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## Enacting computer icons. The dynamics of interpretation between forms and diagrams

Riccardo FUSAROLI\* & Simone MORGAGNI†

**RÉSUMÉ.** Les phénomènes de transposition et de réutilisation des icônes dans les interfaces ordinateur permettent d'analyser plus en profondeur les processus de signification dans leurs usages et dans les interprétations qu'ils impliquent. L'analyse de quatre icônes, apparemment simples, utilisées dans un iPhone afin d'envoyer un message nous conduisent à reprendre la conception de l'icônisme chez C.S. Peirce et la notion de forme dérivée des théories gestaltistes. Nous montrerons que ces icônes appellent à être prises en compte dans le cadre de leurs pratiques d'usage permettant un développement dans le temps de la compréhension et de l'action. Pouvoir en rendre compte de manière adéquate demande alors une approche diagrammatique : les usagers, grâce à leurs habitudes interprétatives élaborent des nouvelles configurations locales permettant par la suite d'en guider les actions dans le cadre d'une dynamique de manipulation et modification constantes et globales.

*Mots clés:* Gestalt, Habit, Icônes, Interfaces graphiques usager, iPhone, Pragmatisme, Raisonnement diagrammatique.

**ABSTRACT.** The transposition of icons and interfaces in a plurality of devices and software questions the processes of meaning construction involved in their use and interpretation. The analysis of four apparently simple icons used to send an email on an iPhone leads us to investigate C. S. Peirce's conception of iconism and the Gestaltic notion of form. Icons are operationally defined as what enables us to do/understand something more. Icons are thus grounded in a bundle of practices according to which the "more" can be established. An adequate description of their meaning relies on a diagrammatical approach: through established habits users infer local configuration of meaningful relations (Gestaltic forms) to guide their action and relations that can be further manipulated and modified.

*Keywords:* Gestalt, Graphic User Interfaces, Diagrammatic reasoning, Habit, Icons, iPhone, Pragmatism.

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\* Istituto Italiano di Scienze Umane – Università di Bologna & Center for Semiotics – Århus Universitet, [fusaroli@gmail.com](mailto:fusaroli@gmail.com).

† LIAS – IMM, Ecole des Hautes Etudes en Sciences Sociales, Paris & Istituto Italiano di Scienze Umane – Università di Bologna, [simone.morgagni@ehess.fr](mailto:simone.morgagni@ehess.fr).

## I INTRODUCTION: OF TRANSPOSED INTERFACES, METAPHORS AND ICONS<sup>1</sup>

What happens when we start using an iPhone? How intuitive are its icons? How much do we rely on the knowledge of more established graphic interfaces, or on the more general Apple touch&feel that seems to pervade it? How much does the new physical features of this object – and the social practices it is embedded into influence our way of using it? This paper investigates the concepts of iconism, form and diagrammatical reasoning in an attempt i) to set up a theoretical framework able to cope with the pervasive spreading of interfaces in everyday life; ii) to contribute to the ongoing development of situated approaches to cognition, mind and meaning<sup>2</sup>.

Graphical User Interfaces (GUIs) were a revolution: finally an intuitive way to perform tasks with a computer. It seemed enough to borrow elements from a well-known domain and use them to structure the computer interface. The DESKTOP conceptual metaphor (Lakoff & Johnson, 1999) was born and we learned to stop worrying and start loving the little scissors, papers and folders that populate our computers. There were limits to this model of course (cp. Benyon & Imaz, 2007; Fauconnier & Turner, 2002; Nielsen, 2000; Norman, 1998; Rohrer, 1995): for instance the new domain did not necessarily reflect the established domain (indeed computers are used to enable us to do more and differently than what we would do in a computer-less office), a too strict projection resulted in confusion (windows and trashcans on the table are certainly not easily understood), different tasks constructed different cognitive perspectives on the interface, thus creating the need of different projections (the trashcan in Os X can either trash files or eject devices), etc.. However, the awareness of the inadequacy of a strict application and interpretation of the DESKTOP conceptual metaphor spread only when GUIs moved out of the relatively safe environment of the operative system on a computer screen, hybridising with other domains (intranet systems, websites, the internet, distributed applications, etc.) and devices (telephones, cockpits, etc.). Icons, for instance, have been transposed and adapted from one application to another (e.g. the transpositions and adaptations of the Google interface from the search engine to Gmail, to Gdocs), specific software has established new standards that have been transposed to whole operative systems and then to new devices (e.g. from iTunes to Os X to iPod and iPhone), and so on. On an iPhone, for instance, we do not have a desktop or the same kind of spatial organisation of the interface, but many icons are preserved. The DESKTOP metaphor is explicitly dismembered and projected on very different plateaux and activities. But it keeps making sense. How?

