



Overcoming the Educational Time Warp: Anticipating a Different Future

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Abstract

Education abridges the time required for individual and social progress by preserving and propagating the essence of human experience. It delivers to youth the accumulated knowledge of countless past generations in an organized and abridged form, so that future generations can start off with all the capacities acquired by their predecessors. However, today education confronts a serious dilemma. We are living in an educational time warp. There is a growing gap between contemporary human experience and what is taught in our educational system and that gap is widening rapidly with each passing year. Today humanity confronts challenges of unprecedented scope, magnitude and intensity. The incremental development of educational content and pedagogy in recent decades has not kept with the ever-accelerating pace of technological and social evolution. Education is also subject to a generational time warp resulting from the fact that many of today's teachers were educated decades ago during very different times and based on different values and perspectives. The challenge of preparing youth for the future is exasperated by the fact that the future for which we are educating youth does not yet exist and to a large extent is unknown or unknowable. The resulting gap between the content of education and societal needs inhibits our capacity to anticipate and effectively respond to social problems. All these factors argue for a major reorientation of educational content and pedagogy from transmission of acquired knowledge based on past experience to development of the knowledge, skills and capacities of personality needed in a future we cannot clearly envision. We may not be able to anticipate the precise nature of the future, but we can provide an education based on the understanding that it will be very different from the present. In terms of content, the emphasis needs to shift from facts regarding the actual state of affairs in the past, present and future to the process governing the continuous evolution of the society and the deep drivers that are catalysts of that process. In terms of pedagogy, there should be a shift from emphasis on comprehension of what is taught to development of the capacity to think independently and creatively about the future. In terms of objectives, it requires a shift from promoting socialization to fostering individualization and from educating the mind to educating the whole person.

Education is the most remarkable technology so far invented by human beings. Education organizes knowledge and abridges time. It transmits the essence of humanity's cumulative past learnings to future generations in a systematic and condensed form. It enables future generations to commence their productive lives with the essential knowledge acquired

by countless generations in the past, rather than having to rediscover and reinvent all that has been learned by their ancestors. This extraordinary device enables society to convert individual experience into a possession of the entire collective. It also makes it possible for society to synthesize the external experience of the collective and apply it to develop the inner, psychological endowments and capacities of each of its members. Oriented in this manner, education becomes the catalyst for conscious social evolution.

Education widens our sense of identity from the family and community to larger social groups. It helps prepare us for responsible citizenship at the national level and for participation in the wider life of the global community. It provides a foundation for the spread of effective democracy and establishment of universal human rights. Education equips us with the practical knowledge and skills needed to productively and creatively contribute to the advances of modern economy, science and technology. Education expands our consciousness of the impact of human activities on distant places, on future generations and on the environment.

In 1870 one new PhD was awarded in the entire USA. Today more than 67,000 are awarded annually. During the same period, the number of BA degrees awarded rose from 9400 to 1.6 million. India's higher educational system expanded from 1.1 million students in 1961 to accommodate 26.5 million last year. Over the last four decades, the world total tertiary enrollment in education has grown nearly five-fold from 37.5 million to 184.5 million.* Were it not for the enormous quantitative expansion and diversification of higher education, it is inconceivable that humanity could have made such enormous strides in raising food production, abolishing famine, eradicating a host of fatal diseases, reducing infant mortality, extending life expectancy, multiplying real per capita global income 12-fold, weaving isolated communities into a single global community through advances in transportation and communication, ending slavery and colonialism, extending rights to women and minorities, and drastically reducing the global incidence of war between nations and war-related fatality rates.

1. The Changing Speed of Time

Education expands our sense of time. It enhances our awareness of the movement of time and extends our conscious time horizons from the origins of the universe, the evolution of Homo sapiens, and the first stirrings of civilization into the near and distant future of individuals, societies and the universe itself. Education provides us with a sense of history and a historical perspective of current events. It generates awareness of the constant process of change occurring ceaselessly in the universe around us, in society and within ourselves.

It shifts our time horizon from the past to the future. It instills belief in humanity's continuous progress, which is one of the defining characteristics of global society today, distinguishing the modern era from earlier more static, conventional periods focused almost exclusively on preservation of tradition. It alters our underlying motivation from a reverence for what has been to an anticipation of what is yet to come. It replaces the sense of fatality defined by historical determinations beyond our control with a sense of freedom, self-confidence and self-determination. It modifies our psychological orientation from conformity

* United Nations Statistical Handbook for 1978, NY, 1979, and UNESCO On-line Database <http://data.uis.unesco.org/?queryid=142>.

to individuality. It transforms our spiritual orientation from blind submission and adoration of ancient beliefs and practices to an intense aspiration for greater knowledge and higher accomplishment.

