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# **Ecological rationality and citizenship education: an interview with Gerd Gigerenzer**

Danilo R. Streck<sup>1</sup>

## **Abstract**

The subject of this interview is the research on ecological rationality carried out at the Max-Planck Institute for Human Development, in Berlin, and its implications for education, especially for citizenship education. The studies on ecological rationality focus on the processes of decision making in a world in which human activity happens in a context of uncertainties, where a complete evaluation of factors is practically impossible. The assumption of the research is that cognitive processes cannot be dissociated from social and cultural realities, and that therefore the identification of the heuristics used in making decisions can be an important instrument for the formation of autonomous thinking. Of special interest from the pedagogical perspective is promoting the development of the capacity to understand and deal with the limits and possibilities of the scientific logic on which educational processes are largely based, and the development of forms of knowing that are as much or more determinant than that one. Gigerenzer emphasizes the role of collective and interdisciplinary work to promote creativity in research and teaching, as well as to make decisions in daily life.

## **Keywords**

Ecological rationality – Citizenship – Heuristics – Uncertainty.

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# ***Racionalidade ecológica e formação de cidadania: entrevista com Gerd Gigerenzer***

Danilo R. Streck<sup>1</sup>

## **Resumo**

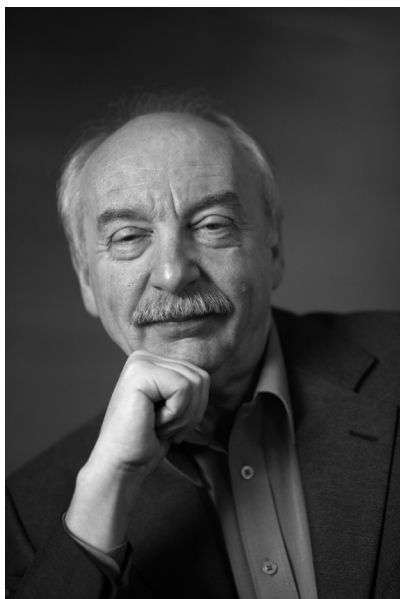
*A entrevista tem por tema as pesquisas sobre racionalidade ecológica e suas implicações para a educação, especialmente para a formação da cidadania, pesquisas essas desenvolvidas no Max-Planck Institute for Human Development, em Berlim. O estudo da racionalidade ecológica ocupa-se com o processo de tomada de decisões num mundo em que o agir humano se dá num contexto de incertezas, em que uma avaliação completa dos fatores é praticamente inviável. Parte-se do pressuposto de que processos cognitivos não podem ser dissociados da realidade social e cultural, e que a identificação das heurísticas que regem a tomada de decisões pode ser um importante instrumento para a formação de um pensamento autônomo. Destaca-se, do ponto de vista pedagógico, a importância de favorecer o desenvolvimento da capacidade de compreender os limites e as possibilidades da lógica científica na qual se fundam os processos educativos e de estimular o desenvolvimento de formas de conhecer que são tão ou mais determinantes da ação quanto a lógica científica. Gigerenzer enfatiza o papel do trabalho coletivo e interdisciplinar para favorecer a criatividade na pesquisa e no ensino, bem como para tomar melhores decisões no cotidiano.*

## **Palavras-chave**

*Racionalidade ecológica – Cidadania – Heurísticas – Incerteza.*

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## Introduction



Fonte: arquivos do entrevistado.

