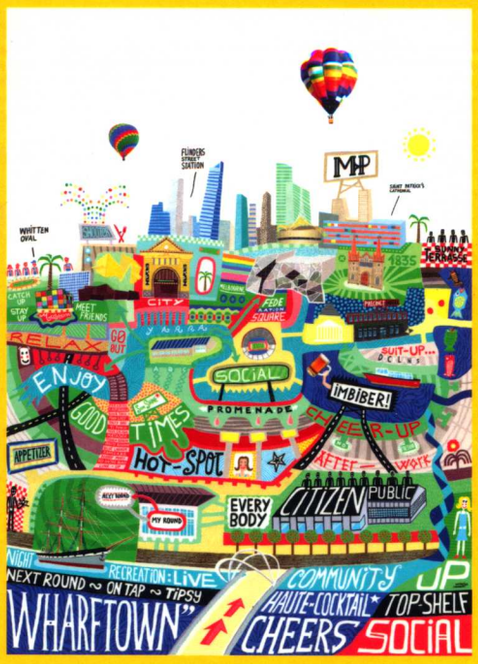

VISUAL STORYTELLING

Inspiring a New Visual Language

Featuring the Chapters

1. Seeing the News
2. Viewing Science and Technology
3. Looking at Travel and Geography
4. The Modern World
5. Observing Sports

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VISUAL
STORYTELLING

Inspiring a New Visual Language

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Imprint

VISUAL STORYTELLING

Inspiring a New Visual Language

Edited by Robert Klanten, Sven Ehmann, and Floyd Schulze
Text and preface by Andrew Losowsky
Project descriptions by Rebecca Silus

Cover and layout by Floyd Schulze for Gestalten
Typeface: Mercury by Radim Peško

Project management by Rebekka Wangler for Gestalten
Production management by Janine Milstrey for Gestalten
Proofreading by transparent Language Solutions
Printed by Offsetdruckerei Grammlich, Pliezhausen
Made in Germany

Published by Gestalten, Berlin 2011
ISBN 978-3-89955-375-8

Bibliographic information published by the Deutsche Nationalbibliothek.
The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available online at http://dnb.d-nb.de.

None of the content in this book was published in exchange for payment by commercial parties or designers; Gestalten selected all included work based solely on its artistic merit.

This book was printed on paper certified by the FSC®.

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myclimate
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VISUAL STORYTELLING

Inspiring a New Visual Language

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Introduction by Andrew LOSOWSKY

The world provides us with a near-infinite level of input. Sights, sounds, smells, sensations are constant and unrelenting. According to many cognitive scientists, our first reactions to fresh external stimuli are determined not by our conscious minds, but by the parasympathetic nervous system, which provokes our bodies to produce immediate physical and chemical reactions, such as the production of tears, laughter or adrenalin. It's only a few milliseconds afterwards that the more evolved, computational processing parts of our brain get involved, adding logic and explanation to this instinctive emotional outpouring.

The essence of visual storytelling is this combination of emotional reaction and narrative information. The colors, typography, style, balance, format of an image will generate that first instinctive smile or frown, attracting or repelling the gaze for reasons we don't fully understand; only if the reader's instincts are sufficiently encouraged to continue focusing on the visual stimuli can the more complex, contextual information come into play. Like the soundtrack in a movie, the visuals create a barely perceptible emotional context to the telling of the main narrative.

Every field has some central tension it is trying to resolve. Visualization deals with the inhuman scale of the information and the need to present it at the very human scale of what the eye can see.

○ Martin WATTENBERG, quoted in the *Economist* (2010)

There are many different ways to approach the challenge of visual storytelling. Sometimes, a designer will intentionally aim to maintain a sensation of continuity between the color scheme and the typography and the tone of the information itself. At other times, they might try to invoke contradictory emotions between a piece's visual language and the nature of its content, in order to shock or delight the viewer.

Though its theoretical basis may lie in measurable science, this is an imprecise art. It is dependent in part on the skill of the artist and also on the cultural background, personal experience and current state of mind of each individual viewer. As in every other aspect of design, there are many generally accepted guidelines, but no universally applicable rules. One person's serif is another person's sans—and such preferences are fickle, and change over time.

One thing is for sure, however: more than half our brains is dedicated to the processing of visual input, and so pure text and numbers simply cannot convey information in as memorable or digestible a form as that of successful visual-based storytelling.

