Pre-analysis plan - school reopening

November 2020

Abstract: In this study, we evaluate the effect of schools reopening in the context of the Covid-19 pandemic on students' educational and health outcomes, their families' health and economic outcomes, and school staff's health outcomes. A subset of schools in São Paulo, Brazil, reopened at the beginning of October. We will combine administrative and phone survey data as well as quasi-experimental and experimental methods to evaluate the effect of the reopening on the outcomes of interest. In the experiment, we randomly encourage students in some schools, but not others, to returns to in-person classes when they resume.

Keywords: Covid-19, School reopening, Education, Health, Economic Impacts.

1 Introduction

In order to minimize the impacts of the Covid-19 pandemic, an array of non-pharmaceutical measures – from mandatory face masks to social distancing to lockdowns – were adopted around the world. Recent evidence documents that these measures effectively reduced the spread of the disease and saved lives (Friedson et al., 2020, Dave et al., 2020 and Sears et al., 2020, Carneiro et al., 2020). However, these measures also generated significant costs to society. One of the most concerning effects of lockdown measures is the closure of schools.

The costs of school closure might have direct and indirect effects on students, their families and school staff. The direct effects include effects on learning and health outcomes. Students might not adapt to remote teaching, reduce learning, or even permanently drop out of the school system. Similar school interruptions have been associated with short and long-run negative effects on students in other circumstances (Meyers and Thomasson, 2017; Belot et al., 2010), which is consistent with the early evidence on the recent interruptions (Madonado and De Witte, 2020; Engzell et al., 2020). Furthermore, these adverse effects might be particularly strong for low-income students, amplifying existing inequalities (Haeck and Lefebvre, 2020).

On the other hand, school closure might prevent Covid-19 infections. Nonetheless, it is not clear that the schools' closure is a particularly effective measure to contain Covid-19 spread since young generations are less susceptible to Covid-19 infection than adults (Snape and Viner, 2020). The fact that schools' closure was implemented simultaneously to other lockdown measures also hinders specific impact evaluations.

The closure of schools may also generate indirect economic costs to families. Children in online classes require supervision and some technological equipment, which might restrict the labor supply and diminish the productivity of students' family members.

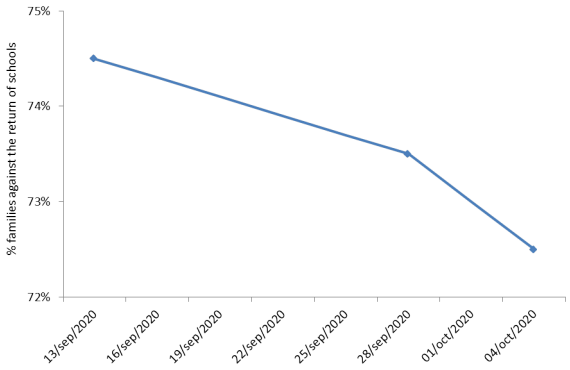
This study attempts to provide a broad picture of school reopening on health, education and economic outcomes of students, school staff and their families. Through a partnership with the São Paulo State's Education Secretariat (SEDUC-SP), in Brazil, we combine quasi-experimental and experimental methods to quantify the trade-offs brought about by the decision to reopen schools in terms of their potentially positive effects on students' educational outcomes and their potentially negative effects on students', school staff's and their families' health outcomes, due to their direct and indirect effects on the spread of Covid-19.

SEDUC-SP will provide researchers with administrative data on which schools reopened and recorded attendance on those schools, as well as data on remote learning activities and educational outcomes available throughout the length of the evaluation. Similarly, SEDUC-SP in partnership with the State Health Secretariat will provide researchers with detailed and geo-referenced information on Covid-19 cases, hospitalizations and fatalities. This information will be complemented with phone surveys, directly administered by the research team, that contact either students themselves (grades 10 to 12) or students' caregivers

(grades 6 to 9).

Since the sequence of reopening of schools is not based on a random process and may be influenced by the current state of the disease in each municipality or the state of local schools, simple comparisons between schools that reopened and schools that did not are unlikely to identify causal effects on either health and education outcomes. For this reason, we will implement a matched difference-in-difference approach to evaluate the effect of schools reopening on the outcomes of interest. We will weekly update the estimates of these methods to evaluate the effect of schools reopening in near real-time.

