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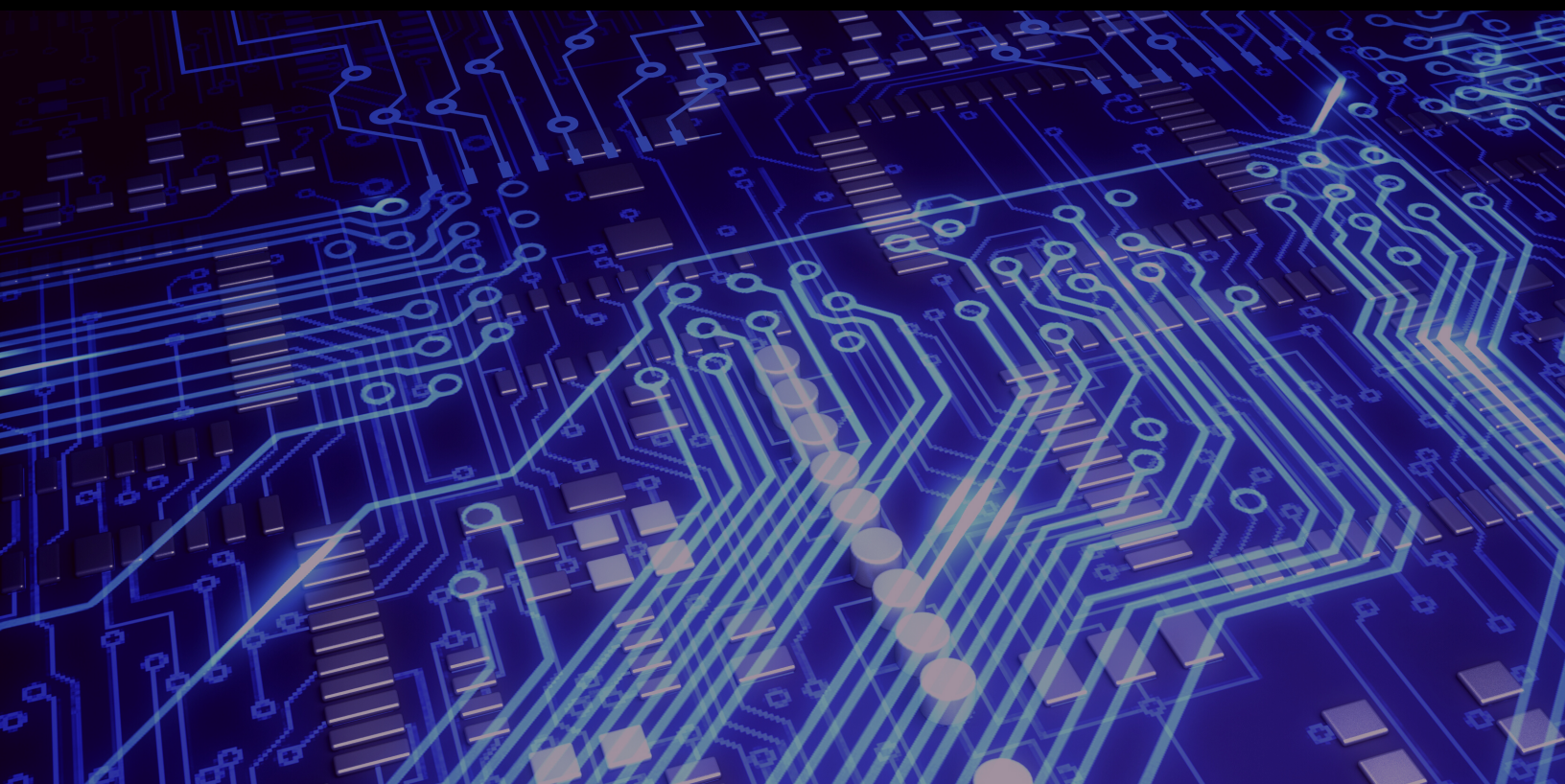

Inequality, Social Cohesion and the Post-Pandemic Acceleration of Intelligent Technology

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Abstract: Epidemics and pandemic are not purely biological ills that can be adequately addressed medically. They are complex, relational calamities that reveal social, economic and political vulnerabilities and values conflicts and that can accelerate historical processes in often unpredictable ways. This paper examines and invites ethical reflection on potential synergies between emergency pandemic response measures and ongoing transformation resulting from the 4th Industrial Revolution, and how these synergies might affect social cohesion, particularly through commercial incursions on education and socialization processes.

