

Visual aspects in contemporary artistic mappings

Aspectos visuais em mapeamentos artísticos contemporâneos

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mapping,
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spatialization, materiality

This is an excerpt from a research project in the field of information design, which aims to identify visual principles in artistic mappings displayed in exhibition environments. The term “mapping” is used to define the practice in focus, which consists of spatializing data into material configurations. The study is based on an exploratory survey of contemporary projects in the field of the arts, through research into collections, compilations, artist and designer portfolios, and visits to exhibitions. The analysis is based on design research tools. The 11 categories found synthesize visual properties, which are presented and discussed in this article.

*mapeamento,
visualização artística,
fiscalização, espacialização,
materialidade*

Apresenta-se o recorte de uma pesquisa no campo do design da informação cujo objetivo é identificar princípios visuais em mapeamentos artísticos exibidos em ambientes expositivos. O termo ‘mapeamento’ é adotado para definir a prática em foco, que consiste na espacialização de dados para configurações materiais. O estudo parte do levantamento exploratório de projetos contemporâneos situados no campo das artes, mediante a pesquisa de acervos, compilações, portfólios de designers e artistas e visitas a exposições. A análise se baseia em ferramentas de pesquisa por meio do design. As 11 categorias encontradas sintetizam propriedades visuais que são apresentadas e discutidas neste artigo.

1 Introduction

This article presents some partial results of a research project that investigates design principles in artistic projects that map data onto physical materials intended to be displayed in exhibition spaces.

The materialization of knowledge in artifacts such as maps and graphics has been part of the long history of civilization, keeping up with the technologies in vogue in each context (Drucker, 2014). The production of visualizations has been a significant part of a socio-technical system in which design has become a diffuse practice (Manzini, 2017) and in which the production and circulation of media formats favourable to non-verbal language have been enabled by computer systems, although there is a need for a critical framework to accompany this emergence (Hall & Dávila, 2024).

In recent years, a series of initiatives have been dedicated to exhibiting and discussing information visualization as a field of study, often referred to as ‘infovis’. However, it is possible to observe diffuse manifestations

of infovis in works by designers and artists in a variety of circuits, rarely grouped under this term. The research section reported in this article aims to observe infovis practices in the arts field and analyse their visual language properties from a design perspective.

2 Theoretical framework

The understanding of the object of study as artistic mapping draws on a theoretical basis that includes themes related to information visualization and cartography, where the idea of mapping is central – looking at this practice from a critical and contemporary perspective.

Over the last few decades, information visualization (infovis) has been studied with different motivations – from scientific to artistic visualizations (Manovich, 2010). Principles for the visual presentation of data have been organized by authors such as Tufte (2006), Bertin (2011), who focus on the communicative efficiency of graphic pieces, while Cairo (2016) addresses the possibilities of storytelling in the production of infovis, still focusing on the efficiency of message transmission. Considering the visuospatial reasoning involved in this practice, Tversky (2005) provides an overview of the cognitive process of making maps, graphs and diagrams, pointing out their importance as creative tools, especially for design.

One way to critically approach infovis is to recognize that any cultural artifact conveys a discourse that relates to its social and historical context (Drucker, 2014). Even the simplest visualizations cannot be claimed to be neutral since, as emphasized by D’Ignazio and Klein (2020), a series of decisions are made from data collection onwards.

The search for expressions of InfoVis in different materialities benefits from the general understanding of such artifacts as the result of processes of information spatialization. This term, on which Tally (2013) elaborates, relates to the paradigm of the spatial turn in postmodernity. In this sense, a cultural context is being established in which non-linear narratives and the spatial organization of information stand out, which impacts cultural production in several domains.

Faced with the emergence of data analysis technologies, Viégas and Watenberg (2007) reflect on the artistic appropriation of such resources. In the context of the visual arts, the paradigm shifts in aesthetics and representation related to database culture is addressed by Kosminsky (2012). The relevance of artistic visualizations today points to these artifacts as an important object of analysis for the design field.

The issue of the materialization of information can be seen in recent academic production around the theme of “data physicalization” (Jansen et al., 2015), including a robust inventory of projects. Under this approach, information physicalization projects are categorized according to their interaction features, techniques, and media formats. The production related to this line of research demonstrates that its main objective is to build a knowledge base for computer-based procedures, although it also looks at analog artifacts as a historical repertoire.