Having said that, the fact that schools officially reopen does not guarantee that students will effectively return. Families might be skeptical about the effective functioning of schools under the pandemic or might be afraid that children get sick and thus avoid sending them back to school. Reports state that at the moment, over 70% of students and caregivers are against returning before a vaccine becomes available.



Note: SMS surveys conducted by Movva with over 10,000 caregivers (grades 6 to 9) and students (grades 10 to 12) asking them about their motivation to return to school once they reopen.

For this reason, we complement the analysis depicted above with an experiment. We will send motivational text messages (e.g. nudges) to students and their caregivers, randomly assigned across schools that reopen. Similar low-cost interventions have been shown to be effective in incentivizing students in similar contexts (Yeager et al., 2019, Bettinger et al., 2020; Lichand and Wolf, 2020). If this intervention effectively increases students' attendance, then we can directly evaluate the effect of students going back to school in the variables of interest by comparing among the schools that reopened, those that received the text messages with those that did not. To rule out potential direct effects of nudges on the educational and health outcomes of interest to this study, we also randomly assign nudges across schools that do not reopen, which allows us to estimate potential placebo effects. This SMS experiment was evaluated by the UZH-OEC Ethical Committee and approved the project with a letter dated October 7, 2020.

2 Research questions and hypotheses

The study will investigate the following research questions and will test the following hypothesis.

1. What effects will school reopening have on students' educational outcomes?

    - **Hypothesis 1**: Schools reopening will affect educational outcomes by reducing dropouts, and the likelihood of student dropout. We will use data on attendance and drop-out rate information. This is conditional on the quality and quantity of data available from SEDUC-SP.

2. What effects will school reopening have on students', school staff's, and their families' health?

    - **Hypothesis 2A**: School reopening will have negligible or small negative effects on students', school staff's, and their families' Covid-19 cases, hospital admissions and deaths. To test this hypothesis we will rely on individual data provided by SEDUC-SP on Covid-19 cases and hospitalizations among students and their network. We will likely obtain this information through the Health Secretariat. In case this information would not be available as expected, we will use data from the platform that SEDUC-SP created to collect information on Covid-19 cases in schools and that is managed by schools directors. Last, we will use any available public information and platform.
    - **Hypothesis 2B**: Negative impacts are larger for adults, and increasing in age.

3. Does the school reopening alters the labor supply choices of the students' family members?

    - **Hypothesis 3A**: The school reopening will not affect the probability that the students (children or teenagers) work.
    - **Hypothesis 3B**: The school reopening will increase the the labor supply of other family members.
    - **Hypothesis 3C**: The positive effect of school will be particularly strong for female members of the household and informal workers.

4. Do the educational and health effects vary according to schools' and municipalities' characteristics?

    - **Hypothesis 4**: School reopening will have worse effects on health outcomes in municipalities where the recent spread of the disease has been faster and schools have a worse physical infrastructure. We will use available data platforms, such as the Brazilian school census, to combine information on the outcome of interest with administrative

information on school infrastructures and available analysis of the trends in the pandemic spread.

5. Do treatment effects vary with the time gap since the school reopened?

   - **Hypothesis 5**: School reopening will not produce short-run treatment effects since both educational and health outcomes need time to be affected. We expect these effects to be increasing over time.

6. Do nudges motivate students to go back to school?

   - **Hypothesis 6**: School attendance will be higher within schools where students and caregivers are nudged to return. We will use data on attendance and drop-out rate information. This is conditional on the quality and quantity of data available from SEDUC-SP.

7. Do schools with higher attendance experience larger impacts on health and/or educational outcomes?

   - **Hypothesis 7**: Impacts of school reopening on educational and health outcomes will be increasing along with increasing school attendance. We will use data on attendance and drop-out rate information. This is conditional on the quality and quantity of data available from SEDUC-SP.

3 Experimental intervention

To measure the impact of school reopening, we will take advantage of the fact that schools will reopen progressively. We combine administrative data for the universe of students and school staff and mobile survey data for a sample comprising both students and school staff enrolled and working in schools that have reopened and those enrolled and working in schools that are still closed.

Approximately 20% of the municipalities in São Paulo State authorized schools to reopen for optional sports and cultural activities on September 7, 2020 and for regular activities (only for high school students) on October 7, 2020. The return of school activities might depend on several characteristics, such as the state of the pandemic in the municipality, mayor's characteristics, etc.

