



The Digital Era: Challenges for the Modern Mind*

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Abstract

The digital media are the new interface between mind and world. They enable us to gain instant access to an infinitely expandable collective memory system. This is an indispensable breakthrough, but has the potential to seriously violate the ancient co-evolutionary pact between brain and culture which has kept the rate of cultural and technological change within tolerable limits. Traditional cultures, with all their flaws, stayed well within the adaptive capacities of the individual brain. However, the recent explosion of digital culture has placed all forms of traditional culture under serious challenge.

The principal challenge is a cognitive one: the economic system is increasingly tethered to a machine-driven agenda that either ignores or downgrades the most basic needs of the human mind. The result is a governance system that is out of control, in which success depends upon fitting the individual mind to a largely machine-driven agenda, rather than vice versa.

Three especially serious concerns stand out: (1) how to maintain the autonomy of the individual mind in the context of massive and sophisticated external programming; (2) how to construct networks of trust in an environment of anonymity and manipulation; and (3) how to place the most basic needs of the human mind at the top of our list of governance priorities.

The digital media are the new interface between mind and world. They cannot be avoided because they have become essential for survival. They enable us to gain instant access to an infinitely expandable collective memory system. Every corner of the world has been reached by this system, through cell phone networks and the Internet.

This is an indispensable breakthrough, but it is also disturbing and disorienting. It represents a massive change in human interconnectivity that comes with intellectual and emotional baggage. All forms of traditional culture are under challenge. It is fair to say that our conception of human nature itself is also under challenge.¹

This is a revolution, perhaps one of the greatest in human history, and we are in the middle of it. But it is not so much a political or economic revolution as it is a *cognitive* revolution. The new media are aimed at the mind. They are interconnected with the sense organs. They

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aim their sophisticated, carefully engineered messages directly at the memory systems of the brain. They actually restructure memory, changing both the storage and retrieval systems we depend upon, and they are addressed directly to the source of our experience, and aimed at consciousness itself.

Moreover, the digital media are omnipresent. The old religions and ideologies enforced influence by means of daily rituals, sermons of an hour or so once a week, and in small numbers of books and pamphlets, but their available means of influencing people were very limited besides the tools available to the new media. For much of humanity today, the media are present every hour of the day, in the bedroom, living room, and boardroom; on screens in subway stations, airports, and store windows; on buses and automobiles; and in schoolrooms and offices. Smartphones are in our pockets; laptops and tablets are in our briefcases and backpacks. Wearable devices are already appearing, and we are soon going to see flexible new micro-devices insinuated into the fabric of our bodies and clothes.

Politicians are using the new media for self-promotion, rather than seeing them as a serious challenge that might require a major adjustment to our political system. Educators are being forced to reconsider what they should be doing with the new media, but they have no visible plan at this point, at least none that is not tainted by self-interest, whether in the massive revenue-generation opportunities afforded by Massive Open Online Courses (MOOCs), or in fundraising and personal careerism.

The revolution has just begun, and counter-revolutions are inevitable. We should not be surprised if reactionary movements gain momentum. The new media are a central component in the rewiring of human society by machines, and the replacement of human work with robots that comply more easily with highly centralized systems of control. There will inevitably be pressure to decentralize control, in such phenomena as hacking, leaks, whistleblowing, and deliberately decentralizing Internet projects like Wikipedia. But there is also continuing pressure to privatize and monetize every aspect of the Internet, and bring it under corporate control.

1. Finding Context

If this is a period of cognitive revolution, it follows that cognitive science should have something useful to say about its significance. At the very least, what we know about the mind should be able to provide some context that might make the new media, and digital culture, more intelligible. A coherent theoretical framework might help us think more clearly about what these radical new technologies are doing to our minds, what this implies for the way we run the human world, and what we should expect of ourselves.

