Por uma taxonomia do desenho baseada em princípios de Media Ecology
Towards a Taxonomy for Drawing Based on the Media Ecology Principles

Nora Aguilar, Luiz Antonio Coelho

Desenho, design, *Media Ecology*, taxonomia, competências.

Este texto apresenta uma proposta de taxonomia para o desenvolvimento de competências em desenho baseado em três elementos de *Media Ecology*: tecnologia, sistema simbólico e condições de acesso e uso. Esta **abordagem contribui com o campo de duas maneiras**: na condição mais ampla do uso da linguagem visual relativa à técnica de desenho e na identificação de competências para o desenvolvimento da pesquisa em Design.

Drawing, design, *media ecology*, taxonomy, skills

Based on the *Media Ecology* outline, this text proposes a taxonomical basis for drawing anchored in three elements: technology, symbol system and conditions of attendance. This approach contributes in two different levels: firstly, through a wide comprehension of the use of visual language in drawing and secondly, by identifying competences in the designer's profile for investigation.

1 Introduction on *Media Ecology*

Our theoretical framework here stems from Media Ecology (or ME), an interdisciplinary field of the Social Communications whose concern is the impact of mass media on human beings based on the assumption that technology, techniques and the manner information is organized play an important role in our way of thinking, acting and organizing social groups. Thus, ME is in charge of the effects provoked by media in behavior, cognition and the nature of a social group, according to the existing technological grid in this group.

Media Ecology focuses on the context in which mass media occur, and may be connected with Henry Jenkins' idea of technological convergence (Jenkins, 2012 & 2006), as well as Bauman's way of describing our liquid modernity where one cannot tell where a technology ends and another begins. (Bauman, 2000).

First of all, the focus on social context leads us to the idea of ecology associated with technology. To Media Ecology, **any object** is potentially a means of communication, mainly because it may represent a complex technological combine that affects social environments.

When ME studies the influence of technology, it does not consider it in a separate way from the symbolic system used by this technology that is to say, the language used by such technology as a well-structured coding similar to traditional communication systems (or any

contemporary language), or, furthermore, used by nontraditional communication systems, still in development, as in the case of visual languages (like drawing), sound languages (like music), or even human pragmatics like sign language.

Therefore, we can assume that a specific example of drawing—and the existing technology behind it—creates meanings in accordance to what is established by the social group. But to really understand these meanings the researcher has to become a part of the community and get to know its uses (the way people address and interact with the object), observing, furthermore, its customs, symbolic values and ideology.

The same object represents a set of meanings to a social group differently from what it represents to another group. Meanings depend on how the object is attended and used. Let's refer to three media ecological elements considered in this text—**technology, symbolic systems** (languages) and the **conditions of attendance**—that work in any communication system, and are, in fact, interdependent. Any change in one of the elements provokes an impact on the system itself, giving off new definitions and meanings. Technology, symbol system and practical uses intermingle in the same communication organism as a specific set, requiring a careful study in order to define what a specific technology does to a group, and how definitions change according to the juncture.

 The term Media Ecology was created by Neil Postman by the end of the 60's of the twentieth century at New York University. (Gencarelli, 2006) Postman drew his idea on the theoretical studies on media developed by Marshall McLuhan through books and courses given in different countries, especially at the University of Toronto since the creation of the *Centre for Culture and Technology* in 1963.

McLuhan's, himself, based his famous theory of mass media on the theoretical studies developed by his professor, Harold Innis, on how technology of writing has affected and influenced ancient civilizations. (Innis, 1964).But the creator of the first Media Ecology university program was Neil Postman and his colleagues Christine Nystrom and Terence Moran at New York University in 1971. According to Postman,

> Media Ecology looks into the matter of how media of communication affects human perception, understanding, feeling, and value, as well as how our interaction with media facilitates or impedes our chances of survival. The word ecology implies the study of environments: their structure, content, and impact on people. (Postman, 2015)

