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# Proposal of a method of analysis for visual narratives applied to a pre-columbian codex representing time and space

## Propuesta de un método de análisis para narrativas visuales aplicado en un códice prehispánico que representa tiempo y espacio

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### Abstract

This article presents the proposal for an analysis method designed for the study of narratives that use visual language. It was applied on a sheet of the Codex Zouche-Nuttall and arose from the interest in corroborating that Mesoamerican manuscripts use visual signs to convey information.

To define the method, qualitative exploratory research was carried out using documentary review. The shortage of previous studies on methods to analyze visual language led to the definition of a sample of five areas of knowledge. Of these, the following were chosen as the foundation of the proposed method: Narratology, Iconography and both Visual and Information Design.

The results indicate that the method facilitates the identification of visual features, narratological attributes and iconographic motifs of each of the signs. It also helps to categorize the characteristics of signs and scenes in terms of the information they propose. This makes it possible to verbally describe the representations of both time and space in the manuscript.

The method contributes to the understanding and description of the features that are used in the design of signs: symbols and pictograms that express attributes of both time and space.

**Keywords: method, analysis, time, space, Codex Nuttall**

### *Resumen*

*Este artículo presenta la propuesta de un método de análisis diseñado para el estudio de narraciones que emplean lenguaje visual. Se aplicó en una lámina del Códice Zouche Nuttall y surgió del interés por corroborar que los manuscritos mesoamericanos emplean signos visuales para transmitir información.*

*Para definir el método se realizó una investigación cualitativa de tipo exploratorio empleando la revisión documental. La escasez de estudios previos sobre métodos para analizar lenguaje visual condujo a la definición de una muestra de cinco áreas del conocimiento. De éstas se eligieron las siguientes como fundamento del método propuesto: la Narratología, la Iconografía y el Diseño tanto Visual como de Información.*

*Los resultados indican que el método facilita la identificación de rasgos visuales, de atributos narratológicos y de motivos iconográficos de cada uno de los signos. Asimismo, ayuda a categorizar las características de los signos y de las escenas en cuanto a la información que proponen. Con ello es posible describir verbalmente las representaciones tanto del tiempo como del espacio en el manuscrito.*

*El método contribuye a la comprensión y descripción de las características que se utilizan en el diseño de signos: símbolos y pictogramas que expresan atributos tanto de tiempo como de espacio.*

***Palabras clave: método, análisis, tiempo, espacio, Códice Nuttall***

## Introduction

Visual language-based narratives are those that use an alphabet composed of signs other than words (verbal language) to narrate some event, certain parts of a story or even an entire narrative.

Today, this type of visual stories can be created by graphic designers and are seen in pieces of visual communication, such as infographics, book covers and posters, among others.

Over 10 centuries ago this type of communication was observed in the pre-Columbian codices, i.e. "manuscripts made on a flexible support that contain elements of one of the native writing systems" (INAH TV, 2010, 0:10). Particularly, those elaborated by the Mixtecs used direct writing (van Doesburg, 2011) or pictographic writing. These codices used pictograms made with simple and necessary features to represent everyday reality issues, in order to be communicated regardless of the reader's language, as long as the reader understood the context and genre of the text in which they were presented.

It is appropriate to mention here that, although the term "ichonogram" would be the most appropriate to name the signs used in a codex, since it refers to "an iconic sign that, as an illustrative representation, emphasizes the points in common between signifier and meaning" (Abdullah and Hübner, 2006, p. 10), the use of the term "pictogram" or "pictography" will maintain to respect the anthropological lexicon.

It is also necessary to explain that, in addition, within codex writing it is possible to find signs that correspond to the description of a symbol which, according to Marafioti (2010), is something that represents "by means of some conventional, habitual, dispositional or any other legal type of relationship " (p. 94).

The *tlacuilos,* among the *Mexicas,* and the *huisi tacu,* in Mixtec culture, were the people who communicated, through this language, information about calendars, cartography, economics, genealogy, history, rituals, among others. By observing the codices that are still preserved, it is possible

to deduce that part of the learning of our pre-Columbian tlacuilos-designers consisted of activities similar to those carried out in the current profession; an example of this is the mastery of techniques around color: in the case of codex painters, they had to manipulate minerals to produce color, while current designers apply it in different media and materials. They also specialized in the use of methods for the preparation of the substrate on which the information was transcribed, in specialized knowledge for the application of formal and aesthetic rules of language, as well as in the iconography used in the region, and even in the investigation on the subject matter addressed in the document in question.

This article presents a method for analyzing two concepts found in visual narratives: time and space. Its objective is to describe the visual characteristics used in the representation of these concepts and thus contribute to the understanding of the rules established for the visualization of the information to be communicated. In this way, it is expected that after reading the article, the phases and steps used in the method will be understood in general.

