How the Kahn Academy Uses a 21st Century Technology to Reinforce a 17th Century Mindset

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Given the fear of extremism, from how jihadists are turning America into a police state to the many other fears circulating like a virus throughout society— including the fear that many Americans will lack enough savings to support a decent retirement, the successes of the Kahn Academy should be the focus of a national celebration. Its approach to making learning free and accessible to anyone in the world who has access to a computer, and in providing clear explanations of difficult concepts that students can learn and discuss with others in ways free of the old time and lock step schedules of most classrooms. The rave reviews are now coming in from all the corners of the world. Further evidence of the Academy's success has led to partnerships with NASA, The Museum of Modern Art, The California Academy of Science, and MIT. The Academy's use of technology to present lessons across a broad array of curricula, from mathematics , the sciences , to economics, history and the arts, has also attracted major funders such as the Bill & Melinda Gates Foundation, Albertson Foundation, AT&T, and Foundaçion Carlos Slim.

Salman Khan's early start in using videos and software to help his cousin, Nadia, overcome a six grade level difficulty in learning certain math concepts, led to the basic optimism that is now a hallmark of the Kahn Academy. The title of Kahn's book, *The One World School House*, (2013) communicates this same optimism that characterizes his announcement that "you have only to learn one thing: you can learn anything". This message has

apparently been taken to heart by the 35 million learners that have accessed the learning resources of the Academy.

Given the millions of learners who are claiming to benefit from the Academy, and the promise that it represents a model to be followed by other countries, readers should be asking why I am suggesting that Kahn's understanding of the world we live in is based on the same deep cultural misconceptions and silences that characterized the elite western thinkers of the 17th century. That his taken for granted view of the world is supported by both the super-rich such as Bill and Melinda Gates, and Eric Schmidt, as well as a wide cross section of the world's people seeking the advantages of computer mediated learning leaves me with a feeling of deep concern. And the concern is not limited to Kahn's failure to recognize the misconceptions and silences that were part of his MIT education—including how his understanding of the nature of learning contributes to exporting the Western 17th century mindset to other cultures. Like so many other well-intentioned social reformers , and many who were not well-intentioned, this process has been called colonization. But the real issues are how the conceptual limitations so evident in his book, as well as in the thinking of his many supporters and followers, reproduce the 17th century mindset that put the industrial and now digital revolution on an ecologically unsustainable pathway.

Elements of the !7th Century Mindset Present in the Thinking of Salman Kahn:

One of the most important silences in the thinking of Kahn is the total indifference to the deepening ecological crisis that is partly responsible for the millions of people who are already homeless, and are on the move across national boarders in search safety and a new start in life. And the world is just entering an era of extreme

environmental changes that will lead to even greater social unrest and chaos—which some scientists are now referring to as having entered the 6th extinction of the Earth's plants and animals. It is important to note that it was the earlier environmental destruction in parts of Europe, particularly in England, that led to the age of discovery of resources in the "New World". And like today, these efforts to acquire the resources of other cultures was part of the taken granted thinking of how progress was understood. Indeed, it was so taken for granted that the elite theorists whose legacy of abstract thinking continues to shape today's political world did not bother to mention the ecological crises of their eras. It was assumed that if the supposedly new lands could be named in the explorer's language, it then became an extension of the Great Britain, Spain, France, and so forth. These early centuries of colonization may seem totally irrelevant to what I am referring to as Kahn's silence about the ecological crisis, but they are not.

These earlier efforts to dispossess indigenous cultures of their land and resources, which is now not too different from dispossessing these cultures of their face to face intergenerational knowledge and skills of how to live less consumer dependent lives by promoting the computer-dependent approaches to education advocated by Kahn involved a radically different world population. That is, until the transition to the 20th century, it is estimated that the world population was somewhere around one and a half billion people. Now the world population is estimated at seven and a half billion, with future grow projected as leveling off at nine billion. The number of people now living on less that two dollars a day is in the billions.