To Postman, furthermore, Media Ecology

> […] is concerned with understanding how technologies and techniques of communication control the form, quantity, speed, distribution, and direction of information; and how, in turn, such informational configurations or biases affect people's perceptions, values, and attitudes." (Postman, 1989)

It can be said that ME has become an epistemology and an independent field of study, and has been adopted by a considerable group of researchers worldwide acting mainly through the *Media Ecology Association* (*MEA*), which maintains a *Chat Group* for associates and journals such as *Explorations in Media Ecology* {*EME*}; *In Medias Res*; and *Proceedings of the Media Ecology Association*. This organization also promotes annual scientific gatherings in various cities of the U.S.A., Canada and Mexico. (<http://www.media-ecology.org/media_ecology/>, 15/02/2015)

The relationship between technology and *ecology* was explained by Postman with the analogy of experiments carried out by biologists to identify the nature of bacteria that appear and thrives when in contact with some nutrient, such as the agar-agar. They develop a specific culture according to the nutrients encountered. It is the same as any seed that gets in touch with a fertile soil. These notions of ecology were, then, used by Postman to explain the concept of

social ecology, which is not totally absurd, having in mind that humans are integral and essential elements of biological and environmental ecology.

2 Towards a Taxonomy for Drawing

The text that follows draws on three elements of the Media Ecology theory adapted to the area of Design. It examines the technology involved in the object creation, the symbolic codes that make this object happen, and how we use it and with what purposes. In this specific work, we examine drawing as an object for a Design group, and the main focus here is on the way technology leads to specific communication systems. This is carried out through the study of the visual language behind drawings, and the use given to them by students of a Design Program in order to establish their organization and meanings.

Technology

Media Ecology is concerned with the meanings behind an object. It examines the technology involved in the object creation, the symbolic codes that make it happen and how we use it and with what purposes. In this specific work we examine drawing as an object for a Design community, and the main focus here is on the way technology leads to specific communication systems. This is carried out through the study of the visual language behind drawings and the use given to them by students of a Design Program in order to establish their organization and meanings.

Arnold J. Bauer (Bauer, 2002) looks into objects and their meanings when he mentions that "[…] the value we attribute to an object may be largely determined by what it means to us - by the degree to which it 'resonates with associations and meanings in our own minds.'" For this reason, we will look over usage associations in the present text. On the other, hand Bauer considers that objects are goods that establish a relationship with modernity, and we add up to this assertion that the knowledge of applied technologies is the same as to know how to use them properly.

Drawing carried out with tracing tools

Technology use on drawing is related to the use of tools that trace. These tools make possible outlining, spotting, erasing, scaling etc. The following are some examples of drawings made with different tools and placed in their historic context. Tracing tools can generate lines like a pencil, or like a brush that can make spots. We can also use more complex tools like a compass or measurement rules for this. Or we can trace using square, protractor, plumb and so on. Currently we can find these tools in digital drawing software, even for mobile phones.

Drawing tools that creates lines:

One of the first manuscripts that speak of drawing in Europe is *The Book of Art* by Cennino d'Andrea Cennini, at the end of the 14th century in Italy. Cennini writes a great deal about knowledge in the medieval times. Among his contributions there is the making of drawing tools, like willow charcoals, marten brushes, boards and feather cutting. The drawing of outlines and the use of instruments with a tip that result in line drawings are, actually, an interpretation of what a child develops by drawing with pencils at an early age. When we observe something we don't just see, but interpret. In *Practice and Science of Drawing*, Harold Speed demonstrates his point of view with the following illustrations:

A.- Typical example of the first drawings by a child, which reveals that no visual data has been consulted

B.- Typical example of what should be expected if there is a search of a genuine interpretation of the visual image.

