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Beyond beauty and utility:
ergonomics seen from a semiotic perspective

Semiotics for Ergonomics

The kind of yardstick we use to evaluate everyday objects rather tends to focus on their appearance and their technical functionality. The dialectic relationship between beauty and functionality is a recurrent theme in design history: the Modern Movement invested considerable ethical energy in shifting attention towards objects' functional honesty (from Adolf Loos' approach to ornament as a crime, to Louis Sullivan's formula "form follows function"), while others have stressed objects' ability to fascinate and seduce.

But a closer look at this dialectic reveals that it makes no contribution to any real knowledge about our "being involved" with objects: because both categories – a preference for beauty or one for functionality – still leave the object itself *outside us and in front of us*. From this vantage point, then, beauty and functionality are perceived as no more than values intrinsic to the object, not pertaining to how it relates to whoever uses it: these objects are products, artefacts, objects made by people for people, objects that, above all, exist *in the expectation of being used*.

Evaluating an object therefore involves projecting the consequences of its existence onto the stage of its possible uses. Seeing it in the *semiotic interplay*. Imagining it *on us, in our hands, in the setting* where we shall use it. Everyday objects are not heritage to be preserved, admired and safeguarded: at all times, people's hands and experiences are all over them, they bear the marks of human activity and it is the nature of that activity that gives them their quality and their value. Moreover, every object is an element in a "system", in which man is an integral, active part: the most important part. Ultimately, what this means is that the user *makes* the object, because his work completes the design and brings it right up to date (Rabardel, 1997).

There is a significant piece in Plato, where Socrates is discussing beauty with Hippias, who argues that beauty belongs to the gods and to the godlike. Mere things, such as a pot, for example, cannot be called "beautiful", unless they are made of precious materials: of gold, ivory or marble. Socrates is not convinced and asks which is more "beautiful": a golden spoon or a wooden spoon? Hippias' answer is irritated, but he has no choice: the beautiful spoon is the wooden one.

Socrates could be looked upon as ergonomist *ante litteram*. What we notice when we read the piece quoted above is that, when he speaks about objects and tools, the discussion about *beautiful* actually introduces another adjective: *appropriate*. The "appropriate" tool is the one that *best suits a pur-*

pose and that *relates to its user*. Socrates' spoon is beautiful because the material it is made of is *appropriate* and because it is only in that way that it can be *appropriate* for the interplay between the working activity (cooking) and the system of instruments (the spoon, the pot and the soup), as well as for preventing possibly harmful consequences (changing the taste of the soup, getting scalded etc.).

In the field of design ergonomics, artefacts are evaluated in terms of their usability and of the possibility they offer the user to act with the object and to achieve the desired benefit as a result of this action. "Usable" does not just describe an object that "functions", but also an object with which it is possible to achieve the desired result with ease. This is also a question of semiotics.

The semiotic approach to be used is therefore the one that deals with the pragmatic dimension, i.e. is alert not so much to the "meanings" of things and objects, as to their *sense* and *effect* (the object's purpose and possibility of use). What *can be done* with an artefact and *how* it can be done thus means how to interpret it and how to "come into play" with an artefact. Pragmatically, an artefact's use should be construed as a fully-fledged semiotic act, comprising a series of exchanges of dialogue and interpretation between the user and the artefact itself, in which the "discourse" thus constructed is both the performance, i.e. the "labour", and the result achieved.

1. *The object-object: when the object is presented (primarily) as an image*

There are objects that, in the strict sense of the term, we do not actually use: they are objects that were designed to be *seen* and not to be *taken in hand*, the objects that in one way or another adorn our homes and cities. They are objects to be contemplated, whose contact with humans is primarily perceptive in nature; objects that *offer themselves* only as sources of aesthetic stimuli and sensations: pure significant presence.

This is the group that includes artefacts devised and produced to be enjoyed aesthetically, in any of a variety of ways. Works of art first and foremost. But also gardens and other attractive edifices in our cities: because inhabiting a space is not just a matter of occupying or sharing it, but of "feeling accepted" by it. Then there is furniture: no-one will ever convince us to choose an armchair that is comfortable but rather unappealing. And the same applies to clothing: while it is true that clothes are something we wear (so something we *use*), it is even more true that they are something that is shown, exhibited and flaunted.

