

Feb Mar Apr May Jun Jul Aug Sep Oct Nov

1995: the driest May on record,  
with only 20.8mm of rain

1997 was the wettest year in  
the period 1990–2013, with a  
recorded rainfall of 3343mm

# NERD *journalism*

How Data and Digital Technology Transformed News Graphics

Doctoral thesis submitted by

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to the Doctoral Programme in the Information and Knowledge Society

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IMPORTANT NOTE:

THIS IS THE LATEST DRAFT  
OF THE DISSERTATION.

UPDATED ON JUNE 5, 2017

Many corrections and edits remain to be done

Computers don't make a bad reporter into a good reporter.  
What they do is make a good reporter better.

*—Elliot Jaspin*

The greatest value of a picture is when it forces us to notice  
what we never expected to see

*—John W. Tukey*

Numbers have an important story to tell.  
They rely on you to give them a clear and convincing voice.

*—Stephen Few*

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## INTRODUCTION

# A DINOSAUR IN THE MATRIX

It is a most disturbing experience to walk into a modern newsroom and feel like a creature of a forgotten past.

In the Summer of 2014, I spent more than a month at *ProPublica*<sup>1</sup> observing how its News Applications team designs news graphics, from static infographics to interactive visualizations. I felt that I needed a refresher after teaching at the University of Miami for a couple of years. I began my career as a news graphics journalist back in 1997. I have worked in news organizations in three countries, I've published three books about the craft (Cairo 2008, 2012, 2016,) and been part of most of the international conferences related to it, like the Malofiej International Infographics Summit and Awards<sup>2</sup> and the Society for News Design Annual Workshop,<sup>3</sup> besides teaching how to design news graphics in many countries. I thought I knew quite a bit about journalistic graphics.

I was delusional.

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<sup>1</sup> *ProPublica* ([www.propublica.org](http://www.propublica.org)) is a nonprofit investigative journalism organization based in Manhattan, New York. *ProPublica's* News Applications team is in charge of data, visualization, and infographics projects. Its members call themselves “the nerds,” and their collective blog is the Nerd Blog: <https://www.propublica.org/nerds> This was the main inspiration for the title of this study.

<sup>2</sup> The Malofiej International Infographics Summit takes place in the School of Communication of the University of Navarra (Pamplona, Spain) every March since 1992: <http://www.malofiejgraphics.com/>

<sup>3</sup> The Society for News Design is the largest trade association of graphic designers in journalism

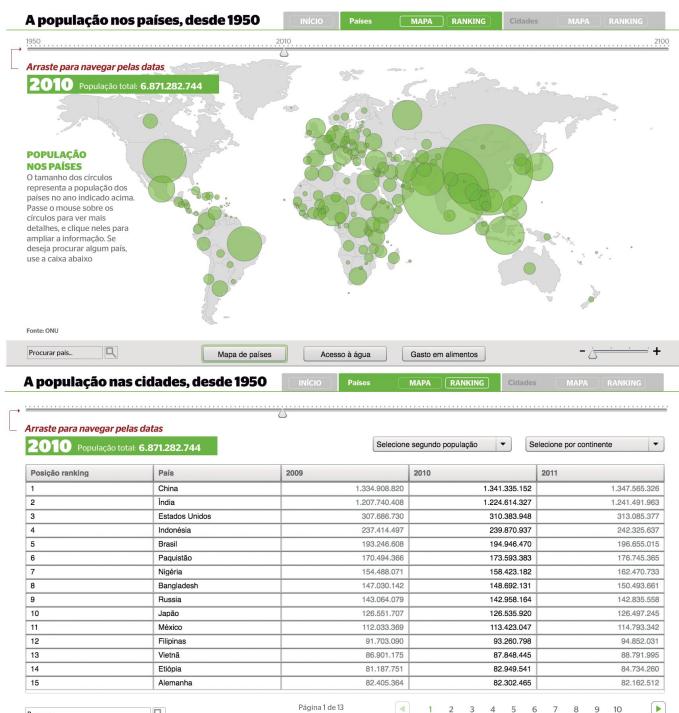
None of the endeavors listed above prepared me for what I witnessed. The craft of news graphics has changed much in just a handful of years, and in fundamental ways. At *ProPublica*, I saw a department that embodied most of the transformations I later explored for this study consulting with dozens of professionals at several news organizations, and analyzing two decades of Malofiej Infographics Awards. The central role of data and code, the increasing autonomy and influence of visual journalists in award-winning newsrooms, the rise of a new generation of tech-savvy news graphics creators, are the most noticeable changes.

I had hunches of some these changes before, during my tenure at *Época* magazine, a Brazilian weekly outlet where I was director of infographics between 2010 and 2012. I was trained as a journalist and as a print designer in the late 90s. I transitioned to online and multimedia journalism in the early 2000s, when working at *El Mundo* online, in Spain, using off-the-shelf software tools like Adobe Flash. Years later, the team that I led in Brazil still used Flash (Figure 11), but also designed animations and interactive visualizations with HTML, CSS, JavaScript, often based on connections between graphics and databases. Because of this, I had to hire professionals with backgrounds much different than mine, folks who were versed in coding and web development, not just in drawing, visual design, or classic 2D and 3D animation.

## ABOUT THIS PROJECT

The present study intends to explore the turmoil that news graphics as a form of doing journalism and as a professional endeavor has experienced in the past decade and a half. News graphics in the 90s and early 2000s used to equate to illustration-driven explanations, sometimes supplemented by small and straightforward statistical graphs and data maps. That's what I learned to do in the early stages of my career. Today, according to the findings of this study, the balance has shifted to presentations that rely mainly on the visual display of data, both quantitative and qualitative, as we'll soon see. Illustration-driven explanation graphics have often become a secondary consideration. The style of news graphics has changed profoundly.

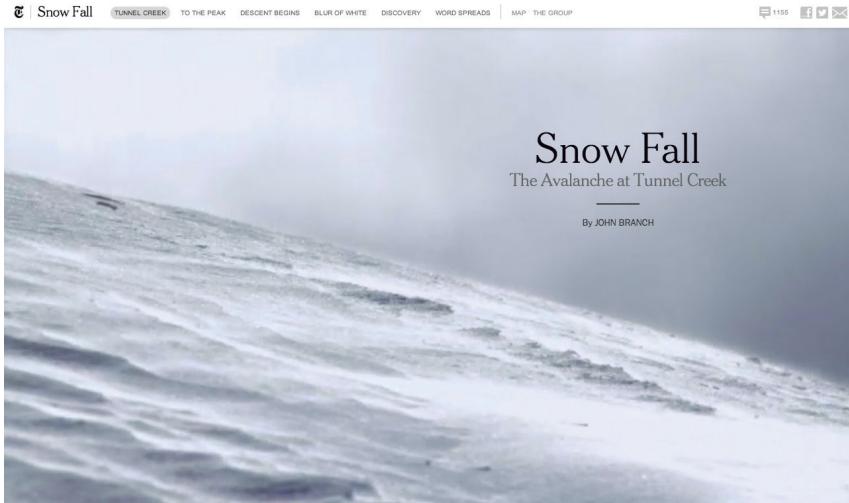
Newsroom dynamics are also different. In the past, news graphics used to be made mainly by visual designers and artists who took "orders" from reporters and editors. Not anymore. Today, individuals and departments who produce news graphics, at least at elite publications, are content creators. They are autonomous. They generate their projects, or they partner up at equal footing with other

Figure I1: <http://tinyurl.com/3pphgcc>

departments to gather information, process it, and then deliver it to the public. As a consequence, many professionals who do news graphics for a living nowadays see themselves primarily as journalists, and only secondarily as designers, artists, or programmers.

Moreover, news graphics creators in many cases don't even work in "graphics" departments. In some places, like *ProPublica* or *NPR Online*, the teams are called "visuals," "news applications," or "interactive journalism." To highlight the fact that news graphics —explanation infographics, interactive data visualizations, etc.— are just one of the multiple ways to convey information to their audiences.

A specific professional group doesn't own news graphics as a craft. It may well be in the process of becoming a language, skill, and a resource that can be embraced by anybody, very much like writing. In some newsrooms, any reporter or editor, not just the members of specialized teams, can put together basic charts and data maps thanks to tools developed for internal use, not by IT departments—as it used to be the case in the past,— but by visual journalists within the news-



**T**he snow burst through the trees with no warning but a last-second whoosh of sound, a two-story wall of white and Chris Rudolph's piercing cry: "Avalanche! Elyse!" The very thing the 16 skiers and snowboarders had sought — fresh, soft snow —

Figure I2: <http://www.nytimes.com/projects/2012/snow-fall/>

### How Y'all, Youse and You Guys Talk

What does the way you speak say about where you're from?  
Answer all the questions below to see your personal dialect map.

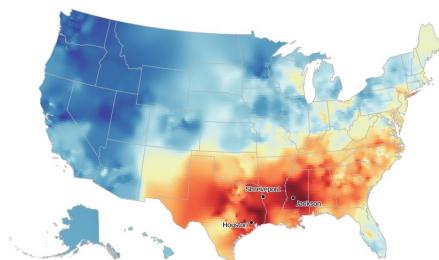
#### Your Map

See the pattern of your dialect in the map below. Three of the most similar cities are shown.

Least similar      Most similar

Show least similar

SHARE YOUR MAP:



These maps show your most distinctive answer for each of these cities.

JACKSON



What do you call a drive-through liquor store?  
**beer barn**

HOUStON



What do you call the small road parallel to the highway?  
**feeder road**

SHRIVEPORT



What do you call a sweetened carbonated beverage?  
**cole**

Figure I3: <http://tinyurl.com/pke94a2>

room itself. In several cases that we'll explore, news graphics journalists are not just software users anymore. They have become software developers.

News graphics journalists also claim to be at the forefront of technological innovation in journalism. They see themselves as pioneers. Many of the most influential and popular projects published by those top news publications that have invested in news graphics in the past ten years had visual journalists at their center. *ProPublica*'s Scott Klein, for instance, wrote that "my [news applications] team is about 20 percent of the [newsroom] staff, but its projects are about half the traffic. We bring in earned revenue and grants. We bring home prestigious journalism awards." (Klein 2016).

"Snow Fall: The Avalanche at Tunnel Creek," by *The New York Times* (Figure I2) is credited for opening a new era of multimedia and interactive journalism (Usher 2016), by demonstrating what could be achieved by merging text, photo, 3D animations, maps, and video in an immersive, scrollable, and mobile-friendly experience. "Snow Fall" had nearly 3 million visits in a relatively short time. It became so popular among journalists that media critics began to use "to snowfall" and "snowfalling" as tongue-in-cheek terms to describe projects that mimicked its rich and organic blending of visual and textual elements.

This said, Snow Fall's popularity with general audiences pales in comparison to "How Y'all, Youse and You Guys Talk" (Figure I3), an interactive quiz and data visualization published on December 20, 2013, which became the most popular piece published by the Times that year (Meyer 2013). In just 12 days, that project had more visits than any other story launched since January 1st, 2013. Later, it became the most popular piece of content ever published by NYTimes.com, and a book, put together by one of the authors of the interactive presentation, Josh Katz (Katz 2016).