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<sup>1</sup> The authors would like to thank Frederik Stjernfelt and two anonymous peer reviewer for the constructive critiques and discussions of previous versions of this paper.

<sup>2</sup> These multifarious approaches (from extended mind to situated action) all attempt to show the constitutive role of the environment (physical, artefactual, intersubjective, socio-cultural) in the cognitive process ( Clark, 1997 and 2008; Hutchins, 1995; Menary, 2007; Noë, 2009; Robbins & Aydede, 2009; Suchman, 1987). While we are aware of their difference with each other and with our positions, for the purposes of this paper the move beyond a skull-bounded cognition, is a commonance enough and we aim at advancing this case.

Through these transpositions, the concepts of intuitivity and iconicity reveal more profound complexities. The need to enable the user to move between contexts in flexible ways (from a desktop to a website, from a laptop to an iPhone), the need to create interfaces that can cross (and adapt to) different cultures creating similar pathways for similar actions do not allow for simple transpositions of a whole interface, or even of isolated icons. Effective transpositions and adaptations rely – as we will see – on wider topological, chromatic and eidetic configurations, as supported by practices<sup>3</sup> and interactional rhythms. This explains the difficulties in switching from Win to Mac, for instance. Even if many icons are similar and sometimes more iconic<sup>4</sup>, their positions, their groupings, the possible actions and the keyboard shortcut are different.

## II FOUR ICONS FOR ONE ACTION

We can consider some apparently simple examples: a handful of graphical “icons” in the iPhone interface<sup>5</sup>, all involved in the act of sending a message.



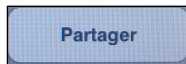
- This icon can be clicked on to send short text messages (when on the right top of the screen) or emails (when on the right bottom). When the content of a message is already displayed on the screen, this icon is sided by a “share” button.



- This icon appears on the left of the “tray” icon when writing or reading a note. When clicked, it creates an email with the note as body.



- This icon appears in the options bar on the left bottom of the screen when an image is on display. When clicked, it creates an email with the image as attachment.



- This icon appears in two different versions after playing a video or after clicking on the bookmark icon situated on the mid-bottom of the screen when visualising a web content.

Every single icon enables the user to send a message. Why four different icons? Why not just one conventional or naturally motivated metaphorical icon

<sup>3</sup> For an analysis of the transposition of Google interfaces, cp Vandi (2008).

<sup>4</sup> It is easy to think, for example, at the problems emerged with the trash icon on Mac and Windows as shown by Rohrer (1995).

<sup>5</sup> In our analysis we will use the iPhone example, whit the version 2.0 of the Apple software released in late June 2008 but it is important to remember that the new Apple multi-touch interface is shared with the last version of the iPod series: iPod Touch.

corresponding to this action? What is the meaning of the change of position? What is the role of variation in general? To start answering these questions we need to better understand what we mean by “icon” as well as the specificity of computer icons.

### III CONCEPT OF ICONICITY AND HOW IT APPLIES TO COMPUTER ICONS

A very lively debate on iconism was enacted in the semiotic scene in the 70's (Eco, 1975; Goodman, 1968; Fabbrichesi Leo, 1983) and has recently re-surfaced, partly thanks to the development of the second generation of cognitive sciences and its insistence on the relation between semantics and perception (Barsalou, 1999; Eco, 2007; Itkonen, 2005; Stjernfelt, 2007). The debate staged two main positions: iconism as conventional vs iconism as natural<sup>6</sup>. We will here examine Peirce's and Eco's positions to highlight an operational definition of iconism.