Gerd Gigerenzer is a researcher at the Max-Planck Institute for Human Development, in Berlin, where he is presently director at the Harding Center for Risk Literacy. He graduated in Psychology from the University of Munich (Germany), where he also obtained his Ph.D. degree in Psychology. He was director of Max Planck Institute for Psychological Research, in Munich, from 1995 to 1997, and of the Max Planck Institute for Human Development in Berlin in various terms between 1997 and 2013. He has been a professor in important European and North American universities such as Chicago, Munich and Salzburg.<sup>1</sup>

The concept of ecological rationality (TODD et alii, 2012), which is central to Gigerenzer's work, suggests a certain familiarity with the idea of ecology of rationalities as found in the writings of Boaventura de Sousa Santos (2004), who has not only promoted the critique of the hegemonic scientific rationality, but stimulated the "uncovering" of knowledge

that was silenced by this logic which Santos identifies as metonymical. The reflection on the limits and possibilities of our rationality is relevant to all fields of knowledge, although it is of special interest for education. It can be assumed that the crisis of the school is related, among other reasons, to the difficulty of taking into account the diverse forms of thinking, of knowing and making decisions that today seek to express themselves as part of a plural society.

One of Gigerenzer's books which has received various important international prizes was translated in Brazil with the title *O poder da intuição; o inconsciente dita as melhores decisões* (2009).<sup>2</sup> The title proposes in a somewhat provocative way the argument that permeates Gigerenzer's work: that intuition can be an important tool for making good decisions. The question, according to him, is not whether but when we can trust our intuitions. And to answer this question we need to understand how intuition works. In his endeavor to recover intuition from the negative aura which it is usually associated with, Gigerenzer's critique also reaches the school: "Aligned with this negative vision, our educational system valorizes everything, but intuition."

His definition of intuition entails three dimensions: 1) it arises very quickly in our conscious mind; 2) the fundamental reasons are not fully accessible to this conscious mind; and 3) it is sufficiently strong to motivate our action. According to these characteristics, we realize that a large portion of our decisions fits such definition. First, for the limited capacity of the human mind, which is supposedly unable to "compute" consciously all the alternatives for every action. Therefore, in his work one finds frequent references to the will of omniscience which is legitimated by some specialists' claim of knowledge mastery in a given field. Secondly, because we cannot count on a deterministic worldview, according to which

**1-** This interview took place at Dr. Gerd Gigerenzer's office at Max-Planck Institut für Bildungsforschung (Max-Planck Institute for Human Development), in Berlin, in November 2012.

**2-** Published by Best Seller. Another of Gigerenzer's books in Portuguese, *Calcular o risco: aprender a lidar com a incerteza* (from the original *Reckoning with Risk*), was published in Portugal by Editora Gradiva.

the consequences of our decisions would be entirely predictable.

One of the underlying assumptions of the concept of ecological rationality is that the brain works as two blades of a pair of scissors: one of them is the neurological capacity and the other one is the environment in which we operate, and which conditions its functioning. For making decisions, we have an “adaptive toolbox”, the heuristics, understood as practical strategies for decision-making. These are not inborn neither fixed, but their structure is adaptable to the environment where we act. In the book *Gut feelings*, Gigerenzer presents many examples of how in daily life we use these “shortcuts” as much in our work as in social relations. Important decisions such as changing jobs or determinant choices for our future are less the result of complex calculations than of intuitions which may appear little rational. Not surprisingly, the epigraph of the first chapter is Blaise Pascal’s famous phrase: “the heart has reasons that reason does not know”.

From the educational perspective, the studies of Gigerenzer’s research group call for humility in terms of the scope and capacity of rational and scientific logic. The studies do not suggest abandoning this logic, within which the studies themselves are conducted, but they challenge to be open for other forms of knowledge that, as Gigerenzer explains in the interview, were considered the most trustworthy in other times in human history. It is necessary to recognize that the mind’s operation is conditioned by the environment (*bounded rationality*), developing more or less creative and innovative ways of adaptation (GIGERENZER, 2006). In line with these principles, in his research practice there is a strong emphasis on interdisciplinary work.

The challenge for education is to become aware of this “adaptive toolbox” and to know how to take better advantage of the tools which resulted from the long evolutionary process of the human brain. To know how and why one studies a certain topic and not another one,

why one chooses certain clothing brands, why one chooses certain companies are decisions which, according to the author, “are not only an issue of imagined pros and cons. Something else weighs in the decision-making process, something which, literally, has a reasonable weight: our brain, the result of the evolutionary process. The brain gives us abilities which have developed over millennia, but which are largely ignored by the standard texts about decision making” (GIGERENZER, 2006, p. 73).