In the last decade, news graphics and data journalists have introduced many novel ways of conducting journalism and presenting information to the public. According to CUNY journalism professor Jeff Jarvis, "it's accepted wisdom in the news tribe that journalism is storytelling." Not anymore. Jarvis wrote:

There are so many new forms of journalism emerging. Data is (are) journalism. Platforms that enable communities to share what they know and need to know are becoming journalism (Fred Wilson: We will cover ourselves"). Algorithms that aggregate and cluster and prioritize news are journalism. Collaboration and crowd sourcing yield journalism that doesn't necessarily end up in story form. Journalism can be a stream (see Twitter from Iran). Journalism can be a snapshot of current knowledge (see Wikipedia). Journalism is a process (which make take the form of Waves soon). But stories are products (Jarvis 2009)

The notion that the linear narrative is just one form, among many, of delivering useful content isn't novel. Back in 1998, media theorist, Lev Manovich explained that the database, not the narrative, is the primary form of cultural expression of the computer age:

As a cultural form, the database represents the world as a list of items and it refuses to order this list. In contrast, a narrative creates a cause-and-effect trajectory of seemingly unordered items (events). Therefore, database and narrative are natural enemies. Competing for the same territory of human culture, each claims an exclusive right to make meaning out of the world [...] In general, creating a work in new media can be understood as the construction of an interface to a database. In the simplest case, the interface simply provides the access to the underlying database (Manovich 1998).

Manovich's idea, as radical as it might sound, is echoed in the claims of some modern visual journalists. It also provides the foundation for another radical change in news graphics: From a world where a news graphic was a self-contained object, often a single file saved in a specific software format to be later displayed on a page or a computer screen (think of programs like Adobe Illustrator or the aforementioned Flash,) we have moved to another where graphics are often dynamic ensembles of items that interact with each other algorithmically to form the final product: HTML files linked to CSS and JavaScript objects that provide the looks and the interactivity, all connected to underlying live databases that provide the data to be displayed on screen.

## THE EXPLORERS

But not all modern news graphics are based on databases. News graphics journalists have been among the first in newsrooms to experiment with augmented reality and virtual reality, technologies that may bring back the old tradition of illustration-driven visual explanations and pictorial animations. The cliché "pushing the boundaries" is appropriate here to explain the attitude of many news graphics professionals and departments in top publications when it comes to technology experimentation and early adoption. This attitude is something that was very visible in most interviews conducted for this study.

Perhaps for a good reason. While writing these lines, *The Guardian* has released a major virtual reality project that intends to reproduce the experience of

being in solitary jail confinement (Figure I4). In 2016, Fusion Interactive won the Best of Show Award of the Malofiej Infographics competition with a virtual reality project about blue whales (Figure I5).

News graphics journalists are also at the center of projects that are winning non-design awards. Two of the projects recognized in the most recent editions of the Pulitzer Prizes are, in essence, news graphics, one by *The Washington Post* —a visual exploration of police shootings in the U.S., Figure I6— and another by the *Tampa Bay Times* —about failing school districts in Florida, Figure I7. In the past, news graphics were part of coverages that were awarded Pulitzer Prizes. In the present, *the graphics themselves*, which rely on a thoughtful use of technologies that were nowhere to be seen in newsrooms just a few years ago, win those awards. A majority of the professionals we interviewed highlighted facts like this, and they seemed proud of them.

## JOURNALISM FIRST

The fact that technology, data, and code play a central role in news graphics today, however, doesn't mean that visual journalists have adopted them uncritically. A majority of the professionals we interviewed highlighted that technology isn't a goal, but a means to enhance the practice of journalism, and that ethical and professional standards precede any technological considerations. The traditional rules of journalism —seeking facts, loyalty to citizens, verification, independence, fairness, etc. (Kovach, Rosentiel 2001)— apply to visual designers, data editors, and programmers, as much as they apply all other branches of the journalistic enterprise.

The response to all these transformations varies a lot among news graphics creators, and among journalists in general. Some have embraced the multiplicity of quick changes wholeheartedly; others long for the past, even being optimistic about new technologies; a third group seems to be unequivocally wary of the near future.

Here's Julia Cagé, a French academic who has written extensively about the current state of journalism:

To be sure, hiring skilled web journalists has contributed to some interesting and beneficial technological innovations, such as improved Online graphics and data-driven journalism. With one click it is now possible to obtain detailed graphical-ly illustrated election results for any election, almost in real time. Interactive links,

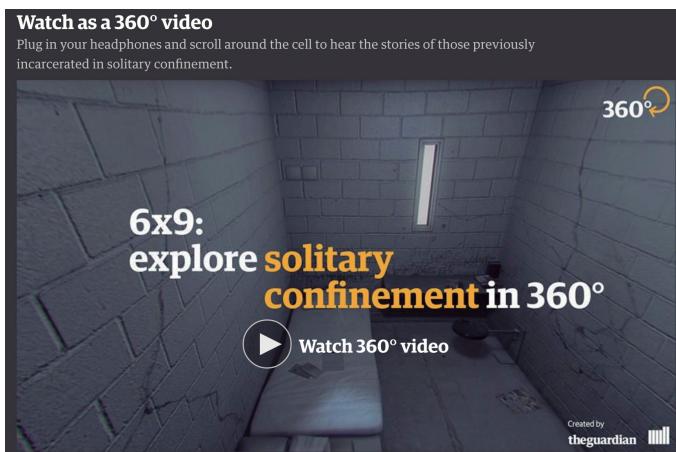


Figure I4: <http://tinyurl.com/jh964mg>



Figure I5: <http://tinyurl.com/jcyzxeb>

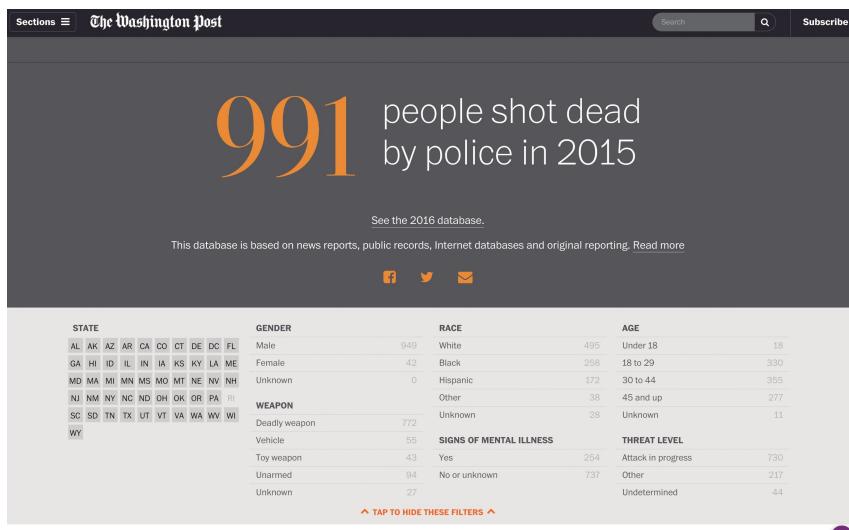


Figure I6: <https://www.washingtonpost.com/graphics/national/police-shootings/>

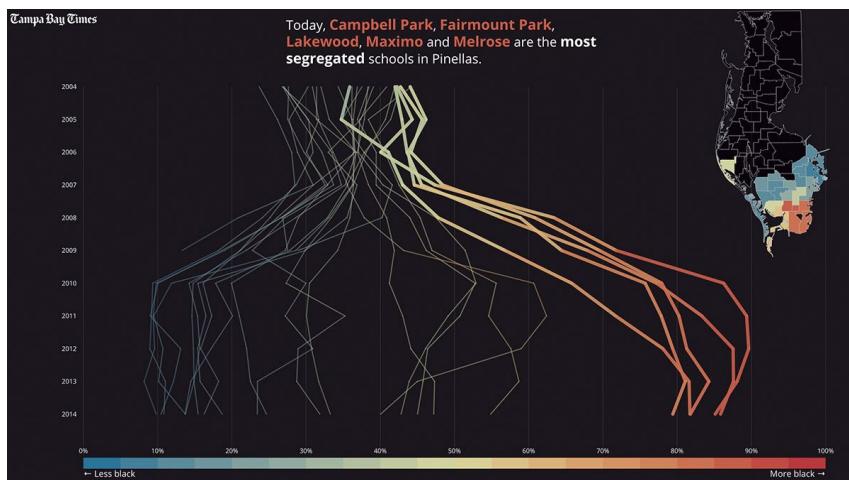


Figure I7: <http://tinyurl.com/obgatz5>

Online videos, and animated graphics promote a better understanding of the news. But at what cost? The digital revolution has come at a time of constrained resources so that most outlets have taken advantage of digital not as a complement to quality news (intended for print as well as the web) but as a substitute. Print journalists have been replaced by computer specialists and Java experts who are give no opportunity to leave their screens to do shoe-leather reporting (Cagé 2016, pp. 31)

And here's Javier Errea, main organizer of the Malofiej Infographics Summit and competition, discussing the winners of the 2012 edition:

It's not just that data visualization is trendy among infographics designers. It's that its presence is overwhelming [...] Visualizations almost never inform, at least not clearly. Even worse: they make you feel guilty. If you don't understand them, it's because you're dumb. News infographics —like everything in life— has limits, and if we go beyond those limits, we're not meeting our obligation of informing [...] Journalism is about this: about telling stories. And infographics are about this, too. (Errea 2015, pp. 67).

Finally, Hiram Henríquez, a designer who has worked for publications like the *Miami Herald*, the *South Florida Sun-Sentinel*, and *National Geographic* magazine, wrote:

Juan Velasco, the Art Director at *National Geographic* who worked at *The New York Times* from 1996 to 2001, believes that newspapers moved to data visualizations and away from explanatory graphics because of the influence of *The New York Times*, which slowly reduced the presence of large explanatory graphics, especially illustrated ones, during the 2000s. Data-driven and unadorned charts replaced them, and over time, this trend was widely imitated as illustrated graphics came to be seen as less "serious." Due to that trend, many newspapers stopped hiring people who could draw well, or who can design complex infographics with multiple elements. Developers are preferred to personnel with artistic and design skills. Velasco believes that graphics are resolved as "data visualizations" even at times when an illustrated graphic would be better, due to lack of vision and skill. (Henríquez 2014, pp. 10)

Hope and enthusiasm, on the one hand, and uneasiness and rejection, on the other, coexist in the world of news graphics today. News graphics creators, after calling themselves "designers" or "artists" for decades, now prefer terms like "reporter" or "editor" and claim to act as such.

Moreover, as Henríquez—and Juan Velasco, quoted in his work—emphasized, they don't do many large illustration-driven visual explanations or infographics anymore, but focus on stories that combine text with data-driven visuals, like graphs, charts, thematic maps, and diagrams. This focus is confirmed by a quantitative analysis of two decades of Malofiej International Infographics Awards—again, the most relevant in the news graphics field—in the last part of this dissertation.

Statistical graphs showcased in that section, based on the data from the competition itself, prove that in the early 90s, when Malofiej was launched, news graphics professionals mostly favored pictorial explanations that sometimes—but not often—included data graphs and maps as corresponding elements. Today, the balance is shifting, and nearly half of the projects that win Malofiej awards have data graphics at their core. Explaining the relationship between this shift, and the others changes listed in this introduction, is the purpose of this study.

