

Cedric Villani, beyond mathematics

Politique.com reviews one of the major events of 2013, the Economic Forum of Aix-en-Provence, the French Davos, which brings together well known economists [1] and business leaders like Carlos Ghosn or Gerhard Cromme [2]. Cedric Villani, the 2010 Mathematics Nobel Prize winner [3] participated in a round table on education. He answers our questions on the keys to learning, the situation of French Universities and the political project of the European Union.

Politique.com: What do you retain from the debate on the theme “taking the time to train”?

Cedric Villani: I note Philippe Trainar’s approach that consisted in applying statistics and indicators to these questions. This is a real problem, and is important in educational issues. There are things that work and others that do not. This debate on effectiveness is too often tainted by ideological questions. We are told that we need this or that education system for ideological, political reasons: it is something we hear a lot to varying degrees.

What I like about Trainar is that he uses statistics, and there is something dispassionate about his recourse, which is very important for me. Men have been writing for millennia, our brain has not changed. There is no reason why we should not know how to do algorithms now. We have increasingly effective methods of learning.

Politique.com: Could you give us 3 keys to effective learning?

Cedric Villani: The first key is to accept the scientific and experimental approach. Once again, there are things that work and things that do not, these need to be confronted in the long term, on a global scale.

Politique.com: If I understand well, you recommend a sort empirical method

Cedric Villani: An empirical method, indeed! Everything that has something to do with training such as for example: the biology of people with their reflexes and mental circuits. It is not something we master, something we understand. We must not believe that the student will adapt to the method, on the contrary, it is the method that must adapt to the student.

The second key is the question of human factors: the teacher student relationship. The processes that are put in place, the interplay of emotions are as important as the method itself. The whole question of pedagogy is to find the right balance between encouragement and sanction. It is obvious that in France, the cursor is currently too tilted towards sanction and not sufficiently towards encouragement. In my opinion it should be exactly the opposite. It really changes everything for student who only answers half of the question, if he is told “no your answer is wrong” or “bravo, you are on the right track, keep it up”. The psychological function of this human dimension of the teacher is very important.

Politique.com: In relation to new technologies, what do you have to say about the disintermediation of knowledge between the teacher and the student?

Cedric Villani: One must understand that learning is above all a human process. When you communicate on Internet, you communicate with people. The computer is just the intermediary between these relationships; it is not a machine that teaches us to talk. There is something new that is more interesting which has now been put into place: self-training on computers. Or simply with an I-phone to learn languages for example, a little bit like a tennis-man's training wall. I would include this aspect of learning into the question of the keys that student need to take matters into their own hands. We would need to tell them "here is the exercise that you need to work on" so that he can practice outside the classroom.

To sum up there are 3 keys to efficient learning: the empirical method, human conditions, - the fact of valorizing the student for better learning- and the third key: autonomy.

Politique.com: Could new technologies enable students to be more autonomous?

Cedric Villani: Yes! It is a good question. New technologies, like all technologies per se are neither good nor bad. There are distance courses with a lot of people to have a massive impact. We would need to bring the parties humanely closer, for example with student-teacher interaction through a chat system especially if the people already know each other. Tools enabling people to help each other are essential. For example translating a text into Japanese with an electronic language translator is much faster and more varied, programmable, and enable's one to invent sentences, compared with the use of a Franco-Japanese dictionary. It can also spot your mistakes and make you re-examine them very often.

Politique.com: More broadly, concerning education in France, what do you think of the autonomy of universities introduced by the former Minister of Higher education Valerie Pécresse and of private investments that could help them develop?

Cedric Villani: Unfortunately in France we have a very negative attitude towards private money, and mixing genres and education is an essentially noble value understood as being an attribute of the State. Bringing in private investments may be a problem in the eyes of people. But I also believe that the best run schools are very often private, offering true cohesion and organization, as for instance the Ecole Active Bilingue Jeannine Manuel [4] which is one of the most remarkable examples.

Politique.com: On the theme of private funding, I would like to refer to an article in Challenges [5] in which the director of the ESSEC pointed out that charging students €10,000 per annum was a good thing, explaining that in turn, this obliged students to really involve themselves and work hard. You are the opposite example of a researcher who did not have to dole out €10,000 for his education thanks to state schools and who has proved- by obtaining a Fields medal - [6] that without generalizing, the state system could also be efficient. Would you say that what the ESSEC director said is still relevant today?

Cedric Villani: The idea of a school costing €10,000 is an idea that spontaneously shocks me, because it is foreign to French culture. However, he is right on one point - it is a behavioral theory - it is the fact that when you pay for something, automatically "commits you to yourself"

and also to your family: if the latter does not have much money and if you do not go to classes, it will be very damageable for them.

But what he says can also be justified all the more as €10,000 is a large sum but it is not astronomical if we compare with some American universities like Harvard. I think that it is a good thing that the two systems (free versus for-fee education) cohabit, providing that the gap is not huge and that we do not have a scenario in which we would have very good private training and poor state training. But currently it is not the case and there some very high quality state higher education programs.