Another relevant contribution for education nowadays regards the place and role of information in decision making. According to Gigerenzer, there are situations when less means more, depending on one’s capacity to choose the most adequate options. This is valid both for when medical doctors diagnose their patients’ illnesses and when teachers evaluate their students or researchers choose their methodological approach. Luria (1968) already addressed this issue while trying to understand Shereshevsky’s mind, which was able to store an enormous amount of information, but was unable to carry out abstractions based on the data stored (OLIVEIRA; REGO, 2010). In order to learn how to deal with the growing availability of information, education needs to teach how to confront uncertainties and probabilities. As a consequence of not doing this, there are medical doctors who are unable to correctly interpret data for their patients with regard to risks, economists who act as if they were gods, and citizens who have not learned how to “think with/together”.

Gigerenzer warns that the teaching of Mathematics is based on teaching certainties, in detriment of working with probability. According to him, there is a need for “risk literacy”, which requires the introduction to statistical thinking since primary education. Experiences of this type have been carried out in Germany and in the United States (BOND, 2009). In the context of this broader perspective, “risk literacy” is seen as a precondition for well-informed citizenship in

a participatory democracy. In the words of our interviewed guest:

Educators and politicians alike should realize that risk literacy is a vital topic for the twenty-first century. Rather than being nudged into doing what experts believe is

right, people should be encouraged and equipped to make informed decisions for themselves. Risk literacy should be taught beginning in elementary school. Let's dare to know – risks and responsibilities are chances to be taken, not avoided. (GIGERENZER, 2012, p. 260).

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## The interview

Thank you for finding time in your busy schedule for this interview, which I hope to share with a larger Latin American audience. At least one of your many books has been translated in Brazil, *O poder da intuição: O inconsciente dita as melhores decisões* [*Gut Feelings*], and I can see that the concerns addressed in your studies will become part of the discussion in many fields, including education. Could you tell us a little about how you developed an interest in studying this topic? What has driven you to study the role and place of intuition in decision making?

Doctors, judges, managers – they all rely on their intuition and are afraid to admit it. Yet, in Western thought, intuition was once seen as the most certain form of knowledge, that of angels and spiritual beings who intuited with impeccable clarity. Since the Enlightenment, however, reason was placed above intuition, and much earlier, men above women. Now people believe that intuition is feminine and fragile, while deliberate thinking is masculine and rational. This strange career of intuition, which began as a heavenly form of knowledge and has ended up being despised as an unreliable guide of life, and been linked to our guts, drew my attention.

What are some major projects your research group is working on at this moment at Max-Planck Institute for Human Development in Berlin, especially the ones more directly related to education?

One project focuses on teaching health literacy in primary education. Let me illustrate it with one of the greatest burdens in the health area: cancer. For decades, we have tried to fight cancer with drugs. Billions have been spent on technology and medication. Yet, the effect of screening on total cancer mortality is nil for many cancers, and small for a few. The effect of

cancer drugs on mortality, for the most severe types of cancer, is in the order of a few weeks or months of life prolonged, with heavy loss in quality of life.

The best potential for reducing the burden of cancer is prevention, that is, better health literacy and better lifestyle. An estimated 50% of all cancers are due to behavior: cigarette smoking (20-30% of all cancers), obesity due to sugary drinks, fast food, and physical inactivity (10-20%), and alcohol abuse (10% in men, 3% in women). All figures are for the U. S.

However, to tell a 15-year-old to stop smoking is too late. Eating, drinking, and physical activity habits are formed early in childhood. Therefore, a program for health literacy has to start early, beginning at Kindergarten or first grade and continuing through puberty. Every Euro put into such a program could save more people from cancer and other health problems than it does when it is spent on developing new drugs.