## QUESTIONS AND HYPOTHESES

The goal of this dissertation is to study how news graphics has changed as a practice, as a professional endeavor, and as a set of products (information graphics, data visualizations, etc.) More specifically, I posed the following questions and hypotheses, which are described in more detail in the chapter about methodology:

**Q1.** Have the increasing prevalence and usage of digital data and technology in newsrooms significantly change the values that news graphics professionals hold dear, and the way they define themselves, and how the aforementioned interact with each other?

**Q2.** Have digital data and technologies affected the kinds of professionals that are hired to undertake news graphics projects in media organizations, in particular the online versions of newspapers and magazines?

**Q3.** Has the need of dealing with digital data change the structure and the dynamics of news graphics groups and teams in news organizations?

**Q4.** Have new technologies shifted the focus of news graphics professionals in terms of the kinds of projects they create?

The questions led to the following hypotheses:

**H1.** The rise of digital data and technologies have indeed changed the values that news graphics professionals claim to hold. In the past, news graphics professionals talked about themselves as designers and artists, but today they stick to traditional journalistic values that are identical to other reporters and editors.

**H2.** As a consequence, the kinds of professionals hired in newsrooms have also changed, to incorporate more journalists who can take advantage of digital data and technologies, like web developers, computer engineers, etc.

**H3.** The need to deal with digital data, and subsequent changes in values among news graphics professionals, has affected newsroom dynamics, making news graphics teams more autonomous.

**H4.** News graphics professionals and teams are creating many more data-driven graphics, based on abstract charts, graphs, and maps, and fewer pictorial schemes and explanations.

To address these matters I used a mixed methods approach, which I describe in detail later on. The initial step was taken in news companies like *ProPublica*, a non-profit investigative journalism organization in New York, and Univisión Noticias online, in Miami, Florida. I conducted ethnographic observations at these newsrooms which helped me frame the questions more precisely, and which provided some of the clues that I later explored in multiple interviews.

The second step consisted of more than thirty semi-structured interviews with news graphics professionals at leading news organizations in the United States and the UK, like *The New York Times*, *The Washington Post*, *National Geographic* magazine, *The Guardian*, etc. These interviews were transcribed and coded to extract common patterns that helped explore the values and priorities that news graphics professionals claim to have.

The third step was a quantitative analysis of the Malofiej International Infographics awards. The Malofiej is considered the most influential and prestigious competition in the field of news graphics. It takes place every year, since 1992, in Pamplona, Spain, and it recognizes the best news graphics worldwide. After every edition, the Malofiej organization publishes a book showcasing the winners—usually from few dozen to more than one hundred per year. Together, these three elements led to a theory of change in modern news graphics.

¤ ¤ ¤

This project could not have happened without the support of the Knight Foundation. I am the Knight Chair in Visual Journalism at the School of Communication of the University of Miami. The endowment of my chair has allowed me to fund part of the research behind the following pages.

I would like to thank my PhD director at the Universitat Oberta de Catalunya (UOC), Jordi Sánchez Navarro, for his patience with a wayward student who has taken nearly a decade to complete his dissertation. I'd also like to thank the other two members of my committee, Ramón Salaverría, from Universidad de Navarra, and UOC's Lluís Pastor Pérez.

Student assistants Rafael Baldwin, Maria Cermeño, Nancy Cermeño, Cibonay Dames, Luís Melgar, Jiaxin Wu, Zhizhou Wang, and Yuxuan Xie conducted nearly 40 interviews with news graphics professionals which I used for this study. They also helped to quantify the Malofiej International Infographics Awards and copy-edited this study.

The School of Communication at the University of Miami (UM) is my home. I cannot think of a better place to be. UM's Center for Computational Science, where I also hold an appointment, is the place I go whenever I need to find novel ideas. I'd like to thank all my colleagues at both places.



## CHAPTER I

# THEORETICAL FRAMEWORK (I): DEFINITIONS

The meaning of terms like “news graphics,” “infographics,” “data visualization,” “graph,” “data map,” etc., is context-dependent. I will be using them repeatedly and in slightly different ways than other academics that have written about the visual display of information (Tufte 1981, Valero Sancho 2000, and many others.)

I’ll begin with “news graphics.” Depending on the context, this term can refer to:

1. The craft of doing journalism by using graphics displaying information.
2. The products of that craft, such as statistical graphs, maps, visual explanations, interactive data visualizations, etc.
3. A specific kind of department that, in many newsrooms, used to hold the monopoly of news graphics production.
4. The professional community created around the craft.

## THE CRAFT

News graphics is, first, a journalistic activity consisting of putting together graphic images that display information with the goal of informing an audience. There are multiple definitions of journalism. The American Press Institute’s (2013) is the one I’m embracing in this study:

Journalism is the activity of gathering, assessing, creating, and presenting news and information. It is also the product of these activities. [...] The purpose of journalism

is thus to provide citizens with the information they need to make the best possible decisions about their lives, their communities, their societies, and their governments [Its] value flows from its purpose, to provide people with verified information they can use to make better decisions, and its practices, the most important of which is a systematic process – a discipline of verification – that journalists use to find not just the facts, but also the “truth about the facts.” (American Press Institute, 2013).

Journalism is, then, primarily an activity, and only secondarily —and not always—a profession. Journalist-coder Adrian Holovaty has argued that:

Journalists should have less of a concern of what is and isn’t “journalism,” and more of a concern for important, focused information that is useful to people’s lives and helps them understand the world. A newspaper ought to be that: a fair look at current, important information for a readership (Holovaty 2006).

City University of New York’s professor Jeff Jarvis goes one step further:

Journalism is not content. It is not a noun. It need not be a profession or an industry. It is not the province of a guild. It is not a scarcity to be controlled. It no longer happens in newsrooms. It is no longer confined to narrative form. So then what the hell is journalism? It is a service. It is a service whose end, again, is an informed public [...] Anything that reliably serves the end of an informed community is journalism. Anyone can help do that. The true journalist should want anyone to join the task (Jarvis 2013).

News graphics are, then, journalistic graphics. They are visuals that contain useful, relevant, and newsworthy content, and that are designed based on journalistic values and principles. However, “journalistic graphics” sounds cumbersome, so I decided to stick with the shorter “news graphics.”

Many academics and practitioners use the term “infographics” to refer to news graphics (Pasternack and Utt 1990, Valero Sancho 2000, Marín Ochoa 2009, Lee and Kim 2015.) The origin of the term infographic is unclear. Some of the aforementioned authors say that it’s a contraction of information+graphic, while others guess that it is the result of combining informatics+graphics, meaning graphics that are designed with a computer and its software.

I have used the titles “infographics designer” and “infographics journalist” to refer to my role in newsrooms in the past. The word “infographics” has nostalgic

resonances. However, I have decided to reserve it just for a specific kind of news graphic, as I'll later explain.

There are two reasons for this decision. First, very few of the professionals interviewed for this study —all active in news publications— call the products of their work “infographics,” and they rarely label themselves as “infographics designers” or editors. They prefer to use the more generic and vague term “graphics,” which may be a reflection of the multiplicity of work they put out.

Second, the word “infographic” has been co-opted by the marketing industry to refer to combinations of words and visuals intended mainly to bring traffic to websites or to advertise products, not to inform the public (Velasco 2015.) Using the word “infographics” too broadly, then, could lead to confusion.

Other authors, like famed designer Nigel Holmes, prefer the term “explanation graphics” (Hammock 2015,) which is indeed appropriate for the kind of visuals Holmes designs, whose goal is to explain something to an audience, usually in a step-by-step fashion. However, not all news graphics are explanation graphics. Some varieties, like data visualizations, don’t necessarily explain anything unidirectionally (a journalist tells something to her audience,) but consist of tools that readers can use to explore the information to see how it relates to them.

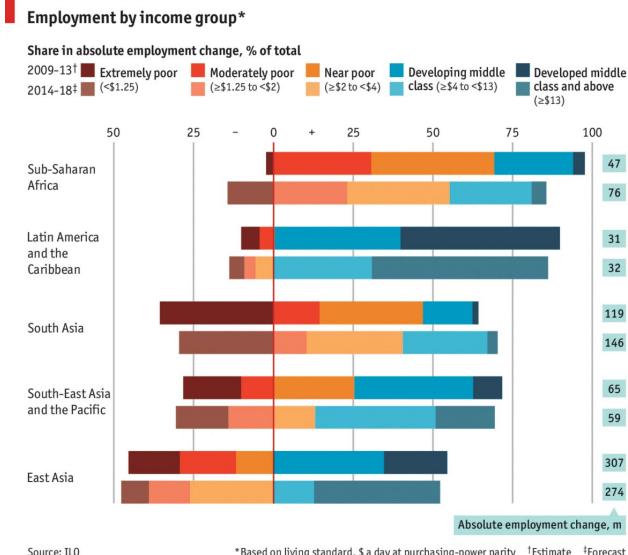
## THE PRODUCTS OF THE CRAFT

The craft of news graphics encompasses different kinds of products, from simple statistical graphs, charts, and maps, to large, standalone interactive animations, data visualizations, and explanation schemes.

In the context of this dissertation, a news **graph** (Figure D1) is a single representation of statistics based on Cartesian coordinates. In a graph, the data is encoded by the position, length, or width of objects —lines, bars, dots, etc.— on X and Y axes.

Annotations usually accompany news graphs. These can be just a headline and a short introduction, but they can also include explanatory text intended to put the data in context. A single news graph can be a standalone feature, or be supplementary to a written story, as is the case with all the other graphics we’ll outline.

A **chart** is a visual representation of data, too, but one that isn’t based on a Cartesian coordinate system. This is the key difference between charts and graphs. Pie charts are the most well-known charts in the news, but other kinds are becoming popular, such as the bubble chart (Figure D2), in which quantities are encoded as circles of varying areas.



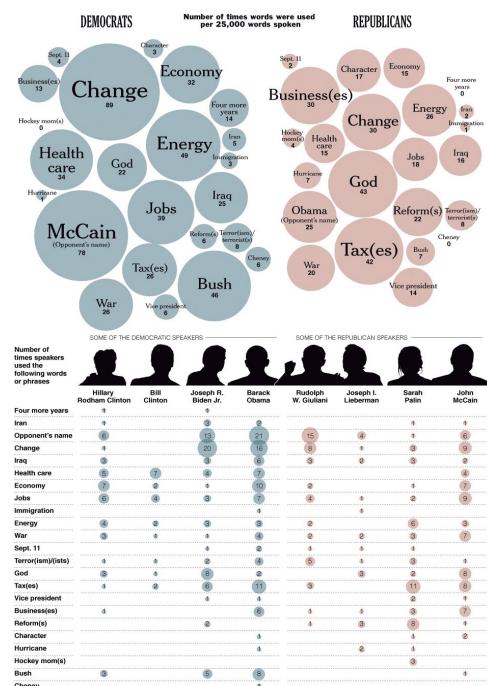
Source: ILO

\*Based on living standard, \$ a day at purchasing-power parity

Economist.com/graphicdetail

†Estimate   ‡Forecast

Figure D1 The Economist



Source: Federal News Service transcripts

Figure D2 The New York Times

An alternative term would be a diagram, like in “network diagrams”— is a simplified representation of the appearance or structure of an entity, regardless of the nature of this entity, which could be anything from an idea to a physical object (Costa 2016). In this study, I’m restricting this term to depictions of workings, processes or procedures.