Education abridges and accelerates time. Historically, our sense of time conveyed continuity with the past, our relatively insignificant place in a slow, unending progression of repetitive events and historical cycles. Awareness of the brevity of our lifetimes and the inevitability of death reminds us of the severe limitations within which we move, act and aspire. Before the advent of literature, ancient and medieval humanity lived in an eternal present, unconscious of the very long, slow incremental evolution of the universe and civilization. The prevailing sense was that things were and always will be more or less as they are now. Our sense of duration in time was also severely constrained. During the Elizabethan Age, ancient Greek myth and contemporary histories, such as Shakespeare's, established both the boundaries and expanse of the social time sense. A mere three centuries ago, Sir Isaac Newton's quest to discover the unchanging universal laws of a static, immobile universe was conducted side by side with his study of Biblical sources to determine the exact beginning of the universe some 6000 years ago. Time seemed to almost stand still in Timeless India, where history, literature and education for millennia depended exclusively on oral traditions.

All things change, including time. Time is no longer what it used to be. At least our sense of it has been dramatically altered. The invention of the printing press coupled with the Reformation and the spread of education gradually altered the time sense in Europe. As consciousness of history expanded, so did awareness of change. Thomas Malthus' concern about the dire consequences of rapid population growth, Adam Smith's writings on the nascent Industrial Revolution, and Darwin's treatise on the origin of species arose from a growing awareness of evolutionary changes impacting on human beings and the world we live in. It took tens of thousands of years for the world's population to reach 100 million, but only 18 centuries to multiply another ten-fold to reach one billion. Since 1800 it has multiplied another seven-fold to cross seven billion. Over the same two centuries, global real GDP multiplied 84-fold. Parallel changes in transportation, communication, life expectancy and every other aspect of life signaled a fundamental change in the speed of time. Things began to change far more rapidly than in the past. Moreover, the spread of education ensured that an increasing proportion of humanity were informed of the fact and understood at least some of the factors and forces that were altering the speed of time and the future of humanity.

2. Time's Challenge to Education

Today the speed of time is accelerating exponentially and society is more conscious and observant than ever before. It is accumulating and analyzing enormous quantities of data every second, generating new inventions and discoveries every hour. More than two million patent applications are filed annually. According to Google, a total of 129 million original book titles have been published since the dawn of printing five centuries ago. We are now adding another 2.2 million a year in addition to the innumerable other forms of text. Born in 1991, the Internet now contains more than one billion websites. These facts provide just

a distant reflection of how rapidly global society is changing, how much new information it is acquiring, and how great is the challenge confronting the world's educational system to keep pace with the lightning rate and gargantuan quantities of facts, experiences, events, discoveries and ideas that contribute to development of knowledge and human capabilities.

“In an age when information about virtually everything is available at our fingertips, the educational system continues to emphasize transfer of information as the predominant objective of education.”

Education as we know it involves the transmission of knowledge from one generation to another. In practice there is usually a two to three generation gap between what instructors learned from their own instructors when they were students, what they teach to students when they become instructors, and the world in which these students will live and seek to apply what they have learned in future. A single generation ago, the Cold War, Soviet Union, Communist Bloc and 70,000 nuclear weapons were dominant realities of the day. The World Wide Web, the Human Genome Project, nanotechnology, iPods and smartphones did not yet exist. Two generations ago, Europe was still recovering from devastation of the Second World War, the US had just landed its first contingent of combat troops to fight in Vietnam, the Berlin Wall had only just been constructed, world population was less than half what it is today, Martin Luther King was just launching the American Civil Rights Movement, and the Green Revolution had not yet emancipated more than billion people from the perennial threat of famine. Three generations ago, the Great Depression still dominated the world economy, the world war was still in its early stages, penicillin was not yet in use, the atomic bomb had not yet been invented, and the population explosion had not yet begun.

3. Closing the Educational Technology Gap

Is it reasonable to rely on the perspective of instructors raised in worlds so different than today to prepare and equip our youth for life a generation from now which we cannot even imagine? The increasing speed of discovery, invention and knowledge generation imposes an ever-greater burden on the educational system and those who pass through it. One result is that the gap between information generation and transmission through education is widening rapidly. The world's educational system lags far behind in responding to the growing need for speed.

