

STRATEGY

Coronavirus and the widening educational digital divide: The perfect storm for inequalities?

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In digital classrooms, do students belonging to wealthier families have an unfair advantage over those from poorer families?

Education's Changing Climate

In the midst of the current Covid-19 pandemic, societies have been altered and forced into an unprecedented way of living. It tore apart traditional beliefs and conceptions and forced millions to rethink the way they work and live their lives.

This disruption has not spared governments, industries, religious entities and even schools. In fact, in educational institutions around the world, instruction delivery abruptly shifted from face to face instruction to an online mode in practically one week. There was all around confusion as teachers and students rapidly adjusted to an untested educational platform.

In the world of education, this disruption has made a deep impact that can linger for years. The U.N. Secretary-General Antonio Guterres in his statement during the opening of the High-Level Segment of the 43rd session of the Human Rights Council, at the European headquarters of the United Nations in Geneva, Switzerland, on Monday, Feb. 24, 2020 stated that “progress lost takes years to regain,” citing as an example teenage girls who are out of school and may never return (Lederer and Press 2020).

Education has been forever transformed in a span of a few short weeks. In this article, as professors at the crossroad between education and technology (and data science in particular), we want to discuss the potential impact of Covid-19 and highlight the need for public policy responses on learning and academic performance of pupils. Many troubling issues remain unanswered – are students who are suddenly forced into online education prepared for it? Do all have access to high-speed internet connection? Do all possess suitable computers to allow them to succeed? Do students belonging to wealthier families have an unfair advantage over the poorer families since they have more tech equipment? Are we experiencing a digital divide in education, which can be even beyond the traditional societal dimensions?

Winds of Change

As we process these hard questions and try to understand the situation, it might make sense to assess the current environment in which we live in. Like a “storm”, five changes are simultaneously taking place alongside the global pandemic:

Psychological Distress. We are living in almost a cyclical pattern of tough times. As a humanity, we experienced terrorist attacks, economic crisis, and now a pandemic. Then Covid-19 pandemic has stoked a deep fear in homes around the world as daily media accounts of infections and deaths blared through the television and the web. It has an adverse psychological impact on everyone. It affects our ability to focus on work and study.

Social consequences. As we experience lockdown for the first time in our lives, there are obvious social consequences. Many have become more withdrawn and have relied on loads of technological tools and gadgets to make it through. Students were separated from peers and friends who typically have provided friendship and support. It is complicated to gather data on this issue, but some earlier studies highlight that academic performance of students from the bottom half of the income distribution was more strongly correlated with time spent in school compared to their higher-income counterparts: they performed 7% lower in reading and 5.3% lower in science compared respectively to 3.9% and 1.9% for students from the higher-income households. It is even amplified for boys compared to girls with a lower performance of 7.3% for boys compared to a lower performance for girls of 4.7% in mathematics tests when they had one year less of schooling (Frenette 2008).

Technological reliance. The birth of the Information age in the 1970s and the AI age of the 2010s help us in many sectors, mostly service sectors. The technologies we have access to, supported by the global Internet infrastructure, ease our burden in many ways. Life would be better without lockdowns, but in a Bayesian way of thinking, considering we are going through the biggest pandemic of our time, things could also be worse without these technologies. Moreover, these technologies provide a lot of benefits and will likely impact education while raising new questions (Govindarajan 2020). In the classroom, technological breakthroughs such as digital databases, augmented reality and even robots have enhanced learning experiences.

Digital division. In many ways, we are on a “marche forcée” towards digital transformation. As a result, we are starting to observe some issues emerge. A recent article from Marco Iansiti and Greg Richards (2020) explain that the “stakes for digital transformation have increased dramatically”, “creating a new digital divide that will deepen fractures in our society.” In the advent of online education and the disparity of technological equipment available to the wealthy as compared to the poor students, instruction delivery will be inconsistent and unfair. In Canada, although the vast majority of households with children under 18 years-old had access to the Internet in 2018 (98.8%) with a slight difference for the lowest income quartile (95.8%) (Frenette, Frank, and Deng 2020), other factors may affect the time that pupils can spend in their online (synchronous and asynchronous) educational activities at home. One of these, for instance, is access to Internet-enabled devices. Income levels may play a role here. Again in Canada, 56.2% of households in the highest income quartile had access to the Internet at home with less than one device per household member and 43.9% with at least one device per household member. In the lowest quartile, 63% of households have less than one device per household member and 37% have at least one device per household member (Government of Canada 2018). Lower income households are thus more likely to have to share devices with other household members (Rideout and Katz 2016). Another fact that can affect the time a student spends on online education activities is the type of devices used to access the Internet. About 24.1% of households in the lowest income quartile use mobile devices only, and 75.9% use a personal computer (with or without mobile devices) compared respectively to 8% and 86.2% in the highest income quartile (Government of Canada 2018).

