Transforming the Transformer in a Time of Crisis. Marie Neurath's Experience in the Time of the Web

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Abstract *The article explores how Marie Neurath's work as a Transformer can inspire and inform contemporary digital social design practices. It draws parallels between the historical crisis faced by ISOTYPE and today's digital crises and introduces two case studies exemplifying principles of translation, relation, and enablement in information design.*

Author keywords *transformer; information design; digital social design*

1. Introduction

The purpose of this contribution is to draw attention to the emerging field of *digital social design*, with a particular focus on *information design*, and to highlight the need for interdisciplinary research in this area. Although information design has been widely researched from historical and cognitive perspectives[1], the link between design practice and social design issues has yet to be explored. As such, there are several important questions that researchers could address, such as how data usage practices change as they move from paper to digital, how to engage and assess impact with large and distributed online audiences, and how to inform with data in an increasingly polarised online environment.

This contribution traces a research line starting with analysing case studies beyond traditional information design, utilising data as a narrative device to open up debates and problematise the status quo. These works shift data from being a subject to an object and, in doing so, provide a means of exploring the potential for greater awareness and social equity through information design projects. The contribution identifies the information crisis as the context for this reflection and proposes three key concepts: *Translate*, *Relate*, and *Enable*. These concepts provide a framework for

1 https://www.jbe-platform.com/content/journals/1569979x/1/1

imagining a transformation process in the digital sphere and for configuring information design projects as devices for greater social impact.

To contextualise the contemporary relevance of these concepts, the contribution also highlights the role of Marie Neurath as a *Transformer* after WWI. Her work provides a helpful reference point for defining the contours of the contemporary reverberation of the information crisis in the context of a crisis similar to the present one. Overall, this contribution aims to contribute to the development of a more robust and interdisciplinary research agenda in the emerging field of digital social design, with a particular emphasis on the importance of information design in promoting greater social equity and awareness.

2. The information Crisis

The last decade has been characterised by, among other things, the *information crisis*. It had, and is still having, serious repercussions on democracy, science and society in general (Bennett & Livingston, 2018). On the one hand, modern society is confronted with *hyperobjects* (Morton, 2013), intangible, non-local phenomena whose effects we experience and contribute to simultaneously. These include but are not limited to, the Coronavirus, climate change, and the Internet: complex, abstract objects whose effects are difficult to measure and grasp, requiring data to do so. They impact the daily lives of millions of people, also in negative ways, and challenge the comprehension and reflection abilities of a vast scale of citizens. On the other hand, a significant portion of the population suffers from poor media and information literacy. The disintermediation of information (Bessi & Quattrociocchi, 2015) generated by the Web 2.0 technological acceleration (O'Reilly, 2005) has exposed Internet users, who lack the tools to approach media and information critically, to a plethora of information, often false or extremely biassed, particularly on controversial and highly polarised topics. Such campaigns are not limited to fake news but also include disinformation campaigns aimed at undermining the democratic resilience of contemporary society (Bennett & Livingston, 2018).

The information crisis has been the subject of several meetings of the European Council (2020) and the European Commission (2016). Of particular interest are the meetings in 2016 that included disinformation campaigns among *hybrid threats* and the one in 2020 that called for greater *media literacy* among the population to approach information and media critically. Even Unesco, in 2023, denounced the need for more *information literacy* to access information about health, the environment, education, and work and to make critical decisions about one's life[2]. It is

2 https://www.unesco.org/en/ifap/information-literacy

a widespread crisis, which finds a vast and heterogeneous public unprepared to approach the complexity that characterises the contemporary world critically.

In some ways, this is a crisis similar to the one that characterised Viennese society after the First World War; a society that came out of the war ruined, in a serious state of illiteracy, lacking a critical and democratic spirit towards the most important political and social issues. A context in which the ISOTYPE experience gave rise, conceived by Otto Neurath together with Marie Neurath and Gerd Arntz, and aimed to inform a broad and low-literate public visually. Although the two crises are not in continuity, several common points can be identified given the historical, political, social, and technological premises that triggered them. On the one hand, there remains a lack of specific literacy to interpret the world around us and develop greater democratic sensibility. On the other hand, specific design practices intend to inform and curb illiteracy through visual tools. A last element in common is the hybrid design nature: a continuous reconfiguration and repositioning to meet the needs of specific places and times (Margolin, 2002).