In the context of scientific-academic events, the 2CO Conference initiative defines “information environments” as one of the four thematic axes that organize the conference. This axis refers mainly to installation projects in exhibition environments or urban interventions. It is worth noting that the projects covered by this category tend to approach contemporary issues – such as the climate emergency, gender, public health – and establish a standpoint through audience sensitization approaches.

Regarding displaying information in an urban context, Schoffelen et al. (2015) address the political dimension of infovis projects in public spaces. In this vein, Claes and Vande Moere (2013) explore the specific design aspects for this context, focusing on design guidelines along five axes: local and social, aesthetics and support, persuasion, context, opportunity and reliability.

In the Data Flow compilation (Klanten, 2011), a series of infovis design projects are reported under the category “datascares”, landscapes created from data. There is also a mention of “infotecture”, a term attributed to the dialogue these projects carry out between information and architecture.

One of the properties related to displaying in public spaces is the casual nature of visualizations that interact with the flow of people, as Pousman et al. (2007) pointed out. For this research, the possibility of interaction with the visitor’s path through the space is a key factor that accounts for the prioritization of surveying infovis expressions in physical environments. Approximations with this trait can be seen in artistic movements whose central issue is the interaction between the body and physical space, such as the situationist works (Jacques, 2002) and the neoconcrete movement (Pedrosa & Arantes, 1998).

2.1 Theoretical and methodological perspective

This study follows a qualitative approach consistent with research into art and design (Frayling, 1993). Having defined the object based on an exploratory literature review, the data collection and processing benefit from digital methods (Venturini, 2012) to set up a database that allows one to trace the origins of the data while keeping traces of the research process itself.

Taking a phenomenological approach, this study proposes an analysis of artifacts in their formal and material configurations (Cross, 1999). Throughout the analysis, the artifacts were observed, manipulated, organized, grouped, and subjected to further procedures that constitute design research strategies (Noble & Bestley, 2013).

2.2 Research design

As a starting point, we reviewed the literature to identify the state of the art of the object in question – the practice of artistic data mapping to physical materials intended for the exhibition space.

To create a database, multiple sources were looked at – digital collections of institutions, digital and printed catalogues of exhibitions, and portfolios

of designers and artists. We explored collections from Brazilian institutions Museu de Artes de São Paulo (MASP), Museu de Arte Moderna (MAM), Pinacoteca de São Paulo, Bienal de Arte de São Paulo, Inhotim, Arte-Cidade, Cidade Gráfica, Existência Numérica, and foreign institutions – Tate Britain, Guggenheim, Museum of Modern Art (MoMA), Manifesta Biennale, Whitney Museum, as well as compilations such as *The Map as Art* (Harmon & Clemans, 2009) and *Data Physicalization* (Jansen et al., 2015). Works found during visits to exhibitions such as *Existência Numérica – Emergências* (2024), *Tempos Fraturados* (2024), *Des-habitar Escutas* (2024) were incorporated.

The survey sought to collect the same data types on all the projects. The data set comprises title, author, date, place of exhibition, source of the data, environment, work name, themes, contextual description, and a representative image.

Data treatment involved systematizing the data to build a structured database on the Notion platform. Bearing in mind a stage of physical manipulation of artifacts during the analysis, the information was laid out in the InDesign program to create cards for each project, which were then home printed.

As a method of analysis, we used the Affinity Diagram (Hanington & Martin, 2012), a research strategy based on cycles of association between artifacts. In this paper, we show partial results of this analysis conducted on one of the axes considered by the main research, the visual syntax.

The analysis was based on around 200 printed cards relating to the projects collected. These cards were spread out on the floor, due to the space needed by the entire set (Figure 1). This is how the Affinity Diagram procedure began: the projects were associated based on visual elements, seeking to form small groups of up to five projects around a predominant visual characteristic.



Figure 1 Start of the analysis process.

A new stage followed after all the projects had been associated with small groups of up to five units (Figure 2). The small groups were grouped on a new level to form conceptual categories.



Figure 2 Intermediate stage of the analysis.

Throughout the grouping process, it was useful to make notes in the form of keywords in each group to help memorize the properties that had been observed and which had led to the grouping. These notes were then transferred to a text document in which the groups and categories were recorded. This document developed a longer sentence for each grouping, seeking to specify the reasoning that ties the projects together.

