

Sapiens and *Demens* in Design Thinking – Perception as Core

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Abstract

Design is characterized as an open process of transformation. Information about the project and knowledge of the subject are important elements of the resulting design, but creative thinking is even more essential. A successful designer is not the one who only knows how to handle technical, semantic or methodical knowledge, but the one who also has vision and imagination, who makes connections between previously unassociated ideas and concepts, and who knows how to exploit unexpected incidents.

This paper focuses on the relationship between knowledge and imagination, rational methods and intuition, planning and chance in the design process; concepts, which are contained in the dichotomy *sapiens-demens*. Because *Homo* is not only rational and wise, but also *demens*: to create he needs enthusiasm, passion and a good portion of madness.

In the dichotomy '*sapiens-demens*', 'knowing-not knowing', we face perception at the core of design thinking. In constructivist perspective, we understand perception as a 'self-organizing-information-system', which restricts our thinking to already set up patterns. The act of perception is always an interpretation and a biographically influenced assignment of meaning. So, if we want a different view on a design problem, we have to liberate ourselves from a routine and mechanical kind of perception.

These are the kinds of considerations we approach in our paper, seeking in this way to show the complementary interaction of *sapiens* and *demens* in the 'Perception-in-Action' process of design creation.

Keywords: design cognition, Constructivist Theory, '*sapiens*' and '*demens*', knowledge and not-knowledge, perception.

1 Introduction

Design is concerned with the creation of the new, or with changing an unsatisfactory situation into a preferred one. Thus, design deals with the response to new life conditions, discovery of new possibilities, development of new solutions and invention of new realities. Man's knowledge had increased so much that no one person can have an overview of all relevant information on a project. Rapid technical innovation, the flood of information through the

media and the global network of enterprises and states, all contribute to the impossibility of an overall view of evolution. The same applies to the design field, because the designer has to integrate knowledge from very diverse areas to manage his different projects, being at the mercy of numerous economic, social or technological restrictions. And more and more it seems that chance determines the course of a design project.

So design innovation emerges 'as a territory of freedom, as a new possibility in the network of contextual constraints.' [Pombo 2003] Considering that design problems are mostly ill-defined, design is characterized by its process of free transformation. Piece by piece, moment by moment, we design structures, forms and symbols that transform possibilities into a new reality. As an endless process of transformation, design leads to a temporary solution with a formal-aesthetic and semantic expression.

In attempting to better understand the process of creative thinking in design, we will, in this paper, explore the relationship between knowledge and imagination, rational and emotional thinking and intuition, planning and chance in the design process. All of the above mentioned concepts of 'knowing' and 'not-knowing' in design are contained in the dichotomy *sapiens-demens*. Philosophers, artists and scientists have forever been asking themselves to what extent our creativity is based on unconscious and irrational thinking and to what extent on conscious and rational thinking. Because *Homo* is not only rational and wise, but also *demens*, to create he needs enthusiasm, passion and a good portion of 'madness'. This perspective is defended by philosophers [Foucault 1980, 1981; Morin 1997, 2002], by sociologists [De Masi 2003], by physicists [Binnig 1997], by neurologists [Damásio 1994, 2000, 2003] and, finally, by design cognition researchers [Lawson 2004].

In this paper we want to discuss, how much it is our nature as *homo sapiens* which directs us to an original development of the design solution, and how much it is our nature as *homo demens* which leads us to innovative products. To a theoretical analysis of the dichotomy *sapiens-demens*, we add our practical and design education experience. In our approach we have tried to integrate the viewpoints of the first author, a philosopher, and those of the second author, a designer and educator, and her observations of the working process of an experienced team of communication designers. During 2004, the second author collaborated on a project of corporate identity and packaging for a sugar enterprise. She participated in the design process during the conceptual phase, some visualization episodes and also the phase of preparing the presentation and justification of the final design solution. We consider 'our' team of communication designers to be an experienced team: the chef designer has been working successfully in his field for more than 30 years and the communication work of his studio has been exhibited in several international events (Colorado Poster Exhibition, Icoграда World Graphic Exhibition, Poster Triennial in Toyama, etc.).