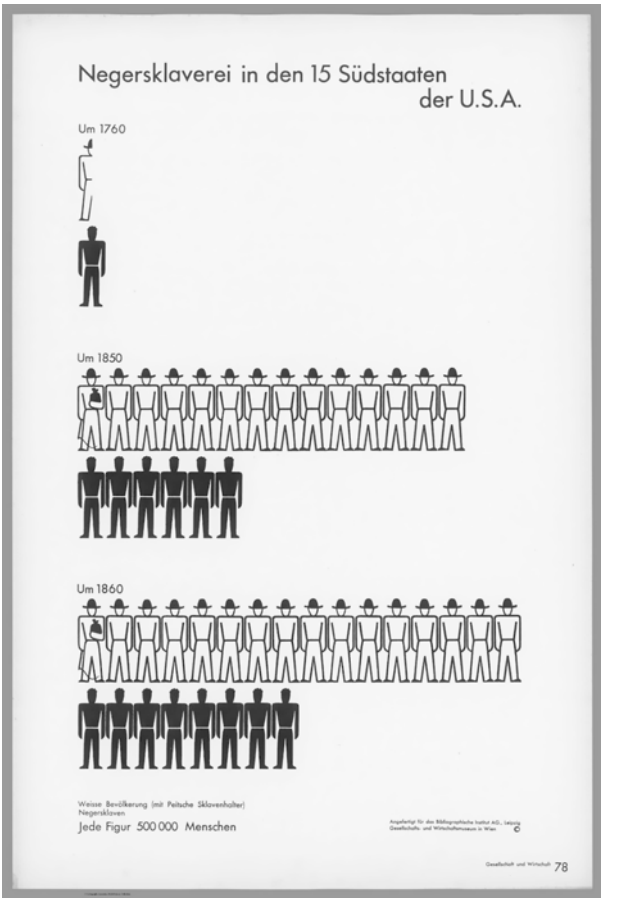
In this frame, the current information crisis presents a valuable scenario to build upon the ISOTYPE approach in the digital domain, focusing on the *Transformer* role discussed by Marie Neurath, the role of a visual and verbal translator that mediates meaningful content through design means. This aspect of the digital *Transformer* is an aspect that still requires research, and this contribution aims to bring it to scholars' attention, particularly from an *information design* perspective. Thus, the practice is positioned at the intersection of socially oriented information design and Science and Technology Studies, creating a space for both design and critical reflection in which two case studies described below, coordinated by the author of this contribution, come to life.

3. The *Transformer* Crisis

The year 1920 was a time of crisis for Vienna, which had just emerged battered from the First World War. It was during this period of unrest that the International System of Typographic Picture Education (ISOTYPE) was initiated by Otto Neurath in collaboration with Marie Neurath and Gerd Arntz. This system was developed to inform and visually educate an illiterate or semi-literate population segment on fundamental societal issues and the phenomena that characterise it. Additionally, it aimed to transmit an aptitude for scientific thinking towards developing democratic societies (Nemeth, 2013).

Otto Neurath, the founder of ISOTYPE, believed in the power of images to unite rather than divide people. He hailed ISOTYPE as a revolution that brought together data visualisation, graphic design, anthropology, and the social sciences (Figure 1).

Figure 1: ISOTYPE – Negersklaverei in den 15 Südstaaten der U.S.A. Angefertigt für das Bibliographische Institut AG., Leipzig. Gesellschafts- und Wirtschaftsmuseum in Wien. ©



This interdisciplinary approach gave rise to a new figure called the *Transformer*, who was capable of receiving, filtering, and shaping scientific content so that it was accessible to the target audience and served educational and training purposes. Marie Neurath played the role of *Transformer* within the interdisciplinary working group that made ISOTYPE possible. This central role in design is comparable to that of the modern designer, meant as a translator (Baule & Caratti, 2016). The *Transformer* is capable of dialoguing with the different figures that make up the interdisciplinary team, relating with the communities of reference, and translating information on complex phenomena in an accessible and engaging way.