Keywords: artificial intelligence, big data, education, ethics, socialization, technology

Emergency measures taken in response to the COVID-19 pandemic are dramatically transforming social, economic and political landscapes and opportunities in ways that may well have significant multigenerational ramifications. Large scale emergencies have often served as accelerators of history. One possibility is that the COVID-19 pandemic will serve as the "great accelerator" of transformations of both human awareness and geopolitics as humanity awakes to the fact that all nations and peoples must work together to address the viral alien invader amongst us.[1] Catastrophic plagues and wars have, in fact, often been important factors in lessening social inequality (Scheidel, 2017). And, notwithstanding the immense suffering it is now causing, perhaps the COVID-19 pandemic will serve as a catalyst for reversing global historical trends toward greater inequality.

[1] https://www.berggruen.org/the-worldpost/articles/weekend-roundup-planetary-co-immunism-is-on-the-way/

That is certainly a hope worth cultivating. Yet, the pandemic may instead serve to fast-forward populist and isolationist movements or to accelerate the shift of social energies into digital public spheres in ways that deepen the inequalities already associated with the "winner takes all" network economy (Brynjolfsson and McAfee, 2014) and the growth of "surveillance capitalism" (Zuboff, 2019). These, too, are very real possibilities. Inequality has often been a cause of catastrophic instabilities which have opened spaces for societal transformations, reinforcing some values while running sharply askew of others (Piketty, 2017). Thus, the inequalities that preceded the 1929 stock market crash and that deepened during the cataclysmic Great Depression that followed incubated both vibrant expansions of democratic values and the rise of Nazi Fascism and Stalinist Communism.

The disparity of those results is particularly salient as we consider the values informing current emergency-response decisions regarding the COVID-19 crisis and how they may be end up being written into the DNA of future social, economic and political policies and practices. Epidemics and pandemics are neither random in their origins nor chaotic in their spread. Microbial and viral disease agents exploit physiological vulnerabilities. But just as crucially, they exploit societal liabilities—disparities in living conditions, sanitation, nutrition, healthcare, and social cohesion and resilience that afford points of colonizing entry and energy exploitation (Snowden, 2019).

In short, epidemics and pandemics are not purely biological ills that can be adequately addressed medically: reminders merely of our vulnerabilities as physical beings. They are complex, relational calamities that reveal social, economic and political vulnerabilities and values conflicts: weaknesses in the body politic. Sustainably addressing the COVID-19 pandemic will require mobilizing medical resources and marshaling globally-integrated

commitments to accelerating scientific and technological innovation and collaboration. But it will also require mobilizing moral resources and accelerating shared ethical deliberation and creativity.

The First Pandemic in the New Era of Intelligent Technology

As a means to spurring focused and creative ethical reflection on the societal impacts of the COVID-19 pandemic, I want to envision some potential synergies between the emergency response measures being instituted around the world to slow and eventually contain the pandemic, and the ongoing transformation of the anthrosphere (the sphere of distinctively human endeavors) by the 4th Industrial Revolution or what I prefer to call the Intelligence Revolution. In particular, I want to consider how these synergies might fast-forward incursions on privacy and erosions of social cohesion that are already evident in nascent and variously expanding practices of smart capitalism and smart government—commerce and governance informed and leveraged by big data, machine learning and artificial intelligence.

