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## Infographics as a Mnemonic structure: Analysis of the informative and identity components of infographic online compositions in Iberic newspapers

**Abstract**

Infographics as a transdisciplinary component that permits to objectify depth that amplifies and potentiates informative time and space, is the proper structure for the reading characteristics of Net Generation and outputs the dynamic skills of visual intelligence, creating mnemonic frameworks. This article analyses the use of its Informative content, and its appliance to the qualities of Online Information (accurate, timely, complete and concise), its components of Identity (periodicity, animation, stateness, interactivity, image, multimedia and typology) and its Informative components (structure, clarity, content and readability) through revision, over two weeks (2014 and 2015), of the six daily general online newspapers of Iberian Peninsula that, according to the *Asociación para la Investigación de Medios de Comunicación* and *Marktest*, have more views: *El País*, *20 minutos*, *Público*, *Correio da Manhã*, *Jornal de Notícias* and *Diário de Notícias*. Is also registered in this analysis, the vision of content producers through a survey of members of the *Infographic Society* (the only professional association of this particular profession established in the Iberian environment) and the results of the study are contrasted with an in-depth interview with structured questionnaire relating to four global infographic designers working for *The Guardian*, *The Times* and *National Geographic*. Although the results reflect a low Multimediality and Interactivity, the analysis finds that there is a sensory and affective effort to Permanence and Narrative in the mnemonic meshing of skills in Journalistic Online Infographics limited by a poor Visibility of the Infographic compound given by the media, either by failure of Production, of Continuity, Informative, of Usability and/or integration.

**Keywords**

**Cyberjournalism, Infographics, Interactivity, Readability, Animation, Perception.**

## **1. Introduction: Perception, Mnemonics and Visual Information**

The new information narratives are conditioned by the transformations that support that derivation from the traditional towards the online consumer products. This derivations have changed the ways of narrating, in parallel with the exchange that will experience the ways of consuming online information, and have varied audiences communicative priorities, now more weighted to elect information with proposals of the written language that integrate not only interactivity, but also, audio and image components as part of the Multimedia code that characterizes the network.

The infographic is part of the possibilities of visual communication that have the means to build their global account information, although, as noted Cairo (2008:28) can distinguish at least two functions: Aestheticized, which defines "dominant trend in information displays Press today" (Cairo, 2008: 29) and Analytical that increase "the cognitive ability of readers" because "not only shows and describes facts but discovers connections, constant patterns not obvious at first sight, not to be represented visually, but that remain oblivious to the reader." (Cairo 2008: 29) which adds to the task of information architect need to advance themselves and generate, create order "before the minds of the users try to do it" (Cairo, 2011: 33).

This research is focused on exploring what is the use that online newspapers provide to infographics into their informative stories today and resorts, as sampling, to a selection of the most representative online newspapers of Spain and Portugal. Contributions in scientific articles on infographics in the press, as well as books and manuals, already appear frequently diluted in works on data journalism (Herrero Solana & Rodríguez Domínguez, 2015). Specific works are in numerous media and brazilian authors (Lima, Andrade and Monat, 2015), but less frequently in studies of Spain (Fondevila Gascón-Rom-Santana-Rodríguez & Lopez, 2016) and Portugal (Pereira, Oliveira & Zamith, 2015). There were not found significant precedents related to this investigation (Rodrigues Pinto, 2012; Maciel, Bovió & Castro, 2011), although evidently works on infographics in newspapers and even numerous dissertations or masters, among which are Miranda, 2013; Meireles, 2012; Fonseca, 2015 or Cardoso, 2014.

In line with contributions from, among others, Fondevila et al (2016), Smith and Rodríguez (2015), Cairo (2008), Salaverría (2005), Machado (2007), Barbosa (2007), Fidalgo (2007) and Colle (2004), the article explores the visual communication as a manifestation of journalism that identifies what Rodríguez labeled has the third phase in the development of digital infographics, by describing it as a manifestation that recovers internal databases and also from the cyberspace, to create graphics, and that represents a trend towards a more systematic use in the current phase of interactive infographics, surpassed the linear infographics phases including its of multimedia infographics simulate scenarios of hiper-reality.

It was sought to identify the elements that help to understand the value of infographics and its role in global journalistic account of the medium in which it is spread, which requires review the entire process of creating infographics as a visual element of communication and understand how schematization of thought is articulated through "small simplified representations of objects in the world, which were assembled at the scene of consciousness" (Costa *et al.*,1991: 9). That is, a process in which memory would be like a reusable screen for a free, random composition, fueled by the sense of sight which, in a continuous supply, supplies the memory of imagetive elements that assist us in decoding what is intrinsic to reality. A thought process that prepares for understanding.

This theme of mental dynamics (relation between induction and deduction) situated infographics in relation to cognitive process of the message, ie the perception while learning, retaining, the layout (individual and unique dynamic process of prioritization of

the elements due to the decoding message on an idea of force, based on concepts -or pre-concepts, intuitive consciousness by sedimentation, a selective memory or by acculturation, induction or experimentation) and, finally, the presentation of what has become knowledge. That is, infographics can be considered the result of a filtering mechanism of reality "to reduce it to these universal recognizable and storable" (Costa et al., 1991: 12) in an inseparable use of language and visual imagery.