The *Transformer*, therefore, possesses not only design skills but also social skills, and is capable of immersing in new contexts to grasp their peculiarities and cultural nuances on which to build relevant and accurate information, visually and verbally. It is a role which acquired greater substance only after Marie Neurath's experiences in Africa. In fact, ISOTYPE was born and developed in the West, betraying the concept of internationality for having the West as its main reference point. Marie Neurath's reflections on her collaboration with the Nigerian government are worthy of note, as quoted by Kindel in 2022:

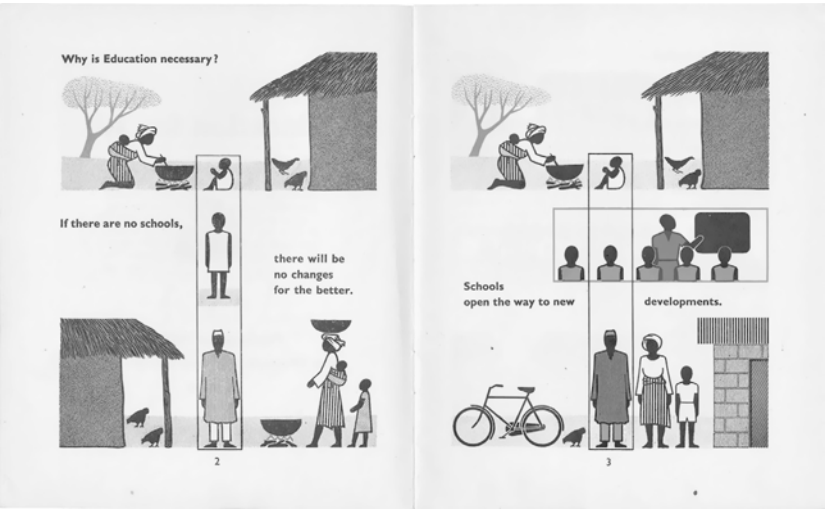
> "Already in London, I had been given a 'white paper' on education to read... From this I had designed a large summary chart; it went straight into the wastepaper basket after I had walked through the streets of Ibadan; why should these people have to struggle with my chart?"
> (Kindel, 2022, p. 6)

And later, in another interview about the same experience, she recalls that:

> "More than before I recognised this when I had to work out ways of informing the Nigerian people about health, education, agriculture, voting etc., in visual terms. Man, woman, house, plants, markets, trees... all had to be drawn in a different way to be understandable in that country. Also the approach, the speed of information, the colour scheme, the ways to catch the attention-all had to be different."
> (Kindel, 2013, p. 192)

As highlighted by Marie Neurath's reflections, the limitations and contradictions of ISOTYPE emerge clearly, particularly when applied to a non-Western cultural context. If the awareness that is gained limits and redefines the international ambitions of ISOTYPE, it also indicates the potential of the transformative approach, which appears scalable in other cultural contexts.

Figure 2: Marie Neurath: Education for all in the Western Region, pages 2–3.



> "The methods and approach are, I think, more universal than the symbols are. I had to discover this when I worked for Africans for some time. I had to make things clear to them, and I could not force our 'international symbols' on them. Many symbols, of man, woman, house, tree, field, etc. had to be specifically designed for them. When things are equal all over the world the symbols can be the same." (Neurath, 1971)

It is, in fact, a translation process that considers different cultural and social aspects and is capable of reconfiguring the project according to the community of reference. It is the first step in a broader process that aims to relate to the audience, designing familiar and relatable entry points to enable them to understand new phenomena through information design.

> "It is the responsibility of the 'transformer' to understand the data, to get all necessary information from the expert, to decide what is worth transmitting to the public, how to make it understandable, how to link it with general knowledge or with information already given in other charts. In this sense, the transformer is the trustee of the public" (Neurath & Kinross, 2009, pp. 77–78)

Although there is substantial literature on ISOTYPE, particularly its historical, social, and educational aspects, less is known about the details and reflections on design practice concerning its translation aspects (Neurath & Kinross, 2009). The *Transformer* is an essential figure that can support informing and reconfiguring contemporary design practices, especially those operating at the intersection of

data, information and society, inevitably digital practices, to become a "trustee of the public" (Neurath & Kinross, 2009).

4. Transforming the Transformer

The comparison between ISOTYPE and contemporary information practices has garnered considerable attention among scholars (Schreder et al., 2018; Luigini & Moretti, 2019; Piekarski, 2016; Bohman, 2015; Jansen, 2009). However, it is worth noting that while many researchers have explored the subject, a limited number have delved beneath the surface, focusing on the profound implications of the relationship between ISOTYPE and modern information practices (Mayr & Schreder, 2014; Zambrano & Engelhardt, 2008).

This section does not merely address the reinterpretation of pictograms and graphical elements in contemporary information design. Instead, it seeks to explore the narrative construction of reality through design modalities that synthesise principles from data design, journalism, and the social sciences. These integrated forms represent a response to the challenges and opportunities of the ongoing information crisis. It is crucial to recognise that these hybrid forms might not be exclusively digital; instead, they encompass a broader spectrum of approaches.