Before continuing, it is necessary to define the two concepts referred to: on the one hand, time, which, from Cassirer's philosophical perspective (2016), is proposed as "a process, a continuous stream of events without truce, in which nothing returns in the identical form" (p. 100), within "an infinity of time" (Kant, 2018, p. 53) that can be indicated by means of temporal markers, which in the case of pre-Columbian codices are related to the 260-day calendar called *tonalpohualli* in Nahuatl.

And, on the other hand, space, which is a dimension that exists around people and is part of their lives, since "human activity takes place in a multitude of spaces" (Tversky, 2003, p. 76), and is there, although it is not seen. It is perceived, says Cassirer (2016), that is, "it has a very complicated nature, containing elements of the different genres of sensory, optical, tactile, acoustic and kinesthetic experience" (p. 89).

Additionally, it should be specified that anthropological methods are used for the study of codices. One of them is the one proposed by Joaquín Galarza: a "systematic, exhaustive and scientific analysis of all the elements in the codices [...] created in such a way that it can be applied to different groups of traditional indigenous manuscripts" (Fernández Díaz, 2017, p. 25). Its objective is to interpret the written language in the codices. This method consists of six phases: the first two deal with separating the signs and the last four constructing the reading of the manuscript.

Methods whose approach is the Iconography understanding are also used. This "is the branch of art history that deals with the subject or meaning of works of art" (Panofsky, 1955, p. 26). It "describes, analyzes and, eventually, interprets the content of the images generated by the visual arts through verbal language" (Cayuela Vellido, 2014, p. 3). In

other words, it is "a description and classification of images" (Panofsky, 1955, p. 31). The method proposed by Panofsky uses three phases: the first that deals with identifying the forms and expressions represented, the second that describes and classifies the topics addressed and, the third whose purpose is to interpret the content of the ideas, concepts, images and themes reflected in the work.

In the field of Design, definitions of communication elements that make up the units of the visual alphabet were found, although it was not possible to find a specific method to the discipline that would allow the analysis of these components. Among the first studies on the subject are Bertin's (2011) conceptualization of visual variables, which was published in French in 1968, as well as Dondis' (1988) visual literacy, which was originally published in English in 1973. More recently, there has been publications such as those of Iliinsky and Steele (2011), who approached the concepts from the visualization of information, and that of Leborg (2013) and Lupton and Cole Phillips (2015), who explore them from theory (the first) and practice (the latter), complementing the aforementioned definitions.

On the other hand, in the field of Information Design, "discipline that addresses the organization and presentation of data [i.e.]—its transformation into valuable and meaningful information" (Shedroff, 1999, p. 268), and whose purpose is to "communicate, document and preserve knowledge" (Schuller, 2007, para. 2), no methods were found to study visual communication elements or to analyze historical documents where pictographic language was the source of communication.

Due to the nature and age of the document, it was important not to keep in mind that regarding pictograms or iconic signs, a "person must have a certain visual repertoire, as well as previous experience/knowledge on the topic/subject to correctly infer about the meaning of the icon. Otherwise, the communication of the message will be affected" (Spinillo, 2022, p. 2). It should be noted that this happens not only with the understanding of the icon, but also with that of the index; although this form of the sign has a closer relationship with reality, it is necessary to place oneself within a certain worldview to understand the meanings of the signs in the environment.

## ICD Method

A study of various disciplines that would facilitate the study of pictographic manuscripts was carried out, establishing as a criterion for their inclusion those that would enable the description of characteristics used in the design of time and space. From the selected disciplines, the iconographic method of Art was chosen, as well as the study of components of Narratology, Information Design and Visual Design. Based on these choices, the phases and steps that structure the ICD Method, which gets its name from the initials of each of its stages: identification,

categorization and description, were proposed. This was used as a pilot test on a sheet of the codex.

Following the results obtained in this test, the icd method was adapted to be used in five sheets, including the one analyzed in the pilot test. Finally, a third adjustment was made that applied to eight sheets, including the five previously analyzed.

***Brief chronicle of the definition of the ICD Method***

Initially, Anthropology, Hermeneutics, Semiotics, Iconography and Narratology were considered of as the base of the method, so a study of their purposes, methods and objects of study was carried out, resulting in the choice of two of these disciplines: Iconography, due to its interest in understanding the icons, images and themes present in works of art, and Narratology, because it deals with studying the structure and function of narratives, within which Mesoamerican codices of historical type can be considered. To these two was added Design (Visual and Information) as the third discipline that underlies the proposed method.

