

## THE RELATION BETWEEN INFOGRAPHIC AND VISUAL LITERACY

Banu İnanç UYAN DUR, Assoc. Prof.

FMV Işık University, School of Fine Arts, Dept. of Visual Communication Design

inanc.uyan@isikun.edu.tr

### ABSTRACT

The developments in communication technology didn't only affect the visible side of life but also transformed the ways of thinking, perception and interpretation. The form of communication through visuals is accepted to be the reality of today. On the other hand, the digital evolution due to the advances in technology has had the advantage of ever increasing flow of data and information. Therefore, processing the intense, unorganized and complex data to transform them into meaningful and useful datasets has become an area gaining more importance. Making information more understandable for wider audience requires the presentation of data through systematic visualization. Therefore, infographics have become an element that is used more frequently in every media. Infographics fulfil a very important need in this age by presenting the information and data that increases due to technological developments through an understanding focusing on functionality and aesthetics where visual communication is in the center. In understanding infographics, the visual literacy level of the user is a factor that is as important as the quality of the design. This article examines the relation of visual literacy with the process of reading, perceiving and interpreting the infographics.

**Keywords:** Infographic, visual literacy, data visualization.

### INTRODUCTION

Ever increasing data and information flow has been another advantage of the age in addition to the dominant power of visuality and visual communication. In the age of information, the importance of visual design in the presentation of complex, unorganized information and data through a certain systematic organization is increasing. Therefore, there is also an increase in the use of infographics that presents information through visualization in various communication media. The subjects addressed by infographics are the multilayered, intense and complex information contents that need to be presented systematically. Infographics are strong instruments that present information through stories and that have the qualities of being educational, persuasive and guiding depending on the content. Infographic applications can be used every media from printed ones to digital ones in manner which is stationary, animated or interactive. In the design of infographics, various elements including data visualization, map, illustration, photograph, typography and colour are used depending on the content. An infographic, which has a high aesthetic quality and which is functional, includes variables that affect the result from the relations of all these elements to the design principles like integrity, balance and hierarchical order. From this point of view, the success of infographics to fulfil their purposes is considered to be depending on only the performance of the design team. This article deals with the infographics as the structures that require reading practice and examines their relation with visual literacy.

### THE CONCEPT OF LITERACY

The concept of literacy is frequently used in the same meaning with reading and writing skills. This traditional perception dates back to the period when printed media was dominant and it considers the literacy as the skills of reading and writing and as the process of acquiring cognitive skills. However, literacy has a wider conceptual content than the reading and writing skill which is an act realized with writing symbols. "Contingency is the leading essential quality that distinguishes literacy from reading&writing. Reading&writing is a process that requires communication by the reader between the written material and the scope of the reading condition while literacy refers to the ability to make changes between contexts and to the transfer of skills to different contexts (Gül, 2017, p.19). Literacy includes not only the reading&writing skill but also the mental processes that require processing and interpreting the information at a conceptual level.

Technological, social and cultural developments have widened the content of the literacy concept during the course of time and caused the emergence of new literacy types. There are several types of literacy including Information literacy, media literacy, cultural literacy, emotional literacy, critical literacy, web literacy, universal literacy and financial literacy etc. Evaluation of the concept of literacy by the own theoretical points of view of every discipline caused the increase of terminology variations and some differences in definitions. Under every condition, literacy is considered to be a sign of a certain competency in the concerned discipline. The common qualities in the definitions of all literacy definitions are the abilities of interpreting information, using it functionally and producing new meanings by associating it with different information.

### VISUAL LITERACY

Mirzoeff stated that "human experience is now more visual and visualized than ever before" (1999, p.1). Several

studies demonstrate that we live in a visual age that reshapes social processes, communication, ways of perception and interpretation (Barnard, 1998; Lester, 2000; Parsa, 2004; Sartori, 2004). All applications that have changed everything of man and life radically including the Internet, smart telephones as an indispensable instrument, social media, mobile applications, video games, virtual reality and augmented reality are visually oriented. The transition from page to screen and from word to image due to the developments in communication technologies has also caused changes in the concept of literacy. The fact that the people today are facing too many visual images ever before increased the need for visual literacy.

Visual literacy can be defined to be the abilities to define visual, solve their messages, use a visual language and create new meanings. According to Felten (2008), visual literacy includes the skill to interpret, design, produce and use cultural based images, objects and visual resources. Yenawine (2015) defines visual literacy to be the skill of finding the meaning in images while Sinatry (1986) considers visual literacy to be the effective restructuring of visual messages by past visual experiences to create a meaning.