Within this conceptual framework, the moments of crisis framed above offer an opportune juncture to devise an approach that can inform and shape the social practices of digital information design. It is a pivotal moment to gather many insights and begin delineating an emerging practice, ultimately leading to its comprehensive systematisation through extensive and sustained research efforts.

The reflections presented in the ensuing discussion should be construed as the initial groundwork, representing the nascent stage of a strand that will be enriched by future scholarly contributions in the time to come.

The transformation of the audience

The pervasive influence of technology has profoundly reshaped our interpersonal relationships and information processes, consequently affecting a profound evolution in the public sphere compared to the *Transformer* era. The concept of the public has shifted from being relatively well-defined and delineated to a state of diffusion and geographical and cultural distribution. Within the contemporary digital paradigm, content dissemination targets an expansive, decentralised, and diverse public, characterised by varying levels of educational attainment, disparate age groups, and shared interests or mere curiosity as unifying factors. Consequently, the challenge of identifying the target audience and shaping the design accord-

ingly—a central tenet of design practice (Margolin, 1997)—presents a significant practical problem.

To navigate this inherent complexity, it becomes necessary to devise stratagems to delineate or reference specific categories of people. One possible strategy involves the highlighting of these categories in the context of *spaces*, whether those are *physical* or *digital*. Despite the Internet's vast and dispersed audiences, a closer examination reveals that diverse generations of people gravitate towards specific digital spaces, such as social networks (Laor, 2022; Gazit et al., 2020). Contemplating the digital spaces frequented by the target audiences presents a valuable approach to design that helps towards a more refined consideration of the forms, languages, and contents. While this approach is imperfect, it offers practical utility in disentangling the intricate web of complexities inherent to audience engagement. It is a pragmatic means to constrict the expansive field of design possibilities. Furthermore, it is conceivable that specific digital projects extend their influence into physical spaces, facilitating connections with communities seeking access to digital information. These approaches bridge the physical and digital worlds, thereby facilitating a more precise and effective approach to reaching out to an audience and designing for them (Bollini, Mastroianni, 2023; Mukta, 2023; Offenhuber, 2019).

In essence, it is helpful to adopt an ecosystem perspective, extending the project to multiple locations, physical and digital, creating a chain effect of information dissemination useful to reach the target audience.

The transformation of language

ISOTYPE introduced a novel approach characterised by dry visual and verbal language, using the Futura font, a few specific colours, essential and neutral headings, and pictograms within the graphics (Jansen, 2009). This approach was motivated by the assumption that images possess an international quality and that "the effect of pictures is frequently greater than the effect of words, especially at the first stage of getting new knowledge" (Neurath, 1936). However, almost a century later, while visual communication predominates in the media, pictograms have become a rare sight in graphs: contemporary audiences have become increasingly proficient in interpreting simple charts. Although emojis are used in many countries and cultures (Abel, 2019) and might be assimilated into a modern version of pictograms, only a few information design projects utilise them. Despite their internationality, emojis have their specific uses and meanings in relation to the cultures that adopt them (Guntuku, 2019) and are often associated with informal communication and emotional content within digital communication.

Despite the discontinuity brought about by the decline of pictograms, the contemporary *Transformer* is still required to adapt visual and verbal languages to global communities. This necessitates a thorough understanding of visual languages, so-

cial skills, and technical and expressive possibilities relevant to storytelling, especially in dealing with complex topics.

The challenge of contemporary information design is to present complex data in an accessible and understandable manner without trivialising or introducing abstraction. Unlike the paper medium of the past, web design allows for interactive content and advanced narrative systems such as *scrollytelling*, which matches scrolling with specific animations or events, to create a narrative approach that isolates and builds on a series of contents, unravelling complexity and enabling understanding (Tjärnhage et al., 2023). Animation, an additional tool, can increase immersion and engagement or even serve as an agent of meaning (Burgio & Moretti, 2020), while interactive explorations of graphs or data visualisations provide new forms of storytelling, such as the *reverse martini glass* approach (Segel & Heer, 2010), which is characterised by an author-driven opening, followed by an open-data exploration to enable new personal patterns and perspectives.

Although it is challenging to disseminate the complexity of contemporary phenomena, digital technology offers the contemporary *Transformer* several tools to dilute complexity and build true forms of enablement. The portrait of an 'augmented' *Transformer* emerges as a figure that straddles design and social practices on a larger scale than ever.