Crises are also opportunities. Emergency conditions are conducive to fast-forwarding innovation and implementation—occasions for moving with extreme rapidity from concept through proof-of-concept to mass deployment. The COVID-19 pandemic is the first truly global health crisis of the smartphone era. Digital connectivity platforms are being repurposed to assist with contact-tracing. E-commerce and smart delivery systems have made it possible for millions of people to meet their food and other basic needs while observing strict stay-at-home orders. And, scientists and technologists are turning collaboratively to big data and deep/machine learning both to map and predict patterns of disease transmission, and to accelerate the development of a COVID-19 vaccine. Without the digital connectivity and smart services that are our most apparent interfaces with intelligent technology, it is doubtful whether the spread of

the pandemic would have been slowed as effectively as it has been, or as peacefully. But, there are also very real potentials for emergency response measures allowing new and emerging artificial and synthetic intelligences to pass below our collective ethical radar, accelerating their permeation of daily life in ways that may not be readily reversible and that may well deepen inequalities and compromise social cohesion.

All technologies scale up human intentions, magnifying and multiplying the scope and impact of human action. But the technological acceleration now underway is unlike that in any previous period in human history. Now, for the very first time, technology is an active, intelligent participant in shaping the human-technology-world relationship. Making use of human data (the traces of human intelligence), evolutionary machine learning algorithms and other machine intelligences are able to learn from their mistakes and rewrite the code that determines their behavior, functioning as tirelessly innovating agents devoted to transforming human relations and experiences in keeping with the values that (intentionally or unintentionally) have been coded into their mathematical DNA.

Trajectories Forward: A Range of Possibilities

One hopeful possibility envisioned by Nick Gillespie in his March 2020 piece in the libertarian magazine, *Reason*, is that the COVID-19 pandemic will serve as an occasion to realize the utopian promise of the internet and the boons to humanity afforded by online work, learning, healthcare, shopping and popular culture consumption.[2] A somewhat more measured, but also ultimately hopeful possibility, presented by Yuval Noah Harari in a March 2020 *Financial Times* article, is that the post-COVID-19 world can be one of greater global

[2] https://reason.com/2020/03/17/how-the-coronavirus-might-kickstart-the-21st-century/

cooperation, freedom and dignity if we reject the future normalcy of "under-the-skin" surveillance in trade for current health security, and if we ensure that increased data-gathering enables us both to make more informed personal choices and to hold governments accountable.[3]

To be sure, natural catastrophes and national emergencies can often bring out the compassionate and caring best in human nature. But, this is not always the case, especially when the environment in which we frame our responses is otherwise biased. As Naomi Klein (2020) documents in a recent opinion piece, intelligent technology and connectivity giants are aggressively positioning themselves to capitalize on the opportunity spaces opened by pandemic response measures to establish new public-private partnerships to scale up telework, e-commerce and e-learning capacities and make their transformative integration into the post-COVID-19 world a matter of economic and public health policy. Moreover, there is nothing in the recent track records of corporate giants like Apple, Google, Amazon, Microsoft, Facebook, Alibaba and Tencent—the primary global purveyors of smart and nearly frictionless digital commerce and connectivity—or that of other private contractors digitalizing government services to suggest that accelerating the rate at which they are permeating our daily lives and scaling up their commercial intentions will decrease inequalities of wealth, income, opportunity or risk (see, e.g., Zuboff, 2019; Eubanks, 2019; O'Neil, 2017).

Thus far, much of the concern expressed about pandemic-accelerated infusions of intelligent technology into our daily lives has focused on issues of personal data privacy. But, attitudes vary greatly toward the infringements on data privacy entailed by pandemic response measures like the use of smartphones to track the spread of the virus and compliance with stay-

[3] https://www.ft.com/content/19d90308-6858-11ea-a3c9-1fe6fedcca75

at-home orders. Among citizens living in liberal democratic countries, the temporary loss of data privacy in exchange for a swifter end of the pandemic has generally been deemed acceptable. The continuing loss of privacy post-pandemic is, for some at least, more controversial. For citizens of China, however, the government of which has a legal right to all data produced within the country's borders, these uses of data have generally been seen as unproblematic evidence of smart governance in action.

