2CO3-COmmunicating COmplexity

Selected contributions to the Conference
September 8-9, 2022

Edited by Nicolò Ceccarelli

2CO3 Conference

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Contents

1.3 Interactive data visualization

1.4 Informative environments

Visual narratives for positive impact
on public ecosystems

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Abstract. Currently, there is growing attention towards the phenomenon of digital transformation within the public sector, namely eGovernment (eGov). It becomes then of key importance for government to have a good understanding of its citizens and the context they live in every day since. 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 and visual narratives 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. These are the premises of the experimental didactic project Atlante della trasformazione digitale della PA (The Atlas of digital transformation of Public Administration), 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 Iuav University of Venice. 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.

Keywords. Design for eGovernment / Digital transformation / Service Ecosystems / Data visualisation / Visual storytelling

1. Digital transformation of public administration

This paper explores a specific application of data visualization to the digital transformation on the public sector, namely eGovernment (eGov), which could be 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).

1.1. Context

In the wake of the Corona-virus pandemic and related crisis, the ongoing efforts by the public administration in Europe, aimed at ensuring a broader and more effective offering of digital governmental services (eGov), have been fostered out of need. Infact, while the unsafety of using most of the physical service delivery channels has definitely been the main driver, the byproduct of this situation has been a deeper need for understanding and agency both of the general public, the civil servants and the politicians. Nevertheless, for the Italian case, we can see that while the 'online service completeness' indicator, as measured by the Digital Economy and Society Index (DESI), is in line with the European average (63%), the actual usage indicator is way lower (36%, almost half of the average). Main reason for this can be found in the lack of digital literacy and the overall quality of the user experiences.

1.2. Intro

This paper, presents an experimentation of how design and visual storytelling can be applied to digital transformation processes of the public sector on one hand to sensitize and empower the professionals working on eGov, via a better understanding of the public domain, on the other hand actively engaging newer generations, namely students, in making sense and facilitating to public sector data for the general public, overall fostering a positive impact on the delivery of a better citizen experience.

2. Design to foster a positive change

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, this transformation has to be guided so as to avoid replicating the complexity and redundancy of analogue dynamics but taking instead the opportunity to radically innovate the delivery and access to public services by means of digital tools and platforms.

2.1 Vision

As the public sector is typically coping with wicked problems, "an environment presenting characteristics of Volatility, Uncertainty, Complexity, and Ambiguity (VUCA) (Bennett & Lemoine, 2014), it highly benefits from a design approach, therefore the design discipline with its methodologies and tools, has a core role and the key characteristics to support this change and essentially contribute to the public benefit (Krawchuk, 2018). "Innovation has to be design-driven to achieve an actual shift in meaning, embracing progress both at technological and sociological level"

(Verganti, 2018), ultimately improving the relationship between citizens and institutions.

Its systemic approach allows to frame problems considering the overall context of actors and touchpoints involved in the delivery of a service, because, "in the 'infosphere', individuals, as informational organisms, are part of a shared environment" (Floridi, 2017).

2.2 Key principles

The design practice is traditionally based on bringing together technology, business and customers, its adaptation to serve the digital transformation of public services has the potential to bring together technical requirements, legal regulations and citizen needs while ensuring consistency, harmony, integration and optimisation of the exchanges of value and information within its ecosystem.

Its participatory nature implies along the process the involvement of all stakeholders, even if with different backgrounds, competences and roles, in order to develop solutions together with those whom will be impacted by them.

In public ecosystems, this allows to address the needs not only of final users, namely citizens, in terms of usability and accessibility, but also of the public servants and IT providers which are involved in processes and procedures, and contribute to the delivery of digital public services.

Being iterative allows to quickly make changes to improve digital solutions, by following loops of design, development, testing and monitoring their performance.

In the public domain is key to save money and time, a step-by-step implementation process can avoid re-workings or unsuitable solutions. At the same time it is important not to reinventing the wheel every time, instead decision making has to be informed by a good understanding of the current context and existing solutions.

3. Informing and sensitizing decision makers

"It is not easy to persuade people to change if research insights are not well explained and supported by data" (Dykes, 2020), and these data have to be effectively presented to be grasped, often numbers and charts are not enough to make sense and gain an understanding of a complexity.