Since the dawn of the Industrial Revolution, rapid technological development has been one of the key drivers for accelerated social evolution. It has radically altered the way almost every human activity is carried out. Mass production has radically changed the nature of work and the workplace. The train, automobile and airplane have transformed beyond recognition the frequency and speed with which we move from place to place. The telephone, radio, television and internet have inconceivably altered the speed and frequency with which we communicate. Urbanization has drastically reconfigured where and how we live. Antibiotics

and other medicines have doubled our life span and abolished many ailments. The only notable exceptions are religion and education which are conducted largely as they have been for centuries in the past. Organization stifles rapid evolution in both fields.

Although the number of people engaged in higher education has increased even faster than the growth of population, the technology of higher education remains essentially unaltered. A reluctance to adopt new technologies in higher education can be traced back to the very origins of the system. The first modern university was founded at Bologna in 1088 about 360 years before the invention of the printing press. At that time oral transmission of information and ideas from scholars to assembled groups of students at a central location was the only available method for mass education. Yet six centuries after the advent of the printing press and the wide availability of printed books, the earlier model remains dominant. Since then, systems of communication have advanced from handwritten books to instant printing and global text, audio and video broadcasting, but education continues to rely on oral delivery systems akin to those used in ancient India and ancient Greece.

Serious efforts to develop alternative models can be traced back a few centuries, but have only recently begun to attain the critical mass needed to meet the rapid growth in demand. The first distance education program was introduced at the University of London in 1836 and at the University of Chicago in 1892. The USA and Soviet Union introduced distance education by radio broadcasts in the 1920s. Iowa State University became the first to broadcast educational courses on TV in 1950. The UK Open University was founded in 1969. The first online program of higher education was introduced by the Western Behavioral Sciences Institute of California in 1981. After 2000, MIT and other mostly American universities began to experiment more seriously with online delivery. The creation of YouTube in 2005, followed by Khan Academy and iTunes University in 2006, opened up alternative delivery systems outside the traditional university environment. This eventually led to the founding of the first Massive Open Online Courses (MOOCs) offered by Udacity, Coursera and EdX in 2012.* Today more than 30% of American college students participate in distance learning programs. China is expected to have 100 million online learners next year.^{1,2,†} These developments herald the first truly widespread change in educational technology in ten centuries. Yet, inertia and resistance from within the present system remain enormous and still retard adoption of new models.

4. Rediscovering Pedagogy

The mode of delivery is only one of the ways in which the global system of higher education is out of sync with the needs of society in the 21st century. Pedagogy is another serious constraint. The prevailing conception of what should be taught and how it should be taught remains mired in the distant past. In an age when information about virtually everything is available at our fingertips, the educational system continues to emphasize transfer of information as its predominant objective. It is time to pause and ask ourselves whether an entirely different conception of education is required.

* See <http://www.worldwidelearn.com/education-articles/history-of-distance-learning.html>

† See 2014 China Online Education Report (Brief Edition), <http://www.iresearchchina.com>

The world over memorization of facts remains the predominant and often the exclusive approach to education. The predominant measure of education remains the capacity to regurgitate facts. With rare exceptions, understanding and application of principles and independent thinking are at best given secondary importance. In many countries students learn how to read, but still do not learn how to comprehend what they read. They are taught how to read and understand individual sentences, not how to comprehend the meaning of a series of arguments. They learn to speak in grammatically correct sentences, rather than to think in coherent chains of thought. Excessive emphasis on memorization diverts mental energy from higher processes of understanding, analysis and thinking. It forges deeply engrained habits at an early age that persist throughout life. It reinforces the insatiable appetite for more news and information. It explains why the best informed, most highly educated populations in the world continue to exhibit a very poor capacity for comprehension and independent thinking, as reflected in public opinion polls and electoral behavior.

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While leading American universities tend to give greater emphasis to understanding and analysis than universities in most other countries, subject proficiency remains the primary qualification for lecturers around the world. At the WAAS-WUC conference at UC Berkeley in October 2013, leading educators confirmed that the perpetual race to keep up with the increasing accumulation of information to be taught has overshadowed research on the actual process of learning itself. The role of the university instructor is still primarily to transfer information, not to awaken minds and stimulate creative thinking.* The near universal effort to remember more and more has led us to neglect something more important than all the facts they commit to memory. In placing exclusive emphasis on what is to be taught, we neglect the process of learning itself. Higher education has forgotten the central importance of pedagogy. Thus, text based learning and oral language learning continue to predominate long after educators and psychologists have identified important individual differences in the way different people learn best and multiple intelligences which human beings utilize in order to learn in multiple different ways.

