

INDUSTRIAL DESIGN AND VISUAL COMMUNICATION VS. PERCEIVED QUALITY

DISEÑO INDUSTRIAL Y COMUNICACIÓN VISUAL VS. CALIDAD PERCIBIDA

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RESUMEN

Esta contribución identifica una tipología innovadora de diseño industrial y comunicación visual, capaz de superar los problemas de percepción y “affordance - carácter sugerente de los objetos”, que surgen y se desarrollan a través de metodologías basadas en propuestas a nivel emocional. Hasta ahora, de hecho, se ha evaluado para influir en el usuario explotando solo los componentes emocionales del producto, como el color y la forma, encontrándose con una brecha entre la calidad percibida y la calidad real. Aquí nos encontramos ante una nueva forma de desarrollar una estrategia innovadora, basada en la ergonomía, que combina las peculiares características y necesidades del objeto industrial con la imagen de la marca a la que se refiere. Así nació la intención de aprovechar los descubrimientos científicos más recientes en el estudio de los procesos cognitivos, los de la semiótica generativa, la psicología de la Gestalt, las aplicaciones sinestésicas sensoriales, hasta los nuevos estudios sobre la evolución del neocórtex (neuronas espejo, memes), en estrecha relación con el valor comunicativo de los nuevos medios, las redes sociales y el Metaverso.

ABSTRACT

This contribution identifies an innovative typology of industrial design and visual communication, capable of overcoming the perception and “affordance” problems, that arise and develop through methodologies based on proposals on an emotional level. So far, in fact, it has been evaluated to influence the user by exploiting only the emotional components of the product, such as color and shape, running into a gap between perceived quality and real quality. Here we face a new way of developing an innovative strategy, based on ergonomics, that combines the peculiar characteristics and needs of the industrial object with the image of the brand to refer to. Thus, was born the intention to make use of the most recent scientific discoveries concerning the study of cognitive processes, those on generative semiotics, Gestalt psychology, sensory synesthetic applications, up to the new studies on the evolution of the neocortex (mirror neurons, memes), in close connection with the communicative value of new media, social networks and the Metaverse.

Palabras claves:

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PREMISE

It is well known that, today, designers try not only to create eye-catching shapes and colors but also to help try to impress and establish the brand in the minds of current and potential customers. In fact, when the brand conquers the customers' mind, the business results increase significantly. It is therefore necessary to actively promote all those values that should be "perceived" by consumers, communicating them with a design in an "effective", "efficient" and "pleasant" way, through coherent planning, decreasing the "gap" between perception and the real qualities of the artifact. The proposed idea is to launch an innovative project of integrated design, user-oriented, which uses the methods of Ergonomics applied to industrial design and communication, that takes into account the components of the human cognitive system, focusing in particular on perception and usability and which communicates this artifact with the help of semiotics and, in general, the sciences of communication to ensure that there are more and more "consumers who buy" and fewer and fewer companies that sell.

ERGONOMICS

Ergonomics (or Human Factors) is the scientific discipline that deals with the understanding of the interactions between humans, objects, other elements of a system and the environment. Applied Ergonomics deals, in a systemic way, with the methods and specific phases of any project, in order to lead to the anthropocentric realization of an optimal adaptation of the system "man, what man builds and the surrounding environment" to the capabilities and psychophysiological limits of the human being, through the study of specific "interfaces". So, in short, Applied Ergonomics (User-Centered Design, Interaction Design, etc.), deals more specifically with the project activity, for the identification of a "user-oriented" design with the effect of meeting the actual needs of users.

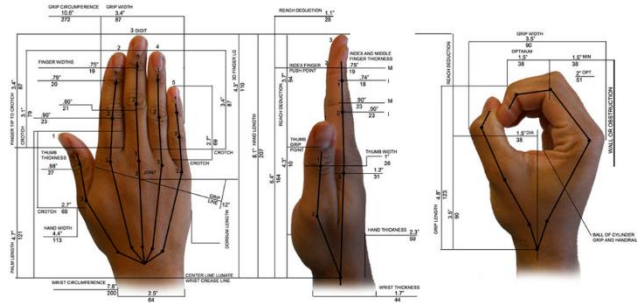


Figure 1. Anthropometric Hand Measurements.