This is not a new idea. Indeed, the existence of prehistoric cave paintings seems to suggest that abstracted recreations of reality predate written language by tens of thousands of years. Virtually every culture in recognized history has employed visuals as a way of communicating ideas and better understanding the world around it. Some of these methods have become so familiar in our own culture that we don't think of them anymore as visual sto-

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SUPER FERTILE
○ Kali Arulpragasam
1 CRA$H
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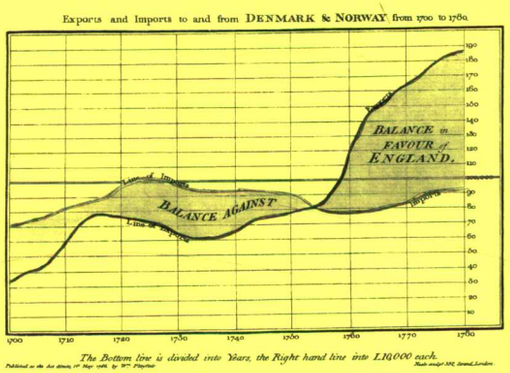
WILLIAM PLAYFAIR
2 The Commercial and Political Atlas

William Playfair's book, *The Commercial and Political Atlas,* examines the imports and exports between Britain and other countries. To clarify these trade relationships, Playfair created line charts that showed the change in trade over time. In doing so, he invented the first line chart.

Year: 1786



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rytelling. These include religious sculptures, weather vanes, signs of the zodiac, playing cards, maps, musical scores, road signs, thermometers, barometers, seismographs, dashboards, analog clocks, flags, chalk outlines at a murder scene, sets of scales, measuring jugs. Visual abstraction is a human instinct, and a societal necessity.

Though the inventors of most of these abstractions are lost to history, the canon of visual storytelling does have its share of pioneers. Perhaps the most curious, and ultimately influential, character in the field was William Playfair [fig.2]. A Scotsman who, it seems, rarely lived up to his name, he was variously an engineer, a silversmith, a journalist, a real-estate salesman, a fraudster, a liar, and a blackmailer.

One of his money-making schemes involved writing books on economics and trade. To accompany his wordy explanations, Playfair decided to employ what he called "lineal arithmetic." His books were published between 1786 and 1801, and included what are considered by many to be the very first instances of the pie chart, the circle graph, the bar chart, and line graphs.

His innovations gained some attention, especially in France, but did not meet with much initial enthusiasm. In 1805, the writer Jacques Peuchet wrote that "No one will ever believe that such methods can serve any useful purpose in the study of statistics. They are but plays of the imagination as foreign to this science as the details of natural history or of topography with which some writers unfortunately wish to embellish it."

In Germany, the economist Karl Knies wrote that the increased use of this lineal arithmetic in economic circles was frivolous at best. "Outside of its use as a pedagogic means," he said, "it is only a plaything without importance."

And yet, mostly after Playfair's death, the popularity of graphs as mathematical visualizations grew to the point where they not only entered the canon but became the default way of succinctly displaying changes in numbers over time.

As mentioned earlier, virtually every human culture has represented the world according to its particular needs and values. Today, in the field of visual storytelling, there are many names, both past and present, who are regarded as exemplars of the art and the science of such a challenge.

It would be ridiculous to try to express by curved lines moral ideas, the prosperity of peoples, or the decadence of their literature. But anything that has to do with extent or quantity can be represented geometrically. Statistical projections which speak to the senses without fatiguing the mind, possess the advantage of fixing the attention on a great number of important facts.

- Alexander von HUMBOLDT, *Political Essay on the Kingdom of New Spain (1811)*

They include Charles Joseph Minard (best known for his 1861 diagram showing the retreat of Napoleon's troops from Russia), Florence Nightingale (for her 1858 visualization of war casualties), John Venn (inventor of the Venn diagram in 1880), Winsor McCay (pioneering early animator), Otl Aicher (creator of the now-iconic stick figures for the 1972 Olympics), Harry Beck (designer of the London Underground map), Peter Sullivan (the designer who introduced infographics into the *Sunday Times* of London in the 1970s), Nigel Holmes (infographer at Time magazine for 16 years), Richard Saul Wurman (designer and inventor of the phrase "information architect"), Edward Tufte (prominent visual designer and author), Ben Fry (new media visualization expert), David Small (creator of interactive visualizations), Chris Ware (remarkable illustrator and storyteller), Nicholas Felton (champion of personal data-led infographic design) and Jamie Serra (major visual innovator in the Spanish media).

In recent years there has been a tremendous increase in the use of visual materials for the presentation of ideas and facts. Nowhere is this trend better illustrated than in the field of statistics, where there has developed a widespread use of graphs so extensive, in fact, that one might say that the graphic method is rapidly becoming a universal language.

- H. Gray FUNKHOUSER, Historical Development of the Graphical Representation of Statistical Data (1937)

There are just a few of those whose work has pushed the area of visual storytelling in new directions and among disciplines. There are many more. It should also be noted that all bar Nightingale are white men; the field, like so much of design, remains painfully lacking in diversity. We can only hope that this will change as it spreads and grows, encouraging also a wider range of narrative themes.