The next step was to understand the method and the components proposed by the selected disciplines. This research allowed to define the iconographic study proposed by Panofsky from Art as the basis. From this, both the decision to use three phases and the general characteristics of the purpose of the first two stages were recovered: identify and categorize. From Narratology, the study of the following components was taken: time, space, character and action, so their attributes were defined. From Information Design, various definitions proposed between 1999 and 2016 by professional design associations were analyzed, from which the most representative of the area were selected and, from these, the useful labels to categorize were determined. To complete this journey, a study of basic elements of visual literacy based on five different authors was carried out. Visual features were chosen and defined by studying color, shape, size and direction, as well as their relationships.

***Structure and objectives of the method***

The ICD Method aims to explain features of the pictograms in the Mixtec codices from the narratological, iconographic and Visual and Information Design perspectives to verbally describe the visualization of time and space. As seen in Figure 1, it consists of three stages: identification, categorization and description, using a total of 16 steps: 10 for the first, three for the second and three for the last. It is important to mention that in none of the stages is the analysis carried out from a single approach, as explained in the following paragraphs.


Figure 1. *ICD Method for analyzing time and space in Mixtec codices. Source: Own elaboration.*

The identification, or first stage, aims to detect visual, narratological and iconographical features of time symbols and space pictograms. The first two steps divide the codex sheet into scenes and symbols or pictograms for further study. From step three to seven, visual attributes are identified; in steps eight and nine, the narratological ones; and in step ten, iconographical.

Step one begins with the determination of the scenes, from the anthropological interpretation. The scene is named to identify the topic being addressed. Step two the type of pictogram or symbol used is recognized using taxonomy derived from the analysis of the document, whose categories are: person, place, toponym, date, object, fauna, and flora.

Step three is to establish the color used in the pictogram or symbol being studied. The values are obtained from the codex palette: yellow, blue, white, gray, orange, black, red, wine, and green. Step four aims to distinguish the characteristics of the shape and its compounds used in each pictogram or symbol. The values can be geometric, organic or random in the case of the shape, while its interior can be solid or perforated, opaque or transparent, smooth or textured and uniform or gradient.

Step five defines the size and location of the pictogram or symbol. The first value is determined from dividing the sheet into 36 modules (obtained by separating the width into six columns and the height into six rows) and the second by dividing the sheet into quadrants. Step six serves to specify the direction of the pictograms or symbols, so that they can have a horizontal, vertical, diagonal, perpendicular, curved or undefined direction and leftward or rightward, upward or downward, inward or outward, or undefined direction.

Step seven seeks to clarify the relationship between pictograms and symbols. They are studied from the parallel, perpendicular, oblique, tangent, subordinate, superimposed, coordinated, foreground and background relationship.

Step eight specifies the type of narratological component, so that the pictograms and symbols studied are those representing characters, time or space. The date is specified for time and whether it represents a day, a year or a specific day of the year. The space indicates the type of place (toponym, natural element or building) and whether it is natural or artificial, open or closed. If it is a natural space, it is necessary to identify whether it is aquatic, celestial or terrestrial.

Step nine distinguishes the narrative intention of the scene; that is, the characteristics that determine activity, time and space are studied. In the first case it is specified based on the characters, whether is an event, a play or an action. The sequence and singularity of time is defined. As for the space, it is established whether it is used for performance, contemplation, dwelling or navigation.

The last step deals with defining the iconographical motives present in the scene, so that the theme is observed and both the elements and their conformation in relation to that theme.

The categorization stage aims to analyze and organize, so the grouping allows to study each scene from the Information Design perspective: first the visual characteristics, followed by the narratological and, finally, the iconographical. The categories used in the three steps are related to various definitions of Information Design, which are the following: ease understanding, identify, record, point and transmit.

In the first step, the visual features are cataloged, determining the appropriate information category for each (color, shape, size and direction). In the second step, the narratological attributes of the scene are categorized, establishing an appropriate information category for each (date, sequence, type of place and function of the place). The third step labels the iconographic motives by specifying an appropriate information category.

The description or third stage proposes to verbally detail the visual, narratological and iconographic features that define time and space. Three steps are used for this. The first details the visual, narratological and iconographic peculiarities used to relate the time represented in the scene being studied. The second exposes the visual, narratological and iconographic characteristics used in the space that is reproduced in the scene. The last proposes an alternative narrative emphasizing the spatial and temporal attributes encountered.

As a summary, a synoptic chart of the ICD Method is presented in Figure 2.