Figure 1: A drawing that shows the difference of how we draw and how we see. (Speed, H. *Practice and Science of Drawing.* Buenos Aires: Albatros, 1941. P. 45)
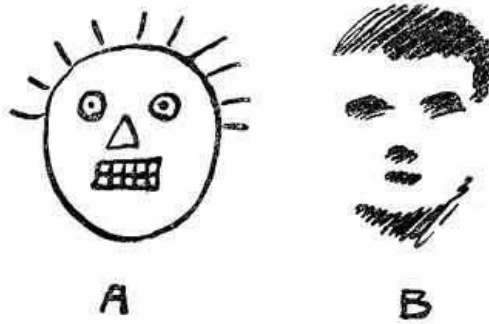
An example of drawing made with tools that generate spots:

This is the method of Kimon Nicolaides, who takes up the idea that drawing and observing correctly are something related. In *The natural way to draw*, this author mentions: "Learning to draw is really a matter of learning to see –to see correctly– and that means a good deal more than merely looking with the eye." (Nicolaides, 1941)

Drawing made with technology related to vision:

Technology as an instrument encompasses familiarity with technological advances and requires manual skills. Beyond just having access to proper tools, one needs full knowledge of the instrument. The full mastery of tools brings financial benefits and social recognition. Some examples for reaching such a technical level are *Alberti's Window*, the perspectograph, compass, square, dark chamber and countless modern tools, as computers, digital tablets, drawing tablets, digital pencils and so forth. The latter are linked to drawing software as *Autocad, Sketchbook, Photoshop* to name a few.

A case of drawing by means of the Alberti's Window:

Each technology tool has an impact on image construction. The case we examine here is important and transcends the concrete procedures of the image composition, being it a painting, a photograph or a film. In *De picture* (in Latin) or *Della pittura* (in Italian), published in 1435 and 1436, respectively, Leon Battista Alberti presents concepts such as *internal and external design*, *center point of the eye* and the *Alberti's Window*, among others. This window is a framework with a grid allowing a cartesian sectioning of the image by positioning one eye on the viewfinder. It is an approximation of a two-dimensional image that will be later known as perspective view.

Another example of a tool related to drawing: the perspectograph.

This tool embodies an important contribution to the representation of depth. When Durero designed the perspectograph he contributed to the mastery of the perspective knowledge. This instrument manages to place the observer in a fixed point of view; show the perspective surface; project vanishing points; and make the horizon line visible. In his notes Durero also included exercises of perspective like tracing of cubes, spheres and architecture details. The use of perspective as knowledge and, of course, as a symbolic system had a high impact in architecture. Nowadays we have software for 3D modeling so the user can live an immersive experience of a building before the actual construction begins.

Figure 2: Perspectograph, Perspective device, Water mark: anchor inside a circle. Dated 1514. (Albrecht Dürer, The human figure by Albrecht Dürer, 1972.*The complete Dresden Sketchbook*, New York: Dover Publications, p. 293).
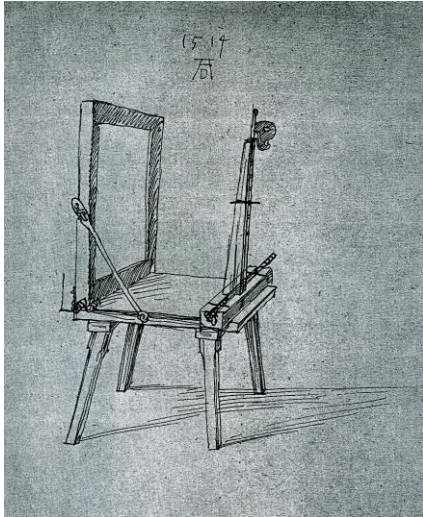
Drawing made with technology related to learning:

Since ancient times copy drawing is a common learning process. In the *Academy of Vasari* this method was incorporated on the basic lessons and it consisted of the copy of primers. Primers are drawings that have been copied by an artist. They were two-dimensional models that have been reinterpreted from tridimensional models. Sometimes they were also copied from plaster cast since the 15th century. As Cennini mentions in his book, these models were also interpretations and representations of other artists. Basically they were *outline drawings* or volume representation by means of *hatch patterns*. Later on, after in the 18th century photographs of sculptures are added, which could work as catalogs for museums.

