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The Changing Drawing. From Technical Representation to Data Visualization as an Ethical Agent of Society

This article investigates the contemporary transformation of drawing from a technical instrument of representation into an active device for the interpretation, mediation, and communication of complex information. Within the post-digital condition, where analog and digital dimensions converge into integrated environments of knowledge production, drawing no longer functions merely as a tool for reproducing reality but increasingly operates as a critical and interpretative practice. The study develops an interdisciplinary framework situated at the intersection of visual semiotics, visual studies, digital humanities, and the ethics of images, analysing how diagrams and data visualizations shape the perception and understanding of social, environmental, economic, and political phenomena. Particular attention is devoted to the rhetorical dimension of visualization and to the ethical responsibility embedded in graphic languages.

Through references to the theories of Jacques Bertin, Edward Tufte, Alberto Cairo, and Johanna Drucker, the article discusses how visual variables, selection processes, and representational strategies influence both the readability of information and the construction of meaning. Historical and contemporary case studies –from ISOTYPE to recent exhibitions such as *Diagrams* at Fondazione Prada and *Inequalities* at the Milan Triennale– demonstrate the central role of graphic sciences in fostering critical awareness and visual literacy. The article argues that contemporary drawing possesses a form of agency: it mediates between informational complexity and human understanding while actively influencing social behaviours and decision-making processes. Consequently, the future of drawing lies in the development of an ‘ethics of the sign,’ grounded in transparency, accessibility, and intellectual honesty, capable of contributing to a conscious and democratic visual citizenship.

Keywords:
Graphic Sciences; Data visualization; Ethics; Society; Complexity

INTRODUCTION

The contemporary age is characterized by processes of technological and social transformation that require a continuous and profound updating of cognitive and communicative paradigms. Within this shifting scenario, drawing also sees its role redefined, surpassing the traditional function of technical support in representation to become an active device for mediation and critical interpretation of reality. This article discusses this transformation within the context of a scenario in which drawing is culturally repositioned because of its nature as an educational tool and its capacity to read and interpret contemporary phenomena, which makes it crucial in the construction of an ethical and responsible citizenship.

The theoretical framework of this article lies at the intersection of distinct yet contiguous scientific fields, which structure its interdisciplinary methodological approach. First, visual semiotics makes it possible to investigate the signifying content of the graphic sign in relation to its technical expression, thus overcoming the conception of drawing as the mere recording of phenomena. This perspective integrates with the field of visual studies through the problematization of the cultural context in which both the theme of the image and the phenomenon of vision are situated, on both the perceptual and productive levels. As Marc Cousins observes, the evolution of visual regimes corresponds to structural changes in the modes of acquiring knowledge and closely links the act of seeing to the technologies that make it possible (Cousins 2018). Consequently, the image is configured as a dynamic interface operating within an infosphere (Floridi 2017), a global informational environment in which the distinction between analog data and its digital transcription becomes progressively elusive. In this context, the field of digital humanities provides the theoretical and procedural tools for the use of computational sciences in the representation of complexity; drawing thus offers its capacity to make data visible and comprehensible, operating as a filter that structurally contributes to the

interpretation of reality. The integration between graphic sciences and the humanities therefore transforms the graphic sign into an interpretative act, in which the visualization of increasingly numerous and complex information through equally complex algorithms reveals its non-neutral nature and its design value. This aspect further extends the investigation into the field of the ethics of images (Scarafile 2022; Menchetelli, Cotana, Dottorini 2025), which discusses the implications of visibility for society and, consequently, the capacity of graphic sciences to intervene directly in decision-making processes and in the formation of public consciousness.

Within this articulated framework, the visualization of data that has repercussions on the collective sphere (social, environmental, economic) assumes political and cultural significance, making drawing – particularly in the forms of the diagram and data visualization – a central actor in the presentation, interpretation, and discussion of critical issues emerging from society. From a tool that ‘makes visible,’ drawing, and specifically the broad typological category of the diagram, evolves into a genuine rhetorical act of visualization (Prelli 2021): it performs an educational role that ‘makes understandable’ and, consequently, ‘makes act,’ producing conscious behaviours within a heterogeneous and stratified collectivity. The objective of this article is to investigate this new dimension of drawing by analysing the current disciplinary responsibility inherent in the tools and practices of graphic sciences and the mechanisms through which the rhetoric of visualization influences the perception of phenomena and determines, in either transparent or opaque ways, the behaviours and choices of society.

A NEW PARADIGM: BEYOND THE ANALOG-DIGITAL DUALISM

Disciplinary debate has long revolved around the consequences and potentialities introduced by the transition from the analog to the digital paradigm; these questions have now matured into a critical synthesis within the scenario of post-digital

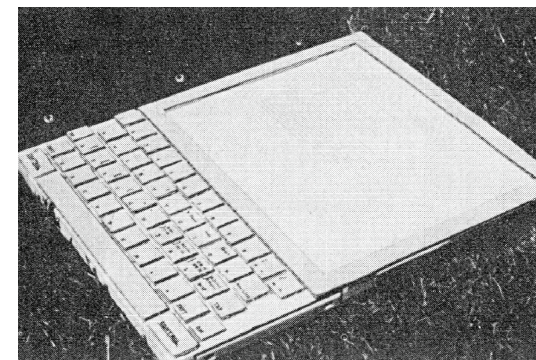


Fig. 1: The first DynaBook presented as a mock-up (Kay, Goldberg 1977, figure 26.2)

drawing, a condition in which digital technologies shape an integrated environment of design and knowledge. The overcoming of the analog-digital dualism therefore imposes an evolutionary reflection on drawing, which definitively distances itself from the function of reproducing reality in order to assume a role of active processing, interpretation, and narration of information.