The imperceptible dynamic between eye and brain associates the infographic work to one of a cognitive, psychological recognition machine, almost an unique informational mnemonic memory flow between your memory file and a visual reality, virtually sensorial and informative, that only updates "through their interaction" where "as the devices, this update is more or less inventive, unpredictable, and leaves a variable part to the initiatives of Diving in it" (Lévy, 2000: 153).

In the same way, the quality and quantity of capturing the visual information depends on this global predisposition to do so, the Perception of the user (as an act of information processing data in favor of knowledge, which adds factors of syntactic, semantic and pragmatic in this deductive and inductive dynamic and involvement. However, identifying that in visual perception "any stimulus pattern tends to be seen so that the resulting structure is as simple as the given conditions permit" (Arnheim, 2005: 47) the effectiveness of visual compositions through a set laws of "perceptual organization" (Arnheim, 2005; Calado, 1994; Marques, s/d; Soegaard, 2005): Law of Frequency and Stability, Law of Similarity, Law of Closing and Continuity, Law of Centralization, of Color, of Dominance and of Proximity, and Law of Participation, those which could be added to the 'information spaces' (measuring, mapping, *exploring-interaction space - hypertext navigation- and navigating - architectonic space-*) announced by Martyn Dade-Robertson (2011:108-117). As a result of visual communication, infographics has an intrinsic role of informative contribution, in addition to a complex narrative or even individual item full of meaning in itself, without other narratives. It is accepted that this transfer should visually "facilitate journalistic information" (De Pablos, 1999: 30) but not always the message can be transmitted by visual language because not all subjects are likely to create an infographic (Cairo, 2005). The infographics features in the media may also serve as an element to define the stage in which it is located. Given the proposal of Amaral (2013) is possible to distinguish three: (1) *Transpositivo*, the newspaper on the internet that follows the model printed; (2) Perceptive adds features online journalism; (3) Hypermedia, uses hypertextuality, convergence of different media and dissemination of the same product on multiple platforms.

A decade before Amaral proposal, Nichani and Rajamanickam (2003) link 'Interactive Journalism' and 'Visual Journalism', apart from considering that it is a movement born "out of the desperate need to engage and excite news consumers in the post-information age". The authors write that this movement of "dissemination of information and news breaking has given way to interaction, participation and involvement of consumers in news making. It is called interactive journalism or visual journalism."

These authors assume that "interactives are one of the first experiments in interactive journalism. They are brief Web-based interactive visual explainers. They are designed to explain complex concepts or ideas".

On the other hand, Beatriz Ribas (s/d), adds to this table the infographic utility features described by Valero Sancho (2003) and proposes an interesting classification for multimedia infographics -constructed with contributions from Peltzer, 1991; De Pablos, 1999- as a model for an online journalistic composition: Informational, Narrative, Interactive, Play-Act or Exploration. In addition to these elements, Ribas (s/d) from the four levels that Meadows (2003) attributes to Interactivity, also organizes online infographics by Types, States and Categories.

Each informative format corresponds to a set of specific technical knowledge by the journalistic binomial I+T (the [T] information is "expressed in a visual language" [I]) (Alonso, 1998) and that requires from the infographic professional, journalistic skills, meaning that you should know the tactics and the way to deeper content. Nothing is replaced and everything is integrated. Praise the differences on behalf of information totality. On the other hand, since we are also considering online media, it is the time factor that, proportional to its speed and usability, gives Infographics its corner, amplifying it. This is because if, in Journalism, waiting decreases importance to the event, it is with infographics that "it narrates what has a beginning and a transformation and, then, a consequence of what happens in action" (Valero, 2008).

From infographics perspective as information built with a visual, multimedia and interactive language without the need for explanatory textual support outside its own chart and where converge the visuals skills: Appreciate, Functionate, Communicate (Barnhurst, 1998) we approach the task of reviewing what happens today in the mainstream of the Iberian territory and what is the perception and evaluation performed by the products of infographics and experts working for some of the major headings of Spanish and Portuguese journalistic world.

## **2. Methodology**

The list of the texts collected does not include an analyses that has as an active subject in direct relationship between the infographic journalistic product and the online support as a synonym for 'newspaper', but rather, as assume Quivy and Campenhoudt (2008:230) the "analysis of ideologies, systems, values, representations and aspirations as well as its transformation". It is, therefore, a study on the structure of the infographic online editions of daily general of the Iberian Peninsula -*Correio da Manhã* (CM), *Público*, *El País* and *20Minutes*- the date of the proposed research, best latest compilation of views submitted by online Markest (Portugal) and the *Asociación para la Investigación de Medios de Comunicación*-AIMC (Spain). But because the scenery is not profitable for generalist daily national newspaper of reference -neither tends to be so, too, on the infographic dynamic- it was decided to also integrate the *Jornal de Notícias* (JN) and *Diário de Notícias* (DN) in the compound of the investigation.

No similar studies have been identified preliminary thereby, it was decided to confer an exploratory nature to this investigation that is, to address four topics: i) what is the intensity and frequency of use of infographics in media journalism?, ii) what is the perception of infographic designers about the influence of the support function, contents, authorship and the relationship with the audience?, iii) what are the Identity and Informative elements commonly used in infographics in online journalism?, iv) what is the framework mnemonic attributable to Journalistic Online Infographics?