The transformation of the relation

Neurath's innovations transformed museums into places of learning and education, offering fundamental and strictly scientific information for social understanding, even to the less educated, without depressing them as scholarly books and statistical tables do (Jansen, 2009; Neurath, 1973). In today's world, it is not the public that goes towards information, it is the other way around. The overabundance of information, combined with the persistence of technology and the increased fragmentation of attention, pose new challenges for the contemporary*Transformer*. It is essential to develop effective strategies to engage the audience in an immersive experience and encourage them to continue reading beyond the first contact.

To achieve this, it is crucial to consider the relational aspects of the information design project, which involves designing a relationship of proximity between the audience and the phenomenon described. This requires revealing the effects of phenomena on everyday life, or vice versa, the impact of everyday actions on global phenomena. The content should develop around the reader, accompanying and unravelling along the story, stimulating curiosity and learning. The proliferation of data in contemporary times enables the creation of customised narratives capable of reinstating proximity to phenomena. This fact is exemplified by various projects such as the New York Times' coverage of climate and pollution (Popovich et al., 2018; 2019), which utilises data to personalise narratives based on an individual's geographical

and personal connections. In contrast, initiatives such as the *Civic Budget of the City of Gdańsk*[3] offer transparency to the public regarding how their tax contributions benefit the community. These initiatives demonstrate the potential of reader-centred data storytelling to enhance public engagement and promote constructive civic participation.

An interdisciplinary effort is necessary to tackle this approach through the collaboration of professionals with lateral skills, which are not only information design but also social and relational ones. Therefore, it is pertinent to amplify and extend the *Transformer's* knowledge in a way that they are immersed in the world and habits of their target audience to develop related and engaging languages and experiences that can inform and educate. Moreover, this paper proposes an approach that can inspire digital information projects, especially those that aim to last, serving as true knowledge bases on the borders of the digital commons (Dulong de Rosnay & Stalder, 2020).

Case studies

The reflections above arise from an extensive body of work on information and information design viewed through a social lens. This work has culminated in identifying three critical concepts, namely *translate*, *relate*, and *enable*. It should be noted that the present paper does not purport to develop a comprehensive methodology for digital design, as doing so would necessitate more diverse and nuanced case studies. Nevertheless, it constitutes a practical framework that can serve as a roadmap for digital information projects.

The first concept, *Translate*, pertains to the interpretation of data, and not just quantitative data, in a way that renders it meaningful to a broader audience. Although data is frequently made available to the public, rendering it relevant to a diverse audience requires various skills. The initial phase involves translating data from rows and columns in spreadsheets into valuable, meaningful information. This information is subsequently translated visually through compelling graphics embedded within a broader narrative, supported by carefully designed text and contents.

The second concept, *Relate*, is fundamental to endowing data translation with any value. Bridging the gap between data and the audience is critical. Providing a connection, such as a particular entry point, can make vast amounts of data meaningful and engaging for specific individuals.

The third concept, *Enable*, may be achieved in two stages. The first stage entails supporting readers in comprehending the content and graphics, while the second

3 https://www.gdansk.pl/gdanski-budzet (retrieved on October 21, 2023)

stage involves catalysing discussions and motivating readers to participate and engage with the topic.

Translate, *Relate*, and *Enable* are three interrelated concepts, each building on the previous one. Although these principles are frequently traceable in well-designed projects, they are often implicit and not explicitly articulated from the outset. Thus, considering how projects respond to these concepts can be advantageous, leading to a more structured reflection on digital projects that aspire to have a social impact, particularly in the context of the new digital *Transformer*.

The following discussion pertains to two case studies commissioned between 2020 and 2023 by the Osservatorio Balcani Caucaso. Glocal Climate Change[4] and Mapping Diversity[5] focus on *climate change* and the *gender gap* in European cities, starting from a data-based perspective. Despite being privately commissioned, these projects aspire to function as *digital commons* accessible to a broad and diverse audience. They are characterised by the intention to push forward the definition of *information design*: they do not merely display numbers. Indeed, they share a social aim: the audience can access, re-use, and contribute to the data that underlies the work and get meaningful content and insights hidden by the numbers. Moreover, projects support unskilled readers to understand the data and enhance their reading and interpreting skills. To achieve that, digital design plays a crucial role in creating proximity between the data and the readers, building stories around them, and reducing the distance with the phenomenon they are concerned with.