In the early 1970s, computer scientist Alan Kay developed the DynaBook project (fig. 1), a device equipped with a dynamic and interactive interface primarily intended for children – a pioneering tablet that was nevertheless never produced –, which he later defined, together with his colleague Adele Goldberg at Xerox PARC – Palo Alto Research Center, with the evocative term “metamedium, whose content would be a wide range of already-existing and not-yet-invented media” (Kay, Goldberg, 1977, p. 403). Even before its production and dissemination, therefore, the computer was conceived as an informational environment in which different systems of production and communication, both existing and yet to exist, could operate simultaneously. Referring back to this original definition, Lev Manovich argues that software logic acts precisely as a metamedium, recoding traditional graphic conventions within algorithmic processes and configuring every sign as a computational entity of

an open and interpretative nature (Manovich 2010; 2013). This hybrid dimension dissolves the dichotomy between the intuitive act of tracing the sign and the rigorous asepticism of procedural generation, since both aspects become contaminated within the post-digital environment (Cramer 2015), in which the image is an integrated synthesis of semantic values and computational data. From this perspective, the contemporary image is the manifestation of multiple invisible relationships, since it encloses and conveys aesthetic, figurative, semantic, and informational contents, positioning itself at the intersection between computational sciences and visual studies.

This transformation determines a parallel shift concerning the definition of the accuracy of drawing: it is no longer so much a technical characteristic measurable in terms of exactness or correspondence to reality –technical precision–, but rather an interpretative quality readable through its degree of transparency and honesty –cultural relevance–. Moreover, the concept of “remediation,” theorized by Jay D. Bolter and Richard Grusin, highlights precisely how, within the new integrated condition established by the digital, new media assimilate and transform the internal logics of previous media (Bolter, Grusin 1999). This also occurs in the visual and graphic domain, turning drawing into a stratification of meanings that are simultaneously technical and cultural: drawing becomes an autonomous and versatile linguistic structure capable of generating new knowledge. A further issue, emphasized by Mario Carpo, highlights how the digital has definitively dissolved the distinction between copy and original, transforming drawing into a flow of manipulable data requiring constant intellectual control (Carpo 2011).

Within the context of this article, the theoretical framework described above also leads to considering drawing as a tool endowed with “agency” (Prelli 2021), namely capable first of mediating between the density of information and human reading capacity and, secondly, of actively determining human behaviour. Selection, processing, interpretation, and shaping of data are the

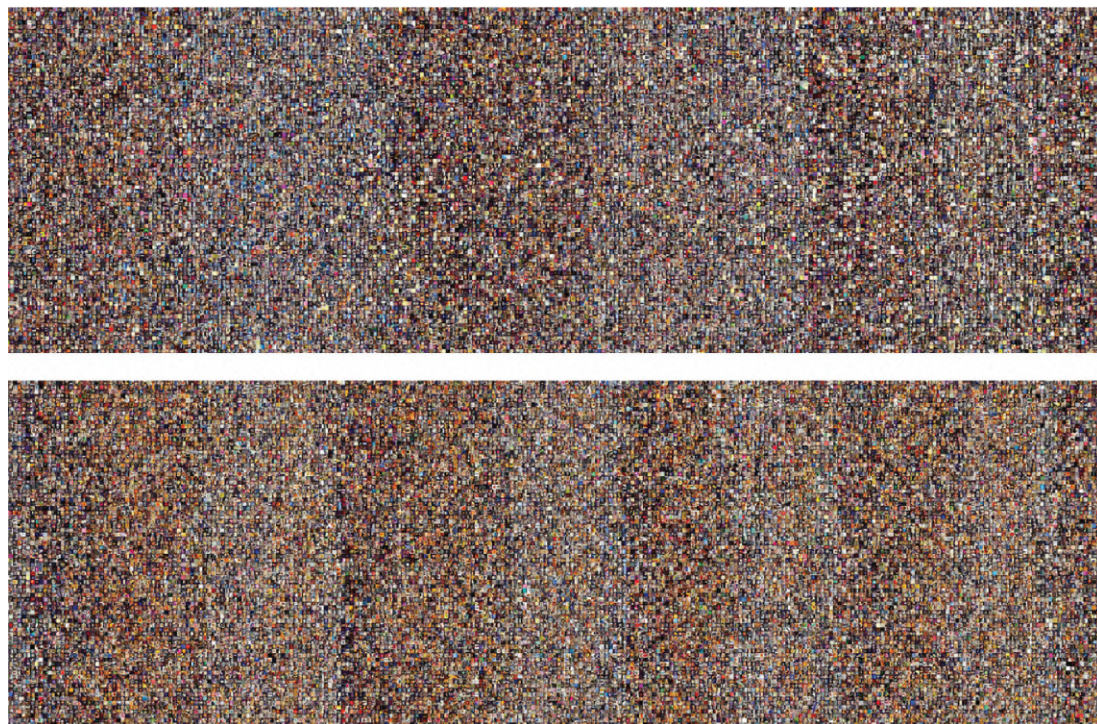


Fig. 2: Lev Manovich, *Cultural Analytics*, 2020 (Manovich 2020, plate 15).

procedural phases that make it possible to distill informational complexity into graphic artefacts that become engines of critical understanding. Faced with such complexity, the definition of increasingly advanced computational models, such as cultural analytics (fig. 2) (Manovich 2020), constitutes an aspect that still requires investigation, calling into question the issues of transparency and the ethics of visualization. It is therefore now necessary to understand how graphic sciences possess both the power and the duty to construct images endowed with an active function within society; only from this perspective can drawing become a place of communication and a vehicle of meaning in the contemporary age.

SHAPING VISUALIZATION: THE ETHICAL RESPONSIBILITY OF THE SIGN

The construction of a graphic artefact entails a process of extracting meaning from the information to be represented, which must then undergo a phase of encoding designed in a pertinent and appropriate manner in relation to the communicative intent (Columbro 2021). Designing a visualization means investigating, understanding, interpreting, and giving visible form to the latent relationships within the complex system of information, so that such relationships may become intelligible. In this sense, drawing is configured as the logical architecture entrusted with the task of shaping and