Each piece of work by these famous names must also be viewed in the context of the technological and cultural conditions under which it appeared. Until the 1930s, for example, the economics of printing technology remained the greatest barrier to the widespread use of visuals in print. Over the following 70 years, technological developments, spurred on and paid for in part by the growing demands of advertising, changed everything. Offset printing made large print runs affordable. The desktop computer allowed text to be typeset quickly and efficiently, and graphs to be plotted automatically, based on numbers crunched at inhuman speeds. Image manipulation software introduced a box of tricks far beyond the capacity of the darkroom. New terms, such as vector graphics and Bézier curves, described the movement from page to screen.

The introduction of the internet and mobile technology has brought with it further visualization challenges and opportunities. Publishing frequency has shifted from daily to minute by minute. Huge amounts of data are now available, much of which can be shared, stolen, reproduced, slipped illegally onto a thumb drive in a matter of moments. While the media struggles to deal with the quantities of data that emerge from leaks and Freedom of Information requests to government, so we too strain not to become overwhelmed by the near-constant information flow.

We had the Encyclopaedia Britannica at home. When I was a small boy, [my father] used to sit me on his lap and read to me from the Britannica. We would be reading, say, about dinosaurs. It would be talking about the Tyrannosaurus Rex, and it would say something like "This dinosaur is twenty-five feet high and its head is six feet across."

My father would stop reading and say "Now let's see what that means. That would mean that if he stood in our front yard, he would be tall enough to put his head through our window up here... But his head would be too wide to fit in the window." Everything he read to me he would translate as best he could into some reality.

- Richard P FEYNMAN, as told to Ralph Leighton, *What Do You Care What Other People Think?* (1988)

Infographics are neither illustrations nor "art". Infographics are visual journalism and must be governed by the same ethical standards that apply to other areas of the profession.

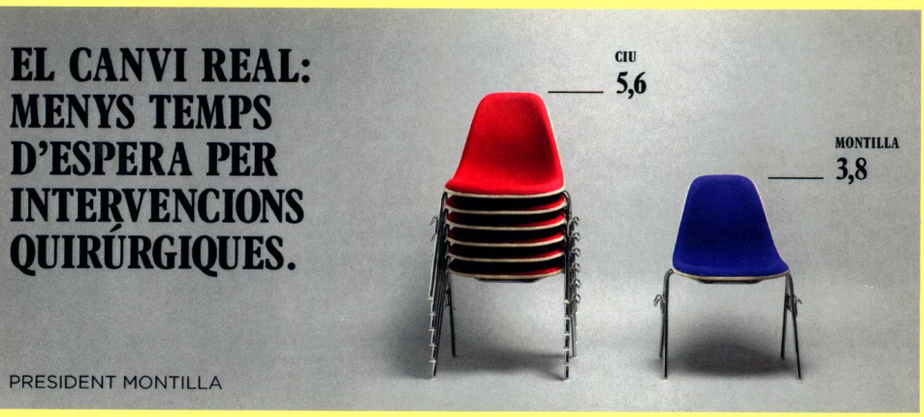
- Juan Antonio GINER and Alberto CAIRO, Checklist for Infographics, Nieman Watchdog website (2011)

In reaction to this, over the past decade, the use of visual storytelling by the mass media has increased enormously. From editorial illustrations to detailed maps, from data visualizations to process outlines, placed within art installations and company reports, content is being re-contextualised through increasingly sophisticated visual forms.

Compelling abstractions don't now merely accompany a story, but are often the principle manner in which it is told. Combining beauty and truth, they are, at their best, inspiring, fascinating, visually interesting and easy to read, while conveying complex levels of information in an impactful way. We are now in an age of show and tell.

In order to visualize effectively this influx of data, there are three stages of response: first, track down and then verify the quality and truth of the data. Second, structure the data and try to establish a clear narrative from within it. And third, come up with an appropriate, succinct and visually engaging method of representation.

In order to tackle such a huge task, we are seeing the emergence a new kind of visual journalist or graphic editor, one more likely to have a background in statistics or systems programming than politics or literature, a person who has to have a capacity both to process and visualize large quantities of anything from balance sheets to satellite photography, for journalistic ends.



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As the genre has grown and matured, embracing both professional and hobbyist storytellers alike, so have arisen a number of visual-based controversies. The most elegant visual solution imaginable can't salvage imprecise or incorrect data. A series of inaccurate infographics about the death of Osama Bin Laden led to the creation of a six-point Statement Against Fictional Infographics in May 2011, written by Juan Antonio Giner, a Britain-based president of a media consultantancy, and Alberto Cairo, infographic director of the

SARAH ILLENBERGER

1 Campaign for PSC, Socialist Party of Catalonia (Kampagne für PSC, Sozialistische Partei Katalonien)
→ 76 – 77

Brazilian newsweekly *Epoca*. It includes the demand that every infographic state its sources, and makes very clear that infographics are not art.