**Schemes** are representations of connections, relationships, and sequences. They can be abstract or pictorial. Abstract schemes symbolize entities that don’t have physical nature. A relational depiction of the connections between concepts in a novel (Figure D3) is an abstract scheme, for instance.

Pictorial schemes are, by far, the most common kind of news graphics, if we observe the entire history of the field. A pictorial scheme is a depiction of a physical object or creature, or of a process or procedure that has (or could potentially have) a physical manifestation. Examples of pictorial schemes abound in the media. Their variety is staggering: from detailed cutaways of buildings or pieces of machinery (Figure D4) to simplified explanations of the inner workings of artifacts or breaking-news events (Figure D5).

In the rest of this dissertation I will use the terms “pictorial scheme” and “pictorial news graphic” as synonymous. The distinction between abstract and pictorial graphics will be relevant later on when focusing on the style changes experienced by the news graphics field, which is at the core of this study. In the past, pictorial representations used to be preferred by news graphics professionals. In the present, abstract representations of quantitative or qualitative data are much more prominent.

Another category of common individual news graphics is maps. The most common kind of map in the news is the **locator map**, intended to show readers the location of events usually described in a story. The second kind is thematic maps, which aren’t intended to reveal locations per se, but “to show attributes or statistics about places, spatial patterns of those attributes, and relationships between places” (Axismaps 2015). In the news, data maps, a specific kind of thematic maps that show categorical or quantitative data in relationship to geographical areas, are the most common kind (Figure D6).

So far I have referred to individual kinds of news graphics. Single graphs or charts can convey sufficient information about a story, but often journalists assemble several of them together, to produce a new unit. As we’ll see in the following chapter, the late 80s in newspapers and magazines witnessed the rise in popularity of large feature graphics that resulted from the combination of several individual graphs, charts, maps, and schemes. The term that was coined to refer to these assemblages, regardless of their size and ambition, is **infographic**.

An infographic is a combination of several individual graphics which, along

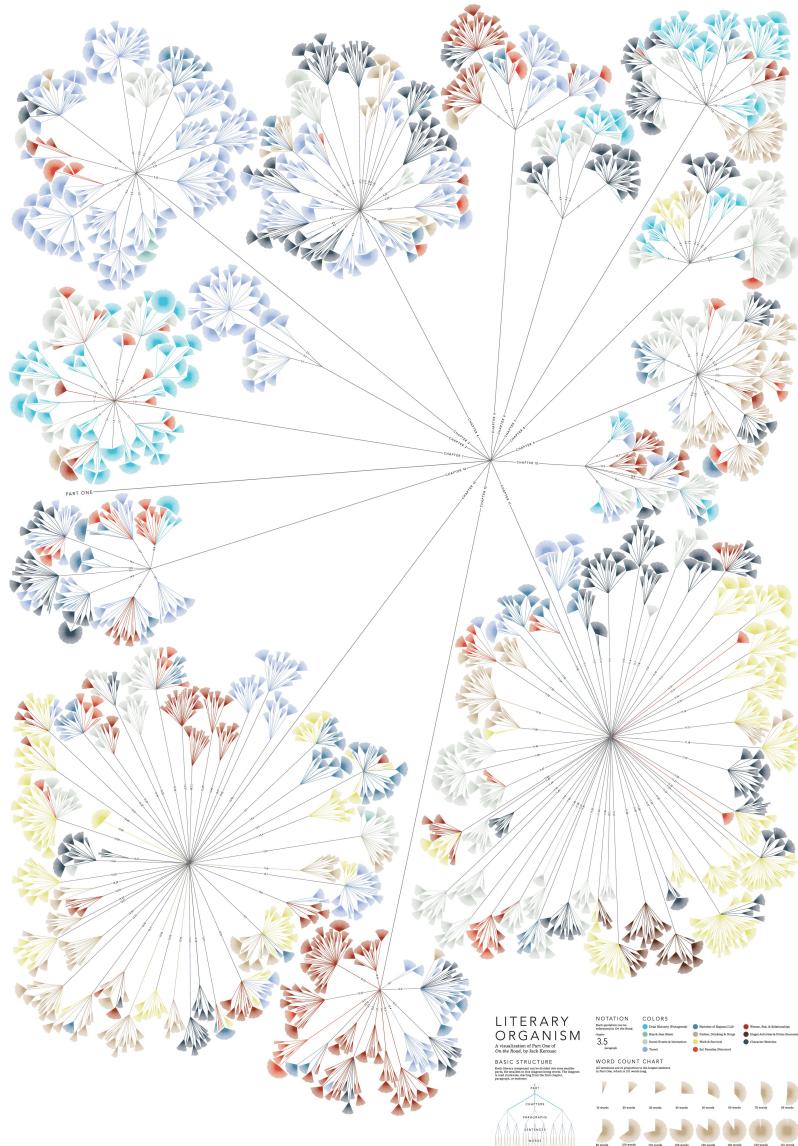


Figure D3 Stephanie Posavec: <http://www.stefanieposavec.co.uk/writing-without-words/>

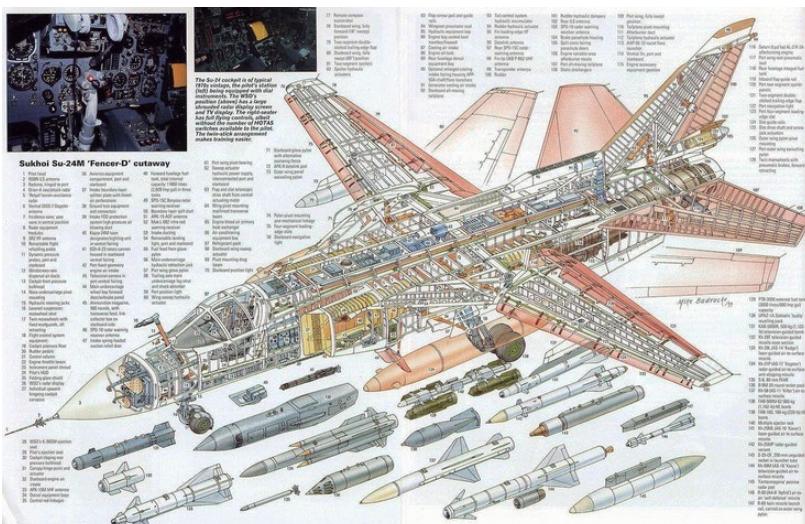
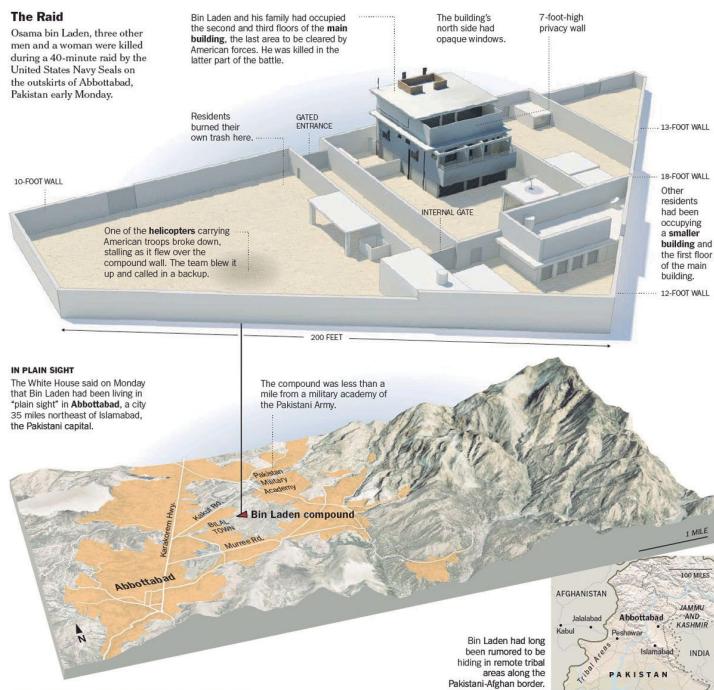


Figure D4 Mike Badrocke



Source: Department of Defense; Central Intelligence Agency; LeadDog Consulting

Figure D5 The New York Times

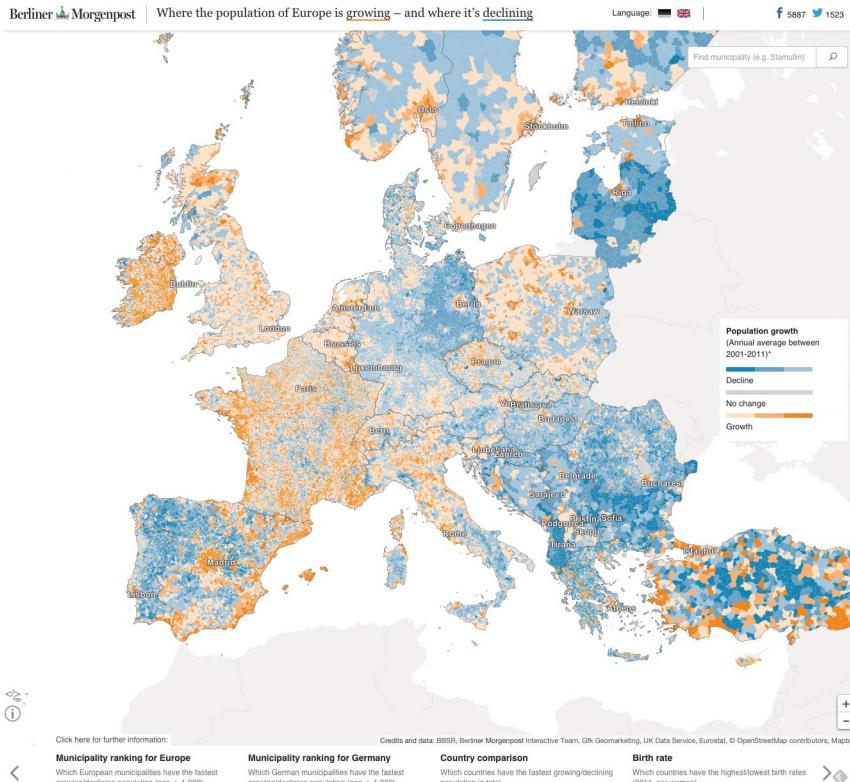


Figure D6 Berliner Morgenpost

with copy that ties them together and provides context, offers readers a complete overview of a story, often—but not always—structuring the information in a sequential manner. A news infographic can be made of several elements of the same nature, such as graphs (Figure D7), or it can be made of an assortment of graphs, maps, pictorial schemes (Figure D8). Authors like De Pablos (1999) and Valero Sancho (1999) have written about different genres of infographics, and proposed the term “infogram” to refer to each graphical element of an infographic. According to Valero, infograms are “elementary units of graphical information.” (Figure D7), then, would be made of four infograms.