We live in a time when there is an unprecedented availability of data. In the public domain, the issue of the collection and use of citizens' data is particularly sensitive and the subject of discussion today, not least because of the critical issues associated with the extraction and economic exploitation of personal data and the increasingly evident risks of social control. Regulation that ensures transparency and careful oversight of the use of citizens' data thus becomes essential to enable their use. Indeed, data can be used in the interest of citizens, to inform and raise awareness among decision makers of the public administration, helping them to better

understand the context in which they operate, and to make more appropriate decisions.

3.1 Mission

Information design can especially contribute to understanding and conveying the complexity of public services' ecosystems. Data visualization 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 visualization 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).

Fig. 1. Communication Design Lab, University Institute of Architecture of Venice, Italy, 2021/22.

4. Visual narratives to explain public ecosystems

These are the premises of the experimental didactic project *Atlante della trasformazione digitale della PA* (lit.: The Atlas of digital transformation of Public Administration), 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 Iuav University of Venice.

4.1 Goal

The goal of this project was to identify archetypical models for the design of strategies, resources and tools to support the information of public organizations across different aspects of civic life, by enabling students, through design methods and tools. While leveraging visualization techniques to explore, make sense and communicate the state of the art and multifaceted nature of complex ecosystems such as those of digital public services.

The project was developed during the Communication Design Lab throughout the semester and involved 62 students divided into 13 groups[1].

Due to the reach, variety, heterogeneity and complexity which characterizes the domain of public administration in Italy, the project scope was limited to five main fields of delivery of public services, namely: district management, education, healthcare, culture and mobility. For each field different topics were identified, for a total of 13.

The focus was to investigate the matter from a sociological, anthropological and ontological point of view, rather than from a historical, legislative and scientific 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 from eminent examples of ontology in complex fields and in particular from the work of Christopher Alexander A city is not a tree (Alexander, 1965), which shows how a complex set of elements such as cities cannot be represented hierarchically, but rather according to a globally interconnected structure (semi-lattice); a concept taken up in his later work A Pattern Language, where the identification of recurring patterns formed the basis of software development according to object-oriented programming (Alexander, 1977).

4.2 The process

The design process of the lab was conducted in two main phases: an explorative one, where visualization techniques were leveraged as a tool to understand the field of

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[1] The Lab was led with the assistance of Irene Sgarro.

exploration, and the conceptualisation one, where visual narratives were used as means to convey the characteristics of the different services ecosystems.

Fig. 2. The Atlas of digital transformation of Public Administration, 2022. (Communication Design Lab, University Iuav of Venice).

Research phase
The first phase began with a participated workshop organized with experts in digital transformation of public services, the aim was to help students to gain familiarity with the domain of public administration and create a shared framework to consistently carry out the research phase.

The workshops represented the first step for an immersion in the complexity typical of extended and branched organizations such as those of the PA and at the same time allowed them to familiarize themselves with the numerous design kits made available by Designers Italia, the platform of the Department for digital transformation, Presidency of the Council of Ministers to promote design culture in the Public Administration. The kits were extensively used in all phases of the work.

The main activity was to map service ecosystems to identify all the actors, touchpoints and digital infrastructures that play a key role in the delivery and use of public service, to delve into the context and its dynamics, to identify the characterizing patterns of each domain, and to delineate the archetypes of systems, organizations and people.

Fig. 3. The Atlas of digital transformation of Public Administration, 2022.
(Maddalena Pesaresi, Giulia Guy, Cristina Simone, Gianmarco Gallina, Gaia Graziotto).

Many methods and tools borrowed from service design and user research were used in this phase: from service ecosystem maps to actor maps, from empathy maps to user's journeys and scenarios (Stickdorn et al., 2018; Stickdorn & Schneider, 2012).

Within an evaluative approach (necessary for an initial definition of stakeholders to be confirmed by subsequent field research) special attention was paid to defining archetypal service figures, those representations of roles that we can consider universally shared in our culture, expressions of common needs, desires, and potentials, according to a narrative practice that has been repeatedly reflected in recent years, for example, in participatory design, design fiction or brand identity projects (Hartwell & Chen, 2012; Mark & Pearson, 2001). This allowed us to further investigate archetypes involved in the domain of digital public ecosystems, those roles and traits which can be universally recognized and shared within Italian culture, these represent common needs, desires and values.

Fig. 4. The Atlas of digital transformation of Public Administration, 2022. (Maddalena Martani, Giulio Villano, Giulia Giordano, Ruggero Perenzin, Marcello Sponza).

