District of Columbia

HELPING CHILDREN LEARN WITH TUTORING: EXPERIENCES FROM THE DISTRICT OF COLUMBIA

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KEY MESSAGES:

- Rigorous impact evaluations of several tutoring programs implemented in the District of Columbia suggest that the programs have statistically significant impacts on student learning.

- Tutoring sessions should be active, varied, and engaging – one program had students repeatedly throwing a golf ball up to the roof of their gymnasium and measuring the time it took for the ball to fall down in order to estimate statistically the value of the gravity constant.

Introduction

Tutoring and other supplemental education programs have received renewed attention in the United States in the last fifteen years. Under the 'No Child Left Behind' Act adopted in 2001, public schools that had not made enough progress in learning assessments for two consecutive years were required to provide such services to children. This makes sense given that there is evidence that tutoring programs can help students learn better.

This brief summarizes selected findings from the evaluation of two tutoring programs implemented in Washington, DC and other cities by leading nonprofits in this area: Higher Achievement and Reading Partners. While these are not the only tutoring programs implemented in the district, they have the benefit of having been evaluated rigorously. In addition, the brief also gives examples of great lessons plans for another tutoring program implemented by a local Rotary club. While there are elements of evaluation for that program as well, the insights provided by that program lie more in illustrating how creativity can help make tutoring lessons more engaging for students, and even fun.

Box 1: District of Columbia Education Series Primer

Why a series of briefs on innovations in education in the District of Columbia? While much of the work of the Education Practice at the World Bank focuses on low and middle income countries, insights from innovations in OECD countries can also be highly valuable when thinking about education policy. This series focuses on innovative programs in Washington, DC.

What are the topics discussed in the series? The series looks at a number of innovative programs related among others to the curriculum, student learning, tutoring, and skills for the labor market. Private provision through charter schools is also discussed. Many of the programs have received support from the World Bank Community Connections or individual Bank staff.

What is the question asked in this brief? The question is: How much difference do tutoring programs make for student learning, and how can tutors make lessons more engaging?

How is the question answered? Findings from the evaluation of two tutoring programs in Washington, DC, are summarized and examples of great lessons plans for another program are shared to show how lessons can be engaging and even fun.

Several tutoring program implemented in the District of Columbia have demonstrated impact on student learning. These successful programs include Higher Achievement and Reading Partners.

Not all tutoring programs for disadvantaged children work equally well. The literature on tutoring and out-of-school-time programs suggests that in order to achieve higher impact, it is often beneficial to:

1) Provide consistent and sustained instructional time for students, for a total of at least 40-45 hours per year (and often more);
2) Provide tutoring to small groups of students, preferably less than ten at a time;
3) Follow a curriculum that is rich in content and takes into account the specific needs of students while being also closely related to what students learn during the regular school day;
4) Ensure that tutoring sessions are active and varied (for example by combining structured and unstructured instruction, as well as individual and collective work time) and focused on targeting the development of specific skills;
5) Foster positive relationships between tutors and students; and finally
6) Foster collaboration between teachers and tutors with support of administrators, including for constructive evaluation[1].

Successful tutoring program often provide consistent and sustained instructional time for small groups of students, taking into account the needs of students and ensure that tutoring sessions are engaging. Good collaboration between teachers, tutors, and students are also key.

Many of these features appear to be at work in successful tutoring programs implemented by nonprofits in Washington, DC. For two such programs – Higher Achievement and Reading partners, results from recent impact evaluations suggest that the programs are having a positive impact on student learning.

Higher Achievement is a nonprofit that operates in Washington, DC, Baltimore, Richmond, and Pittsburgh. Students in the program meet three days a week during the school year. They first complete homework with support from teachers and volunteers. They may then have dinner and work on a specific subject in small groups of two or three with a trained volunteer mentor.

This is a rigorous program – overall, students spend 650 hours per year in the program between 5th and 8th grade.

Data from Higher Achievement suggest that three fourth of the enrolled students improve their grade point average (GPA) by at least one letter grade, and 95 percent graduate from high school – two times the rate of their peers. Three fourths of the students also go on to graduate from college – four times the rate of their peers. The program has been evaluated rigorously by MDRC, a nonprofit and nonpartisan research organization. Researchers from the University of Texas at Austin compared Higher Achievement students ("scholars") with a control group of students who applied to the program, met the admissions criteria, but were not selected to participate through a randomized lottery.

