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# Creative rationality and design education: Towards a pedagogy of adventure

**Synopsis**: Design education is usually based on the paradigm of innovation defined as a mere application of science. This paper aims at showing that such a point of view is the result of an intellectual perspective which has thrown techniques out of science and, thus, has neglected a specific kind of rationality (the "creative rationality"). Integrating this kind of rationality in the design education drives us to invent "pedagogy of the adventure".

## Introduction

Because firms that use their design activity as a strategic driver are five times as likely to develop new products as compared to firms that do not do it (Swedish Industrial Design Foundation, 2008; European Commission, 2009), improving European innovation capacity requires a shift of focus from exclusive R&D to design.

If design contributes to innovation, then, we aim, as design theorists, to understand the reason and the level of its contribution. Our hypothesis is that design involves a specific rationality which has been underestimated in the Occidental thought as we show it in the first part of our paper. We call it "creative rationality"

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which is usually taught in the engineering Universities as if techniques were a mere application of a contemplative, essential science.

More precisely, according to us, the design education implies a "pedagogy of adventure" which leads students and professors to build a new relationship with knowledge. This kind of pedagogy must invite students to be confronted with the unknown and the unforeseen. It impels professors to abandon the idea that they are the guardians of a finite knowledge they must pass on. They are not the ones who drive their students towards an already known result but the ones who teach them to mobilize their knowledge in an adventurous process. In such a pedagogy, the object of evaluation is not the result per se but the capacity of students to be engaged in a creative process.

**An historical approach of the problem: analytical rationality /creative rationality**

We think that, if we want to understand creativity, first, we must have an historical approach in order to identify its form and occurrences. Creativity is linked to a form a reason the Greeks called the "mètis" (Homer).

According to two French historians of ideas Marcel Détienne and Jean Pierre Vernant, the main characteristic of the "mètis" is to use ruse and cleverness. As they said, the "mètis" is a form of intelligence and thought; it implies a complex but very coherent group of mental attitudes, of intellectual behaviours, which combine the gift for nosing things out, sagacity, the adaptability of mind, the feint, the resourcefulness, a watchful attention, the feeling of opportunity, various skilfulness, a long-time experience (Detienne, Vernant, 1974).

Paradoxically, what characterizes the occidental history of ideas is the forgetting of the "mètis", the kind of reason which produces technology and which is a creative one. Nevertheless, techniques have been thrown out of the "Logos" and cannot be a principle or an object of knowledge.  In the classical Greek way of thinking, knowledge is a kind of contemplation, a "theoria" (Plato). If the Greek knowledge is specular, techniques are  not a way of understanding Nature nor an object of knowledge. As we have inherited of this intellectual tradition, our knowledge is always specular. Human thought is like an "intellectual look" inside reality (Descartes, 1629). It is considered as a mirror of reality and reality itself appears as a kind of mirror of thought.

To understand this reality, Cartesian philosophy uses an analytic method which is a building of thought which implies deduction and divides the aspects of reality in order to understand it. For instance, this method divides a same question in several aspects in order to

solve it. The Cartesian principle is well known: "*to divide every problem I will examine in as plenty parcels it will be possible and it will be necessary in order to solve them*" (Descartes, 1991)

Paradoxically, this Cartesian analytic reason, as Giambattista Vico writes in the *De Ratione*, has never been the source of any technological great innovation which changed the modern world. Besides, according to him, innovations such as the gun, the sailing ship, the clock, are anterior to the development of physical mathematics. And, in a short note of the *Scienza nuova*, Vico even writes that, in the Middle Ages, all the greatest inventions were made by ignorant people or barbarians. For instance, the compass was invented by a shepherd of Amalfi, the astronomical telescope by an uncultivated optician etc., (Pons, 2003).

**What do we call creative rationality?**

Considering "metis" or "ingenium" leads to the rehabilitation of a kind of reason which the Occidental intellectual tradition does not consider as producing science.

