Research of Communication Design: a synesthetic approach
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Abstract
The paper deals with the theme of the research of communication design starting from the assumption that any communicative artefact, both based on only one sensorial register and multimedia, solicits, refers to and interacts with a whole of information – acquired (inside the individual) or concomitant (physically present in the external environment) – by which its intrinsic nature is modified. Therefore we believe in the necessity of methods of research in which acquired, and acquirable, learning should converge with the theory, practice and praxis of the design itself. Under this perspective, some approaches to problem solving used in basic design – though mainly referred only to the visual register – are seen as concrete operative methods of research for the design of multisensorial/multimedia artefacts.

Keywords
Basic design, Communication, Multimedia, Sensorial interaction, Synesthesia, Visual design.

0. Introduction
In this paper we are going to deal with the theme of the research aiming at communication design – mainly multimedia, but not only – with a reflection upon the perceptive manners and features of the user in the moment of fruition. The attention will therefore be focused not so much on the object, that is the multimedia medium in its physical essence of an instrument which conveys and integrates heterogeneous information – written texts, sounds and animations – as instead on the subject, the individual as a being who perceives such information in a unitary way.
Multimedia products are usually referred to as hypertexts, due to the possibility offered by data processing items to sail,1 that is to move in a text according to a reading order which is not pre-established and which goes beyond the rules of a linear reading, towards textual models in which the various parts are connected with each other by cross-references – links – whose structure follows reticular ways.
We usually recognise multimedia products also the quality of interactivity, that is the capacity of exchanging information with the user. Through some input devices – such as the keyboard and the mouse – we can give commands to the computer, while through others – such as the screen and the speakers – we can get a feedback to our actions. A multimedia product is however – though this aspect is usually neglected – also a medium which triggers the perceptive globality, that is the multisensory peculiarity present in man.
Our paper will start therefore from the assumption that the fruition of multimedia products inevitably implies the activation of synesthetic phenomena and sensorial interaction,2 that is the birth of co-

1 Not only a digital support, however, allows a hypertextual fruition. For example even the cross-references from a definition to another in paper encyclopaedias must be seen as hypertextual links, though only manual.
2 We want however to point out that processes of sensorial interaction and synesthetic ones are triggered – as well as by multimedia artefacts – both by monomedia artefacts and by artefacts with no specific communicative aim, since the real knowledge of the objects is provided by the integration of the whole sensorial media. See: Riccardo Luccio, “I cinque sensi nella formazione della conoscenza”, Raffaele Simone (editor), Alfabeti del sapere, Firenze: La Nuova Italia, 1999, 48. Also see: Dina Riccò, Sinestesie per il design. Le interazioni sensoriali nell’epoca dei multimedia, Milano: Etas, 1999.
operation among the senses, that may sometimes help the communicative process, but may some other
time instead hinder it.

1. **Intersensorial perception and multimedia communication**

It is still commonly believed that a stimulus, such as a sound, involves hearing and only that sense, in
the same way as a visual stimulus involves only sight and so on. Instead, even when we deal with
*monomedia communications*, which employ one communicative register, what is triggered is not only
the sensorial system which has been directly stimulated, but also other senses that, though not directly
stimulated, start some processes of information completion.

This process is particularly evident in people with sensorial handicaps. Let us think of post-linguistic
deafness, that is of people who, while talking to those who can hear, are spontaneously led to integrate
the expression of the speaker’s lips with the perception – actually absent – of the corresponding
phonemes.\(^3\) It is evident that every sensation, even when it is perceived by a specific sensorial organ,
undergoes a synchronic elaboration and transformation from all the senses.

Everybody knows that our brain is made up of areas which are deputed to the processing of specific
sensations: there are the visual areas, the auditive areas, the somesthetic areas and so on. We must
however keep in mind that these areas work closely related with each other. The neurones in our brain
are distinct, self-governed entities, but at the same time they are linked by a huge number – even
billions – of synapses.

In any perception indeed, apart from the sensorial origin of the stimulus, there is the intervention of
those mechanisms – connected with the mind’s background and imaginative capabilities – which are
responsible for these interplay of reciprocity among sensations of different registers. This already
happens in monomedia communications.

In front of *multimedia messages*, then, the perceptive process obviously becomes by far more
complex. The simultaneous proceeding of several registers may in fact stimulate phenomena – which
we generically call of sensorial interaction – in which the action of a sense also modifies the
perception of the other sensorial systems that have been at the same time triggered by it.