Based on the available research, the health literacy program should be grounded in two basic principles:

1. Start early. The program should start when children are aged 5 to 10 years, before puberty.
2. The program should be integrated. Health literacy should be taught by regular teachers, not by a special teacher, and be integrated into sports, biology, and other subjects. This feature is important because teachers are role models, and as such they need to be part of the program.

The content of the curriculum should include three kinds of competencies:

1. Skills such as cooking and sports.
2. Medical knowledge such as: cigarettes contain arsenic and other poisons; what the lungs of smokers look like; and how one's body gets fat.
3. Psychological knowledge such as: how advertising is designed to impress young people, and how profit-oriented companies manipulate children so that they develop harmful lifestyles.



Your work is basically about making better decisions in situations of uncertainty. What would you consider a good decision? Are there special conditions for making a good decision?

A good decision improves your health, wealth, and well-being, and that of your community at large. What one needs to have a better chance to make good decisions is knowing the basic evidence as well as statistical thinking, and, in an uncertain world, one also needs good heuristics and intuition. And courage: Sapere Aude!

The basic concept in your theory is *ecological rationality*, and its assumption is that the mind and the environment function as two blades of a pair of scissors. What struck me as interesting in your theoretical construct was exactly the idea of *ecological rationality*, which I tried to relate with the concept of ecology of rationalities [Boaventura de Sousa Santos], meaning that there is not just one way of thinking and knowing. When you talk about ecological rationality, is there any implicit value, as when we talk about the environmental movement?

Let us start by saying that morality is not simply within the individual, as supposed by most theories, but is also external. You can talk about a moral or immoral environment in the same way you can talk about a moral or immoral personality. There is always a match between the two.

That somehow goes back to Piaget, who deals with the individual's intelligence in terms of the adaptation between organisms and environments. But in your theory the idea of structures is not present.

Piaget has stages. Basically, he suggests that children are somehow enlightened by the age of twelve or fourteen. I do not believe it is

like that. There are certainly advances in the cognitive strategies that people use, but, at least in Western societies, teenagers have never been so dependent on the opinions of others. And if they behave according to the heuristic "do what your peers do", the result can be evaluated as highly moral or highly immoral depending on the situation in which they use this heuristic.

Let us now move on to the contribution of your theory of ecological rationality and heuristics to citizenship. When reading your articles and going through some of your books, I noticed that one of your contributions is the dismissal of the idea of omniscience, and the other one is the importance of identifying and understanding the heuristics we use, for example, when choosing a candidate. Am I on the right track?

You are right on several points here. First, there is no such thing as certainty; overcoming the illusion of certainty is the first step towards mature citizenship. This also means that you have to stop believing that all sorts of experts know everything. That is the first point. Secondly, democracy will function only if knowledge is distributed across people, not if a few experts claim to know everything and everyone else watches soap operas. That is a decadent form of democracy, one that will decline. What we need to do is to create, through education, an environment in which people are inspired to think; to think and not only to seek maximum pleasure; to think and to enjoy thinking.

Regarding your question on the toolbox of heuristics, this toolbox is what you need in a world of unknown risks. If everything is known, like in a casino, you would be able to calculate and use statistical thinking. You would not need any intuition or heuristics. But for most problems, not everything is known, for instance, whom to marry or what to do with the rest of your life. Here, heuristics are useful as tools. Other tools are analogies or stories. But,

in a world of uncertainty, we need heuristics, and that is why there is not only one, but a toolbox of them. However, no heuristic is useful all the time, which leads to the question of their ecological rationality. Take the heuristic “imitate my peers.” That can be a good idea if you have the right peers, and a very bad idea if you have the wrong ones.

More concretely, in educational practice, how could we deal with heuristics? Would it be helpful to say “Let’s think about the way we choose our candidates”?

Yes, this would be a self-experiment. An American might say, for instance, “I am against Obama because my parents or my group of friends are against him”. This insight can be helpful. Then you can ask yourself: “Do I actually want to be this person who just reflects, mirrors the environment without even struggling to think, or do I want to do something else?”