2 Background

Studies of the cognitive processes that are manifested in design action are some of the key areas in recent design research. [for example Lawson 1986,

2004, Schön 1987, Cross, Dorst & Roozenburg 1992, Love 2003, Tschimmel 2004]. Knowledge about design thinking can give direction to design education and design practice, and of how to improve the development of design capability in individuals. The authors own design experience and observation of students' design process shows us, that each designer interprets a given design brief in a quite different and subjective way, so that each design solution is a specific and personal option from the designer/design team.

Since the eighties, cognitive psychology and Constructivist Theory have challenged the existence of an objective reality and recognize the plurality of perceptions and perspectives of reality. Our thinking process is influenced by the fact that the brain is a self-referential system [Roth 2000]. We do not stand aloof from our environment, but our world passes through us. Because of the self-organization of the brain, all ideas emerge, grow and mature during the creative process in an interaction with the situational system.

With this in mind we find ourselves in the design paradigm that Schön [1987] and Dorst [1997] describe as a 'Reflection-in-Action' process and that Dorst and Cross developed further in 'Co-Evolution of Problem-Solution' [2001]. We can observe that designers often change the project goals and characteristics during the design process, either because of unexpected difficulties or because of a new 'insight'. According to *Gestalt* Theory, 'insight' is the result of a reorganisation of a perceptual field [Puente Ferreras 1999: 227]. The brain recognizes something as suitable. With this concept the 'insight' is connected with our memory, intellectual and creative capacity, life and professional experiences and external influences.

Maturana e Varela [1987] introduced notions like 'Structural Determinism' and 'Operational Integrity' which refer to the fact that cognitive organisms can only reciprocally stimulate the construction of information in an 'orientated interaction'. In this constructivist perspective, the designer decides what to do and when, on the basis of the personally perceived and constructed design task. Thus, information about the design project and knowledge of the subject are not enough to create an innovative design solution, but creative thinking is even more essential. As the human brain is inclined to simplify complex facts, the individual has a tendency to stick to the well-known instead of checking out and using new possibilities. Man uniquely amongst all other living creatures is the possessor of the *Sapiens*, but he underestimates his ability to profit from the unexpected, to make the best of all circumstances. And for this he needs a lot of his characteristics as *Homo Demens*.

3 The dichotomy of *sapiens-demens*

3.1 Reason and madness

When Foucault dissolved the modern paradigm of the reason, he manifested his complete disagreement with a civilization that had hidden madness to impose the hegemony of reason. He criticised Descartes, protagonist of modern rationalism and exalted Nietzsche, Van Gogh and Artaud as figures who exposed the darker side of human existence. Conscience is neither sovereign nor autonomous. In *L'Archéologie du Savoir* [1980], Foucault's deconstruction of post-Socratic model of rationality shows a very strong

criticism of the historical category of 'continuity' and simultaneously the intention to destroy the foundations of the rationalist myth of the self-sufficient conscience. The human being is at the same time himself and his double, his own alternative, the unimaginable (*impensé*), who remains outside his self-representation.

In *Histoire de la Folie* [1981], Foucault approached a specific kind of knowledge, i.e., the occidental knowledge of madness. If madness is excluded by the rationalistic paradigm, the madman is considered a complete stranger, not only to others, but mostly to himself, as he is deprived of the power of conscience, which legitimates the capacity to decide. Bringing Foucault's inheritance to this work emphasises that consciousness does not exist in isolation, but coexists with other psychic manifestations. The 'no consciousness' has its own language and demands an opportunity to express itself. There are specific dominions for that kind of expression such as art and design or others, which demand creative and innovative solutions.