Kahn's educational mantra "you only have to know one thing: you can learn anything" adds to the false promise about how his vision of educational reform contributes to personal

empowerment. Like the 17th century thinkers who also assumed that their approach to knowledge did not require awareness of how their taken for granted cultural traditions were adversely impacting natural and belief systems of other cultures, Kahn omits any reference to the deepening ecological crisis. This is surprising as even an increasing percentage of the market liberal/libertarians (so called "conservatives") now acknowledge that climate change exists and has dire consequences for the future of humanity. But they seem unable to recognize the cultural patterns that are contributing to climate changes, or the alternative lifestyles that have a smaller ecological footprint.

For an educational reformer who is promoting using the Internet to provide a "world class education" for everyone, it would seem necessary for Kahn to be aware of the environmental trend lines that reflect the consensus among the world's scientists. Otherwise, he has to fall back on the naïve assumption that students in different cultural settings will on their own make explicit the taken for granted cultural patterns of thinking and daily practices that are contributing to an ecologically unsustainable future. Later I will explain why this is exceedingly difficult even for highly educated people who assume that critical thinking is the engine of progress.

We have only to consider how long it took academics to recognize their taken for granted assumptions about why woman were unsuited to becoming scientists, historians, engineers, and so forth. As most of the cultural patterns of thinking and behavior are learned at the taken for granted level of awareness, where explicit awareness comes into play only when others deviate from the norms— which often leads to sanctions of the Other but not to rethinking what is taken for granted, I shall return later to the question of why any discussion of culture needs to take account of

the tacit ways most knowledge is acquired and carried forward. But to understand the connections between the 17th century Western mindset still promoted by the digital revolution that Kahn relies upon for his "reimagined" approach to educational reform it is necessary to introduce into the discussion what both scientists and people around the word are experiencing as the impacts of climate change and the other changes occurring throughout the Earth' ecosystems.

It is the environmental trend lines that represent a consensus among the world scientists that need to be understood before suggesting that the Kahn Academy represents the model of educational reform that the rest of the world should follow. The environmental trends include the following: (1) The acidification of the world's oceans is expected to increase, from today's pH level of 8.2 falling to 7.8 by the end of the century. The destruction of coral reefs, which are home to as much as twenty five percent of fish species, will continue to die off. There will be a continuing decline in the marine calcifiers (organisms that build external shells out of the mineral calcium carbonate) which are critical to the bottom of the marine food chain. As oceans warm, fisheries are migrating to colder waters that replicate their former habitats—which means people living in warmer climates will have less access to sources of protein. (2) The rapid melting of the Greenland ice sheet is slowing the Atlantic meridional overturning circulation (AMOC) that carries the warm salty water from the tropics to Northern Europe, which warms the region. The change in the behavior of the Gulf Stream is also contributing to the rise of ocean levels along the East Coast of the United States. (3) The growing water crisis, which includes the melting of glaciers that are the primary source of water for

the Chinese as well as for the countries of South East Asia, glaciers in the South American Andes now melting at a rate where they are predicated to disappear entirely before the midpoint of this century, the over-exploitation of major aquifers, along with the droughts occurring in different regions of the world, will lead to further economic disruptions and mass movements of people. (4) The globalization of the digital culture that undermines the face to face intergenerational knowledge and skills of how to live less consumer dependent lives, as well as the increase in economic growth as the Internet of Things makes obsolete so many aspects of the built culture, will further increase dependency upon the industrial system of production and consumption that requires exploiting more what remains of the Earth' natural systems.

What is not recognized by classroom teachers, university professors, and the promoters of the Kahn Academy is that when today's six year olds reach their retirement years, these environmental changes will have shifted the focus for those not already engaged in wars of survival to how to recover the less monetized traditions of living together in mutually supportive communities. Educational reforms will need to enable others to recognize the cultural commons and the localism movements that are leading a small minority in different countries to drop out of the consumerism-on-steroids culture in order to live ecologically sustainable and community-centered lives. These reforms will require recognizing the silences and mythical thinking that Kahn takes for granted. This criticism is aimed more at the system of higher education that perpetuated the misconceptions and silences of 17th century western philosophers. Kahn and his many supporters are highly intelligent and have the right motives, but as I will explain in the following sections intelligence can become a destructive force when it is based on unrecognized cultural

assumptions derived from the abstract and thus culturally and ecologically uninformed thinking of earlier eras.