Considering priority differences like these regarding the value of data privacy and security should be integral to global deliberations on post-pandemic norms. But privacy loss is just one of the risks to consider in evaluating continued expansions of intelligent technology in the aftermath of the pandemic. Moreover, privacy concerns—like those regarding the use of data proxies and training data that encodes historical bias—direct attention toward design and misuse risks that can be addressed by technical and/or legal means and away from structural risks that can only be adequately assessed and addressed ethically, inadvertently "green lighting" the pervasion of society by intelligent technology.[4] Even if intelligent technology *can* be deployed in ways that are safe, explainable, free of design and training data flaws, and respectful of individual data rights, that does not entail that it *should* be so deployed.

Social Distancing and Online Education as Accelerators of Digital Socialization

Here I want to focus on pandemic-accelerated and –expanded digital connectivity and online education, the ways in which they may serve as a catalyst for the normalization of digital socialization, and the structural risks that this poses for social learning and empathetic social cohesion.

[4] On distinguishing among design, misuse and structural risks, see Zwetloot and Dafoe, 2019.

Socialization is the process by means of which the behavioral, cognitive, and emotional norms of society are internalized, and by means of which social and cultural cohesion and continuity are ensured. It begins in the home as parents, grandparents, and older siblings model and state what is and is not acceptable conduct, continues on playgrounds, and then goes into high gear in schools and in employment and civil society environments in which social learning and accommodation are required.

Up until very recently, socialization has only occurred face-to-face and generally in groups. Digital social media, telework, and online schooling open other possibilities. It is no longer necessary to meet in person to be mentored or pressured into conformity with group norms. Instead of seeking advice on, for example, sexuality from older family members or friends who are part of their immediate communities, teenagers can now explore sexual norms online, including through graphic online video. And, with social media, it is now much easier than at any time in the past for individuals to choose which groups they belong to and the social dynamics to which they decide to adapt, in effect self-selecting the communities into which they will be voluntarily socialized, and to what degree.

Social media and online interest groups are voluntary spaces of association. Some are friendly and accommodating places. Some are rough and full of caustic banter. Others are blatantly antisocial. But, since entering and participating in these spaces is understood as optional, weighing the socialization risks involved is generally regarded as a matter of individual conscience. Given the extent to which digital identities—especially those of young people—are no longer merely representations of self and subjectivity, but constitutive of them, it is debatable whether the risks incurred by taking part in digital sociality are truly voluntary. There is no

debating the fact, however, that school attendance is mandatory in modern societies and that any risks associated with school-based socialization are societal and not merely personal.

Mandatory school attendance through mid- to late-adolescence ensures that every citizen is treated to eight to twelve years of state-sanctioned socialization. Educational systems vary tremendously from country to country, some with national curricula that every student navigates, others that offer considerable curricular latitude. But in general, teacher training and certification ensure some degree of uniformity in instructional methods and content, and in the norms and values schooling is intended to instill. This has been a cornerstone of national efforts to build social cohesion.

There are other possibilities. Over the last generation, the modern paradigms of brick-and-mortar schools and curriculum-based formal instruction have come under increasing criticism as course-delivered, discipline-focused, grade-incentivized, and standards-driven education has apparently fallen out of step with labor market demands and societal needs. The broad consensus, driven also in part by considerations of how to address upwardly spiraling educational costs, has been that a revolution is in order: a "turning back" toward key features of the premodern, studio apprenticeship model of flexible, individualized and continuous/lifelong learning while taking full advantage of new information and communications tools (see, e.g., Davidson, 2017; Auon, 2017).

Unsurprisingly, online/distance learning has been undergoing dramatic growth over the last decade. But, absolute numbers have remained relatively small. Based on 2016 data, only 6% of all public K-12 students in the U.S. took a majority of their courses online.[5] In higher

[5] https://nces.ed.gov/surveys/ntps/tables/Table_3_042617_fl_school.asp

education, based on 2017 data, roughly 33% of all undergraduate students and 38% of all graduate students in American colleges and universities were enrolled in at least one online course, and approximately 13% and 29%, respectively, were enrolled *only* in online courses.[6] As of early May 2020, as an emergency response to the COVID-19 pandemic, virtually every student in the U.S. and in many other countries—ranging from kindergarteners to graduate students—is finishing up the academic year online.