In philosophy, since the nineties, it is Edgar Morin, who calls attention to the fact that *sapiens* in *Homo* can't alone guarantee intelligent reasoning. In *Amour, Poésie, Sagesse* he proposes that 'we should do everything to develop our rationality, but in its own development rationality recognizes the limits of reason and enters into a dialogue with the irrational'. [1997: 12] According to Morin reason defines itself in the dialogue it has with the exterior and interior world, also accepting the irrational. In the dialectic between *sapiens* and *demens* he sees the origin of creativity, inventions and imagination. *Demens* intimidates but at the same time favours *sapiens*. Innovation can only arise if the individual isn't completely imprisoned in reality, in logic, in the genetic code, in culture and in society. Above all research and discovery press ahead with uncertainty and delusion. [1999: 65]

Gerd Binnig also agrees with this proposition in his work *Aus dem Nichts. Über die Kreativität von Natur und Mensch*, but in another perspective. Binnig considers madness in the creative activity in the capacity of not getting out of the creative process prematurely. Many people let themselves be discouraged too quickly by slow progress and initial wrong results, but 'one needs time and patience and perhaps a little bit of madness to continue'. [1997: 141]

Domenico de Masi, who in his work *La Fantasia e la Concretezza* has developed a sociology of creativity, sees in imperfection - like Foucault and Morin - a basic element for creativity. Imperfection drives on the creative process and offers the necessary space for creativity to be developed. [2003: 50f] In the same train of thought as Foucault, De Masi goes further with his arguments by affirming that 'only the difference is normal'; difference for him meaning dissimilarity, variety, dissonance, abnormality and contrast.

3.2 Knowledge and imagination

It seems incontestable that a high degree of knowledge in a designer improves the quality of his designed products. The design expert distinguishes himself from the novice with his structured knowledge. Christiaans and Venselaar distinguish four types of design knowledge: 'declarative knowledge' based on

factual information, 'procedural knowledge' (how to use 'declarative knowledge' in certain processes), 'situational knowledge' based on understanding the project conditions and 'strategic knowledge' which refers to knowing about acquisition and utilization of information. [In Cross, Dorst, Roozenburg 1992: 113] In their empirical studies about a knowledge-based design system they conclude that knowledge is of primary importance in the early phase of the design process when information about the design task is organised and integrated into the idea generation process. But in design as an innovative field, it isn't enough to handle only technical, semantic or methodical knowledge, so the designer has to look for an extra ingredient that allows him to arrive at an original solution. All knowledge operates through selection of significant facts and rejection of less significant facts. According to Constructivist Theory design, as other activities, is characterised by a self-organising process, and so is strongly person-related. Thus knowledge can't be interpreted as a static phenomenon, but only as a key that opens possible doors. Knowledge in constructivist perspective signifies an ability to operate adequately in an individual or social situation.

In his paper "Schemata, gambits and precedent: some factors in design expertise", Lawson supports the idea that 'design knowledge is more heavily dependent on an experiential or episodic memory and less on a theoretical or semantic memory'. [2004: 453] Strong emotional experiences help in memorising events and facts for a longer time, and thus are more important for originating ideas than theoretical knowledge is. And they are the basis for imagination understood as the faculty of mentally visualising something in a different perspective. To find really original solutions, the designer needs imaginative thought. It is imagination that liberates us from stereotypical ideas, dogmas, and taboos. Einstein even asserts that imagination is more important than knowledge, because it encompasses the whole world and stimulates progress, while knowledge is limited. [in Guntern 1995: 12] This statement supports Jonas' affirmation that design has always been the 'expert discipline for dealing with not-knowing' [2003: 14], which lead us to the important role of intuition, imagination and chance in design activity. In his earlier work *How designers think*, Lawson has pointed out that the designer needs imaginative thought to find new solutions, but then a critical attitude with rational thought is necessary to evaluate the relevant solution for the real-world problem. "The control and combination of rational and imaginative thought is one of the designer's most important skills." [1986: 101]