The real "purpose of use" of such artefacts is to be subjected to the perusal and appraisal of others: we use them *so that someone will look at them*. They are ostentatious objects, whose display may imply communication strategies, or stress a decorative function; artefacts that make their presence felt on our sensorial and emotional nature even before they influence our cognitive and interpretative faculties. To a certain extent, these are not so much significant objects as objects that *prepare* signification.

The dominants here are the *expressive function* and the *aesthetic function*. Expressive, because the object is posited primarily as a vehicle for conveying a sentiment, a concept or a worldview of its creator-sender; but also because

the object's use becomes an intentional expression of sentiments, concepts or worldviews of the user who appropriates it to himself. Aesthetic, because it is the object's formal and sensorial aspects that act as the immediate, primary presence with respect to the user-observer.

Seen from an ergonomics perspective, these two functions may have plenty of consequences. The focus on the expressive function highlights the incidence of subjectivity in our approach to objects, making the user not only the ultimate recipient of the product, but also an *active player* in the entire process of use. Meanwhile, the focus on the aesthetic function enables the sensorial-emotive impact exerted by the object on a person to be evaluated better and the incidence of its attractiveness (perceptive wellness) to be defined for the purposes of an ergonomically satisfying use. And while attractiveness, from an ergonomic standpoint, means physical and sensorial wellness of course, it also means mental pleasure, the pleasure of social intercourse and of intellectual excitement (cf. Bandini Buti, 1998; Jordan, 1998).

The relevance of the aesthetic function brings me to my next consideration. Semiotically speaking, the object-object comes to the fore because it is an *icon*. This term is used to describe signs and texts whose signification comes about through resemblance. An icon is a *resembling sign*: its configuration reproduces the semantically relevant and necessary properties of what it represents and which it thus intends to signify. Now, this "resemblance" can be construed both as an analogical correspondence between one form and another and as a *functional correspondence* between a form and a corresponding position or action of gesture. In the first case, the icon (our "object-object") takes the form of an evocative image, a visual text with an open, ambiguous and polysemic semantic spectrum. In the second case, the icon is an object whose own form *reiterates and reproduces* the form of a "gesture behaviour" somehow related to it, based on the principle of affordance: *hollow* forms correspond to the action of *gathering*, while *elongated* and *sharpened* forms correspond to the action of *pointing* and so on. In this latter sense, *resembling* signifies *imitating the form*.

As far as objects themselves are concerned, these two ways of construing iconicity may often overlap and blend, generating a certain diatribe between the primacy of form-and-function and the primacy of form-and-appearance. Semiotically – and ergonomically – speaking, iconicity must be identified as an object's primary dimension, i.e. that which often dictates every possible relationship between the user and the product. Not only because a "good image regulates our empathic relationship with an object, but also because both its evocative strength and its clarity of representation act, for better or for worse, to influence every possible method of use.

2. *The constrictive-seductive object: when objects guide (or force) our actions*

Dialoguing with an object may also mean just having to give answers, without asking any questions. In that case, the object sets the tone of the dialogue, guiding our remarks and channelling us towards almost obligatory answers. These are objects that *heterodirect* our actions. Yet in the case of such objects, there is often *only one* answer that is beneficial to us: all the others, though possible, are at our own risk or against our interest. It is as

though you come to a road junction and a sign obliges you to go a certain way, a *one-way* street; if you do not obey the sign (which is *advice* or a real *order*), you will be venturing towards unknown, uncontrollable solutions.

Here are a few examples from town planning and architecture: in addition to actual road signs, these include sleeping policemen, the crash barriers that line traffic lanes and all kinds of “fencing objects” that channel how we move along routes; staircases, corridors and architectural thresholds; walls, fences and trenches. On the negative side, this group also includes the architectural barriers that make getting around an obstacle course for disabled people. Examples from other sectors include a trap that interrupts and compromises an action, a weapon levelled at you that forces you to surrender (or react), any system of levers and controls that presumes sequences of actions and reactions and a beam of light that forces you not to look or that, on the contrary, enables you to see and so to act.

While the object icon in the case mentioned before was polysemic, in the examples I have just cited the object’s semantic content can only be unequivocal; it is always only singular: it is our only advisable answer, which should be construed as an *action reflected* by the object and as its main purpose of use and sense. Moreover, this second group of objects always acts only *in our presence* and in situations of environmental nexus, according to the *index* method: as a result of spatial contiguity (such as a pointing finger) or of a cause-and-effect relationship (such as the needle on scales).