This is an unprecedented opportunity for scaling rapidly up from proof-of-concept and the limited implementation of cutting edge educational technology to mass implementation: national experiments that could never have been attempted in anything but catastrophic circumstances. As might be expected, the results have been mixed. But, digital educational technology (EdTech) includes everything from online and flipped classroom platforms to developments in artificial intelligence, augmented/virtual reality, adaptive learning and gamification—all aimed at realizing both budgetary and learning efficiencies—and the incentives for taking the pandemic as an opportunity to improve EdTech design and implementation are undeniable, if not irresistible.

In 2018, EdTech accounted for $157B or just 5% of global education expenditures, but was forecast to increase almost three-fold to $420B by 2025. Educational gaming and massive open online courses were expected to grow 66.2% and 36%, respectively, from 2018 to 2020. And, reflecting the immense market potential of EdTech, global investment in EdTech startups in 2018 stood at $13B, with $8B being invested in the U.S. alone, where K-12 education expenditures topped $696B and higher education expenditures topped $480B.[7] EdTech is

[6] https://nces.ed.gov/fastfacts/display.asp?id=80
[7] http://www.abscapital.com/assets/2019/03/14-agc-EdTech-jan-2019.pdf

potentially very big money. In fact, the argument can be made that so-called Big Tech is compelled to get into education for the same reasons that it is compelled to get into military and defense work: the revenue bases of global tech leaders like Apple, Microsoft, Google, Facebook, Amazon, Tencent, Alibaba and Huawei are so large that only a handful of sectors can support their further growth at rates attractive enough to retain and gain investors.[8]

It is almost impossible to imagine that entire nations would switch from face-to-face to online education practically overnight in the absence of a global health catastrophe. But it is almost as hard to imagine that, in the aftermath of the pandemic, policies conducive to mainstreaming online education and EdTech efficiencies will not be forwarded as necessary responses to very real and long-lasting budgetary catastrophes. Worldwide, education is overwhelmingly publicly-funded. Given that tax revenues will plummet as part of the economic fallout of the COVID-19 pandemic, revenues for education will also plummet. EdTech efficiencies, proven or still hopeful, will be almost impossible to resist. Mainstreaming online education will undoubtedly be easiest for colleges and universities for a host of reasons. But even in primary and secondary education, where parent employment has been a major factor in keeping brick-and-mortar classrooms open, and where the needs for age-tailored platforms and personalized content for students with different learning styles set a high bar for feasibility, the incentives for EdTech innovation and for shifting significant class time online will be substantial.

Whether the COVID-19 crisis *can* trigger accelerating mass movement toward flexible and personalized learning of the kind that largely dematerialized, digital schools afford is fundamentally a technical matter. Whether it *should* do so is a profoundly ethical one. Formal

[8] See: Walsh, 2020.

education is a primary global public good—a good produced in response to collective needs, in keeping with shared societal aims. While its public goods purposes are variously understood, and while its provision generally involves a mix of both public and private funding, formal education in all contemporary societies has been the primary institution responsible for conducting the socialization process. As such, education has played foundational roles in sustaining and enhancing both social cohesion and social resilience.

EdTech opens entirely new possibilities for commercializing and marketizing both education and the socialization process. The increasing volume, velocity, and variety of data that is now being generated—enough to produce a 10-hour high definition television program on every person on the planet, every day—is fueling a "Cambrian explosion" of synthetic intelligences: algorithmic, adaptive learning systems that merge the intelligence manifested in human behavior and attention patterns with computational imperatives to carry out certain kinds of work, according to predetermined values. While systems like IBM's Watson supercomputer and Deep Mind's algorithmic game-playing wizards—AlphaGo, AlphaZero and AlphaStar—have garnered tremendous media coverage, they are evolutionary outliers. At the vanguard of this evolutionary explosion of synthetic intelligences are much more general purpose, voice-activated virtual personal assistants. These include "search agents" like Siri and Alexa, but also virtual counselors, travel agents, fitness trainers and "do agents" like Viv that are able to translate vernacularly-expressed human intentions into actionable code.

