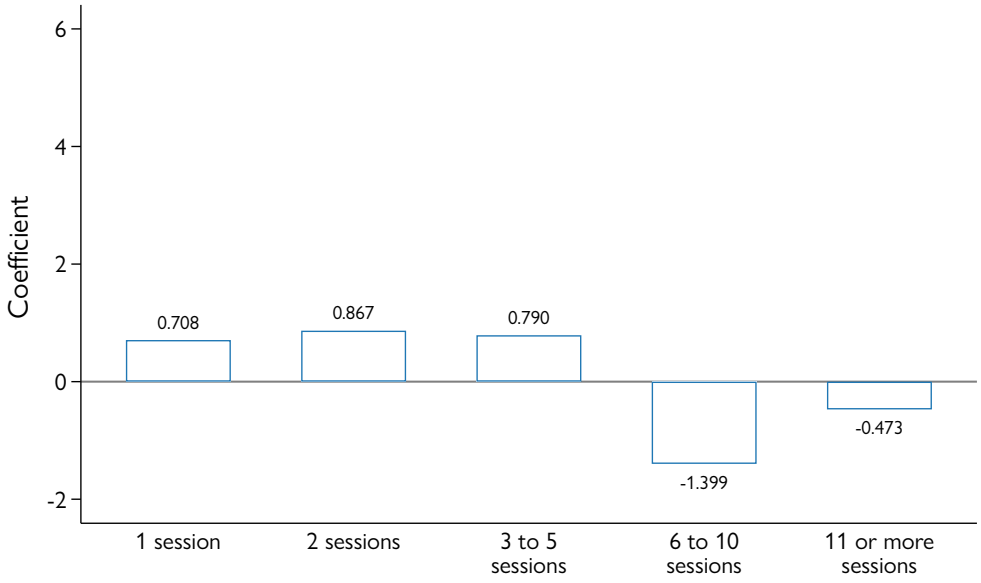
Notes. This figure shows the estimated partial correlation between each math session count category for Tutor.com usage and students' national percentile rank (NPR) on the math winter SY 2021–22 assessment. NPR is calculated using formative assessment scores relative to national student performance in SY 2016–17 (MAP Growth) or SY 2018–19 (i-Ready). The filled (leftmost) bar indicates a partial correlation that is statistically significant at a 95% confidence level. Thus, participating in one math session relative to no sessions is associated with approximately a one-percentile-point increase in math NPR, on average, holding other variables constant. The model controls for students' fall SY 2021–22 math scores and the number of instructional days between the fall and winter assessments.

Finding 4: Tutor.com Usage and Student Achievement Growth

In general, the extent of Tutor.com usage was not correlated with student achievement gains, though there is suggestive evidence that high-intensity use could yield gains in student achievement. The causal relationship between usage and student achievement is unclear because students chose their level of Tutor.com use.

Figure 6 provides estimates of the partial correlation between Tutor.com usage for math and national percentile rank changes in math achievement from our main model. Students who engaged in only one online tutoring session between the fall and winter assessments had a one-percentile-point gain in

Figure 7. Estimated Partial Correlation Between Number of Tutor.com Sessions in Non-math Subjects and Change in Math National Percentile Rank



Notes. This figure shows the estimated partial correlation between each non-math session count category for Tutor.com usage and students' national percentile rank (NPR) on the math winter SY 2021–22 assessment. NPR is calculated using formative assessment scores relative to national student performance in SY 2016–17 (MAP Growth) or SY 2018–19 (i-Ready). None of the estimated coefficients are statistically significant at a 95% confidence level. The model controls for students' fall SY 2021–22 math scores and the number of instructional days between the fall and winter assessments.

math achievement relative to students who did not use Tutor.com at all. In contrast, students who used the platform for two to 25 sessions did not exhibit achievement growth that was significantly different from that of non-users. High usage of Tutor.com (more than 25 sessions between the fall and winter exams) was associated with a 4.4 percentile increase in national rankings, but this effect was not significantly different from zero, likely due to the small number of high-intensity users (only 14 students).