In this project, we will combine quasi-experimental and experimental methods to evaluate the causal effect of school reopening on the outcomes of interest. In this section, we describe the latter. The experiment will comprise an encouragement design, in which we send nudges to motivate students to return to school – randomly assigning within municipalities where schools are open. We will send motivation SMS to students themselves (grades 10 to 12) or a students' parent or legal guardian (grades 6 to 9, if those are allowed to resume regular classes in the months that follow).

We can use this experiment to assess the reduced-form effects of school reopening on the outcomes of interest by simply comparing treated schools with non-treated schools within municipalities that chose to reopen schools. If we have access to attendance data for the schools that reopen, from administrative records, we can use the assignment to nudges as an instrumental variable to estimate the causal effect of school reopening on health and education outcomes.

In order for the simple comparison described above to generate causal effects, we need to assume that the messages do not have a direct effect on the outcomes of interest but affect them only through the attendance in reopened schools. We will verify if this is the case by sending placebo messages. Specifically, we will send the same messages to students enrolled in schools that did not reopen. Since we will have information on students in both types of schools, we can evaluate if messages have a direct effect on the outcomes of interest.

Table 1 summarizes the stratification of intervention:

Table 1: Design of the experiment

	Treatment	Placebo	Control
Message	Nudge	Nudge	Unrelated message
School reopened?	Yes	No	No
Students reached	6.086	6.086	6.086

We will initially plan reaching 18.258 students equally divided between the treatment, placebo, and control groups, but we may reach more students if necessary[1]. The content of the messages will be the same, but the students in the treatment group will be randomly assigned among those in municipalities that reopen schools. The placebo group, on the other hand, will be composed of a random set of students of the municipalities that did not reopen schools[2]. We will send two messages a month for each student during three months. We show that this sample size is large enough to detect relatively small effect sizes with high probability. We show power calculations in Appendix A.

To implement the intervention, we will partner with the social business Movva. Movva is a Brazilian edtech specialized in nudges via text messages, with expertise in implementing randomized trials and partnering with researchers to conduct evaluations to assess the effectiveness of programs and policies. Movva is in charge of designing and sending text messages in the context of our experimental intervention.

When it comes to the nudge experiment introduced in the previous section, the nudge intervention used for the encouragement design includes messages such as the following (we present more examples in Appendix B):

[**Motivating Fact**] EDUQ+: It is normal to be afraid in times of uncertainty.

[1] We are able to reach up to 400,000 students if necessary.

[2] We will not select the placebo group students among all municipalities that reopen schools, but only a matched set of municipalities that resemble those that reopened. See section five for more details.

Use this scenario to your advantage: take the opportunity to develop the ability to focus on your plans for the future.

[**Suggested Activity**] EDUQ+: How about summarizing your life project? Highlight which dreams you would regret NOT realizing. Plan step by step how to get there. **Discuss with your teacher in person if your school has reopened!**

[**Interactive Message**] EDUQ+: Tell us! From 0 to 10, what is your level of confidence that completing high school will help with your plans for the future? SMS free of charge.

[**Growth Message**] EDUQ+: One step at a time! That's how we build our story. Be the protagonist of yours and focus on your studies to finish the school year. **Return to regular classes when your school reopens!**

4 Data and outcomes

We will rely on two sources of data: detailed administrative data from SEDUC-SP and phone survey conducted by the research team. Each of them depends on specific partnerships. We describe each of them below.

4.1 Administrative data

SEDUC-SP will provide detailed administrative data for students' outcomes. This data will contain information on students' dropout from the school system and the utilization of the platform for online classes. It will possibly contain information on students quarterly grades and in-person attendance. SEDUC-SP will also provide telephone numbers for students, their caregivers, and their household addresses.

We also requested a list of health variables to SEDUC-SP. In partnership with São Paulo health secretariat, it will provide us detailed information on the Covid-19 related hospitalizations for students and school staff. SEDUC-SP will also provide direct information about positive test cases in the school environment from its internal monitoring system. For a complete list of requested variables, see Appendix C.