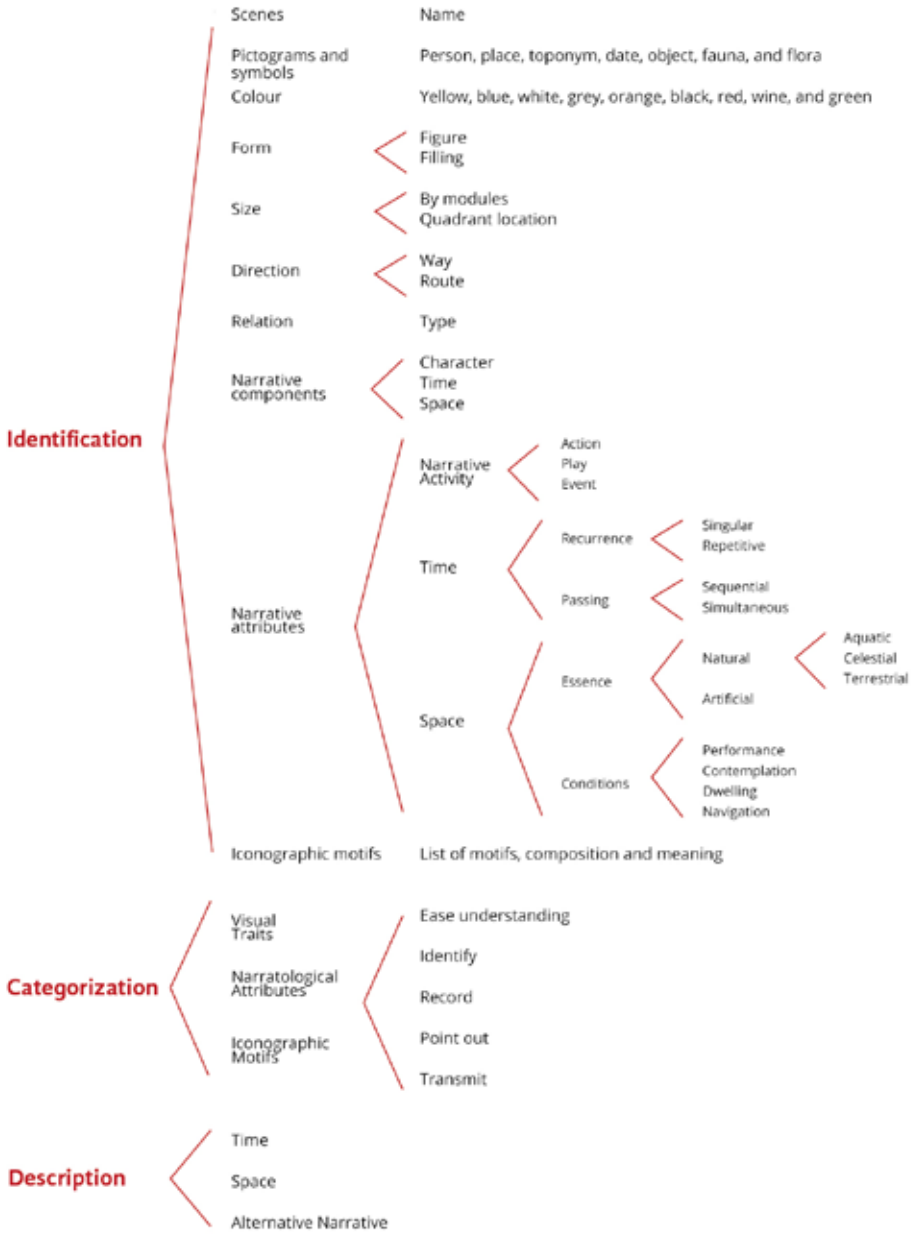


Figure 2. *Synoptic chart of the ICD method for an analysis of time and space in visual narratives.*
*Source: Own elaboration.*

## Results

The method proposed and described in this article was used as part of a doctoral research to analyze eight sheets of the Codex Zouche-Nuttall. Only the results of the analysis carried out on the sheet that deals with the journey of Señor 8 Venado returning to Tilantongo are presented here.

In Figure 3, the original sheet is shown on the left and in the center the four scenes found are presented indicating their reading sequence. In

the upper right corner, the first scene is displayed, the following are distributed following clockwise direction, so that the last one is in the upper left corner. On the right side of the figure, the lines traced to divide this sheet into 36 modules.