This type of analysis was especially useful for finding relevant properties about the object of study among the many examples collected. As the works can have a variety of visual properties, it is possible that one work could make up more than one group. However, the projects were not repeated between the different groups. The choice not to repeat them kept the attention only on the properties that stood out and established a pragmatic limit to the execution of this stage, given the significant number of projects observed.

Therefore, the categories that emerge from this analysis consist of properties perceived in information mapping projects for physical materials. The properties will be described and related to information design literature.

3 Results

The project collection includes installations, printed objects, and sculptures, among others. The analysis of visual syntax resulted in the formation of 11 conceptual categories. These categories correspond to visual properties that emerge from mapping projects with physical materials in exhibition spaces. As they represent principles, a project could be associated with

one or more categories in subsequent analyses. The categories identified are listed below, followed by an analysis of each category, with examples of representative projects.

Table 1 Visual categories.

A	Drawing on visual conventions
B	Grid: meshes and modules
C	Confection: combined languages
D	Pictographic systems
E	Lines
F	Monochrome
G	Complex multiples
H	Figurative and abstract bodies
I	Whole and components
J	Variable modules
K	Organic deformation

3.1 A) Drawing on visual conventions

In projects such as Alban Biaussat’s *The Green(er) Side of the Line* and Kathy Prendergast’s *Lost* (Figure 3), the authors intervene in a representation of the physical environment. Both the image of the landscape and the cartographic base are manipulated in such a way as to cause strangeness about their conventional presentation. While Biaussat inserts a vibrant color component in the middle of the landscape to create his photographs,



Figure 3 *The Green(er) Side of the Line*, Alban Biaussat, 2005 (© Alban Biaussat); *Lost*, Kathy Prendergast, 1999 (© Kathy Prendergast).

Prendergast omits the textual annotations typical of a road map, depriving a map of its primary function, spatial orientation. By working with the insertion or removal of elements from a conventional framework, these works take advantage of one of the virtues of the map, which is allowing us to relate “a figure naturally perceived as the place we inhabit” to “a set of concepts that goes far beyond this physical reality”, such as historical events, personal experiences and connections with other territories (Hall & Dávila, 2023, p. 194).

3.2 B) Grid: meshes and modules

In works like *You Are Here* by Peter Dykhuis (Figure 4), there is a general form that is predetermined either by the technical limits of the object or by the cartographic cut-out chosen by the artist. The space is zoned into blocks of information. This category is related to the restricted modularity mentioned by Manovich (2024), since the elements cannot be freely recombined – they obey a spatial order which gives meaning to the data. Drawing a connection with Tufte (2007), it is possible to see in works such as *Catalogue [female symbol] 3 Skin*, by Judy Clark, the strategy of compartmentalizing content, which the author attributes as a relevant principle of visual explanations.



Figure 4 *You Are Here*, Peter Dykhuis, 2005/2007 (Photos: Robert Zingone/Steve Farmer).

3.3 C) Confections

This category defines a series of projects in which the interaction between different formal languages can be observed. To illustrate a process or describe a place, artists such as Rosana Paulino and Marlene Almeida (Figure 5) combine pieces from different media in the same scene. The way in which the elements are visually structured suggests that the works are more than collages, and can be understood as visual confections, as defined by Tufte:

Confection-makers cut, paste, construct, and manage miniature theaters of information – a cognitive art that serves to illustrate an argument, make a point, explain a task, show how something works, list possibilities, narrate a story (Tufte, 2007, p. 138).

Tufte emphasizes the presence of the verb in visual confections. A confection implies the existence of verbs, actions, and consequences. This strategy is excellent for presenting processes, such as the structural racism denounced by Paulino in *A permanência das estruturas*.

Taking the contemporary perspective of D’Ignazio and Klein (2020), we can observe the depth with which the artists treat the events they narrate, adding aesthetic complexity and allowing the visitor to connect emotionally with the information the work conveys.



Figure 5 *A permanência das estruturas*, Rosana Paulino, 2017 (Courtesy of the Artist and Mendes Wood DM São Paulo. Photo: Bruno Leão); *Histórias da Terra*, Marlene Almeida, 2024 (Photo: © Danilo Galvão).