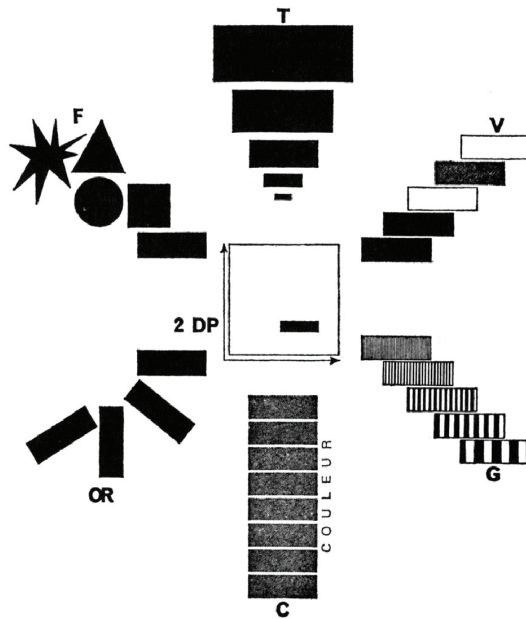


Fig. 3: The codification of visual variables according to Jacques Bertin (Bertin 1970, fig. 8).

conveying the possible communicative messages contained within data but which, if not visually expressed, would remain implicit. In the seminal volume *Language of Vision*, György Kepes highlights how the graphic sign operates as an integrative instrument of content, whose plastic force is capable of actively structuring the experience of reality (Kepes 1944). Later, Jacques Bertin provides the analytical foundation for employing drawing as a system for the visual processing of information: through the identification of visual variables (size, value, texture, colour, orientation, and shape, in addition to the two dimensions of the representational plane, fig. 3), he systematically defines a logical syntax in which the graphic sign is interpreted as a monosemic unit subject to precise organizational properties (Bertin 1967; 1970). Manfredo Massironi subsequently situates drawing between perceptual psychology and semiotics, reinterpreting in graphic terms the

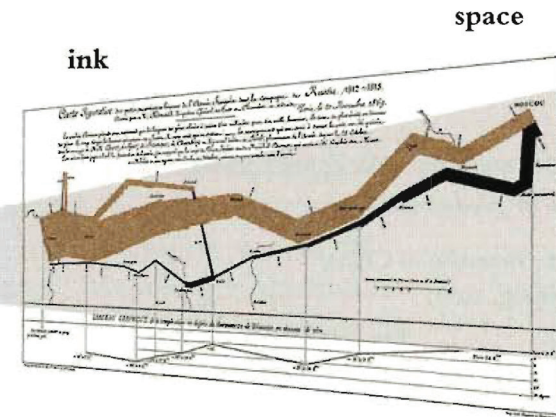
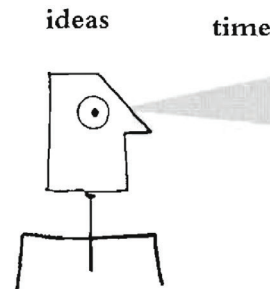


Fig. 4: Edward Tufte's concept of graphic excellence (Tufte 2001, p. 51).

concept of visual thinking formulated by Rudolph Arnheim (Arnheim 1974), and developing a grammar of the sign that attributes to drawing the role of an instrument for seeing (Massironi 1989). Drawing operates as a filter: through processes of decomposition and recombination of data, it hierarchizes information and allows the observer to identify reciprocal relationships through levels of reading of varying complexity. The effectiveness of the visual artefact is closely connected to its rhetorical function, and an 'honest' image derives from the correct correspondence between the nature of the data and the structure employed to represent it. In Edward Tufte's methodological essays, "graphic excellence" is defined through the combination of informational density and expository clarity (fig. 4): since every design choice translates into an act of visual persuasion, the responsibility of representation requires, according to Tufte, the highest level of informational

transparency, corresponding to the minimum level of graphic elaboration (Tufte 2001). Nevertheless, the aesthetic aspect of an infographic visualization is not secondary, since it generates experiential and emotional engagement, itself an indispensable condition for ensuring the effectiveness of a communicative process. Alberto Cairo's definition of "functional art" consequently appears even more balanced and appropriate (Cairo 2013): a visualization must balance aesthetics and functionality, optimizing the transmission of informational content. At this point, it becomes necessary to further investigate the theme of the "rhetorics of display" (Preli 2021), namely to analyse how specific graphic configurations may act upon perceptual dynamics and consequently orient opinions and behaviours. The graphic attributes of the sign—such as colour, scale, and thickness—and their modes of aggregation—such as layout, composition, and visual

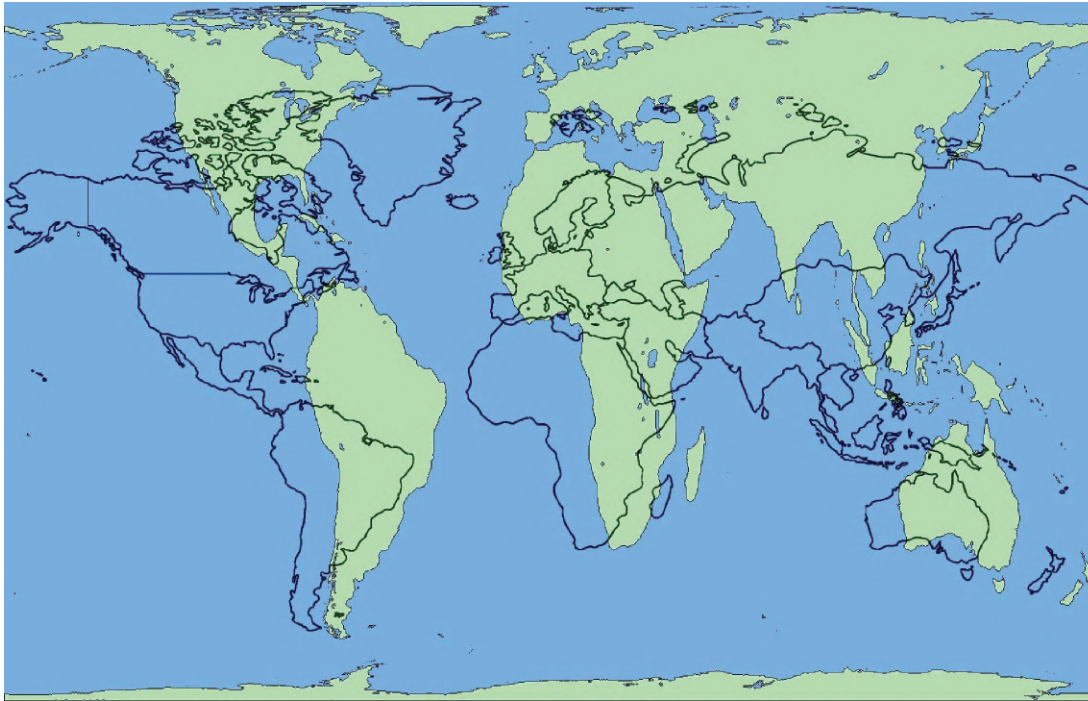


Fig. 5: Comparison between the Mercator and Gall-Peters projections (Source: Reddit).