These objects’ indicial character depends not only on their environmental circumstance, but also more generally on the nature of their forms. One appropriate term here could be the *energy of form*, as these objects’ effective strength actually resides in their material configuration. Unlike before, however, we are not talking here about an aesthetically relevant form any more, so much as one that is *materially constricting*, again in the sense of affordance: a pointed object *repels*, a curved one *accompanies*, a hollow one *gathers*, a channel *conducts*, a protuberance *causes an impact* etc. These are simple forms, minimal and elementary: forms that concentrate on their objective of sense and aim to avoid ambiguity and distraction. If you like, they are *forms without image*, forms that “do without” all aestheticising elaboration, the better to do the job entrusted to them: to act on the recipient without any mediation.

Forms without images are forms that develop in circumstances where there is a need to react to situations of environmental hostility: by *resisting* the environment. Examples include the igloo (resistance to hostile weather conditions), the bunker (defence against aggressive warfare), aerodynamic vehicles (overcoming, or breaking through, physical barriers), the Franciscan habit (social and religious resistance) etc. Now, it is this very *resistance* that produces the process of semantic reduction discussed earlier: concentrating on a single objective and method for achieving it, gearing up to play a “communications game”, in which no space for interpretation is left to the adversary or companion (the recipient).

All this shifts the focus towards the *fatigue function* (which guarantees a physical contact between the sender and the recipient, as well as between the message and its recipient) and towards the *conative function* (calling attention to the recipient, stimulating his attention, strategies of seduction). Both of these functions exert a sort of “pressure”, including a physical pressure,

on the recipient, who plays a passive role in the interaction that is not always supported by conscious awareness. To this extent, such objects may be construed as devices for achieving behavioural responses that would otherwise be difficult to achieve; objects that, in certain situations of social life (regulating traffic), working life (protective or dissuasive gear for accident prevention), or interpersonal relations (for attracting or avoiding meetings etc.) make us act in ways unrelated to our own actual intentions.

But while *constriction* is one side of the coin, the other is *seduction*. In the first case, the object issues orders; in the second, it sets traps. In the first, the dialogue interchange aims at merely *obtaining*; in the second, it also aims at *exchanging*, in a (misleading) game of giving ground in order to come away with a far bigger catch. In this case, the object becomes constrictive when it becomes an icon, an ostentatious image, putting itself on show and exhibiting its more attractive aspect (the side that allows for exchange), but concealing its less attractive aspect (the side aimed at obtaining).

Seducing means *attracting to oneself*: provoking a response from the recipient, exerting leverage on his weaknesses or his lack of defences (physical, material, mental or emotional) and his needs and interests.

Objects of seduction and exchange include all previous goods, first and foremost money, which has taken the very idea of economic exchange and made it into an objective. They include objects of allurement and of propaganda, the status symbols that win us admiration or consent (like monumental architecture). They also include furnishings that generate a physical sense of wellness in the body, such as chairs and armchairs, sofas and beds: seductive because they welcome us (and enwrap us), exchanging because, by providing comfort, they restore the body with a “fresh supply” of wellness that replaces what it has lost or dissipated.

3. *The object-instrument: when the object is an instrument for taking action (and for inventing)*

Lastly, there are objects with regard to which man (both user and maker at the same time) adopts an aware, active stance: in this case, man’s dialogue with the object is entirely in the hands of the subject and user, as the object is an instrument for human action.

Let’s first define what we mean by instrument: every artefact whose use enables us to a) transform existing reality, b) acquire a new reality or c) explore a possible reality. So instruments include both the tools used by carpenters to work on the wood used to build Columbus’ caravels and the compass that Columbus used to acquire information about navigation, as well as the ships themselves that took him to a new continent.

In each of these cases, the object instrument implies predetermined methods of use, which are learned from tradition and training. The dominant semiotic method here is the *symbolic* one, because this kind of knowledge is the result of cultural conventions and decision-making processes. You have to be familiar with the rules that govern how the instrument is used, or at least be capable of reconstructing them, using suitable inferential movements. The communication functions implied are the *metalinguistic function* (the code used in the system of signification) and the *referential function* (which is responsible for the object’s denotation).

But what exactly do you need to know about an object-instrument? The question arises because there are some tasks that we perform spontaneously and intuitively, without needing any instructions, while there are some objects that we use in ways other than their intended use.