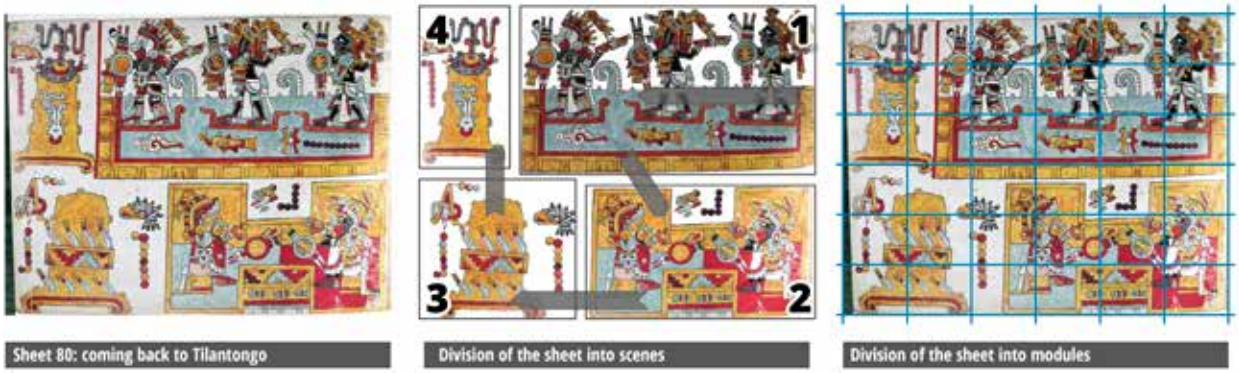


Figure 3. *Sheet 80 of the Codex Zouche-Nuttall.*
*Diagram designed to show the original sheet on the left side, in the center the scenes found including the reading direction marked by gray arrows and on the right side the modules defined to determine the size or hierarchy of the signs.*
*Source: Own elaboration based on the photographs taken from the facsimile published by Anders Jansen and Pérez Jiménez (1992). © The Trustees of the British Museum.*

Figure 4 shows the four scenes placed in horizontal arrangement. Four symbols that represent dates can be identified: one in each scene. Three of them only indicate the day, while the date in the scene named “A Landmark" indicates the day and year. Additionally, each of the scene shows pictograms representing places. These are three natural places — two are terrestrial and one aquatic — and a single built place: the ball game, which is appreciated (through its symbol) in the scene named "The exchange".

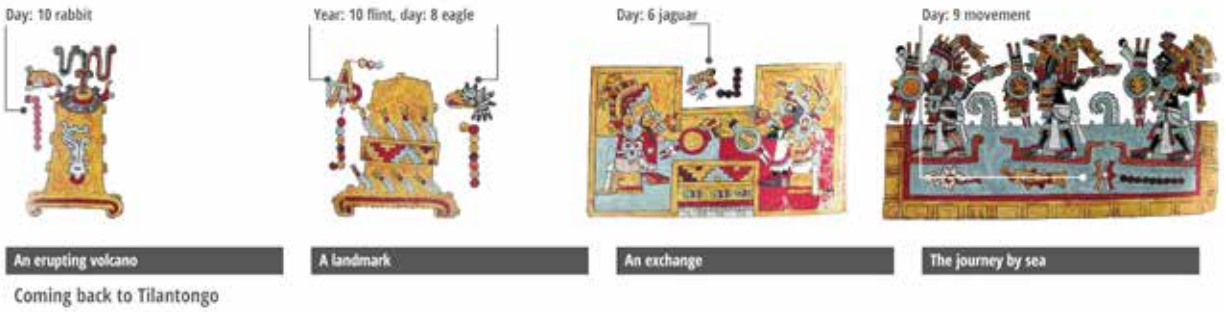


Figure 4. *Four scenes from the story "Back to Tilantongo".*
*Diagram designed with the four scenes of sheet 80, using the same scale for its reduction. The scenes have been aligned horizontally by changing their location on the sheet; However, the proper reading direction of the codex has been maintained, so the schema must be read from right to left.*
*Source: Own elaboration based on photographs taken from the facsimile published by Anders et al. (1992). © The Trustees of the British Museum.*

Regarding the visual features of time symbols (see Figure 4), it was found that the color and shape used in the signs that name the day convey the nature of the animal they symbolize: a rabbit, an eagle and a jaguar. The symbols measure approximately 1.5 by 0.5 modules horizontally or vertically. Its size and location convey the need to specify the moment. On the other hand it is possible to determine its direction: two verticals, one mixed and one horizontal, but it is not possible to determine the course in all cases, since there is no indication of the route of the trace they follow. In all cases, the dates have a parallel relationship with the other pictograms, communicating affinity.

The results of its narratological attributes indicate that time occurs chronologically, as it is read as a sequence of events. In the first, second and fourth scenes, time is represented by indicating only the day, while in the third scene, day and year are used to mark the calendar date. The passage of time is also told through change: in the first two scenes, both the setting and the characters are modified, while in the last two scenes a variation in the type of pictogram (a hill and a volcano) is shown.