3.4 D) Pictographic systems

In this category, we can notice the creation of a coherent system of visual codes. Pictograms, silhouettes, and shapes allude to beings and objects. The Isotype system created by Otto Neurath was a pioneer in this practice and still resonates in informative designs. The combination of pictorial system and signage in physical space highlights socially shared issues (Claes & Vande Moere, 2013). While the work of Otto and Marie Neurath and Gernt Arnz was aimed at educating people about economic and social statistics, an unprecedented procedure at the time, contemporary works reflect the particular issues of the place in which they are located, such as the multiple species that live in English territory signposted by Julian Opie in *Escaped Animals* (Figure 5), or the set of events deriving from the military dictatorship that were translated into graphic memory by the Grupo de Arte Callejero in the installation *Carteles de la Memoria* (Figure 6).



Figure 6 *Escaped Animals*, Julian Opie, 2002; *Carteles de la Memoria*, Grupo de Arte Callejero, 2010 (Source: GAC Archive).

3.5 E) Lines

Many works develop around linear structures. The line, one of the main elements of visual language, is described by DonDIS (2005) as the result of experimentation and a way of materializing a gestural decision. The line can indicate temporal sequence but establishes spatiality, representing direction or contour. In Carla Caffé's *A(e)rea Paulista* (Figure 7), urban spatiality is translated into a scene formed by stacked linear strips that refer to streets in the proximity of Avenida Paulista. The continuity of the design suggests visitor interaction through walking and reading. In Luiz Ludwig's work, *Nortitude* (Figure 6), the mixture of relief and light projection refers to and provokes reflection on imaginary lines' cultural dynamics.

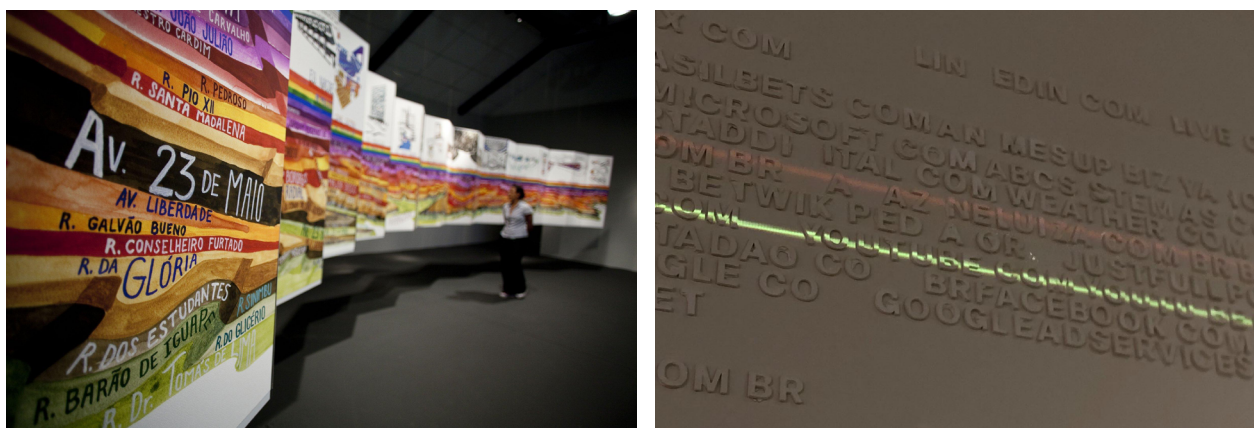


Figure 7 *A(e)rea Paulista*, Carla Caffé, 2012 (Photo/Handwriting: Juliana Campos); *Nortitude*, Luiz Ludwig, 2024.

3.6 F) Monochrome

In visual communication, one of the elementary strategies is manipulating light and shadow, whose relevance to our perception precedes the effect of color variations (Dondis, 2007). As Manovich points out, one of the key principles of infovis is the manipulation of spatial variables, which means that we map the most interesting data onto topology and geometry, leaving other properties such as color and transparency in second place. Works such as Jaime Lauriano's *Invasão* and Antonio Dias's *Anywhere is my land* (Figure 8) operate through the manipulation of fullness and emptiness in the graphic space.