3.3 Rational and emotional thinking

Rationality and reason are still principally connected with natural science, and intelligence is mostly equated with logical and analytic thinking - despite Goleman's *Emotional Intelligence* [1995] - , whereas emotions and intuition above all are connected with the Arts. The contributions of Damásio in the neurological domain of cerebral activity about the process of intellectual development, put in question the whole occidental tradition of the evaluation of the intellectual coefficient and the conception of logic and deductive activity as a factor of intelligence. According to Damásio's studies [2000, 2003], the human being is distinguished by his reason, but his reason is marked by his own emotional experience. There is no intelligence without emotion, considering that, before any cognitive process, desire is a priority

condition. Together with the way that each human being actually is, the desire about what he/she wants to become or to do provokes a dynamic re-evaluation of the outside world. In each moment that passes, the self re-constitutes itself. The individual taking decisions refers to prior knowledge, which is registered by emotional memory. This in turn was shaped along the way, by the suffering and the pleasure that were experienced through interaction with others and the world. All those experiences constitute a dynamic matrix with which decisions are taken and through which individuals differ from each other.

In the design process emotions and feelings have a lot of functions such as, for example, the quicker and easier identification and redefinition of the design task, the reinforcement of already existing preferences (styles, values, attitudes) and the acceleration of the formation of new preferential structures. The knowledge about the importance of emotions in the creative process can help in understanding and accepting the interruption of fluency in the thinking process by sadness, bad mood or fear and help to develop a strategy to overcome these negative feelings. Meta-cognition and meta-communication certainly helps the understanding of our own emotional and intellectual state, improving reasoning, solution finding, conception or communication in the design process. [See the proposal for the introduction of a new discipline in design education: "Cognitive Processes in Design", Tschimmel 2003] According to Radical Constructivism, awareness of our cognitive operations while constructing our experienced world (*Erlebnisswelt*) can help us to do a lot of things differently and perhaps better.

3.4 Intuition

Another faculty, responsible for managing unknown or very complex information is our intuition. Intuition is a specific unconscious form of perception and recognition that suddenly and unexpectedly gives us the solution to a problem, an undirected rationality in which emotions are strongly involved as Damásio shows us.

One of the best known philosophers, who placed intuition at the centre of his life-philosophy, was Henri Bergson. "Intuition", asserted Bergson, "firstly means consciousness, but an immediate consciousness, a direct vision which only slightly differs from a observed object, a recognition which is both tangible and contemporaneous. Moreover it is a heightened consciousness, which temporary breaks through the barriers of the sub-conscious and which lets us share the sub-conscious in a swift succession of illumination and recurrent darkness." [1993: 44] Far from searching for a universal definition for 'intuition', Bergson did however see a primary meaning: intuitive thinking means for him 'thinking in time'. Whereas Bergson characterized reasoning as something static, he saw intuition as a constantly changing process. Intuition connected to time means an internal expansion with a ceaseless rearrangement of previously existing elements. The mind continually renews itself.

Even though Bergson separated intuitive recognition from recognition through intelligence, his concept is very significant for our argument. Bergson reduced rational thinking to its capacity of offering new combinations, 'while intuitive thinking doesn't create from known components, but from many, different and

complementary perspectives'. [Ibid.: 46] With this affirmation, almost one century ago, Bergson pointed to the importance of holistic thinking and of an increased capacity of perception in the creative process. "No matter how abstract a thought is, its starting point is always a perception. Intelligence combines and separates; connects and coordinates, but doesn't create. It needs material, and this material can only be delivered by sense and conscience." [Ibid.: 152] In this connection, Bergson also points out that the selectivity of perception is always slightly arbitrary.