Visual literacy is a skill that can be learned and improved like a language. Seeing is before speaking and words in the development process of humans. In visual literacy, visuals are interpreted depending on environmental conditions including past experiences, culture, education level, social and economic levels. “Visual literacy, like language literacy, is culturally specific although there are universal symbols or visual images that are globally understood” (Stokes, 2002, p.12).

Irvin Rock (1995) states that the brain doesn't perform a simple identical recording of the world but creates a unique picture of it. Signals transferred to the vision center go through an interpretation process by the brain with regard to what the seen thing is. Therefore, human beings are not passive audience in perceiving the world. Cognitive data, memory and experiences are combined to create a meaning about what is seen and the world is almost restructured in the mind. The previous experience and knowledge have a dominant role in this interpretation process. John Berger (1990, p.8) supports this idea by stating that “the way we see things is affected by what we know or what we believe”.

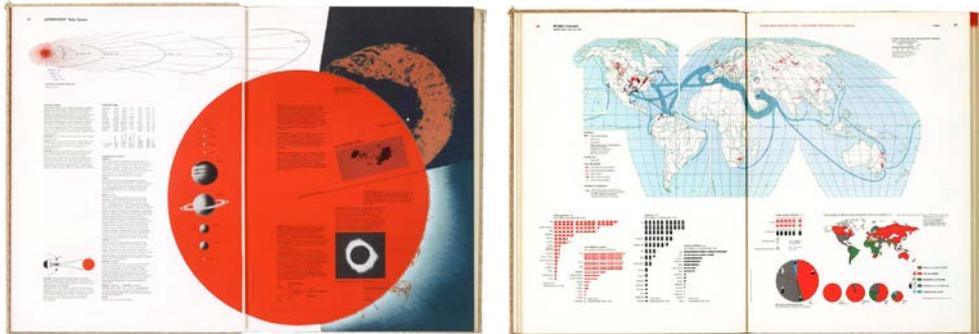
#### **RELATION OF VISUAL LITERACY AND INFOGRAPHIC**

Old definitions on visual literacy focus on the skills of analyzing and evaluating the image and establishing communication. However, most of the modern definitions on visual literacy includes all the components of design and creation as well as the interpretation of visual images. Visual literacy is considered by Avgerinou (2009) to be a series of acquired competency for producing, designing and interpreting visual images and messages while Seels (1994) sees it as a gained skill for visual communication, visual thinking and visual learning. In this aspect, visual literacy is a competency that needs to be present within all process from the creation of visuals to the interpretation of them by the person.

From the designer's point of view, visual literacy competency has to be high. As mentioned above, visual literacy also covers the design and creation processes. Therefore, the subject has to be considered from the perspectives of both the designer and the user when evaluating the infographics in the context of visual literacy. Infographics are usually produced by a team work depending on the scope of the subject matter and on the qualities of the content. For example, if the subject matter requires expertise in a certain field, the team includes an expert managing the content while interactive applications may include a software programmer. In every condition, the designer is responsible for the face of the infographic seen by the user. Visual decisions in the elements of infographic including data visualization, illustrations, colour, typography and map are given by the designer. At this point, it is necessary to emphasize the fact that the visuals are carriers of culture. Culture is an important element that affects the production process of visuals. There are some cultural differences in visual communication according to several studies (Kress & Leeuwen, 2006; Jun & Lee, 2007; An & Kim, 2007; Callahan, 2007; Wu, 2008). There are different visual languages just like the different alphabets and verbal languages in the world. Visual languages vary among cultures just like the verbal language. Gunther Kress and Theo van Leeuwen argue that visuals have also a grammar structure like the verbal language. The visual grammar concept introduced by Kress and Leeuwen (2006) in their book 'Reading Images: The Grammar of Visual Design' is a new approach on reading visuals. Kress and Leeuwen suggest that visual images can be read like texts and the grammar may be method used when working on visuals. “Grammar” is a sequence of resources that are combined for structuring the meaning rather than a sequence of rules for the proper use of visual language. Kress and Leeuwen state that the visual language which is specific to every culture has a specific visual grammar like the grammar of every verbal language includes unique differences. The fact that visual language and visual grammar are culture-specific elements is a very important guidance point for the process of infographic design. The precondition of an effective visual communication is the match of the visual language of infographics with that of the user. Again, the level of visual literacy of the user is very important for the