In action research and participatory research, which is the methodology which I use in my research, collective self-reflexivity is one the basic criteria of validity and quality of research. Would it be in line with this criterion?

Yes, it is self-reflexivity, but the same principle can be used with your peers, your colleagues. The issue here is to think about the heuristics they use, which can be done with everyday things, for example, when ordering a dish in a restaurant. I give many talks in many places around the world and usually end up in restaurants I have never been to before and probably never will be again, and I have learned to not even bother opening the menu. I use a simple heuristic that works better than trying to maximize, that is, trying to assess all the alternatives. If it is a good restaurant, I ask the waiters what they would eat there that evening. And I do not ask them what they recommend

because this makes them think “Oh, this is a German guy, and I will suggest something that Germans might like”. They know what there is in the kitchen when I ask. This is very simple and uses the knowledge of others who know more about the subject. Many Germans have problems with imitation, as compared to other cultures.

Can’t heuristics be reduced to mere tricks? I know that your theory is not at all simplistic, but I would like to understand better what you mean by *simple*. We might call it the “aesthetics of the simple”. How does it relate to complexity, which has become a widespread concept since Edgar Morin’s work, and many others who followed in his trail.

Simplicity allows transparency, and transparency allows trust, because you are less likely to be deceived. Complex systems are different. For instance, in Germany and the US, as well as in other countries, we have tax systems that no one understands, not even my tax advisor. This is not how a democracy should work. There is no need for such a complex system, except for the many loopholes in it that interest groups take advantage of. A simple system is transparent. You know exactly where its strengths and weaknesses are, and everyone can understand it. So I do not think this should be considered a trick. In fact, it becomes clear that complexity is often something from which we do not benefit and that it is intended to disguise the true state of affairs. I work with the Bank of England and the regulation systems like Basel 2 and Basel 3 are so complex that everyone I have asked at the bank tells me: “Nobody understands the consequences of their implementation”.

Yes, that’s what we are told: “It is too difficult for you to understand”.

There is an understanding in our society that, if we face a complex problem, we need to look for a complex solution, and, if it does not

work, we make it more complex, and if it does not work again, we make it even more complex, instead of asking a different question: Is there a simple solution to this complex problem that is not perfect but works better? It will never be absolutely perfect.

Let me go back to the simple in health care, which is an area of your studies. Isn't there a bigger risk of error when the doctor has just some simple processes to evaluate a patient? He looks at two or three factors and then makes a decision, which for the patient may be a matter of life or death. [At this point of the conversation, two researchers of Gigerenzer's team joined us].

The answer is: the doctor may be right or wrong if he uses heuristics. That is what the study of ecological rationality is about. In this case, would calculating sophisticated statistical regression help the doctor make better predictions and inferences about your state of health than looking at just one or two things? Heuristics are also interesting for money-related issues, for instance with credit ratings. If you are a banker and I come to you and say I need a million because I want to set up this new business, then you would have the same problem. There are different ways of approaching this issue. Some have a large volume of data and try to accumulate every piece of information; others are like a banker in Berlin who told me: "I just look at two things, and that's it".

But for you to come to this point there is a lot of previous knowledge. A professor may look at a paper and, after reading the first lines, he may say that it is good or bad, but, in order to be able to do it, he had to go through a complex process.

I would say he has experience. But what the processes really are we do not know. We just call them complex because we do not know. And

we have evidence from other studies that complex problems can be solved by heuristics, although everyone who does not know the heuristics would say that the solution must be complex.

In that sense, clearly the idea of simple does not mean easy. Now moving on to another point, what would you say about dissonant thinking? A thinking which is not only an accommodation, but which is innovative, divergent? How do innovations come about?

That's a big question. Certainly, analogies are a good example. What we try to do is to create an environment that facilitates innovation. We have people from many different disciplines: for instance, Konstantinos is an engineer and Timo, a visiting researcher, is a mathematician [meaning the two colleagues who joined the conversation]. This is very important. Again, much of innovation, I think, is about creating an environment rather than putting something into people's minds. And having a sufficient degree of heterogeneity, people with different methods that have to be put together to analyze the same problems. We also have a little ritual here. Every day at 4 p.m., we have coffee together – you are cordially invited – so that people come together and talk to each other.