It may happen, for instance, that the perception of a specific visual animation is transformed – slowed
down, accelerated or with several temporal changes – by a concomitant and parallel sound production.

What results is therefore an interference between the visual and the auditive sensations.

In case of multimedia communications such conditions take place for example when there are
languages with contrasting static-dynamic features, as for instance when a sound sequence is
superimposed on a static image, that is on a figure without a parallel visual movement. In these cases
we are led to perceive a contradiction between the sound dynamism and the immobility of the visual
image, and therefore between sound time and visual time.

Besides a state of perceptive uneasiness, also actual perceptive distortions may result.

Let us suppose to compare two different representations: in the first one a short piece of music is put
together with a static image, while in the second representation the same music is accompanied by an
image in motion. We can easily notice that in the first case the sound sequence is perceived as much
longer than in the second one. Likewise when a visual animation is presented with no audio (besides
conveying a sensation of incompleteness, also due to the audiovisual perceptive habits induced by TV
programmes) our perception of time is dilated if compared with the same animation accompanied by
audio.\(^4\)

\(^3\) See: Flavia Ravazzoli, “L’orecchio parla nell’orecchio?”, Alfred A. Tomatis, L’orecchio e il linguaggio, Ibis, Como-Pavia,

\(^4\) Experiments on the interferences between audio and video have been carried out also in our Laboratorio di comunicazione
visiva (Workshop of visual Communication), 1999/2000, in the course for the Degree in Industrial Design at Politecnico di
Milano. In particular one of the tasks assigned (Visual Translation of Sound Events) to the students required – after designing
a visual animation on a given audio fragment, according to specific rules and goals – the verification of the perceptive
changes parallel to the variation of the relative audio/video speed.
Particularly meaningful and exemplifying are then some people’s reactions after some full-immersions in virtual reality.

The so-called simulator syndrome, for example, gives symptoms such as nausea, giddiness, etc. and takes place exactly when a virtual environment presents sensorial information contrasting with each other. Let us suppose the case of a simulation in which the subject is given precise visual and auditive information suggesting him to be in motion, without being given at the same time the corresponding proprioceptive (pertaining to musculature) and vestibular (pertaining to the sense of equilibrium) stimuli which are however usually present in a real situation of motion. A display error then arises, that is a contrast in the information coming from different senses; this is a proof of the close interrelation among the senses and, consequently, of the necessity of a design which bears in mind the unity of the senses.

It is already evident from these few examples that in multimedia design the mix of different languages and their sensorial registers in one message cannot simply be considered as a sum of single items – texts, images, sounds – but must be seen as a unity, coinciding with what Abraham Moles had called esthetical and perceptive synthesis, since the perception of each single element inevitably interacts with all the concomitant parts.

2. The synesthetic attitude of multimedial languages

It is therefore evident that the specific potentialities that multimedia have of conveying heterogeneous information – which differ from each other both in their syntactical organisation, due to the use of multiple languages, and in the sensorial channels referred to – besides offering a wide range of applications and expressions, make at the same time the processing of communication more complex. In multimedia, in films, in TV and generally in all audiovisual media – since all of them look for a congruity between parallel-proceeding visual and auditive events – a particular perceptive attitude starts, which Michel Chion calls audio-vision. What takes place in audio-vision is not simply the sum of visual and auditive sensations, but a perception in which all the information coming from both channels influence and transform each

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8 This statement is well expressed by M. Della Casa: «Indeed we cannot consider these “multiple messages” as similar to simple musical, or literary, or visual messages. Neither is it possible to come to view them as a mechanical sum of autonomous and self-sufficient parts. There is instead a reciprocal interpenetration, which deeply changes their original functions, thus establishing a new network of meanings and values arising from their reciprocal contact, or rather from their fusion, synthesis» (Maurizio Della Casa, La comunicazione musicale e l’educazione, Brescia: La Scuola, 1974, 238). Della Casa then points out that also in multiple messages, as in simple ones, there are denotative and connotative elements; mostly the latter, however, have the task of interrelating the different languages thus constituting a sort of connective web among them.

9 This expression was used by A. Moles, according to whom multiple languages are «many channels, or many ways of using them for communication, [which] are simultaneously employed in an esthetical or perceptive synthesis, in which there is no interference but agreement among the logical meanings harmoniously carried in their own ways» (A. Moles, op. cit., 257). The use which is here made of the expression multiple languages is however in a simplified and more generical meaning than the previous one, as it includes all combinations of languages, independently of the finally resulting effect, either concordant or interferent.