What this work intends is to advance the analysis of informative infographic object reviewing products according to product (infographic) and producer (infographic designer):

1) to the infographic, was constructed and applied an Observation Table that under 'Direct Observation' (Quivy & Campenhoudt, 2008: 164) and not comparative, seeks to determine the four components: Identity, Information, Design and Web, in the extent of Hypermedia applied to the Infographics, but also at the infographic interpretative structure as well as at its levels of content organization. The development of the indicators grid has been supported by preliminary testing applications for functional improvement of the tables, after which met the final model.

2) to the Producer, aimed to know the perception and evaluation that the Infographic designer has of the Online, was administered an original online survey, to the members of the Infographic Society, which includes professionals from different media.

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Besides the review to frame the reality of the matter, to strengthen the methodological triangulation was decided to conduct an interview to one of the categories of persons who may be considered to be "experts in the field of research" (Quivy & Campenhoudt, 2008: 71). The script was sent by mail, *ex-áqueo*, four international relief Infographic experts working in *The New York Times* and *The Guardian* or *National Geographic*, who previously agreed to participate.

The study lasted two weeks (Monday through Sunday) in one month (April) chosen randomly and two stages of observation (2014 and 2015). The second stage (2015) serves the purpose of marking the results, as it is proposed to confirm the terms of Usability and Integration of the structure that were obtained on the first.

For the systematization of the product, the instruments used will then be the general daily Iberian newspapers in their online versions, so it is of a multiple case study, based on documents online, interactive and filed. Furthermore, the objects under study do not take into account titles, themes, texts or any other elements and/or formats other than the infographic as what is intended is a characterization of Online Infographics.

a) Design Components, to evaluate visual ergonomics:

**Table 1.** Component Design (own design)

Structure	Indicators	If scroll, webpage, horizontal or vertical
	Objective	Elements dynamic: interdependence and harmony. Horizontal or vertical structure
Style	Indicators	Editorial   Authorship
	Objective	Affinity between media and infographic.
Impact	Indicators	1 = Weak   5 = Excelent
	Objective	Visual strength of the elements in page against the components interplay.
Visibility	Indicators	1 = Weak   5 = Excelent
	Objective	Integrity / sharpness of the element vs the hierarchy (visual organization) that gives it meaning
Legibility	Indicators	1 = Weak   5 = Excelent
	Objective	To evaluate speed of the identification process and decoding of the element in each hierarchy of the visual group.
Perception	Indicators	1 = Weak   5 = Excelent
	Objective	Sensory knowledge of objects and external events.

b) Identity Components to identify what is classified as 'infographics', creating an identity in its structure and content, in eight items:

**Table 2.** Identity Components (own design)

Animation	1 = absent   5 = most
Stateness	1 = partial   5 = Total

Interactive	1 = absent   5 = most
Image	No (0) / presence (1) design, photo, graphic
Aggregated Elements	No (0) / presence (1) components external and/or internal
Aggregated Elements ( <i>Multimedia</i> )	No (0) / presence (1): video components, audio and gallery
Animation type	No (0) / presence (1) automatic or controlled
Compound type	No (0) / presence (1) integrated or autonomous

c) Informative Components as a result or data of perception:

**Table 3.** Informative Components (own design)

Structure	Scale	No (0) / presence (1) title, opening, authorship, source(s), readers
	Objective	Adapted according leturia (1998) components
Clarity	Scale	1 = Poor   5 = Excellent
	Objective	Decoding difficulty
Visibility	Scale	Absent = 1   5 = Complex
	Objective	Integration and information depth of dynamics
Readability	Scale	Confused = 1   5 = Specific
	Objective	Expressive force of the content
Perception	Scale	1 = Poor   5 = Excellent
	Objective	Acquired knowledge level. What is likely to verbalization (check faces and increment)

d) Web Component that relates to the interactive structure:

**Table 4.** Web Components (own design)

Interaction	Scale	No (0)   presence (1) of instruction, manipulation, and exploitation.
	Objective	Exchange of information between system and user device (Cairo, 2008:70)
Text	Scale	Absence (0)   presence (1)
	Objective	Components of the theme and other
Image	Scale	Absence (0)   presence (1)
	Objective	Components gallery and video
Sound	Scale	Absence (0)   presence (1)
	Objective	Components automatic and controlled
Animation	Scale	Absence (0)   presence (1)

	Objective	Components of the theme and other
Perception	Scale	1 = Poor   5 = Excellent
	Objective	Relationship between visual ergonomics and intuitive structure.

Taking the Albarello et al. (1997:48) in that the first purpose of an investigation is "set at a given moment, a particular social situation" to carry out an assessment of the relationship of the producers with the NTIC, given the Infographics, we chose to perform an online survey of own. The inability to establish a benchmark universe led to consider the sample represented by members of the professional association specifies identifiable in the territory to study, the *Infographic Society*, equivalent to an international stratified sample because:

1) Is designative of qualified professionals to the infographic construction and, therefore, possessors of an in-depth knowledge of the object under study;

2) This group can be considered a reference sample in representing a professional group with international operations also because they represented work in different national and international media. There are:

Alberto Cairo current Knight Chair in Visual Journalism at the University of Miami and director Preview Program Computational Science Center at the same university. Awarded, among others, by Malofiej and the Society for News Design (SND) worked in *El Mundo* and was the director of Infographics section and *Multimedia Editora Globo*.

Chiqui Esteban, is from early 2016 the Deputy Director of Art, Maps and Graphics in National Geographic. Since 2007, Consultant Digital Narratives in Innovation Media Consulting, a company in which has shown their work to countries like Brazil, Colombia, USA, Greece or Portugal. Between 2012 and 2015 was visual journalist at *The Boston Globe*. It has more than 45 awards which include *Malofiej*, *Society for News Design* (SND) or *European Newspapers Award*.