The narratological attributes of the space show that the pictogram in the first scene to the right is of aquatic type; The second, to the left, shows a built space and the last two are of terrestrial type.

Regarding each of the place pictograms, in the first scene there is a sea (see Figure 5). Its visual features show that it uses color and organic form to convey its nature, so that it is white and blue in the sea section, and orange with red on the edge, communicating that it consists of land. It is the largest pictogram of the sheet, measuring approximately 10 modules, displayed in a horizontal direction and with a subordinate relationship to the rest of the pictograms, indicating that it refers to the background of the scene.

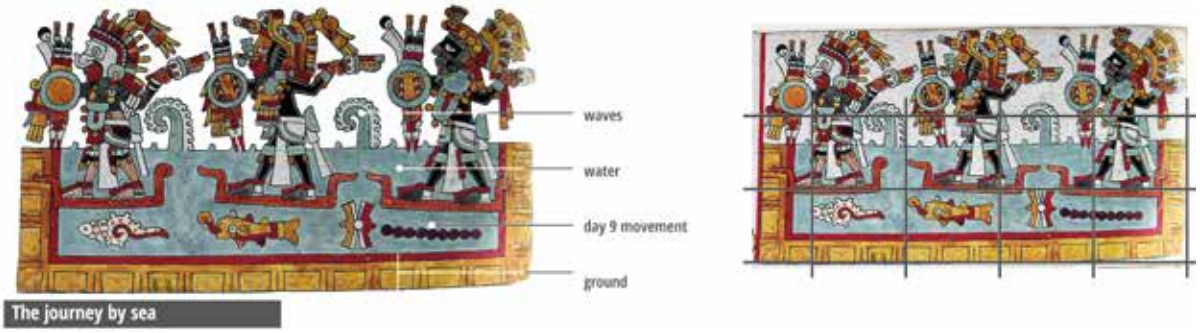


Figure 5. *The journey by sea back to Tilantongo.*
*Diagram designed with the scene of the journey by sea. The water contained by an edge made of land (orange and red) presents high waves with foam and smaller ones near the surface. The diagram shows how the pictogram is the largest in the sheet: it measures more than five modules wide by almost two modules high.*
*Source: Own elaboration based on photographs taken from the facsimile published by Anders et al. (1992). © The Trustees of the British Museum.*

The ball game (see figure 6), which is present in the second scene, is a pictogram in the form of a lying "I", which makes use of three colors, including orange, transmitting its relationship with the soil, in addition to red and blue seeking to communicate the colors of the opponents. Its geometric shape indicates that it has been built. It measures more than nine modules and maintains a horizontal direction. It also has a subordinate relationship, which conveys its location to the background of the scene.

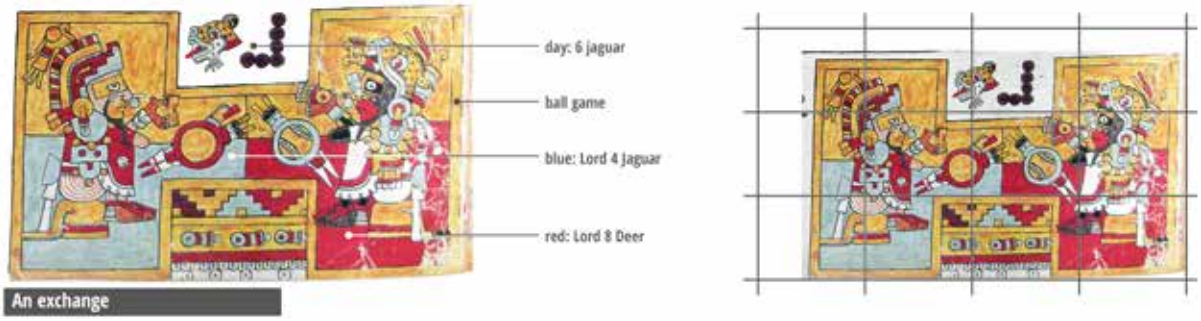


Figure 6. *The ball game back to Tilantongo.*
*Diagram designed with the scene "An exchange" showing the ball game symbol in the background of the two main characters of the story. The exchange is noted, as the shields displayed show the opponent's color. The diagram shows how the pictogram measures more than three modules wide by almost three modules high.*
*Source: Own elaboration based on photographs taken from the facsimile published by Anders et al. (1992). © The Trustees of the British Museum.*

The two pictograms of the last two scenes reproduce geographical elevations (see Figure 7), they use color and shape to convey their nature: orange and red for the soil, as well as an organic shape with curved edges accompanied by scrolls to the outside. The direction is vertical in both cases, whose size is similar: between 3.5 and 4 modules. It also shows a parallel relationship with the pictograms of the same scene, communicating affinity between them.