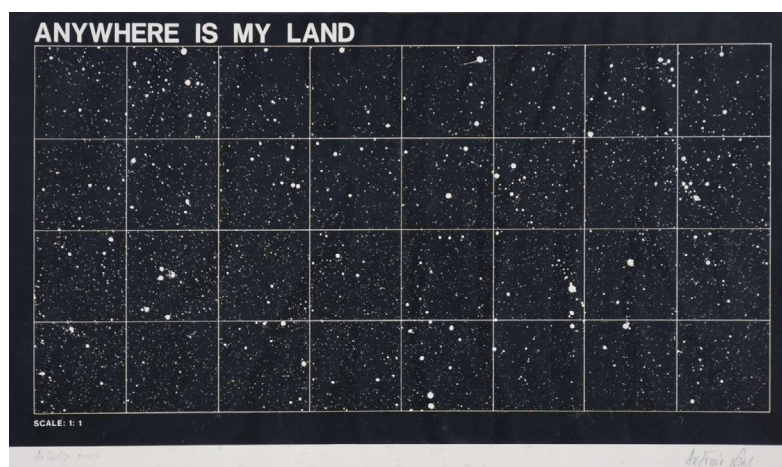


Figure 8 *Anywhere is my land*, Antonio Dias, 1968
(Source: Enciclopédia Itaú Cultural).

3.7 G) Complex multiples

Rivane Neuenschwander's *Mapa-Mundi/BR (Postal)* and Filippo Minelli's *Across The Border* (Figure 9) feature multiple artifacts of similar materiality. The units in these works have the same material properties (printed photographs, flags), but their internal composition varies (different places, nationalities, etc.). The overall arrangement leads to the perception of parallelism between the pieces, allowing them to be perceived as variations of the same category while simultaneously allowing their content to be compared (Tufte, 2007). Putting together a scene that unites symbolic expressions from different sources recalls the strategy of scenographic imagination that characterizes visual confections, as discussed by Tufte (2007).



Figure 9 Rivane Neuenschwander, *Mapa-múndi/BR* (Postal), 2007 (Courtesy of the Artist; Tanya Bonakdar Gallery, Nova York; Galeria Fortes Vilaça, São Paulo; Stephen Friedman Gallery, Londres. Photo: Eduardo Ortega); *Across the Border*, Filippo Minelli, 2010-ongoing (Photo: Wolfgang Traeger).

3.8 H) Figurative and abstract bodies

There is a series of works whose central theme is living beings in their ecosystemic, social, or cultural context. The representation of bodies takes place through figurative representation, but it aims to represent cultural characteristics, so they are not portraits, but representations of social groups. There can be a sense of collectivity in visualizations that present bodies as an element of information visualization. In Mona Chalabi's work *100 New Yorkers* (Figure 10), a series of illustrations reflects population statistics. Through this illustration on an urban scale, the designer brings out the diversity of bodies that make up New York society. In posters by the Guerrilla Girls collective (Figure 10), a body is composed from a collage of pieces from the mass media, to stand for a category under-represented on the exhibition circuit: women. This illustrative element is significant to produce meaning in the infographic.

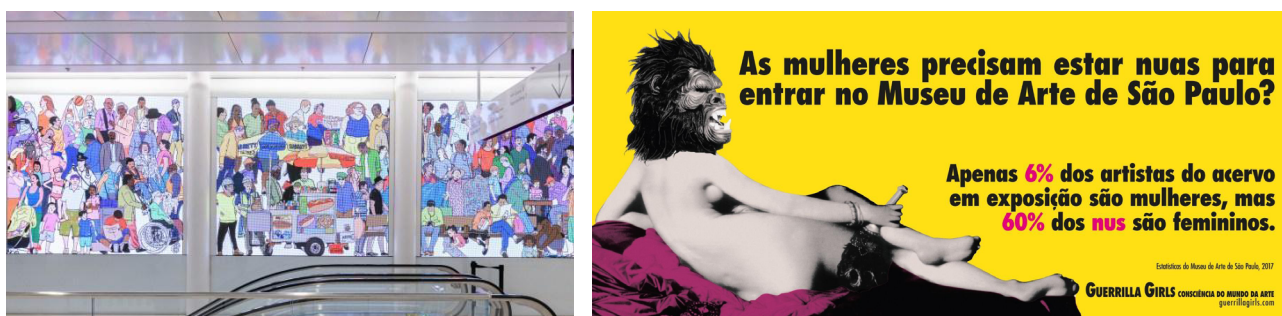


Figure 10 *100 New Yorkers*, Mona Chalabi, 2020 (Photo: Ian Douglas); *As mulheres precisam estar nuas para entrar no Museu de Arte de São Paulo?*, Guerrilla Girls, 2017 (© Guerrilla Girls).