Mario Cameira was for 10 years, the editorial coordinator of digital design and interactive infographics in the Portuguese newspaper *Público*. Co-founder of *zDB Art Gallery*. Winner of several awards in Web Design, Art, Illustration and Infographics Interactive. In 2010, Mario was invited to join *The Times* in London, and since then, part of the Department of Visual Journalism this English periodical as Visual Journalist.

Xaquín González Veira is currently Guardian Visuals Editor, *The Guardian*. Infographics works since 2000 in *La Voz de Galicia* and *El Mundo*. In 2007 he joined *Newsweek* as an Art Direction Assistant. A year later is graphical editor at *The New York Times*, a post he held for almost six years. In 2012 Adventures by teaching the arts, as a teacher of Information Design at the School of Visual Arts in New York.

### 3. Results

In order to check the adaptation of the format to Media, it were identified and validated in two weeks, with an interval of one year, a total of 75 infographic structures (45 in the 1st round and 30 in the 2nd stage) which were scrutinized on a table with 44 control items. The results of these measurements are shown differentiated below.

#### 3.1. Measurement of Identity and Informative components

For the exploitation of items in a study on the structure, understood as the provision or organization in which the parties are dependent on the whole and therefore solidary, we rely in Cairo (2008: 75-78) and its navigation settings Horizontal and Vertical, finding Scroll

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and Webpage the best settings for the structures that we consider not fit in mentioned in the literature. Mostly, we find the use of horizontal structures, ie the newspapers *Diário de Notícias*, *Correio da Manhã* and the *Jornal de Notícias* favor the use of this type. For its part, *Público* structures tend to be webpage. *El País* does not present any record of navigability.

But if on the one hand, the use of horizontal structure stands out even articulating navigation, in some cases "mixed structure with horizontal dominance" (Cairo, 2008: 78) is the *20M* that stands out for the diversity of dynamic navigation: scroll, four times; Webpage twice; horizontally once and vertically, none. Note that, the two times that the scroll is used in the *Diário de Notícias*, it activates slide elements, by animation.

**Table 5.** Infographics Design components. Túñez&Nogueira, 2016

Analysis DESIGN 2014/2015		Online Newspapers						TOTAL
		CM	PUB	DN	JN	EP	20M	
Infographics number		14 7/7	10 7/3	8 8/0	10 8/2	20 8/12	13 7/6	<b>75</b> 45/30
Structure	Scroll	35,7%	20%	25%	20%	35%	46,2%	32%
	Webpage	21,4%	50%	25%	20%		15,4%	18,7%
	Horizontal	14,28%	20%	75%	50%	5%	23,1%	21,3%
	Vertical		10%	25%				5,3%
Style	Editorial	50%	100%			100%		49,3%
	Authorship	50%		100%	100%		100%	50,7%
Impact		2,8	4,6	4,37	4,4	3,9	4,5	4,2
Visibility		4,2	4,9	4,9	4,9	4,6	4,8	4,7
Legibility		3,5	4,9	4,9	4,8	4,3	4,7	4,3
Perception		4,3	5	4,8	4,7	4,1	4,8	4,6

**Table 6.** Infographics Identity components. Túñez&Nogueira, 2016

Analysis IDENTITY 2014/2015		Online Newspapers						TOTAL
		CM	PUB	DN	JN	EP	20M	
Animation		1,8	1,7	3,5	2	1	2,1	1,8
Stateness		4,8	4	4,7	4,5	5	3,7	4,5
Interactivity		2,4	3,4	3,8	4	1,4	3,9	2,9
Image	Design	78,6%	80%	75%	70%	80%	76,9%	77,3
	Photo	50%	20%	62,5%	50%	30%	46,2%	41,3%
	Graphic	14,2%	50%	37,5%	20%	40%	30,8%	32%
Aggregated elements	External		10%		10%			2,7%
	Internal				10%		23,1%	5,3%
Multimedia	Vídeo		10%		10%			2,7%
	Áudio		10%					1,3%
	Gallery				10%			1,3%
Animation type	Automatic	28,6%	20%	62,5%	40%		30,8%	25,3%
	Controlled		10%	25%			7,7%	5,3%
Compound type	Integrated		60%		10%	60%	30,8%	30,7%
	Autonomous	100%	40%	100%	90%	40%	69,2%	59,3%

**Table 7.** Infographics Informative components. Túñez&Nogueira, 2016

Analysis INFORMATIVE 2014/2015		Online Newspapers						TOTAL
		CM	PUB	DN	JN	EP	20M	
Structure	Title	92,9%	100%	100%	100%	100%	100%	98,7%



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	Opening	78,6%	80%	62,5%	60%	95%	100%	82,7%
	Authorship	78,6%	80%	87,5%	80%	95%	100%	88%
	Source	50%	80%	62,5%	60%	75%	84,6%	69,3%
	Readers	92,9	90%	100%	100%	95%	100%	96%
Clarity		4,8	5	5	5	4,8	4,7	4,9
Content		1,4	3,2	3,5	3,9	1,1	2,6	2,3
Readability		4,6	4,7	5	5	4,6	5	4,8
Perception		4,6	5	5	5	4,8	4,9	4,9

