

Online tutoring for students from vulnerable backgrounds in Navarre

Lucas Gortazar, María Hernández-de-Benito, Claudia Hupkau,

Teresa Molina-Millán, Antonio Roldán-Mones¹

June 2024

Extended Abstract

This RCT, implemented by the Department of Education of the Government of Navarra, consists of an intensive online tutoring program for students from vulnerable backgrounds, with the aim of improving their academic skills in the area of mathematics. The intervention, implemented in two waves, has been carried out in 46 public education centers of the Autonomous Community of Navarra. In the first wave, a stratified random assignment was used and students were distributed into two treatment groups that received tutoring for 8 weeks and a control group. The difference between the two treatment groups is the number of students per tutoring session, with one group of two students (T1) and the other of three students (T2). In the second wave, stratified random assignment was also used to distribute the students between the groups, but an additional treatment group (T3) was added. In this additional group, the 8-week program has two students per tutor, but the tutors received additional training in social-emotional skills. The analysis shows positive and significant effects of tutoring on the math grades of the students assigned to tutoring in both waves, both in placement tests and in the students' school grade. There is also an improvement in the math self-efficacy and anxiety index in mathematics in the group assigned to tutoring with 3 students in the first wave and in the group with the social-emotional component in the second wave. Finally, in the latter group we also observed an increase in the students' interest in mathematics.

Study Design

The Department of Education of the Government of Navarra has implemented an intensive program of online tutoring in mathematics with professional teachers. The program has been aimed at students in 5th and 6th grades of primary school and 1st and 2nd years of secondary school (10 to 14 years old) from vulnerable environments, with the hypothesis that these tutorials will have a very positive impact on student learning.

Specifically, three different treatments have been implemented, all of them carried out by teaching professionals, outside school hours, in 90-minute sessions, twice a week, for 8 weeks. The first treatment (GT1) consists of an intensive program of online math tutoring in groups of two students per tutor. The

¹ Gortazar: Universitat Ramon Llull, ESADE, Spain and World Bank, United States of America; Hernández-de-Benito: University of Alicante, Spain; Hupkau: CUNEF, Spain; Molina-Millán: University of Alicante, Spain; Roldán-Mones: Universitat Ramon Llull, ESADE, Spain and Department of Social Policy, London School of Economics, United Kingdom.

second treatment (GT2) is the same as GT1, but with 3 children per tutor. If the results were similar to those obtained with 2 children, the GT2 design could significantly lower costs in future public policy designs. The third treatment (GT3), which was only implemented in part of the sample, consists of varying the training received by tutors. The tutors in the third treatment received an additional 15 hours of training (30 hours in total versus the 15 hours of training received by tutors in treatments GT1 and GT2) with greater emphasis on socioemotional aspects.

The tutoring classes were taught online (remotely) from rooms provided by the Government of Navarra. The tutors had electronic devices and internet connection, and used digital platforms to give the tutorials. On the other hand, the students had to have, provided by the Government of Navarra, a Chromebook device and internet connectivity, through the use of digital platforms.² and internet connectivity, through which they could connect to the tutorials. During the implementation of the treatments, the tutors had to coordinate with the students' educational centers for a better follow-up of the students.

The project was implemented in two waves. In the first wave, developed between March and May 2023, treatments 1 and 2 were carried out. In the second wave, developed between September and November 2023, treatments 1, 2 and 3 were implemented. Prior to the implementation of the treatments, the student body was randomly divided into 3 groups (in the first wave) and 4 groups (in the second wave), so that one group (control, CG) did not receive any treatment, and the other groups (GT1, GT2 and GT3) were assigned treatments 1, 2 and 3, respectively. The assignment of the participating students to each group was done randomly, at the individual level, stratifying by school, school year, vehicular language and gender. The students from the first wave did not participate in the evaluation of the second wave.

The eligible population for this study is made up of primary and secondary school students from vulnerable socioeconomic backgrounds and enrolled in public primary and secondary schools. The territorial organization of the Social Services of the Comunidad Foral de Navarra is divided into 44 zones. In the first wave, 10 eligible areas were selected for having a poverty rate above 70%. In the second wave, in order to increase participation, the poverty index threshold was reduced to 50%, resulting in 14 eligible areas. Within these eligible areas, more than 50 schools were contacted in the first wave and more than 80 in the second wave to learn of their interest in participating, with priority contact given to schools with the highest educational vulnerability index. In the first wave, 18 schools agreed to participate, and in the second, 39 schools. Among the participating centers, all families of students in the last two years of primary education (5th and 6th) and the first two years of secondary education (1st and 2nd ESO) were offered the opportunity to participate.

To evaluate the impact of the tutoring, questionnaires were administered to the students to assess their expectations and attitudes towards education, as well as mathematics placement tests before and after implementing the treatments. In addition, the report cards of the participating students were collected and information on their vulnerability status was obtained through administrative records (identification of vulnerable students by the Department of Education). A brief questionnaire was also administered to families to obtain information on the educational level and employment situation of the adults living with

² Chromebook devices are portable computers running the Chrome OS operating system developed by Google. These devices are mainly focused on the educational sector.

the student. Questionnaires were also administered to tutors to learn about their previous dedication to teaching, particularly tutoring, and to gather their experience in tutoring in this project, including their expectations about the academic future of the students assigned to their online tutoring.

Empirical Strategy

We estimate the Intention to Treat (ITT) effect of mentoring on the set of outcome variables. Specifically, the regression to be estimated in the first wave is the following specification ancova:

$$y_i = \alpha + \beta_1 T1_i + \beta_2 T2_i + \gamma X_i + \delta y_{-1,i} + \epsilon_i$$

where y_i is the dependent variable of interest observed after the intervention for student i , $T1_i$ y $T2_i$ are binary variables equal to one if the student has been assigned to the tutoring treatment group with 2 students (GT1) or with 3 students (GT2), respectively, with the control group being the omitted category. $y_{-1,i}$ is the lagged value of the dependent variable (i.e., before the intervention), X_i contains the stratification variables, and ϵ_i is the error term robust to heteroscedasticity. In cases where the value $y_{-1,i}$ is not available, a binary variable equal to one will be included indicating it and the value of $y_{-1,i}$ with the value zero. For all specifications, we estimate linear regressions regardless of whether the results are continuous or discrete. The variables used for stratification in the first wave are school center, sex, and grade, and in the second wave, school center, sex, grade, and Spanish or Basque.

In the second wave, the specification of the regressions is identical to the first wave, except that a third binary variable is added capturing the assignment to the tutoring group with 2 students plus the socio-emotional component (GT3) ($\beta_3 T3_i$).

References

Bethhäuser, B.A., Bach-Mortensen, A.M. and Engzell, P., 2023. A systematic review and meta-analysis of the evidence on learning during the COVID-19 pandemic. *Nature Human Behaviour*, pp. 1-11.

Carlana, Michela and La Ferrara, Eliana, *Apart But Connected: Online Tutoring and Student Outcomes During the COVID-19 Pandemic* (February 1, 2021). CEPR Discussion Paper No. DP15761.

Gortazar, Lucas and Hupkau, Claudia and Roldán, Antonio, *Online Tutoring Works: Experimental Evidence from a Program with Vulnerable Children* (March 2023). CEP Discussion Paper No. 1908.

Kraft, Matthew A., John A. List, Jeffrey A. Livingston, and Sally Sadoff. 2022. "Online Tutoring by College Volunteers: Experimental Evidence from a Pilot Program." *AEA Papers and Proceedings*, 112: 614-18.