Source: <https://seanpaulgibson9.wixsite.com/dgm3-razor/blank> © 2015 / 2016 by Seanpaul Gibson

Consequently, the ergonomic action begins before the actual design activity and all the verification operations which are then carried out throughout the design process, in a constant research work to verify the balance between product quality and its characteristics of "usability" and "pleasantness". It should also be noted that all these elements have a common property, they are subject to a condition of dynamic equilibrium within the space-time variables. Therefore, in simple terms, this speculative investigation is dedicated to the study of a precise "interface", understood as a set of inputs and outputs concerning the interaction with the object, in order to create artifacts at an anthropocentric level. With the ergonomic design method, the users' needs, wishes, objections and suggestions are tested "a priori", using already widely tested procedures, and the final result will lead to a document with specific instructions (guidelines) for the designer, then being able to do this by effectively reducing the margin of error. Finally, Ergonomics offers the designer the right tools to achieve his most important goal, being able to combine the aesthetic idea with the validity of the creations, helping him to resolve the conflict between the need for freedom of expression, inherent in the creative process, and the constraints imposed by the rules, characteristics and production process.

COGNITIVE PROCESSES

In 1935 Kurt Koffka thus defined the goal of the psychology of perception in order to explain: "Why do things look as they do?". For example, visual perception is not completely elucidated by the images collected by our eyes, in fact, identical stimuli sometimes produce two or more different perceptions. Visual ambiguities are cases in which stimuli can be perceptually organized in equally different valid ways. A classic example to verify this claim is the "Necker Cube", an optical illusion first published as a rhomboid in 1832 by the Swiss crystallographer Louis Albert Necker. It is a simple two-dimensional drawing of a cube with no visual cues as to its orientation, so it can be perceived with either the lower left or upper right square as the front face.

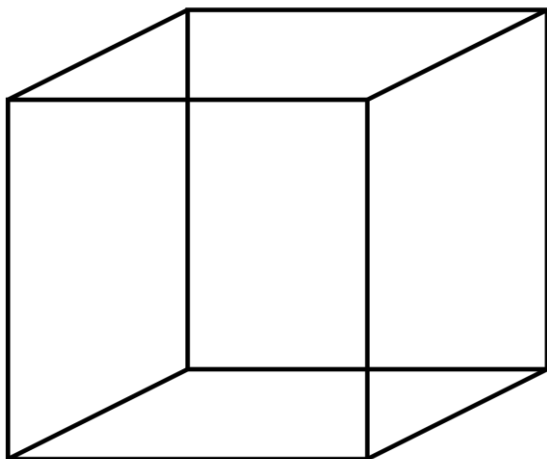


Figure 2. The Necker's Cube
Source: Drawing of the author

Naturally, similar considerations can be developed for other sensory information other than vision. Scientific speculation is specifically focused on examining the development of the transformation of "sensations", understood as sensory inputs, into "perceptions", as a subjective decoding of the sensations received, which allows the acquisition, processing and representation of sensory information, and this by means of "attention", through which a selection of the relevant information is carried out, as well as in the study of the mental storage process, understood as a procedure for

maintaining mental representations. The formulation of the design process is therefore expressed in these anthropocentric terms, through the application and adaptation of existing knowledge, already used in other sectors and which can lead to a wise interaction in the ambit of human cognitive processes, up to the formulation of a suitable interface. Therefore, first of all, we must refer to the system of man's five senses, through which he relates to the world around him and therefore to the synaesthesia that can consequently take place. In other words, designing with cognitive science therefore means:

- Planning for troubleshooting.
- Designing backwards, reconstructing the chain of effects that goes from a conceived object, endowed with shape and other properties, up to the functions and conditions of use for which it was created.
- Build visual (perception) and cognitive (memory and thinking) models.
- Use both cognitive stylistics, which deals with the interface between linguistics, literary studies and cognitive sciences, and the "primary generator", i.e. a large initial goal or a small set of goals, self-imposed by the designer, a value rather judgment than the product of rationality.