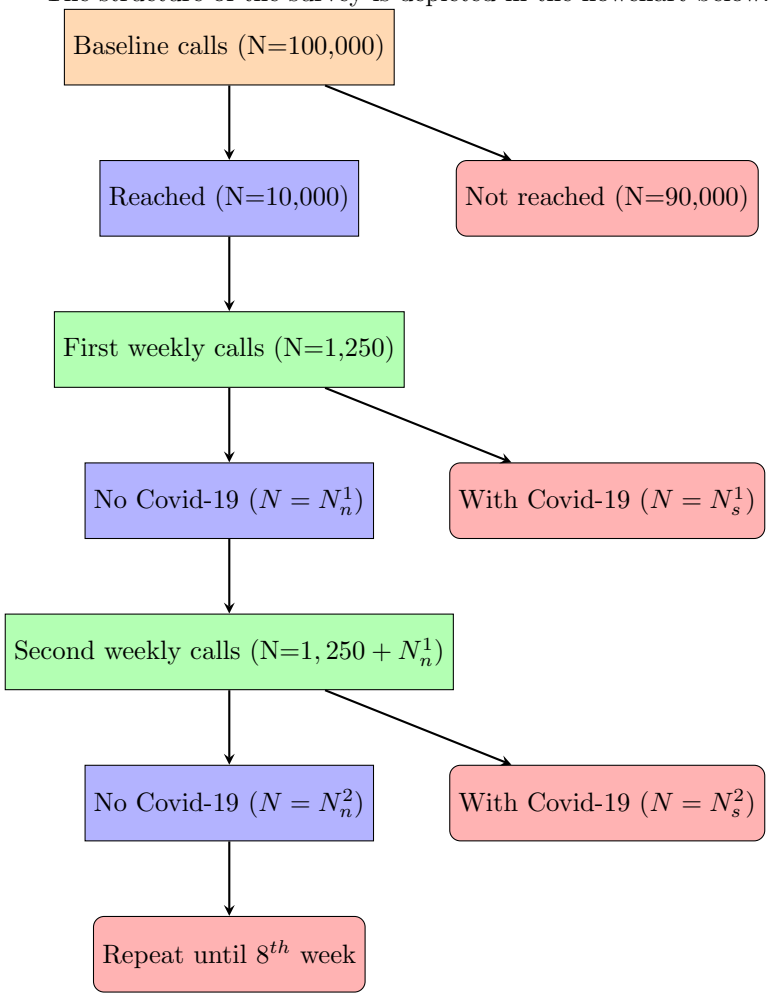
The research team will match these health variables to students, caregivers, and school staff using personal identifiers and home addresses. This will allow us to estimate the direct effect of school reopening on affected subjects and not only aggregate effects on municipalities. We further discuss the different levels of aggregation in the estimation in section 5.

4.2 Phone surveys data

We will complement the administrative data above by running phone surveys

with students and their legal guardians. As stated above, phone numbers will be shared by SEDUC-SP. We will make two call for each students' family: a baseline and a follow-up survey.

The structure of the survey is depicted in the flowchart below:



We will start making 100,000 initial calls. Based on similar studies, we expect a response rate of approximately 10%, reaching approximately 10,000 individuals. The baseline survey will ask questions about demographic characteristics of the respondent, household appliances, opinions and behavior related to the pandemic, and a health questionnaire.

Then, in the next week, we will call 1,250 of the families we reached in the baseline call. In the follow-up survey, we will ask questions about health outcomes, perceptions of online and in-person learning, and household members' labor supply. If the interviewed individual has or had Covid-19 symptoms, we interview her only once.

In the following week, we call other 1,250 individuals and all individuals that never had Covid-19 symptoms and were called in the first week. For the latter, we will only apply the health part of the questionnaire. We follow this procedure for the next eight weeks so that we call all individuals reached in the baseline at least once and we call individuals up to eight times.

4.3 Outcomes

We will assess the effects of schools reopening on the following variables - obtained both through administrative data and mobile based phone surveys (the list of health and educational variables requested to SEDUC is in Appendices C and D):

- Quarterly grades, by school subject, based on these activities (admin data);
- Student dropouts (admin data);
- Number of positive Covid-19 cases in the family of students, school staff and municipalities that reopen (admin and phone survey data);
- Number of Covid-19 related hospitalizations in the family of students, school staff and municipalities that reopen (admin and phone survey data);
- Number of Covid-19 deaths in the family of students, school staff and municipalities that reopen (admin and phone survey data).
- Labor supply of household members (phone survey only).