**Table 8.** Infographics Web components. Túñez&Nogueira, 2016

Analysis WEB 2014/2015		Online Newspapers						
		CM	PUB	DN	JN	EP	20M	TOTAL
Interactivity	Instruction	35,7%	80%	75%	70%	10%	84,6%	52%
	Manipulation		30%	25%	40%		30,8%	17,3%
	Exploration							
Text	Theme		50%		20%	45%	76,9%	34,7%
	Other		70%			30%	69,2%	29,3%
Image	Gallery				10%			1,3%
	Video		10%		20%			4%
Sound	Automatic							
	Controlled		10%					1,3%
Animation	Theme				10%			1,3%
	Other							
Perception		4,1	5	4,9	4,9	4,5	4,8	4,6

In the Style Components, considered as a set of formal aspects and significant features that characterize a text, is positioned infographic composite relative to production in order to observe which graphic line to the sheet. The result is simple: only *Público* and *El País* maintain the type of basic elements, namely, design, line, color, iconography and letter, while the other four –*Correio da Manhã*, *Diário de Notícias*, *Jornal de Notícias* and *20M*– this definition is the responsibility of the author.

Directly related to this issue adds to the visual power of the elements the Impact on the clarity and expression of the visual composition.

In general, all journals are careful about the information visuality (quality of being visual) articulating the concept in terms of tangibilization rigor and cross clarity to society and culture allowing thereby that the composite, as explained Oliveira (2005) reaches "a key role in the understanding of mankind, as it ensures an understanding of the world, being, of spheres of knowledge, and also the unknown" alleviating visual decoding process canceling invisibility since "the vision is touched by the latency of shapes, colors, arrangement given a plastic surface, a topology".

In Visibility, the values go up in scale. It is observed, in particular, greater stability of the *Correio da Manhã* and the general increase in rank, taking *20M* the leadership, *ex-áqueo* with *El País*.

The Readability is used to measure the visual balance of the composition. In this case, the numbers are favorable to the care that newspapers dedicated to each of the observed infographics composites, with a clear predominance of *20M* and *Público* plus *Diário de Notícias*, followed by the *Jornal de Notícias*.

As of Perception, the Informative, Web and Design components indicators differ little from each other and are mostly positive highlighting the *20M* by unanimity. The largest fluctuations are present in the *Correio da Manhã*, in particular in Design and Web components, probably influenced by the fact that the style of those infographics is authoral.

The conditions that led to the choice of a static type at the expense of an interactive, may have to do with the issues of periodicity, however, this choice, even at the expense of the Media skills, it seems, tend to not harm the informative interests nor the dedicated care to the processing of each of the constituent elements of visual journalistic message, nor, visual ergonomics of this composite as journalistic text.

Despite the lack of use of the infographic composite – therefore, subtracting to the potentialities of the theme, those of the Media, as noted in the absence of aggregates elements – the structure of infographics studied in this first week did not interfere with the overall Perception of the informational message. The care that newspapers employed in its realization, even if they could, in general, to go further –as is, for example, the case of extrapolation of Content and Exploration Levels not verified in Web Components–, amplify the competences of informational message. And it is because of this lack of integration and usability that it seems that the issue continues to go through, not understanding the potential of the structure to face the Media skills.

### 3.2. Verification of identity components and informative

In the second week of observation found a few surprises in the Portuguese scenario. Starting with the *Correio da Manhã* that first differed from the *Diário de Notícias* and from *Jornal de Notícias* in the passage from printed to online journalism, also in Infographics, a year later, differed from their peers, choosing, such as *El País*, for create daily infographics, even at the expense of losing competences to the online, as they are totally stateness and without complementarity. For its part, the *Diário de Notícias*, suspended the presentation of infographics of its online edition: currently only found in galleries, those that correspond to the photography.

Except the *Correio da Manhã*, periodicals did not change in a significant way the dynamics of publication. *El País*, despite two interruptions at the daily, beats, again, the record of publications, this time, with twelve entries in seven days of observation.

As mentioned in the Methodology, this second stage of observation has the purpose of marking the results in order to understand what is the newspaper position face the issues of usability and integration of infographic composite in a dynamic media such as the Web. For this reason, it is a more exogenous approach. Although valid and insurmountable in specific cases insist on the issue of Stateness without Interactivity, it can be a form of amputation which, by failing to transpose the barrier of complementarity and informative depth against the scope of the Media, does not allow the dynamic range and, as such, this causes the deviation in the usability of the format.

And if to the non-Interactivity be added the fact that this indicator is essentially integrated in composites where the structure does not go much beyond an Interaction for Education, nullifying an Interactivity that, by essence, actively challenges to research and to increase knowledge by proactivity and that opens doors beyond Explanation level by integrating the Contextualization and Exploration levels which could be assumed as another factor for the very low appealing feature of Online infographics.

Interrelated with the issue of Usability is Integration with a very strong absence as proved by the non-presence of the above-mentioned Content Levels, which forces information text to stand at the 1st level of Tumbled Pyramid. In fact, at the infographics of the second week the Aggregated Elements are non-existent in any format, for any journal, except *20M*, in which three openings are a link to a page on the topic.

In the dynamic text to see if, in typology, fits in integrated or autonomous, *El País* continues to stand out widely for compliance with the thematic effective Explanation or meshing on the subject which, if viewed in reverse and according to the Infographics function, it is a standard deviation of the lack of Content levels. However, even if each

Infographic stands on its own, it represents the level of Deepness against the text, eventually close on its own structure.