A massive cognitive revolution also implies an equally massive cultural revolution. Cognition and culture have been locked into a symbiosis for a very long time and, given the nature of the new technologies coming down the line, that relationship is leading toward a major cultural shift on a global scale: the importance of knowledge stored in the brains of individuals is shrinking, relative to the size of our communal knowledge bank. Where

individuals once held most of our collective knowledge in personal memory, knowledge is now overwhelmingly stored in new media, outside our biological systems.

Our minds and brains are living evidence of where we started the human journey: as animals living in the wild. Distant human ancestors evolved from African primates during the Miocene era, five million years ago, and this is evident in our anatomy; we are still very much cast in the primate mold. Our vision, hearing and basic emotional repertoires greatly resemble those of Great Apes. Human intelligence is somewhat more evolved than that of our ape relatives, but we should not exaggerate the size of the cognitive gap. Collectively, we may be very clever and able to achieve remarkable things; but individually, and especially when isolated from society, we are quite limited creatures. This applies even to our so-called geniuses, most of whom are more a product of their historical situation than they might like to admit.

Our particular subspecies of humanity has lived on this planet for only about 150,000 years, and for most of that time our way of life was very slow to change. During the last few millennia, the rate of change has accelerated; and during the last two centuries it has exploded into an exponential growth curve that has suddenly increased our numbers sevenfold, while our technology suddenly reaches every corner of the planet.

This has happened so fast that the speed of our ascent is difficult to place in historical context, and somewhat worrying for anyone aware of the typically slow pace of adaptation that characterizes most biological systems. There seem to be no precedents for the speed of our sudden rise to dominance of this planet, and for the stress this imposes on our capacity for adaptation. We have arrived at a point in history where our range of intellectual possibilities as a species has greatly expanded, mostly because of the new digital web encircling the world.

However, as might be expected, we have not all travelled at the same speed. Some societies have developed very fast; others very little, and some, apparently, not at all. Whether due to the accidents of climate, the vicissitudes of geography, or the availability of resources, human societies have not all developed at the same pace, nor arrived at the same cultural destination. Some societies discovered metal technology and writing very long ago, while many never reached that point. Moreover, the ones that got there first have tended to move farther and farther away from those still more or less stuck at the starting line, and they are constructing a globalized economy that is encircling the entire planet. This uneven race has left our planet with a wide variety of human cultures living side by side, colliding and interacting, while existing at vastly different stages of development. Even those few small groups that have remained relatively isolated are now inevitably influenced by the wider world.

Cultural collisions create tremendous stress. This is usually treated as an economic and political problem, but it is also, and perhaps even mostly, a cognitive problem. Societies on our planet do not all operate on the same assumptions, and do not share values and norms to the extent that they must. Our traditional bag of economic and political instruments does not seem to be working very well in resolving these stresses (if it ever has). Thus, it might help to examine the problem of cultural compatibility from the vantage point of cognitive science;

that is, by looking at the world as if societies were primarily systems for governing thought and memory, and only secondarily concerned with what we normally call government and economic growth.

We have good reason to believe that dissonance between cultures has much deeper roots than a mere mismatch of specific values and norms. The sources of disagreements between any two cultures at roughly similar stages of historical development, such as between the subcultures of Christian Europe, are fairly obvious, and attributable mostly to the pursuit of incompatible self-interests. So are disagreements between say, Russia and China, or between Pakistan and India. But the sources of disagreements between small tribal groups and the large national governments that exist in Asia, South America, and Africa, or between hunter-gatherers and any developed modern state, are so deep that one wonders where to start.

This may sound like the myth of progress: well, yes it is, but without any moral implications whatsoever. So-called developed societies are not necessarily more moral, nor are their citizens necessarily any more intelligent, in terms of innate potential; quite the contrary. But it would be foolish to deny that the president of, say, Citibank, or the chief scientist at CERN does not possess massive cognitive advantages over their counterparts in a Stone Age hunter-gatherer society in the Amazon, regardless of whether they would prove, on closer examination, to be on equal moral or intellectual terms.