The fundamental definition of iconicity can be found in the (infamous) sign taxonomy articulated by Charles Sanders Peirce: the trichotomy of sign types consists in icons (signifying by means of a similarity between the sign and the object), indices (by means of an actual causal or purposive connection) and symbols (by means of habit<sup>7</sup>, in mind or in nature). In this framework, iconicity is often considered the basis of semiotics, since indexicality presupposes iconicity and symbolicity presupposes both iconicity and indexicality.

Umberto Eco - after a long flirtation with a strong cultural relativism for what concerns iconism (Eco, 1975) – tackles the need for a basis of interpretation, for a beginning of semiosis: “a pure perceptual state that is free from any interpretation and that in some way precedes it” (Sini, 2004: 24), through which the world “kicks the subject” (Eco, 1997) thus triggering her/his interpretations. This position is less trivial than it seems, engaging the complex phenomenological framework devised by Peirce, composed of three categories: Firstness (the pure possibility of a quality), Secondness (the resistance of the world to the subject), and Thirdness (the generality of experience, shaped by previous interactions)<sup>8</sup>.

In Eco's reading of Peirce, the way in which the world penetrates the subject is a primary iconism (Firstness, Ground), an icon of sensory stimuli below the semiotic threshold (Eco, 1997: 88). There is no mediation: every time we touch a boiling pot, we experience a similar pure sensory quality invading us; a disposition to retract that does not need any interpretation. It just happens, every time in a similar way (Eco, 1997: 93) and in this adequacy of the answer lies iconicity. From a pure possibility, we enter already in the domain of Sec-

<sup>6</sup> Our position – following Peirce's example – is an attempt to make this opposition explode, through a third perspective: iconism as a natural adequacy inside of a practice, a disposition. On these lines cp. also Nöth (in press) and Fabbrichesi (in press).

<sup>7</sup> Habits can be defined as dispositions to act/interpret/perceive in a similar manner in similar situations (Peirce 1931-58, CP 1.148, 1.157, 6.612). We interpret them as a structure of distributed cognition not reducible to single occurrences and based on similarity and not sameness. (for an analysis of the articulation of the concept, cp. Fusaroli, forthcoming).

<sup>8</sup> In a Kantian critical spirit, Peircean categories are conditions of possibility for any single cognition, logical forms that should not be confused for any real cognition, since they are always compresent in different proportions.

ondness<sup>9</sup>: “We find Secondness in occurrence, because an occurrence is something whose existence consists in our knocking up against it. A hard fact is of the same sort; that is to say, it is something which is there, and which I cannot think away, but am forced to acknowledge as an object or second beside myself, the subject or number one, and which forms material for the exercise of my will” (CP. 1. 358). The pure possibility is noticed, passes into awareness as opposed to other possible perceptual qualities: the pot is boiling, not cold, or just lukewarm. The third step of this perceptual process is in formulating a perceptual judgement, in creating a proper percept: “I am feeling warmth, I am feeling pain” (Thirdness in Peirce’s terms). This perceptual judgement is, as everything in Peirce, an inference, based on some sort of premise, in this case previous experience. We could be holding a freezing pot, instead, or being tricked by our imagination. Still the primary iconism cannot be fouled: in that moment we retracted, we were feeling pain. Summing up, the world imposes its qualities and from this “kick” the subject can start perceiving and interpreting. Through the pure possibility of Firstness, the world is experienced as a resistance and a force, and thus cognised into a percept and a perceptual judgement. Icons are figures for this, are the kind of signs in which this primary iconism is embodied, since they signify through similarity and similarity is established as adequacy at least at its most basic level.