10 In particular there are some musical cd-rom whose main purpose is the research of an extreme correlation between visual and auditive phenomena. Let us quote two examples: Making Music (Voyager, 1995), a cd-rom which invites to draw in order to make music, after a series of correspondences which the author – Morton Subtonick – has defined between sound features (pitch, intensity, duration and timbres) and features of the drawing signs (respectively: high/low position, thickness, length and colours); and Les Musicographies, designed by Dominique Besson (INA, 1995), a cd-rom which is based on the interactive graphic transcription of ten musical pieces. There are some demonstrations of the latter cd-rom at the web site of the Institut National de l’Audiovisuel (www.ina.fr).

other: we do not see the same thing while we simultaneously hear it and, vice versa, we do not hear the same thing when we can simultaneously watch it.  
When an isolated sensorial datum is inserted as an integral part of an audiovisual medium, the latter immediately acquires new perceptive features.
Chion finds an explanation to this process of interaction among sensorial data in the fact that the same sensation may be perceived simultaneously by several sensorial systems. Only few sensations pertain specifically to one system: we may for instance consider the sensation of colour as specifically visual; the sensation of pitch as specifically auditive; other sensations however, such as for example the ones determined by the perception of rhythm, of texture or of matter can derive from several sensorial systems.
In other words, according to the sensorial information to be perceived, there is the activation – again quoting from Chion – of trans-sensorial perceptive models (in which the same sensation is perceived by different senses, though not necessarily in the same instant); or inter-sensorial models (when the same sensation is perceived in the same instant by many sensorial organs).

The suggestion given by Chion for the analysis of the sensorial interactions produced by audiovisual media is to put oneself always the following question: how much is visible on the screen of what we hear and, vice versa, how much can we hear of what we can see? It is exactly through this kind of questions that we can detect in the image the false sounds, that is the sounds which are conjured up by the image, but which cannot be heard; and the sounds in the negative images, that are the images only created by the suggestion created by the sounds.

Chion’s inter-sensorial model corresponds to those phenomena which are more specifically called synesthetic. If the etymological meaning of synesthesia is the generical one of simultaneous perception (from the Greek syn = with, together and aisthánesthai = to perceive), its basic meaning underlines however a precise perceptive phenomenon which, though multisensorial (even if it is partly physical and partly psychic) does not necessarily need a multimedial contribution. We are referring to the perceptive phenomena which are triggered, for example, by auditive/visual synesthesias, in which a sound stimulus is sufficient to induce the perception of coloured images. They are those phenomena, known at the beginning of 1900 under the name of audition colorée, which deeply influenced the work of such poets as Baudelaire and Rimbaud, of painters as Klee and Kandinsky, of musicians as Scriabin and Schönberg, and that nowadays involve also designs in multimedia.
This means that even in multimedial products each of the sensorial registers – besides interacting with the other concomitant registers – at the same time acts as a potential activator of synesthetic stimuli.

3. The objectives of synesthetic design

These reflections lead us to consider the design of multimedial communication as a synesthetic design, which has the main aim of the research for coherent sensorial information.
Every communication design must indeed face the multisensorial nature of human beings in which – as Merleau-Ponty argued – synesthetic perception is the rule.

Which are, however, the advantages, the added value, that such an approach grants to design? There are several reasons, roughly synthesised in the four points which follow.

12 See: M. Chion, op. cit.
13 See: M. Chion, op. cit., 116-117.
14 See: M. Chion, op. cit., 163.
16 Two examples of synesthetic multimedial products are described in note 10.
17 “the vision of sounds or the hearing of colours exist as phenomena. Neither are they exceptional ones. Synesthetic perception is the rule and, if we do not realise it, this happens because scientific knowledge neglects experience, because we have unlearnt to see, to hear and, generally, to feel, in order to deduce from our bodily organisation and from the world seen from a physical perspective all that we must see, hear and feel”. Maurice Merleau-Ponty, Phénoménologie de la perception, Paris: Gallimard, 1945 (It. tr.: Fenomenologia della percezione, Milano: Il Saggiatore, 1965, 308)
18 M. Chion defines as added value of an audiovisual medium the expressive and informative value occurring only after the synchronism sound/image and added to the one provided by the same audio and video registers separately taken. See: M. Chion, op. cit., 8 and ff.
A. Incoherent sensorial data slow down the processes of working out information
Every time we deal with sensorial data containing a conflict of information, the time of data processing undergoes a dilation. That is the sensorial conflict inside the registers slows down the process of communication. This phenomenon was first analysed by Stroop (Stroop test, 1935) through a test to detect the reading times of words printed with types of different colours: when the word represents the name of a colour which is different from the printed one (for example the noun “red” written in green), the sensation related to the colour negatively interferes with the meaning of the word, thus slowing down the reading process.