According to the evaluation[2], the program had a statistically significant positive impact after one year in the on mathematics proficiency and reading comprehension, as measured by standardized tests. The mathematics impacts lasted four years after enrollment in the program. The program also increased the probability that the students would enroll in high performing private high schools. These findings suggest that intensive out-of-school-time programs like Higher Achievement can be beneficial for student learning.

Rigorous impact evaluations for two tutoring programs implemented in Washington, DC – Higher Achievement and Reading partners, suggest that the programs have statistically significant impacts on student learning.

Another program that also operates in Washington, DC, and that has been rigorously evaluated by MDRC, is Reading Partners. The program serves more than 7,000 students in over 130 schools in California, Colorado, New York, Oklahoma, Maryland, South Carolina, Texas, and Washington, DC. As is the case with Higher Achievement, Reading Partners works in (large) part with volunteers, which helps in keeping costs down. The evaluation of Reading Partners was conducted in 2012-13 in a subset of the schools where the program operates. Results suggest gains in reading proficiency[3].

From a policy point of view, before expanding tutoring programs, it is important to ensure that the programs are cost effective. But when programs are staffed in large part

[1] Heinrich, C. J. and P. Burch, 2011, The Implementation and Effectiveness of Supplemental Educational Services (SES):A Review and Recommendations for Program Improvement, Paper presented at the Tightening Up Title I conference, Center for American Progress and American Enterprise Institute, Washington, DC.

[2] Herrera, C., J. B. Grossman and L. L. Linden, 2013, *Staying On Track: Testing Higher Achievement's Long-Term Impact on Academic Outcomes and High School Choice*, New York, NY: A Public/Private Ventures project distributed by MDRC.

[3] Jacob, R. T., T. J. Smith, J. A. Willard, and R. E. Rifkin, 2014, Reading Partners: The Implementation and Effectiveness of a One-on-One Tutoring Program Delivered by Community Volunteers, MDRC Policy Brief, New York: MRDC.

by volunteers, they are likely to be cost effective. In some cases, particularly in developing countries, it is also important to ensure that tutoring does not become a substitute for good teaching in school[4]. But again, by and large, tutoring tends to be beneficial for students when the programs are well implemented.

Creativity in tutoring can make an important difference in how much students learn and succeed.

Tutoring sessions should be active, varied, and engaging. One small tutoring program focusing on STEM (Science, Technology, Engineering and Mathematics) implemented for a decade in an elementary school in the District of Columbia by the Rotary Club of Washington, DC, illustrates how this can be done[5]. The program focuses on mathematics and reading for students in second through fifth grade. It runs once or twice a week for most of the school year, thereby reaching the minimum threshold of the number of hours required to make a difference according to the literature. Students are not tutored individually, but instead participate in groups of three or four with within each group a common level of achievement (placement is based on previous test results and an assessment). This makes it feasible to tutor more students, and it also promotes interactions between students that facilitates learning and makes the program more interesting for them.

The program is run in close collaboration with teachers who select the students who they believe are the most likely to benefit from tutoring. The program actually takes place during school hours, with groups released from the classroom for sessions of 45–60 minutes. Tutors know the content of classroom instruction and maintain contacts with teachers throughout the year. They focus the tutoring sessions on materials that are similar to tests that students must take by grade in the District of Columbia, while also providing additional instruction.

Students generally read questions from previous tests one question at a time, and discuss each question before doing individual work. Behavioral rules for the sessions are spelled out clearly by the tutors, such as "pay attention", "raise your hand if you want to speak", "respect the tutor and the other members of the group", with appropriate disciplinary action matched to these rules – not more lax, nor more severe. Positive reinforcement and congratulations are provided often individually or in front of the whole group. After a few weeks, students recognize that the tutors know a lot, come weekly without fail to help out, and are also good buddies.