relationship— produce signifying effects that are then exposed to interpretation by the observer. Colour introduces visual hierarchies that emphasize or distinguish categories; at the same time, the use of specific chromatic schemes, such as red and black in contexts of social representation, automatically activates associations with situations of alarm or danger determined by acquired visual experience, conditioning the emotional reception of data. Similarly, the choice of scale, and in cartographic representations the choice of projection, also assumes political significance; for example, in a geographical map, the Mercator projection, historically functional to navigation, enlarges the surfaces of countries distant from the equator,

whereas the Gall-Peters projection restores an equilibrium based on equal-area representation, exercising a critical counterbalance to visual Eurocentrism. In this sense, drawing is never neutral and exerts power in shaping our perception of the world (fig. 5).

The first filter applied during the construction of a visualization is the selection of the information to be shown, and therefore the exclusion of what is to be concealed: bringing certain aspects of a phenomenon to light necessarily entails rendering others invisible. Through an effective linguistic choice, Johanna Drucker defines this selection through the conceptual transition from *data* [given] to *capta* [taken]: whereas data are given

and effectively exist as records of a phenomenon, *capta* are actively selected and constitute the information chosen for the construction of the visualization and its meaning (Drucker 2014). The subsequent process of shaping data through the tools of graphic sciences (Cicalò, Menchetelli 2020) introduces the linguistic and expressive choices that will determine the perception and reception of the informational content of the image. In the process of encoding an informational image (Elkins 2009), the adoption of a graphic language characterized by a greater or lesser degree of abstraction—ranging from diagram to illustration (Moles 1972; Anceschi 1992)—corresponds to the choice of a specific communicative register establishing dialogue with the observer.

The visualization of information has by now become an indispensable practice for reading the phenomena and dynamics affecting contemporary society, as demonstrated by numerous recent exhibition initiatives that underline its usefulness. The architecture of society, territories, and culture today requires the use of representational tools capable of making complexity accessible: diagrams, networks, maps, and infographics able to highlight relationships among information. Graphic sciences make available the possibility of interpreting social data such as migratory flows, economic structures, environmental transformations, and geopolitical dynamics; the diagram constitutes the privileged device for reading highly complex data. In the contemporary scenario, in which information is often exposed to acts of counterfeiting and manipulation, visualization is a powerful instrument requiring the exercise of ethical and critical responsibility, placing graphic sciences at the centre of cultural and political debate.

THE DIAGRAM AS A RHETORICAL DEVICE OF VISUALIZATION

In order to discuss the role of graphic sciences in the interpretation of information, it is useful to refer to several case studies that highlight both the interdisciplinary roots and the evolutionary character of data visualization.

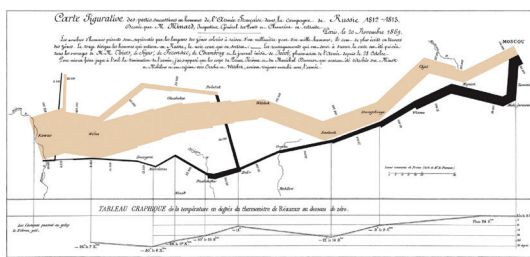
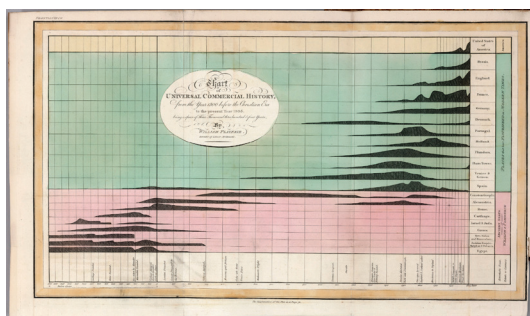
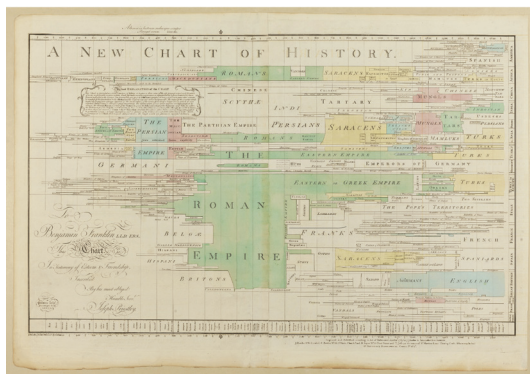


Fig. 6: Joseph Priestley, *A New Chart of History*, 1769 (https://upload.wikimedia.org/wikipedia/commons/1/1e/A_New_Chart_of_History_color.jpg).

Fig. 7: William Playfair, *Chart of Universal Commercial History*, 1805 (Playfair 1805, Frontispiece).

Fig. 8: Charles Joseph Minard, *Carte Figurative des pertes successives en hommes de l'Armée Française dans la Campagne de Russie 1812-1813*, 1869 (https://cdns.tblsft.com/sites/default/files/pages/1_napoleon_minard.png).