3.5 Planning and chance in the design process

Expressions such as "Planned Creativity" or "Systematic Design" are from the distant past of Design Research. The change of paradigm from 'Problem Solving' to 'Reflective Practice' and 'Co-Evolution of Problem-Solution' has contributed to an increasing acceptance of the importance of unpredictable factors in the design process, which the themes of this conference clearly show. Results of research from fields like system theory, evolution theory and chaos theory lead us to the assumption, that creative design thinking not only depends on the designers intelligence, his domain and general knowledge, his imagination and his emotional state, but that sometimes pure chance plays a decisive role. We use the notion 'chance' for unpredictable events, which are far distant from our reason and intentions. Thus to recognize something as casual is the consequence of 'unknowledge'. In the most cases, a situation is too complex and determined by too many influences (as it is the case of most design tasks) to understand and plan it completely. Man's brain isn't really well prepared for this, and the history of design methodology also shows that the designer doesn't deal very well with chance events in the design process. Also creative people like designers prefer to have everything under control. From the perspective of evolution theory, chance represents arbitrary danger in an increasingly confused world. Our memory depends on order and sense because of the limitation of its receptivity. Casual events, which are not possible to simplify into rules, complicate our cognitive operations. For economical reasons the brain invents explanations as required. Man needs rules to find his way around. For this reason, evolution programmed the human brain to deal with speculation, when logical thought doesn't get a response. Faith in the regularity of nature is also a foundation in creative thinking. In constructivist perspective, each new creation is based on the moment in which the attentive observer recognizes a new connection between previously unrelated facts, a new order in the cosmos.

Binnig [1997] shows in his evolution-theoretical model of creativity, in which chance has the main role in the interrelation of mutation and selection, that chance is at the same time the consequence and the motor of each advance. Only by chance the new emerges. Creativity is based on trying out and combining elements, which are not previously related— and this with unpredictable consequences. To avoid being at the mercy of chance, the brain uses diverse strategies: thanks to its selective perception, it only receives such information that suits its own expectations; it recognizes rules where there aren't any; and with its associative thinking abilities it creates connections between objects and events which have nothing to do with each other.

From this phenomenon we can conclude that the designer could use the effects of chance more when he attempts to develop something original. In English 'chance' means 'possibility/opportunity' and 'luck/fortune'. For a long time, artists and writers have been consciously using chance in their work as a seed and as a way to a new form of order: splattered colours, picked up words, the spontaneous choice of a subject, etc. Because of the mainly rational approach to design activity, exploiting chance opportunities is still relatively unexplored by designers. But the 'lucky chance' that leads us to innovative solutions only emerges in one circumstance: it has to encounter a prepared and searching mind.

4 Perception as core

In the above described dichotomy *sapiens-demens*, perception seems to be the most promising field where *sapiens* and *demens* work in a complementary effort. In constructivist perspective, we understand perception as a process of actively searching, directed by our objectives and expectations. From the point of view of the brain, perception operates as a 'self-organizing-information-system'. Psychological studies show that perception is never a mere reflection of external events, but a selective and creative process into which prior experiences, emotions and expectations enter. [Roth 2000] Thus the act of perception is always an interpretation and a biographically influenced assignment of meaning. This assignment of meaning happens according to the principals that *Gestalt* psychology postulated since the twenties. Our perception that seems to be determined by immediate sensations, in reality is composed of products of memory, which means, that the brain, in a quick scan of the environment, interprets events in the light of previous experience. So, if we want a different view on a design problem, we have to liberate ourselves from a routine and mechanical kind of perception, criticized by Bergson [1993: 156].

Speaking in terms of 'semantic self-referentiality' and 'self-explanation' of the brain, Radical Constructivism left the impression, that it is impossible to change or develop the perception of an individual. Even Bergson tried to refute the predominant thought that 'attention could be specified and intensified, but that perception can't release what wasn't already inside. [Ibid.: 154] It is to Art that Bergson gave the role of letting people see things that don't affect their own senses and consciousness in an explicit way. Painters, poets and novelists are for Bergson revealers of new nuances of feeling and thinking.