SEMIOTICS

Semiology, from the French term "sémiologie", i.e., "study of the sign", is a discipline that studies signs and differs from semiotics, from the Greek "σημείον-semeion", "sign", which also studies the way in which signs form a meaning (the sense). A sign is the association of a signifier and a signified. Signified is the "mental image" of an object, that is, of a concept; the signifier is the "acoustic image", the series of sounds with which the concept is transmitted.

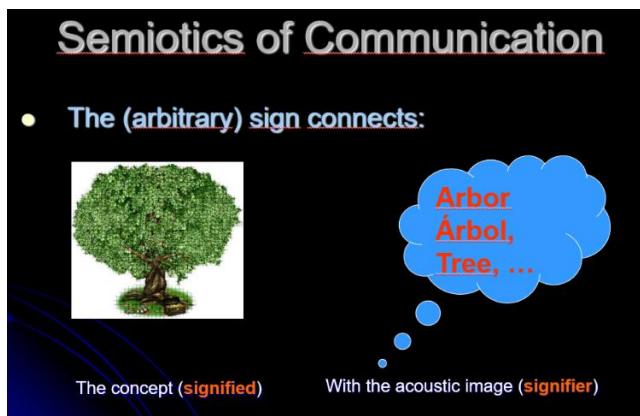


Figure 3. Signified and Signifier
Source: Slide made by the author

Industrial Design, understood as a semiological act, is a "sign", or rather, a "syntagma", i.e., a conjunction of several signs, made up of a "workthing", which functions as a sensitive symbol, and an "aesthetic object" which it resides in the collective consciousness and functions as a "sensation". For example, the phenomenon of synesthesia is examined, a metaphor that implies the transfer of meaning between two or more sensory systems. The most common synesthesias are: visual-auditory (chromatic-sound), visual-tactile, visual-gustatory, tactile-visual (tactile-chromatic), tactile-auditory and tactile-olfactory. In other words, synesthesia occurs when two or more senses overlap and interact simultaneously. This perceptual typology, called simultaneous semiosis, leads from a syncretic semiotics, where a level of homogeneous content corresponds to a level of heterogeneous expression, towards a synesthetic semiotics, which from a level of expression treated in a homogeneous way, refers to a level of content not belonging to the original semiotic system, but which replaces it by borrowing it from another system, thus leading to the characteristic superimposition of two or more perceptions. The process starts from the examination of the fundamental values of the product identity (axiological level), subsequently dynamizing them in the form of stories of complicity, heroism, etc. (narrative level) and finally going back to the pertinent communication, where the fundamental values and narrative structures are enriched by environmental figures (visual/discursive level).

VIRTUAL REALITY

The new types of communication do nothing but extend what is our nervous system, in a complex network, the so-called "global village", which expands the communicative and creative process of knowledge to the entire society. Communication, understood in its broadest meaning as the sharing of knowledge in a codified symbolic interaction, today takes on a new value, thanks to "new media" and virtual reality, which allow the expansion of our extended senses in the McLuhanian global village. In particular, the speculation on virtual reality undertaken in the twentieth century, initially evoked fantastic worlds and was the object of attention above all by writers, directors and artists. At the dawn of the third millennium, the sense of this technology consolidated and led us to a more scientific epistemological position, which arises from the consideration of how the perception of the virtual environment is acquired by the mind through the interface of the "extended body". From the point of view of this external-internal passage, the subject implements the so-called "embodiment", i.e., uses technological artefacts to increase his possibilities of action in the virtual environment, also combining spatial perception with psychomotor action in this specific context.