It is useful to draw a distinction here. Pierre Rabardel (1997) defined the instrument as a mixed entity comprising a) an *artefact* component (the object's formal, material, aesthetic and technical nature) and b) a *scheme of use* component (all those activities, actions and "scripts" that determine an instrument's purpose).

The artefact component of a hammer, for example, is in the union between a *handle-grip* part, a *steel block* part and so on. The general scheme of use associated with it is *striking*, while more specific ones include *hammering*, *shaping*, *demolishing* etc. According to Rabardel, these usages should be construed as veritable *organisers* of the user's actions.

Using an instrument therefore means updating its schemes of use in relation to the nature of the artefact: the association between the scheme of *striking* and the *hammer* artefact constitutes the instrument I can use to hammer a nail into a wall. In other words, if a scheme of use contains an action plan, a potential script, then using the object will signify putting that plan into practice, playing the part provided in the script.

But, like in any performance, variations and amendments are to be expected. As a matter of fact, in the same article, Rabardel also examined what he called the *process of instrumental genesis*, or "the use of instruments to designate the application of one instrument rather than another or the application of instruments for uses unknown to them", a process that the French ergonomist associates with metaphor. This is because schemes of use are actually independent of the object: the same scheme of use may be applied in similar ways to different types of objects, while schemes of use typical of certain objects may be "assimilated" by other objects.

Let's then try examining what, semiotically speaking, constitutes the heart of the problem of dialogue interaction between a user and an object, i.e. the dimension of interpretation, since every action taken with an instrument should be construed as an act of interpretation of the object itself.

a) This interpretation can be construed as an *application* of the *schemes of use* expected by the object and explicitly declared and indicated by it. Approaching the object, the user *finds* and then *applies* the intentions of the "action plan", starting from predetermined "instruction rules". The design intentions and the action plan should be clearly legible in the object: in its actual form or by means of auxiliary aids.

b) But we don't always have a hammer ready to hand. Sometimes all we have is a spanner, or a shoe. And yet we use it just the same to bang our nail in. In this case, the interpretation should be construed as a *translation* of schemes of use typical of other objects or areas of activities, applying the slogan proposed by Rabardel: *the design continues and is completed in use*.

This observation is of enormous interest to design, because it enables schemes of use that already exist in already familiar objects to be recuperated and exploited. Like addition or replacement, this translation of a scheme of use can therefore be seen both in terms of an object's deviation from its expected and imagined functions and as the expression of a freedom vested in the individual: discretionary usage, the appropriation of the object and the

identification of inventive methods of usage. In this sense, the possibility to *translate* an object's use is an indicator of the contribution made by users to the instrument's design. Considering that the translation also requires its own degree of legibility: the possible extension of use must be involved in the object's formal configuration or technical characteristics.

c) Lastly, we have interpretation as the *invention* of a new standard of use: both starting from an existing object and prefiguring a new one. In this case, the identification of needs or desires that have not yet come to expression, and yet are *real*, leads to the proposal of unprecedented objects capable of instituting innovative schemes of use. It is as though an existing object were to provide an *interpretation* of a method of use that was unforeseen but is *possible*: so the new use institutes an unprecedented correlation between artefact and function.

It is easy enough to understand that this last observation is more applicable during the design process, at least during that design process that is capable of *imagining* products capable of coming up with answers to requirements for use, rather than just adding further demands. Considering that the tension to design is inherent both in those who prepare the object's design and in those who produce it... *as well as* in those who use it.

Conclusions: ergonomics, semiotics and design

It is fair to think that the more the technology of objects evolves, the more they have difficulty communicating with the people who use them. There are some artefacts that *defy interpretation: we ourselves* are alienated by the language spoken by the artefact and its designers, because the object is just *there, in front of us*, silent and untouchable. This "indecipherability effect" is not limited to the functionality front; on the contrary, rather more often, it is actually the emphasis on aesthetics that makes everyday objects look as though they come from another planet.

We all have to deal with certain elementary questions: what are we designing when we design an everyday object?

What does using an object actually mean?

What is the part played by beauty of form in an everyday object?

I suggest these three answers:

- 1) creating a *beautiful object* in a way that can be described as designing *well* and *on the human scale* means first and foremost knowing how to foresee an *appropriate* use for it; in other words, what the designer designs is not only the object's material form, but also the *form and methods of its interaction with its user*;
- 2) using an object *well* and *for your own benefit* means essentially knowing how to interpret it, knowing how to dialogue with it and, if necessary, knowing how to reinvent it, orienting it in such a way that it will cater for your own needs;
- 3) an everyday object's *beauty* is not an "added value" (something added onto its technological structure, for example), but corresponds to its ability to generate an overall benefit *in favour* of its user.