The reason for this is that it is the larger cognitive *system* that matters most, not the individual. Collective cognitive power is more a function of the society as a whole than it is of its individual members. Intelligence, as manifest in such things as new technologies, and complex ways of life, is largely a product of a collective system that coordinates the intellectual resources of an entire society. The collective cognitive system even exerts influence on gene expression during development. By means of this kind of influence, social systems can profoundly influence the way individual brains develop, and the way growing minds allocate their inborn resources.

Before the twentieth century, societies that were very far apart in cognitive resources tended to be geographically isolated from one another (with some notable exceptions). We can easily forget how much of the Earth was still very difficult to explore a mere two centuries ago, and how little we knew of societies that were far removed from the hot spots of development. The globalization of economic activity has brought many of those societies, isolated from the mainstream in terms of collective cultural experience, into close proximity and inevitable collision with the mainstream. Like it or not, we all now share a common economic and communication space.

Moreover, that space is getting crowded and more complicated. Some small societies still live in the late Stone Age and continue to exist as hunter-gatherers, without writing, agriculture, or metal technology (as most humans did until 10,000 years ago). Others are locked into

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various historical prisons. Even some highly literate societies still maintain theocratic rule, living and governing as many societies did a few hundred years ago. A few secular high-tech states have completely broken with the past, and have come to dominate the planet, not through any superior moral force, but rather through their overwhelming success in merging technology with social organization to create a powerful new apparatus of thought and invention.

This recently achieved global power is cognitive power. Societies that master it dominate because they have an institutionalized system to merge technology and knowledge, and a collective apparatus of thought and memory incomparably more powerful than anything we had before. Moreover, this revolution is just starting. It will go much further.

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The question is: how can we design a system that will harness the collective intellectual and adaptive power of the human species? We cannot afford to underestimate the scale of the challenge facing us. The variety of human tribes, nations, and multicultural entities on the planet is truly staggering, and we are all now marching toward a kind of global forced marriage, largely because of the spread of communication technology and rapid transportation.

Technological change imposes challenges on society. The juxtaposition of so many disparate societies represents a historical convulsion of human history and prehistory back upon itself that amplifies both the size and number of challenges. It is as if all periods of human history were suddenly present at once: all the migrations and diasporas, all the tragedies and victories and great inventions, all the strange ideas, all the different habits and customary practices, suddenly present at once, in a global collision.

All this complexity needs governance, and a governance structure is gradually emerging, consisting of a rather loose collection of institutions and governments, dominated by several large super-powers. There is a new elite emerging, as well as a ruling international culture. However, this new elite does not reflect the full complexity of world cultures, and it is questionable, first, whether it wants to govern at all; and second, whether it has the internal resources to deal with the difficult problem of world governance if it should choose to accept the challenge to try.

In fact, the new elite governing class is drawn from a fairly narrow sample, and reflects a fairly homogenous international culture, one that has been very recently developed in concert with a massive application of new technologies. This has entrenched a way of thinking that can be characterized by certain unique features, which have been institutionalized in the more elite schools and universities.

What I am suggesting is that the cognitive style of the new elite might well be regarded as its distinctive and identifying feature. I have suggested a label for this new cognitive style: “theoretic” culture, that is, governance by abstract theories and analytic thought.² International standards and control systems are now vested in non-biological memory devices. Examples

can be found in the vast archives of legal codices, for example, in the archives holding the documents spelling out the Law of the Sea, which far exceed the personal memory capacities of experts in the field; or in scientific instruments that anchor world-wide standards of measurement in physical devices (such as the atomic clock); and in complex human-machine networks that link the minds of human beings into a complex web involving computers and other electronic devices, as in the control systems for nuclear weapons. All of these examples show how dependent our society has become on system-level networks, rather than on the memory capacities of individuals.

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The theoretic mode extends to the sampling statistics and monitoring strategies of governments and corporations; they now rule by means of abstract models and large-scale analysis of metadata banks. Personal whim may occasionally override the theoreticians’ work, but for the most part the system is driven by abstract models and technologies.