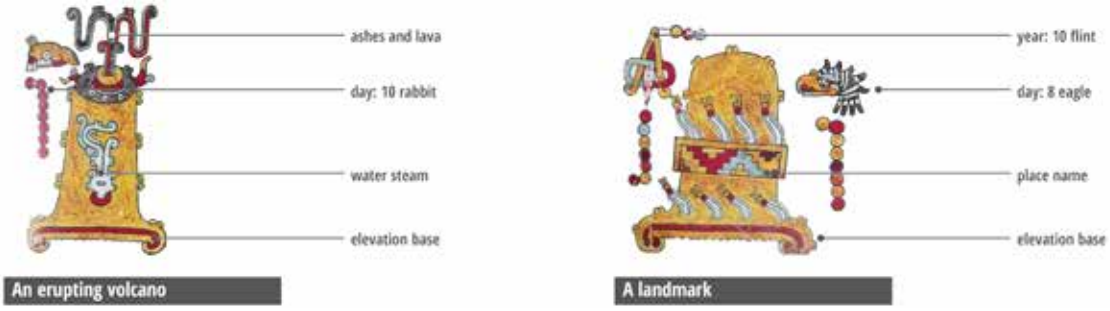


Figure 7. *The hill and the volcano back to Tilantongo.*
*Diagram designed with the two elevations present in the last two scenes of the sheet. They are presented as reference points on the return journey that Señor 8 Venado, Garra de Jaguar marked to return to Tilantongo.*
*Source: Own elaboration based on photographs taken from the facsimile published by Anders et al. (1992). © The Trustees of the British Museum.*

Three of the scenes feature navigation spaces: the two terrestrial ones point out landmarks on a trajectory, and the aquatic one is shown as a path where the characters' activity is recorded. The second scene, the built place, exhibits a space of contemplation that could also be considered as a node in the trajectory.

Regarding the iconographic motifs, it was found that the entire sheet reports on a journey. The names assigned to the scenes summarize the theme: the journey that in this sheet has a path, a stop and two landmarks. The motifs found express the characteristics of the space: in the sea, waves, rafts and animals typical of the place are portrayed; in the volcano three curved elements are portrayed: two emanate from the top of the elevation, one is red like fire or lava and the other is gray like ash, in addition, another blue with white element is shown in front, like steam.

## Discussion

The results on the direction of the reading and distribution of the scenes in the studied sheet indicate that the relationship of the time symbols with the rest of the pictograms follows its reading, that is, in order to be read first, the dates are placed at the entrance of the scene (see Figure 8). At the same time, pictograms indicating place are read after and often presented as backgrounds in the scene, allowing us to infer that they are representations of space using different planes.

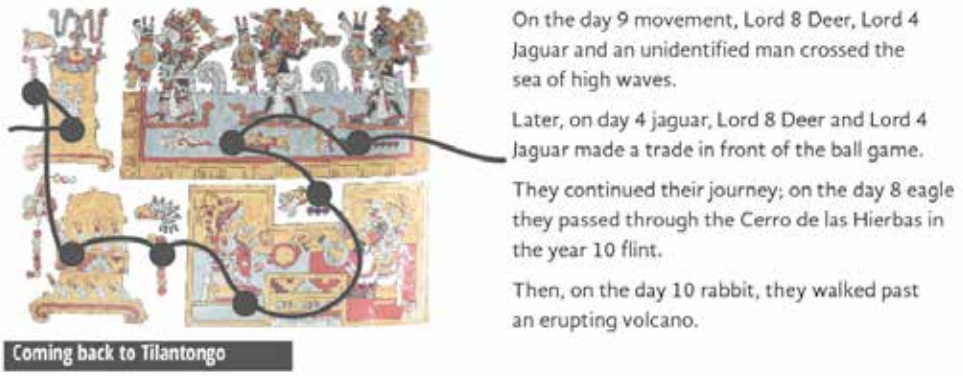


Figure 8. *Direction of reading and own translation.*
*Diagram designed with the scenes of the sheet in which the reading sequence of the pictograms and the symbols present in the story are indicated. It is accompanied by the translation provided by the author of this article.*
*Source: Own elaboration based on photographs taken from the facsimile published by Anders et al. (1992). © The Trustees of the British Museum.*

The balance between the amount of natural and artificial spaces represented helps to suppose that there was a great coexistence between them. In this sheet, a tendency to natural spaces was found; however, in the complete study reported in the doctoral research the results indicate

the same amount of artificial and natural spaces. This fact allows us to infer that the narratives in this codex took place in these contexts.