Desk research investigated legislation, thematic literature, and quantitative research with the census of datasets related to different public service domains to understand and make sense of the context. This information base formed the starting point for the qualitative field research phase. An extensive corpus of interviews, more than 130 in total, was thus conducted with civil servants and users using the tools for conducting structured and semi-structured interviews.

Design phase
In the very beginning of this phase a second participated session was dedicated to map and analyze the quanti-qualitative data available, understand their value, create a fluid narrative and identify the appropriate visual models to express it.
Processing involved how the data were translated and how they were structured narratively within the available space (32 pages for each group).
Convincing people that change is necessary is not easy, and only through a skillful combination of the 3 key elements of data storytelling — data, narrative, and visual — will resistance to change be overcome (Dykes, 2020, p. 51).
Data storytelling is a step in which many of the designer's skills come into play: the basics of data visualization, but also the narrative construction of data exposition or,

Fig. 5. The Atlas of digital transformation of Public Administration, 2022. (Sveva Stanghellini, Francesca Pilon, Sara De Barba, Luca Di Benedetto, Caterina Sartorello).

to put it another way, a data based storytelling, rather than the telling of data (Manchia, 2021).

Essentially "design is storytelling" (Lupton, 2017), therefore the articulation of the narrative of each service ecosystem needs a narrative arc. The students 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 (Feigenbaum & Alamalhodaei, 2020), that adequately constructs the crescendo of the action. "The main purpose of data visualization is to lead the reader toward insight (the "aha moment") and not pictures per se" (Cairo, 2016, p. 59), allowing him or her to discover hidden connections and patterns. The revelation of the insight constitutes the turning point of the narrative that finally leads to the epilogue with useful suggestions to change the status quo. The final layout of the Atlas, through a collective construction, finally defined the editorial structure through a graphic rhythm that visually emphasized the narrative progression (Smith, 1983).

Matching the principles of traditional narrative patterns and leveraging metaphors allows the infographics to be understood by a wide target audience, by leveraging these aspects to create a 'common ground' with the user. Moreover, during the design phase special attention was paid to the accessibility of colors, font size and overall readability and usability aspects, to make it usable to a broad target.

4.3 The artifact

This project combines a strong focus on quanti-qualitative research with a tangible output: a large 412-page Atlas[2], a collection of maps and infographics to guide the reader in the realm of the public sector. The Atlas is the result of a deep investigation of the field and is a resource meant to create awareness and sensitizing those who operate for the government to ultimately foster change.

The collection of infographics
The Atlas is a collection of maps and infographics to navigate the ecosystem of public administration services by facilitating an understanding of how public service ecosystems work, with a particular focus on the role of digital, and the citizen experience of using public services. The Atlas photographs and connects the more rational dimension of data and the emotional dimension of motivations that drive PA actors. It was created especially for planners who relate to the world of Public Administration in the context of the project and helps them determine the scope of action, orient themselves, study a strategy and properly set up the process to achieve their goals.

The Atlas is intended to be a working tool, a path that allows future designers to approach the complexity of the mechanisms that regulate public administration and, at the same time, accompanies those who are called upon to play a decision-making role in the public sector through those territories, still not much frequented, of visualization and graphic representation.

That is why the visual restitution of the investigations carried out on ecosystems, archetypes, and touchpoints, which constitute the data storytelling of the Atlas, are only the synthesis of an extensive research work.

Beside the main volume, in fact, there is a collection of the reports made by students, about their research and design process, this is invaluable to start to build shared knowledge about the domain and validate the methodology. In each report, students collected, for each service area, the main documents collected, data sets, extensive interview transcripts, elaboration of the data, narrative structure, data visualization choices, graphic grid, final layout and, last but not least, the photographic backstage of the work done.

As described earlier, the Atlas is divided into 5 main sections (related to the main fields of civic life) and 13 chapters that visually map collective archetypes, such as communities and organizations, their context, and the organizational and procedural aspects of each public service field, tracing recurring patterns.

