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	Particle	
	Given Name	<b>Maria Luísa</b>
	Prefix	
	Suffix	
	Role	
	Division	CIAUD
	Organization	Faculdade de Arquitetura da Universidade de Lisboa
	Address	Rua Sá Nogueira, Polo Universitário da Ajuda, 1349-063, Lisbon, Portugal
	Division	
	Organization	Instituto Superior Miguel Torga
	Address	Largo da Cruz de Celas nº1, Coimbra, Portugal
	Email	design.luisacosta@gmail.com
Author	Family Name	<b>Rala</b>
	Particle	
	Given Name	<b>Sílvia</b>
	Prefix	
	Suffix	
	Role	
	Division	CIAUD
	Organization	Faculdade de Arquitetura da Universidade de Lisboa
	Address	Rua Sá Nogueira, Polo Universitário da Ajuda, 1349-063, Lisbon, Portugal
	Division	
	Organization	Instituto Superior Miguel Torga
	Address	Largo da Cruz de Celas nº1, Coimbra, Portugal
	Email	
Abstract	In this article, we start from a literature review on the concept of Information Design and analyze how and why the hermeneutic process of knowledge construction can be applied to visual information systems. We present several typological approaches associated with Information Design, such as Diagrammatic Design, Schematic Design, Infographic Design, and Wayfinding Design, sometimes with common or different graphic characteristics, the greater or lesser complexity associated with it and how the elements that constitute the language and visual grammar contribute to the organization, systematization, and understanding of the information produced in this context.	
Keywords (separated by '-')	Information Design - Diagrams - Infographics - Wayfinding systems - Hermeneutic process	



# Information Design and the Hermeneutic Process of Knowledge

Maria Luísa Costa<sup>1,2(✉)</sup> and Sílvia Rala<sup>1,2</sup>

<sup>1</sup> CIAUD, Faculdade de Arquitetura da Universidade de Lisboa, Rua Sá Nogueira, Polo Universitário da Ajuda, 1349-063 Lisbon, Portugal

<sup>2</sup> Instituto Superior Miguel Torga, Largo da Cruz de Celas nº1, Coimbra, Portugal

**Abstract.** In this article, we start from a literature review on the concept of Information Design and analyze how and why the hermeneutic process of knowledge construction can be applied to visual information systems. We present several typological approaches associated with Information Design, such as Diagrammatic Design, Schematic Design, Infographic Design, and Wayfinding Design, sometimes with common or different graphic characteristics, the greater or lesser complexity associated with it and how the elements that constitute the language and visual grammar contribute to the organization, systematization, and understanding of the information produced in this context.

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**Keywords:** Information Design · Diagrams · Infographics · Wayfinding systems · Hermeneutic process

## 1 Introduction

The field of Information Design covers various formal applications and different graphic approaches. Examples of this are graphics, pictograms, diagrams, illustrations, maps, signage, technical, educational, or scientific drawings, in which we can use various representation resources and even the combination of several such as photography, drawing, illustration, color, and text, to convey information. The understanding of this information is not immediate, and it derives from an interpretation process based on the interaction between the whole and the parts that constitute the design object and the context in which it is presented. This comprehension process is referential since everything we understand derives from a knowledge we have a priori and from the connections we thus manage to establish.

AQ4

According to Bonsiepe [1], information design is a way to communicate complex data, articulating several visual communication elements that aim to transform primary data into information. That communication is structured based on a visual grammar composed of expressive and symbolic elements. Which constitute a visual language and, considering that, like any language, this one is likely to be interpreted and understood, we analyzed which media are recurrently used in the context of Information Design, the designations, and functionalities assigned to them by different authors regarding diagrams, infographics, wayfinding systems, and maps, as well as how they enable the transmission of information and what are the underlying objectives.

## 2 Design as a Visual Language and the Hermeneutic Process of Knowledge

A language is a communicational resource that takes various forms but, in order for it to be effective, it implies that all members of a given group share the meaning associated with a standard body of information [2], know its grammar, which in the case of visual communication is as Leborg [3] states the same as that of any other language, it defines the basic elements, the relationship processes existing between them and the way in which through these elements communication systems are created.