3.9 I) Whole and components

Works in this category are characterized by a remarkable overall form, built from components that blend almost indistinguishably, in a mass in which the order of internal components doesn't matter. Examples can be seen in *24hs in photos* by Erik Kessels and *The Mood Test* by Domestic Data Streamers (Figure 11). As the modules do not necessarily follow a sequence, they could be associated with a free modularity (Manovich, 2024).

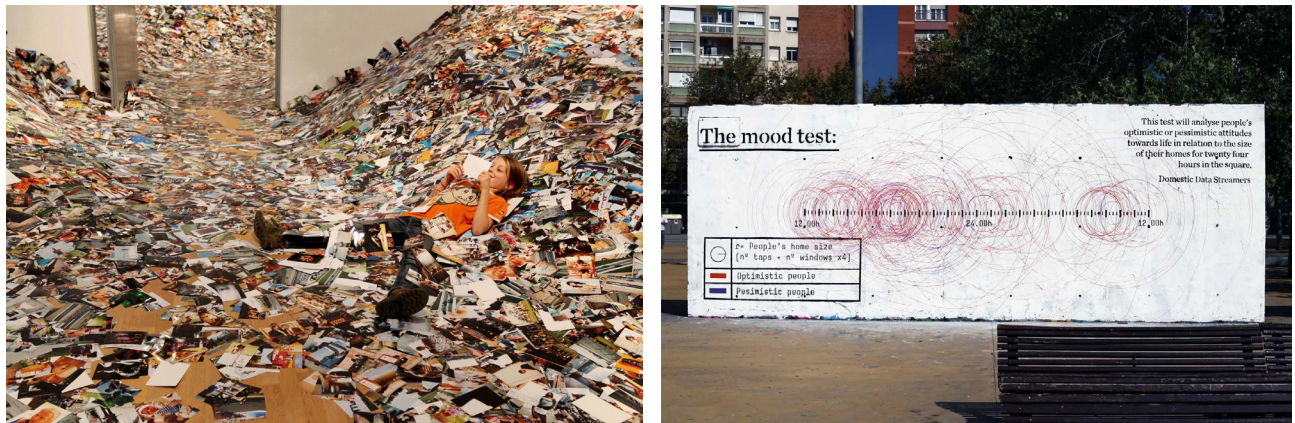


Figure 11 *24hs in photos*, Erik Kessels, 2012; *The mood test*, Domestic Data Streamers, 2014.

3.10 J) Variable modules

This category describes works whose main component is a repeated formal model that retains internal rules, so each repetition presents a formal variation, in the visual and material sense, according to the data it receives. In this set, there is a modularity of content (Manovich, 2024), as in the *Handmade visualization toolkit* by designer Jose Duarte (Figure 12).



Figure 12 *Handmade visualization toolkit*, Jose Duarte, 2010 (easydataviz.co); *Los nombres del agua*, Tania Candiani, 2019 (Photo: Albarrán Bourdais).

An approximation to the concept of small multiples (Tufte, 2006) can be seen in works such as *Los nombres del agua* by Tania Candiani (Figure 12).

3.11 K) Organic deformation

In this group of works, the visual aspect has a strong relationship with materiality, having its initial form transformed by interaction with the environment, as can be seen in Rivane Neuenschwander's *Contingent* (Figure 13). By provoking interaction with agents of other species, these works illustrate the concept of feral (Tsing et al., 2024), which explains the engagement of non-human actors in structures created by humans, establishing processes that the project can no longer control. In this sense, material is a relevant information element, contributing to data visceralization (D'Ignazio & Klein, 2020). In the urban environment, attention to the materiality of the support can be a relevant strategy for this type of visualization (Claes & Vande Moere, 2013), which can be seen in Dietmar Offenhuber's *Rastros de poluição* (Figure 13).



Figure 13 *Contingente*, Rivane Neuenschwander, 2008 (Courtesy of the Artist; Tanya Bonakdar Gallery, Nova York; Galeria Fortes Vilaça, São Paulo; Stephen Friedman Gallery, Londres); *Rastros de poluição*, Dietmar Offenhuber, 2024 (Photo: Zhai Sichen. Source: Existência Numérica Archive).

4 Discussion

Amidst the wide variety of formats from this database, it is possible to observe characteristics shared by the projects:

- fruition of information through embodied movement.
- interaction between artwork, architectural space, and landscape.
- a chance of drifts in reading or experiencing information.
- predominance of visuospatial reasoning.
- material restrictions for the complexity of abstract data.