This interpretation of Peirce has been widely criticised from a philological perspective (cp. for instance Bonfantini, 2003; Stjernfelt, 2007 and even Eco, 2007). Thus we will set philology aside to follow two other complementary perspectives: i) a critique of Eco’s model of perception in the light of cognitive and phenomenological research on perceptual processes; ii) a more in depth consideration of iconic signs in Peirce, leading to a different conception of iconicity.

The first path individuates a blindspot in Eco’s choice of starting his argument from Firstness, and his definition of the perceptual process as an isolated moment, sterilised from previous expectations and ongoing activities. This is not how perception happens. Recent research on attention and perception (Noë, 2004; Rensink, O’Regan & Clark, 1997; O’Regan, Deubel, Clark & Rensink 2000; O’Regan & Noë, 2001; O’Regan, Rensink & Clark 1999; Simons & Chabris, 1999; Simons, 2000) has shown a high degree of attentional and change blindness. Giving the subject a task (counting how many times a basketball is passed around in a team of basketball players), irrelevant elements tend to go unperceived, even when they are as ludicrous as a person in a gorilla costume dancing through the basketball field. Changing elements in an image while the eye, or better the retinal fovea, is focused elsewhere results in the lack of perception of this change. Leaving aside the discussion of what is exactly consciously or unconsciously perceived and what is not, we can certainly state that the event of perception, the “percussivity” of the world on the subject, emerges only on a ground established by former practices. Even at the most basic level, the activation of neurons in the cortex (including the visual cortex, the cerebral areas correlated to the basic treatment of visual informa-

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<sup>9</sup> It is clear how Eco is here confusing categories with moments of the perceptual process. This shows, for instance, in Firstness being defined as already involving a resistance and two elements, ergo being Secondness (cp Fusaroli 2007).

tion) real-time optical imaging; and electrophysiological techniques show that the same stimulus evokes responses which variability is as large as the response itself, presumably due to the already ongoing cortical activity (Arieli et al., 1996<sup>10</sup>) according to the ongoing cerebral activities. Perception always happens as a process embedded in other processes. Perception is not passive but active both in actual movements of the perceptual systems and in anticipation.

Considering iconic signs, we already said that icons signify through similarity and that similarity, in Eco's interpretation, is adequacy, the fact that there is a constant response, ensuring and attesting the sameness or similarity of the stimulus. This is not the only possible take. When the mature Peirce laboriously attempts to define and redefine icons, he develops a tripartition of this class of signs: images (functioning by one or few similar qualities), diagrams (functioning by similar configurations of relations between parts) and metaphors (functioning through the mediation of a third object). A first important aspect that clearly emerges here is how these phenomenological categories that we have encountered as Firstness, Secondness and Thirdness are rarely pure, they rely on each other. Iconicity appears as a variegated and not immediate concept. In particular, when discussing diagrams Peirce states: "deduction consists in constructing an icon or diagram the relations of whose parts shall present a complete analogy with those of the parts of the object of reasoning, of experimenting upon this image in the imagination, and of observing the result so as to discover unnoticed and hidden relations among the parts." ("On the Algebra of Logic. A Contribution to the Philosophy of Notation" (1885), CP 3.363). Iconicity and similarity are thus not necessarily intuitive, but operational. Iconic is what, upon manipulation and observation, reveals new information about the object. In Peirce's words: "For a great distinguishing property of the icon is that by the direct observation of it other truths concerning its object can be discovered than those which suffice to determine its construction. (...) Given a conventional or other general sign of an object, to deduce any other truth than that which it explicitly signifies, it is necessary, in all cases, to replace that sign by an icon. This capacity of revealing unexpected truth is precisely (...) the iconic character (...)" (CP 2.279).

We have thus two crucial interrelated insights that we can use to develop our analysis of computer icons in the iPhone:

- the importance of the activity in course for defining the relevance of the perceptual stimulus and its iconic properties (of the Thirdness as a ground on which Firstness can emerge)
- the operational value of iconic properties, their being grounded and confirmed through inferential activities and their power to enable the subject to know and/or to do something more.

