# To Steer Well We Need to See Clearly: the Need for a Worldwide Futurocentric Education Initiative

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## ABSTRACT

Given the fact that the future is open and hard to predict, and that humanity is not a single organism with a single purpose, what are the initiatives that could realistically improve our ability to steer the future? There is no shortage of studies that analyse current trends in order to determine the likelihood of different future scenarios. But when it comes to actually steering the future, although some initiatives at the national level can have real impacts, international initiatives (like the Kyoto Protocol) often fall short of their intended goals. The fact that many people around the world have lost faith in figures of authority and "Big Government" only compounds the difficulty to enforce international resolutions. If humanity is to act in a concerted and coherent way to successfully steer the future, it will have to be on the basis of the *collective will and understanding* of a sizeable fraction of the world population. To achieve this, we need to have a worldwide conversation about the current state of the world and the realistic options that humanity can take. To make this possible, we need to raise the collective awareness about the topics that are the most relevant to the future (energy, natural resources, environmental protection, biological engineering, nanotechnology, artificial intelligence, robotics, societal trends, etc.): we need a worldwide Futurocentric Education Initiative. We also need to foster a balanced and constructive attitude toward the future: we must counter the arguments of the fatalistic pessimists who exaggerate the problems we face, but also of the techno-optimists who believe that future technologies will save us no matter how careless we are. If humanity is to successfully steer the future, its citizens will need to rise to the challenge and become future-literate.

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> We are all in a situation that resembles driving a fast vehicle at night over unknown terrain that is rough, full of gullies, with precipices not far off. Some kind of headlight, even a feeble and flickering one, may help to avoid some of the worst disasters.
>
> Murray Gell-Mann[2]

*Humanity steering the future*… the expression conjures up the image of the future as some kind of untamed beast, and of humanity riding it like an apprentice sorcerer flying on an unruly broomstick.

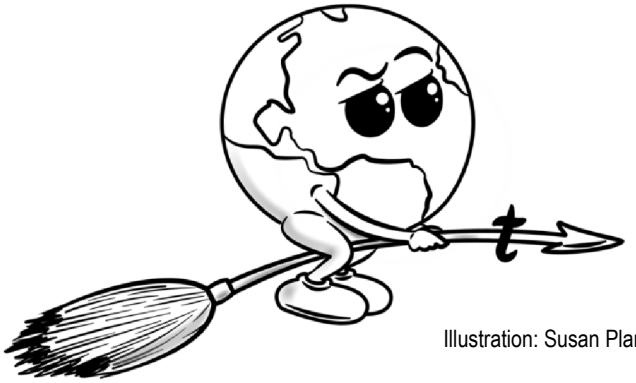

Illustration: Susan Plante

Can one truly hope to answer the question *How Should Humanity Steer the Future?* The future is open, difficult to predict, and even more difficult to steer. And humanity is not a single organism with a single purpose: human society is big and fragmented, and no one truly "speaks for humanity". Yet, the question is an important one, perhaps the most important of all. If we, as a species, fail to act in a coherent and optimal way, the future could bring a lot of hardship, a possible regression in global standards of living, and even, in the worst case scenarios, the extinction of mankind.[3]

## Thinking about the future… and doing something about it

The future is where we are going to spend the rest of our lives, so it is not surprising that we think about it often. Politics, business, education: all these endeavours are, by definition, future-oriented. But most of our "strategic planning" about the future is focused on the short term: politicians and voters are mostly concerned with the next four year term, businessmen think mostly about their quarterly reports and the immediate challenges that their enterprises face, students focus mostly on learning the particular skills that will allow them to get a job upon graduation.

Most people do not take the time to think deeply and seriously about the long-term future, on the scale of decades, or a lifetime, or more. Many have a fairly optimistic view that they will personally fare reasonably well, while harbouring the suspicion that life in the future will be somewhat worse than today, being influenced by the mostly pessimistic visions put forward by the entertainment industry (bad situations make for interesting fiction) and the news media (bad news sells).

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[2] Gell-Mann, Murray (1999). Transitions to a More Sustainable World. In Yorick Blumenfeld (Ed.) *Scanning the Future: Twenty Eminent Thinkers on the World of Tomorrow.* London: Thames and Hudson. (p. 79), cited in David Christian (2004). Maps of Time: An Introduction to Big History. Berkeley, CA: University of California Press. (p. 467).

[3] Bostrom, Nick and Milan Ćirković (2008). *Global Catastrophic Risks.* Oxford, UK: Oxford University Press.