Besides, we also have information on various other baseline variables: the history of access to the distance learning platform since May; attendance and grades for the first quarter of the year, provided by administrative records; predicted risk of dropouts at the student-level, on a 0-100 scale. We will use them for the heterogeneity (described below).

5 Estimation

Other than implement the intervention described above, we also rely on quasi-experimental methods to evaluate the effect of school reopening on the variables of interest. As discussed above, schools will reopen progressively non-randomly. There is a range of potential methods that we can implement. We decided we will implement a matched difference-in-difference approach. In Appendix A we show that our this estimates will have considerable statistical power.

We will weekly update the estimates of these methods to evaluate the effect of schools reopening in real-time as new data comes in. We implement this strategy in two steps: 1) We estimate how the probability of getting treated (municipality opening schools) relates to exogenous characteristics; 2) We implement a difference-in-difference strategy and compare municipalities effectively treated with those matched in the first step.

Formally, in the first step, we estimate:

$$SR_m = \alpha_0 + \boldsymbol{\alpha} * X_m + \varepsilon_m$$

using a Probit model, where SR_m is a dummy indicating that municipality m reopened schools and X_m is a vector of covariates that are likely to affect whether municipality m reopened schools. This vector will include variables such as the current state of the pandemic in that municipality (number of new cases, number of deaths), education-related variables (number of schools, students grades'), and other exogenous variables (population, income).

Then, we calculate the estimated probability of the model above (propensity score) for each municipality and match each treated municipality with the non-treated one with the closest probability of getting treated. Then, using only the matched sample, we estimate:

$$y_{mt} = \beta_0 + \beta_1 * SR_{mt} * T_{mt} + \beta_2 * SR_{mt} + \beta * X_{mt} + \psi_m + \epsilon_{mt}$$

where y_mt is the variable of interest (number of new Covid-19 cases after school reopening, average dropout), T_{mt} is a dummy indicating that in period t the municipality m already reopened schools and ψ_t is a municipality fixed-effect.

Intuitively, we compare the trend of the variable of interest for treated municipalities with the trend for control municipalities. The idea is that, in the absence of treatment, treated and control municipalities would have a common trend. If this is the case, β_1 represents the causal effect of school reopening on the variables of interest. We could estimate these treatment effects using the full sample (without the first step), but it is less likely that average non-treated municipalities provide a good counterfactual to the treated ones. Then, the first-stage is likely to help to provide a more appropriate counterfactual.

As a robustness check, we can also implement a triple-difference strategy where not only compare trends in different municipalities but also trends in neighborhoods with and without schools within treated municipalities., which

might provide an even better counterfactual than matched municipalities. Formally, we can estimate:

$$y_{mnt} = \gamma_0 + \gamma_1 * SR_{mt} * T_{mt} * NS_{mn} + \gamma_2 * SR_{mt} * T_{mt} + \gamma_3 * NS_{mn} * T_{mt} + \\ + \gamma_4 * SR_{mt} + \gamma * X_{mt} + \psi_m + \psi_n + \epsilon_{mnt}$$

We are also interested in estimating heterogeneous treatment effects and spillovers. We will estimate heterogeneous effects according to the following variables: state of the pandemic in the municipality and school infrastructure quality. We measure the state of the pandemic as the number of per capita recent cases and the infrastructure as the the first component of a principal component analysis (PCA) that summarizes schools' physical infrastructure. We include the following variables in the PCA: the presence of kitchen, bathrooms, trash collections and basic sanitation, the availability of potable water, and the average number of students per class in 2019.

As discussed in section 4, we will estimate the effect of school reopening on health outcomes of students, their families and school staff as well as the health effects at the municipality level. We consider the former to be the direct effect of school reopening and the latter to be the total effect. Then, we intend to compute the spillovers of treatment as the total effect minus the direct effect. As a robustness check, we also will estimate the spillovers comparing the health outcomes of neighborhoods with and without schools.

Whenever we have access to multiple outcome variables mapped into a single outcome category (e.g. grades for several school subjects), we will build summary measures: following Kling, Liebman and Katz (2007), we will normalize all outcomes to z-scores, and run seemingly unrelated regressions (SUR) to compute effect sizes for each outcome category.