This new system of cognitive governance stands out, when compared with governance systems from the recent past, let alone the more distant past. Whether we realize it or not, national and ethnic origins have become largely irrelevant, except inasmuch as such things may affect the way the new cognitive system works. The members of the new elite have been educated into a common culture more closely tied to the new digital media than to the traditional guideposts that once defined cultures. They are entering a unique cognitive-cultural ecology, which will have its own distinctive way of regulating the thoughts and memories of its members.

The graduates of the top universities in the world are moving into a world where knowledge is mostly out there, rather than inside the head, and decisions are made by hybrid social networks that merge humans and machines. They are entering an emerging new culture, and need to accommodate the novel demands of that culture. They need to develop new ways of allocating their personal cognitive resources.

A new ecology implies a new set of challenges, and three potentially serious flaws of the new theoretic culture stand out. These concern (1) individual autonomy, (2) trust; and (3) priorities: human versus machine-driven.

2. Challenge #1: Autonomy and the Externally Programmable Mind

The new media have made us more externally programmable than ever before. This means we are subjected to a constant bombardment of highly controlling messages and images. This situation is not new in principle; Plato famously complained that reading would make us mentally lazy. However, it is certainly novel in terms of the intensity, scale, rate of change, and sophistication of the new media.

The notion of external programmability can be traced back to the invention of writing. When a person becomes literate, whether in the limited sense of just learning how to read, or in the broader sense of reading widely and critically, the brain is permanently changed by

the experience. The scientific study of acquired dyslexia has shown that the brain of a person who learns to read acquires a new wiring pattern that creates a “cognitive architecture” – that is, a subsystem within the brain that automatically carries out the various complex sub-operations involved in reading.

The cognitive architecture of reading is interesting because we know the reading circuitry of the brain did not evolve as such; writing was not invented until about 5,000 years ago, very long after the modern brain reached its present form. Moreover, the vast majority of the world’s languages have no indigenous writing system, and yet any neurologically normal child from any remote corner of the preliterate world can learn to read. This is strong evidence that the neural architecture of reading is not innate; rather, it is installed in the brain by culture and technology. The corollary is this: in principle, *technology and culture can change the brain’s functional architecture*.

The same principle applies to the subsystems of mathematical skill, and other cognitive skills that depend heavily on external symbolic devices and scripts, such as those involved in musical performance, or the graphic arts, or computer programming. Recent imaging experiments have shown that the internal organization of several brain areas changes when a person acquires numeracy and literacy skills. Regions normally used for other purposes are “cannibalized” or redeployed, and as the brain becomes entrained to any new symbolic interface, it rewires its circuits accordingly, setting down new functional pathways and reallocating resources.

This ability to rewire internal functional circuits, is a reflection of the extraordinary plasticity of the human brain, especially of the cerebral cortex. However, plasticity renders us vulnerable to external programming. When we learn to read, the images of words in our native tongue acquire great intrusive power, because they can no longer be treated just as normal environmental stimuli; once the brain’s circuits are altered, these images tap directly into automatic neural circuitry. External symbols can thus evolve into “cerebral Trojan horses,” triggering automatic circuits in our brains, like it or not.

This makes us highly programmable, in the sense that, once our cognitive architecture has been altered, our minds can more easily be manipulated by people who are skilled at triggering those deep automatic responses in us – such as writers and film directors, or more dangerously, marketers who use explicitly cognitive techniques of persuasion. A good film, book or advertisement can quickly set up a mind-state that has been carefully designed and powerfully scripted, and which is very hard to resist; this is due to those Trojan horses planted in our brains, which continue to proliferate as we enter adulthood. This is the basis of present-day “cognitive engineering” by writers, film directors, advertising designers, and various other kinds of media producers, employed to manipulate our states of mind. The objective of cognitive engineering is to manufacture, not material products, but states of mind. It has enjoyed a great increase in relative power in recent decades, with sophisticated new media, supplemented by systematic psychological and social research.