Figure 4. Full immersive virtual reality
Source: <https://www.linkedin.com/pulse/virtual-reality-full-immersion-brady-anderson>

The virtual environment, which becomes transparent to the cognitive system, is perceived thanks to a continuous "mapping", which merges with the interactivity favored by the "affordances" of tech-

nological artifacts. An innovative metacommunication, resulting from the social presence in virtual units and developing both in the connotative derived intentionality of anthropomorphic artificial agents, and in the interactive intentionality of "avatars", will give life to new models of social groups, with repercussions of strong social, economic and cultural impact. The subdivision of "virtual reality" into non-immersive, semi-immersive and immersive technologies is known; in particular, very complex interfaces are used in immersive virtual reality, which make it possible to perceive a virtual "world", where the spatial "presence" should coincide as much as possible with the physical one. A virtual environment is the simulation of a real environment that can be explored three-dimensionally in real time, where the user can interact with artifacts and other users, in compliance with the concept of "incarnation", which expresses the mental representation of the embodiment in the virtual environment. As far as the design of virtual reality and the virtual environment is concerned, we have a whole series of design typologies available, which refer "primarily" to sensory transduction and to the synesthesias that occur between the five senses. Above all, it is necessary to make use of the current knowledge on cognitive processes, in relation to the translation of sensations into perceptions through the mechanism of attention. What does it mean to design with cognitive sciences? It means designing to arrive at solutions, solve problems and this can be done by designing "in reverse", as is done in Ergonomics, by reconstructing the chain of effects that starts from the conceived object, endowed with properties and going back to the specific functions and conditions of use for which it was designed. The design path then continues through the construction of adequate visual and cognitive models and, for a correct formulation of the project in a virtual environment and of the relative interface, some ergonomic methodologies of an objective and subjective type are used. Usability is an objective method and allows us to quantify effectiveness and efficiency with respect to user satisfaction. At last, pleasantness allows us to identify the subjective

desires of users, which can only be qualified and difficult to quantify.

METAVEVERSE

The "Metaverse" is an application of virtual reality. It has the feature of extending the physical world using virtual reality and augmented reality technologies, allowing users to seamlessly interact within simulated environments, using avatars and holograms. The Metaverse will, over the next decade, revolutionize nearly every aspect of life and business, enabling collaboration in virtual spaces, augmented physical locations, and a combination of both. It will also create new lines of business and transform the interactions between clients, designers and companies.



Figure 5. A Metaverse landscape
Source: <https://uniquetimes.org/exploring-the-metaverse-a-virtual-journey-into-the-future/metaverse-landscape-glow/>

The term Metaverse, a neologism composed of "meta-" (from the Greek meaning after, beyond) and "universe", was born in Neal Stephenson's 1992 science fiction cyberpunk novel "Snow Crash", to indicate a three-dimensional virtual world populated with digital human replicas. The Metaverse defines, in summary, a convergence zone of interactive virtual spaces, located in cyberspace and accessible by users through an avatar with the function of representative of individual identity. Stephenson characterizes the Metaverse as an immense black sphere 65,536 km (216) in circumference, bisected at the equator by a monorail road with 256 (28) stations, each 256 km apart. On this sphere each person can create what he wants in 3D, shops, offices, nightclubs and more, all of

which can potentially be visited by users. An archetype of the Metaverse has been the virtual worlds platform Second Life, which originated in 2003. So, it is not a new concept in the digital world that of a reality based on a virtual world. Today, however, thanks to the platform set up by some Social Networks, we are witnessing an incredible increase in interest in the Metaverse, through which it is possible to live immersive experiences and be able to test artifacts and products before they are created.