Of course, there are many scholars, scientists, analysts and fully-fledged futurists whose job it is to analyse current trends in order to predict the likelihood of various long-term future scenarios. For instance, most of the science of climate change in concerned with building accurate models that can predict the evolution of climate over the next century and beyond. Think tanks like the Millennium Project[4] focus their attention on several key issues (clean water, population, the rich-poor gap, energy, etc.) and track their global evolution over time. The Future of Humanity Institute[5], at the University of Oxford, specializes on assessing the likelihood of possible global catastrophic risks, many of them human-caused, like global warming, nuclear war, bioterrorism or the enslavement of humanity by out-of-control artificial intelligences.

All these *futures studies* (the plural "futures" denoting the essentially probabilistic nature of any statement about "the" future) have the implicit goal to inform policy makers. Do they really have an impact? If we attempt to list the things that have clearly steered the future in a global fashion, it is certainly easier to think about particular technological advances (like the Internet or the cell phone) than the prognostications of professional futurists.

When it comes to steering the future, it is clear that political decisions at the national level can have a significant effect: consider, for instance, the National Defense Education Act in the United States in 1958, that led to the space race with the USSR, or the one-child policy introduced in China in 1979. But when several countries have to get together toward a common goal (like the 1997 Kyoto Protocol on the reduction of greenhouse gases emissions), a lot of effort has to be deployed to get results that are often disappointing.

If humanity is to successfully steer the future (in order to avoid bad outcomes or the worst case scenarios of global collapse), it has to identify clear goals that lead to positive outcomes for the greatest number of humans, as well as the actions that can make these goals come true. Then it has to implement these actions. Ideally, the leaders of the world (or of the most powerful countries) would be in charge. Yet, in many countries, there is a general loss of faith in figures of authority and the institutions they represent: "Big Government" is increasingly seen with suspicion.

At the planetary scale, any significant steering initiative, to have enough legitimacy and a chance of success, will need to be understood and supported by a sizeable fraction of the world population. To truly influence the course of humanity, an initiative will have to start by influencing the minds of the most people possible, and to do so, *it must implicate them in the process*. The time has come to have a well-informed, serious worldwide conversation about the future.

[4] www.millennium-project.org

[5] www.fhi.ox.ac.uk

## The need for a worldwide Futurocentric Education Initiative

If we are to act in a concerted and coherent way to successfully steer the future, it will have to be on the basis of the *collective will and understanding* of the citizens of the world. The key word here is *understanding*. How can we, as a species, act intelligently to protect the environment, when most of humanity knows almost nothing about the basic principles that determine the climate? How can we make judicious decisions about energy management, when most of humanity has no idea what the difference between a joule and a watt is, and has no clue that the Sun, in any given time interval, sends us *several thousand times* the energy humanity uses as a whole? How can we have a balanced policy on the whole enterprise of GMOs (genetically modified organisms), when most of humanity lacks even a rudimentary understanding of the relationship between genes and the processes that go on in living organisms?

To enable a worldwide conversation about the current state of the world and the realistic options that we can take as a species, we need to start by raising the general knowledge and the collective awareness of the citizens of the world about the topics that are the most relevant to the future of humanity. To reach this goal, scientists, scholars, journalists, authors and educators everywhere must work together to organize a worldwide Futurocentric Education Initiative. Futurocentric education is education whose goal is *explicitly* focused on the future: it prioritizes knowledge and skills that enable a coherent and fruitful discussion about the future of humanity. It should include, among other things, basic knowledge about energy, natural resources, environmental protection, biological engineering, artificial intelligence, robotics, space exploration, economic and political theory, statistics, probability, extrapolation, worldwide societal trends, but also about the importance of striking an ever-evolving balance between technological advances and the social, psychological, spiritual, artistic and cultural aspects of the lives of the citizens of the world (see Table 1).

The futurocentric curriculum presented in Table 1 is a rough draft that is not meant to be exhaustive: one of the greatest challenges of a successful Futurocentric Education Initiative will be to determine what the optimal curriculum should be. The curriculum will have to evolve and be refined as the project progresses. It must also be adapted (in scope and level of detail) to the various characteristics of its target audiences: the focus will certainly be different when dealing with students of different grade levels, or with the general public that has already finished formal schooling.