Not all these influences are used maliciously or dangerously; most are not. However, some are, and the potential for mass manipulation is significant. Just as automatic weapons

make it easier to wage a war of terror, the new media open up new possibilities for mass cognitive influence. Regardless of the benign intentions of the majority, the fact remains that training in the use of symbolic systems opens the mind to outside influence and leaves it vulnerable; this is given of modern life. We are made this way by our bond with technology, and we have no choice in the matter, given the obvious cognitive benefits associated with developing such a powerful interconnected system for thought and memory. This connectedness can add enormously to our experience of life.

However, our increased vulnerability to intrusive cognitive engineering is a good reason to think very carefully about how we use our digital power over the growing brains and minds of children. Digital natives they may be, more skilled perhaps, but also more vulnerable, precisely because they are so wired into the system. We may campaign for open access to the Internet, and against censorship of any kind. This appeals to liberal values; but it also exposes the brain to an unstoppable plethora of powerful external factors, and renders the individual vulnerable to disintegrative forces that break up attention, and can prevent the formation of a coherent personal identity.

To mitigate this danger, students need to be trained in a new kind of cognitive guerilla warfare: how to see through, and resist, such powerful forces of persuasion. Professional training usually achieves the opposite, socializing the student into a pre-existing set of ideas and symbols, so that they fit nicely into a slot in a managerial flow-diagram, and are unlikely to insist on thinking for themselves. The ideals of education once emphasized the cultivation of personal autonomy and judgment, rather than specialized job training; never in history have these ideals been more important than they are now.

3. Challenge #2: Building Networks of Trust in a Digital World

This concerns the problem of how to construct and maintain networks of trust in an open digitally connected society where anonymity is easy, deception is even easier and much harder to detect, and influence can be far more subtle and devious than it is in traditional social life.

All humans, even those living in hunter-gatherer societies, live in communities in which the cognitive work of thinking and deciding is distributed across the members of the community, and supplemented by whatever symbolic technology is available. This kind of arrangement produces a space in which trust becomes possible between people who do not live in close proximity. It works best when the members of a community are in agreement regarding certain ideas and habits that make cooperation and division of cognitive labor possible.

Written documents were important in extending the range of trust, by aligning values and belief in large populations. Classical civilizations used writing to manage their larger-scale communities, and this was an important step that enabled rulers to extend their control far beyond the boundaries of relatively small kinship groups. Material artifacts such as monumental buildings, art, and libraries also served to maintain a zone of trust, and a

common universe of discourse, by defining a set of symbols and values over generations, and helping perpetuate the kinds of cognitive arrangements that make a large community of mind function effectively.

The cognitive arrangements that establish alignment, and control the flow of ideas and memory representations in a community may or may not correspond to what is conventionally known as “government.” In theocratic systems, the two were usually identical. In more complex societies, this was not necessarily the case. For example, in Medieval Europe military power lay in the hands of kings, whereas cognitive governance was mostly determined by the Church hierarchy, which controlled most legal and educational institutions. This separation of power probably aided the gradual breakup of old power monopolies in the West.

Religions and legal systems, usually backed up by military force, were the traditional vehicles, as well as products, of this alignment process. The digital world (backed by military and economic force, albeit more indirectly) carries the same process one step further, because individuals must enter into a far more intimate and personal embrace with the new technology, and thus with the ideas and symbols communicated by the media. Digital culture has much more sophisticated weapons to work with than traditional societies, and the virtual worlds created with technology can become subjectively hyper-real, and even more intense and persuasive than the “real” worlds of traditional social intercourse.

Of course, traditional communities of mind could also bully and coerce; they were not always benign. It would be naïve to expect that digital culture will be any different. To achieve any degree of effective cooperation and alignment in a digital community, the same ancient need for establishing reliable circles of trust will still be there. However, there are enormously complex challenges involved in establishing a satisfactory degree of trust in a digital environment; it is obviously not going to be easy to achieve.