In his book *De Nostri Temporis Studiorum Ratione* (1709), Giambattista. Vico describes the "ingenium" as the faculty to understand the relationships which can exist between separate elements of reality. For him, the "ingenium" is the source of poetry and scientific invention. It is a form of rationality which does not separate but ties, which does not cut imagination from reason, binds them in a process of creativity. It is a kind of rationality which does not aim at the being but is situated in the context of reality, which does not aim at the eternity of ideas but is situated in the time. It is the faculty of all the people who bring nearer distinct worlds. It is not the faculty of the designers who, for example, use materials of furnishing in the design of glasses.

So the "ingenium" is a thought which establishes relationships between separate things or concepts. It is an open thought which invites us to make the experience of newness, of innovation, of the unexpected. This is why the "ingenium" is the technological rationality which is used by engineers, for, as writes an other French historian, Helène Vérin, "the main characteristics of engineers, from the Greek mechanics of Antiquity, has always been to establish relationships between heterogeneous forms, materials, forces, figures, sizes so as to produces news effects." (Vérin, 1993: 16). Nevertheless, if Giambattista.Vico is the first philosopher who tries to give a description of this kind of rationality, the "ingenium" or the "mètis" are forms of an ambiguous rationality which, in the Occidental history of ideas, is hidden and pushed outside the field of scientific knowledge.

To consider creative rationality is not a pure theoretical stake It has pedagogical implications. It leads to abandon the kind of contemplative, dogmatic, analytic rationality which is usually taught in the engineering departments of Universities as if techniques were a mere application of a contemplative, essential science.

**Creative rationality thinking and design education**

French engineers formations are more concerned by analytical rationality than by the creative one (Faucheux, Forest, 2007). They have been based largely on the applied sciences model (the name of our Institute is a good example: "National institute of applied sciences"). The first two years of the curriculum are devoted to the teaching of a solid basis in essential sciences.

Such a choice is a mistake. According to us, Engineering Universities, far from appearing as places dedicated to the application of sciences, should not forget to be places of the "ingenium" training. For instance, we need engineering formations which help to develop creative rationality. And, in the same way, the process, the art of design which is widely considered to be central in the activity of engineering implies to use a creative rationality. Such a point of view impels us to define a specific pedagogy, the "pedagogy of adventure".

**Pedagogy of adventure**

First of all, it is useful to consider the usual way of teaching creativity. Most of time, such a teaching tries to develop a "mass-production" of ideas. For example, techniques such as the brainstorming, the divergent thinking, aim at improving the production of ideas. Of course, the number of ideas which are produced is a not a criterion of creativity.

Our position is that in order to give a true formation to creativity, it is necessary to open them to the dimension of alterity. By developing relationships with the others, students may capture other ideas, other visions of things, other paradigms, other cultures which can stimulate their creativity.

Stressing the necessity of alterity underlines the limits of specialization. As shown by the French historian of techniques, Bruno Jacomy, mostly modern or contemporary innovations are not made by specialists who apply the knowledge of his specific field of expertise. For example, in France, Roland Moreno who invented the electronic credit card was not a computer specialist but a journalist (Jacomy, 1994).Indeed, specialization which characterizes the expertise gives a limited understanding of reality. The knowledge of the expert draws frontiers between what appears to be possible and what seems to be impossible.

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On the contrary, teaching creativity must invite students to pass through the barriers of their disciplines and to question their certitudes.

If, creativity needs the possibility to overcome the frontiers of the well-known, this is why it needs what we call "a pedagogy of the adventure". In a kind of circularity, if we want to form creative engineers, teaching needs to be itself creative and adventurous. This concept of pedagogical adventure can be understood in a lot of ways and placed under the sign of Odysseus character. In the Homer's poem, *the Odyssey*, the main character, Odysseus (Ulysses) tries to go back to Ithaca, after the ten years Troyan War. Odysseus's behavior is characterized by the use of the *mētis* which leads him to use deceptive speech and disguise and. For instance, he disguises himself as a beggar when, at last, he reaches Ithaca or lie, telling the Cyclops Polyphemus that his name is "Nobody".