How Kahn Reproduces Other 17th Century Misconceptions of that are Putting at Risk Our Collective Future:

Kahns makes a series of statements about how education happens, which are really based on his widely shared misunderstandings about the role of the brain in the process of learning. "Education," he writes, doesn't happen out in the ether, and it doesn't happen in the empty space between the teacher's lips and the students' ears; it happens in the individual brains of each of us". (2013, 45). As part of his explanation that has important pedagogical implications, it is necessary to quote more fully how he explains "*associative learning*" which leads to more comprehensive understandings. But first, it is important to address his explanation of the learning/ "educated" neurons connection. Learning, as he puts it, "develops new synaptic terminals—these being the tiny appendages across which one neuron communicates with the next….As we work with the same concept from slightly different angles and investigate questions surrounding it, we build even more and deeper connections….In physiological terms, then, learning means that our brains have done some sort of exercise—digested information, connected concepts and memories in new ways—and our nerve cells have thereby been altered". (46)

How different is this from John Locke's (1632-1704) argument that learning begins with sensory experiences which the brain then organizes on a rational basis into ideas? Or Rene Descartes' (1596-1650) claim that thinking is what establishes one as a rational person? Remember his famous claim: cogito ergo sum? Neither understood what is now recognized as the "mechanisms" of the neural pathways of the brain. Nor did they

recognize the multiple forms of cultural intelligence and their diverse semiotic patterns and networks of communication that sustained life within the natural and cultural ecologies of their day. Both Locke and Descartes, like the other abstract and ethnocentric philosophers of their era, set the agenda of culturally uninformed theory that today's philosopher are just beginning to question.

More importantly, neither the 17th century philosophers nor Kahn (as well as the professors from whom he learned) understood what is more important as our ecological survival clock nears the point where it cannot be reset. That is, if we are to change our conceptual world in ways that enable us to move beyond the cultural myths and silences that put us on the ecological unsustainable pathways that we now equate with progress it will be necessary to promote what Kahn calls "mastery learning"—that is, in my words, a deep historically and culturally informed understanding of how the vocabularies we are introduced to when becoming a member of the language community influence thinking , awareness, —including what will not be recognized.

Both Locke and Descartes reproduced the misconceptions and silences of the taken for granted world of the elite thinkers of their era. One of the misconceptions they both promoted (but for different reasons) is that the theoretical and folk knowledge handed down from the past, must be rejected as being less reliable than the empirical and individually-centered approach to knowledge advocated by Locke, and the individually-centered deductive reasoning promoted by Descartes. Both, in effect, represented individuals as starting with a clean slate, which has morphed today into the widely held misconception that the individual's thinking is matter of adding to and strengthening the neurons in the individual's brain—which is, as Kahn put it, "analogous to what happens when one exercises a muscle…." (46)

The two 17th century patterns of thinking Kahn takes for granted is that this is a world of ideas that originate from the individual's conceptual and sensory encounters with the world, and that there is no need to consider the cultural history of the words used to express the individual's thoughts and experiences—that is, to recognize that most words are metaphors whose meanings encode the analogs settled upon in the past. The current indifference to recognizing the importance of understanding that words have a history is not unique to Kahn. It is also held by most academics, including computer scientists, and even by most peoples socialized to thinking of themselves as autonomous thinkers and moral agents.

The reality, which contrasts sharply from the widely held misconception about the language/thought connection, is that when learning to rely upon the vocabulary shared within the community into which we are born, our thinking is initially framed by the taken for granted prejudices, misconceptions, silences, and even wisdom that is encoded metaphorically in the meaning of words. In effect, the metaphorical nature of most of the vocabulary, such as words such as "individualism". "woman", "I", "technology". "tradition", "intelligence," "science", "progress", "literacy"' and so forth have a history and the analogs that framed their meanings were settled upon in the past by powerful groups—with some of the analogs now being challenged and replaced new analogs the are culturally and ecologically informed.