The question of the artistic value of such carefully crafted pieces of graphic design is a complicated one. Every publication wants their stories to be visually attractive—indeed, the graphic design aspect of visual storytelling is much of the reason for its popularity. Yet the visuals have to serve the data as well as the audience.

At the time of writing, visualizations have reached the point where most audiences understand their journalistic value, whether online, on television or in print; this level of cultural recognition has encouraged the development of data-based art, being visuals whose aesthetics are often more important than a need to convey information in a clear and immediate fashion. If visualisation is a language, then new dialects are being created all the time, often with grammatical rules all their own.

By narrative we take the best stock we can of the world and our predicament in it. What we see and recreate is seldom the blinding literal truth. Instead, we perceive and respond to our surroundings in narrow ways that most benefit our organismic selves. The narrative genius of Homo sapiens is an accommodation to the inherent inability of the three pounds of our sensory system and brain to process more than a minute fraction of the information the environment pours into them. In order to keep the organism alive, that fraction must be intensely and accurately selective. The stories we tell ourselves and others are our survival manuals.

- Edward O WILSON, Introduction to *The Best American Science and Nature Writing* (2001)

A glut of recent, relatively meaningless data visualizations has led to a call from many for visual storytellers to refocus their efforts on the need for a clear narrative. An interactive web interface in itself is not a story; a series of changing graphs does not explain anything on its own. In order to be successful, a narrative has to be central to the communication form.

This is why we have called this book Visual Storytelling. A successful visualisation is the same as any successful story, regardless of medium, or even whether it is fiction or fact: it informs, it makes the reader think about the world around them, and about our own lives. It stirs emotions, it encourages action, it equips us, it inspires us. It enriches our world in tiny ways that we may never understand.

Inside these pages, you will find a wide variety of visual solutions that do just that, divided into five narrative themes: News, Science, Geography, The Modern World, and Sports. We felt that these topics allowed us to feature an incredibly varied selection of voices and visuals, whose styles and methods range from experimental to conventionally journalistic, while also showing a common thread between them all. This is not a how-to manual, though we hope visual storytellers will find it helpful and inspiring. This is a book of stories.

We also spoke to some of the leading practitioners, from photographers to computer-led designers, to reveal their very different approaches to converting information into attractive and informative visuals.

Where the industry goes from here is, as ever, as exciting as it is uncertain. In the hands of skilled visual storytellers, we are starting to see a combination of disciplines being applied to tell different aspects of a narrative. Text, photography, computer-generated and hand-drawn illustration are all being applied at various times by individual designers and publications. Visualizations are also being used as online tools for dynamic reporting, rather than snapshots of a particular moment, with some interactive infographics allowing users to zoom in on the area of data that is most relevant to them.

The brain finds it easier to process information if it is presented as an image rather than as words or numbers. The right hemisphere recognizes shapes and colours. The left side of the brain processes information in an analytical and sequential way and is more active when people read text or look at a spreadsheet. Looking through a numerical table takes a lot of mental effort, but information presented visually can be grasped in a few seconds. The brain identifies patterns, proportions and relationships to make instant subliminal comparisons.

- The *Economist*, The Data Deluge (2010)

There is no doubt that our narratives across all media are only going to be more visual. The data that we increasingly generate and surround ourselves with demands explanation, context, comparison. As we seek to read, understand, and then move on to so many other distractions with increasing efficiency, those who truly inform us will be those who convey information in an attractive, elegant and easily comprehensible form.

Visual storytelling is increasingly becoming the most effective way of finding order among the chaos. It gives us the tools to process, to look and to learn. Only then can we try to understand.

Part

A

Visual

STORYTELLER

Interviewing People

Carl Kleiner, *The Big Blur,* 2010

DensityDesign

DensityDesign is a research lab in the Design Department (INDACO) of the Politecnico di Milano in Italy, headed by Paolo Ciuccarelli. It focuses on the visual representation of complex social, organizational and urban phenomena. It is open to collaborations with private institutions, NGOs, other universities and private companies.

- *www.densitydesign.org*

How did you create the Greenpeace infographic? → 14

In late November 2010, Greenpeace UK commissioned DensityDesign to make this infographic as part of their "Oceans" campaign. The brief was fairly ordinary but we decided to embrace it as a chance to formulate and test a new design process, one which could enhance our ability to transform data and stories into a visual narrative.

