Person-centered design: a communicational meta-model for the evaluation of digital interactive artifacts

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Abstract
This work is included in the set of studies that point to an analysis of interface design supported on communication sciences and on literary disciplines.

In the scope the communication sciences supply an initial conceptual basis and an epistemological frontier that allow the definition with some precision of the course of analysis.

Semiotics represents a theoretical support capable of studying communication processes, seen as an exchange of symbols between the artefact and the person.

Finally rhetoric can be used as an analytical tool for the evaluation of the emotional component in these type ok artefacts.

These three areas of research provide, in this way, three analytical macro-blocks likely to be incorporated into a single evaluation meta-model.

That meta-model will be able, then, to supply the methodological bases for the implementation of an analytical system useful not only in the evaluation, but also in the design of interactive digital products, that will include communication, understanding and seduction levels.

Introduction
The daily experience and, therefore, our interactive relation with the objects that inhabit our environment, in which we include the interactive objects, is full of explicit or silent emotions. The artifacts do not possess only informative and communicative but also appellative and persuasive dimensions, so that it becomes necessary a most possible enclosing theoretical treatment of the relation that they keep with the subject.

Advertising campaigns with a truly overwhelming force, reliability, speed or inertia for the change cannot represent the only nature of values that decree the success or the failure of a technical interactive product.
On the other hand, the long minutes connected to the net waiting for the loading of a flash site, or the hours spent to learn all the possible tricks to overcome the successive scenes of the game Tomb Raider, must have some reasonable justification.

In the case of pure leisure products, a starting investment of the user (player) can be understandable which successively will be rewarded emotionally. However most of the interactive digital artifacts are, currently, an indispensable tool for every high number of professions and, consequentially, for a number equally high of people obliged to a daily use.

If in a world-wide level ‘technical’ theories are defended which try to associate the quality of these artifacts to paradigms of effectiveness and efficiency, there are the ones who, without disdaining this type of approach, try to identify the causes of apparently ‘irrational’ phenomenas as a loss of time, or cognitive alienation without reason.

Our investigation can be placed in this second line of thought and looks to create the foundations for an epistemological disclosure in the study of the interfaces that equally recognize the cognitive and emotional person’s dimensions.

A crossing of the postulates that we will enumerate, becomes easily understandable that the ergonomic performance of an interface depends, not only about communicating capacity, but also about the capacity in start an emotional processes. These processes allow the citizen a better cognitive performance and, consequentially, a superior capacity of learning and use of artifacts.

a) Human activities are, more and more, followed and assisted by an environment filled by interactive digital artifacts. A fast analysis of the daily actions of an occidental man will detect an extensive succession of operations made by means of artifacts of this nature. Independently of the academic formation or the social class. The majority of the people is forced to a slow but inexorable change of their own habits through a bigger and bigger analogical sets for digital actions (ATM, shopping on-line, booking, etc.)

b) The interfaces development - that Anceschi defines as ‘osmotic membrane’ that separates the object from the user (Anceschi, 1993) - has justified the existence of a set of discipline that profoundly studies its design. However while an extensive inquiry in the field of the usability exists, a lesser investment in the understanding of the nature processes has been verified typically human that support and characterize the use of these products. In other words the studies of the interaction processes have pointed to a paradigm of efficiency of the operations on the basis of the adoption of models of generic users whose cognitive activity and decision was considered as alien to the emotional activity.

c) The relation between artifacts and person is able to be considered as an activity of communication mediated by an interface. The interface communicates with the person by the way he will be able to control the functioning of the machine. This dialogue estimates that it lacks, to the person, something that the machine can offer and vice versa. An evaluation of the interface (of the dialogue system user) will have to consider as qualitative parameters its capacity in support an efficient communication.

d) The cognitive ergonomics can be considered as ‘(...) social and cognitive compatibility between systems and users’ (Mantovani, 1995). The biunivocal relation that exists between creation of
artifact and its use will have to be related with a use context, refusing, a priori, the possibility to exist generic artifact for a generic user.