The connection between the cultural misconceptions and prejudices and the choice of analogs (what something is like) encoded in the taken for granted meaning of words can be seen in the analogs that framed the meaning of "woman", which can be traced back the *Book of Genesis*. The original analogs settled upon by Francis Bacon (1561-1622) and other scientists who framed the

meaning of "science" as being based on objective observation—as though it is a mode of inquiry that is free of cultural/linguistic influences And how many today still associate "technology" as a tool we use rather than a tool that now uses us, and as the engine of progress, even though it is leading to a near total surveillance culture where we have few defenses from being hacked by anyone anywhere in the world, and manipulated by corporations and government agencies?

As most of the metaphorical vocabulary that supports today's consumer-dependent lifestyle, and thinking of the environment as an exploitable resource, now represent a challenge for those who create the videos and the curriculum materials that are socializing hundreds of thousands of Academy students to think within a metaphorical vocabulary that is both ethnocentric, and that fails to represent the world we live in as environmental and cultural ecologies that are emergent, relational, and co-dependent networks of communication.

There is another aspect to the metaphorical nature of language that needs to be understood if the Kahn Academy is to become a leader in addressing the linguistic issues that perpetuate the ecologically problematic misconceptions that most westerners take for granted. These include the idea of an autonomous individual, that this is a human-centered world, that new technologies always contribute to progress and thus need not be questioned, and that emancipation from traditions always leads to progress.

There is another aspect of the metaphorical nature of language that Kahn's theory of the learning/brain connection does not take into account. The meaning of words cited above as being framed by analogs reflecting the prejudices and misconception of earlier eras are image metaphors that support the root metaphors

that function as conceptually broad taken for granted interpretative frameworks that influence the choice of analogs that in turn influence what will be given attention and what will be ignored.

Because root metaphors are largely taken for granted their control of what we are aware of, and how they influence interpretations of events, ideas, and causal relationships is too often unrecognized. These root metaphors vary from culture to culture and are derived from a cultural's mythopoetic narratives. For example, the dominant root metaphors (interpretative frameworks) in Western culture include patriarchy and anthropocentrism (both of which are now being challenged) can be traced to the *Book of Genesis*. The origins of other root metaphors, such as individualism, progress, mechanism, evolution, and now ecology, can be traced to powerful evocative experiences, a long history of cultural practices, and the influence of powerful groups that have cobbled together an ideology derived from earlier traditions of abstract thinking such as John Locke's explanation for the origins of private property, Adam Smith's abstract account of the behavior of free markets, and, now Ayn Rand's efforts to justify the virtue of individual selfishness on a rational basis.

Root metaphors, such as Johannes Kepler's explanation of shifting from the explanatory frameworks of Middle Ages to understanding life processes as machine-like, as well as other philosophers who made a similar argument, elevated objective knowledge, experimentations, the ability to measure success in terms of increased efficiency and profits to high states while excluding value judgments derived from wisdom traditions. Today, mechanism and its supportive vocabulary is the taken for granted interpretive framework that governs decisions in agriculture, medicine (including brain research), education, economic development and uses of technologies, and even to

thinking about how to slow climate change. Like other root metaphors, such as how the root metaphor of individualism excludes taking seriously cultural and linguistic influences, and how the root metaphor of progress excludes considering the rate and scale of environmental changes that are moving the world closer to the endgame of constant civil war envisioned by Thomas Hobbes.

As the Kahn Academy draws students from other cultures it has a special yet unrecognized responsibility for avoiding the process of linguistic colonization, and for adapting their curriculum in ways that demonstrates an awareness of the difference between print-based and oral traditions of learning. When most English teachers do not understand the importance of recognizing that words have a culturally specific history and reproduce earlier forms of cultural intelligence that students mistakenly assume to be their own original thoughts, the problem will be for Kahn and his entire instructional staff to achieve mastery learning about the cultural and linguistic roots of the ecological crisis as well as how the use of technologies such as print contribute to basic misunderstandings about the world within which we live.