The brief was 10 pages long, and we had just two weeks to complete it. We decided to divide the brief into different parts, and then sketched separately—or, as we like to say, "visually rephrased"—the elements of the story. All those visual concepts were then combined into a single schematic. Then we sent the illustration to Greenpeace and asked them to participate in a sort of game, performing three actions:

- Rate the different parts of the drawing from one to five stars, ranking the importance they wanted to give to each piece of information in the final infographic;
- Put the different sections in sequence, numbering each one
- Finally, the most important contribution: annotate, delete, add details, cut details, rewrite, move, underline, enlarge, select, shrink, write down everything that occurred to them from looking at that first draft.

When they sent back the schematic, we were able to look at their changes, and then formulate the final structure of the story and its subplots.

As for the visuals themselves, after some geo-referenced sketches, we choose a bird-eye view on a fictional landscape in which we could depict the journey of fish from the sea to the supermarket. We drew the schematics and sketches by hand, scanned them, printed and then sketched and scanned again before finally moving onto computer software (Adobe Photoshop and Illustrator) to achieve the final look.

How do you decide what data to include?

It really depends on the specific needs of the client. In some cases the data are all there. In other cases, we could propose and integrate other data, even if it was not in the original plans of the client. We are intrinsically curious (as any designer should be), and so we always question the content we receive; we always verify the sources, or at least try to have our own idea about the story behind the data, and surprisingly often clients appreciate this kind of proactive behavior.

The visual storyteller is fully responsible for the visualization, not for the data and its accuracy. In representing any phenomena, especially social ones, a visual storyteller shouldn't see himself as a holder of any truth. Phenomena are often complex and fuzzy, show many different dimensions, and can be perceived from many different points of view. That's why there are lots of different—in some cases opposite—truths.

Even if the phenomenon is described by accurate data (and statisticians could say a lot here about the existence of accuracy in gathering, organizing, and communicating data), a visual narration rarely can be scientifically accurate, because, as with every type of narration, it deals with causality of events, and causes are often fuzzy.

How important is the hierarchy of narrative in your work?

If the order of events is fundamental to understand of the phenomenon we're describing then we highlight the starting point and make the flow of reading very visible. These techniques derive from graphic design basics: left-right reading orientation, sizing, coloring, common symbols such as arrows, techniques borrowed from comics.

When the main narrative doesn't hinge upon strict sequences, we often conceive our visual stories like a panorama, where the eye is free to wander. There are no starting or end points. It's the viewer's choice which part of the story to follow, which arguments to combine.

How do you balance precision and aesthetics?

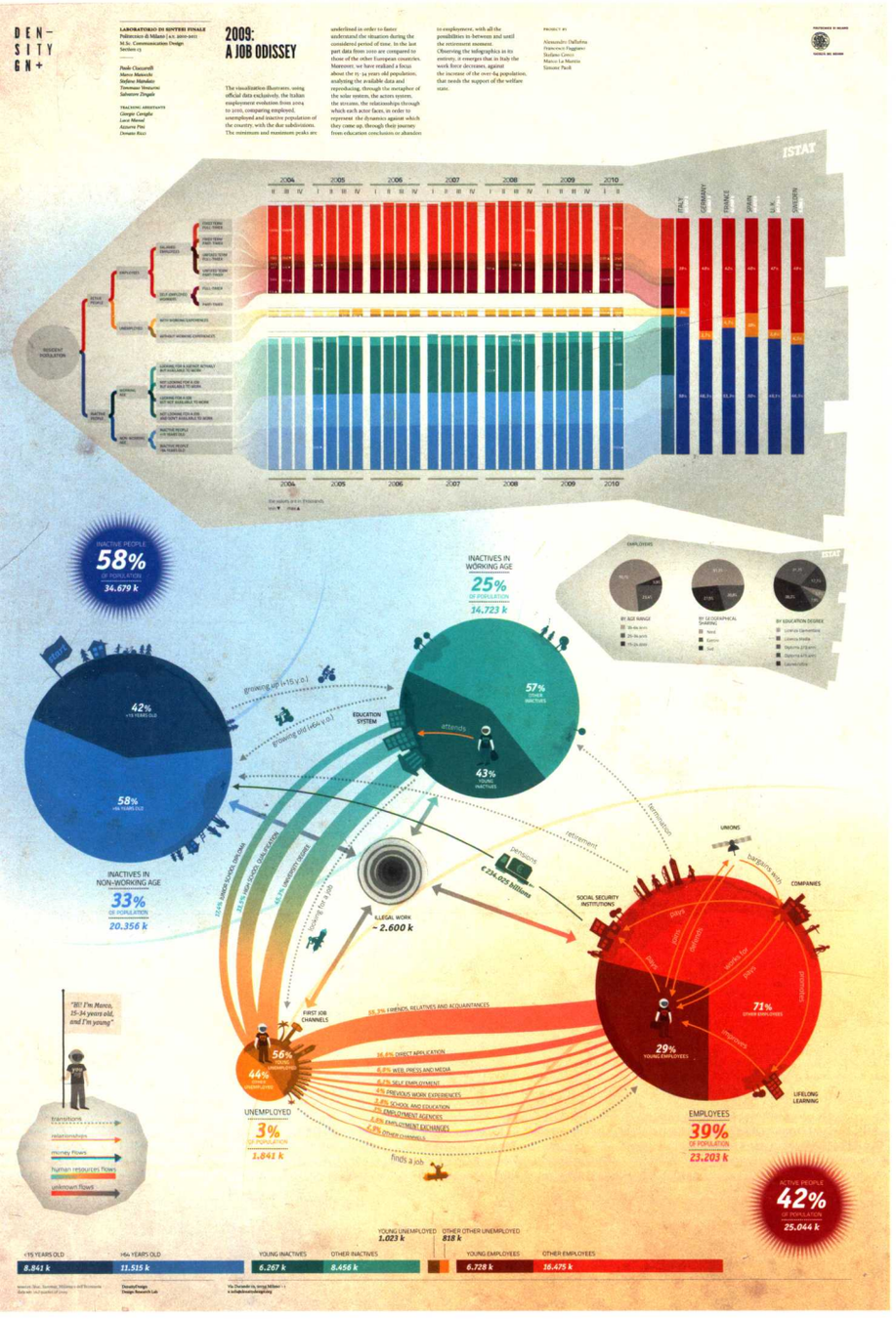
The surface of a visualization cannot be seen as an epiphenomenon (a secondary effect that arises from, but does not influence, a process) but has to be considered to be an essential part of the discourse itself. That can be a controversial idea because appearance can be illusory, vague, superfluous.