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Appendix A - Power calculation

We can write the following equation that relates the important quantities to the power calculation:

$$\frac{ES}{\sigma} = (t_{(1-k)} + t_{\alpha}) * \sqrt{\left(\frac{1 + (V(N_m)/\overline{N} + \overline{N} - 1)\rho}{N * P(1-P)}\right)} \tag{1}$$

where ES is the effect size of treatment, σ is the standard-error of the estimate, $t_{(1-k)}$ is the power of the exercise, t_{α} is the significance level and P is the proportion treated.

Note that if the size of the clusters is balanced, we can simplify the equation above to:

$$\frac{ES}{\sigma} = (t_{(1-k)} + t_{\alpha}) * \sqrt{\left(\frac{1 + (\overline{N} - 1)\rho}{N * P(1-P)}\right)} \tag{2}$$

and if we do not have any clustering the equation above simplifies to:

$$\frac{ES}{\sigma} = (t_{(1-k)} + t_{\alpha}) * \sqrt{\left(\frac{1}{N * P(1-P)}\right)} \tag{3}$$

Table A1 summarizes the estimates of interest as well as the treatment-level, the total number of treated units and clusters:

Table A1: Relations of interest, number of observations and clusters

Outcome	Treatment	Level	N observations	N clusters
Students' dropout	School reop.	student	5.313.336	142
Grades	School reop.	student	5.313.336	142
Covid-19 cases	School reop.	students/staff	6.917.641	142
Covid-19 hosp.	School reop.	students/staff	6.917.641	142
Covid-19 deaths	School reop.	students/staff	6.917.641	142
Covid-19 cases	School reop.	municipalities	142	1
Covid-19 hosp.	School reop.	municipalities	142	1
Covid-19 deaths	School reop.	municipalities	142	1
School attendance	Nudges	students	18.258	142
Economic outcomes	School reop.	students' families	10.000	142

The number of treated students shown in Table 1 (rows one and two) is based on the average number of students in each municipality is São Paulo state in 2019 Brazilian school census. Rows three to five also include the number professionals working in schools in São Paulo's municipalities.

For several relations above, we will have both administrative and phone survey data. Whenever this is the case, we calculate the estimates' power based on the admin data, which amplifies the number of available observations. For economic outcomes, the number of observations is restricted by the number of calls we make (approximately 10,000 observations).

The number of municipalities (clusters) considered in the sample is based on the number of municipalities that will reopen schools (71 in the treatment group and 71 in the control group). Finally, I assumed that 18.256 students will receive nudges, the same number as in Lichand and Christen (2020), and 10.000 will receive telephone calls.

Now, we discuss the important paramaters for the power calculation. We show them in Table A2:

Table A2: Parameters

Panel A: Intracluster correlation (ρ)

Variables	Parameters	Source
Students' dropout	0.007	School census (2019)
Students' grades	0.032	Prova Brasil (2017)
Covid-19 cases	0.015	State health secretary (2020)
Covid-19 hospitalizations	0.008	DataSUS (2020)
Covid-19 deaths	0.006	DataSUS (2020)
Employment	0.110	RAIS (2017)
Student attendance	0.005	SEDUC (2019)

Panel B: Other variables

Variables	Parameters	Source
Power ($t_{(1-k)}$)	0.84	Standard parameter
One-side level of significance (t_α)	1.282	Standard parameter
Proportion of treatment (P)	0.5	Standard parameter
Average cluster size ($\overline{N}$)	37.417	School census (2019)
Cluster size variance ($V(N_m)/\overline{N}$)	87,591	School census (2019)

We assume that both the call and the nudges will be uniformly distributed among the municipalities in the sample and among treated and control clusters. As can be seen in equations (1) and (2), this choice minimizes the minimum effect size of the estimates.

Using the parameters in Tables A1 and A2, we are able to calculate the minimum effect size (measured in standard-deviations) that would be detectable for each relation of interest. To ease interpretation we also measure MDE in % of each variable mean. Results are summarized in Table A3:

Table A3: Results of the power calculation

Outcome	Treatment	Level	MDE (s.d.)	% mean
Students' dropout	School reopening	student	0.042	18.7%
Grades	School reopening	student	0.110	2.04%
Covid-19 cases	School reopening	students and staff	0.068	15.6%
Covid-19 hospitalizations	School reopening	students and staff	0.050	12.1%
Covid-19 deaths	School reopening	students and staff	0.043	8.2%
Covid-19 cases	School reopening	municipalities	0.15	52%
Covid-19 hospitalizations	School reopening	municipalities	0.15	27.2%
Covid-19 deaths	School reopening	municipalities	0.15	18.9%
School attendance	Nudges	Students	0.039	2%
Economic outcomes	School reopening	Family members	0.120	11%

Appendix B - Additional text messages examples

Additional example 1:

[**Motivating fact**] EDUQ+: Studying at home and miss school is challenging during the quarantine period. Soon, this will pass, and you will be learning with your class again.