If we are unable to recognize that impermanence is a dominant feature in both environmental and cultural ecologies, we will continue to ignore what careful observation will reveal: namely, that all life forming and sustaining processes are emergent, relational, and co-dependent. This basic understanding is essential if we are to become relational thinkers who are aware of how past cultural misconceptions are now leading down ecologically unsustainable pathways.

Kahn leaves his readers with an overly simplistic understanding of the Janus nature of the technologies carried

forward from the past, as well the digital technologies that are revolutionizing the conceptual foundations of the world's cultures. His brief comments leave the impression that, as he put it, "… when it comes to education, technology is not be feared, but embraced; used wisely and sensitively, computer –based lessons actually allow teachers to do more teaching , and classrooms to become a workshop for mutual helping, rather than passive sitting." ((36). He recognizes that language is a technology (66) (here I think he is referring to print) but ignores the more fundamental issues that must be addressed as the ecological crisis transforms people's taken for granted world.

Unlike many indigenous cultures that developed different approaches to ecological intelligence that required giving close attention to the emergent, relational, and co-dependent patterns in their bioregion, the West took a different pathway to acquiring and intergenerationally renewing the knowledge of its elite thinkers who ignored that the reliance upon print misrepresented the emergent life forming and destructive processes. As the lessons and videos of the Khan Academy rely heavily upon printed texts (which are different from textbooks) and videos that are also highly abstracted from local cultural contexts, as well as computer mediated learning in classrooms across the country (and now the world), the Academy could be making an important contribution to addressing the ecological crisis if it were to clarify the fundamental conceptual and experiential differences between face to face and print-based thinking and communication.

Both print-based cultural storage and thinking, and now data which has many of the same characteristics of print, reproduce the Enlightenment view of individual intelligence as free of the influence of traditions, a human-centered world, and that equates change with progress. Both also reinforce the tradition of abstract

thinking that undermines awareness that we live in an emergent, relational, and co-dependent cultural and natural ecologies. The noun dominated English language also plays a role in undermining awareness that we live in a relational world. As the benefits of both print and data are well understood, the focus here will be on what has generally been ignored. The following points not only need to be discussed by students, but also subjected to a deep ethnographically informed examination of what aspects of their own experience cannot be fully represented in print and by data.

In order to understand the overlooked limitations of print and data it needs to be kept in mind that impermanence, rather than fixed and autonomous entities characterizes all life forming and sustaining processes. Print and data provide an abstract understanding , which includes the following: (a) both provide only a surface knowledge that lacks depth in representing local cultural and ecological contexts; (b) printed and data-based accounts provide only a snapshot of the flow of experience (which can be tested by obtaining a printed account of a crashing wave or an ongoing conversation); (c) what is committed to print, even when used by a gifted writer, too often takes on a life of its own and becomes reified as a universal, which can be seen the abstract theories of Western philosophers and social theorists; (d) the abstract thinking reinforced by print and data-based accounts is inherently ethnocentric as it ignores the emergent, relational, and semiotically complex networks of communication taken into account in oral cultures. (That is, face to face communication often involves personal and historical memory, awareness of the motive being what is communicated by the Other, critical thought, awareness of traditions that were sources of meaning and empowerment, and even empathy); (e) what is committed to print and represented as data encodes the taken for granted assumptions,

cultural interpretative frameworks, and silences acquired earlier in the writer's and data collector's process of primary socialization to thinking in the language handed down from the past; (f) because of the limitations accompanying the use of print and data, and the cultural tradition of thinking of language as part of a conduit, that is, a sender/receive process of communication, both the printed word and data are too often assumed to represent objective facts, information, and data; (g) the lack of understanding that the taken for granted meaning of most words were framed by the analogs settled upon in earlier times, along with the cultural convention of writing as a third person observer, leads to the widespread failure to recognize that what is written is always an interpretation, and the reader's relationship to what is written or represented as data is also an interpretation based the taken for granted thinking of earlier generations; (h) the abstract thinking reinforced by print and data leads to unequal power relationships, especially when other cultural assumptions such as when print is assumed to be evidence of a more rational and advanced civilization than oral cultures. This can be seen in how the use of maps, printed treaties, and the use of Western metaphors to established ownership of the "new" land indigenous cultures had occupied for centuries.

