

► PANDEMIC RECOVERY: THE VALUE OF RETROSPECTION AND BY-PRODUCTS

As control of the pandemic gradually increases through vaccination, population immunity, and familiarity with isolation procedures, recovery has become a prime topic and policy focus. It is not surprising that both our focus and large amounts of funding have shifted to the recovery phase of the pandemic; many are heartily sick of COVID-19. A critical piece of optimal recovery is hunting value in the products and processes of the pandemic. There are several key examples.

The first, raised by Emmanuel Suez at the latest American Economic Association conference, is the view of the pandemic as a monumental natural experiment in the field of economics in reference to participation in social assistance and how economists' model social programming. Second, many public policy practitioners point to rapid innovations in communication channels and supply chains catalyzed by the pandemic as a valuable area of study. Third, physicians' ability to practice medicine through video chat and phone calls is a pandemic practice that may have significant implications particularly in low population or remote areas. The purpose of this article is to draw attention to another unintended benefit of pandemic operating procedures—an extensive record of educational practices and material.

Canadian universities are now well into their second semester online. Despite the best efforts of all involved, online university education is widely viewed as lacking some critical elements of the in-person experience, as well as causing significant problems with stress, time management, and isolation. However, one key feature of online education is that in order to accommodate students'

drastically variable schedules and time zones, many classes are recorded. This measure, adopted for the sake of convenience, has in effect, created a snapshot of the tools, methods, and strategies used to increase human capital in students. There are two immediately apparent uses for this archive.

One intriguing use for this data is evaluation. Effectively, we have archived a large part of knowledge transfer from "educators" to "students" for the majority of the 2020 academic year. Although this is an intimidating volume of data, it allows us to ask many questions. One could process this data into a summary of skills and capacities possessed by students—not based on course goals, but based on the content of lectures, seminars, and labs. One could evaluate how often X group of students are exposed to Y concepts and Z technologies. One could also use this resource to conduct department specific reviews—do courses feed into each other in a productive and logical manner? Are subjects reiterated through numerous courses? We structure higher education with specific intention and now there is an available data source that can examine how well that intention manifests.

A second use concerns education's primary goal of increasing human capital—the capacities, abilities, and skills of students. While there is substantial benefit attached to in-person education—the absence of these benefits being keenly felt during the pandemic—there is a robust selection of high-value online education channels including Khan Academy, Skillshare, and Udemy. While these materials are tuned towards an online audience following at their own pace, MIT has created an

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OpenCourseWare YouTube channel, in which the institution posts full year classes, largely unedited. Some lectures gather relatively small viewership, however the channel's most viewed lecture in 2020, "1. Introduction and the geometric viewpoint on physics", has garnered 139,081 views at the time of writing. While online education carries a set of disadvantages compared to in-person education, the ability to share high-calibre knowledge with a wide audience may have significant benefit in developing human capital as a supplemental learning method.



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The core input of these supplemental learning methods is a stock of recorded knowledge structured as lessons—this is what the online transition of the 2020 academic year has created. Although there are barriers to directly publishing such material (student consent for their contributions to be published publicly being a primary concern), the record of the 2020 academic knowledge transfer is a substantial resource and a valuable by-product of the pandemic prompted by the transition to online education. I have sketched out two possible uses for the data and practices produce—a rare opportunity for thorough evaluation and as base material for purely online education ventures. There are likely other interesting uses for this material; big data analytics and artificial intelligence increasingly invite the use of raw data sources that previously presented insurmountable computational challenges.

The potential outlined in higher education using recorded lectures serve as one example of a broader phenomenon. As the pandemic has progressed, our work, social, governance and business practices have, by necessity, required us to adapt to a new normal. There is substantial knowledge to be gained in examining the value of these adaptations and their by-products as we move toward post-pandemic recovery.