[**Suggested activity**] EDUQ+: It's time to go back! List the school subjects that you would like to revise with your teaches when in person classes return!

[**Interactive message**] EDUQ+: Tell us: do you believe that in-person classes will help your learning? Text for free YES or NO.

[**Growth message**] EDUQ+: United and strong! In return to in-person school, talk to your class and evaluate how you can help one another with your studies.

Additional example 2

[**Motivating fact**] EDUQ+: The day has come! School uniform, bag, books, and facial masks! The way to study in the school will be different. Take care of yourself and protect your schoolmates and teachers.

[**Suggested activity**] EDUQ+: Health above yearning! In school, avoid handshakes and hugs. Keep distance and always wash your hands! Soon it will pass!

[**Interactive message**] EDUQ+: Friend is the one who cares! In school, are you being careful with your classmates and teachers? Text for free YES or NO.

[**Growth message**] EDUQ+: Studying is a serious business, as well as fighting Covid-19. For your in-person classes to continue, it is necessary that everyone do your part and be careful.

Appendix C - List of Health Outcomes Requested to SEDUC-SP

Table C1: List of requested health variables

Variable	Source
STATE OF NOTIFICATION	Ficha de notificação SIM-P COVID-19
CITY OF NOTIFICATION	Ficha de notificação SIM-P COVID-19
INSTITUTION CODE	Ficha de notificação SIM-P COVID-19
NOTIFICATION DATE	Ficha de notificação SIM-P COVID-19
PATIENT NAME	Ficha de notificação SIM-P COVID-19
PATIENT'S MOTHER NAME	Ficha de notificação SIM-P COVID-19
DATE OF BIRTH	Ficha de notificação SIM-P COVID-19
SOCIAL SECURITY NUMBER	Ficha de notificação SIM-P COVID-19
SEX	Ficha de notificação SIM-P COVID-19
STREET	Ficha de notificação SIM-P COVID-19
NUMBER	Ficha de notificação SIM-P COVID-19
NEIGHBORHOOD	Ficha de notificação SIM-P COVID-19
CITY OF RESIDENCE	Ficha de notificação SIM-P COVID-19
STATE OF RESIDENCE	Ficha de notificação SIM-P COVID-19
HOSPITALIZATION DATE	Ficha de notificação SIM-P COVID-19
ICU	Ficha de notificação SIM-P COVID-19
DATE OF HOSPITALIZATION	Ficha de notificação SIM-P COVID-19
DATE OF DISCHARGED	Ficha de notificação SIM-P COVID-19
SYMPTOMS	Ficha de notificação SIM-P COVID-19
STATE	Ficha de investigação de SG suspeito de doença pelo coronavírus
CITY OF NOTIFICATION	Ficha de investigação de SG suspeito de doença pelo coronavírus
SOCIAL SECURITY NUMBER	Ficha de investigação de SG suspeito de doença pelo coronavírus
DATE OF BIRTH	Ficha de investigação de SG suspeito de doença pelo coronavírus
SEX	Ficha de investigação de SG suspeito de doença pelo coronavírus
ZIP CODE	Ficha de investigação de SG suspeito de doença pelo coronavírus
CITY OF RESIDENCE	Ficha de investigação de SG suspeito de doença pelo coronavírus
STREET	Ficha de investigação de SG suspeito de doença pelo coronavírus
NUMBER	Ficha de investigação de SG suspeito de doença pelo coronavírus
NEIGHBORHOOD	Ficha de investigação de SG suspeito de doença pelo coronavírus
NOTIFICATION DATE	Ficha de investigação de SG suspeito de doença pelo coronavírus
DATA ONSET SYMPTOMS	Ficha de investigação de SG suspeito de doença pelo coronavírus
SYMPTOMS	Ficha de investigação de SG suspeito de doença pelo coronavírus
TEST TYPE	Ficha de investigação de SG suspeito de doença pelo coronavírus
TEST RESULT	Ficha de investigação de SG suspeito de doença pelo coronavírus
FINAL CLASSIFICATION	Ficha de investigação de SG suspeito de doença pelo coronavírus
CASE OUTCOME	Ficha de investigação de SG suspeito de doença pelo coronavírus
NOTIFICATION DATE	ficha de registro individual - casos hospitalizados
ONSET SYMPTOMS	ficha de registro individual - casos hospitalizados
STATE	ficha de registro individual - casos hospitalizados