**And what is the relation between heuristics and intuition?**

Intuition is defined as felt knowledge, which is quick to appear in our consciousness, but we cannot explain. We do not know whether all intuitions are based on heuristics, but we know that some of them can be analyzed and are based on quite simple heuristics. The very same heuristic can be used intuitively or deliberately. The link to innovation is an interesting one. I give many talks to businesspeople and many of them have problems with innovations and *gut feelings*, a term I use as a synonym of intuition. They distrust any gut feeling and that

is an obstacle to innovation. In addition, there are those who ask for explanations for every new idea; that is the opposite of an intuitive strategy. Yet, intuitive decision-making is no different in the business world than in sports or the arts.

**Would then heuristics be a middle ground between intuition and the desire of omniscient rationality?**

It is slightly different. I would say that intuitive decisions are at least in part the mechanism of heuristics. But the same heuristic can be used both consciously and intuitively. For instance, the gaze heuristic – how to catch a flying ball – can be used deliberately but also unconsciously. This is why the distinction between these two mental systems, which links heuristics to unconsciousness, makes no sense. If you are an omniscient being, you do not need intuition. If you are God, you do not need anything; you do not even have to think.

While I was at MPIB, I became very interested in the work of two research groups which provide important contributions to citizenship education. One is the ecological rationality group and the other is the history of emotions one, in which emotions are seen as cultural and historical phenomena. I have noticed a certain relation between them.

I appreciate that you are reflecting on the approximation of these two groups.

**There is a lot of literature today stating that we live in a world of uncertainty. Are there any links between such literature and your research?**

Yes, there is a lot of literature, most of it in sociology. I distinguish between risk and uncertainty, in which the alternatives are largely unknown. Decision theory has largely ignored uncertainty. Such theory goes as far as

ambiguity, which is when you do not know the probabilities but know the alternatives, all the consequences. This is typical for economics, in which everything is built on the idea of risk, and if they do not know the risks, they reduce them to fit the old calculus of risk. I think we are one of the few centers in the world that try to deal with uncertainty mathematically.

**I see quite a lot of research in the fields of health – about doctors' and patients' decision making – and economics, which has to do basically with the market. How to education professionals receive or deal with your theory?**

Take, for instance, our work on how to teach statistical thinking by using certain representations, which is also an ecological rationality approach. This idea has entered into quite a number of statistics textbooks that are used in secondary education in Germany. That is a sign of success here. But besides that, I think that statistical thinking is much more important than geometry or algebra for all of everyday life after school.

**Is that what you call the mathematics of certainty?**

Yes. That is what is taught. Everything that is certain is taught. The moment uncertainty comes in, even if it is about unknown risks... [Timo: But many things in the world are certain. I mean, the streets in Berlin. They are always there. I do not understand why you are against geometry.] I am not against it. I am talking about prioritization. Of course, you can do both.

**Let me take this idea to the way we deal with theories, say in the field of education, where we sometimes have very “closed” ways of seeing our theories against the others.**

Many of the theories are so true that they cannot be wrong. And so they are like

channels in which you are, and you still do not know what to do. What we try to do is to develop tools that actually change things. For instance, we know that many people have what we call mathematics or statistics anxiety. They do not know anything about statistics, which is often due to some representation, to useless and boring examples that they do not understand. And if you represent, for instance, an inference that is called Bayesian (Thomas Bayes) inference as unconditional probability, then you can count on 90% of the

listeners becoming interested, because they will eventually say: “Oh, I can do this”. And the conditional probabilities will come later. Then you always have this kind of security blanket, where – if you do not understand – you can go back to the theme. This is also about helping people have a better emotional relationship – helping children learn how to deal with risks and with uncertainties, and how to distinguish between them. A last remark on that: I think that heuristics and statistics should both be taught since first grade.

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