Line, point, plan, shape, size, color, but also structures and the relationships that are established between all the elements, create systems that are sources of information and need to be interpreted and understood so that this information is transformed into knowledge, i.e., we reach the knowledge through a hermeneutic process of understanding that results from the interaction between the whole and the parts that compose it. In this sense, we consider the information design as a visual language, liable to be understood through the hermeneutic process of knowledge.

From literature to medicine, different areas proceed to hermeneutic analyses as processes of data interpretation and translation, aiming at a comprehensive understanding.

Thus, hermeneutics can be understood as the science that seeks to understand and interpret the meanings inherent in a given discourse to achieve comprehension [4].

Palmer [5] refers that Dilthey saw in hermeneutics the central discipline that would serve as a basis to all the disciplines centered on understanding art, behavior, and writing. Ricoeur [6] understands hermeneutics as a set of rules that enable interpretation of a text or set of signs that can be considered as texts and, as such, interpreted.

According to Palmer [5], signification has to do with context, the explanatory process being the space of understanding; that is, a narrative or event only has meaning within a specific context.

Still, for the same author, understanding happens via a dialectical interaction between the parts and the whole, where each one will give meaning to the other, in what is called a hermeneutic circle, since understanding consists of a referential procedure, that is, we only understand something by comparison with something we know. "What we understand is grouped into systematic units or circles composed of parts. The circle as a whole defines the individual part, and the parts together form the circle." [5].

In this interaction and dialogue between the whole and the parts resides the understanding and knowledge in the systems' scope generated in the information design context.

## 3 Information Design

Information Design is the representation of information in a visual format that can include visualizing data, processes, hierarchy, anatomy, chronology, and other facts [7]. The visualization of information has different sources: images, signs, symbols, schemes, and texts, perceived at different hierarchical levels with iconic, schematic, and symbolic decoding, transformed into information with the conceptual purpose [8].

Wildbur e Burke [9] define Information Design as the selection, organization, and presentation of an idea to a particular audience. According to the authors, the areas of information design can originate from almost any source, such as weather map, timetable listing flight departures, statistical data, orientation on a map or signage system, and can represent a vast content, where the user needs to extract what is needed for a particular purpose.

Tufte [10] states that the principles of Information Design are universal and independent of a particular language or culture; they result from the intersection between image, text, numbers, and art, which we can articulate in charts, diagrams, graphs, tables, guides, instructions, directories and maps.

Concerning terminology, we find that theorists and designers sometimes title information Design as Diagrammatic Design, Schematic Design, Infographic Design and Wayfinding Design.

Holmes [11], a graphic designer and theorist of the graphic information area, titles Information Design as Diagrammatic Design and divides it into categories: diagrams, maps, architecture, and other designs. Similarly, Perderon [12] divides the area of diagrams into: statistical and comparative, flow and organization, technical and functional, maps and plans, architectural, and finally, scientific and medical.

On the other hand, Costa [8] calls Schematic Design the Information Design, and considers it the graphic design area that operates with a didactic, informative, professional, and dissemination function. According to the author, the world of schematic visualization is characterized by its utility, is defined by the motivations of the target audience, and is expressed by different types of graphic language in three fields of action: that of scientific research, that of the technique and that of everyday practice, divided into families, characterized by schemes: of reality, of structures, of relationships, of history, of the analysis of results and the presentation of textual data (not phenomena or demonstrative), with more significant predominance in cartographies, organigrams, diagrams, histograms, and semantograms.

Another term also commonly used in the medium is Infographic Design. The word “infographics” results from the contraction of “information” and “graphics” [13]. Sanchó [14] defines infographics as an informative narrative, prepared with iconic and typographic elements, enabling or making it possible to understand significant events, actions, or facts. It is considered to have eight essential characteristics: 1) to give meaning to information, 2) to guarantee conformity with current events, 3) to enable the understanding of the message, 4) to contain written information with textual elements, 5) to contain perceptible iconic elements, 6) to include relevant content or to have a synthesis or complementary function, 7) to have an aesthetic concern, 8) to have no errata or lack of concordance.

For Kanno and Brandão [15], infographics enrich the text with visual elements and embellish the composition making it more attractive.