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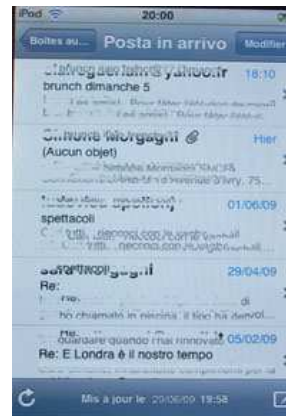
<sup>10</sup> Analogous conclusions can be inferred from Tolia et al. (2005): "Our study revealed that electrical stimulation activates a larger region of the cortex than that expected by the direct excitation of cortical elements. The behavioural effects of microstimulation are therefore likely caused by decoding the activity of a population of neurons significantly larger than the one activated directly..." (ivi. 908). A persuasive discussion of these experiments, and how they might relate to our visual phenomenological experience, is in Madary (2009).

We have been talking up to now of icons in a theoretical semiotic perspective. But what are computer icons? The literature on GUIs simply defines them as “graphic representations” of an object (Benyon & Imaz, 2007: 54). This is both an under- and an over-definition of computer icons. They are graphical images standing for an object, an action or a property. Their standing for is grounded on a wide variety of strategies, two of the main ones being a certain resemblance either to the object (a file as a small piece of paper), or to an element potentially or prototypically involved in an operation (scissors for “cut”). Their resemblance is highly conventional. The ship standing for NeoOffice on Mac, the floppy disk (but sometimes hard drive) standing for “save”, the Adobe triangle on pdf files do not make sense in themselves. Even when apparently more motivated, the selection of relevant properties is highly mediated. Let us just think at the four icons for sending a message that we considered before: an envelope and an arrow are certainly referring to the act of sending, but in very different ways. These icons make it easier to create a story to remember their functionality, and to make us wonder about their functions if unknown, but they do not immediately make sense by similarity.

This is because computer icons are actual signs: complexes blending in different proportions symbolic, indexical and iconic aspects. Do they present a prevalent iconic aspect? And in that case, do they work as images, diagrams, or metaphors? The conception of iconicity that we have just presented requires focusing on the ongoing activities and the habits that structure them. It defines the computer icons not in themselves as abstract signs, but as moments of wider meaning trajectories<sup>11</sup>.

#### IV SOME ELEMENTS FOR AN ECOLOGY OF COGNITION: COMPUTER ICONS AND DIAGRAMMATIC FORMS OF PERCEPTION

In this framework, the differences and similarities of the four computer icons considered should acquire a meaning as effects and contributions to the practices involved. The way a user enact a computer interface is not based on the immediate perception of some natural qualities but on an interaction with the world inherently mediated by previous experiences and established habits. Computer icons, and more generally computer interfaces, make sense through an ongoing coupling between perception, action and the way the interface reacts to and supports them. All the four icons enable us to send a message, but what does it mean to send a message? We selected as relevant for this sketch of analysis and we will develop, in all our four examples, the topological position of the icon in his application, the eventual history of similar icons or similar established practices, the structure of the proposed tasks as well as their affinity relations with other similar tasks.



<sup>11</sup> Cp. also Thereau's *Cours d'action* project (2006 & 2009), combining a Peircean phaneroscopy with an enactivist position, that turns the Peircean triadic *thought-sign* into an hexadic *activity-sign*.





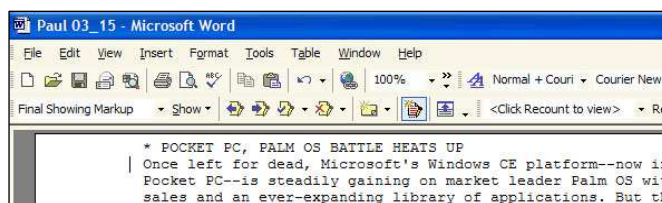
The first icon appears in the context of iPhone Mail and SMS applications. There is a history of mail applications to be considered;

for example the option bar of the classical Apple mail application contains the same icon to compose mails, thus grounding it on a very well established convention. In the iPhone the actions selected as relevant are “writing”, “change directory”, “delete”, and “forward”. As far as the usage of this same icon in the short text messages application is concerned, it is easy to think to an extension of the first usage following the recent success of social networks like Facebook or Twitter, which hybridized mails and SMS practices. Here this icon seems to recall and reinforce this extension of an established series of habits on a partially different kind of content. The action of sending an email or a SMS is usually composed into forwarding, writing, and then sending.