e) The emotional activity is strictly related to the cognitive activity. There exists a set of authors that studies, under some points of view, the relation between the thought and emotion. Gregory Ashby, in the article 'A neuropsychological theory of positive affect and its influence on cognition', affirms that: ‘positive affect systematically influence performance on many cognitive tasks’ (Ashby, 1999). António Damásio speaks about relating emotion with the mnemonic capacity when he says: ‘for example, if the reader will have somebody that tells two comparable stories, with an equal number of facts and that they only differ because in one of them some of the facts have one enhanced emotional content, the reader will remember a very number of details of the emotive story than of the other’ (Damásio, 2001). This typology of studies points with respect to a direct relation between emotional and cognitive activity, that is, it points to the existence of a link that binds our emotional state and our involved mental capacities, for example in the resolution of problems.

In this context, this work bellows to the set of studies that point to an analysis of the design of the interfaces through a vision supported by communication sciences and by other subjects that, traditionally, are not invoked by the domain of the technological areas.

The development of a meta-model of communicational analysis for evaluation of interactive digital products that is considered here implied the necessity to ponder its functioning and performance in an optics ‘person-centered design’. This term intends to enhance the fact that the use or the interaction must be studied looking at the person in an integral way, in one determined context and never reduced exclusively to the ‘user condition’. Even because the semantics load associated with this word seems to break the person in two: one that lives and another one that only uses.

Without refusing a ‘technicist’ approaching continues to represent a valid and necessary element in the analysis of these products, it is searched to widen the qualitative parameters including the emotional dimension and the form through which this affects the human action throughout interaction processes.

**Theoreticians estimated for the construction of an evaluation meta-model**

In the scope of the cultural contextualization of the phenomena underlying the use of the interactive digital artifacts, the communication sciences can supply a first conceptual base and a epistemological platform that allow to define with some precision an analysis process. They allow, for example, evidencing the main necessary parameters for an evaluation of the communicative capacities of these topologies of products.

The interfaces could be analyzed while artifacts capable to emit and to receive a variety from messages for and by the person. Each communicative action will have to be structuralized in such a way as to be understandable by the receiver and, as such, to be capable of carrying meaning.

Semiotics represents another theoretical support apt to the study of the communication processes, considered as an exchange of symbols between artifact and person. The intrinsic characteristics of this nature of products require an epistemological adaptation of the semiotics, which translates it in a conceptual and terminological migration of the literal universe for the study of the communication (of the dialogue) between artifact and person.
In the same way that it happens in the interpersonal communication, dialogue could well be structuralized, however, to result incompressible due the use of a code or a set of inadequate codes. Some problems connected to the used language, to the cultural context in which the process is found, can be at the base of the bad interactive understanding of an interactive artifact.

Finally, the necessity to measure the capacity with which digital artifact involves the person emotionally requires the introduction of an element capable to represent and to evaluate this dimension.

In this context the rhetoric is a subject that since the antiquity is pointed out as ‘Art of the seduction’ as it possesses the structure that allows the recognition and/or the creation of the underlying emotional aspect of the communication. The seduction, or either, the emotional evolvement of the listeners, was through the centuries, one of the concerns of the rhetoric, while: ‘the negotiation of the distance between the citizens’ Meyer in Carrilho (Carrilho, 1994).

Thus, an applied rhetorical theory to the interface represents, paradoxically, the creation of a thickness in the interface (considered so far as plain, two-dimensional element), in the direction where it allows to give a substance, an autonomy and an active capacity of reply to the stimulations of the person.

This does not mean to deny the transparency of the interface (Norman, 2000), it means to question the concept of osmotic film, recognizes it as an element with more dimensions, an autonomy and a volume that allow an immersion of the person in an emotional dimension.