Some examples of primers are those by Cusin (1595), Van der Passe (1624), Brown (1660), Preissler (1721), Jombert (1740), Brée (1821), Alberti (1822), Le Breton (1830). Even the work of Preissler was considered as an essential material in the academies (SPEED, 1941). Each system of learning by copying includes structures, schemes, and a particular aesthetics that had impact on the symbolic system of drawing.

Figure 3: Odardo Fialetti, "Eyes", *Il vero modo et ordine per dissegner tutte le parti et membra del corpo humano*, Venecia, 1608, hoja 4. Collection of illustrations from the Division of Art Miriam e Ira D. Wallach, Illustrations and photographs, Public Library of New York, Astor, Lennox y Tilden Foundations. Efland, A. 2002, *A history in the Education of Art*, Spain: Paidós, p. 58.

Another way of learning to draw is through model observation, known as *natural drawing*, drawing with a model and drawing human figure with models, which may also be done with a white model (plaster cast sculpture) or live model.

3 Symbol system

One can talk about drawing composition from the very first visual aspects grasped by the eye from a given thing. We can do this by adopting what we know about some *Visual Grammar* that has been established along centuries. By looking at an image one can say how its visual composition has been created: if it is a construct made with lines or a pictorial composition carried out with spots; if the composition is made by figure and background; and when T systems are considered, one observes the overlapping surfaces or depth of field, and the perspective is, then, measured in one, two or three vanishing points.

We don't talk just about the drawing structure, but refer to a symbolic system of representation. Another symbolic system is the interpretation of space, that is, the representation of dimension and scale as guide for creating perspectives of mountains, plains and maps. As for the temporary interpretation we have timetables, flow charts and route maps as examples.

The *perceptive whole* is divided up by the intellect in the process of drawing with the goal of identifying the constituent elements of an object, so they can be interpreted by the person responsible for the physical production as a translator into visual form. From this point on, the iterative process of observation, analysis and selection of specific features of the scheme will repeat until the *material update* complies the requirements and functions as a symbolic concept.

In *Art and Illusion*, Gombrich deals with the symbolic system in relation to the visual thinking (Gombrich, 1998). This is based on what he calls *graphic vocabulary* or *visual literacy* (Dondis, 1976). Drawing is mainly based on *observation,* despite the fact that *seeing* includes two different modes, the process of vision and of visualization (Vilchis, 2008). In any of these modes, drawing begins with *seeing*, which is a process of reaching for understanding a part of the world. However, drawing, itself, is a new way of seeing as explained by Elliot W. Eisner, when he argues that

> […] one cognitive function of art is to help us describe the world. A landscape by Monet or a photograph by Paul Strand makes a new way to see possible […]. Visual perception and its context are considered a starting point, whereby the ability of representation is developed. (Eisner, 2004)

We consider that qualitative characteristics of drawing can be divided in two, because of their reference levels; representation and synthesis:

-*representation drawing*: mimesis and analogy;

-*synthesis or abstraction drawing*, which is the representation of the object's substantial qualities.

The notion of symbolic system encompasses the classification of drawing methods, whose features have been established by teaching methods mainly: academic, measured perspective, gestural, geometric, outline etc. We observe that since the Italian Renaissance a doctrine has been established: that "art can be taught and learned; that is, that academic dimension is inherent to the artistic fact" (Calvo, 1981). This idea is fundamental for the understanding the equation of drawing as a systemic procedure in education.

Drawing method by observation

We adopt the idea that observing has a unique form of perception, based on the neoplatonic model. In other words, the ability of seeing is compared to understanding the essence of the observed object, referring more to a cognitive process than to a sensorial or perceptive process;

Gombrich explains it the following way:

> The perfect painter is gifted with the faculty of seeing the universal in the particularity of seeing through the tailings of matter, the "essential shape" that -in aristotelian terms or, rather, platonic-has been molded on the resistant clay from within (Gombrich,1998).