The recent revolution in learning technologies has revived efforts to understand the process of learning itself and to measure it more effectively. It has also facilitated the study of different individual learning patterns and their results. This research confirms what every teacher has always known—that we learn most when we teach others. The present system is designed to maximize the learning of the instructor, rather than that of the student. The mind develops when curiosity is aroused and imagination is awakened, not when it is passively absorbed processing bits and pieces of canned knowledge. The essential value of live contact with the instructor is to promote interaction that raises conscious awareness and stimulates independent thinking. Experimentation with hybrid learning models in which students study

* “The justification for a university is that it preserves the connection between knowledge and the zest of life, by uniting the young and the old in the imaginative consideration of learning. The university imparts information, but it imparts it imaginatively. At least, this is the function which it should perform for society. A university which fails in this respect has no reason for existence.” Whitehead, *op. cit.*, p93.

on their own and then come to class to interact with instructors and other students demonstrates rates of learning far exceeding those obtained by either conventional classroom or online methods by themselves. Moreover, the shift to online learning has greatly facilitated the adoption of multi-sensory forms of learning, incorporating text, images, sound and video that appeal to different aspects of human intelligence. A new pedagogy is needed that harnesses the new technologies to provide a more complete and effective learning experience.

“Examination of humanity’s current problems makes evident that narrow specialization is a source of the problems rather than a solution to them.”

Another longstanding pedagogical tenet is that students learn best when they study independently and compete with one another. Few question why this should in fact be the case. In the workplace almost all activity involves group collaboration, where the process of discovery and development is a collective process. A cooperative learning model was introduced at New Technology High School in Napa, California in 1996 at the suggestion of companies seeking to improve the learning skills and working capacities of their future recruits. The altered model was found so successful that it has resulted in the establishment of a national New Tech Network consisting of 160 schools in 26 states based on the cooperative learning model.*

5. Restoring Life to Education

There is another fundamental aspect of pedagogy which receives too little attention today—the creation of context. As Whitehead put it, “There is only one subject-matter for education, and that is Life in all its manifestations.”⁷³ Life is a learning experience that is perceptible to all our physical senses, feelings and emotions. In addition, it is inherently contextual. Each experience occurs within a wider physical, social, cultural, intellectual and psychological context that provides essential insights into the nature of the knowledge that can be discerned from the experience. We understand very little about the unique discoveries of Copernicus and Darwin, unless we are cognizant of the constraining force of religious orthodoxy opposing the propagation of ideas that appeared to directly undermine the authority of established church doctrine. Great scientific discoveries of the 20th century met with similar resistance from the entrenched scientific community. The history of the American Civil War is hardly intelligible unless viewed in the context of the growing sentiment against slavery that began in Europe and spread around the world after 1700. Yet today the tendency toward decontextualization of information is greater than ever before. We have evolved a culture of facts devoid of knowledge. We pride ourselves on the capacity to absorb innumerable snippets of data daily on a wide range of subjects so that we can converse on all subjects without really understanding any of them. And this may be widely prevalent within academia, as well as in the outside world.

* <http://www.newtechnetwork.org>

This tendency toward decontextualization is fueled and aggravated by the exponential growth of information, but it has deeper, more fundamental roots in the workings of the thinking mind. The nature of the mind is to try to know by dividing reality into parts and concentrate on studying each part as if it were a whole, then subdividing it into smaller parts and studying each of them as if it too constituted a whole in its own right. We study the trees and lose sight of the forest. We study circulatory or respiratory diseases and lose the holistic perception of human health, which characterized ancient systems of medicine such as Ayurveda and Siddha. We create specialists in finance who have been taught little about the impact of finance on production, employment and human welfare. We educate experts in marketing, engineering, and human resources without imparting the knowledge of how organizations grow, develop and evolve. We educate leaders of business and research without considering the impact of their activities on society and the environment. We produce experts in each of the parts who are increasingly blind to the whole of which these parts are inseparable, integral elements.

“Growing awareness of this reductionist tendency of the human mind led to the development of systems theory, complexity theory, ecology and holistic thinking as efforts to reconstruct the whole that has been infinitely subdivided.”