The term infographic belongs to an era of print newspapers and magazines, where written stories and graphical assets were separated on the page, even if they belonged to the same informative package. The use of this term nowadays is complicated by the fact that web journalistic stories often blend text, photographs, video, and graphics seamlessly in what some authors have called “in-

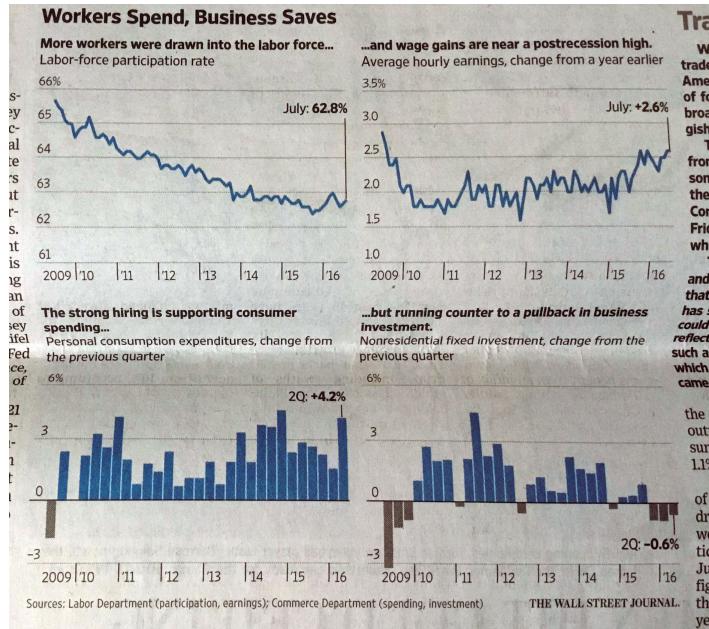


Figure D7 Wall Street Journal



Figure D8 La Tercera

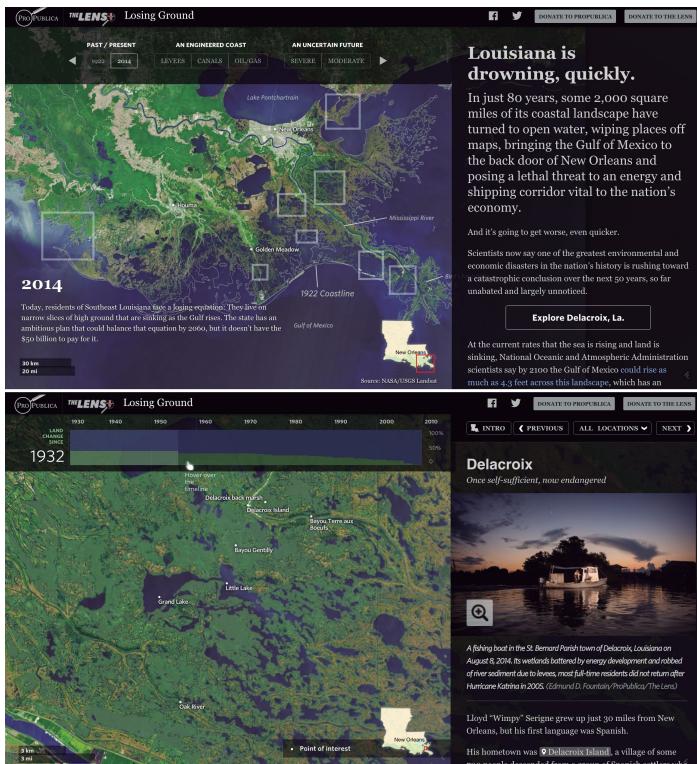


Figure D9 <http://projects.propublica.org/louisiana/>

teractive” or “multimedia” narratives or journalism (McAdams 2005, Jacobson 2012, Usher 2016, for instance.) Is a journalistic piece like the one in Figure D9 an “infographic” or simply a data-driven story in which graphs and data maps are given prominent space? I hope that this example shows that any attempt at devising a detailed and rigid taxonomy of news graphics is doomed by the sheer variety of projects being published nowadays, and by the fact that the field mutates rapidly and unpredictably.

An additional kind of news graphic that I’ve identified elsewhere (Cairo 2016) is the **data visualization**. A data visualization (Figure D10) is, simply, a graphic—made of one or more “infograms,” usually graphs and data maps—intended to enable exploration, rather than an unidirectional conveyance of information from an emitter (the journalist) and a receiver (the reader).

In this sense, the difference between an infographic and a data visualization lies in the purpose of each particular project, and on what it enables. A data visualization doesn’t necessarily tell a story or have a sequential structure like a

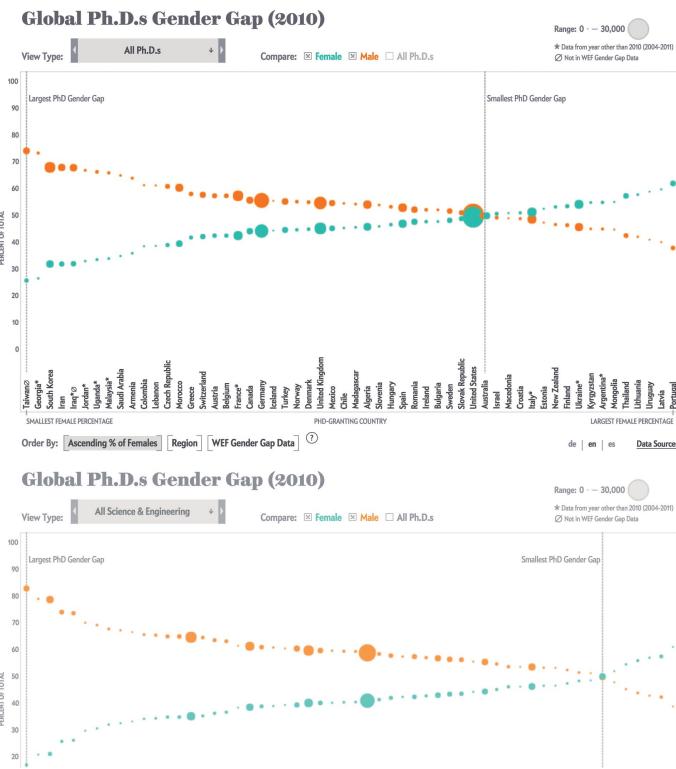


Figure D10 <http://www.scientificamerican.com/article/how-nations-fare-in-phds-by-sex-interactive1/>

traditional infographic or news story have. Rather, instead of being the journalist or news graphics designer who tells something to her or his audience, it is this audience who is enabled to discover insights, patterns, and trends in the information shown to them using the interface put together by the journalist. Many hybrid projects, combining narrative features with deep level of exploration are common in news media today (Figure D11,) and blur any possible boundaries between infographics and data visualization.

## DEPARTMENTS AND PEOPLE

A third sense of the term “news graphics” has to do with the groups and the individuals who produce this kind of work in newsrooms. As we’ll see in the

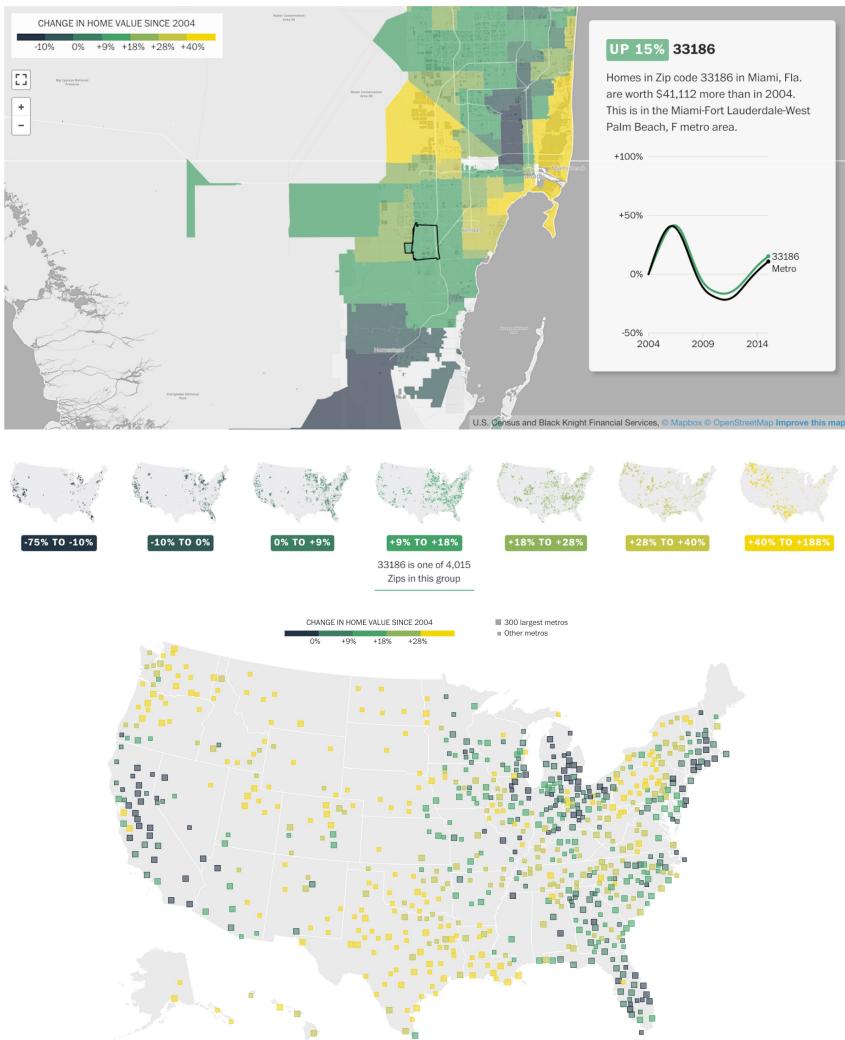


Figure D11 <https://www.washingtonpost.com/graphics/business/wonk/housing/overview/>

History section, before the 80s, charts, maps, graphs, diagrams, explanatory illustrations, and other kinds of news graphics were done either sporadically or by people who didn't identify themselves as "infographics" designers. It was usually "art" desks who designed these kinds of elements, besides taking care of publication layout and overall style.

The landscape changed in the late 80s and the early 90s. Many news organizations, in part as a response to the influence of *USA Today* and other publications producing explanation graphics in great quantities, began creating departments exclusively devoted to the production of news graphics. They were called "infographics department," "graphics desk," etc., as a way of distinguishing them from design or departments, devoted to page layout, illustration, and even photography.

Graphics desks monopolized the creation of news graphics of all kinds. The fact that the most common professional profiles of those first departments were a graphic designer or visual artist is one of the factors that explains the dominance of pictorial explanations in this era. These teams began creating a professional identity around conferences and professional competitions like the Society for News Design Awards and the Malofiej International Infographics Summit.

Today, the situation is more complex and varied. Many of these "graphics" teams still exist. Some of them, like *The New York Times'* or the *Washington Post's*, are still very influential. But graphics desks have dwindled, or even disappeared, at most mid-range publications. However, those publications still produce news graphics, so who makes them?

The answer is either individual journalists who aren't designers, or groups with names like "news applications," "interactive news," etc. The professionals who work at these departments aren't just graphic designers and artists anymore, but programmers, statisticians, web developers, etc. For this kind of team, news graphics is not their sole task, but one of the many ways —along with text, video, audio, or newer technologies like Virtual Reality— information can be made understandable to readers. The focus of these teams is not the form itself —news graphics— but what underlies this form, the data. The following chapter explores this transformation and the section in this dissertation containing interviews with professionals puts it in context.



## CHAPTER 2

# THEORETICAL FRAMEWORK (2): HISTORY OF NEWS GRAPHICS

The following pages are an overview of the history of news graphics in print and web publications. A few warnings are pertinent: Even if I mention some non-U.S and non-UK newspapers, websites, and individuals, the reliance on mostly secondary sources—and personal experience and conversations—forces these notes to be focused on English-speaking publications. It is my hope that the present study will prompt researchers worldwide to contribute to a more comprehensive history of information graphics in journalism, by chronicling their development in their countries.