CONCLUSIONS

The design methodology described here, is aimed at satisfying the needs of an increasingly aggressive and dissatisfied user and the desired result is the emergence, at a cognitive psychological level, of a "suggestion" capable of producing the evocation of ideas and sensations. In a nutshell, the key principle of our design process is based on the use of different disciplines, in order to involve potential users also through their natural suggestibility. The suggestion, therefore, takes into account the ways in which the stimuli are received and internalized and, consequently, by intervening on these mechanisms it is possible to channel the mental outputs within the genetically determined circuits which would instead be hindered by previous experiences. This information resides, according to numerous researchers, in two main memory reservoirs, the biographical one and the socio-environmental one. The "Biographical Memory" pertains to the genetic heritage (Genotype) and is the one that has been studied with greater scientificity, the "Socio-environmental" one instead identifies itself in the so-called "phenotype", i.e. in the sum of a whole series of factors/experiences that the individual undergoes in the course of his life. New studies, the result of the verification of behaviors aimed at maximizing the response to the increasingly massive stimuli coming from the current information society, are aimed at the reactions implemented by our body to counteract the stress overload to which it is subjected, in order to be able to regenerate adequately.

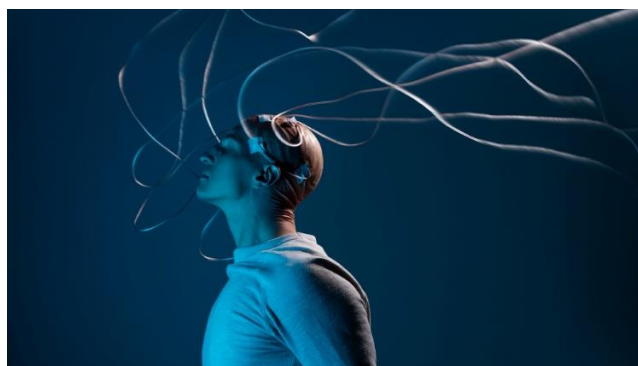


Figure 6. The Meme Replicants
 Source: <https://www.dreamstime.com/bald-man-electrodes-his-brain-future-technological-additions-connected-to-virtual-reality-additional-image198572388>

According to Richard Dawkins, for example, the increase in transmitted information, determines the appearance of a new replicant, called a "meme", capable of continuously propagating itself, both in time and in space. Some researchers have then advanced the hypothesis that our mind may be made up of genetic hardware and memetic software and the natural collocation of memes has been called "memome", which would reside precisely in the context of socio-environmental memory. The most recent theories on this subject distinguish three decision-making components for the establishment of such connections: the genetic one, that relating to experience, the environment and the biography and the casual one, which is becoming increasingly important in order to influence consciousness.

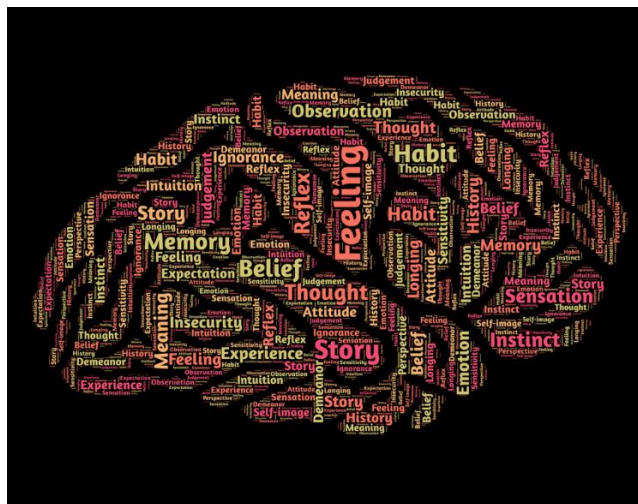


Figure 7. From Thought to Suggestion
 Source: <https://mikegreg.com/blog/here-are-last-four-seven-ways-be-more-persuasive-based-neuroscience>

Thus, the suggestion, taking into account the modalities with which the stimuli have been produced, would produce a percept, that is a transposition and an internalization, which could also be very different from the reality that surrounds us. And it is precisely the “suggestion”, aimed at the perception of the properties and characteristics of the design object, the lever through which we will be able to influence consumers to reduce the gap between the perceived quality and that actually implemented, in order to satisfy the needs expressed or implicit needs.

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