The second icon appears in the context of the Notes application. The main task that is being performed is the act of taking a note. A few buttons side this activity: looking your notes, delete a note, send the note via email. As before, there is a precedent: Word processors in the late nineties started integrating the possibility to send the document as an email. The role of the sending action is very different from what we have seen in the previous scenario. In the previous one it was (one of) the main action(s) to execute the task, now it is just one of the possible conclusions. The icon does not act as the standard opening for the action but just as a reminder for a possibility that usually arrives in a second time after composing a content.



A third scenario (in which we can fit both the third and the fourth icon) introduces additional nuances. The task enacted is “sharing something with somebody”. This is a relatively new task spreading more and more due to mobile interfaces and social networks. There is no antecedent for this (but cp. the small icons to share news on different social networks, recently appeared on many blogs). Every content on the iPhone can be shared, but since no established set of expectations is yet at place, it seems that different kinds of icons



(most of them recalling existing icons) are being used for different kinds of content, but in a way that mutually recall and reinforce the

others<sup>12</sup>. The third icon appears in the options bar on the left bottom of the screen when an image is showed in the Photos application. The interesting thing is that here the icon is conceived as a mirror image (the arrow has an inverted orientation and is used on the ground of a stylised photo) of the classical “forward” icon used in the Mail application which was our first scenario. The user can rapidly establish a connection between these two sets of actions to support a new similar action: sharing an existing content, as a complementary action in relation to different kinds of principal task. In the same way the fourth icon allows the user to share a YouTube video<sup>13</sup> or to send an URL by email after seeing it.

In conclusion it is possible to describe three different and complementary activities, each implying a different usage of graphical elements, relying of different established habits in the more complex Apple emotional design<sup>14</sup>. This analysis enables us to see a peculiarity of the iPhone interface where each of these activities is reinforced by the development of a different interactional rhythm<sup>15</sup> between manipulated contents, the interface and the user. Manipulating a tactile interface implies in fact an important modification of the classical interaction between the user and his interface trough the reintroduction of a gestural



value created by the fusion of a key's selection and activation in an apparently unique and direct action. The iPhone multi-touch interface in particular allows its users to articulate their practices around a minimal triadic articulation composed by a *Movement – Touch – Modification* schema. In the cases we considered this minimal articulation is reinterpreted in the different applications following the different task organisation, the actions the user will do to accomplish them in the topological organisation of the screen elements. As a result we obtain, in the limited number of the stereotyped actions iPhone permits, the stabilisation of some different rhythmic intervals for the diverse manipulations of icons, contents and appli-

<sup>12</sup> It possible to predict that in time, a unified sharing icon will emerge, or better a set of sharing icons more focused on the way of sharing than on the kinds of contents.

<sup>13</sup> It is interesting to notice that a slightly different version of the classical “envelope” icon is also used for sharing content. This happens only on the option bar appearing when playing a video. As the others examples of practices’ extension we can see here how this third scenario is not still established for users as a completely coherent set of expectations and actions.

<sup>14</sup> On how Apple’s interfaces recreate an emotional feeling with the users cp Morgagni (in press).

<sup>15</sup> We will use here the notion of “Interactional Rhythm” as the result of a global coordination of gestures, movements and content’s modifications on the interactional space composed by the user and the interface both intended as actives elements of that process.

cations. So we have, on the user's ongoing activity, a progressive sensorimotor stabilisation between valuable gestures and content modifications permitting to rely more closely the praxeologic dimension of the interaction we described with the topologic and chromatic one.