B. In the case of contrasting sensorial data, the correct data are not always the most credible ones.
The data pertaining to some registers, such as the visual one, are endowed with an index of credibility, and therefore with a communicative potential, which is superior to others. This happens apart from the exactness of the information conveyed. It may therefore happen that in the presence of, let us say, tactile and visual information in contrast with the quality of some object – for instance the size – we are disposed to believe in the visual information, though it does not correspond to reality. There are indeed some hierarchies among the several sensorial registers according to which one may prevail over the other only with reference to the choice of the channel and not of the content conveyed.

C. The concentration of information on just one sensorial medium easily provokes mistakes
In the presence of a high number of information to be conveyed (such as for example a pilot’s console) there is the need of a balanced distribution of information among the various registers. The concentration of all information on just one sensorial medium causes indeed the user to make a selection, in which very important information may be excluded. If therefore the fulfilment of some operation requires for example a visual implication, the signalling of possible faults or wrong actions still based on this register may be unnoticed.

D. Coherent sensorial data of different registers produce more communicative effectiveness than the same data taken one by one
The combination of coherent sensorial data which make use of different sensorial registers helps the communicative process. To be more precise, the availability of communications which avail themselves of more sensorial registers makes the message acquire a double potentiality:
- it simplifies the process of comprehension of the information conveyed, since the possibilities of giving wrong interpretations are reduced and at the same time there is an improvement of both the linguistic and the graphical feedback of what has been learnt;
- it reinforces the processes of memorisation, partly remedying to forgetfulness, since possible “gaps” of memory in one register are counterbalanced by remembering in another way.

The main objectives of a design of synesthetic communication are therefore the following:
1. the search for coherent sensorial information,
2. the reduction of the sensorial overload to only one modality,
3. the careful choice of the sensorial registers according to the communicative aims,
4. the balance of the informative “loads”, that is the orchestration of the sensorial registers.

23 Let us think, for instance, of a pianist who, during an execution by heart, puts in action a triple skill of memorisation: auditive (the flow of music), visual (the score), motory (gestures). If one fails, the others enter into action. This happens in a similar way also in the field of language in its triple function of spoken, read, written.
4. Synesthetic design and activities of research

If it is quite easy to define the goals to pursue in synesthetic design, it is by far more difficult to outline the most suitable ways and methods to reach these goals. The subjects with a higher scientific tradition, both the ones dealing with the artefacts, the objects as physical entities (physics, engineering, etc.), and the ones which study the human being (psychology, sociology, etc.) make use of kinds of research, methods and procedures which are mostly defined and most of all well-established. The same may be said for historical, or experimental, or sociological research, and so on.

Design, and therefore also design research, must work according to both directions or teleologies (man and artefact), and aims in this way at creating new ways and approaches of research which may detect no longer only physical, but also perceptive/cognitive congruencies. A full integration between the two levels should be found out. This presupposes a change of the scientific model, in which the pursuit of objectivity is replaced by the pursuit of values related to intersubjectivity, according to perspectives arising from phenomenological philosophy.

And in another sense the possible directions, besides the traditional ones leading from the formulation of a theory (be it endodisciplinary, or exodisciplinary, or interdisciplinary) to its application in a practice, take into account also reverse ways, which start from the practice to draw the theory out of it, or even from a series of practices to reach the definition of a design praxis.

We think that in the latter perspectives the didactic experiences in basic design, though mostly, but not exclusively, concerned with the visual register – Moholy Nagy’s basic –, may suggest concrete operational ways of research in some approaches to problem solving – such as in Joseph Albers’ work, which is explained in the following lines.