The corporate holy grail—as avidly sought after in Beijing's Zhongguancun high-tech hub as it is in Silicon Valley—is an ambient, artificial/synthetic intelligence system that is able, not only to mediate conversational commerce, but to mediate every aspect of daily life: a constantly adapting personal assistant able to offer individualized "smart services" to help with

everything from ordering groceries to selecting clothes, from choosing bedtime stories and managing investments to eldercare and lifelong learning. Voice activation means that literacy can be bypassed along with screens, enabling machine intelligences to interact even with infants and toddlers, potentially serving simultaneously as virtual playmates, helpmates, and nannies.

We are on the verge of passing from the smartphone-wielding generation of "digital natives" to a smart service generation of "digitally socialized" consumers/citizens who from earliest childhood have lived in the company of virtual assistants and friends, whose synthetically intelligent teachers have drawn almost magically on both global databases and intimate socio-biophysical knowledge of their own learning responses, and whose spaces for play and work have always been densely populated with ambient intelligences watching over them to ensure that they have experiences of the kinds and intensities that they want, peppered judiciously, perhaps, with what system designers have decided will offer suitable opportunities for personal growth.

This is not a path to be embarked upon lightly. Governments vary greatly in their determinations of what counts as conduct aligned with societal norms and values. Some restrict freedoms to engage in political opposition. Some prohibit public expressions of sexual and gender identities. Some constrain and discipline religious practices and beliefs. And, others insist on public civility and respect for cultural difference. Corporations the world over, however, tempered only in degree by commitments to social responsibility, are committed first and foremost to maximizing profit and shareholder value. This has almost invariably meant both seeking commanding market share and engineering greater market differentiation.

Offering a range of products or services at different price points with different degrees of prestige is a well-worn path to profitability. Capitalist markets produce inequalities along with

increasing varieties of goods and services (Piketty, 2017). Computationally-enhanced smart capitalism is grounded and thrives on the provision of maximally personalized goods and services: market differentiation and inequality production on data steroids. Whether deregulated markets are more efficient is debatable except when market wellbeing is delinked from broader societal wellbeing. A single metric of success eliminates controversy. As the core institution by means of which societies ensure sufficient sharing of values to secure the conditions for social cohesion and societal wellbeing, education can be subjected to market forces only at considerable risk. Not every public good that *can* be privatized and marketized *should* be. The metrics of market success and societal wellbeing are not identical.

Of course, many education systems around the world have long operated as something akin to markets governed by the dynamics of national (and eventually global) attention economies. But until relatively recently, these markets were dominated by what might be called vernacular reputations—that is, reputations grown over time in informal reflection of the academic, social, economic, and political influences exerted by school graduates. Algorithmic school ranking systems have changed that, formalizing reputation mathematically in ways that have distorted higher education priorities and contributed to monumental growth in tuition costs. Even more worryingly, the marketization of education opens lucrative spaces for predatory practices that exploit education-seekers from the most precarious populations—for example, the poor, single mothers, immigrants, displaced workers and veterans with post-traumatic stress syndrome (see, e.g., O'Neil 2017:50-83). Opening the door for profit-oriented EdTech and smart education services to permeate all levels of education and assume increasingly central roles in our schools and in the lives of our children is not something to be done without long and profound ethical deliberation, especially if their presence is digitally-mediated.