## EARLY PIONEERS IN THE NEWS

A handful of authors has tried to pinpoint the first news infographics ever published. Tascón (2011) describes a 1638 explanation of a volcano in the Azores islands (Fig. H1) that appeared in a Spanish “relación,” a kind of official publication that is commonly considered a precursor of newspapers. In 1702, *The Daily Courant*, the first British daily newspaper, published a map describing an attempt

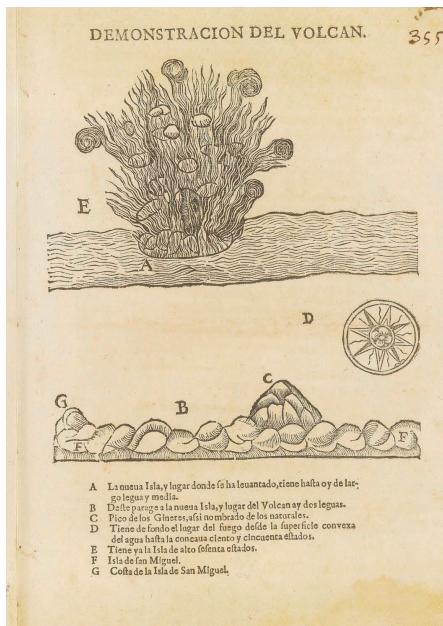


Figure H1



Figure H2

of invasion of the city of Cádiz, Spain (Fig. H2). This is commonly considered the oldest newspaper infographic conserved to this day.

In a book about infographics in Portugal and Spain, Almeida (2008) unearthed a January 1723 explanation graphic in *Gazeta de Lisboa Ocidental*. The graphic shows the dimension of a whale that got beached near Lisbon.

Sullivan (1987) showcases an 1806 quite sophisticated visual explanation of a murder case in *The Times* of London (Fig. H3) and points out examples of early sequential, comic-book like presentations in British newspapers.

Rogers (2011, 2013) says that there's a connection between the development of news graphics and the history of the use of data in journalism. On the back page of the first issue of the Manchester *Guardian*, in May 1821, there is a data table of all schools in Manchester and Salford (Fig. H4).

Rogers also points out how hard it was to develop good news graphics before the invention of modern printing techniques. He highlights a diagram about army unit organization during the Second Boer War done just with typesetting, with characters like "y" and "o" representing soldiers and their positions. Technology can constrain and enable, but until the full development of digital meth-

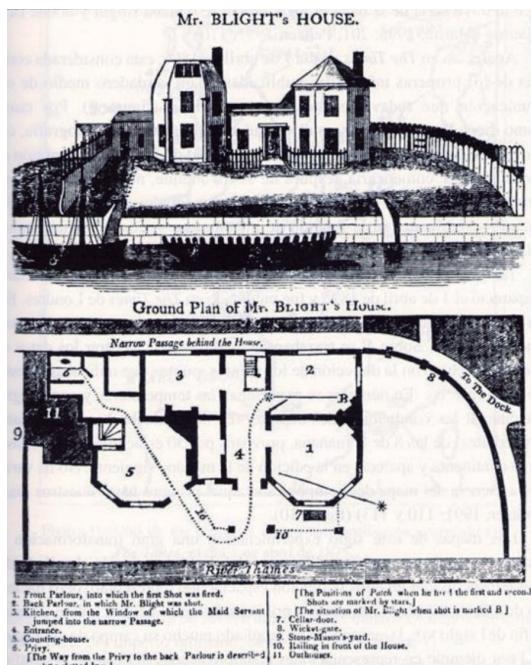


Figure H3

ods of creation and dissemination, in the last decades of the Twentieth century, it did much more of the former than of the later. In this early period of newsmaking, maps, charts, and explanation illustrations and diagrams were published just sporadically, likely because of how challenging it was to find professionals who could design them, and of how difficult it was to have them transferred to the page. Up to the late 19th century, the dominant technique to bring graphics to newspapers was wood engraving, which was laborious (Monmonier 1989: 34)

More recently, Scott Klein, deputy managing editor at *ProPublica* and head of its News Applications department, has launched a project called Above Chart (Klein 2016), which traces statistical charts and data maps in American newspapers between the late Eighteenth and the early Twentieth centuries. Many of the graphics Klein has included in his project so far mention William Mitchell Gillespie (Figure H6, from the *New-York Daily Tribune*,) an engineer and math-

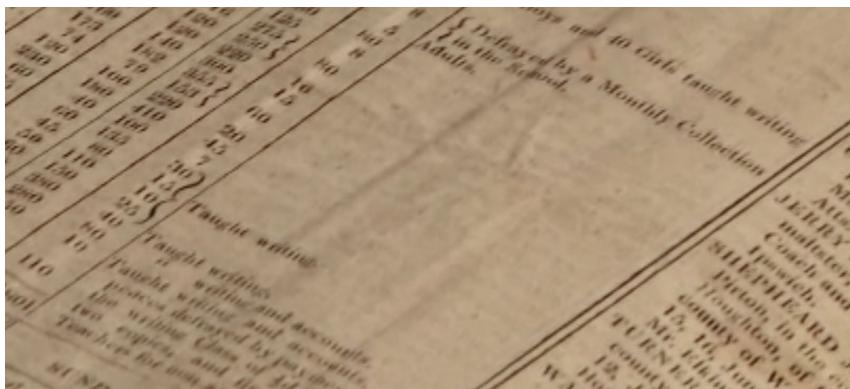


Figure H4



Figure H5

ematician. Here is what Klein says about Gillespie, whom he calls “the most important person in the history of newspaper data visualization”:

If anything in mid-19th-century newspaper graphics can be called “common,” it’s Gillespie’s credit line. He’s cited in at least five graphics I’ve found from the period [...] It’s not perfectly clear what role he played in making (these graphics), except in the case of a chart from 1854, which explicitly credits him for its construction. Most of the others claim simply to be “indebted to” him. Bylines, as we know them now, hadn’t been invented yet, so it’s hard to know what to make of any of that. But his contribution was big enough to merit mentioning (Klein, 2016).

Regardless of the role that non-journalists like Gillespie played in early news infographics, what is clear is that they were bringing to the field tools and techniques from many other disciplines, like mathematics, statistics, and cartography, a phenomenon we continue observing nowadays.

## THE RISE OF DATA CHARTS AND MAPS

Most early newspaper infographics look crude in comparison to the oldest surviving examples of data charts and maps done by scientists and cartographers. Mapmakers call quantitative, and qualitative data maps “thematic maps” (Slocum, 1998), and have found its origins in the Seventeenth century (Robinson 1982), linking its expansion to the Enlightenment and the scientific revolution.

The display of data using charts has its origins in the Eighteenth century. Joseph Priestley (1733-1804) designed the “Chart of Biography” (1765), a Gantt chart plotting the lifespan of many historical figures, and “A New Chart of History” (1769), which displays time on the horizontal axis, and uses area to represent the size of empires, kingdoms, and modern countries (Figure H7). Priestley had a very modern understanding of what data graphics are about (Rosenberg and Grafton, 2010):

We have no distinct idea of length of time until we have conceived it in the form of some sensible thing that has length as of a line.

William Playfair, a Scottish engineer and economist, is commonly credited as the inventor of statistical graphs and charts (Friendly, 2008). There are earlier, isolated attempts at plotting social data over a Cartesian coordinate system, like a 1669 chart of hypothetical mortality estimates by Christiaan Huygens (Spence,

