INFO-GRAPHICS Session 01
Chair: Nicolò Ceccarelli

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Visual storytelling for positive impact on public ecosystems

Design for eGovernment / Digital transformation / Service Ecosystems / Data visualisation / Data storytelling

Currently, there is growing attention towards the phenomenon of digital transformation within the public sector, namely eGovernment. It is defined as "the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees" (Silcock, 2001) and "the communication between the government and its citizens via computers and web-enabled presence" (Evans & Yen, 2006).

It is of key importance for government to have a good understanding of its citizens and the context they live in every day since, in this way, digitalization can empower and enable citizens to exercise their rights and perform their duties. Otherwise, the risk is to widen the gap further.

Ongoing digital transformation means undergoing change, sometimes even radical, of procedures, processes and practices within the public administration. As change can easily raise concerns and resistance, the aim of digital transformation needs to be communicated well and clearly to all stakeholders involved.

Furthermore, this type of change can only be effective when citizens are able to fully take advantage of the benefits deriving from the digital transformation of public services. This requires, downstream, the delivery of high quality user experiences and, upstream, decisions informed by the understanding of the context. It is not easy to persuade people to change if research insights are not well explained and supported by data (Dykes, 2020).he challenge is, therefore, to use infographics to sensitise public administrations.

The design discipline, with its methodologies and tools, has an unprecedented opportunity to essentially contribute to the public benefit on both sides, by fostering change and ultimately improving the relationship between citizens and institutions.

Information design can especially contribute to understanding and conveying the complexity of public services' ecosystems. Data visualisation techniques and tools can both: make sense and portray the complexity of fields like healthcare, education and mobility, but also inform decision makers and big players. However, informing alone is not enough to orient public servants towards change, designers should leverage metaphors and storytelling to engage viewers.

Storytelling is fundamental to the human capability of connecting the dots and establishing collaborative networks of individuals that follow a shared purpose: religion, economy and finance are some expressions of it (Gottschall, 2012; Shaw & Reeves-Evison, 2017).

Data visualisation and infographics heavily rely on visual narratives, the most effective way to bring out connections and guide the reader to intuition which otherwise will stay concealed in the fuzzy mess of data (Cairo, 2016).

These are the premises of the experimental didactic project (...), which involved the collaboration of the Department for digital transformation, Presidency of the Council of Ministers and students of the master's degree in Communication Design at (...) University.

The goal of this project was to identify archetypical models for the design of involvement strategies, resources and tools to support the information of public organisations across different aspects of civic life, by enabling students, through design methods and techniques.

The focus was to investigate the matter from a sociological, anthropological and ontological point of view, rather than from a historical, legislative and scientifical one. A systemic approach was adopted to handle the complexity and granularity of the field of study, to enable the identification of recurrent patterns and representative elements and the expression of the visual language and storytelling to communicate the dynamics of each service ecosystem. This approach is borrowed by eminent examples of ontology in complex fields, such as in A city is not a tree, which shows how a complex set of elements, such as cities, are not

hierarchically organised but rather interconnected globally and his follow up work The Pattern of Streets, example of identification of design patterns used in software development (Alexander, 1965)

The design process of the lab was conducted in two main phases: an explorative one, where visualisation techniques were leveraged as a tool to understand the field of exploration, and the conceptualisation one, where visual narratives were used as means to convey the characteristics of the different services ecosystems. This project combines a strong focus on quanti-qualitative research with a tangible output: an Atlas, a collection of maps and infographics to guide the reader in the realm of the public sector.

The first phase began by mapping service ecosystems to identify all actors, touchpoints and digital infrastructures which play a key role, to then outline their dynamics and identify patterns which characterise each field. Especially, the definition of a number of collective archetypes such as communities and organisations come out naturally because, in the 'infosphere', individuals, as informational organisms, are part of a shared environment (Floridi, 2017).

The second phase focused on designing the visual narrative: a data based storytelling, rather than the telling of data (Manchia, 2021). Essentially 'design is storytelling' (Lupton, 2017), therefore the construction of visual narratives required students to combine three key elements: data, storyline and images. They had to articulate the infographics along a narrative flow and describe each context by the unfolding of the plot, also transposing rhetorical figures such as the Hero's journey or Freytag's pyramid (Alamalhodaei & Feigenbaum, 2020), to lead the reader towards the insight, the information unveiled from the mist of data.

The Atlas is the result of a deep investigation of the field and is a resource meant to create awareness and sensitising those who operate for the government to ultimately foster change.

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Sitting around a table: data visualization for cross-sectoral exchange in European Projects

European Projects / Data Visualization / Discussion tables

Since the most ancient times, the visual display of information has been practiced across an extremely wide range of fields – spanning from mathematics to architecture, from economy to medicine, going up to sociology, psychology, music, and many others – as a vehicle to address sector-specific epistemology. However, this interpretation should not be considered exclusive, especially in today's day and age: in fact, the exponential increase in the quantity and quality of information that we are now experiencing (Floridi, 2017) brings to attention the cross-sectoral potential of data visualization.

Through the design of infographic outputs such as tables, graphs, charts, diagrams, maps, or similar, data visualization formalizes a “common language” whose taxonomy enables individuals to transfer knowledge across cultural, translational,

and disciplinary boundaries (Lima, 2013). Moving from these premises, the proposed paper applies this perspective to the specific dimension of European Projects, which is increasingly establishing itself as one of the most relevant contemporary sources of operational sustenance for both researchers and professionals.