The quantum of information is growing so rapidly that keeping up with new knowledge in a single field has become a full-time job that leaves little time for either teaching other people or applying that knowledge in other occupations. The knee-jerk response to information overload has been a proliferation of new disciplines and more specialized fields of study, resulting in an increasing fragmentation and compartmentalization of knowledge. The ideal of higher education a century ago was to equip people with broad general knowledge coupled with specialized expertise. Today higher education turns out specialists in innumerable narrow technical disciplines of business, chemistry, economics, engineering, law, medicine, physics, psychology, etc., but almost no generalists with a broad perspective of the whole subject or the wider reality of life of which all disciplines are a part.

The world's problems today arise from a divorce between ourselves and the reality we live in. Financial markets are divorced from the real economy, economy is divorced from ecology and business and science are divorced from social responsibility and accountability. This results in a tendency to affirm the exclusive truth or greater truth of one side or aspect of reality at the expense of the other: we mistake the elusive gains of financial speculation for real economic progress; higher GDP for greater human welfare; and huge arsenals of nuclear weapons for enhanced cooperative security. After centuries of progress in all fields of natural science, we are baffled and helpless before the destructive impact of human activity on our environment, a consequence intuitively self-evident to far less advanced civilizations who lived in touch with nature.

Is more and more specialized expertise really the type of knowledge we need in the 21st century? The evidence suggests it is not. Examination of humanity's current problems makes evident that narrow specialization is a source of the problems rather than a solution to them. A narrow focusing on financial economics is a root cause of the divorce between finance and economy that dominates the global economy today. Real knowledge is knowledge of the whole. Exercise of fragmentary partial knowledge without a wider perspective undermines the integrity of living systems, just like unlimited production devours the earth and unidimensional treatment of specific diseases often cures one ailment while creating another one in its place.

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6. Trans-disciplinarity

To compensate for this fragmentation of reality, mind seeks to aggregate and recombine what it divides to form larger wholes, like the dictionaries and encyclopedias that gather all available information on a subject and place it in a container alphabetically. Then we seek to reconstruct relationships between the parts that have become separate by creating interdisciplinary, cross-disciplinary and multi-disciplinary studies that never succeed in encompassing the vitality, complexity and organic integrality of the original holistic reality they examine.

Growing awareness of this reductionist tendency of the human mind led to the development of systems theory, complexity theory, ecology and holistic thinking as efforts to reconstruct the whole that has been infinitely subdivided. This is a welcome and important development. Systems theory is based on the mind's capacity for organization. The principle of organization is one of the characteristic ways in which mind aggregates its perceptions of separate ideas, objects and activities. Organization is an example of a trans-disciplinary principle applicable to all academic fields and all human activities. A study of the fundamental characteristics of organization is relevant to all fields of knowledge and life. Organization is the means by which human beings give form and structure to our consciousness and aspirations. We organize our ideas into theories, beliefs into philosophies and religions, values into modes of conduct and cultures, emotional commitments into relationships, activities into fields of social existence, land and material objects into property, etc. Organization is creative. It generates power for accomplishment. It can also become obstructive, rigid, inflexible and stifling to creativity, freshness and life itself.

Organization is essentially a mechanical construction of reality designed to divide and aggregate parts, the way a business subdivides work into specialized functions and activities and then aggregates them through structures, systems, rules and procedures. In contrast, the natural and social worlds in which we function are dynamic living systems, with the characteristics of all living organisms. The organizations we create often are a combination of the two—their organic character makes them dynamic and creative, their mechanical character

makes them conservative, inflexible and bureaucratic. The reality they seek to create, nurture, manage and preserve evolves continuously over time, but the organizations themselves tend to become fixed in time, rigid and inflexible. These characteristics are relevant to the development and understanding of languages, societies, religions, political establishments, businesses, economic systems, scientific research and educational institutions.

“The artificial detachment of the observer absolves scientists and universities from demands for social relevance, social responsibility and social accountability.”

The principle of organization is only one example of a wide range of trans-disciplinary principles and processes that characterize life, society, growth, development and evolution. A shift of emphasis from retention of facts to understanding of the trans-disciplinary principles applicable to all fields of study and life is one of the ways to counter information overload by raising the field of study from concepts that divide and contrast to concepts that differentiate even as they unify.