The position of Roland Barthes seems pertinent (Barthes, 2000), that it refers to the rhetoric as a meta-language (speech concerning the speech) emphasizing, thus, a structuring characteristic of disciplines in relation to its objects of analysis. And as ‘(...) a narrowed connected machine, a tree of operations, a ‘program’ destined to produce a speech’, strengthening the concept of rational science, logically and moving away definitively, any reference the personal or ‘naturals aspects’ that they aim to justify the communicative capacity as instinctive ability or given innate; that is what Aristotle calls acquired ‘familiarity’ or ‘disposition’. Barthes, when defining rhetoric as a subject ‘Architecture’ of the speech, how a ‘program’ seems to justify the construction of an analytical model of evaluation that ponders and quantifies its functioning.

**The meta-model structure**

On the basis of theoretical presuppositions above described, the meta-model of evaluation structures itself by three analytical axles. The first is relative to communication, the second to understanding and, finally, the third referring to seduction.

Each axe represents a dimension in a three-dimensional analytical space. This allows the creation of a vector, whose value is represented by the vectorial addiction of the three dimensions.

The first axe is based on the Roman Jakobson’s communication model, that seems to adapt itself better while support for an analysis of the communicative potentialities of the interfaces, contemplating and considering all the involved elements in the communication. Each element considered by Jakobson in his model, through its functions, plays a role in whole the process. By means of an evaluation of each of these aspects the communicative capacities of the interface will be evaluated.

Thus, when identifying the predominant functions proposals in the model of Jakobson (emotive, referential, phatic, metalinguistic, connative, poetic) are identified, as a consequence, if the product communicates in a
coherent form its specificities and in its public-target or if, on the opposite, its communicative force is weak or even is badly directed.

As underlined by Jakobson, the characteristics of the message are based on the hierarchic order of the functions; it will be extremely difficult to find one alone function in the message. ‘Each one of these factors originates a different linguistic function. Although to distinguish six basic aspects of the language, we can hardly find verbal messages that only use a function. The diversity of the messages does not base on the monopoly of one or another function, but in the different hierarchic order among them’ Roman Jakobson (Jakobson, 1958).

In the evaluation meta-model it will be then possible to introduce numerical values that represent each recognized and estimate function. The ponderable standard of all the extracted values will be represented in the three-dimensional model through a vector placed a long the axle of the communication.

The second axe mentions the semiotics characteristics of the artifact. It indicates the responsible qualitative aspects for the sense production processes (semiotics processes) and the forms as the same ones act. Donald Norman, in its known theory about the mental models that are involved during the use of interactive artifacts talk about ‘semantic distance’ (Norman, 1986) to describe the distance between the two models (user and designer). The semiotics theory describes this distance as something that, throughout a communication process, is negotiated continuously through a set of accessories (gestures, look, tone of the voice, etc.) that most of the times results involuntary. In the case of the interactive artifacts they should be able to negotiate with the person the processes of sense production.

As it is being estimated that it does not exist a generic artifact projected by generic designer and to be used by a generic person, it is necessary to evaluate the quality of the inserted semiotics processes in the use context. The rank of the value found together in the axle with the first one, into the three-dimensional model, allows the creation of a first resultant figure that, besides informing concerning the communicative and semiotics capacities of the artifact, allows having a fast reading of how do they relate between them.

But each message contains, in some form, one rhetorical component. In this scope the rhetoric can be defined as one sapiente application of the semiotics once it, is through interpretation processes (meaning) that the emotions can be provoked or be propagated. It is concerned, basically, in the way the message will have to be structuralized to reach the ends and the ways to which it destined.

The third axe of the meta-model points to the detention of the nuclear elements of the responsible interactive digital artifacts for the emotional component of the communication and therefore it tries to quantify its capacity of seduction.

The analytical process of which will result the quantification of the rhetorical component of artifact is based on an identical structure as the one of the proper rhetoric. Thus a first module evaluates the presence of the three involved instances in the process: ethos, logos and pathos.