Precisely, a pedagogy of adventure implies to make the experience of the unknown and the alterity in contradiction with education which consists in learning the ready known, the familiar in sciences. This aim can be achieved by giving students the ability to explore new cartographies of knowledge, by giving them the possibility of making analogies the collision of which can be creative. It will be necessary to train students to "navigate" between various fields of knowledge (science and art, science and history, technology and culture…) thanks to courses the aim of which is an interdisciplinary approach.

Precisely, in this pedagogy of adventure, the dimension of language is important. Language, and more specifically, the narration, is the way to establish relationships with the others and the unknown. Narration is the support of adventure. Language, as said in the Homer's poem is the way to be creative, to use a new personality, to make the experience of the other.

Telling a story, in a kind of a role play, can be a way to give a linguistic shape to their project through narratives, metaphors which implies an interaction with the others students.

Then, it is necessary, to abandon the place of the class-room and to teach design in new places which permit students to move, to "travel", to stage their story and shape their project.

The pedagogy of creativity, which for us is a pedagogy of adventure and is relevant with an epistemology of the invention, implies to invent new kinds of social and human sciences which will be specific to engineering Universities and will develop among the students the knowledge of technical objects, of technology, the understanding and the use of the process of creativity. So, students, throughout their scientific and humanistic studies, will be encouraged to find and develop their own way of thinking, to be creative themselves and at the same time, to understand the process of creativity.

**Conclusion**

Our research work leads us to underline that it is necessary to understand what the call "the creative rationality" which is at the source of innovations. This is why we try to elaborate a modelisation of this rationality beyond the description of its way of the kind of reasoning which is used. We think that the integration of the historical, cultural, anthropological dimensions in such a modelisation, could be interesting. We have also tried to demonstrate that this creative rationality must be considered as the technology object.

Finally**,** to describe creative rationality implies to be creative and to use in the academic field this kind of rationality. In other words, we need to be creative if we wish to make a description of creative rationality. This is why we think that interdisciplinary in our way of thinking is not at the periphery but is central and implies to draw a new cartography of knowledge. In other words, thinking creativity implies an intellectual revolution in the academic field. For instance, a problem remains unsolved for us is the ability for teachers and academic institutions to make an evaluation of the results of creativity which is no longer a reproduction but a mere creation.

**Bibliographical references**

Détienne Marcel, Vernant Jean Pierre, Les ruses de l'intelligence, la mètis des Grecs, Flammarion : Paris. 1974.

Descartes René, Règles pour la direction de l'esprit, 1629, LGF : Paris, 2002

Descartes René, Discours de la méthode, Edition originale 1637, 2ème partie, Folio Essais, Gallimard : Paris, 1991.

European Commission, Design as a driver of user-centred innovation, SEC(2009)501.

Faucheux Michel, Forest Joëlle, « Recherches en SHS en écoles d'ingénieurs : vers une cartographie des savoirs ingénieux », pp. 91-103, Les recherches en sciences humaines et sociales dans les écoles d'ingénieur : un enjeu nouveau de la connaissance, Faucheux Michel, Forest Joelle (eds), Pétra : Paris, 2007.

Faucheux Michel, Forest Joëlle, « Expliquer l'inexplicable : Sciences de la conception et créativité », pp. 211-222, Cahiers de RÉCITS, N°5, 2007

Homère, Odyssée, Folio, Gallimard : Paris, 1973

Jacomy Bruno, Une histoire des techniques, Seuil : Paris, 1990.

Platon, La République, Garnier Flammarion : Paris, 2002

Pons Alain, L'invention chez Vico, Document du Forum du Conseil scientifique MCXAPC, www.mcxapc.org, 2003.

Vérin Hélène, La gloire des ingénieurs, Albin Michel : Paris, 1993.

Vico Giambatista, De Nostri Temporis Studiorum Ratione, 1709.

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My research works are based on the relation between design and innovation. Considering the creative nature of design leads to take into account the creative rationality. Such a point of view stresses that without knowledge production innovation can not occurs. My current researches pursue two objectives. The first one aims at developing a model of the production of knowledge. The second aims at reintegrating the question of the production of the knowledge in territorial policies such as the clusters policies.