In matters of Integration, should be taken into account this dichotomous relationship between two scenarios: i) one in which, tendentially, the Infographic -in that structure parallel with the beginning of Online Journalism- does not absorb or reflect the powers of the Media, but it is, by itself, more a complementary tool and informative presentation, and ii) one in which the depth and informative skills of the text that integrates are notorious in the number of indicators corresponding to the Web Components -and that clearly stands out in the Spanish journals-, although insufficient in relation to the media, it is also rich not only face the first week of observation as well as in confrontation with both tables of Aggregates Elements of Infographic content.

However, nothing has changed in the care that journals and Infographic designers have on the conditions for Perception, in each one of the infographics, continuing to cover, each of them and it's majority, the values that translate the good decoding of a verb-visual information structure, the sum of meaning and sense, appealing and dynamic, challenging the concepts and canons information, without changing it.

### 3.3. Perception of infographic designer on the competences and structural failures

The opinion of infographics producers comes from the responses of members of the *Infographic Society* (IS) who participated in the survey and are of interested in the qualification of the respondent source, though, statistically, can't be considered significant by the size of the sampling, despite being chosen, as shows, intentional. Created from the will of Mario Cameira, Portuguese Designer working at *The Times*, the SI currently has about 30 members, infographic designers in international journals.

Gender Journalistic. Most respondents (66.7%) consider that undoubtedly the Infographics can be considered a Journalistic genre. The answer is almost unisonous if we accept those who ask that consider infographic as a gender depending on the subject or on the approach, and that is nine out of ten.

Elements. In decrescent order, the elements to be considered most important in Infographics are: Image, Interactivity and navigability (coincidence to mark them as the most important to the confluence between the structure and the Media); Text and Iconography; Table/Graphic and Animation; the Audio and Video.

Competence. In Reading Competences, we asked respondents to rank in order of importance, of each of the eight (8) elements, given their role in creating a Infographics Journalism Online. Clear winner was the Preliminary Investigation (75%), followed by Visual Impact (66.7%), and á-exequo, Interactivity, Navigability and Content Levels (58.3%). Followed by Visual Ergonomics (41.7%), Animation (33.3%) and Multimedia (25%).

Reasons to Use. In the main reasons for the use of Infographics Journalism Online, the Perceptual Effectiveness was the undeniable winner. Apart from this, but 50% of respondents, come the Impact News and Update Speed. 50% found the longevity of information. With 33.3% of the choices found Theme Broadcasts and with the same valuation, but at the top of the scale, we find the Content length.

Structural Faults. Structural Flaws that may jeopardize the message reception and perception, the majority of producers consider a failure: Do not contemplate, for lack or excess, the set of elements necessary for informative perception, Do not conceptualize the perception informative, Not meet the informational goals, Do not be updatable, Not meet the multimedia convergence, Not capture the interest (views), Do not be readable, Do not be intuitive. Rather, it is not considered failure: Not meeting the information dissemination World Wide Web. And there is opinion divided those who consider it a failure or not, the fact that Not be interactive.

Structure and/or Information Characteristics. Unequivocally -but that does not stop being curious- the respondents attributed to the Visual Architecture the top value, but with responsibility for both (91.7%) and not to the Structure (8.3%), as it could be expected. Just below, the Interactivity/Navigability will also be the responsibility and both (83.3%) and Intercultural Management (58.3%) followed by Cybercultural Manager, Editor, Content Management and Manager Multimedia formats. Clear competence of the structure is only the Technology and to the Information, the "Data Manager".

Who creates an Infographic. In addition to the production of skills, there are the issues of productive dynamic. Thus, first of all, they have no doubt in that only an Infographic designer or a team of Journalist and Designer may be the creators of a Journalistic Infographic. Now, in the lack of it, or "a team in equal parts," or "for a designer with support of a Journalist" (25% *á-exequo*), although there are those who disagree noting that the infographic structure should be developed "by a journalist with supporting a Designer"(8.3%).

### 3.4. The experts' assessment: support, function, content and reception

The Infographics can be considered a step forward in regard to the representation of the information reality, like the advent of NTIC applied to journalism, the more we continue to talk about a concept that has come to affect a structure that appears to have understood not its technical operation or intertextual, but synergistic, hypertext, multifunctional and comprehensive, and to cause an apparent tend to the sub-utilization of the network capabilities.

Therefore, this research drew up a panel of experts who study and create infographics. The group, consisting of five reference names in the world, is integrated by infographics experts from *The Guardian* (Xaquín Veira, XV), *The Times* (Mario Cameira, MC), the *Computer Science Centre of the University of Miami* (Alberto Cairo, AC) and *National Geographic* (Chiqui Esteban, EC), was interviewed in depth with structured questionnaire to basically address five key issues:

#### 3.4.1. How does influence the support off/on line in the infographics

The Web journal refers to uninterrupted information in support in changing the format and information because you migrate the Inverted Pyramid of printed, to Tumbled Pyramid at the online, and is set to cyberjournalist, while content mediator, starts to produce nonlinear journalistic texts, with consequent information complexity, a qualitative multi-dimensional spiral about its content. In this context, "the attention that reference media is providing to precision journalism -and visualization de data and ace of depth reportages with profusion of multimedia elements- Snowfall in the NYTimes and similar" grants to be "the ideal time to the development of Interactive Infographics, more dependent on the ecosystem of each communication media"(XG).