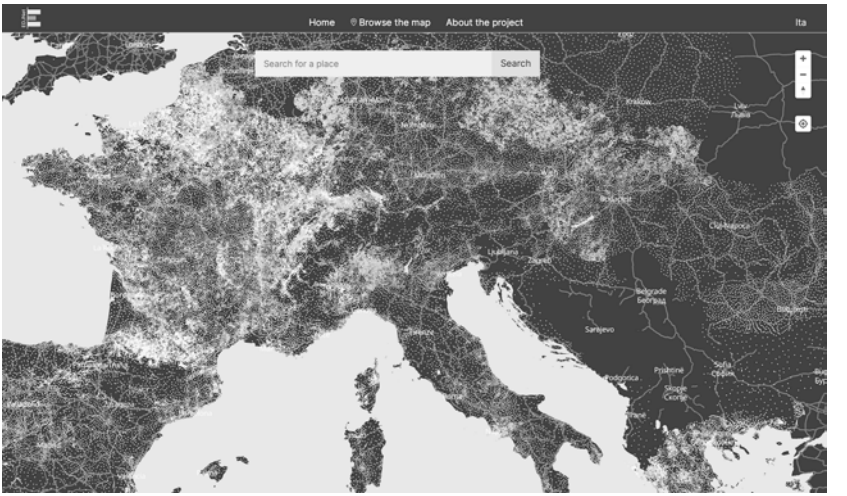
Glocal Climate Change

The project, published in late 2020, aims to make open data concerning European climate accessible. It achieves this by making temperature trends on European territory from 1961 to 2019 instantly visible. The project consists of a map with over 100,000 points, coloured by the climate trend data. Each point corresponds to a single European municipality, giving shape to a granular and ubiquitous visualisation that encourages visitors to search for places they are connected to (Figure 3). During test sessions with readers, it was observed that each person accessing the project searched for places they connected with, such as their birthplace, honeymoon destination, first kiss location, current residence, or holiday spot, for instance.

4 https://glocalclimatechange.eu/

5 https://mappingdiversity.eu/

Figure 3: The dot-based climate map



Once the readers find their places and click on them, a new page opens: it narrates the specific climate trend through a series of text and charts. The narration starts from the readers' places to broaden the story towards the surrounding provinces and regions (Figure 4) to broaden the readers' climate perception.

Figure 4: The place-specific climate storytelling page

Through scrollytelling, the content density is diluted, allowing readers to focus on one piece of the story at a time. Furthermore, the data of the main graph is progressively revealed, helping readers understand their places' changing climate over the years (Figure 5).

Figure 5: The scrollytelling supports readers in the climate trend chart understanding

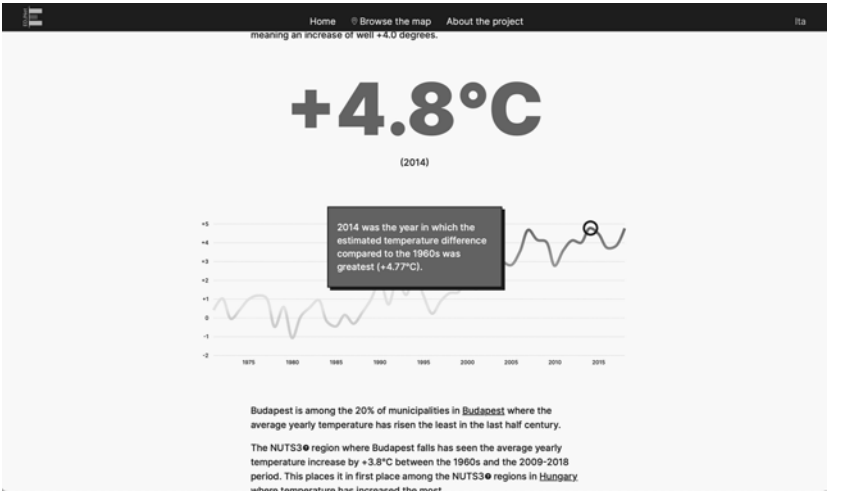
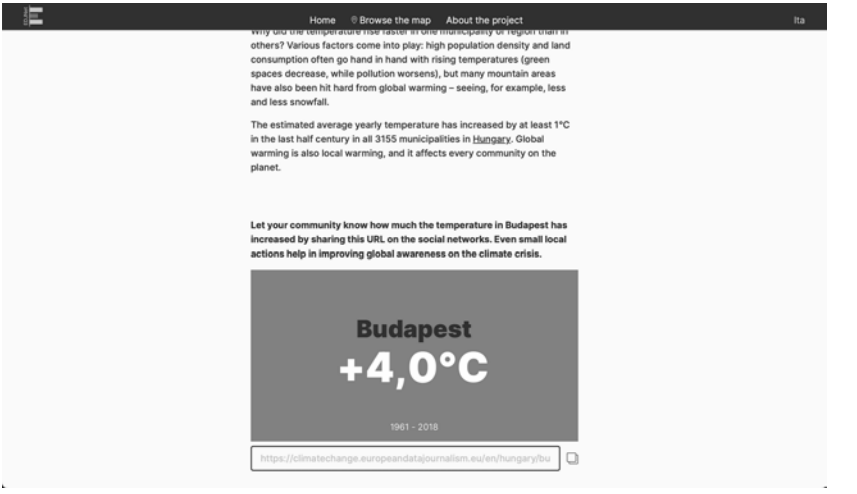