While computer icons seemed to display an intuitive similarity to an object, this brief analysis already shows the complexity through which this similarity is constituted. The way they are perceived as iconic and intuitive is at every level deeply pervaded by cognition and practices, and works on the ground of a coherent set of local relations, thus participating to a wider iconic diagram. This point of view is obviously not new. Defining icons as local figures of a global interactional field of action bears striking parallelisms to the conception of the form in certain strains of the Gestalt theory (Koffka, 1935; Köhler, 1929 & 1969; for an historical approach, Ash, 1998 and Smith 1988; and for a contemporary reprisal and development Rosenthal & Visetti, 1999 & 2003). Contrarily to what is commonly believed, the form is – at least in the Leipzig school and in the more recent microgenetic approach inspired to it (Rosenthal, 2004 & 2005) – constituted in time through the co-occurrence of practical and cultural determinations that will emerge in action following a multiplicity of not entirely determined patterns. If this Gestaltic approach is focused on time, we can integrate it with the conception of iconism as the operational and tentative establishment of additional possibility of understanding and interacting. Thus, microgenesis meets Peirce, in the form of a diagrammatic reasoning, the constitution and manipulation of relation configurations through various interacting habits belonging to different levels, in order to know more about or to be able to operate better on their objects. We have seen in our analyses some of the habits from different levels of analysis, interacting in the constitution of the form. How does this translate in the actual process of perception? We can give here only a sketch of how this could happen.

An initial exploration of the interface environment seems to be performed through the elaboration of low spatial frequencies in order to extract semantic contextual information (Bar, 2004; Queen, 2006), early enough to affect our perception of individual objects in it. Certain saliencies<sup>16</sup> emerge as pregnant for the ongoing tasks, thus providing sets of expectations that can guide perception and action and influence our exploration of a scene using eye movement and attention in a deeply integrated way with memory and semantic structures. A network of relevant relations and elements defined in them is established (a diagram), as a minimal guide for sensorimotor action on the interface, in a wider horizon of actions and expectations. In this horizon of action every form will continually be reread at the light of the isotopic patterns selected by users in the course of their actions emerging as a result of the regularities and the constraints constituting the relation between the interface and his user. In this framework, computer icons act as reminder and prompt of possibilities to act; possibilities which meaning is defined by the particular perspective on the action/object that they embody, through their position, graphic

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<sup>16</sup> Following the experience and the action accomplished by the user it can be the icon's colour, his position on the screen as well as his textual description.

appearance, grouping<sup>17</sup>. Here lies their non-banal diagrammatic iconism. These possibilities are tentative and constituted through the interaction of different levels. In the course of specific tasks these possibilities are enacted and different expectations can be brought to the foreground and verified. The diagram is thus manipulated, and continually modified at the same time from local to global and inversely (like the semantic forms in Rastier, 2001).

## V CONCLUSIONS

In this exploratory article we have shown how even considering minimal elements of an interface - four similar icons – it becomes necessary to analyse their interaction with a wider texture of habits thus defining the configuration (diagram) of relations in which they acquire meaning. We have thus sketched a categorical framework based on Peirce's notions of iconism, diagrams and the idea of a microgenetic constitution of the form from Gestalt theory. Icons act as reminder/prompt of possibilities of actions that are perceivable only through a texture of habits, supported by local elements. Through these elements a network of relations is established, in order to further interpret, perceive and act. This happens in time through the interaction and co-constitution of a plurality of dimensions (we considered mainly the praxeologic one in its repercussion on eidetic dimensions, but the emotive, topological and chromatic dimensions - for instance – should be further explored). This constitution in time is tentative and operational, trying things out, widely predicting and anticipating. Through this framework the local constitution of meaningful forms, like computer icons can take into account the different practices and the different devices they appear on, in their sameness as well as in their variations<sup>18</sup>.

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<sup>17</sup> This kind of semiotic approach to cognition make also possible interpreting these manifestations of a readiness for action in terms of affordances, intended as possible actions, as shown in Morgagni (forthcoming).

<sup>18</sup> In this lies the difference between certain reductive drifts of schematism and our approach, in the constitutive importance of variation, in the attempt of describing the logic of variation as constitutive to the schema, or diagram.

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