Digital Socialization and the Potential for Social Learning Deficits

There is now a considerable body of neuroscientific evidence that asynchronous, digitally-mediated connectivity fails to activate the mirror neuron system that supports both verbal and non-verbal communication, thus compromising social learning, empathy, and emotional fluency (Dickerson, Gerhardstein and Moser, 2017). The mirror neuron system facilitates communication by enabling the actions of another person to be registered, in a part of the brain that is responsible for perceptual and motor processing, "as if" they were one's own actions. That is, mirror neurons enable experiencing others' actions, emotions, and sensations through same neural systems at work when we experience these actions, emotions, and sensations ourselves. It is this perceptual-motor coupling that enables coordinated and dynamic perception-production cycles, not just in individuals, but among them (Rizzolatti, 2005; Hasson etal.,2012). In short, the predominance of digital learning, rather than face-to-face learning, will have the effect of producing a social learning deficit.

Social learning is crucial to successful socialization, which is in turn crucial to practices of membership in society that allow individual talents and capabilities to be fully realized. Any deficit in social learning, especially among younger children whose school socialization is largely digital, will have potentially lifelong ramifications. Digitally-mediated schooling would not only allow commercial values to directly inform the socialization process, by failing to facilitate the full activation of the mirror neuron system, it has the potential to compromise intentional attunement and the development of skills in realizing bodily and affective synchrony with others (Vivanti and Rogers, 2014). As such, it has the potential to compromise the efficacy of the values training and moral reasoning that are at the heart of the school socialization

process. Bluntly stated, exclusively online education would place at risk biosocial developments that are foundational for ethical deliberation.

Social Cohesion and Social Resilience after COVID-19

The COVID-19 pandemic has revealed patterns of societal vulnerability at different scales, from the local and national to the global. At each scale, these patterns of vulnerability reveal densely interwoven histories of values-driven practices and policies. They also reveal persistent values conflicts. The COVID-19 pandemic is an invitation to reflect on these values conflicts—the societal predicaments—that have become manifest as failures, for example, to aptly anticipate the supply chain liabilities of just-in-time production and zero inventory practices, or to exhibit the readiness needed to improvise expeditious routes around apparent supply bottlenecks, or to keep the protection of national political fortunes from impeding the protection of national populations, especially those in positions of greatest precarity.

There is no fixed trajectory for how digital connectivity will affect qualities and depths of social cohesion. On one hand, there is evidence that digital connectivity can positively affect the coordination of disaster relief, that it provides flexible forums for mutual support groups, and that it can be instrumental in initiating solidarity movements. Yet, consistent with current research in the neuroscience of empathy, the best empirical social scientific evidence is that positive social transformation requires commitments that are socially-embodied and not merely digitally-expressed (Castells, 2015). Moreover, digital connectivity has proven worryingly conducive to the rise of populist movements and fringe associations. It has opened spaces of opportunity and enhanced capacities for engaging in disinformation campaigns, for spreading fake news, and for producing deep fakes intended variously to entertain, dismay, and enrage.

Digital connectivity is, in other words, also consistent with fostering social division, if not full-fledged social incoherence.

This disparity among the affordances of digital connectivity is *not*, as some defenders of the digital way might argue, evidence of the neutrality of the technologies involved. It is evidence of the particular constellations of values priorities that have been designed into our communication and information tools and infrastructures—priorities that inform the dynamics of the technologies through which we are not only recrafting our relationships with world around us and with one another, but through which we are also remaking ourselves, now with the unrelenting help of adaptive machine agencies. Evaluating the significance of this disparity is crucial practically for establishing protocols for more aptly and equitably facing future catastrophes. It is just as crucial for taking responsibility ethically for the transformations ahead.

At present, the technologies of digital connectivity—like the technologies that drove the 1st, 2nd and 3rd Industrial Revolutions—are biased toward the values of control, choice, convenience, competition and predictive precision (Hershock, 1999; 2012). The epistemological and ontological powers that these technologies afford can be differently wielded. But, they are *powers*: abilities to determine how things turn out, whether on battlefields, in markets, in schools, or in the intimate spaces of domestic life.