According to Meirelles [16], in graphic design, two terms are mainly used for information visualization: infographics and information design. He defines infographics as visual compositions, encompassing text illustrations, symbols, maps, diagrams, from complex illustrations of the human body to maps of train or metro routes. On the other hand, he considers that the term ‘Information Design’ is used to describe communication

design practices, where the main objective is to inform and not to advertise, to persuade. He also states that infographics are one of the possible applications and others, such as the design of information systems, wayfinding, and visualization of statistical data.

Concerning the operational purpose of Information Design, it can be seen that the different approaches and classifications are similar by function/field of action (research, dissemination, learning, organizational/orientation), graphic expression/graphic language (iconography, schematic design, technical design, illustration) and applicability to a given target audience (specialists from the various areas or general public). However, we may have different levels of complexity of graphic representation, recourse to various visual elements, and different information analysis phases.

In this framework, Information Design, regarding the graphic representation of geographical territory or dedicated to the projectual development of wayfinding systems flows, different forms of design and levels of complexity may be included, from the schematic/diagrammatic representation, through illustration, to the relation between orientation signs in an area, where drawing, image, pictograms, signage, and text combine to transmit certain cartographic information.

## 4 Visual Information Systems and Wayfinding

Within the scope of Design, visual information systems are sets formed by interrelated visual and textual components of greater or lesser complexity, whose existence and operation derive from the interaction between the whole and the parts that compose it.

The visualization of information allows an adequate understanding and better management of the vast amount of data that we are recurrently called to process.

Tufte [10] states that it is necessary to work with intersections between images, words, numbers, and art to visualize information.

In this sense, we can identify as part of this group the information produced through diagrams, since these are abstract, structured, and simplified representations of a particular event, process, system, space, or micro or macrostructure, materialized with the line, color, and typography, such as a plan of underground lines and stations.

Infographics are the abbreviation for “information graphics”, a term that has become popular with online marketing in recent years. In short, an infographic makes use of visual signals to convey information [7], for these authors, infographics can be as simple as a traffic sign or as complex as an analysis of the global economy.

Infographics are two or three-dimensional diagrams that describe a step-by-step process with the help of iconic, chromatic, and typographic elements, allowing the understanding of complex information, such as the representation of a geographical surface, and may privilege narrative, instructive, exploratory, or simulation aspects.

A wayfinding system consists of a set of visual, textual, and physical information that appeals to the user’s sensorial and cognitive interpretation to facilitate access to highly complex spaces.

According to Costa and Amaral [17], wayfinding systems are sets of information elements that facilitate accessibility and enhance citizens’ experiences, using, according to Gybson [18], explicit signs and information, as well as implicit signs and landmarks.

Wayfinding systems, which have been studied for decades, are at the core of the development of multiple cognitive science specialties, namely in-depth studies on legibility, color perception, and typographic legibility [19]. We can state that a wayfinding system comprises multiple elements that integrate the information systems mentioned above, namely maps, whose representation can be simplified and diagrammatic or complex and with a three-dimensional expression. “In addition to maps, wayfinding systems integrate a set of signs to inform, identify, guide, functions inherent to signage” [20]. These signs integrate what we call signposting. We can consider it a system inside the other system - the wayfinding - for having visual components, that despite being integrated into the broader system, has particular specificities, both relational and formal or chromatic.

The development of any of these forms of Design is based on multiple primary data, ranging from numerical and statistical to more subjective data, such as physical and identity characteristics and particularities of a space or individuals. The process of collecting, analyzing, and systematizing this data is essential to produce this information. The knowledge of the signs’ formal and chromatic characteristics (pictograms, arrows, typography), in their symbolic, denotative, and connotative aspects, to construct information that articulates image and text fulfills the objective of informing.

Thus, the hermeneutic process of knowledge, previously mentioned, should enhance understanding, through 1) expressive aspects (how to say); 2) explain (meaning), relates to the symbolic, historical and connotative aspects of the graphic elements; 3) translate (make accessible), lies in safeguarding the principle of universality and the good understanding of what is graphically represented.