But the same illusion of easy knowledge can be induced by reducing things to their primordial structures: the depth obtained by robbing things of their qualities can be as much illusive as the superficiality of their image. As the artist David Hockney once said: "Surface is illusion—but so is depth."

Have you ever made a mistake in an infographic?

Well, it wasn't really so embarrassing, but it can be considered a mistake: in 2009, *Wired UK* asked us to create something for their "Information" section. We decided to create a visualization to show how people in the 27 EU countries perceive the impact of the internet and mobile phones on their lives—and then contrast this with the real penetration of those technologies in each country; a new map of Europe.

The result was a bit too complex for the target of the magazine, and it was never published. That happens sometimes: as we are a research lab, we try to use any opportunity to test an idea, and it doesn't always match the needs of our clients. Especially big publishers!



How does being within an academic environment affect your work?

The benefits are the possibility (and the need) of working at the frontier; the ability to chose the projects we want to tackle; the ability to collaborate with many other disciplines within the Politecnico di Milano (engineering, computer sciences etc.) or within other universities.

The downsides are the need to work only on reasonably big projects, with a certain perspective in terms of time and resources; we don't have a great deal of flexibility or speed: we're not an agency, we can't (and we don't want) to accept small projects that need to be done tomorrow. But we are entirely self-funded, through grants and projects.

What are your ambitions for the future of the laboratory?

We would love to merge our visual storytelling with the potential of interactivity. To be able to combine animation, interaction and visual narrative would be a huge leap forward towards our goals of engagement, inclusiveness and meaning making.

Are we in a golden age of infography? Why?

We're at a point where data and information are more and more widely available, and the visual language of data and information is becoming more popular, thanks to mass media and designers sharing their work on the web. The web itself is also increasingly based on the visual communication of data. So there is a huge potential, but the transformation of this into a golden age is not at all obvious. We first have to avoid the risk of producing too many ineffective visualizations, and adopt a consistent visual language, and create a stronger visualization literacy based on research into its effectiveness.

But no single discipline alone, visual storytelling included, can cope with the complexity of the issues and the phenomena we have to face in this world.