Used since antiquity in different cultural contexts to represent measurements and scientific observations (Christianson 2014; Franken, Margheri 2025), diagrams progressively emerged as an increasingly widespread visualization tool, experiencing a particularly productive and influential phase during the second half of the eighteenth century (Cicalò, Menchetelli, Trizio 2025). Works such as Joseph Priestley's historical *Charts* (1765 and 1769) (fig. 6) and, a few years later, William Playfair's *Commercial and Political Atlas* (1786), followed by further infographic experimentations (fig. 7), established the fruitful collaboration between graphic sciences and the humanities, achieved through the hybridization of geographical, mathematical, and statistical representational tools. Subsequent advances in cartography within the French context led to the widespread production of maps addressing social and political themes –one may think of the work of engineer Charles Joseph Minard, author of the celebrated diagram of Napoleon's Russian campaign (1869) (fig. 8)– as well as to an evolution of interdisciplinary applications of data visualization in the social sphere –such as the map drawn by physician John Snow to analyse the spread of the cholera epidemic in London (1854) (fig. 9), and the renowned diagrams created by nurse Florence Nightingale for the interpretation of health data concerning infections in English hospitals (1860) (fig. 10). This rapid evolution of the diagram as an instrument for the analysis and interpretation of information led to a significant advancement of research in the field of graphic languages, finding a fully developed formulation of revolutionary and still contemporary relevance (Menchetelli 2013; Luigini, Moretti 2019) in the international ISOTYPE language (International System of Typographic Picture Education), developed by the working group coordinated by sociologist and philosopher Otto Neurath and including Marie Reidemeister and Gerd Arntz (Neurath 1936). The ISOTYPE language originated within the context of the Gesellschafts- und Wirtschaftsmuseum (Ge-Wi-Mu) in Vienna with the explicit aim of enabling the average citizen to access economic,

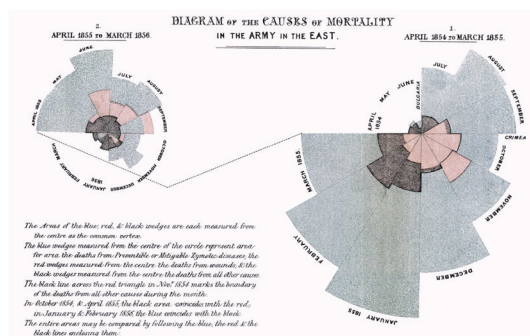


Fig. 9: John Snow, mapping of the cholera epidemic in London, 1854 (https://cdns.tblsft.com/sites/default/files/pages/2_snow-cholera-map.jpg).

Fig. 10: Florence Nightingale, *Diagram of the Causes of Mortality in the Army in the East*, 1858 (<https://ibolive.unipd.it/sites/default/files/2019/12/-florence-nightingale.jpg>).

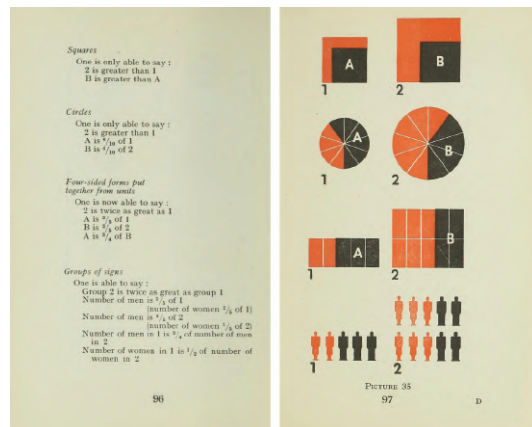


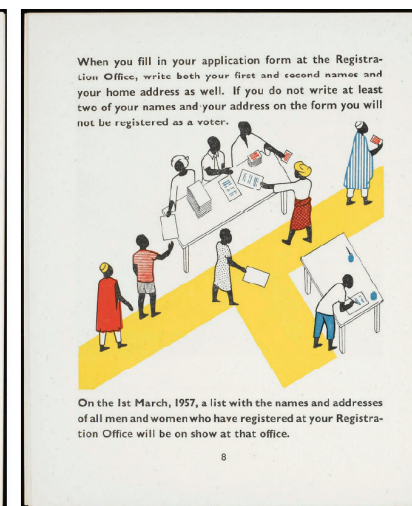
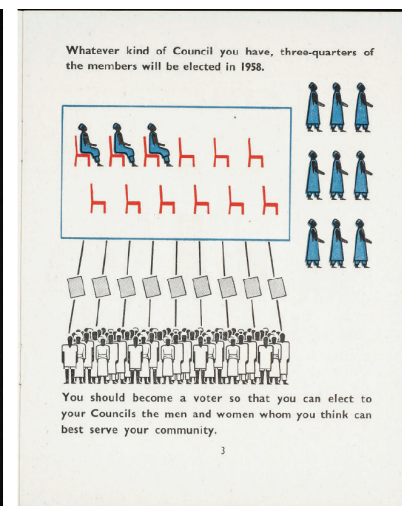
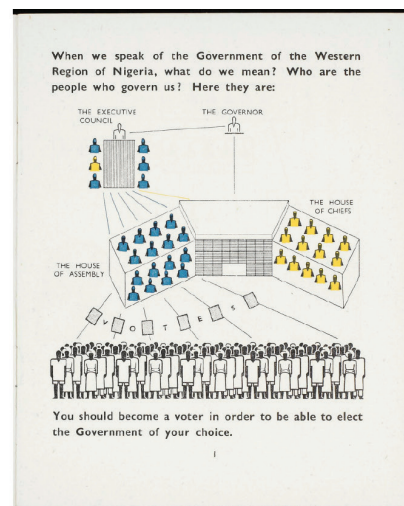
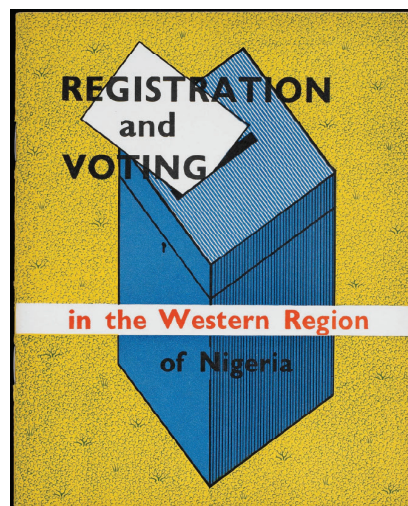
Fig. 11: Otto Neurath, principles of the ISOTYPE visual language, 1936 (Neurath 1936, pp. 96, 97).