**Table 1: The futurocentric curriculum**

*What does it take to be future-literate?*

| TOPIC | A future-literate citizen needs… |
|---|---|
| **1. Energy and the limits of the possible** | …to have a basic understanding of how energy conservation constrains the possible, and to be aware of the energy resources that humanity can count on now and is likely to control in the future. |

| TOPIC | A future-literate citizen needs… |
|---|---|
| **2. Renewable and non-renewable natural resources** | …to know the current state of the world's basic renewable and non-renewable resources: clean water supply, food supply, fossil fuel reserves, etc. |
| **3. Environmental protection in perspective** | …to be aware of the magnitude of mankind's impact on the environment compared to the "base-level" environment, so as to be able to rationally take into account the need for environmental protection in any plans for the future. |
| **4. The realistic potential of biological engineering** | …to know enough about the way life works (the mechanism of genetics, the consequences of replication, etc.) to understand where biotechnology (and the related fields of agricultural technology and life extension science) can realistically lead, and to evaluate its promise and potential dangers. |
| **5. The rise of artificial intelligence** | …to be aware of the inexorable increase in the scope of artificial intelligence, and how it can in some cases amplify human intelligence, while in other cases so outperform humans as to replace them. |
| **6. The promise of robotics and nanotechnology** | …to know how automated processes and robotics is evolving in conjunction with the rise of artificial intelligence, and how the extension of robotics in the realm of the very small could lead (in conjunction with biological engineering) to radically new possibilities (both beneficial and potentially catastrophic). |
| **7. Space exploration and settlement** | …to have an understanding of the realities of space (how huge and generally inhospitable it is), but also of the realistic and beneficial ways in which humanity could expand in the solar system and throughout the galaxy. |
| **8. The challenge of globalisation and the evolution of capitalism** | …to have a concrete understanding of the basic principles of economic and political theory, in order to have a balanced opinion on the issues relating to world trade, globalisation, and the evolution of capitalism. |
| **9. Making sense of uncertainty, statistics and probability** | …to be aware that most scientific results are obtained through a statistical analysis, so that some level of uncertainty is unavoidable, and that one needs to be very careful to avoid the various biases that lead to the wrong conclusions when considering probabilities. |
| **10. The art of extrapolation** | …to know the difference between a linear trend, an exponential one and a S-curve, to recognize when a given model can yield good predictions, and to be aware of the limits of extrapolation. |
| **11. The growing disparity and complexity of society** | …to understand the societal trends that are the most important when thinking about the future: the global increase in the standard of living, the widening gap between the rich and the poor, the increasing complexity of everything (making it harder to understand the future and also harder to steer it), and the way electronic communications, automation, artificial intelligence and robotics have impacted and will continue to impact the job market. |

| TOPIC | A future-literate citizen needs… |
|---|---|
| **12. The Good Life in an ever-evolving technological world** | …to be aware of the different factors that translate into a fulfilling life, and of the importance of taking into account the social, psychological, spiritual, artistic and cultural aspects of the lives of the citizens of the world. |
| **13. Sorting the plausible from the far-fetched and the plainly impossible** | …to have a wide and deep enough understanding of the way the world works so as to be able to evaluate the plausibility of a claim about the future in the news, or of a futuristic scenario in a work of fiction. |

A sizable part of futurocentric education will take place, of course, where most of education already takes place: in schools, colleges and universities. Interestingly, it can have a positive impact on the schooling process itself. For a great number of students, what they learn in school suffers from a "deficit of meaning": "Why do we have to learn this?" is a question that many students (especially in high school) have so often on their minds that they no longer bother to ask it out loud. Futurocentric studies can serve as a motivator for education at all grade levels, by offering great opportunities for problem-based "authentic" learning. If you can start by making students acknowledge the importance of a certain topic for the future of humanity, you can motivate them to learn the basic facts necessary to understand the topic: in this way, you can make them want to learn more about the present, and even the past.

In an ideal world, simply understanding the present should be motivation enough to learn, but most of us are so jaded that the present no longer impresses us… even though, when we stop to think about it, we live our everyday lives in what was, only a few decades ago, the stuff of science fiction. But the future has a unique characteristic: it is still open. A discussion about the future leaves a fundamental place for the unknown, the awe-inspiring, the mysterious. And as Einstein said: "The most beautiful thing we can experience is the mysterious: it is the source of all true art and science."

In education circles, there is already a lot of talk about teaching "21st century skills" deemed essential to succeed in the new economy, like critical thinking relating to information retrieval and Internet enhanced collaboration. Futurocentric education is compatible with 21st century skills, but it goes beyond general learning skills: it focuses on the actual specific knowledge that needs to be "internalized" if one is to be truly future-literate.

## Is widespread future-literacy realistic?

The call for a Futurocentric Education Initiative aimed at the greatest number of citizens of the world could seem naively utopian: to start with, isn't is a well known fact that the general population, even in countries that are advanced scientifically and technologically, has an abysmal track record when it comes to basic scientific literacy? Numerous surveys show that a disquieting number of people can't tell how long it takes for the Earth to go around the Sun, or have no idea that the Sun is much larger than the Earth. However, most of the questions that are asked in scientific literacy surveys focus on the recollection of disconnected factoids. It is not surprising that the general public does not show great

enthusiasm in internalizing those types of facts, especially when a lot of people are walking around these days with instant access to all the encyclopedic knowledge in the world.