At his point we have to ask ourselves how the artist develops his own perceptual ability. According to Bergson, the artist is absorbed less than other people in the material side of life – he is 'absent-minded' and lives removed from everyday problems. Bergson goes so far to claim that the artist is born as a 'free agent': depending which sense is involved in this kind of 'freedom'; the artist may become a painter or a sculptor, a musician or a poet. [Ibid.: 158] Because perception is constricted by our personal world (*Lebenswelt*) and by the necessity of acting practically, the one, whose senses and conscience are less attached to everyday life, is able to dedicate himself more to the contemplation of the essence (*An-sich*) of an object, instead of a merely responding to the object. In this connection, Bergson indicates the importance

of objectives in creative work. Everything that seems relevant to the problem should be selected; all the rest could be rejected. This operation in creative thinking Bergson called 'Dissociation'. [Ibid.: 157]

In Bergson's train of thought, we conclude that the creative designer is the one who 'sees' (with all senses) and relates what other people don't see and connect. The creative man has to be both unworldly, and down to earth; within this paradox is the alternating game of *sapiens* and *demens*. Our observation of, and participation in design projects confirms this. Frequently we could observe in the work of 'our' team of designers, that the principal idea for a design solution came in a relaxed moment, when the designer was looking at a reference work, that wasn't related directly to the field of the design task: leafing through a journal, surfing the internet, visiting an art exhibition or just walking on the beach. It is commonly accepted in design that creativity involves making use of ideas from extraneous situations. Expert designers have a facility of applying ideas from other domains to their design task. In a recent study, Lawson puts this facility in relation to the above exposed phenomenon of episodic memory when he refers to creative thinking skills developing in design education: "The argument here is that recognising design situations is one of those key skills. Seeing some kind of underlying pattern or theme that enables a designer to recognise this and make a connection with some precedent in the episodic memory. Remarkably that episodic memory may relate to something from an entirely different context." [Lawson 2004: 454] Of course part of the development of expertise lies in the accumulation of experience. It is the variable of specific experience of the problem type that enables designers to perceive design problems in terms of relevant solutions. In all phases of the creative process the designer is faced with the challenge of a perceived design situation: the interpretation of the problem-solution space.

This kind of perception is a characteristic of the 'Reflection-in-Action' process identified by Schön [1983] as the notions 'naming' and 'framing': in the 'naming' stage the designer selects and names the objects to be considered in the problem-solution space and in the 'framing' stage the selected entities are put into a new perspective. After 'making moves' and 'evaluating' (an experimental action based on 'naming' and 'framing'), the design project leads to a 'reframe' of the design task. The 'framing' step is rarely limited to the starting point of a design process, but diverse moments of 'framing' are more likely to be distributed along the whole design process. This is why we consider that perception ability is at the core of the development of creative design thinking. The role of design education in this domain is the 'training' of a 'free' and 'creative' perception. Thus habits of stereotypical perception and thinking have to be 'destroyed' through practical exercises, the realization of conceptual projects and a theoretical approach.

5 Conclusion and future research

Design is, as are all other creative activities, not only a reflective activity, but also an emotional and intuitive process. Cognition and emotion, knowledge and imagination, planning and chance cannot be separated - they work together in tandem, one complementing the other. Perhaps this perspective offers us a better way of understanding the development of design expertise. Knowing how to explore chance and emotions in design is certainly more likely a characteristic of expert designers and not yet of novices because of their fear of making mistakes or of looking ridiculous.

The reflection on knowing and not-knowing, *sapiens* and *demens* and the central role of perception in the 'Reflection-in-Action' process of design, suggests some future lines of research into design practice. We should further explore the perception of design situations and in particular how they are recognized, classified and how new combinations in the 'reframe' are created. In the exploration of the problem space and in the co-evolution of the solution space, we see the key concept in perception. It is our perception abilities in the sense we emphasised in this paper that should be principally trained in design education. But how can design education develop intuition and emotional thinking? And is this kind of development really necessary to improve the designer's creativity? Would it be useful to create emotional charged situations in the learning environment? And how can we promote the collection of new and rich life experiences? The authors are preparing empirical research with design students in order to isolate some principles and some concrete measures for the development of 'real perception' (as opposed to a mechanical kind of perception) in design education.

As a conclusion to the reflections in this paper, we want to emphasise that all original and innovative design is the result of a liberation: the liberation from the routine of perception - the routine of the designer's perception, and also the routine of the clients' and users' perception. In future research, we will develop a description for the 'Perception-in-Action' process of design creation in which *sapiens* and *demens* have a complementary role to play.

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