As previously mentioned on, Kimon Nicolaides explains how drawing and observing are intermingled. To him, learning to draw is the same as learning to see correctly. However, this goes deeper than seeing with your eyes. (Nicolaides,1941). Despite the fact that the verb to see might suggest that seeing is something that happens in the eye solely, it is impossible to set it apart from our mental processes, like Baxandall explains, when picking up the concept of linear movements: "Obviously, the optical process of our vision is not all that exists in the act of observing. While seeing we use our minds, and our minds use concepts (Baxandall, 1989).

The Copy-drawing Method

The C*opy-drawing Method* is based on the reproduction of drawings, a basic and constant method used in the teaching of drawing as observed in drawing treaties and academies. Copying included primers with basic principles, teacher's prints, plaster or living models. (Rodríguez, 1992). This didactic method of teaching and learning to draw is systematized since the Renaissance, and is the most common method to teach drawing throughout history. The Copy-drawing Method is a system based on diagrams, mainly used in the academic courses and was called *Principles Drawing* (Uribe, 1999). This copying was made from primers of principles, which were prints made by renowned teachers and, later, originated from plaster models. To make these copies students could use measurement instruments like a compass, plumb, perspectograph or grids.

The Contour Method (tactile evocation)

This method was introduced by professor Kimon Nicolaides as the *Contour Method*. By relating observation to touch, Nicolaides told his students to imagine they were touching the object with their sight while drawing it. This teaching manner was actually "discovered" in the sixties of the last century. It allowed the students to understand how people's eyes make linear translations of the contour of an object. (Parini, 2002).

From the visual culture ecology's standpoint, it is possible to analyze drawing in its social and cultural aspects. This analysis provides us with the guidelines of a special kind of observing the drawing process. By considering the discourses of the draftsperson, the student of drawings and the teacher of drawing we move these agents' social, economic and symbolic contexts to the center of analysis.

4 Use Conditions

In this portion of our text, we examine the conditions of attendance as defined by ME in their use aspects.

When we refer to drawing, we don't speak of a trace on a piece of paper but the action someone plays when drawing. Besides, we are concerned with how the results will be dealt with by the maker or any person interested in its use as well. Because of the Media Ecology concern with the act of drawing, we refer to the *competence in drawing*. This approach interlaces the act of drawing with the drawing competences. Every process in drawing is related to its approach. For example, an illustration is related to the use of technology whether it is digital or analog just as the materials used to produce it, like pen, watercolors, or digital software from a symbolic system whether it is because of its abstraction level, the use of a perspective system or the style used.

The **technological system** is related to the access of specific pieces of knowledge, and the skill of tool control. Technology is also related to the impact of didactic materials. The **symbolic system**, is related to applied knowledge of drawing methods.

Table 1: How Media Ecology can be compared with the drawing competence

Outline of competence	Knowledge	Abilities	Skill	Attitude
Outline of competence	Symbolic system (language of drawing)	Use of technology and symbolic systems.	technology system.	Conditions of Attendance Usage conditions.

As to the **conditions of attendance** concerning drawing, they allow for important aspects of communication to come out. Drawing is, indeed, a way of communicating and meaning making, whether it is taken in its linguistic aspects when it is taken from its univocal quality translated into mathematical and absolute values; expressed in descriptive geometry; measured in terms of perspective and orthogonal views; or in its polysemic quality, as a visual communication media in different cultural contexts, with endless technical and expressive possibilities, such as the so-called natural drawing of a scenic picture. (Sanz, 1990)

In the interaction between the designer and a client, drawing is a communication medium for formal representation of objects and spaces. Also it is a medium for representing information diagrams, building sceneries and so forth. As a finished product it means rendering and illustration.

Under the ME perspective, the development of a designer's profile should consider the familiarity with the symbolic systems involved, the use of technology and, of course, the mastery of the digital tools, and the conditions of attendance, which include human characteristics and communication ethics. Unfortunately, this approach is not normally explored in the regular courses of drawing in Design programs.