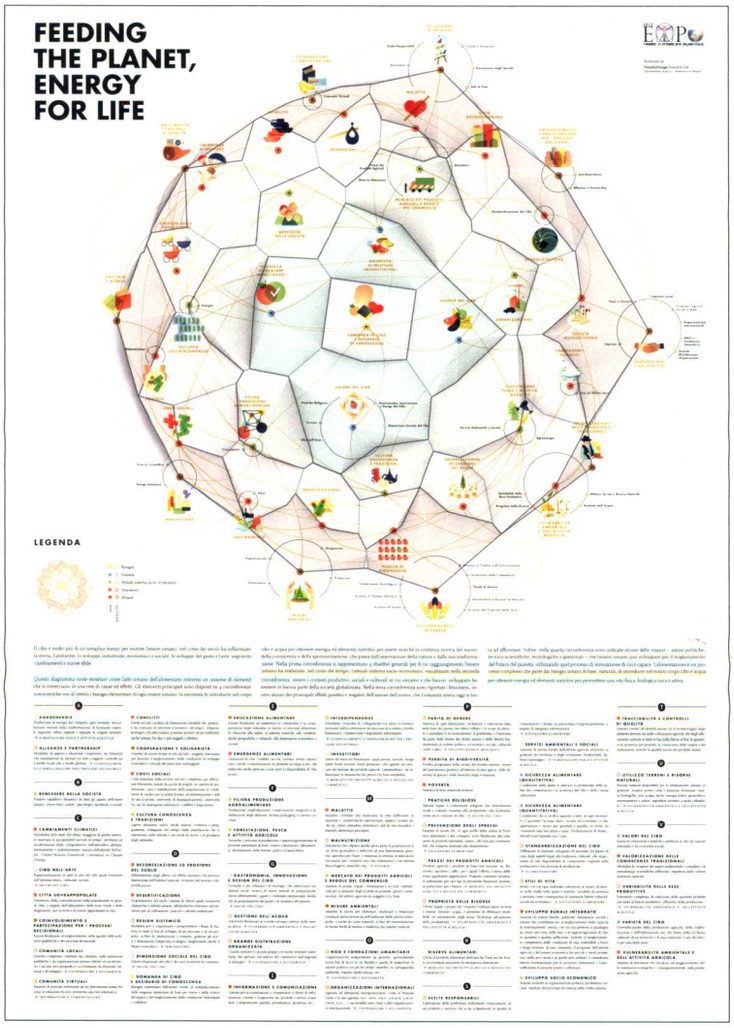
2009 A Job Odissey

Using official data from 2004 to 2010, this infographic shows the evolution of employment in Italy. The employed, unemployed, and inactive population are compared with minimum and maximum peaks highlighted in order to emphasize the situation during particular periods of time. Data from 2010 is compared to that of the other European countries. When viewed in its entirety, the infographic reveals that as the workforce in Italy decreases due to the aging population, support of the welfare state will be needed.

Year: 2011—Client: University Project—DensityDesign - Final Synthesis Design Studio A.Y. 2010–2011 M.Sc. Communication Design Faculty of Design Politecnico di Milano—Students: Alessandro Dallafina, Francesco Faggiano, Stefano Greco, Marco La Mantia, Simone Paoli

1 Feeding the Planet, Energy for Life. Expo Themes Visualization

A graphic commissioned by Expo to communicate the complex theme of food. DensityDesign worked with Expo's scientific committee to develop a better understanding of this theme by investigating the relationships of its sub-themes. Food is much more than simply a means of feeding man; it has influenced history, the environment, industrial, economic, and social development.



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2 Feeding the Planet, Energy for Life. Expo Themes Pictograms.

Pictograms developed to describe the themes and subtheme of the Expo visualization.

Year: 2010—Client: Expo 2015 S.p.A.—DensityDesign Research Lab INDACO Department Politecnico di Milano Scientific—Coordinator Prof. Paolo Ciuccarelli—Project Leader: Michele Mauri—Team: Luca Masud, Mario Porpora, Lorenzo Fernandez, Giorgio Caviglia

3 How Do You Feel, Italy?

Italy's national health care system aims to improve the health and lives of citizens through care activities, education, and prevention. Using data from the National Institute of Statistics, a path has been mapped that shows the investments, infrastructure, and guaranteed benefits of this system. It focuses on the perception of the health care service as well as the most common types of diseases, discovering the causes, connections, and complexities that surround them. The resulting data reveals the presence of multiple health care systems with deep territorial differences at regional and provincial levels. The overall picture of the system is that it is structurally complex and fragmented—and not always clear in its communications with the citizens it serves.

Year: 2011—Client: University Project—DensityDesign - Final Synthesis Design Studio A.Y. 2010 – 2011 M.Sc. Communication Design Faculty of Design Politecnico di Milano—Students: Felipe Alejandro, Ospina Borras, Stefano Cotzia, Jacopo Marcolini, Davide Martinotti, Xuan Wu

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LABORATORIO DI SINTESI FINALE
Politecnico di Milano | A.Y. 2010-2011
M.Sc. Communication Design
Section c3

Paolo Ciuccarelli
Marco Mauicchi
Stefano Mandato
Tommaso Venturini
Salvatore Zingale