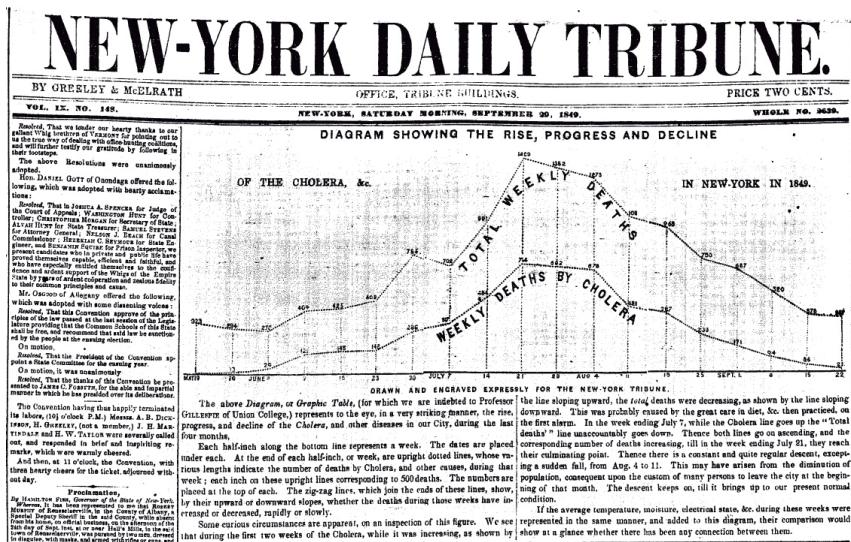


Figure H6

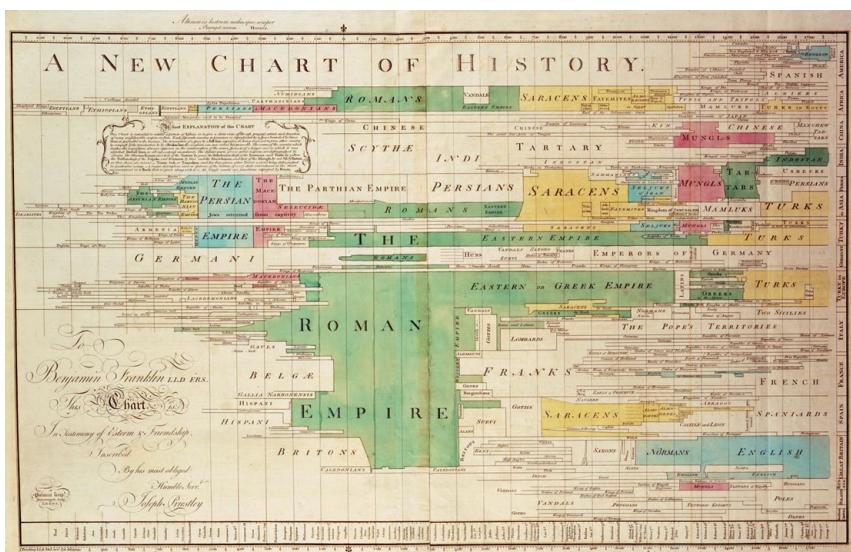


Figure H7

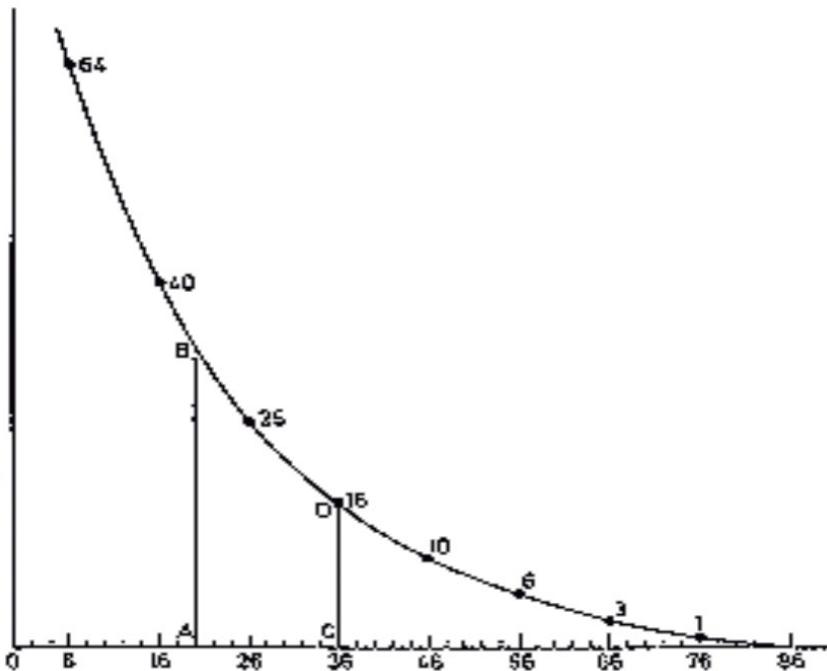


Figure H8

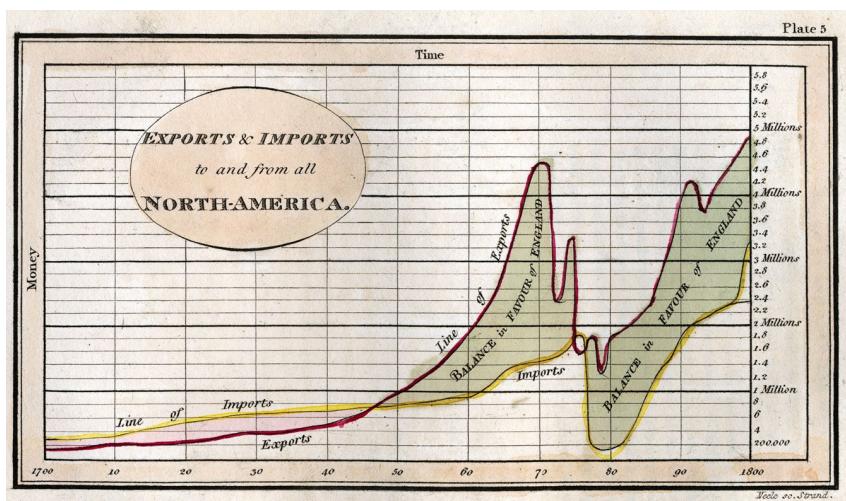


Figure H9

2006) (Figure H8), but Playfair is considered a pioneer of the form because he used them in a systematic manner, and theorized about their utility in two books, *The Commercial and Political Atlas* (1786) and the *Statistical Breviary* (1801). Playfair used mainly time-series line graphs (Figure H9), but he also designed bar graphs and pie charts (Spence, 2005).

Many of the most famous landmarks in the history of data visualization come from the 19th century. According to Michael Friendly (2008), the rate of creation and publishing of data charts and thematic maps in this century is unparalleled. He calls it a “Golden Age.”

There are various reasons that explain this creative explosion. First, modern nation-states had an increasing interest in collecting and analyzing economic and demographic data. It is hardly a coincidence that, at its origin, statistics was known as “political arithmetic.” The 19th century was the first era of massification: Industrialized cities became megalopolis, and commerce exploded. The term “mass warfare” is commonly applied to this period, starting with the Napoleonic Wars (1803-1815). To control both society and its products, leaders understood the need to quantify and study them scientifically. Quantification yields data and insights from this data often become noticeable when displayed on a chart or a map.

Second, statistical methods that were already common at the beginning of the century in physical sciences like astronomy and geodesy began to be adopted by the social sciences (Stigler, 1999). Thinkers like Adolphe Quetelet —who was an astronomer— and Francis Galton struggled with problems in social science that still sound familiar today, such as to what extent a statistical average (a mean, a median, etc.) is representative of the data set it comes from, or how to better model or predict the behavior of complex systems, like human groups, based on incomplete data.

Third, the 19th century witnessed the dawn of new sciences, like epidemiology (Koch, 2005). Quantification and new analysis techniques opened the door to innovations in visualization. Some of the most famous landmarks in the history of both graphics and epidemiology are dated in the middle of this century.

On one hand, Florence Nightingale, a nurse and activist who played a key role during the Crimean War (1853-1856) and was greatly influenced by Quetelet's statistical ideas, designed a series of diagrams to prove that a great part of the British soldiers died not because of battle wounds, but of sickness (Small 1998, Figure H10). On the other, John Snow, a medical doctor, claimed that there is a connection between the consumption of foul water and the likelihood of con-

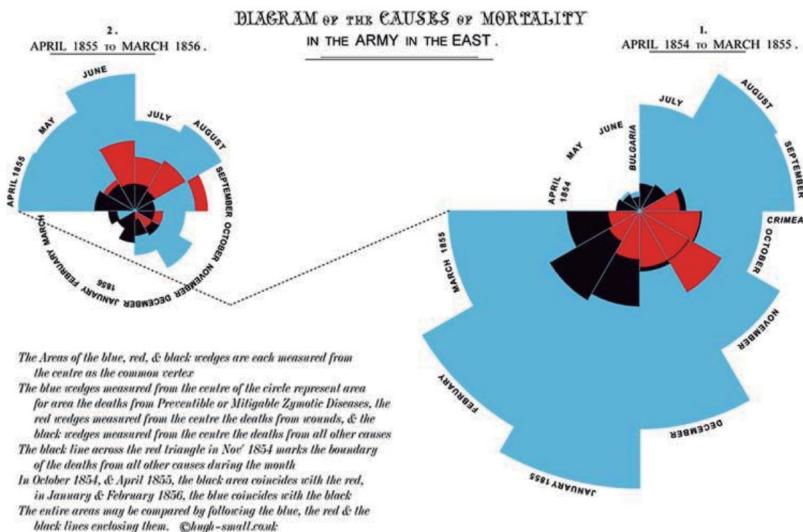


Figure H10

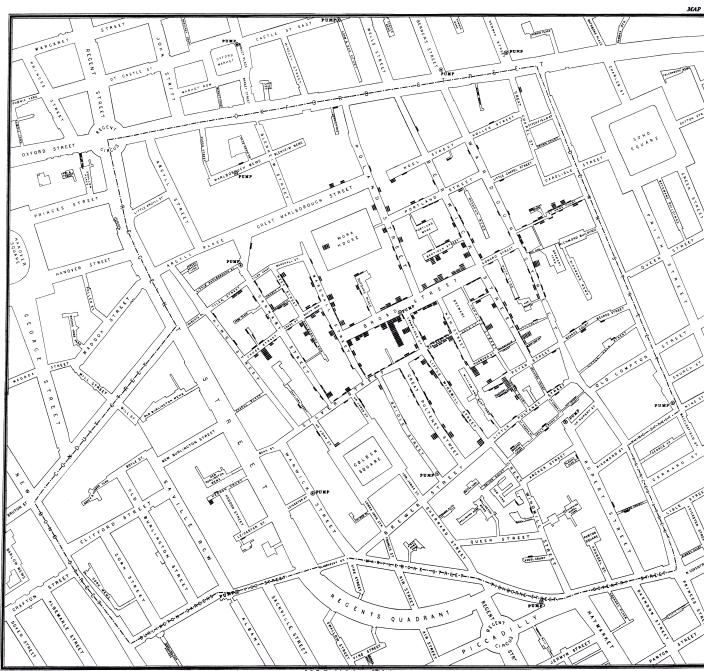


Figure H11

tracting cholera during an outbreak by using a map based on data he collected (Johnson 2006, Figure H11).

□ □ □

The second half of the 19th century was a time of noticeable increase in the use of illustrations of all kinds by newspapers (Barnhurst and Nerone 2001). Conflicts like the American Civil War led to a significant amount of maps being published by periodicals (Bosse 2011). In their book, Barnhurst and Nerone list seven kinds of illustrations common in this period; two of them, “maps and technical drawings,” can be considered news graphics as defined in this study, with maps being the most common, by far (Monmonier 1989). Beyond those two, as the work of Scott Klein (Klein 2016) is slowly revealing, what Michael Friendly calls a Golden Age of statistical graphics may have had a correlate in journalistic publications, albeit perhaps limited to certain publications.

Friendly claims that this age was followed by a period he calls the “modern dark ages” of visualization, though, which began at the turn of the century:

The attention and enthusiasm of both theoretical and applied statisticians (turned) away from graphic displays back to numbers and tables, with a rise of quantification that would supplant visualization. The statistical theory that had started with games of chance and the calculus of astronomical observations developed into the first ideas of statistical models, starting with correlation and regression, due to Galton, Pearson and others. By 1908, W. S. Gosset developed the t-test, and between 1918–1925, R. A. Fisher elaborated the ideas of ANOVA, experimental design, likelihood, sampling distributions and so forth. Numbers, parameter estimates—particularly those with standard errors—came to be viewed as precise. Pictures of data became considered—well, just pictures: pretty or evocative perhaps, but incapable of stating a “fact” to three or more decimals. At least it began to seem this way to many statisticians and practitioners. (Friendly 2008)

Despite some new developments that Friendly describes in his papers, it would take many decades, until the 1960’s and 1970’s, for graphics to have a prominent place in statistics again. Friendly plotted the number of visualization historical landmarks per year in a chart (Figure H12,) and the decline after the Golden Age is evident.

But what about newspapers and magazines? The beginning of the new century witnessed a new, entirely different golden era: the pictorial turn.

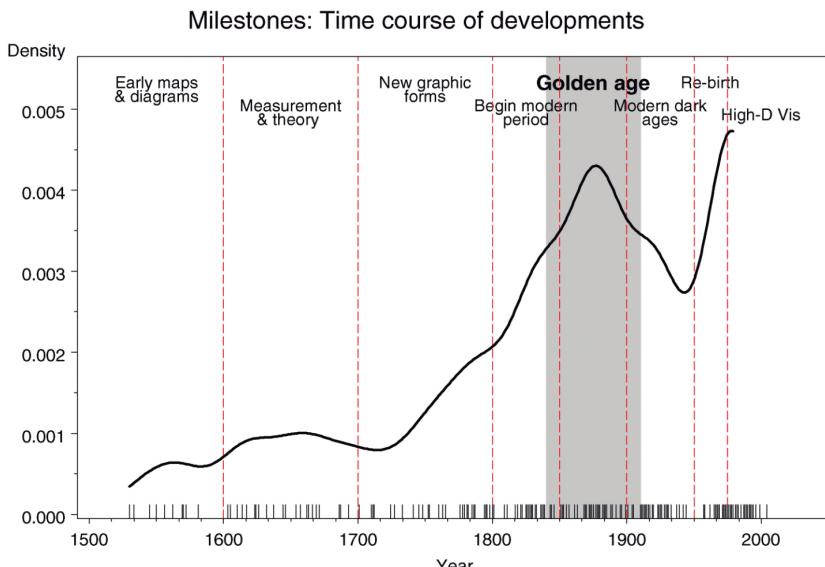


Figure H12

## THE PICTORIAL TURN

According to Barnhurst and Nerone, in the decades between the end of the 19th century and the appearance of *USA Today* in the early 1980s, news publications adopted the modernist design ideals of “readability, clarity, organization, order” (Ben Bradlee, from *The Washington Post*, quoted in Barnhurst and Nerone 2001: 190):

The long trajectory of the modern into the mainstream of newspapers thus gave birth to a peculiar and powerful hybrid modernism. It drew on early modern ideas about geometry, on the neoclassical rejection of decoration, and on late modern faith in science, but brought those notions into the mainstream. Newspapers became a prime site where visual art and popular forces met and made their peace, and news contributed to the fullness of modernism as it arrived in the twentieth century [...] During the century, the newspapers in the study shifted from the abundant complexity of the Victorian era to the fixed simplicity of modernism. They adopted all the specific forms commentators identified with the modern style: fewer columns, prominent illustrations, horizontal layout, and simplified headline typography. The front pages clearly became less dense and more orderly, as indicated by several measures (Barnhurst and Nerone, 2001: 192, 194).