European Projects are often characterized by a high compositional complexity, under which the heterogeneity in stakeholders' backgrounds, on the one hand, and the lack of protocols to manage and address this heterogeneity, on the other hand, often prevent a real mutual understanding between those involved. At the time when the value of data visualization is beginning to be rather acknowledged in the field of public policy-making (Raineri & Molinari, 2021), the paper highlights the need to define methodologies for enhancing its basic interpretation as a shared ground for exchange. In support of these arguments, a specific example is brought: that of the RIStyling project, promoted by the Universities of Padua, Verona, Venice Ca' Foscari and Iuav, in agreement with the Veneto Region in order to redefine the local Smart Specialisation Strategies (S3).

In accordance with the reformed European Cohesion Policy, S3 are place-based economic transformation agendas aimed at enabling regions to turn their needs, strengths and competitive advantages into marketable goods and services (European Commission, 2017). One of the most relevant methods put into play to question the territory was the "focus group", a qualitative research technique that derives information from in-depth team discussions attended by 8-12 people, selected on the basis of the ability to bring knowledge arising from their own expertises (Zammuner, 2003). A first type of focus groups has involved the organization and the conduction, by the University of Padua, of 3 main discussion tables, each one addressing a targeted topic consistent with one of the current European medium and long-term programming priorities, namely:

– Innovation and Digitalization – Industrial Transition – European Opportunities and Partnerships

Labeled as "institutional tables", these focus groups engaged stakeholders corresponding to the four major categories of actors identified in the innovation framework known as the Quadruple Helix Model (Carayannis & Campbell, 2009): academics, policy-makers, industrials, and citizens. A second type of focus groups has involved the organization and the conduction, also by the University of Padua,

of 9 main discussion tables, each one addressing a targeted topic consistent with a relevant aspect emerged from the implementation of S3 in Veneto during the 2020-2014 seven-year term, namely:

- Industry and Digital Transformation
- Circular Economy and Green Chemistry
- Communication, Cultural Industries and Entertainment
- Technologies for Culture and Tourism
- Technologies for Sustainable and Inclusive Living Space
- Technology and Services for Creative Industries and Made in Veneto,
- Energy, Climate and Sustainable Mobility
- Food: Agriculture, Fishing and Farming
- Technologies for Health

Labeled as “thematic tables”, these focus groups engaged stakeholders corresponding to the most significant categories of actors present in the Veneto region’s knowledge economy, such as companies, academic institutions, networks, associative forms, foundations.

As part of the outputs provided by the Iuav University research team, we defined from scratch a design methodology aimed at the identification and the visual representation of the most relevant concepts which came to light during the conduct of the focus groups. A first methodological stage involved the analysis of the textual reports resulting from the various working sessions, in order to identify the most recurrent keywords emerging from the tables as a whole, as well as the tables in whose context these concepts appear to have been most frequently mentioned. A second methodological stage involved the production of a series of infographics aimed at revealing proportions and hierarchies between the identified keywords, as well as their correlations with the various categories of stakeholders which attended the focus groups.

The paper describes in detail the features that marked the two methodological stages, dwelling on the technical tools used for carrying on the text analysis and producing the infographics, as well as on the replicability of the design methodology itself within similar projects. At the same time, the procedural difficulties and criticalities encountered in implementing the aforementioned approach are highlighted, addressing the need for a more consistent and structured approach in drafting textual reports in order to make them more suitable for infographic display. Because, if the importance of understanding the audience itself

during the data visualization process is often overlooked (Pontis, 2019), European Projects should be equipped with the finest tools to properly understand what emerges from the tables around which it is so often used to sit and discuss.

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Design through Code: Exploring Web-development as Data Visualization Design Tool

Interactive Data Visualization / Real-time Mapping / Animated Storytelling / Geospatial Information Systems / Web Development

This paper proposes to explore web-development as a tool to design interactive data visualizations. Featuring a selection of four research and design projects conducted by the author and her students, the study proposes a cross-disciplinary design methodology that incorporates computational programming as part of the designer's toolkit.

The first two projects exemplify how approaching web-development from an architect's perspective enables a dynamic and multi-layered form of visualization of complex information through the creation of interactive co-mapping platforms. The first, 'Emerge Beirut' (1), is a pilot web-app that allows to generate and customize interactive data visualizations from user-generated content in real-time. The second, 'The Immuno-Responsive City' (2), is a series of dynamic maps that were presented as part of the Beirut Shifting Grounds project exhibited at the 17th Venice Biennale of Architecture in 2021. Generated through web-development frameworks, using JavaScript, Mapbox GL and Turf.js, the maps composed a spatial and temporal narrative that retraces the momentum and hardship of the grass-root efforts that have charged the grounds of Beirut from 2019 to 2021. The third and fourth projects were realized by students of the 'Digital Makers – Fundamentals of Computational Media Design' course taught by the author at the (...) Institute in the Spring of 2022. Exposing undergraduate design students to full stack web-development, the 'Digital Makers' workshop promotes methods of self-learning through making.

The course runs like a maker lab in the digital space; it invites students to write their own open-ended briefs and come up with strategies to execute the design. The third project featured, 'Global Refuge' (3), is an interactive web-page featuring an animated data visualization of the human migration and refugee statuses around the world. Paired with the UNHCR's API, the website makes use of D3.js and Globe GL to generate a globe-based three-dimensional dynamic data mapping. And finally, 'Urban Soundscape' (4), is a web-app designed and developed by a team of four students which offers the possibility to visualize the sounds of the city in real-time across different scales and mediums. The app was designed and developed using JavaScript, p5.js, three.js, Mapbox GL, Firebase, CSS, HTML and Bootstrap. The paper presents the four projects as case studies to better understand the modalities of design of interactive data visualization in a context where advances in software, open-source libraries and coding languages are increasing accessibility to specialized technical frameworks.

The study concludes by advocating for an intrinsic link between data visualization design and computational programming literacy. Promoting this connection in educational and professional frameworks is essential to foster effective analysis and communication of complex data. The paper highlights guidelines to accelerate this integration.

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