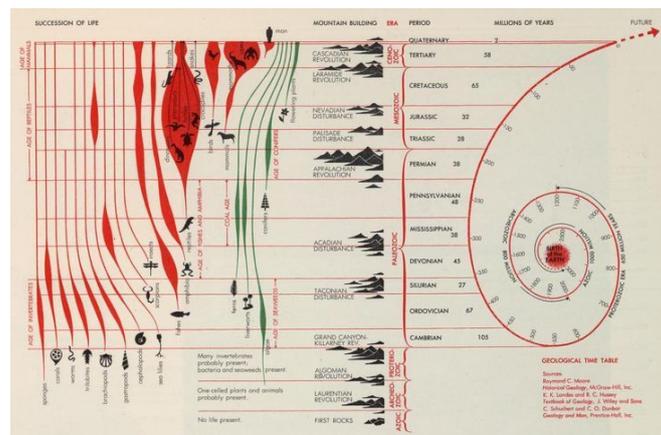
establishment of an effective communication by the infographics despite all these preconditions.

It requires a general competency to read visual language and solve the codes in the images. However, it requires even more to be able understand infographics. At this point, it would be useful to state that this article deals with infographics which visualize broad subjects that include all or a big part of the elements such as illustration, map, data visualization and typography. For example, Herbert Bayer’s ‘World Geographic Atlas: A Composite of Man's Environment’, a book of 363 pages which he designed in 1953, is considered to be a milestone for the visualisation of information and it includes many comprehensive infographics (Figure 1).



**Figure 1:** World Geographic Atlas: A Composite of Man's Environment, Herbert Bayer, 1953.

The Atlas contains comprehensive infographics with several information data as well as conventional geographical maps. Therefore, it can be shown in the article as an example of the infographics with layered information sets and pattern structure to the extent of addressing within the context of visual literacy. The infographics in the atlas provide a comprehensive overview of the economy, geology, demography and climate of countries and they require the skill of visual literacy. For example, one needs to have the skill of “using the past information and associating information” as included in the definition of literacy to be able to understand the geographic time chart. (Figure 2). Although the illustrations and shapes that are used are understood at a single glance, it is not possible to solve the infographics without perceiving the functional structure of the unique design of the time chart. People are used to timelines however Bayer created in his work in Visual 2 a unique and brand-new time chart which is so improved that it can contain more information. The user should have the skill to use the functional logic of the timeline which he or she is used to for using as a guide to understand this chart which he or she is seeing for the first time. If reference is made to the definition of visual literacy from this example, visual literacy means not only knowing a thing but also making new deductions by using the possessed knowledge.



**Figure 2:** World Geographic Atlas: A Composite of Man's Environment, Herbert Bayer, 1953, p. 17.

Infographics are different from graphical design works like posters that are expected by its nature to transfer a message at one sight. Although the easy and fast perception of data is within the success criteria of infographic,



(Figure 4). Rebecca revealed the method of each graphics to present information (operation principle) and the data content where it is more effective in presenting.



**Figure 4:** The Data Visualisation Catalogue, Severino Ribecca.  
<https://datavizcatalogue.com/>

As shown, there are several graphic instruments to visualize information. A certain competency of visual literacy is necessary for these instruments to provide an effective communication and transfer information. Types of information visualization like network diagram which indicates in the interconnection of facts, tree diagram which indicates the hierarchical classifications and timeline which indicates process can be perceived more easily since they don't include numerical data (see visual 2). Data visualizations including numerical values require a more improved level of visual literacy to understand if they are not one of the frequently encountered graphics. At this point, it is necessary to deal with the question of what can be called as data visualization. A frequent mistake is to call graphics without numerical data as data visualization. Data visualization can be called as the visualization of numerical values through tables and graphics and as the conversion of raw data to visual information. The most important aspect of it that it includes clear information based on measurable statistical data. For Friendly, "data visualization, the science of visual representation of "data", defined as information which has been abstracted in some schematic form, including attributes or variables for the units of information" (2009, p. 2).

