Knowledge, Entertainment, the Visual, and the Media

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And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.
T.S. Elliot, *Little Gidding*

Minds exist only in connection to other minds. When I first formulated this thesis (1988) and then had it published (1989, 1991, *Mind—Anticipation and Chaos*), I did not expect that it would be adopted as widely as to become self-evident, and thus free itself from the expectation of being presented as a quote from a duly referenced book. There are many explanations for this, but the most important is the current interest in re-inventing education, one of the essential factors in shaping the future of society. Education is a subject of concern not only to educators themselves, but also to just about everyone—politician, social activist, technological innovator, scientist, philosopher, business person, and student. Regardless of where one stands in respect to education—that is, which model of education one accepts or promotes—there is one component that cannot be eliminated from the equation of education—the mind. Moreover, what cannot be eliminated is the understanding that education involves interaction and thus not only presupposes the mind, but actually is a critical instance in the *self-constitution* of minds.

Having advanced the notion of *self-constitution* as the key to a better understanding of the nature of human existence, I need to briefly explain it. Self-constitution is what the words making up the term say: We make *ourselves,* we constitute *ourselves*. Embedded here are several components: the human being, and for that matter human minds, is not a representation of something else, but rather an entity that unfolds as it partakes in the dynamics of existence. Self-constitution at the most basic level of existence is the projection of biological characteristics (how strong, fast, rational, emotional, how keen the senses, etc.) in

survival. Each act of survival is at the same time an instance of making oneself, of identifying the surviving individual. As the human species constitutes its own nature, self-constitution takes place in the many practical experiences that result in human culture, and eventually in human civilization.

The challenge of any attempt to deal with the many components of the practical experience of human self-constitution that we call education—one among many, such as working, raising children, creating artifacts—is the realization that education has a dynamic nature. Everything involved in education is variable because individuals are themselves as variable as the instances of their self-constitution. Therefore, any attempt to capture an element of permanence in some defined solution for education is illusory—today more than ever. Yet against the background of the dynamics of human existence, education was, and still is, expected to provide some degree of stability. In political programs, this expectation is formulated as a directive: education should prepare the new generation for productive activity. In economical terms, the expectation (expressed in a catalog of skills) is that education is an investment (social or individual, in systems of private education) that will pay off through performance in various businesses, as well as in society. In the more idealistic terms of a political program for a civilized society, education is supposed to inculcate a sense of value through the appreciation of what has been produced by preceding generations and what is expected today of those who would continue the effort of their parents or grandparents. Science expects education to validate its accomplishments and eventually to make possible new discoveries through future generations of researchers and scholars. Technology expects the drive for innovation to continue unobstructed. Humanities would like to see their domains validated as a source of knowledge never substituted by any other endeavor, strengthened only through dedication to what makes the human being *human* in the first place. This short illustration of the vested interests that society at large and each of its components have can continue for quite a while. (Artists, military personnel, or various types of activists would articulate different expectations.)

The best way to fail in defining the goals of education is to take the sum total everything that education is supposed to accomplish. But this is also the best way to draw the wrong conclusion that nothing meaningful can be done. To paraphrase Gödel's theorem, or at least to think in the terms he used, a complete and consistent description of education is not possible. But since such a statement actually applies to any complex knowledge domain, what can we learn from this paraphrase? Better yet, how can we get around its consequences, that is, have a good description and avoid contradictions, assuming that solutions for improved education will not become available unless we know what we are talking about. A wonderful method for dealing with completeness and consistency is *segmenting*. Take a sub-domain; and for such a sub-domain it should be possible to come to a reasonable completeness and avoid major intrinsic contradictions. For better or worse, that is an efficient way to handle some of the problems of education today. Indeed, a first conclusion should be that there is no such thing as education—an inclusive activity that extends from nursery school to post-graduate education and to lifelong learning—but rather *various segments of education*. These segments belong to an ill-defined practice of enabling the young and less young to perform within society and to reach their creative potential in a variety of experiences of self-constitution.

Now let us focus on some of the details. The expectation that language and literacy are a universal element of education belongs to a pragmatic framework that no longer predominantly relies on them. Many additional means of expression and communication supplement, and at times supplant, natural language and literacy. It is therefore important to understand why this takes place and, moreover, how education should build alternative modes of knowledge acquisition and dissemination, instead of decrying that reality not longer corresponds to its expectations.