This analytical process already was used by Buchanan (1998) mentioning the ethos he writes: ‘products have to character because in adds way they reflect to their makers, and part of the art of design is the control oh such to character in to order you persuades potential users that product credibility in to their lives. In essence, the problem is the way designers choose you represent themselves in products, not they ploughs, but they wish you appear.’ Buchanan in: Margolin (1989: 101)

The same author mentions the pathos he as: ‘when emotion enters design, it is not an end in itself but mode of persuasive communication that you serve to broader argument. The problem will be design
is you put an audience of users into the frame of mind so that when they uses product they ploughs persuaded that it is emotionally desirable an valuable in to their lives.’ Buchanan in: Margolin (1989:103)

Finally the logos: ‘... it is the logos of design. It provides the backbone of design argument, much chain of formal or informal reasoning provide the Core of communication and persuasion of design. (...) Products ploughs persuasive in this mode when, in addressing real needs, they meet those needs in reasonable, expedient way.’ Buchanan in: Margolin (1989:96)

But, in reality we never are before a communication so fragmented, because each instance influences the message in a changeable form, qualitatively, quantitatively and chronologically.

A second analytical module will try to recognize the basic stages that characterize the process: the inventio, the dispositio, the elocutio. Each one of them represents a procedural moment in the production of a speech.

The inventio is the first phase of the rhetorical construction, through one which it is necessary to find the discursive arguments. The dispositio is the distribution of this material throughout a time-line (in the case of the speech) or in the time and the space (in the case of the interfaces). Finally the elocutio - frequently considered the most important phase of the rhetorical process - that the concepts collected and organized a long the two previous stages are translated into understandable signs for the receiver (person).

If concerning the inventio can be evaluated the quality of the used arguments, in the dispositio the form will have to appreciated as this material is distributed into artifact and as the parts that constitute it relate among them. Finally, in the analysis sponsored for the elocutio, it could be detected and be evaluated the presence of the rhetorical figures. These can be considered as devices capable to evoke the different aspects that the thought assumes throughout a speech to find the expression most apt to a seduction action.

The resultant value of the balance of the analytical contributions of these two modules represents the third and last vector to insert in the three-dimensional space instituted by the evaluation meta-model.

The images presented below are the two exemplificative applications of the meta-model where Xcm are the axle of the communication, Ycp of the understanding and Zsd of the seduction. The analyzed products are two sites of different typologies: first (amazon.com) a product typically dedicated to e-commerce and (contexta.ch) with promotion characteristics on-line.

Looking quickly at the images it is inferred that, although the two products produce a vectorial product similar in dimension, they have very different communicative characteristics. Thus, looking like an identical
communicational quality, the difference between the two products drifts from the biggest investment in the rhetorical component visible in the site of contexta.ch, and the done by Amazon in an easily intelligible functioning that it was expressed in a higher value attributed to the axle of the understanding.

**Conclusions**

Observing the construction process of the considered neta-model and the results gotten through its assay with some products it is possible to arrive at the following conclusions:

1. This meta-model authorized the implementation of a model that translated a set of grids that allow guiding the qualitative evaluation of any interactive digital artifact, making the bridge for its quantification. This instrument is in a refining phase.

2. The graphical transposition of the values found for the related three-dimensional space, allows a fast inspection and the characterization of a product, beyond the detention of its deficit aspects of a communicational point of view.

3. As any analytical instrument it seems to be equally interesting as a support instrument the decision making in the scope of design of the interaction. The present study still praises, a line of development of devices, that we could characterize as ‘rhetorician agents’, that will be able to be enrolled in the interfaces with the aim to diminish the emotional distance between artifact and the person. Through suggestions or impositions, they try to institute a relation between ‘you’ and ‘me’ improving the typical relation with the digital artifacts, where these function work tending as objects-almost-subject.
References

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