7. Reuniting Life and Knowledge

The tendency of mind to divide reality occurs in multiple dimensions. Horizontally, it divides reality into innumerable specialized fields of knowledge and activity. Vertically, it places an artificial divide between Life and Mind. It divides knowing from living, education from society, the universities from the real world. The tendency of mind to separate idea from fact divides knowledge from the reality it seeks to comprehend. Mind’s capacity for abstraction generalizes from the particular to formulate universal principles, laws and theories. Abstraction is one of mind’s greatest powers, yet at the same time the source of some of the greatest weaknesses and deficiencies of modern education. It fosters an ever-widening gulf between idea and reality, theory and practice.

All reality is multi-dimensional and complex. It admits of differing perspectives and interpretations, depending on the vantage point of the knower. Viewing the complexity of reality from different perspectives—each valid in its own right—leads to the formulation of mutually contradictory theories in physics, evolutionary biology, genetics, economics, psychology, philosophy and other fields—each internally consistent, but irreconcilable with one another or with the facts they seek to explain. In psychology it has led to multiple theories of personality that appear more applicable to different species of life than to different individual human beings. Only when we are able to conceive of the personality as a living, organic whole will we be able to formulate concepts that are sufficiently inclusive and integrated.

Mind’s ultimate act of abstraction is its own separation from the world in which it lives. While we are increasingly informed about the world around us, we are also increasingly separated, divorced and alienated from it. The Cartesian separation between mind and world

is the implicit rationale for the poise of the scientist as an impartial, detached observer of nature, even when he is observing detonation of a nuclear explosion, designing a new biological weapon, or creating a computerized trading platform that can destabilize global financial markets. Nearly a century after physicists discovered the importance of the relationship between the observer and the observation in the study of matter, the knowledge dispensed by institutions of higher education continues to regard the objective reality of the world around us as if we were in some way separate and independent. The artificial detachment of the observer absolves scientists and universities from demands for social relevance, social responsibility and social accountability. Perhaps it also explains the relative complacency of the general public to concerns about nuclear stockpiles, Fukushima type disasters in other countries, global climate change and soaring homicide rates in the USA. Is there an alternative?

“Big Data is not a synonym for more knowledge.”

8. Values-Based Education

The Cartesian divide between mind and life led naturally to the development of science as the impersonal study of an objective reality independent of the scientist. We easily forget that all knowledge and education are a product of interaction between the person and the world, between human consciousness and the universe in which we live. In that interaction, the subject, the object and the conscious act of knowing are inseparable and of equal importance. There is no such thing as purely objective knowledge. All knowledge involves and is determined by the subjective consciousness of the observer. Absence of personal partiality and prejudice in scientific investigation is highly desirable, though very difficult to attain; but this type of objectivity is too often confused with efforts to eliminate the valid perspective of the subject, which is neither possible nor desirable. All knowledge depends on the viewpoint and perspective of the observer. All knowledge is subjective. All knowledge is mentally constructed and socially construed.

So too, all knowledge is implicitly or explicitly values-based. We decry investment bankers who destabilize financial markets in pursuit of personal benefit, but ignore the fact that scientific research can equally be driven by personal motives of money, career or fame. Even curiosity can lead to consequences that harm society and endanger humanity, as Pandora demonstrated. Every human action must be accessed on the basis of the motives that actuate it and judged in terms of the values it aspires to realize. The quest for impersonal laws of nature in the social sciences divorced from human values and aspirations dehumanizes the study of economics, business, law and even psychology. At a deeper level, the effort to separate and divorce science from philosophy and spirituality is another reflection of the schizophrenia that characterizes society and education today.

9. Conceptions of Knowledge

Is it possible to continuously expand the horizons of our knowledge through education without being drowned by information overload, fragmentation, specialization and alienation

of knowledge from reality? The answer to this depends very much on the conception of knowledge on which our educational system is based. Today the words data, information and knowledge are often used interchangeably. We speak of the ‘knowledge society’ with reference to a world in which a plethora of data circles the globe at the speed of light and is accessible at our fingertips. We refer to the continuous doubling or tripling of humanity’s information or knowledge base, when what we really mean is the emerging technologies enable us to collect, store and process an infinitely greater amount of data than in the past. Big Data is not a synonym for more knowledge. It simply means that we now have technologies that can measure and computers that can analyze mountains of data, such as the amount of radiation falling on every square mile of earth 365 days a year or the number of search queries, tweets or Facebook hits every hour.