Since data visualization contains too many numerical values, it is one of the strongest instruments used in infographics. As the data layers included by these strong instruments increase, a more improved level of literacy is required. For instance, "A classic "bar chart uses horizontal or vertical bars to show comparisons among categories. One axis of the chart shows the specific categories (dimensions) being compared, and the other axis represents a discrete value (metric)" (<https://support.google.com/datastudio/>). Bar graphics including only double layered information set are read more easily (see Visual 2). In addition, people are more used to bar graphics and pie charts as they are used very frequently. Radar/spider chart is a graphical method of displaying multivariate data in the form of a two-dimensional chart of three or more quantitative variables represented on axes starting from the same point (<https://appsourc.microsoft.com/>). Therefore, a more improved level of literacy is required to understand the radar graphics which include more data layers (See Visual 2). The phrase of "improved level of literacy" is intended to refer to a previous encounter with the "visual" information which is mentioned earlier. The visual literacy required by the modern age is the fact that the person has the motivation to understand or to look for the ways of understanding the new information with the existing qualities. It requires a literacy skill where more active processes are involved like searching, finding, processing and interpreting knowledge. In addition, new literacy skills are variable. Visual contents that are continuously spread from the Internet, social media and television require a skill of visual literacy that can adapt to changes more rapidly.

"Leu, and colleagues (2013) examined and analyzed the existing studies and proposed the principles of the theory of new literacies" (Destebaşı, 2016, p. 897). Some of these principles can be listed as: "The Internet is this

generation's defining technology for literacy and learning within our global community; New literacies are multiple, multimodal, and multifaceted; Critical literacies are central to new literacies; New forms of strategic knowledge are required with new literacies" (Destebaşı, 2016, p. 897).

Current studies associate visual literacy with the skills of adapting to the digital world and virtual media, understanding the visual contents produced by this media and creating content. In this context, the relation of animated and interactive infographics require more different competencies. The skill of effectively using the instruments of digital world makes it easier to understand interactive infographics. The interactive infographic applications can be web-based as well as included offline in the interface of a software product or a mobile application. The user has an active role in the interactive infographics. The user interaction includes controls like selecting the information, conducting searches and actively shaping the content to be shown. Thus, the user controls himself or herself when and how detailed to control the information. The user having such a control on the information enables interactive infographics to contain more information than their static (printed, non-interactive) versions. In this sense, the ability to better use the possibilities of the digital world with respect to visual literacy has a significant effect in the stage of analyzing the meaning structures in the interactive infographics.

Visual literacy cannot be considered to be separate from media literacy. Media literacy is defined to be the skill of reaching, analyzing, evaluating and conveying the messages in a diversity of formats (static, printed, visual, audio, motion, interactive, multimedia etc.) (<https://www.medyaokuryazarligi.gov.tr/>). In this aspect, it is necessary to have the skill of using digital media technologies that provide new communication forms to understand the "interactive infographics" that include elements like "interaction, audio, animation" together with the visuals.

## CONCLUSION

Infographics provides functional and aesthetic presentation of multilayered intensive information and processes that include not only visuals but also elements like audio, animation and time depending on the media. Infographics consist of the combination of elements like "typography, image, illustration, map, data visualization, audio, animation and time" which are contained in its structure. However, none of these elements can be an infographic on its own since infographics tell a comprehensive story by using all of these elements. Therefore, it is not sufficient to understand each of the said elements for understanding the infographics and for achieving the maximum benefit from the information. Understanding the whole story takes place by understanding the structure that consists of the interrelation of all these elements. With this aspect, infographics require an improved skill of visual literacy.

The relation of infographics with visual literacy doesn't only arise from the fact it is a structure that presents information through visual way. Understanding the pattern of all elements in the infographic with each other and the story told by this pattern requires an analytic approach where the visual structures are analyzed and re-combined. Messaris (1994) also reports that the visual literacy skill is a derivation of the general cognitive skills of a person.

Infographics intend to create a change in the audience. This basic goal sometimes involves the increase of information level of the user, sometimes persuasion of the user for an idea, directing the perception of the user and sometimes mobilization of the user directly. Significant components of visual literacy include the skill of questioning the accuracy, validity and reliability of images. Infographics have a great power of persuasion and guidance as they include numerical data and use the visual communication channel which is the most effective interaction method. From this aspect, questioning the accuracy of the information in the infographics and recognizing possible manipulations can only be possible by reading, understanding and evaluating the infographics by an analytic approach. Critical approaches without sufficient information cannot provide realistic results. As a result, establishment of effective communication by infographics doesn't depend only on the fact that is designed well on its own (ideally). The communication success of infographics takes place through a double-sided effort. The visual literacy level of the user is a factor in understanding the infographics as important as the quality of the design.

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