Of course, only finding a statistically significant relationship for single-use makes little sense, and the estimated correlations should not be viewed as causal relationships. Rather, it seems likely that the estimates reflect both the causal effects of tutoring and the influence of unmeasured student characteristics that determine the extent of the Tutor.com usage. For example, students who are struggling with math concepts that are presented at school may use Tutor.com more but also have lower winter test scores in math.

To determine whether student choice of Tutor.com usage is biasing our findings, we conducted a "placebo" test by replacing measures of math tutoring with non-math tutoring and checking if there are effects on achievement with the presumption that tutoring in science or English Language Arts (ELA) should have no direct impact on math achievement but could be a proxy for a student's desire and ability to engage in online tutoring. We find patterns in the estimates for the correlation between non-math tutoring and math test scores that are similar to those between math test scores and the number of math tutoring sessions (see Figure 7). This suggests that our estimates of the relationship between math tutoring and math scores are tainted by student self-selection.

As indicated in Figure 1 and Figure 3, there are substantial differences in Tutor.com usage across schools and across grades. Thus, our main analyses could be conflating usage effects with differences across grade or schools that impact test scores. However, if we restrict our analysis to comparisons of students in the same grade or comparisons among students within the same school, we get results that are similar to those presented in Figure 6. When making within-school comparisons, no usage level, including the single-use category, had a statistically significant correlation with winter test scores.

Policy Implications

Consistent with recent evidence on virtual tutoring in California,[5] we find that participation in virtual tutoring by students in CCPS was low. Only about one in every five test-taking CCPS students used Tutor.com at all, and even fewer—about 8%—engaged in more than two tutoring sessions over a six-month period. One positive finding is that what usage did occur was concentrated in math where pandemic-era reductions in student achievement growth were much greater than in reading.[6]

Unfortunately, because usage was relatively low and students chose how much they would use Tutor.com, we cannot get a clear picture of the platform's causal impact on student achievement growth. While a small group of intensive users appear to have benefited from using Tutor.com, the impact estimates are imprecise. A placebo test suggests that unmeasured student characteristics that are correlated with both virtual tutoring use and test scores may be biasing our analyses of the impact of Tutor.com use on student achievement growth.

It seems clear that if virtual tutoring is to be an effective tool for accelerating student achievement growth, a necessary condition is that student usage must increase. The most effective way to do that would be to integrate Tutor.com use into the school day. Alternatively, students could be offered incentives to participate before or after school, though that is not likely to be as successful, as participation in programs offered outside of the regular school day tend to be low. Messaging parents to encourage their children make use of the virtual tutoring service, as suggested by Robinson et al. (2022), may be helpful as well.

More generally, it appears that voluntary acceleration programs outside the regular school day are unlikely to improve the learning trajectories of most students, particularly those who have suffered reductions in achievement growth during the pandemic. High-dosage tutoring and other acceleration strategies to combat slowdowns in achievement growth are going to have to be fit into the regular school day to be effective. While adjusting school schedules to accommodate acceleration interventions can be challenging, schools may be able to utilize time blocks that have already been set aside for students to receive assistance outside of the normal classroom instruction periods.

Acknowledgments

The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through grant R305A230400 to the Georgia State University Research Foundation, Inc. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education. We thank Thomas Goldring, Maggie Reeves, and Tyler Rogers for their assistance with this report.

Endnotes

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4. Over 95% of fall MAP Growth assessments were taken between August 9 and September 14, and more than 95% of fall iReady assessments were taken between August 9 and September 23. For the winter assessment, over 95% of MAP Growth tests were taken between November 29 and January 26, while more than 95% of iReady winter assessments occurred between November 29 and February 8.

5. Robinson et al. (2022)

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About the Georgia Policy Labs

The Georgia Policy Labs is an interdisciplinary research center that drives policy and programmatic decisions that lift children, students, and families—especially those experiencing vulnerabilities. We produce evidence and actionable insights to realize the safety, capability, and economic security of *every* child, young adult, and family in Georgia by leveraging the power of data. We work alongside our school district and state agency partners to magnify their research capabilities and focus on their greatest areas of need. Our work reveals how policies and programs can be modified so that every child, student, and family can thrive.

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