Figure 6: The informative thumbnail enables readers to spread information



At the end of the page, readers are invited to share an informative thumbnail on climate change in their favourite places, enabling them to spread the word and engage in online debates (Figure 6).

In terms of the *Transformer*, the translation process entails converting spatial data from the original dataset into municipal data, which displays locations instead of surfaces. This strategy renders the locations readily identifiable on the map, enabling European readers to locate them easily and establish a direct connection with the places they represent.

To let readers *relate* to the visual translation, the project creates a climate-specific narrative surrounding the readers' respective locations. By leveraging highly detailed data, the audience is exposed to the climate of the places they care about rather than being presented with aggregate data on a regional or national level. This approach fosters a connection between the audience and a complex and global phenomenon, relying on readers' places as a proxy. Notably, it serves to diminish the perceived distance between everyday life and the phenomenon of climate change, which is often viewed as distant (Bushell et al., 2017).

Finally, it is noteworthy that the scrollytelling approach aims to *enable* readers. It directs the readers' attention towards the salient aspects of the main graph, thereby providing them with fundamental yet crucial support in comprehending it. Additionally, readers are emboldened by the knowledge base and the informative thumbnail to disseminate the topic within their social networks.

In the weeks following its publication, Glocal Climate Change garnered considerable interest, attracting tens of thousands of individuals to the platform. Analytics indicate that thousands of locations were visited, each with only a few visits, underscoring the granular nature of the project. Simultaneously, thousands of thumbnails were disseminated on social networks, not only by activists but also by politicians, administrators, and concerned citizens, reflecting the broad appeal of the project's message concerning the climate situation.

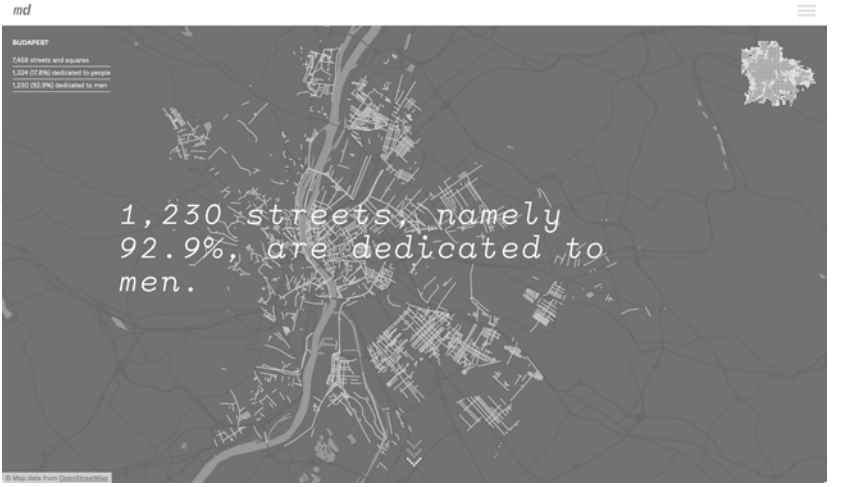
Mapping Diversity

In 2021, a pilot project was initiated to address the gender gap in toponymy by gathering and narrating data from the primary cities of the 21 regions of Italy. Subsequently, in 2023, the project was expanded to the European level, focusing on 40 European cities. The homepage acquaints readers with the topic and its significance, followed by a description of European-wide data, including the percentage of men and women represented in European street names, recurring figures, and their primary professions (Figure 7). The project's primary contribution is the maps of each city, which can be accessed via the homepage.