The recitation of disconnected factoids is not meaningful literacy: it is pointless *by itself* to be able to name the planets in the solar system in order of distance from the Sun, like it's pointless *by itself* to be able to name the Scandinavian countries from west to east. If a futurocentric education initiative is to have a meaningful impact on the ability of people to have a coherent conversation about the future, we will need to properly define future-literacy. One thing is certain: future-literacy *is not* the ability to "robotically" recite unconnected factoids. What is needed is a general appreciation of the issues that are the most important for the future (which is, of course, much harder to measure on a standardized exam). It is reasonably easy to google information about something that already exists, or some historical fact. But if you need to chart a trajectory in the "undiscovered country" of the future, you will need to construct meaningful relationships between many different subjects and ideas, and to do that, you need to hold the necessary information "in your head". You just can't google that!

## Implementing the Futurocentric Education Initiative

So, how do we go about implementing a worldwide Futurocentric Education Initiative? First, we must get the actors that are already working in futures studies to come together to define the principal aspects of the futurocentric curriculum. Then, we need to get the actors in education onboard: teachers, writers, journalists, popularisers, education "YouTubers", etc. We can expect that not everybody will agree on all of the aspects of the curriculum, or on the specific ways they should be presented, which will generate a lot of interesting debates[6]. The debating process itself can become part of the curriculum: to have an educated opinion on the issues of a debate, one has to acquire additional knowledge and understanding, which could open up new debates, creating a virtual learning loop.

Some educational resources well suited for the initiative already exist.[7] Within the school system, the initiative can start small, by "infiltrating" the current curricula with ready-to-use pedagogical activities. In particular, educational videos, at various levels of complexity, can be aimed at the general public, but also used in school: for that purpose, the videos can be supplemented with worksheets, or with complementary questionnaires aimed at self-learners.[8] As the futurocentric curriculum becomes better known, entire courses, even degree programs, could see the light of day.

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[6] The Drexler-Smalley debate on molecular nanotechnology (see the Wikipedia article of the same name) that took place in 2001-2003 is a good example of an interesting debate about the possible futures of a particular technology.

[7] For instance, the publications of Sense About Science (www.senseaboutscience.org), or the following books: MacKay, David (2009). *Sustainable Energy — Without the Hot Air*. Cambridge, UK: UIT ; Muller, Richard (2008). *Physics for Future Presidents*: *the Science Behind the Headlines*. New York: W.W Norton & Company.

[8] The concept of the "Learn This" button by Maria Andersen is particularly interesting : see for example the YouTube video "Ignite Great Lakes – Maria Andersen: Where's the "Learn This" Button? www.youtube.com/watch?v=btFzxL7lXPU

To be successful, it is important that the Futurocentric Education Initiative not be aimed solely at young people still in school. It needs to reach the most people possible, and that means lifelong education, through magazine and web articles, books, documentaries, YouTube channels, MOOCs (Massive Open Online Courses), etc. Participation could even be rewarded: for instance, we can imagine that some countries could one day allow people to take a futurocentric MOOC instead of doing community or military service.

The worldwide conversation made possible by the Futurocentric Education Initiative will not always go smoothly. Talking about the future can challenge a lot of deeply held viewpoints. For instance, some people strongly believe that the world is about to end (religious rapture, total ecological collapse, etc.). Others refuse to believe that the future could be radically different from the present: they recoil in horror or incredulous skepticism at the possibilities offered by artificial intelligence, robotics, nanotechnology and biological engineering.

If the Futurocentric Education Initiative is to succeed, it will need to offer more than valuable knowledge about the future: it will also need to foster a balanced and constructive attitude toward the future, by avoiding all forms of cynicism, and by countering the arguments of the fatalistic pessimists who exaggerate the problems we face, but also of the techno-optimists who believe that future technologies will save us no matter how careless we are. As for the tone of the worldwide conversation about the future that is the goal of the initiative, we should aim for what is eloquently described in this passage from the Millennium Institute's *2013-14 State of the Future Executive Summary* [9]:

> These great conversations will be better informed if we realize that the world is improving better than most pessimists know and that future dangers are worse than most optimists indicate.

## Conclusion

If humanity is to successfully steer the future, its citizens will need to rise to the challenge and become future-literate. Let us bet that *knowledge is a good thing*, and that the more numerous are the citizens of the world who have a sound basic understanding of the way the world is and evolves, the more happy, prosperous and secure the future of humanity will be.

Let the Futurocentric Education Initiative begin. Educators of the world, the future is in your hands!

## Acknowledgements

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[9] http://www.millennium-project.org/millennium/2014SOF-Executive_Summary.pdf