Let's start with the cause of the transition from a logocratic and logocentric model of knowledge acquisition to a multimedial experience of discovery. In previous pragmatic frameworks, the rationality embodied in language and language-based experiences effectively supported the acquisition and dissemination of

knowledge. This knowledge was embodied in machines and in the manufactured objects that belong to industrial society. This is no longer the case. As human beings undergo experiences of self-constitution marked by expectations of higher efficiency, and natural resources are exhausted, knowledge becomes the most important commodity. This knowledge is no longer predominantly mediated through literacy-based experiences and is not embodied in the mechanics of life and production. The gnoseological horizon of humankind is expanding. The new „Machines" are rather an expression of our cognitive abilities than of our physical possiblities. In some unexpected way, we are rediscovering the potential of all human senses. Consequently, knowledge acquisition no longer only begins at the sensorial level—and ends there, as used to be the case--but continues through the integration of the senses and sense-based processing in high-level cognitive processes. Research in vision, to give an example, proves this in many ways.

One can further argue by examples: Many scientific endeavors would not be possible if we limited ourselves to natural language and literacy. The entire domain of knowledge acquisition through visualization belongs here. This includes such endeavors as the visual representation of dynamic systems (i.e., of phenomena unfolding over time) and the exploration of cosmic space. So does the domain of interactions in virtual reality (including here sound, touch, moving the synthetic images that make up the virtual environment). So does the new domain of nanotechnology, in which our designs shape tools, robots, and medicine, among other things, at atomic and sub-atomic dimensions. Mathematics and logic rely on symbolic notation of higher efficiency than natural language. Radioastronomy signals carry with them information that allows us to understand the birth of new stars, a subject for which language can generate metaphors, at best. Genetic processes exemplify the same. The folding of proteins is a subject of 3-dimensional configurations that explain how the genotype is embodied in an infinite variety of phenotypes. We still hope to understand how it takes place because, were it for us to represent it in calculations, we would never reach the performance of the living proteins.

Such arguments are, however, volatile. Examples are always as good as any induction; that is, until the first „black swan" elegantly appears among the white ones that are the only type believed to exist. A better way to argue is to consider the nature of mind processes that support invention, creation, discovery, expression, communication, evaluation, validation (to name only a few that support science, technology, art, writing, etc.). These processes confirm that information is the only known resource that multiplies with use. This growth process is the result of the multiplication of *all* possible and real instances of mind interactions, not only those based on language and literacy. We are back where we started, but probably at a different level of understanding (what T.S. Elliot meant by „arrived at where we started/And know the place for the first time"). Education within a confined pragmatic framework—such as the one defined by the characteristics of language and literacy—made possible repetitive patterns of interactions. The locus of this interaction is the shared language expressed through a book, several books, a library, literate education. As the pragmatic framework changes (*fundamentally* I hasten to say, knowing well that this is not the place where I can prove it), instead of a dominant medium of interaction (the natural language of the Western world, marked by Greek and Roman civilization), we see that *media* for mind interactions emerge and constitute alternative domains of knowledge acquisition, expression, communication, and validation. The visual, as a dominant medium of our days, can be understood only from this dynamic perspective. If we fail to reach this understanding, we could easily misinterpret what is happening in our days as retro-action, a step back to the shadows of Plato's cave, to the rudimentary (though extremely interesting) expression of cave painting.

We face another danger as well: demonizing the future as an expression of mediocrity and instinctual satisfaction of needs and expectations more commercial than spiritual in nature. Many relate to the visual with at least a reticent attitude. The same holds true for the other new means of knowledge acquisition and dissemination, considered unworthy in comparison to the written language of our heritage. Consequently, alternatives to literacy are seen as an indication of failure. Education embodies all the characteristics of the society in which it is practiced

because after all, educators and the educated are part and parcel of that society. Deploring the *post-* (a qualifier that extends from the modern, as in post-modern, to everything pertaining to reality, as in post-reality), many authors assume a profoundly depressive attitude in respect to changes whose causes they fail to question, not to say fail to perceive. Education did not originate in the social programs that go into the history of democracy. For most of its history, education was an expression of privilege and a means of consolidating it. Even today, and not only in the USA or in the most advanced and richest countries, education remains part of the cultural selection mechanism that makes someone who studied at Harvard, the École Normale Supérieure, Göttingen University a better candidate for a professorship, research position, political career, or position in the business world. Democracy wanted to create a framework for equal rights. We have equal access to the latest camcorder and to the newest movie distinguished at Cannes with its *Palme d'Or* or hyped as Hollywood's latest blockbuster. Cars, apartments, vacations, medical treatment, fashion, gourmet foods and wines, you name it, are equally available. In this respect, democracy managed to achieve its goal of universal access to the market, where almost everybody participates in the election (of choices, acquisition), unlike their participation in social and political life.