Speed of absorption. The digital divide is not a new phenomenon. Resistance to process changes in companies is due to the barriers to entry to the use of a new technology being a real barrier or often a perceived barrier. During this Covid-19 pandemic, this resistance has lowered in the face of necessity being real or perceived as a necessity. In many organizations around the world, including educational institutions, technological changes are quickly absorbed and implemented. This scenario forces educators and students to quickly adapt as fast as they can. Students living in a household with higher levels of education may be better supported. Their parents with higher levels of education are more likely to work from home (Turcotte 2010), which is amplified for higher income households due to the strong correlation between postsecondary education and income

(Frenette 2019; Frenette, Frank, and Deng 2020). Parent involvement is positively correlated with students' parental outcomes (Smith 2006) and it is amplified in the context of online learning where students may face organizational or motivational issues (Waters, Menchaca, and Borup 2014; Liu et al. 2010). Lower-income households tend to be less involved because of being more likely to work long hours or having less flexible schedules (Smith 2006), though this may not play a role in our lockdown situation.

These five “winds of change” can alter the course of education and if unchecked can pave the way to a “perfect storm” for educational decline.

Surviving the Storm

In this scenario, important questions arise. Can our education systems re-balance this digital divide? How can policy makers and educators plan ahead?

Manage timing. Some students are poised to graduate and will soon enter a competitive job market. They have switched to online courses to finish their term and will likely be following online courses over the summer in many places across the world. They need to learn important skills, and learn them well in a timely manner in order to succeed in their future jobs. Educational institutions need to carefully weigh upon the timing of programs and initiatives.

Embrace agility. This divide has always existed and is accelerated because the “agile” population is now equipped and has made the switch. People who are less agile or are not in agile positions may be stuck where they are. The same is true for students when one looks at the whole education system. K-12 schools or higher-education institutions are of all shapes and forms across the world. Beyond these various shapes and forms, students themselves have different levels of equipment and also different attitudes towards the use of technologies. Students with the right tools have the agility to learn and perform better. Educational institutions need to provide resources and formalize policy frameworks to help students be more agile.

Innovate strategically. Like a massive number of teachers, we have switched rapidly to online teaching. The infrastructure and the tools proposed by tech giants have been helpful. In the case of CIRANO in Montreal, as a research laboratory, all technological tools are open source. These tools cover online communication tools for the research team, online coding notebooks and other various online collaboration tools. When the research center was asked to do remote work, the research team went home and logged into online systems the way they were logging in at their office desk. Based on this technological platform and the related workflow, the researchers easily changed work location, from a professional office to a kitchen table. In the same vein, another one of our affiliations is the SKEMA Global Lab in AI, which rapidly offered a course on Data Science and Covid-19 as well as organized a Hacking Health Covid-19 exercise to mobilize students to work on Data Science techniques to better understand the world conversation on Covid-19. Educational institutions need to think strategically as they change and innovate.

Adapt with empathy. In higher-education institutions, the digital divide is intensified. Some students are more comfortable talking to a human being in an office, not through a screen. They may face difficulties understanding the learning material when the professor is not physically present (Waters, Menchaca, and Borup 2014). Some other students do not have a powerful enough laptop to do all the work required by the professor, or even a good enough bandwidth to connect to the Internet. We also need to consider all the spectrum of human conditions. Moreover, in Data Science for instance, we need indeed powerful devices. In a field that is male dominated, this could aggravate the differences mentioned by Mr. Antonio Guterres. Furthermore, there is a large technological divide between developed and developing economies resulting to a diversity in the level of preparation of immigrant students. Educational institutions need to be cognizant of these challenges and be sensitive and compassionate.

Plan for continuity. Beyond higher-education disparities, there are also - even in our developed economies - digital disparities in K-12 schools. It became obvious in our communities that some K-12 schools were fortunate to have access to commercial tech tools, and some schools ceased operations due to the lack of adequate technological infrastructure. Even in the former case, students face either technological issues, such as a slow Internet connection, or motivational issues or social issues. Education continuity is a challenge that should not be underestimated, as there are societal consequences, notably

due to the digital divide. In a humble attempt to help the community, Humanités Numériques provided, through a not-for-profit legal vehicle, a platform for video conferencing and a Learning Management System to K-12 teachers in schools that do not have the resources to use commercial solutions at scale (www.maclasseenligne.org). Yet even with this support, the schools continued to face a digital divide. Even with a technological platform or targeted strategies to ensure education continuity, some schools are still left behind. Many classes within these schools have been unable to adapt. Several students in well-equipped schools experienced a major setback in their learning. Educational institutions need to take on a proactive approach and a long-term perspective when seeking solutions to these technological disparities.

These strategies may not be easy, but they are doable. Many of the key issues can be fixed, especially in developed economies. However, it will take time since it is not merely a question of access to technologies but also a question of mastering these technologies within a pedagogical context.

Many challenges will linger. The risk is that the digital divide is widened, complicating existing inequalities while creating new ones. These inequalities will appear in multiple ways and at different levels. The divide is not only geographical, it is also STEM related and motivation-related. So, the paradox is that on the one hand, there are excellent tools that propel knowledge and mobilize talent to address pressing human issues (ie, coronavirus, economic crisis) and on the other hand some parts of the population will not rise to the next level, hence widening the digital divide in a future digital society.

In the education context, schools worldwide have to carefully assess the “learner’s digital agency”- the capacity for a learner to act and leverage knowledge accessible in the digital environment.

As a society, we need to make sure that education continuity stays on course with the vast available technologies at our disposal. Viable and compassionate strategic policies need to be concretized in the governmental and institutional levels. Whatever the new emerging and catastrophic risks, however daunting this “perfect storm” - we need to ensure that our selected solutions minimize the risks of new inequalities and prevent a digital divide.

► References



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