At all levels of society, trust is paramount, because trust supports two of the human brain’s strongest preferences: predictability and familiarity. It also reduces stress; a perpetually vigilant, hyper-alert brain is a stressed brain. The shared machinery of cognition cannot function without a framework of predictability and familiarity. To achieve this, members of a community have to be in sync with one another, more or less as the gears of a clock must be in sync. Absolute universal trust is an impossible ideal, and all communities inevitably have cheaters. But circles of trust are essential in any functioning social-cognitive system, and a common universe of discourse is particularly indispensable in a democracy.

However, the Internet is wide open, to a degree that is historically new. A reasonable balance between openness and cognitive alignment has always been hard to find in human history. Educational systems have played a crucial role in preserving and transmitting cultures across generations; traditionally, they have provided and protected the shared visions that made communities of mind work. But the electronic universe is radically different, because it has multiplied the number of visionary options by many orders of magnitude, making circles of trust harder to rely on. Digital natives may figure this one out eventually, but in the complex world of the Internet, finding a solution will not be easy.

In the current world order, cognitive governance is very widely distributed, and there is no single center of ideational power. This may be seen as a weakness, because cognitive governance has always had a visionary aspect. Shared worldviews keep communities working reasonably well, because they are the basis of trust, encouraging altruistic behavior among the members of the community, and reducing the sources of violence.

The new cultural astronauts will need a home planet, like previous generations. They will need a common culture to unite them in a world they can trust. This means they will need a common culture offering a level of trust comparable to that of traditional cultures. It is not obvious where this will come from.

4. Challenge #3: Moving from Machine-centered to Human-centered Governance

The modern digital economy is increasingly influenced by considerations that are largely or entirely machine-driven. By machine-driven, I mean that the economy is dominated by algorithms and mathematical formulae that are linked directly to computers and the Internet, and dominate the context of decision-making, to the point where they are more important than the humans who are supposedly controlling the process. The theories that are fed into the system have come to dominate it, because the algorithms in question are now *causal*; that is, they are harnessed to various devices that search, analyze, and compress enormous clouds of data that are inaccessible to the human mind without further machine processing.

The intricate corporate and financial systems that dominate the global economy are run by highly focused distributed cognitive networks that co-opt a huge proportion of the world's resources (both human and nonhuman) for their activities, and routinely make major decisions independently of any consideration of the long-term common good, or of elementary human needs such as hope, identity, and a sense of purpose. Their resources are tied up in intricate political systems that are also digitally wired and economically tied to a machine-driven agenda. The competitive economic framework of human life is tied closely to short-term bottom lines, and those are not based on basic human needs such as the need for security, trust, and meaningful work. Rather, they are usually based on numerical calculations performed, for the most part, by robots and algorithms, without much human intervention.

Although many key decisions continue to be made by individual human beings, they are limited to devising personal strategies for surviving in a machine-dominated economy where data are seldom provided without machine support. The sheer speed of interconnectivity within the digital world, and the kinds of short-term incentives that shape so many corporate and government decisions, are creating an international decision-making apparatus that is determined much less by human needs (even simple-minded needs such as egotism, rivalry, and domination) than it once was. This is not all bad; the psychological needs of kings and potentates were not always a good basis for government. But if we assume, as we must if we are orthodox Darwinians, that human governance systems must ideally serve the long-term welfare and survival of the human species, the machine-driven modern world does not appear to bring us closer to the ideal; in fact, it may be drawing us further away.

Some political leaders genuinely wish to guide our shared cognitive system toward an agenda that is more human-friendly and less machine-driven, but the present system of economically-mediated control makes that extremely difficult. Moreover, the speed of technological change cannot easily be slowed, and has created unprecedented pressure on our collective intellectual capacity as a species.