In the scenario of audioscriptovisual production, the formation of cyberjournalists must be grounded from the perception of its role of mediator/producer of knowledge, Socio-Anthropological Culture and Informational Culture regarding the urgent need to think about the first online and not think writing and take online. Nevertheless, "although there are excellent examples around the world, most of the directors, editors still do not think the online journalism seriously" (MC)

Media differentiation is still pending: "There are many things we do online and from there we use for paper. Sometimes, the chart is updated with new online-only data, and the last hour, we take it to the paper"(CE). Is a productive hybridization in which the product costs and processing times is joined in favor of multimedia features, the difference of available space "a written account of yesterday's news"; online "I saw videos of seconds

posted on Twitter and documentaries; I saw a infographic a timeline, a gallery of the best pictures, so many that, only half, would not fit on every page of the printed newspaper" (MC).

#### 3.4.2. What is the role of an Infographic

The variety of genres makes the field of visual representation of information an extremely attractive and considerably unlimited tool. But each specific outcome is for the sole purpose is to present in a structured manner, a set of visual tools, which will be used to that by extracting knowledge "more people are able to understand the full content in less time and therefore are more given to share and to remember the message" (CE).

The visual appeal of an Infographic "is an important value" (AC) because "you will be able to explain the contents otherwise" (MC). The main function of the infographic is to support information and/or for information and to perceive deeper and, so, easier storytelling medium. "It's a support or a tool for the reader to see that information in more depth, with more detail" (AC), because it is better understood that "it is much easier for someone to leave a text or video half way, that to leave an infographic halfseen" (CE) and because "it's easier to understand a visual message that only written" (MC).

#### 3.4.3. Contents and Reception of contents

In journalism there is a need to select, in an evaluative from, the themes to disclose. As news-making ingredient, also in Infographics, "each story requires a way to be told" (CE). To avoid ambiguous narrations it takes more than knowledge of the basics so you do not run the risk of "to lie visually (included using real data)" (CE) or make the infographic "an object of pure entertainment, liar and/or propaganda, disguised as significant"(MC).

From the point of view of functionality, what matters is that the infographic has to work on computers and gadgets "not only technically but also narratively" (CE). From an editorial point of view, and Infographics as journalistic genre since, "Infographics is already so" (XV) must obey the rules that constitute the Code of Ethics and Deontology of Journalism and care in its construction must be the same "that the construction of any other journalistic piece, plus adapted to characteristics of structure" (XV).

That is, should be confirmed equal accuracy in the overall treatment applied evidently included "the visual part of it."

#### 3.4.4. Preparation/Author

Depending on the size, ambition, needs, theme and resources to structure the best way to tell a subject, the information should be considered, professionally, as a group work in which will incorporate the Infographic designer. Therefore, experts agree that the creator of an Infographic "has to be first, Journalist" because "you have to know how to identify a story, look for the sources, etc... as any other journalist." Nevertheless, across the board and in a general effort, the lines of creating an Infographics are always beyond journalism.

The Journalism of reference makes Infographics one of its integral elements of information. And even if it does not refer automatically to a qualitative mutualism, proves this structure as a communication tool in expansion, a requirement that insists - and remains - the question of jurisdiction. "Quality is key and the only way to ensure is that the journalist knows all these areas," this means areas such as Scientific Analysis, Cartography, Cognition Sciences, Cognitive Psychology, Design, Information Engineering, Statistics, Mathematics, Programming , different software, among others. Assume this professional "they are all essential, they are not dispensable" (AC).

The infographic producer should therefore expand their skills, essentially, from a professional point of view. Not abounding with traditional knowledge, graphic design also

have to think "have to have knowledge of both engineering as visual perception, in order to represent the information correctly" (AC) because "the multimedia quality of infographics makes of it, a priori, a way to communicate more fully, but also more complex to produce"

#### 3.4.5. The relation of the reader with the narrative Infographic

Online, the particular characteristics articulate a new type of relationship between the reader and the content of inter-dimensional and multi-narrative. The disappearance of distance and duration of the published informational content -set the urgency of immediacy- places the burden on the structure causing between the reader's requirement and the point of arrival of any journalistic process, arise the main questions that professionals journalists face in writing for Online.

There is a coincidence that the current journalistic everyday initiates as a new information culture that turns the differences between the design characteristics, consumption and delivery of online journalistic product, taking into note the three-dimensionality of online information-news text (time-space-propagation/depth) and "communication behavior" David Berlo (1989: 23) and it is from here that experts assume that it is time that the infographics have answer three basic questions about herself:

- a) What Language? One that combines the relationship between Interactivity, Animation and/or Hypertextuality, Complementarity and Depth, because to the online informative journalistic text, you belong to these references, an added value that still seems not always work, in practice. Being able to "use text, video, audio, pictures... all previous concepts and add diagrams, interactive tools..." (CE) adds to the interactive capacity and direct communication inherent to the infographic structure.
- b) What Structure? The one inherent to Hypertextuality, serving the different online levels of the journalistic text. The Infographic Designer "have to think, when chart creation, how the reader will use to extract information" and see what graphic shapes work best for each context" (AC), a knowledge that no professional if you can shy away from use, at the risk of penalizing the overall perceptual competence of the message.
- c) Editorial Methodology? The exclusive journalism for online, so that, when searching for the communication unit to observe the synergistic functionality of the structures, preventing plurifunctionality, and the cognitive stress, because the language of the media differs from each other, and is at its individualization that is achieved the broad message decoding, making it perceptive in all its aspects. In reality, it can be seen today some tendency for an inversion of habits, in particular as regard to breaking-news. It is to say: Infographics both interactive and print are an impact element in any Media diffusion structure.