When cultural contexts and lived traditions are ignored and viewed as sources of backwardness, the need to reflect on which traditions should be intergenerationally renewed and which should be changed is also ignored. Kahn's view of customs and traditions is yet another area where the Academy could address a basic misconception that is critical to whether educational reforms will lead to an ecologically sustainable future. In his chapter, Questioning Customs, which begins with the following quote from John Stuart Mill: "The despotism of custom is everywhere the standing hindrance to human advancement." (61). Kahn expands

on this view of traditions by noting that it "seems to be part of human nature to assume that customs and institutions come to be seen somehow as inevitable and preordained." Instead of engaging in an ethnographically informed mastery learning of how most of human behavior and thinking involves the reenactment of traditions which are often unrecognized because of the taken for granted status, Kahn simply adopts the ideology of Enlightenment thinkers who viewed traditions as an impediment to progress.

Given the rate of technological change, the continually transformative nature of market capitalism, the changes resulting from global warming and the degraded state of other natural systems, a more complex and culturally informed understanding of traditions become increasingly important—and represent yet another area where the Kahn Academy could provide conceptual and moral leadership. The challenge is to rely upon critical thinking to identify traditions that need to be changed, as well as traditions the need be conserved—such as the traditions essential to what remains of our civil liberties now that privacy has been exchanged for the personal conveniences and efficiencies of the digital revolution. Habeas Corpus, and the long yet unfinished list of social justice achievements are part of the traditions now being threatened by the computer mediated changes in consciousness that undermines long term memory and awareness of the political dangers of accepting that all of human experience can be reduced to data—which leads to a shift in power to outside and unaccountable forces..

There is another reason that the Kahn Academy should counter the 17th century myth that progress requires being emancipated from all traditions. That is, as the ecological crisis deepens, and as the plight of hundreds of millions of people becomes increasingly desperate, the intergenerational knowledge

and skills (traditions) that enabled people to live less consumer dependent lives will become more important. Cultural commons activities related to preparing and sharing of food, narratives, ceremonies, creative arts and craft knowledge and skills, knowledge of how to live sustainably in the bioregion without relying on chemicals and other environmentally destructive technologies, and well as language the encodes the accumulated wisdom of the culture, are all examples of traditions. Other traditions, including the mix of silences and hubris of elite groups who pursued private gain instead of considering the well-being of others, including the need to ensure a sustainable environment for future generations, also need to be critically considered—and also modeled in the Kahn Academy.

While universities have promoted the development of new technologies, they have largely ignored introducing students the cultural transforming nature of modern techniques and technologies. Indeed, technologies are changing daily life in fundamental and irreversible ways, with most student continuing to thing of technologies as neutral tools, and as the latest expression of progress. Kahn is correct in his understanding of the cultural bias that relegated the study of the cultural transforming nature of different technologies to an inferior status, compared to learning the abstract, ethnocentric, and ecologically uninformed theories of mainstream Western philosophers. The educational reforms promoted by the Academy must go beyond overcoming age based learning, the abstract thinking promoted by the use of textbooks, and the increasing tendency to view computer-based curricula and testing as the panacea. How many of the Academy's curriculum developers understand the cultural and linguistic roots of the ecological crisis—or even that there is a environmental crisis ? How many people are aware that the Enlightenment mindset of

the17th century still dominates most of our educational reformers, including scientists and computer scientists who continue the silences about what needs to be conserved, that was also part of Kahn's MIT education?

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