Fig. 12: Marie Neurath, ISOTYPE Institute, *Registration and voting in the Western Region of Nigeria*, 1957 (<https://peoplesgdarchive.org/item/1/registration-and-voting-in-the-western-region-of-nigeria>).

political, geographical, and social information. The “Viennese method” involved the processing and representation of information through applications of graphic statistics designed according to rigorous syntactic rules, favouring a symbolic and simplified connotation of language (fig. 11): bidimensionality of the sign to enhance the pictographic value of representation, multiplication of signs to facilitate the quantification of data, and a restricted colour palette to support the identification and hierarchy of information. The mission of this language, aspiring to the universality of communication (Ippoliti, Camagni, Tomasella 2025), was driven by ethical and educational intentions that found wide application within the European context, leaving a lasting legacy, and were also successfully experimented with in contexts characterized by compromised literacy levels, such as the territories of the British colonies in West Africa, particularly Nigeria (fig. 12) (www.isotyperevisited.org). This ‘visual education’ constitutes the first modern example in which the ethical responsibility of graphic sciences structurally emerges by placing the honesty of the sign at the service of an ideal of collective cultural emancipation.

Within the contemporary scenario, the central role of visualization in the critical reading of social data is demonstrated by the proliferation of exhibition initiatives situated within the field of digital humanities. Among these, two particularly significant examples are presented here, both expressing the intention to attribute to the graphic sign a role of responsibility in providing tools for interpreting the world and society.

The first case is the exhibition *Diagrams*, held in Venice at Fondazione Prada (10 May - 24 November 2025) and conceived by the AMO/OMA studio founded by Rem Koolhaas. The exhibition project highlights the value of drawing, particularly in the form of the diagram, as an interpretative and performative device. Through a diachronic selection gathering more than 300 artefacts, the exhibition demonstrates the chronological transversality of the diagram (present both in three-dimensional artefacts dating back to 40,000 BCE and in contemporary digital mappings). The diagram appears as a “permanent form of communication” (Koolhaas, 2025, p. 13), capable of adapting to different media and historical epochs in the task of organizing knowledge. The theoretical



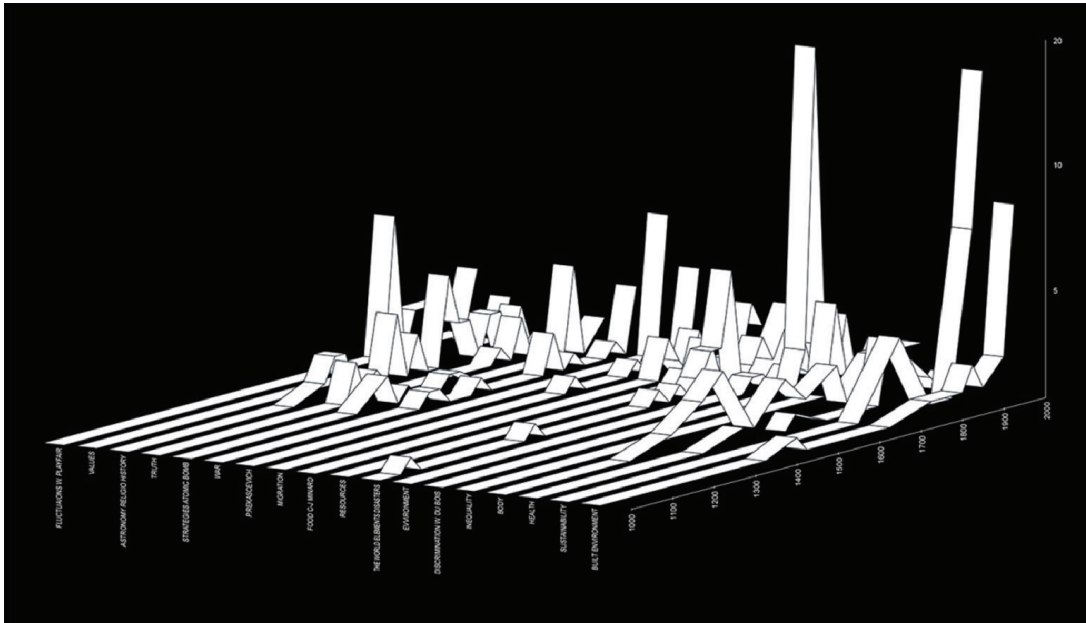


Fig. 13: AMO/OMA, *Diagrams*, 2025, timeline (<https://www.artribune.com/mostre-evento-arte/diagrams-a-project-by-amo-oma/>).

framework of the project finds critical grounding in Gilles Deleuze's assumption that the diagram does not constitute the fact itself but rather its possibility, inviting awareness of the non-neutrality of any representation, capable of shaping thought and orienting the understanding of phenomena. Consequently, the exhibition layout is organized into thematic areas defined as "contemporary urgencies" (war, resources, migration, environment, etc.), also in order to demonstrate the mobility and variability of the concept of urgency over time. In each of the displayed diagrams, the graphic sign introduces an active mediation: the selection of visual variables directly affects processes of meaning construction, exposing itself to the dual role of data manipulation or scientific clarification. The draughtsman thus becomes an interpreter, whose intellectual honesty may be tested by analysing the transparency

of methodological processes. In the case of the Venetian exhibition, this approach is exemplified by the AMO/OMA meta-diagrams (fig. 13), which introduce the exhibition path and provide an overall vision of it, explicitly revealing the research criteria and the mechanisms of data translation, thereby affirming both the capacity to make the phenomenon visible and the logic of the interpretative operation itself. The rhetoric of display is also expressed in the exhibition design solution, where a sequence of showcases and thematic walls unfolding through the extensive dimness of the exhibition spaces encourages the analysis, reading, and study of the displayed representations, allowing for an extended period of maturation of critical thought (fig. 14). The second exhibition event demonstrating how drawing is entrusted with critical responsibility and ethical value is the 24th International



Fig. 14: AMO/OMA, *Diagrams*, 2025, the exhibition space (<https://www.fondazioneprada.org/project/diagrams/>).

