

VIRTUAL HIGH-DOSE TUTORING

The COVID pandemic exacerbated disparities in math knowledge.

Despite enormous attention devoted to the achievement gap over the last 30 years, inequity has been the most persistent, most pressing issue in American education. Research has demonstrated time and time again that students of color and students from lower-income families disproportionately attend under-resourced schools (Darling-Hammond, 1995; Perna, May, Yee, Ransom, Rodriguez, & Fester, 2013; Lewis & Diamond, 2015). And even well-intentioned educators often have lower expectations for these students (Lewis & Diamond, 2015). These persistent barriers have implications that last well into adulthood, contributing to the well-documented differences in college access, completion, and lifelong earnings.

It is indisputable that the COVID-19 pandemic affected all students. However, it disproportionately impacted students of color and students from lower-income families, exacerbating existing inequities in American education (Nickow, Oreopoulos, & Quan, 2020, U.S. Department of Education, Office for Civil Rights, 2021, Hamilton & Kim, 2022). The pandemic's effects are particularly notable in math, which has a three-month learning loss compared to a

one-and-a-half-month loss in reading (Dorn et al., 2020).

Consequently, educators are seeking effective methods to accelerate math learning. Rigorous research provides ample evidence that high-dose tutoring (HDT) can produce large learning gains for a wide range of students (Nickow et al., 2020; Robinson, Kraft, Loeb, & Schueler 2021). HDT is defined as tutoring that is provided with one or two students per tutor, in person, three days or more times per week. While such intensive, individualized tutoring has been shown to be effective, it is expensive and very difficult to implement on a large scale. Providing such individualized, high dose, tutoring virtually could be the solution, as tutors no longer have to be in the same location as students and scheduled time slots are not confined to the availability of a physical building.

In this brief, we report on findings and implications from an evaluation of the Saga Education Virtual Math Tutoring Program. Research has demonstrated that Saga provides an effective tutoring model when delivered in person (Robinson et al., 2021). In this project, we studied whether the program was also effective when delivered virtually. We found that, overall, students who received more virtual tutoring showed

the most improvement in math achievement (Hamilton, Feldman & Gephardt, 2021). However, providing virtual tutoring to high school students proved to be tricky. Despite the offer of free tutoring and the provision of free devices and Wi-Fi, program participation was unexpectedly low. We dove deep into the reasons for this low uptake and describe important lessons learned for future HDT programs seeking to reach high school students virtually.

Saga delivers virtual HDT to boost math scores on the SAT and increase college attendance.

As part of its commitment to improving equity in college access, the College Board introduced Saga's high-dose, virtual tutoring program to low-income, urban high school students in Chicago and New York City (NYC) with the goal of improving their SAT math scores. Starting in the summer of 2019, 427 high school juniors from Chicago and NYC public high schools were randomly assigned to the tutoring program or to a control condition. To be eligible, students had to express an interest in tutoring and have PSAT10 math scores between 400 and 480. The program's goal was to push students' math scores above 530, which is the SAT College and Career Readiness Benchmark.¹ The hope was that, if successful, virtual HDT could be used on a wide scale to dramatically increase the number of traditionally marginalized students attending college.

The Saga Education Virtual Math Tutoring Program provided free virtual SAT math

instruction three times per week for six weeks during the summer. It also provided instruction once a week for 12 weeks during the school year. Students received free laptops and free Wi-Fi to ensure connectivity. Students assigned to the treatment condition were required to register for the program, pick up needed equipment, schedule their tutoring sessions, and participate regularly.

Although the program was virtual, it relied upon real-time interactions between the students and their tutor and the ability for both parties to jointly engage with math problems. In addition, students were required to complete homework, and tutors were trained to use data to monitor student growth and inform future lessons. These activities took place through an online communication platform developed by Woot Math with real-time video, back-end data collection, interactive homework lessons, and a mechanism for students and tutors to write out math problems and share them electronically.

Caution in interpreting findings is recommended due to high study attrition.

Serving as an external evaluator, NORC at the University of Chicago (NORC) studied the impact of the Saga Education Virtual Math Tutoring Program. To do this, NORC used a randomized control trial design, randomizing students separately in Chicago and NYC, and blocking on PSAT10 math scores. Despite the rigor of this methodology, the authors urge caution in

¹ Students with an SAT Math score of 530 or above have a 75% chance of earning at least a C in first-semester, credit-bearing college courses in algebra, statistics, precalculus, or calculus.

<https://satsuite.collegeboard.org/k12-educators/about/understand-scores-benchmarks/benchmarks>

drawing causal inferences. The study experienced higher than anticipated attrition, with many students unable to take the SAT exam (the study outcome) due to the COVID outbreak and teacher strikes in Chicago. In addition, one-third of the teenagers assigned to receive tutoring did not receive any. NORC dug deeper into this high rate of noncompliance and found that scheduling, equipment pickup, and technical glitches were significant barriers to participation for many students as they sought to navigate busy school and summer schedules with the requirements of the program (Feldman & Hamilton, 2021).

Dose is critical with HDT, but participation can be challenging.

Because our study's impact findings were compromised by high levels of attrition, due to the cancellation of many SAT test administrations in spring 2020, what we can say about impact is limited. Despite this, the study still provides some important insights.

While *the offer* of virtual high-dose tutoring did not have a statistically significant effect, we find that virtual HDT had a positive impact on their math SAT scores if we limit our analysis to only the students who *received* tutoring. The most central lesson learned is that, for virtual HDT, dosage is key. Students who received the maximum available dose were nearly twice as likely to cross the 530 math SAT benchmark (a statistically significant finding). Moreover, the students who engaged in the tutoring reported enjoying the program—they felt they learned from the program and wanted more tutoring. Students receiving tutoring also completed an average of 7.5 hours of Khan Academy homework on their own time – another indication of engagement and perceived value. **These results highlight**

the promise of high-dose, virtual tutoring as a strategy to accelerate academic achievement in math. And, while it may seem obvious that more tutoring leads to better results, this study provides important lessons in how to not only *offer* HDT but also how to effectively get students to *engage in* HDT.

While the low rate of tutoring uptake was unexpected, the study goes on to provide valuable lessons on how to overcome the multiple barriers to teen engagement. First, **timing matters.** Reaching out to potential participants during the school year is the most effective as academics are top of mind and students can receive encouragement from teachers and peers. Second, buy-in from **parents matters.** A lack of parental consent decreased the number of students who could participate by over 200. Third, **communication matters.** During the school year, emails effectively reached students. But over the summer, students were no longer checking their school email boxes, and additional forms of communication were needed. Lastly, **scheduling matters.** Over 60 percent of students requested to have their schedules changed at least once, suggesting that flexibility in scheduling is key. Over the summer, work, family obligations, summer school, and travel made it very difficult for many teens to participate in the tutoring. Taken together, these lessons translate easily into concrete strategies for effectively engaging high school students in virtual HDT, thereby accelerating their post-COVID math learning, and improving their chances of college attendance.

More research is needed to assess HDT.

Our research has shown that HDT, delivered virtually, is a promising approach

to accelerating learning and potentially closing opportunity gaps for traditionally marginalized students. However, it is not a panacea. In this study, we demonstrate that there is strong interest in free, online tutoring and that virtual HDT can have positive effects on student achievement when delivered at a high dosage. We also found that interest is not enough. Students need to have access to the necessary technology, devices, and Wi-Fi, and the tutoring itself needs to be provided in a way that encourages teens to participate regularly. Our study provides recommendations on how to address these challenges but is more limited in what it can say about impacts. We therefore recommend additional impact study be conducted of programs that utilize our recommendations for teen participation.

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