

QSS Honors Program Experience 2021-2022

Charlie Budd

“The Effects of Remote Instruction on Learning Losses During the COVID-19 Pandemic”

What I Did

My QSS thesis was inspired by my own difficulty with remote instruction during the COVID-19 pandemic. I heard from my own friends at Dartmouth, my sister in high school, and many other people about the inefficacy of remote schooling. Another key concept in my research was learning loss: the phenomenon by which students reverse in their academic progress. I hypothesized that students who experienced more remote instruction would experience greater learning loss. I decided to regress the difference between standardized test scores in Spring 2021 and Spring 2019 on the percentage openness of each school, to evaluate whether there was a correlation between instructional method and learning loss.

I used the number of cell phones present in a school as a proxy for school openness during the pandemic. One advantage of using cell phone data to proxy for school openness is that this avoids relying on school self-reports. In addition, cell phone usage provides a continuous measure of school openness as opposed to a binary “open versus closed.” SafeGraph, a company that aggregates anonymized cell phone location data, provided cell phone pings by day across many schools in ten states. My regression models included controls for racial characteristics of a school, state fixed effects, and free-reduced price lunch (FRPL) eligibility as a proxy for financial characteristics of a school. In my thesis, I estimated linear and non-linear regressions with different levels of controls and regressing the controls on each other to investigate potential interaction effects.

What I Learned

I found a strong correlation between school openness and learning loss in math: the more open a school was during the 2020-21 school year, the less learning loss their students experienced in math. As for English language arts, I found no significant correlation between openness and learning loss. This result held regardless of whether my models included school-level controls. Additionally, I found disparate effects of remote instruction by group: Black and Hispanic students had disproportionately larger learning losses as a result of both increased levels of remote learning and greater negative impact of remote learning on these populations. Finally, my study revealed that schools with greater percentages of FRPL-eligible students experienced greater learning loss during the pandemic, despite those same schools using less remote instruction.

My study contributes to the rapidly expanding literature on remote learning and suggests that schools should carefully consider the benefits and drawbacks of the form of education. A full cost-benefit analysis of remote instruction should include the significant detrimental impact of remote instruction on learning, especially pertaining to math. Additionally, my study suggests that, when providing pandemic relief, populations should be differentially targeted depending

on the harm they may suffer. Specifically, schools with higher percentages of Black, Hispanic, and FRPL-eligible students should receive the greatest assistance, as these schools are most likely to have experience the greatest negative impact of remote instruction. Lastly, my thesis introduces cell phone tracking data as a viable proxy for school openness, which may alleviate the reliance on unclear terms such as “hybrid learning,” which could mean anything between fully in-person and fully remote instruction.

Why I Did It

The first reason that I chose to write a thesis was that I wanted to work with Professor Charlie Wheelan on a long-term project, as I had enjoyed his courses and I thought his perspective on the confluence of public policy, education and statistical analysis was interesting. I had not done research at Dartmouth, and the QSS thesis program was a good way to take advantage of the professors and resources of the college before I graduated. Second, I had a pretty good idea that I wanted to work in education policy for my career. Writing a thesis would give me a piece of my own work to show to prospective employers to demonstrate my ability to research, analyze, and think deeply about contemporary issues in education. Finally, I had a conversation with Professor Herron in the summer prior to my senior year about whether to pursue a thesis, and he mentioned that he thought every undergraduate student should write one. I thought that it would be a valuable way to cap my Dartmouth experience by bringing my interests together, as well as uniting my major of QSS and my minor of Education in the best way possible. I used skills that I picked up in various courses along the way, and the result was something that I am proud of and will hold onto forever. Even if academia is not your desired path, an undergraduate thesis provides you with a taste of the world and a great capstone on your time in QSS at Dartmouth.

Advice for Future Thesis Students

- 1) Pick a project that genuinely interests you.** You will begin working in September and not submit your finished product until late May or early June. Nine months is a very long time to work on one topic regardless of your level of interest, but if your topic does not really grab you, your spring will become frustrating. Choose a topic that excites you first, and define your research question after. There is research to be done on virtually anything you can think of, and Dartmouth’s professors have such varied interests and expertise that you will not struggle to find an advisor.
- 2) Choose your advisor carefully.** Beyond your topic, the second most important element of your thesis is your advisor. Ideally, choose someone who you have had before for a class, and know their personality well. Your advisor will help you navigate deadlines, and remaining high on your advisor’s priority list will be beneficial to both you and them. It is also important that your advisor is knowledgeable and interested in the topic that you choose. Your advisor will be more helpful if they are also thinking about your topic consistently and offering advice, and this will be the case only if they are invested in your topic.

- 3) **Fall and winter terms are just as important as spring.** As I finished my thesis, I was able to reflect on the entire process from start to finish, which helped me realize that I had not spread my work evenly. I stayed on top of my work in the fall, resulting in a strong literature review that served me well in the spring. However, I did not keep up with deadlines in the winter, which led to a scramble in the spring and more last-minute work than I otherwise would have needed to do. If you are consistent in working across the entire year, the thesis will come naturally without massive work sessions. Be consistent!
- 4) **Have a goal for each work session.** My most productive work sessions were those where I had a list of things to do, and I did them. My least productive work sessions were those where one inquiry led to another, and I found myself in a rabbit hole that didn't have to do with what I had originally wanted to do. It is important to keep the big picture in mind.
- 5) **Make sure that your thesis says something.** In the end, my favorite part of my thesis is that it has an actionable outcome: remote instruction is detrimental to learning, so schools should hesitate to employ remote instruction in the future and should apportion relief with the goal of making remote instruction unnecessary. Knowing that my thesis would result in a statement one way or another that could be put into action through policy made my work feel more relevant, and this served as an incentive for me to keep working on it. Theses are undeniably a lot of work, but they are worthwhile if your study will affect how you think about a topic that you are invested in.
- 6) **Working on a relevant topic is difficult, but interesting.** My project goal was forced to change because a paper was published in November 2021 that used the same methodology that I had planned to use. This was a setback, but in the end the changes I made to my thesis made my project unique and interesting. That is the nature of working on a subject that is recent and relevant. There were difficulties, but I was also able to speak with researchers who currently exploring the same subject that I was, and this made the project a more enriching experience.

Should you choose to pursue it, your own thesis-writing experience will be unique. I have offered some general thoughts and advice, but there is far more related to my project that I could say. If you are debating whether to pursue a thesis, have questions about my own, or questions about research, QSS, or education in general, feel free to email me at charliebudd99@gmail.com. Best of luck!