5. The example of Basic Design between activity of research and didactics

Basic Design was born in the Bauhaus – and exactly in that part of didactics represented by the Grundkurs (the basic course) of the first year – when some authors, who had become teachers, had to face the task of building up, in a radically new way, a new kind of operator. They had to build up the designer of those artificial objects which should fulfil functions of communication, as well as of usage, but which most of all must be considered as an inseparable whole of esthetical and practical aspects: ceiling lamps and posters, chairs and textiles, etc. These new teachers were compelled to develop new pedagogical strategies and suitable didactic methods. The pedagogical model broke away more and more radically from the one of the old Académie de Beaux Arts’ atelier: a faint imitation of the ancient workshop, since it was deprived of the concrete formative aspect of apprenticeship. The advancing model was instead exactly the one which was going towards the foundation of a science of art (Hegel). These teachers, who were at the same time the creators of an auroral form of the subject of Basic Design, were great personalities such as Paul Klee, whose Form und Gestaltungslehre is an example of that transition from personal poetics to a disciplinary system. Or Kandinsky. The same may be said for his Punkt und Linie zu Fläche, but most of all for his Clipboard. Later the young Itten’s basic design, which had conceptual bases of a vitalistic, and then clearly antroposophic, stamp, as emerged later and completely in Berlin Ittenschule, had even therapeutic or cathartic (the young Freud would say) characters, and mostly in the practice of sign agility: the free-hands scrolls which involved dance-wise the posture of the wrist, of the arm, of the shoulder and of the whole upright body. Also Itten’s basic had its disciplinary outlets, that is it led to an objectifying documentation which collects a series of established and protoscientific observations: the essay about the Farbenlehre.

In the approach to Moholy-Nagy’s preparatory course, however, there is no tension between faculty and knowledge, as the choice is decisively creational. Or, rather, here the knowledge, the science to cope with is the materialised knowledge of technology.

The approach is sensorial, or rather multi-sensorial and kinaesthetic, and the protagonist is the body with its receptive, elaborative and executive skills, to be led to such a level of harmony as to be able to absorb all the artifice of the industrial and technological world. It is not by chance that kinetic machines play a role in Moholy-Nagy’s research.

Albers’ basic design represents an extraordinary and very particular version of the integration between the two conceptual poles: students’ training and disciplinary foundation. However Albers adds a third one, that is the establishment of a new practice of research. This emerges in all its necessary clarity particularly in the great work carried out after the Bauhaus, at Yale, in his full maturity, which culminates in the publication of the experimental text-proof *Interaction of colors*. Albers’ point is that the discipline which emerges from research must conform to the sensorial and perceptive areas rather than simulate institutional scientificity. The scientificity of the essay consists rather in its conformity. The validity of the results is based indeed on a method of interpersonal acquisition, and the generalisation counts only if perceptively re-checkable.

At Yale, but also previously at the Bauhaus and Ulm, Albers’ attitude placed the specific research (basic design) on a very balanced equidistant position between science (chromatological physics) and expressive creativity.

This method of design research, which Albers applies to works of an essentially visual nature, keeps its validity unchanged even in the presence of multi-sensorial data, so that in the Bauhaus itself the modality of an embryonic discipline – precisely basic – is found together with aspects of kinaesthetic and sensorial training.

The successive re-elaboration of the curriculum began from the Grundkurs, where Maldonado started to introduce a series of elements taken from neighbouring scientific subjects: topology, symmetry, gestalt psychology and so on. Which means that the work of giving shape should be tackled with logical, scientific and most of all strict conceptual instruments; moreover it means taking design inside and to the level of the connective tissue of science.

Finally, basic design can also take on the evolutive role of the workshop, seminarial for theoretical research: the field of visual/verbal Rhetoric is explored in a basic course held by Gui Bonsiepe at the department of Visual Communication. What emerges here is therefore the idea of a basic design, so to speak, refined, almost set free from the burden of the neighbouring scientific disciplines, which can be viewed as the specific of design.

Starting from Maldonado’s revision of basic design, we had already noticed the formulation given to the practice of basic design, seen as simplified cases of problem solving (limited to a single aspect, for instance the formal one). The written topic, made up of objectives, elements and rules, as well as executive obligations, may somehow be regarded as a simulation (though a less complex one) of a real design brief. And in a certain sense it is this pursuit of the real planning process, this need to stick closely to the modality of praxis, all this contributes to prepare the overturning of formulation which characterises this field in the 1968s.

Pure, systematic and specific research into visual communications (that is what basic design aims at) develops as a diverging branch of the project route. In a movement from the particular to the general, retracing, even with originality, the way in which such skills have been built up. Recasting learning, as it used to be called, in opposition to notional and grammatical learning. Even here and now, in Italy, there are many basics, or rather even in Italy the process of specialisation and adjustment of basic design in progress.

The outline is very multifarious and it seems to explore all the shades of the field between propaedeutics and practice, training and knowledge, research and problem solving.

Paragraphs 0.-3. have been written by Dina Riccò, paragraphs 4.-5. by Giovanni Anceschi.
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Biographical notes

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