The ambiguity of terms relating to knowledge leads to ambiguity regarding the aims and content of education as well. It is, therefore, necessary to define the way we use these terms. The process by which we learn from life experience commences with the observation of the world around us and the gathering of innumerable bits of sensory data. The correlation of these bits of data generates Information. We see a flash of lightning in the sky and then hear the sound of thunder a few seconds later. We correlate the light and the sound to conclude that they result from an approaching storm. We learn to estimate the distance of the storm relative to our location by the time delay between the two events. The storm is five miles away is information derived by analysis of the data. Correlating repeated experiences of this type leads to the thought that sound travels more slowly than light. Correlating two or more pieces of information generates Thought. We also note that the lightning may be obscured by cloud cover, but transmission of the sound persists in spite of the clouds. Correlating two or more thoughts born of the information derived by analysis of the data, we eventually formulate an idea or theory that explains all these experiences in a coherent, consistent manner. In the measure our conceptual conclusion is confirmed by further observations, analysis and careful correlation of thoughts, we come to regard the idea or theory as a form of knowledge. Neither data, information, thoughts nor ideas themselves constitute knowledge.

The process of education currently involves all four of these stages in the process of knowledge generation—observation of data, analysis of data to derive information, correlation of information to form thoughts, and integration of thoughts to constitute coherent principles. It is noteworthy that in this entire process we rarely reflect on the characteristics of the human mind that is engaged in the process of knowledge acquisition. Brain research may be a specialty of Psychology and Neuroscience, but the application of the instrument we call mind to our understanding of reality is of essential importance to all fields of knowledge. Social scientists emphasize the limitations and distortions imposed by our social construction of knowledge. We interpret experience in terms of our own conscious and subconscious values, beliefs and experiences.

The tendency of mind to divide and re-aggregate, to abstract theory from reality and to divorce the observer from the phenomena observed constitutes essential knowledge for understanding the past history of human social evolution and knowledge generation. It is at the root of the errors and problems that now confront humanity in the fields of economy, ecology,

politics, science, society and culture. But even more importantly, in a world that is changing so rapidly and in which retention of all available information has become both untenable and detrimental to human intelligence, essential knowledge about the way we human beings observe, perceive, understand and interpret reality is vitally important knowledge that needs to be transmitted to future generations.

It is ironic that we spend so much time using our minds in search of knowledge and so little trying to acquire knowledge as the instrument we utilize for that purpose. The study of the mind, the way we think and other ways in which we seek to know reality is essential for every human being in search for knowledge, regardless of the field. It is not a subject that can simply be left to philosophers, psychologists or neuroscientists. Education that anticipates the future and prepares for it needs to encompass knowledge of the fundamental characteristics of mind applicable to all human activities, both mental and social.

10. Person-Centered Education

Mistaking the means for the end is a common human folly beautifully depicted by George Bernard Shaw in his play *Pygmalion*. Professor Henry Higgins, an expert in the science of phonetics, takes on the seemingly impossible challenge of educating a flower girl named Eliza within three months to acquire the speech and manners of a high-born aristocrat. On achieving this remarkable feat by passing her off as a princess at a gala ball, he and his associate celebrate in triumphant self-satisfaction, never for a moment considering the effort that Eliza has made to acquire the specialized knowledge he offered, the psychological process that motivated her to make such a prodigious effort, the impact of that training on her as a person, or its utility in her future life. At the height of his celebration, Eliza bursts out in frustration and throws his slippers at him. Higgins was guilty of the unpardonable crime of priding himself on his knowledge of phonetics, forgetful of the fact that education is all about developing human beings, not creating mannequins or robots with perfect diction.

Shaw's play is a satire on an educational system that mistakes specialized subject knowledge for real education. The worship of abstract knowledge divorced from life and devoid of relevance to human beings is at best a superstition, at worst a tragic crime against the human mind, heart and soul. In depersonalizing knowledge, it dehumanizes both the instructor and the student.

The real subject and object of education are the same. The subject of education is a human being. The object of education is to develop the mind and personality of that human being. Everything else is secondary, often irrelevant and many times detrimental to mental, emotional, social and physical health and well-being. The real challenge confronting education for the 21st century is not about altering the curriculum to focus on STEM, ITC, nanotechnology, microbiology or any other discipline. It is about abandoning the superstition that transfer of information and narrow disciplinary expertise is education. Mistaking the object for the subject has led to a world of scarcity in the midst of inconceivable abundance. Robots of either the metallic or flesh and blood variety may be great at high speed calculations but are utterly incapable of grasping or dealing with the subtlety and complexity of human life.

Knowledge is and always will be central and essential to education, but the knowledge we so desperately need now is about how human beings think, feel, act, interact, respond to each other, innovate, create, seek and find fulfillment, overcome the limitations of the past and embrace the possibilities of the future, grow physically and mature emotionally, develop organizationally and evolve consciously.