Social cohesion is not an expression of power. It is a demonstration of strength, where *strength* consists in capacities for contributing to ongoing relational dynamics in ways that enhance qualities of interaction and inclusion for all involved. Power enables us to achieve desirable outcomes in ways that transfer costs to others. Applications of power tend, in other words, to be zero sum. Strength enables achieving win-win outcomes deemed desirable by all. Central among the questions we should now be asking are not those about how best to maintain

or gain geopolitical and economic power, but rather questions about how the COVID-19 pandemic might strengthen our most humane intuitions and intentions.

To reap the potential benefits of smart capitalism and smart government while mitigating exposure to the structural risks they entail, it will be necessary to resist the corporate colonization of our schools and homes and to hold governments accountable for ensuring that differences—including differences in wealth, income, opportunity and risk—function as openings for mutual contribution to sustainably and equitably shared flourishing. The values according to which intelligent technology actively and recursively transforms the human-technology-world relationship are neither fixed nor pre-determined. If the COVID-19 pandemic is to accelerate movement toward greater equity, diversity, social cohesion and justice, it is imperative that the evolution of synthetic intelligences is informed not only by the currently dominant values of control, choice and competition, but also and more centrally by the values of mutual contribution, commitment and compassion.

It is also imperative that socialization processes be carried out in ways that are conducive to empathetic social learning and to honing skills in creative ethical deliberation. If intelligent technology is not going to scale up conflicting human intentions and values, we will need to resolve those conflicts. The COVID-19 pandemic affords us with opportunities to rethink, not only the means by which education is provided as a core global public good, but also the meaning and purpose of education and its indispensible role in fostering the emergence and evolution of truly humane intelligent technology.

Colleges and universities are epistemic ecotones—zones of overlap among the knowledge domains proper to different social, economic and political ecologies, but also to different generations and cultures. In much the same way that natural ecotones are spaces of

heightened species diversification in response to shared environmental challenges and disruptions, college and university campuses can be spaces of diversified response to the COVID-19 pandemic, but also to slower disruptions like those being brought about by climate change and by the ongoing, "Cambrian explosion" of synthetic intelligences. They can be innovation laboratories for producing vaccines and privacy-respecting contact-tracing algorithms, but also centers for the improvisation of correctives for inequalities in the topography of both viral vulnerabilities and social resilience.

The financial fallout from the COVID-19 pandemic will severely affect all but the most elite and fiscally secure educational institutions. Given that educational institutions worldwide are primary contributors to social cohesion and to both workforce development and knowledge innovation, this pandemic fallout should be regarded as a serious and imminent threat to national defense and security. Especially in the U.S., where the current federal budget for Department of Education is $66 billion while the budgets for the Department of Defense and Homeland Security total $686 billion, such a rethinking has the potential to direct sector-invigorating levels of support for a post-pandemic education revolution.

The ability to maintain social distancing in educational settings can be accomplished through aggressively scaling up EdTech, but it can also be accomplished by hiring more teachers to reduce classroom sizes, and then developing programs that split student time between traditional classroom learning environments and outdoor and service learning environments to address classroom shortages (Klein, 2020). College and university research programs, involving both undergraduate and graduate students, could be funded to explore empathetic human-in-the-loop strategies for reducing vulnerability-amplifying inequalities. The kind of history that the COVID-19 pandemic accelerates should not be left up solely to commercial or geopolitical

interests if the futures we hope to realize are to be truly humane futures of greater and more global social cohesion and the kinds of strong interdependence that can emerge when innovation is empathically grounded.

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Humane Artificial Intelligence

Humane Artificial Intelligence is an intercultural, intergenerational, and interdisciplinary initiative of the East-West Center (EWC) to engage the societal challenges and opportunities that are emerging with advances in artificial intelligence, robotics, machine learning and big data. The purposes of the initiative are: to establish an ongoing forum for exploring differences in understanding the goal of aligning artificial intelligence with human values and societal wellbeing; to foster globally-shared commitments to equitable and humane artificial intelligence; and, to engage emerging perspectives on the evolving interplay of people, artificial intelligence, and related technologies.

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