Exhibition of the Triennale di Milano, significantly entitled *Inequalities* (13 May - 9 November 2025). Here, data visualization assumes the role of critical mediator between inequalities on a global scale and their perception at the social level. The exhibition is organized into two sections investigating the multidimensionality of the concept of inequality: the first is dedicated to geopolitical themes and explores data concerning wealth and poverty at the urban and territorial scale, while the second examines biopolitical aspects and analyses the influence of inequalities on lifestyles and life expectancy. Within this context, drawing operates through a plurality of graphic devices acting as instruments of critical decoding: cartography is employed, for example, in Maurizio Molinari's *Atlante del mondo che cambia* (fig. 15) and in the large map *We the Bacteria* by Beatriz Colomina and Mark Wigley (fig. 16), while simple



Fig. 15: Maurizio Molinari, *Atlante del mondo che cambia*, 2025 (<https://triennale.org/eventi/atlante-mondo-cambia>).

yet effective statistical visualizations are used to support the societal model entitled *La Repubblica della Longevità* by Marco Sammiceli and Nic Palmarini. The connecting element between the two sections is the *Shapes of Inequalities* area, in which Federica Fragapane's visualizations employ graphic language by transforming data into drawing in order to convey the complexity of phenomena such as migration, urban poverty, and gender disparity. Fragapane's language constitutes a powerful narrative instrument, relying on organic and stratified forms that produce a visual tension between the aesthetic delicacy and humanity of the represented figures and the harsh

<http://disegnarecon.univaq.it>

substantive nature of the analysed phenomena (Avallone 2026); in this way, a mechanism of deep attention and viewer engagement is activated (fig. 17). The visual identity of the exhibition itself is also centred on the visualization of information: designed by Pentagram (Giorgia Lupi's team) according to the principles of *Data Humanism* (Lupi 2017), it is based on real data and represents them using generative treemap patterns (fig. 18); every communicative tool within the exhibition thus becomes an opportunity to observe the phenomenon of inequality through a specific infographic lens, shaping its critical understanding (Pederbelli 2025).

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Fig. 16: Beatriz Colomina, Mark Wigley, *We the Bacteria. Notes for a Biotic Architecture*, 2025 (<https://archiveofobjects.net/en/design-culture/we-the-bacteria-living-with-microbes/>).

The case studies discussed focus on exhibition initiatives that have stimulated international debate on emerging and urgent social issues. Rather than surveying the broad range of contemporary visualization practices, the analysis considers contexts in which graphic representation is used to support the public interpretation of complex phenomena.

CONCLUSIONS: DRAWING FOR A CONSCIOUS VISUAL CITIZENSHIP

The analysis conducted here makes it possible to outline a new trajectory for graphic sciences,

one that moves beyond the functional, technological, or computational roles of drawing toward a dimension in which the value of representation is measured by its ethical responsibility. In an era characterized by growing informational asymmetry, the 'changing drawing' becomes a practice aware of its own partiality: once the illusion of objective neutrality has been overcome, visualization must make explicit its criteria of selection and its rhetorical mechanisms, transforming the graphic act into a gesture of intellectual honesty. What thus emerges is the perspective of a necessary 'ethics of the sign,' in which the draughtsman assumes the social and political responsibility of visual mediation. As suggested by Luciano Floridi, within the logic of the infosphere the organization of data constitutes an act of constructing reality itself; consequently, the task of graphic sciences is to make complexity legible in order to render decision-making processes more conscious and democratic. The transformation undergone by representation determines the emergence of a new conscious visual citizenship, in which drawing acts as an active mediator between global phenomena and the individual capacity for interpretation and action. The commitment of the discipline of drawing therefore lies in overcoming a merely instrumental conception in order to promote a culture of representation oriented toward readability, accessibility of information, transparency, and educational function. Through this ethical commitment, graphic sciences respond to the challenges of contemporaneity and restore meaning and mission to the complex landscape of the information society. The future of drawing, therefore, concerns the issue of the responsibility of the sign: not only to describe the world, but to contribute to making it a place of democratic understanding and shared participation.

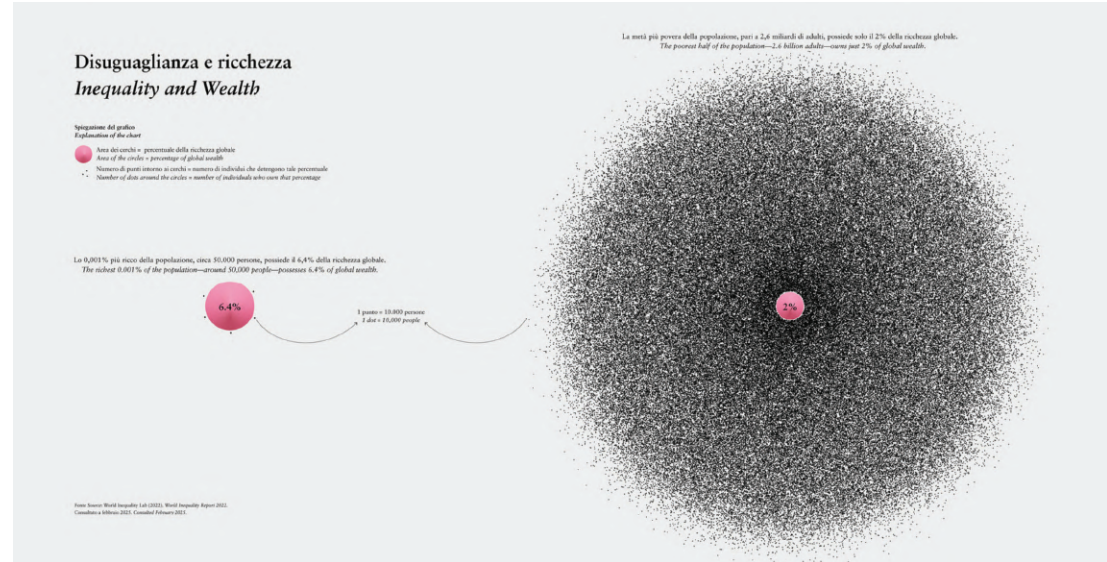


Fig. 17: Federica Fragapane, *Shapes of Inequalities*, 2025 (<https://www.designboom.com/design/data-federica-fragapane-soft-forms-hard-facts-inequalities-shapes-triennale-milano-interview-06-08-2025/>).

Fig. 18: Pentagram, Giorgia Lupi's team, visual identity of the exhibition *Inequalities*, 2025 (<https://www.pentagram.com/work/inequalities-at-triennale-milano>).