Every ergonomic design that is *also* construed semiotically must therefore deal with the possible and necessary communication between the object and its user. This means that the object must be conceived as a self-explanatory organism capable of staging actual situations of dialogue and that it must advertise itself to the user as a *form capable of speaking*.

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References

- Accolla Avril e Bandini Buti, Luigi
2005 *Design for all ed ergonomia*, "Ergonomia", 4, 2005
- Bonapace, Lina
1997 *Prove con utenti nella valutazione dei prodotti*, Di.Tec, Politecnico di Milano.
- Bandini Buti, Luigi
1998 *Ergonomia e progetto. Dell'utile e del piacevole*, Milano, Maggioli.
2001 *Ergonomia e prodotto: dell'utile e del piacevole*, Sole 24 Ore, Milano.
- Bandini Buti, Luigi (a cura di)
1995 *L'industrial design ergonomico. Principi per l'ergonomia del prodotto*, "Ergonomia", 5.
- Bonfantini, Massimo A.
1984 *Semiotica ai media*, Bari, Adriatica.
1987 *La semiosi e l'abduzione*, Milano, Bompiani.
1991 *I tre tipi di dialogo*, in Bonfantini e Martone (a cura di), *Specchi del senso. Le semiotiche speciali*, Napoli, Esi.
2000 *Breve Corso di Semiotica*, Napoli, Esi.
- Bonfantini, Massimo A. e Renzi, Emilio (a cura di)
2001 *Oggetti Novecento*, Bergamo, Moretti&Vitali.
- Bonfantini, Massimo A. e Terenzi, Marina T. (a cura di)
2004 *Come inventare e progettare alla maniera di Poe*, Bergamo, Moretti Honegger.
- Bonfantini, Massimo A. e Zingale, Salvatore (a cura di)
1999 *Segni sui corpi e sugli oggetti*, Bergamo, Moretti Honegger, 2002.
- de Terssac, Gilbert
1992 *Come cambia il lavoro*, Milano, Etas, 1993.
- Club Psòmega
1986 *La forma dell'inventiva*, Milano, Unicopli.
1988 *Il pensiero inventivo*, Milano, Unicopli.
1998 *L'inventiva*, Bergamo, Moretti Honegger, 2006.
- Fabris, Renzo
1992 *Impresa e città dell'uomo*, Padova, cedam.
- Gibson, James
1979 *The ecological approach to visual perception*, Boston, Houghton Mifflin.
- Jordan, Patrick W.
1998 *Ergonomia e ricerca del piacere*, «Ergonomia», 11.
- Latour, Bruno
1998 *Fatti, artefatti, fatticci*, in Nacci, Michela (a cura di), *Oggetti d'uso quotidiano. Rivoluzioni tecnologiche nella vita d'oggi*, Venezia, Marsilio.
- Maggi, Bruno
1991 *Razionalità e benessere*, Milano, Etas.
1998 *L'intervento ergonomico. Un incontro di discipline e di processi d'azione*, "Ergonomia", 11.

Peirce, Charles Sanders
2003 *Opere*, a cura di M.A. Bonfantini, con la collaborazione di G. Proni, Milano, Bompiani.

Platone
Opere complete, Roma-Bari, Laterza, 1971.

Rabardel, Pierre
1997 *Gli strumenti dell'uomo. Dal progetto all'uso*, «Ergonomia», 7.

Re, Alessandra
1995 *Ergonomia per psicologi*, Milano, Cortina.

Vitta, Maurizio
1996 *Il disegno delle cose. Storia degli oggetti e teoria del design*, Napoli, Liguori.

Wilson, John R.
1995² *Ergonomics and Participation*, in Wilson, J. R. & Corlett N. (eds.), *Evaluation of Human Work*, London, Taylor & Francis.

Zingale, Salvatore
1999 *La semiotica per l'ergonomia*, in M.A. Bonfantini e S. Zingale (a cura di), 2002.

2004 *Immagini e modelli per l'invenzione*, M.A. Bonfantini e M.T. Terenzi (a cura di), 2004.

Zingale, Salvatore (a cura di)
2005 *La semiotica e le arti utili in undici dialoghi*, Bergamo, Moretti Honegger.

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