All the characteristics listed reflect the importance of materiality for the result, which has been a major concern in the research project. The research aimed to find aesthetic elements that emerge in contemporary artistic production for the spatialization of information intended for display and enjoyment in a public environment. In this sense, we sought to understand which visual principles appear as recurring expressions of this type of project, seeking to complement the theoretical basis of information design with greater specificity regarding experimental practices and materiality. Surrounded by terms such as *physicalization*, *visceralization*, and *spatialization*, there is the challenge of defining a term that reflects the object of study of this research. Considering artifacts in their materiality and spatiality by defining them as *information visualization* can lead to conflicts in interpretation, which is why building a vocabulary that evokes multidisciplinary design is necessary. Hence, the interest in focusing on the mapping aspect, a process present in all the projects analysed.

An intriguing aspect of these projects' nature is the lack of control over user interaction. The artworks can at most suggest paths, leaving the possibility of unexpected forms of fruition. In this way, the spatialization of the information leaves the visitor free to choose the pace at which to absorb the content, unlike verbal language, which assigns a linear sequence.

The blurring of this object in popular culture was reflected in the survey's challenges, since it was not possible to rely on previously structured categorizations that would return projects suitable for the established cut-off. In addition to specialized compilations such as *The Map As Art* (Harmon & Clemans, 2009), *Data Physicalization* (Jansen et al., 2015), *Existência Numérica* (Castro et al., 2024), *Data Flow* (Klanten, 2011), the search for infovis practices that are diffusely located in the field of the arts required a qualitative analysis of the works that often relied on a careful examination of descriptions and analysis of the broader production by the respective authors. Even with the survey scale, it was necessary to delve deeper into each work to ensure it remained in the collection.

Among the analysis results, four categories emerged that are directly linked to modularity, which reveals a consistent point of contact with one of the most important design principles (Figure 14). The issue of modularity was introduced in a previously published text (Araujo & Velloso, 2024) as the result of a pilot analysis in a case independent of the one reported in this article. Despite being independent analyses, it is interesting to note how modularity stood out in both studies, which suggests a way forward for future research.

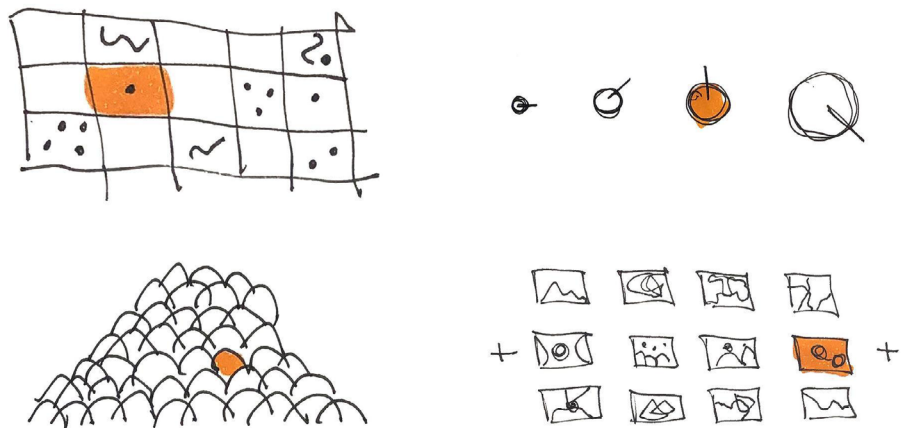


Figure 14 Sketches representing types of modularity found among the categories B, J, I and G.

5 Conclusions

The research section presented consists of studying aspects of visual syntax in artistic mapping projects. The research seeks to identify characteristics that emerge from this specific type of object, for which the concept of the spatialization of information is particularly useful. Given the relevance of visuospatial thinking and the emergence of the production and circulation of non-verbal media, studying such manifestations is justified as contributing to different sectors of society that can benefit from constructing bases for literacy and critical analysis of infovis.

This study is part of ongoing research, and through its development so far, challenges have been identified, such as the diversity of formats of the works, the search strategy for the projects, and the possible lack of detail in the media available for collection.

Once we realized that the proposed groupings do not constitute closed groups, i.e., that a project can have characteristics of more than one group, the groupings were treated as properties or principles.

Considering the intermediate stage of the research, some possibilities envisaged as future steps include refining the definitions and exercising conceptual articulation across the categories.

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