5 Conclusion

This work aims at illustrating how the theory of Media Ecology can contribute to Design Programs in general, adding to them aspects usually not considered in such programs, especially in classes of drawing.

Media ecological principles make the student concerned with the meaning of his/her creation under certain circumstances. They make the student aware of the effects in the act of drawing: tracing, the use of color, aspects of angle etc. Are similar to the use of words in verbal language, that is, by changing the word order modifies the meaning of the sentence. Therefore, the aesthetic changes of the visuals influence cognition and behavior. Along the same lines, the destination or use given to the image may have a similar impact on the person who creates and uses it, as well as the instruments (aspects of technology) used in the may impact the meanings of the work. Other effects will arise with the awareness of drawing as language, technology and attendance. Innovation, for example, usually comes about when the draftsperson is concerned with such aspects.

References

BAUER, A. 2002, *Somos lo que compramos. Historia de la cultura material en América Latina.* México: Taurus.

BAUMAN, Z. 2000.*Liquid modernity*. Cambridge: Polity Pr.

BAXANDALL, M. 1989. *Modelos de Intención sobre la explicación histórica de los cuadros.* España: Herman Blume.

BORDES, J. 2003. *Historia de las teorías de la figura humana.* Madrid: Cátedra.

CALVO, F. 1981. *La Teoría de la pintura en el siglo de Oro.* Madrid: Cátedra.

EISNER, E. 2004. *El arte y la creación de la mente.* Barcelona: Paidós.

DONDIS, D. 1976. *La sintáxis de la imagen. Introducción al alfabeto visual*. Barcelona: Gustavo Gili.

HAKANEN, E. 2007. *Branding the teleself: Media effects discourse and the changing self*. Lanham, MD: Rowman & Littlefield.

INNIS, H. 1964.*The Bias of communication.* Intro. Marshall McLuhan. Toronto: University of Toronto Press.

JENKINS, H., GREEN, J. & FORD, S. 1958. *Spreadable media creating value and meaning in a networked culture.* New York: New York University Press.

JENKINS, H. 2006. *Convergence culture where old and new media collide*. American Council of Learned Societies. New York: New York University Press.

NICOLAIDES, K. 1941.*The Natural Way to draw.* USA: Houghton Mifflin Company Boston.

NYSTRON, C. 1973.*Towards a Science of Media Ecology: The formulation of integrated conceptual paradigms for the study of human communication systems,* Doctoral Dissertation, New York University.

PARINI, P. 2002. *Los recorridos de la mirada.* España: Paidós.

POSTMAN, Neil. What's Media Ecology, Media Ecology Association <http://www.media-ecology.org/media_ecology/index.html>*,* 16/02/2015

POSTMAN, Neil. 1979. Teaching as a conserving activity, *Instructor* 89.4

RODRÍGUEZ, A. 1992. *El siglo XVII entre tradición y academia.* España: Sílex.

STRATE, L. 1999. Understanding MEA, *In Medias Res 1* (1), Fall.

SPEED, H. 1941. *La Práctica y la ciencia del dibujo.* Buenos Aires: Albatros.

SANZ, J. 1990. *El dibujo de Arquitectura.* Madrid: Nerea.

URIBE, E. 1999. *El dibujo en la Real Academia de San Carlos de Nueva España y lãs polémicas culturales del siglo XVIII, Arte de lãs Academias, Francia y México, siglos XVII-XIX.* México: AntiguovColegio de San Idelfonso.

VILCHIS, L. 2008. *Método de dibujo de Gilberto Aceves Navarro.* México: Universidad Autónoma Metropolitana.

About the authors

Nora Aguilar, Universidad Iberoamricana, Mexico: karina.aguilar@uia.mx

Luiz Antonio Coelho, PUC-Rio, Brasil: artcoel@puc-rio.br