Table C1 (continued): List of requested health variables

Variable	Source
CITY	ficha de registro individual - casos hospitalizados
SOCIAL SECURITY NUMBER	ficha de registro individual - casos hospitalizados
DATE OF BIRTH	ficha de registro individual - casos hospitalizados
SEX	ficha de registro individual - casos hospitalizados
EDUCATION LEVEL	ficha de registro individual - casos hospitalizados
STREET	ficha de registro individual - casos hospitalizados
NUMBER	ficha de registro individual - casos hospitalizados
NEIGHBORHOOD	ficha de registro individual - casos hospitalizados
SRAG OUTBREAK RELATED	ficha de registro individual - casos hospitalizados
HOSPITAL CASE RELATED	ficha de registro individual - casos hospitalizados
SYMPTOMS	ficha de registro individual - casos hospitalizados
HOSPITALIZATION	ficha de registro individual - casos hospitalizados
ICU	ficha de registro individual - casos hospitalizados
ICU ADMISSION	ficha de registro individual - casos hospitalizados
ICU DISCHARGE	ficha de registro individual - casos hospitalizados
TEST RESULT	ficha de registro individual - casos hospitalizados
FINAL CLASSIFICATION	ficha de registro individual - casos hospitalizados
CASE OUTCOME	ficha de registro individual - casos hospitalizados
DATE OF DEATH	ficha de registro individual - casos hospitalizados
TYPE	sistema seduc monitoramento covid-19 nas escolas
PUBLIC OR PRIVATE	sistema seduc monitoramento covid-19 nas escolas
PRINCIPAL	sistema seduc monitoramento covid-19 nas escolas
CITY	sistema seduc monitoramento covid-19 nas escolas
SCHOOL SITUATION	sistema seduc monitoramento covid-19 nas escolas
SCHOOL	sistema seduc monitoramento covid-19 nas escolas
RESEARCH TYPE	sistema seduc monitoramento covid-19 nas escolas
ABSENCE	sistema seduc monitoramento covid-19 nas escolas
TYPE OF MONITORING	sistema seduc monitoramento covid-19 nas escolas
AGE	sistema seduc monitoramento covid-19 nas escolas
SEX	sistema seduc monitoramento covid-19 nas escolas
NAME	sistema seduc monitoramento covid-19 nas escolas
SOCIAL ISOLATION	sistema seduc monitoramento covid-19 nas escolas
DATE OF SOCIAL ISOLATION	sistema seduc monitoramento covid-19 nas escolas
COVID TEST	sistema seduc monitoramento covid-19 nas escolas
TEST DATE	sistema seduc monitoramento covid-19 nas escolas
TEST RESULT	sistema seduc monitoramento covid-19 nas escolas
QUARENTINE	sistema seduc monitoramento covid-19 nas escolas

Appendix D - List of education variables

Table D1: List of educational variables

Variable	Description
cd_escola	School ID
endereco_escola	School address
Lat	School latitude
Long	School longitude
funcionarios	Number of school staff
Alunos	Number of students enrolled
cd_func	School staff member ID
endereco_func	Staff member home address
CEP_func	Staff member home address's ZIP code
data_nascimento	Staff member date of birth
Telephone	Staff member phone number
Prof	Indicator variable if staff member is a teachers
series_prof	For teachers, list of all grades s/he teachers in each school
cd_aluno	Student ID
endereco_aluno	Student home address
CEP_aluno	Student home address's ZIP code
telefone1	Student phone number
numero_func	Average number of school staff who attended daily that week
Aula	Indicator of whether school held regular classes that week
numero_alunos	Average number of students who attended daily that week
frequencia_func	School staff member's daily attendance (within schools that reopen)
frequencia_aluno	Student's daily attendance (within schools that reopen)
Nota	Student's grades (for all schools)