“How can we shift the focus of learning from reverence for the past to anticipation of the future, from information to understanding and thinking, from passive to active, from abstracted to contextualized, from fragmented to integrated, from subject centered to person centered, and from productive to creative?”

Education is the means evolved by humanity over millennia to consciously accelerate the development of the individual and the evolution of the society. In an earlier age when information and specialized professional expertise were scarce and extremely difficult to come by, the emphasis on these goals was understandable. In the coming age when information is superabundant and growing exponentially, what we desperately need to develop is the capacity to correlate and synthesize, to place isolated pieces of information within a cohesive framework of thought, to think independently from first principles and originally outside the sanctioned boundaries of accepted knowledge, to reintegrate abstract thought with the world in which we live, and apply it for the growth and development of our own personalities.

Person-centered education needs to be founded on a comprehensive conception of what a human being is and of all the aspects and dimensions of the human mind and personality that can benefit from education. This encompasses a wide range of physical, interpersonal, and mental skills, faculties, capacities, abilities and values. It encompasses all the functions of the human mind, such as observation, perception, judgment, understanding, thinking, will, imagination, and intuition, as well as social and emotional faculties for interactions and relationships with other people. It encompasses all the layers of personality from the most external manners and behaviors to deeper levels of character and individuality. The development of these capacities can be done through many different types of learning experience, including all academic subjects, where the objective is to develop the person and not merely transfer information. Biography, contemporary events, literature and drama, anthropology, the study of accomplishment in business and politics, achievement in sports and the arts, the study of scientific discoveries, philosophy, and all fields of history provide rich material.

Employment is cited as a primary goal of higher education in an age of increasing computerization and robotization. Today, we are aggressively pursuing a course that transforms human beings into robots far more efficiently than it imparts human capacities to computers. We need to be educating people to do what computers and robots can never do, rather than preparing living, breathing people to compete with the memory capacity or calculating speed of a mainframe. The knowledge and skills society needs in the 21st century are those that nurture the mental, emotional and social development of individuals who know how to live

and interact with other people, to lead and collaborate with others, to understand themselves and empathize with others. It needs individuals with the courage to question and disagree, not the submissiveness to unquestionably accept as wisdom all that science proclaims as the present version of truth. It needs individuals who seek opportunities to be creative, not merely productive; to create employment for themselves and others, rather than seeking a job; who know the value of values, not merely laws, rules and procedures.

“A right starting point might be a systematic effort to identify the seeds of future education wherever they already exist and consider how these seeds can be multiplied and further developed.”

The response of the educational system to the issues flagged in this article will have enormous impact on the future of global higher education and evolution of global society. The questions raised here are far easier to ask than to answer and far easier to comprehend than to act upon. But these are among the most critical questions that need to become central to the discussion about the future of education and the human community. How can we shift the focus of learning from reverence for the past to anticipation of the future, from information to understanding and thinking, from passive to active, from abstracted to contextualized, from fragmented to integrated, from subject centered to person centered, and from productive to creative?

Such a radical change cannot be made universally in a year or a decade, but it can begin, grow and spread rapidly. It cannot be done so long as we look up in awe to the pillars of the old system and imbue them with a sanctity or prestige that, however warranted in the past, is insufficient for the future. True education is to replace superstition with knowledge, and that includes a superstitious reverence for past glories. Our blind faith in the present system is the greatest bar to evolving a better one for the future. The strategy of striving to emulate the current best and raising the average to the level of the best is valid and useful in many fields, but only in the measure the best truly represents a viable model for the future. Otherwise we risk reinforcing an outmoded version of perfection, like striving for benevolent monarchy when what we really need is liberal democracy. A right starting point might be a systematic effort to identify the seeds of future education wherever they already exist and consider how these seeds can be multiplied and further developed.

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Notes

1. *E-Learning Market Trends & Forecast 2014-2016* (Athens: Docebo, 2014) <https://www.docebo.com/landing/contactform/elearning-market-trends-and-forecast-2014-2016-docebo-report.pdf>
2. “Trends in Global Distance Learning,” *Hanover Research* December 2011 <http://www.hanoverresearch.com/wp-content/uploads/2011/12/Trends-in-Global-Distance-Learning-Membership.pdf>
3. Alfred North Whitehead, *Aims of Education* (New York: Simon & Schuster, 1967), 6-7.