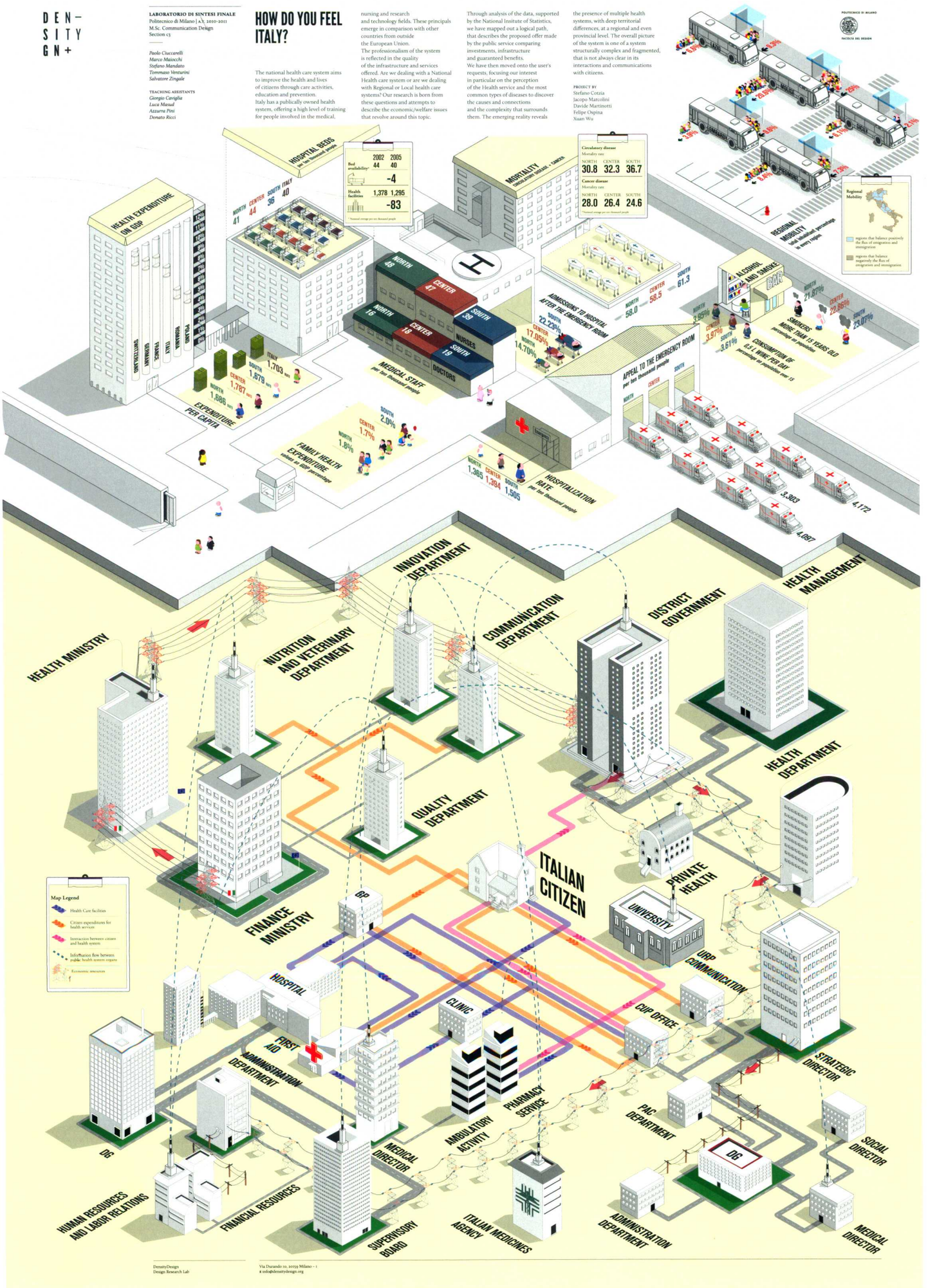
TEACHING ASSISTANTS
Giorgio Caviglia
Luca Masud
Azzurra Pini
Donato Ricci

HOW DO YOU FEEL ITALY?

The national health care system aims to improve the health and lives of citizens through care activities, education and prevention.
Italy has a publically owned health system, offering a high level of training for people involved in the medical, nursing and research and technology fields. These principals emerge in comparison with other countries from outside the European Union.
The professionalism of the system is reflected in the quality of the infrastructure and services offered. Are we dealing with a National Health care system or are we dealing with Regional or Local health care systems? Our research is born from these questions and attempts to describe the economic/welfare issues that revolve around this topic.
Through analysis of the data, supported by the National Insitute of Statistics, we have mapped out a logical path, that describes the proposed offer made by the public service comparing investments, infrastructure and guaranteed benefits.
We have then moved onto the user's requests, focusing our interest in particular on the perception of the Health service and the most common types of diseases to discover the causes and connections and the complexity that surrounds them. The emerging reality reveals the presence of multiple health systems, with deep territorial differences, at a regional and even provincial level. The overall picture of the system is one of a system structurally complex and fragmented, that is not always clear in its interactions and communications with citizens.

PROJECT BY
Stefano Cotzia
Jacopo Martolini
Davide Martinetti
Felipe Ospina
Xuan Wu

POLITECNICO DI MILANO
FACOLTÀ DEL DESIGN



DensityDesign
Design Research Lab

Via Durando 10, 20159 Milano - I
e info@densitydesign.org