Regarding the type of space by the conditions of its activity, the results indicate that it is consistent with the theme. Therefore, this sheet does not show living or action spaces. The four scenes show navigation spaces in accordance with the theme that is reproduced: a journey, an environment that cand be traveled through.

The findings on the narratological attributes of time, in doctoral research, made it possible to distinguish it as consecutive at times and simultaneous at others. Everything seems to indicate that it is related to the theme that is represented. In the case of this sheet there is a chronological sequence in the passage of time, since it presents a journey and several days pass from start to finish.

The results obtained on color and shape in the pictograms that represent terrestrial spaces, as well as in the symbols that express days whose name is an animal, suggest that visual features are used to record the nature of its elements. For example, in this sheet, the hills are orange with red and always organic in shape, so it can be assumed that the ballgame field could have been painted in the colors indicated in the pictogram.

Regarding the size of the pictograms indicating place, it was found that they do not reflect the true proportions of the element, but that their representation obeys contextual purposes; that is, these pictograms are placed to facilitate the understanding of the space where certain activity occurs without registering its authentic material properties.

The results of the visual features of direction: sense and direction, indicate that while the sense is distinguishable in pictograms of space or symbols of time, the direction or trajectory is not. That is, it is possible to identify the vertical direction of a pictogram, although it is not possible to know if it is moving to the left or to the right. Perhaps this is because the trajectory of time and space cannot be discerned, they do not move physically in the story that is narrated, because it is the characters who do it.

## Discussion

One of the main contributions of this method is to facilitate the analysis of visual, narrative, iconographic, and informative features present both in pictograms and symbols and in scenes of a visual narrative. In the case of the codices, it contributes to the anthropological interpretation of the manuscript in question. From the point of view of Narratology, it offers the possibility of understanding any visual story, not only focusing on the character and his actions, but delving into the context, which is possible to describe thanks to this method. The use of Iconography has made it possible to strengthen the findings. The motifs represented

in the scenes complement the understanding of the environment: time and space in which the story takes place.

The application of the method led to the discovery of similarities between the proposed definition of time and space. For the first concept it was found that, in most cases, the scenes in the codex show a continuous flow of events, although, as already mentioned, in other sheets of the codex there are also events that occur simultaneously. Regarding time markers, the method helped determine under which features are presented in the scenes. This method allows us to verify that the definition of space proposed in this article is applied in the codex, since there is a multitude of visible or perceptible spaces, as well as those that are not displayed, but intuited.

The main contribution to Visual Design is to incorporate values into the method that serve to qualitatively observe the basic elements of visual communication; this facilitates and contributes methodological relevance to the realization of descriptive studies that use the icd Method. For other cases, the method could be adapted and include various elements, such as size, scale or even transparency, among others.

The most significant contribution to Information Design is to corroborate that a Mesoamerican codex, such as the Codex Zouche-Nuttall, is a manuscript that informs using visual language. The results indicate that signs transmit and record information about the context where the events that have been reported; in the same way they facilitate the understanding of the exposed topics, such as the journeys made by Señor 8 Venado, Garra de Jaguar, and allow the identification of characteristics of the worldview with respect to the representation of space and time.

An unexpected finding refers to proposing that the *tlacuilos* or *huisi tacu* carried out tasks typical of a today's designer; that is, using visual communication elements, such as color and shape to communicate. The results also indicate that there is structure, i.e., diagramming in the analyzed sheet. Further studies could specify its particularities.

Finally, strengths of the method have been detected, including its suitability for the doctoral research from which it originates. It was necessary to create a method that focused on the specific needs of the study, since it seeks to understand the manuscript as a document that informs, to offer a different narrative, without interpreting the meaning of its signs.

On the other hand, the use of this method allowed to corroborate that the codex is a document that visually informs. For example, it informs a) on the conditions in terms of color and shape of buildings; b) about the conception of some elements of nature such as rivers, hills, trees; c) regarding the date and order of the events it narrates; and d) regarding

the contexts in which ceremonies, journeys, births, marriages, among others occurred.

Although the method is originally proposed to study any type of pictogram from the codex, its application in the doctoral thesis focuses on the description of time and space. One of the circumstances that limit the application of the method, in other historical documents, is its focus on the narrative, which raises the need to adjust it to analyze manuscripts with cartographic or economic information, and even in those whose structure is not narrative or is not organized by means of scenes.

Future research could address its application in other types of historical documents, such as calendrical, genealogical or ethnographic codices of any pre-Columbian culture that use the same type of writing and, even, it is thought that it is possible to use is it to analyze contemporary documents whose narrative is based on visual language.

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