The first part of each tutoring session focuses on prior test problems from DC standardized tests. These tests are augmented by problems that tutors or teachers prepare to emphasize special themes. In mathematics for example, a package would contain around 80 problems, ranging from routine arithmetic operations to data analysis (histograms, bar charts, tables), basic geometry, and problems that require reading to make sense of what is to be done. The problem set is paced by student progress, not by a time schedule. Tutors make sure that if a problem is difficult to understand for one or more of the students, all students understand what the problem is driving at before they start to work on the problem. Students work on the problem until all have finished, but if the tutor sees that at least one student remains confused, a group discussion is launched to help the students get the correct solution. The tutors also try to interject simple science illustrations within the problems to be solved.

After 20–30 minutes of working on problems from previous tests or from material generated in advance by the tutor or classroom teacher, the second part of each session is devoted to playing "math games" with dice, cards or special game material, normally with two teams of two students each to engender competition. Once they have a few sessions under their belts, the students anticipate the game playing part of the session, so it is kept for the end, with the proviso that they have to have behaved well enough to earn it (this is not a matter of acing the problems in the first part of the session; it is a matter of ensuring discipline during the session).

> In a typical tutoring session from one of the STEM tutoring programs in Washington, DC, after 20–30 minutes of working on problems from previous tests or material generated in advance by the tutor or classroom teacher, the second part of the session is devoted to playing "math games" for example with dice or cards.

For example, 2-5 dice are used either for addition or for multiplication. Each student rolls the dice once, the team adds or multiplies the numbers appearing on the dice, and this is repeated. The team with the highest total wins that round. With one, two, or three dice, the concepts of probabilities are illustrated by having students roll dice enough times to confirm the probability of specific numbers being obtained – this is a nice way to compare the theory of probability with the actual results of a trial.

Card games can also be used, giving for example a value of 10 for all picture cards, and a value of one for an ace. Tutors also make use of suits to illustrate subtraction and

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[4] For a case study on the potential negative impact of after-school tutoring by teachers on learning in school in developing countries, see Jayachandran, S., 2014, Incentives to teach badly: After-school tutoring in developing countries, *Journal of Development Economics* 108: 190–205.
[5] This section is adapted from Messer, D. and Q. Wodon, 2014, Learning and Having Fun! A Tutoring Program that Makes a Difference, Rotarian Economist Brief No. 2014-21.

division. For example, black suits add, while red suits subtract, or black suits multiply, while red suits divide.

The tutors also strive to show with simple experiments how mathematics can be useful for scientific inquiry. One of the experiment consists in estimating the gravitational acceleration force on an object at sea level, where Washington, DC is located. The students throw a golf ball in the air in the school gymnasium. The time interval from apogee to hitting the floor is recording using a simple stop watch. This is repeated 20-30 times. Also recorded are estimated distances from apogee to the top of the ceiling, which is done by first measuring the distance from floor to ceiling and next by how much the ball misses the ceiling. In this experiment, the average estimate of 'g', the gravitational acceleration due to the force exerted by the earth on the golf ball, turned out to be within three percent of the accepted value for Washington, DC, even though the individual computations per throw varied widely. This helps in showing to the students how approximate values, when averaged, may converge to true values with reasonable accuracy.

Two students perform a gravity experiment.
Photo credit: Donald Messer

Tutoring sessions should be active, varied, and engaging – one program had students repeatedly throwing a golf ball up to the roof of their gymnasium and measuring the time it took for the ball to fall down in order to estimate statistically the value of the gravity constant.

Another experiment used a hygrometer, an instrument for measuring humidity or moisture content as well as temperatures. This was coupled with water and iced water in cans. Students had to figure out the temperature at which beads of water formed on the outside of the tin cans, which was followed by a discussion of what fog is, how temperature affects relative humidity, why clouds form and sometimes rain or snow is produced.

Two students work with a hygrometer.
Photo credit: Donald Messer

How successful has the tutoring program been? The program is too small to carry a rigorous impact evaluation, but results from standardized tests suggest that the tutored student perform better than the other students in the school, and also better than the average student in the District of Columbia school system as a whole.

Conclusion

Tutoring programs can make a major difference for students who perform less well in school. This brief has presented evaluation data from two such programs that appear to be successful in the District of Columbia according to randomized controlled trials. It has also given illustrative examples from a smaller program of ways to keep tutoring lessons engaging for students. The programs are helping students. But for the volunteers who participate in the programs as well, the experience is rewarding. In addition, beyond better performance on examinations and tests, the programs can through interactions among students and tutors help widen the students' (and tutors') horizons.