One result is that education, as a democratic practice, or as one aspiring to be as democratic as society is, embodies all the characteristics of society. Education itself propagates the understanding of democracy as an equalizer of means and opportunities. To deplore that education is becoming another form of entertainment is as least disingenuous, if not an expression of ignorance. Granted, almost the entire gamut of practical experiences of human self-constitution is shaped as an entertainment event, as a movie. (And there are movies about this turn of events!) If we take a look at the history of culture, this was almost always the case. The university, for instance, was shaped by the practical experience of the Roman Catholic Church; the actors (professors, students) were dressed accordingly. In the pragmatic framework of the Amish, who maintain a lifestyle of early 18th century agriculture in modern America, classes are structured around the demands of farming, and learning is the live movie of life without electricity,

telephony, and combustion motors. To read (and I refer her to Neal Gabler's book *Life, the Movie. How Entertainment Conquered Reality*) that the logic and rhythm of entertainment control our lives sounds like a trivial note that at best deserves to be inserted as a reference, but not in the body of arguments referring to education.

All this would not deserve mention if the main idea would not beg a major point of my arguments concerning education. Gabler claims that „The generation of intellectuals that was raised on television is much more likely to admire popular culture in which to be a celebrity is the most exalted state of human existence." Moreover, „We live under the threat of becoming a *faux* society of authors without books, artists without art, musicians without music, politicians without policies, and scholars without scholarship." This sounds too good to be true!

Expressed here is the fundamental ignorance of the tremendous dynamics of change going on around us today. Indeed, if the reference remains the past, the new means of knowledge acquisition, expression, dissemination, and validation appear at once as devoid of any meaning. The superb abstraction of a philosophical thought (à la Kant, Heidegger, Popper, or Derrida), of a mathematical formula, the powerful rationality of an intellectual discourse grounded in causality (from Descartes on), the elegance of a literary journey or of a poetic image—to name a few—are in contradistinction to the visualization of a bifurcation, to the molecular docking in virtual reality pharmaceutical engineeering, to the remote surgery on virtual representations, and to the self-repairing materials from which nanotechnological devices are made. What we experience is not evolution, but *revolution,* a fundamentally new pragmatic framework from the perspective of which the past often appears as insignificant.

The visual *associated with* entertainment is not the same as the visual *of* entertainment. And the aural, addressing our sense of space and time, is not reducible to the music that made popular culture an expression of generalized mediocrity available to all. To the contrary, I would argue that a fascinating universe is waiting to be further discovered as our science, technology, art, literature, philosophy, and social and political existence transcend the boundaries of the so-

called literate societies. Where authors such as Neal Gabler see an end, I see a beginning.

For this beginning to unfold, we have to re-evaluate our understanding of education. It is in this vein that I argue for more *visual* education, the inclusion of sound, motion, taste, and tactility in educational processes, more interactive multimedia, not as means of illustration, but as alternative media for thinking. It is also along this line that I argue for the end of any illusion of permanency and even continuity, for the end of the dogmatic notion that education is about representation (of knowledge) and its democratic distribution within a structure best embodied by the metaphor of the *container*. The fundamental distinction between the living and the artificial deserves more attention, even at the price of debunking important scientific milestones, such as Newton's system, or even the new metaphors of computation. Education is not reducible to the model of a machine; it is a living process and, as such, marked by anticipation and self-improvement.

As an experience in interaction, education has to focus not on what is common, but on what makes each of us different. It has to rediscover the individual, the ultimate force behind the dynamics we are experiencing today. It has to seek validation in practical experiences of a new nature. According to this requirement, and in addition to my writing on the subject (*Mind—Anticipation and Chaos, The Civilization of Illiteracy*), I am trying to embody my ideas in a variety of products that support interaction-based education. This is part of the validation process made possible by computation—and it would be shortsighted not to take full advantage of it. Before the university, in its traditional form as a bureaucratic institution progressively disconnected from reality, eventually disappears, to be replaced by new ways of mind interaction, an underlying digital structure will emerge as the substratum of such interactions. We can simulate some of these. But we should not re-package in new forms (as many do) what education today dispenses to its consumers. All the programs for taking old educational contents and propelling them by means of CD-ROM, Websites, and multimedia will fail; there is nothing that can save them. Rather, we should understand that new forms of

knowledge are being made necessary and possible *today*. These new forms are actually expressed in the new media.

We are experiencing probably the most interesting cycle of human existence and experience. As long as we are able to free ourselves from the prejudices that accompany a development that has now reached its limits, we will be able to partake in the joy of making possible what yesterday seemed out of our reach, or at best a utopian project.