Figure 7: Mapping Diversity homepage, the most popular women's figures

Readers are guided through a scrollytelling technique that allows them to explore each city through a fixed map accompanying them as they scroll down the page. Contextual information associated with scrolling appears to comment on the changes on the map (Figure 8).

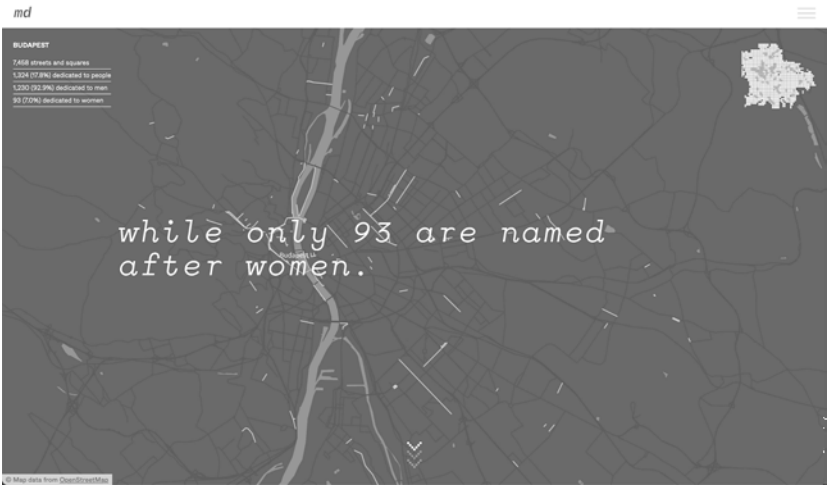
Figure 8: A moment from the Budapest scrollytelling narration



Each city is narrated using the same narrative structure, starting from the total number of streets to those dedicated to women (Figure 9). It follows the *reverse martini glass* narrative structure pattern (Segel & Heer, 2010): it commences with an

initial author-led section that elucidates the data through the map, followed by readers exploring it independently. At the end of the page, readers are invited to share an informative thumbnail on the gender gap in the toponymy of that specific city.

Figure 9: Last data narration before the free map exploration



In terms of the *Transformer*, the complexity of representation in street names is visually *translated* through a map, highlighting the data and values associated with the characters to whom the streets are dedicated. The scroll-activated narrative employed in the project establishes a connection between the total number of streets in a city and the frequently minute number of streets dedicated to women. This narrative stratagem not only promotes reader engagement but also reinstates the proportion of the phenomenon, attributing significance to the numbers rendered visible.

The *relatability* is assured through both the gender and geographical dimensions. In addition to those individuals who reside or have resided in the cities featured in the project, the narrative involves both male and female readers as protagonists of the story. Finally, through the use of scrollytelling, readers are *enabled* to interpret the map. It metaphorically accompanies them on a journey that guides them from the global data, which refers to the total number of streets in a city, to the crucial data, which pertains to the number of streets dedicated to women. This journey supports readers in comprehending the context of the data and the map representation, supporting their ability to explore it autonomously once the narration ends.

The project is still updating: the working group periodically adds data on new cities and offers offline activities designed to involve citizens. In May 2023, the first Mapping Diversity workshop was conducted in Brixen (Italy), with a group of uni-

versity students collecting the data and contributing to the map of their town. Such an approach reinforces the digital commons nature of the project while simultaneously diminishing the perceived distance between citizens and the phenomenon by enabling them to comprehend it and contribute to the data.

5. Conclusion

This contribution seeks to reposition the role of the *Transformer* in the contemporary crisis by reflecting on the post-war crisis in which the ISOTYPE experience was born. Today's society faces a serious crisis of understanding, further aggravated by the acceleration of technology and the crisis of information design that fails to deliver transparent and enabling information. Unlike in the past, reaching out to one's audience has become a challenging task, and designing connections that enable them to engage with data and phenomena that concern them, which are often not perceived as a matter of close concern, has become increasingly difficult.

In this context, Marie Neurath's transformative approach advocates the need to transcend superficial visual aspects and instead embrace the cultural, social and political dimensions of the reference community. Building on this approach, this contribution proposes the concepts of *Translate*, *Relate* and *Enable* as central principles for contemporary digital information design, particularly concerning complex social and global issues. Through the analysis and reflection on two case studies, this contribution sheds light on the importance of these principles in today's society. It highlights their potential to address complex social and global issues. These concepts not only aim to provide a practical framework for social designers working in the digital domain but also serve as a starting point for a new research strand where the research on digital information design practice and Science and Technology Studies can converge, compare their findings and frameworks, and collaborate.

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