## 5 Schemes, Maps and Diagrams

As we have seen, the Information Design area can acquire various formal approaches and different graphic languages. Examples of this are maps, diagrams, illustrations, pictograms, and signage. Which may be organized by types with their particularities, contain graphic design features ranging from the simplest to the most complex representation, and may use various representation resources and even the combination of several such as photography, drawing, illustration, color, and text.

The pictorial representations of a schematic nature precede writing in the era of cave paintings [14].

The drawing characteristics of prehistoric art, established through abstraction, transparency, and superimposition, are attributes of the schematic universe’s representation. Likewise, the Fatimid era Egyptians needed to deform the drawing of maps or route schemes expressing more the economic and cultural reality than the geographical one [21].

The use of aerial photography in the mid-nineteenth century made it possible to reproduce cartographic or street maps with the representation of scale and precise drawing; however, according to Valero, the cartographic representation of a terrestrial surface requires the reproduction of a faithful drawing; on the other hand, when drawing a map for information purposes, we can ignore the rules of cartography in favor of information [14].

For example, early underground map designs had the basic conception of the place's geographical representation with the underground lines and sometimes drawings of the streets superimposed. In 1931, Harry Beck changed this paradigm by designing the London Underground map, where he organized the "routes into a system of lines all drawn at consistent angles. He structured the typography over a grid and noted the station interchanges symbolically" [18].

Holmes [11] establishes the difference between geographical maps, orienteering maps, and statistical and pictorial maps. When constructing geographic maps, the author fixes a set of lines, coastlines, borders, and places in the territory that cannot be tampered with; if they infringe, the cartographic representations become erroneous. Creating an orienteering map, the designer can disregard, exclude details, and adapt the map to specific needs. On the other hand, there are statistical and pictorial maps, where the designer combines images on a geographical basis for illustration purposes.

The structured and simplified visual representation of a given place, space, system, macro-structure, or micro-structure, according to Haslam [22], can be configured by tree diagrams, linear diagrams, three-dimensional diagrams in two dimensions, and sequence diagrams. The tree diagram representing a system's data relationships with abstract graphical language depicts relationship models as in a family tree. It understands by the linear diagram, representation of relations between points or the crossings without connection with the geographical position, where the use of the color can allow a better hierarchic reading of the linear ways independent of the sequence of intersections, as in the representation of a map of the underground lines. On the other hand, a three-dimensional diagram in two dimensions represents three-dimensional relations, or elements in two dimensions, through the linear drawing of view, perspective, or axonometric projection, as the configuration of a route or geographical area in infographic map with two-dimensional or three-dimensional representation. A sequential diagram represents an action through sequences of abstract or iconic representation, where we can represent a unidirectional route where it is necessary to accomplish a sequence of tasks.

Therefore, the universe of Information Design in the scope of the presentation of routes in places or geographical and spatial areas, diagrams, maps, and wayfinding systems presents different typologies, each with its own potentialities as graphic expression.

In any of these representation domains, the sense of information and meaning must be considered to facilitate the search and discovery and improve the perception and recognition of accurate or theoretical data [16].

## 6 Conclusions

Graphic representations in the universe of Information Design may result in a synthetic drawing to represent an idea that one wants to be easily recognized by what it intends to represent, which is elucidative and easy to understand, accessible to the user whom it is addressed. Since an abstract idea or notion may be expressed literally, concretely, iconically, or abstractly, a schematic/diagrammatic design may be a leveled or accentuated design, reduced to an expressive synthesis situated between the literal and the abstract. However, within a leveled logic, it may also be a very complex composition.

Information Design encompasses different information systems ranging from schemes, diagrams, infographics, and maps to complex systems like wayfinding that may include all the previously mentioned systems to make complex information accessible by making it as universal as possible.

For that, Information Design makes use of the visual language, the basic elements, and the existing relations between them, searching for the most appropriate register and expressiveness to make its results - the efficient communication, considering the graphic efficacy and the complexity of the visible and invisible world, in the construction of a precise and impartial narrative. The choice of visual language, or what we refer to as its expressive aspects, where the symbolic, historical and connotative aspects of the graphic elements are crucial to make the information accessible, safeguarding the principle of universality and a good understanding of what is graphically represented, facilitating the process of dialectical interaction between the parts and the whole, in a hermeneutic process of understanding and knowledge.

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## Chapter 11

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