But in my opinion the question of funding is secondary because the real question, the real issue of the Pecesse reform [7] and which is still being debated today is the question of university governance. The question of whether more powers should be given to universities, a more decentralized power. This is an issue that must be developed over a decade with more responsibilities devolved to the local level. It means getting out of a system in which the teachers, researchers, academics have no faith in their presidents, in spite of the fact they elect them.

We must also stop turning automatically to the state to solve everything. The State cannot do this, the state is clumsy. The State is unable to cope. This ideal vision of a state in charge of planning and administrating, which is deeply rooted in the psyche of French academics, is now an unrealistic vision. The Pecesse reform has at least the merit of encouraging universities to shape their own future. Then it is a matter of economic models, business models, and attitudes to adopt.

Politique.com: You are a mathematician, what did you think of the conferences held during the Economic forum of Aix-en-Provence?

Cedric Villani: Firstly, economics is everybody's business, like any science. These conferences involve topics that concern everybody and affect us all. As a citizen, I feel they raise interesting questions and you do not need to be specialized in economics to understand what is said.

Politique.com: Is there a speaker who particularly impressed you?

Cedric Villani: I have not yet had the time to attend many presentations, but the most interesting, which I followed with great attention, was that by Augustin de Romanet and I found in it a lot of common points with what is done in the academic world.

Politique.com: In the crisis situation, which we are currently facing, mathematics are increasingly questioned as being at the basis of financial models and more particularly derivatives. What do you think?

Cedric Villani: Calling mathematics into question for their role in crisis is more or less equivalent to blaming blacksmiths when people fought with swords. It is not the technology which is bad but the way it is used afterwards. Mathematicians play their role, they develop tools. The question is to know how to apply these tools. If you apply them without safeguards, without safety rules, you commit an error.

Politique.com: You talked about the dream of reaching objectives, what was your dream when you were a student

Cedric Villani: When I was young, sometimes a cartoon, a book would make me dream of a mathematical model, an architectural entity. I had no particular dream, but was fascinated by the world of mathematicians.

At school, what attracted me was the “acquisition of technologies” aspect, the result of a demonstration and the competences drawn from it, sometimes with and minimal formalism. The flurry found behind inventive demonstrations is absolutely fascinating. The other great love of my youth was paleontology; I was an expert on all the species, dinosaurs and their representations.

Politique.com: What is the question you would have liked to be asked in an interview?

Cedric Villani: A question that I am seldom asked and which is important to me is to know if a mathematician is qualified to take interest in human, social and political organizations. And the answer is yes. I am politically committed to the European federalist movement. I am currently vice-president of the think tank Europa Nova. Politics is the art of organizing people and I am in favor of a more and better integrated Europe, coordinated and not standardized.

Politique.com: So you take a clear stand in favor of better coordination in Europe on salaries, retirement and more broadly on social issues?

Cedric Villani: Yes, we need an economic policy, a scientific policy, a president elected by universal and equal suffrage, a commission which must be a prime mover with much more flexibility than today; a president who combines the current functions of Barroso and Van Rompuy.

Politique.com: Do you think that parties like The Front de Gauche or the Front National could be threat for the implementation of the European ideal?

Cedric Villani: There are many threats on the European ideal, but the problem does not come from parties which have the right to exist, but from what people think. There is a rise of nationalistic, isolationist feelings, the rejection of differences which are extremely dangerous. It is a tidal wave which has existed for at least a decade, and with no end in sight. It is this general feeling which jeopardizes the whole European construction. Our projects focus mainly on training young people, youth travel, on their openness to new ideas, so that they can meet and talk to each other.

Politique.com: Euroscepticism has never been so high in the polls [8], what future do you see for the EU?

Cedric Villani: Yes, France is one of the most Eurosceptic countries. I heard Augustin de Romanet say in a conference that every time Europe made a step forward, this was accompanied by a step back.

[Edouard d’Espalungue](#)

Notes :

[1] Economists like Mario Monti, Jens Weidmann, Michel Aglietta, Jean-Hervé Lorenzi, Jacques Mistral (Cercle des économistes) were present

[2] Carlos Ghosn is the CEO Renault-Nissan alliance, Gerhard Cromme is the President of the Siemens Supervisory Board

[3] Cedric Villani was awarded the Fields medal in 2010

[4] Ecole Active Bilingue Jeannine Manuel, 70 Rue du Théâtre, 75015 Paris

[5] Challenges n°311 (6 to 12 September 2012), cover: « 'La gratuité ? Une machine à fabriquer l'échec' Pierre Tapie, directeur général de l'ESSEC » (No-fee education? A machine to create failure?)

[6] This medal is equivalent to the Nobel Prize in Mathematics and is awarded every 4 years

[7] Minister of Higher Education in 2007, that same year she pushed legislation on the autonomy of universities

[8] A study by the « Pew Research Center » carried out in March 2013 shows that only 41% French people have a good opinion of the EU, a figure that has fallen by 19 points in comparison with 2012. Quoted in «Les Français plus eurosceptiques que les Anglais », by Jean-Jacques MEVEL, in « Le Figaro », 14/05/2013. (The French are more Eurosceptic than the British)