Finally, a caveat: to reiterate a point made earlier, the personal cognitive capacities of human beings are highly over-rated (this includes our so-called geniuses). Some people may appear to be incredibly clever if they are fortunate enough to be functioning well in a coherent community of mind, largely because our digital networks provide them with such formidable resources. In other words, when married to an effective network, and in possession of the right combination of genes, we can be made to look, as individuals, much smarter than any of us would look if left entirely to our own resources. Geniuses are the lucky possessors of particular talents sought after in a particular historical context. Social networks function as search engines, and when they find what they need in the form of a relevant talent, they can shower that particular individual with great rewards.

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Specific geniuses are wedded to specific cultural contexts. The hybrid system humanity has built over centuries, with its clever hardware and software, is extremely effective in exploiting such talent. It now has an endless supply of trained and well-supported specialists, and a seemingly infinite system of stored knowledge. But at the same time as the new cognitive ecosystem has produced such remarkable change, it also has the potential to stress the human species to an unprecedented degree, because the distributed system is stressing the brains that sustain it.

The modern mind is exposed to constant change. This in itself is a very large deviation from our historical preference for generational stability and familiarity. Modern consciousness is confronted with too many choices, too much information, and too much uncertainty, without a common world view. History tells us this will cause us eventually to fail, unless we find some way to tailor the system to meet the needs of individuals. One civilization after another has had to fight to establish some degree of stability and intellectual cohesion. We are no exception, but the stakes are higher. If our global system collapses under its own weight, it is not clear what kind of system, if any, will be in a position to follow.

5. Conclusion: The Need for a Post-theoretic Governance Strategy

The new cognitive ecology is exciting, creative, and potentially very dangerous and destabilizing, because we have made very little progress in addressing the concerns outlined

here. An out-of-control machine-driven agenda driving a global economy could bring out a fatal flaw in our system, stressing the human mind beyond its capacity.

Our world needs intelligent, sensitive governance as never before. The human brain is basically the same brain we have been using to construct communities of mind for millennia. Because of digital technology, it is being put to the test. Individual minds need protection from the potential dangers of this new world order, but they also have to be immersed in it. If the machine-driven agenda dominates policy, without taking into account the needs of its human component, the system will almost certainly fail.

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However, the signals emanating from our media do not reassure. Theoretic culture sails merrily on, oblivious to the human needs of the vast majority. This trend cannot continue without placing the human species in peril. Our current educational system needs to be re-invented for a twenty-first century world where global governance and high technology are inevitable partners in setting a cognitive agenda that is more sensitive to the human beings it supposedly serves. What we need is a discussion of strategy for a society that transcends the present form of theoretic culture: call it a “post-theoretic”^{*} strategy or a new variation on the theoretic, but in either case, it is urgently needed.

However, this will not happen unless the world directs its resources to prioritizing human needs over machine-logic. It is urgent that we promote the importance of subjects like history, and other value-related disciplines such as philosophy, art, literature, politics, and ethics in our educational systems. A new generation of digital natives will have to find a way to make the system work more effectively for the benefit of the people in the system, which can only be achieved by placing, and then keeping, machine-driven agendas in a subsidiary role.

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Notes

1. Merlin Donald, “The Definition of Human Nature, in the Context of Modern Neurobiology,” In D. A. Rees and S. P. R. Rose, eds, *The new brain sciences: Perils and Prospects* (Cambridge, UK: Cambridge University Press, 2004), 34-58; Merlin Donald, “A View from Cognitive Science,” In D. Genten, V. Gerhardt, J.-C. Heilinger and J. Nida-Rumalin, eds, *What is a human being?* (Berlin-Brandenburg Academy of Science, Berlin: de Gruyter, 2008), 45-49; Merlin Donald, *Cognitive Evolution and the Definition of Human Nature: Philosophy of Science Monographs* (Morris Foundation, Little Rock, Arkansas, 2000), 31.
2. Merlin Donald, *Origins of the Modern Mind; Three Stages in the Evolution of Culture and Cognition*. (Cambridge: Harvard University Press, 1991).

^{*} A term suggested by Bhavna Hariharan of Stanford University.