#### **4. Conclusions**

The Infographics decoding process is always individual. The relationships that must bind a stimulus to its perception, will always be of deductive character and conditioned by the issues that shape the individual. The Infographics represents the added value of guiding the receiver in this deductive process through clues that pave the way for explorative deduction, a process that can be verified, interestingly, in Production Skills where the choices of producers -after Interactivity and Navigability- turn to the Intercultural Management and Content, and Cybercultural Manager and Multimedia Formats, with equal importance in matters of Structure and Information. The Infographics Online is also an emerging format with integration absences in Media, but with informative content. The composite style does not interfere in the outcome. The format is fulfilled, independent and endeavored, because,

in the Media, it is present without being. Lacking is not the role of the producer, but of the owner.

It can be considered sufficiently detailed the Perception of the Producer about the influence of the support, its function, its contents, authorship and the relationship with the audience so we will focus on completing on other topics: intensity and frequency of use of Infographics, identity elements and items of information most used, mnemonic aspects attributable to the Online Journalism Infographics and the meshing of these mnemonic skills.

In short, as positive elements and stimulators of Infographics on Online capabilities appear Clarity, Readability, Legibility, Visual Ergonomics, Visual Seizure and Acquired Knowledge. The latter three match issues of Informative Perception Level in the memory and Coverage are confirmed by the high values of Perceptive Effectiveness (92%) as a Reason of Use and the concern of producers (83%) of Not contemplate, for lack or excess, the elements for Informative Perception will *á-exaequo* with the Not conceptualize Informative Perception.

In terms of less positive elements, we have the high Stateness, stimulated by the almost total absence of aggregates elements and Lower Interactivity. But in reality, the question of Stateness allows maintenance intervals and the type of integration and the issue of Editorial Design, which also allows speed up the construction process. However, the characteristics of high production levels is inversely proportional to adapt the compound to the media.

Also on this level, the Low Interactivity indicates some Interaction, however, because it is of Execution, this is characterized by Instruction, which only allows access to the Explanation level of Tumbled Pyramid, excluding, therefore, the Contextualization level and the Exploration Level, confirming the absence of informational depth and laterality in the Infographic Online structure.

Also, the almost total absence of Aggregates Elements indicates not only that absence of Multimediality and lowest Content Levels confirm this state of lack of Informative depth and laterality in the Online Infographic, but also the dramatic absence of the Hyperlink, which, because articulator and sense generator in Network Intertextuality is the granter of value of the Media competence as a Measuring unit of visualizations (which leads us to "the quality of the overall user experience" of Chammas and Moraes, as an element to measure the usability of product).

Moreover, it is interesting also to notice some relations that appear on the results of the Infographic compound. Thus, it is curious to realize that if "Authorship", the compound is Autonomous allowing some (low) percentage of Animation. In contrast, if "Editorial", the compound is Integrated, however, tends to be static, a characteristic that enables a larger production and more regular intervals.

The Visual Ergonomics is effective, even in static compounds, despite the low concern of producers (Infographic Society) on this item.

The Efficiency and Utility –as informative Control and Progression– of the infographic content face the Media information content is not proven by the data. In other words, the study does not show a fusion of media and its informative functionality.

This means that the informational efficiency of the compound is effective individually, but as whole falls short of the Media Online Immersive skills, a requirement that ultimately interfere with the proportional decrease in the utility of its contents: 1) for the Media, which is confronted by a non-cohesion in message continuity and continuum, due to the need to recover, with Efficacy, and in an Integrated way, the continuity of the theme and the reader's interest; and 2) for the Reader, which could benefit on the issues of Accessibility to a translinguistic interpretation system –that would increase Media popularity, also across borders– by the use of universal and direct language applied to a more embracing structure.

On the other hand, also on the degree of Usability applied to the Infographic Online - considering Integration and Adaptability- the data do not show a fusion of Media and Product, that is, the degree of Usability of the compound becomes scarce, individually, inner and outer space, and the group falls short of Integrative skills Media Online, a functional shift that will interfere in the proportional decrease of Usability on Online Infographics, in particular on issues 1) informational dexterity and information density, online temperament characteristics and 2) the economy, that is to say, the profitability of the product and the Media as, the compound being infographic an eclectic support is, therefore, a versatile structure with a comprehensive language and effective instantaneous information.

From the results, we can see that there is, indeed, a sensory and affective effort for Permanence and Narrative in meshing mnemonic competences in Online Journalistic Infographics. But despite the effort, there is no effect, either for the poor visibility given by the Media to the Infographic compound either for the failure of Productive, Informative, Usability and Integration continuity.

On the other hand, to the Online Journalism is inherent the question of Fast Food and Self-Service Newsy, two heavyweights in the dilution of editorial power and of informative impact, but given the tendentially positive value of speed upgrade as Reason for Use, that allows us to believe that Online Infographics is an emerging format.

In the Media, the Infographic compound is present but not existing. Lacks the owner role for the adjustment of the editorial dynamics, enhancing their profitability, to accomplish the relation between Media and Product (Integration), the relation between Media and User (Usability), the confluence of the content (Information) and the convergence of formats (Production).

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