REFERENCES

- Anceschi, G. (1992). *L'oggetto della raffigurazione*. Milano: Etas.
- Arnheim, R. (1974). *Il pensiero visivo. La percezione visiva come attività conoscitiva*. Torino: Einaudi (first work published 1969).
- Avallone, A. (2026). Dare una forma leggibile alla complessità: Federica Fragapane. In *Buns. Dati sensibili*. <https://www.thebuns.it/2026/04/dare-una-forma-leggibile-alla-complessita-federica-fragapane/>
- Bertin, J. (1967). *Sémiologie Graphique. Les diagrammes, les réseaux, les cartes*. Paris: Gauthier-Villars.
- Bertin, J. (1970). La graphique. In *Communications*, 15, pp. 169-185. DOI: 10.3406/comm.1970.1221
- Bolter, J. D., Grusin, R. (1999). *Remediation: Understanding New Media*. Cambridge, MA: MIT Press.
- Cairo, A. (2013). *L'arte funzionale. Infografica e visualizzazione delle informazioni*. Milano: Pearson.
- Carpo, M. (2011). *The Alphabet and the Algorithm*. Cambridge, MA: MIT Press.
- Christianson, S. (2014). *100 Diagrams That Changed The World*. London: Batsford Books.
- Cicalò, E., Menchetelli, V. (2020). Informazioni accessibili. La visualizzazione dati nell'epoca dei big data, degli open data e degli open tools - Accessible information. Visualizing data in the age of big data, open data and open tools. *Dn*, 7, pp. 17-27. <http://www.dienne.org/2021/01/07/menchetelli-cicalo-2/>
- Cicalò, E., Menchetelli, V., Trizio, I. (2025). I linguaggi grafici dell'informazione: ragioni, funzioni, evoluzioni e definizioni. In E. Cicalò, V. Menchetelli, I. Trizio (a cura di). *Linguaggi Grafici. Informazione* (pp. 12-29). Alghero: Publica.
- Columbro, D. (2021). *Ti spiego il dato*. Faenza: Quinto Quarto Edizioni.
- Cousins, M. (2018). *Storia dello sguardo*. Milano: Il Saggiatore.
- Cramer, F. (2015). What is 'Post-digital'? In D.M. Berry, M. Dieter (Eds.), *Postdigital Aesthetics* (pp. 12-26). London: Palgrave Macmillan.
- Drucker, J. (2014). *Graphesis: Visual Forms of Knowledge Production*. Cambridge, MA: Harvard University Press.
- Elkins, J., 2009. La storia dell'arte e le immagini che arte non sono. In A. Pinotti, A. Somaini (a cura di), *Teorie dell'immagine* (pp. 155-205). Milano: Raffaello Cortina Editore.
- Floridi, L. (2017). *La quarta rivoluzione. Come l'infosfera sta trasformando il mondo*. Milano: Raffaello Cortina Editore (first work published 2014).
- Franken, S., Margheri, G. (2025). Elogio del diagramma: la visualizzazione dei dati nei secoli. In *Fondazione Leonardo. Civiltà dei dati*. (<https://www.fondazioneleonardo.com/stories/elogio-diagramma-visualizzazione-dei-dati-nei-secoli>).
- Kay, A., Goldberg, A. (1977). Personal Dynamic Media. In *Computer*, 10(3), pp. 31-41. Reprinted in Wardrip-Fruin, N., Montfort, N. (Eds.), *The New Media Reader* (pp. 391-404). Cambridge, London: The MIT Press.
- Kepes, G. (1944). *Language of Vision*. Chicago: Paul Theobald.
- Koolhaas, R. (2025). On diagrams. Rem Koolhaas in conversation with Katya Inozemtseva. In *Diagrams / a project by AMO/OMA* (pp. 10-15). Milano: Fondazione Prada.
- Ippoliti, E., Camagni, F., Tomasella, N. (2025). Etica, estetica ed utopia. Due progetti visionari per una lingua visuale universale. In V. Menchetelli, F. Cotana, E. Dottorini (a cura di). *IMG2025 Image Ethics* (pp. 246-259). Alghero: Publica.
- Luigini, A., Moretti, M. (2019). L'attualità di Otto Neurath. Da ISOTYPE al Visual Journalism per un racconto visuale della società. In *XY digitale*, 3(6), pp. 74-93. DOI: 10.15168/xy.v3i6.112
- Lupi, G. (January 30, 2017). Data Humanism: The Revolutionary Future of Data Visualization. In *PrintMag*. <https://www.printmag.com/article/data-humanism-future-of-data-visualization/>
- Manovich, L. (2010). *Software Culture*. Milano: Olivares.
- Manovich, L. (2013). *Software takes command*. Londra: A&C Black.
- Manovich, L. (2020). *Cultural Analytics*. Cambridge, MA: MIT Press.
- Massironi, M. (1989). *Vedere con il disegno*. Padova: Muzzio.
- Menchetelli, V. (2013). Ubiquità di un'atopia. Il linguaggio universale Isotype e la riforma della comunicazione visiva. In P. Belardi, A. Cirafici, A. di Luggo, E. Dotto, F. Gay, F. Maggio, F. Quici (a cura di). *Atopie* (pp. 159-164). Roma: Form Act.
- Menchetelli, V., Cotana, F., Dottorini, E. (a cura di). *IMG2025 Image Ethics*. Alghero: Publica.
- Moles, A.A. (1972). Teoria informazionale dello schema. In *Verus*, 2, pp. 29-37.
- Neurath, O. (1936). *International Picture Language*. London: Kegan Paul.
- Pederbelli, M. (A cura di). (2025). *Inequalities: 24. Esposizione Internazionale*. Milano: Electa.
- Playfair, W. (1805). *An inquiry into the permanent causes of the decline and fall of powerful and wealthy nations...* London: Greenland and Norris.
- Prelli, L.J. (Ed.). (2021). *Rhetorics of display*. Columbia: University of South Carolina Press.
- Scarafile, G. (2022). *Etica delle immagini*. Brescia: Morcelliana.
- Tufte, E.R. (2001). *The Visual Display of Quantitative Information*. Cheshire, CT: Graphics Press. (second edition).