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[2] The Atlas is distributed in open source and can be downloaded from
https://designers.italia.it/progetti/atlante-della-trasformazione-digitale/
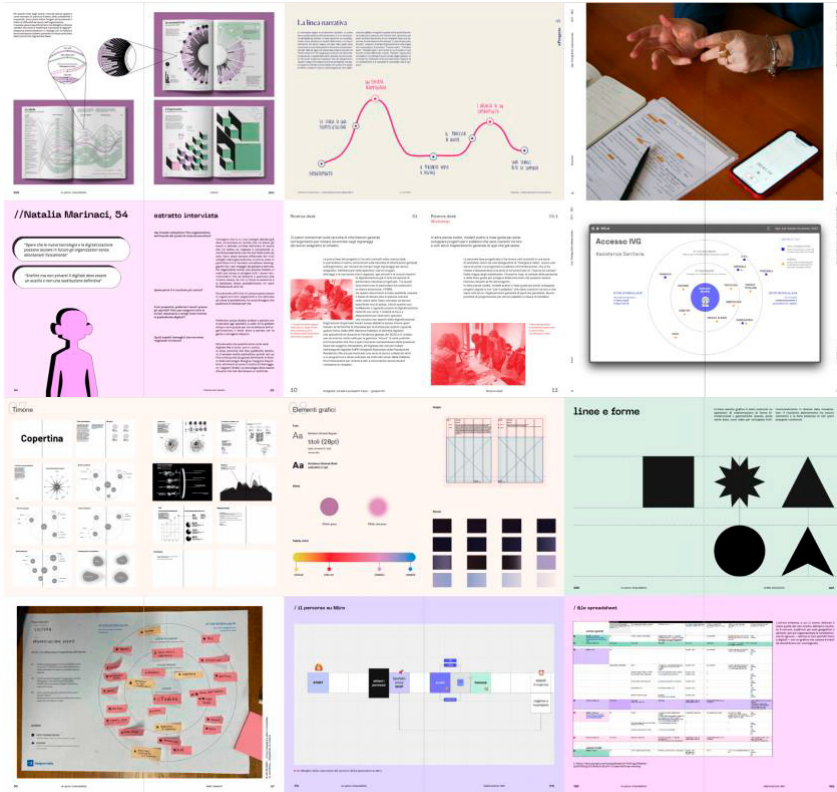
Fig. 6. Preparatory materials developed by students, 2021/22. (Communication Design Lab, University Iuav of Venice).

In order to investigate the expressive possibilities of visual translation in the broadest way, students were given complete freedom to develop their own narrative metaphors in relation to the subject matter. Thus, the story of integrated mobility becomes a journalistic investigation, the registry life of a citizen is retraced in an isometric city model, the university is transformed into a cosmic map, and the analysis of school services refers back to the pages of a textbook.

The Atlas is not meant to connote itself as an exhaustive ontology of PA services, but rather refers back to a militant form of thematic knowledge. Every form of taxonomy and organization of information contains a component of ideological interpretation, but information is conveyed only where a space of uncertainty opens up, where visualization "places at its center that residual category ('other') that so disturbs statistics" (Burgio, 2021, pp 69-112). In this approach, the Atlas while certainly falling into the sphere of "design for politics," as defined by Carl DiSalvo (2019), retains its own connotation of "political design" in a properly agonistic sense, an experiment in civic design that stretches its gaze to include differences and otherness.

5. Conclusions

The model tested in this collaborative project between the central public administration and the university of design constitutes an innovative approach aimed at proving the relevance that the design discipline can have for the public domain. The interest that followed the publishing of the Atlas, with several requests and mail of appreciation coming from civil servants in central and local Public Administration, can be considered a sign of the effectiveness the Atlas has in bringing together the languages and different sensibilities of those who practice the field of design with those who work within institutions. A landmark in the endeavor of promoting a unity of purpose capable of renewing the principles of public benefit through digital transformation.

All the material produced during the course of the project has been made available online and in a series of public dissemination events, in the open source spirit that animates PA digital transformation activities.

The model of collaboration between the design and PA worlds, as well as the application of data storytelling techniques, established with this project can thus be tested and improved in further educational tracks and with other levels of public administration for a desirable incentive for change and to iterate the research and keep the data constantly updated.

Some improvements that the process could use can already be identified:

A better involvement of the users' of the Atlas throughout the process, in order to better scope the research and co-create a solution more based on their needs.

A system should be developed to gather feedback from final users of the Atlas, in order to verify its effectiveness in conveying information through visual language and ultimately evaluate its potential impact on decision making within the field of public ecosystems.

A dissemination strategy, based on formats to both spread the mission of foster state-university cooperation through other educational tracks and at the same time promoting the work done to all the public administrations which could benefit from it.

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