This period also saw “the transition from vernacular to professional design, evident at most of the newspapers.” Regarding page structure and typography, then, publications became more geometric, rational, rigid, but the same cannot be said about news graphics, particularly charts and maps. These became more pictorial, incorporating features that blurred the (contemporary) line between illustration and news information graphics, in part because the same professionals produced both.

This trend had a precedent during the Yellow Press period, roughly in the 1880s and 1890s, and the confrontation between Joseph Pulitzer and William Randolph Hearst for the attention of large audiences. Pulitzer’s and Hearst’s newspapers used numerous illustrations to lure readers into sensational news. The rise of the Yellow Press was enabled by photoengraving technologies which, according to Monmonier (1989: 44) “made possible a publishing revolution marked by abundant graphics, sensational reporting, and highly competitive circulation-building.”

The sensational and the graphic went hand in hand. David R. Spencer’s book *The Yellow Journalism* (2007) describes an explanatory drawing published by Hearst’s the *New York Journal* to illustrate a story about the gruesome murder of a Turkish bath masseur called William Guldensuppe:

Page one carried a graphic drawing of the victim’s remains, showing in detail where the knife used to dismember the unfortunate Guldensuppe entered his body [...] Along with the sketch of the body, Hearst’s artists also drew pictures of the ropes used to tie the oilcloth together around the corpse. At the center of the visual treatment of the tale was a detailed sketch of the location where part of the discovery took place, at Cliff Avenue and 176th Street (Spencer 2007: 112)

Artists during the Yellow Press period took a lot of creative liberties, reproducing a preference for the sensational over the factual, as “most of Hearst’s Sunday papers, if not all his publications, were sources of pure entertainment, as opposed to fact-driven news reporting (Spencer 2007: 93). The most famous example of this behavior is the front page of the *New York Journal* from February 17, 1898 (Figure H13).

The pictorial scheme on it shows a Spanish mine floating right under the U.S. battleship Maine, which had sunk two days before in the bay of Havana, Cuba, killing more than 250 people. The ship had been sent to watch for U.S. interests in Cuba, which was suffering from riots for and against the Spanish colonial authorities. The cause of the explosion that led to the sinking remains unsolved to

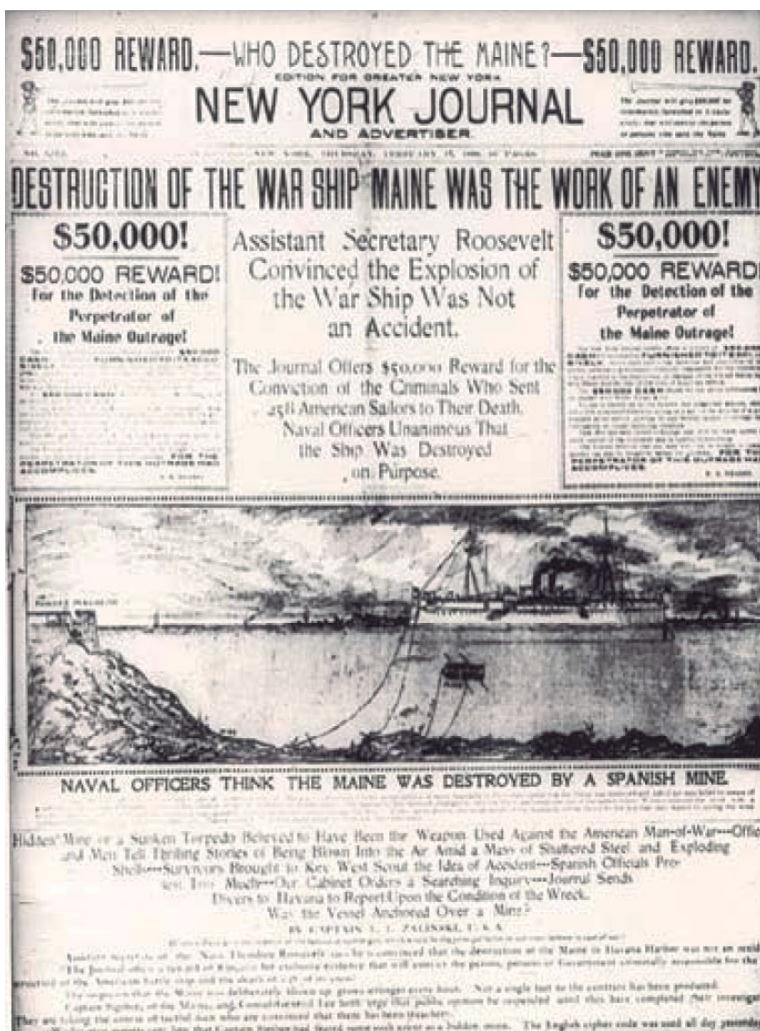


Figure H13

this day, but Hearst was eager to blame the Spanish government. “Destruction of the war ship Maine was the work of an enemy,” read the headline in the *New York Journal*.

Pulitzer was less of a fan of illustrations than Hearst. In the 1880s, Pulitzer ordered his newspapers to eliminate illustrations and focus on text instead. Circulation shrank rapidly and only increased again after pictures were brought back. As today, images were seen as a means of enhancing the informational power of stories, but also—and mainly—of attracting people’s attention to their content. The balance between these two goals is still a matter of heated conversations among news graphics professionals.

In the sciences and statistics, the beginning of the 20th century may have been a “dark age,” as Friendly wrote, but the space left by statisticians and natural scientists was occupied by other voices. The most prominent one is the triad formed by philosopher and sociologist Otto Neurath, mathematician Marie Reidemeister, and designer Gerd Arntz.

Otto Neurath helped found the Viennese Museum for Society and the Economy in 1924. According to Frank Hartmann (2005), the goal of the museum was to make “social and economic relations understandable, especially for the uneducated, its means was the visualization of social and economic relations. This “museum of the future” developed from a particular socialist concept of adult

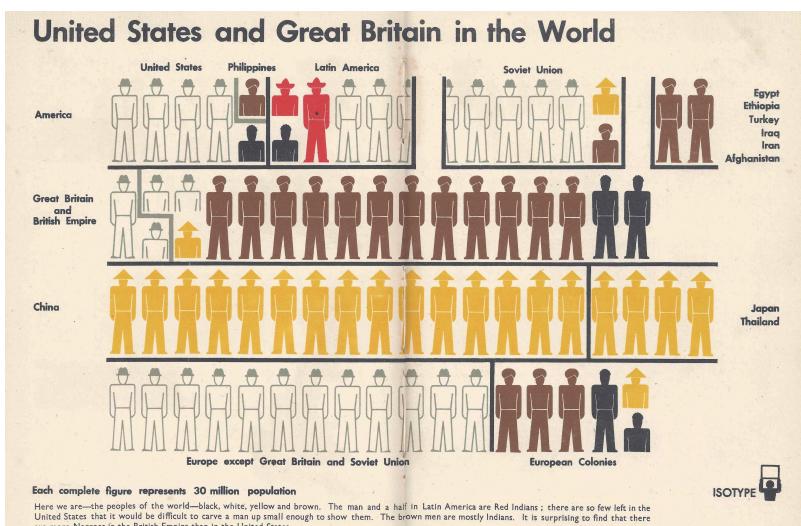


Figure H14

education: to enhance existing scientific arguments with an education through the eye."

Starting on 1927, Neurath and Arntz, and later Reidemeister, began developing a "universal visual language" to depict statistics and other information in a pictorial fashion. They called it ISOTYPE, which stands for "International System of Picture Education." The authors wrote {We have given it the name 'ISOTYPE.' [...] A Sign [...] makes us almost independent of the knowledge of the language, because of pictures, whose details are clear to everybody, are free from the limits of language: they are international. Words make a division; pictures make a connection." (Neurath, quoted by Vossoughian: 2011)

ISOTYPE data charts are usually unidimensional and quite simplistic (Figure H14) in comparison to the visualizations designed by statisticians and social scientists of the 19th century, but they are also very clear and elegant. Their impact on news graphics was significant. They were popularized by books like *Pictographs and Graphs: How to Make and Use Them* (Modley & Lowenstein, 1952). Modley was a disciple of Neurath's and authored numerous books full of charts and maps with pictorial elements.

Modern designers like Nigel Holmes cite ISOTYPE and its derivations as a key influence (Holmes 1984) or as a landmark in the history of the field (Sullivan 1987). Traces of ISOTYPE style can be seen in many publications of the early and



Figure H15

mid-20th century, such as *Fortune*, and they extend through *USA Today* until the present.

*Fortune* magazine has a special place in most chronicles of news infographics, and for good reason. It was founded in 1929 and from the very beginning it published lush illustrations, diagrams, maps, and charts of different kinds. An informal overview of just 12 issues I own reveals numerous ISOTYPE-like charts (Figure H15), data maps with plenty of pictorial elements and rich in textual annotations (Figure H16), ranked data tables (Figure H17), sophisticated traditional statistical graphs (Figure H18), and cutaway drawings (Figure H19). But *Fortune* wasn't alone. Many other magazines that gained popularity up to the first half of the century, like *National Geographic*, *Newsweek*, and *Time*, also published all kinds of news graphics.

In the world of newspapers, Monmonier (1989: 54-56) points out that news graphics, and maps in particular, were not common until the beginning of the 20th century but increased in popularity in the years leading to World War II, and between 1950 and 1960, "reflecting an expansion of feature stories and an improved coverage of national and local events."

Monmonier also sees a relationship between the rise of television as a mass medium, in the 50s, and the acceleration of technological innovation. The time devoted by citizens to read newspaper decreased as the amount of television sets increased, so newspapers reacted by adopting new technologies that enhanced their appearance and made production quicker.

According to Monmonier, "the most fundamental change in newspaper production was the replacement of manually-operated line-casting with computer-generated cold type, [or photo composition.] For maps and other artwork, the principal benefit of photo composition was a shift from page make-up with Linotype relief type and photo engraved blocks, to stick-up mechanicals, produced on layout boards with a knife, paste, and positive paper-copy images of computer-generated type and process-camera artwork." The new technology made integrating text and visuals easier and much more flexible. By the mid-80s, newspapers like the *New York Times*, *The Wall Street Journal*, and the *Christian Science Monitor* were publishing maps at a high rate, sometimes as many as four or five per issue.

## USA TODAY IS BORN

Popular accounts of the history of news graphics and design consider the launch of *USA Today* in 1982 as a major landmark. Mario Garcia, a famous design con-

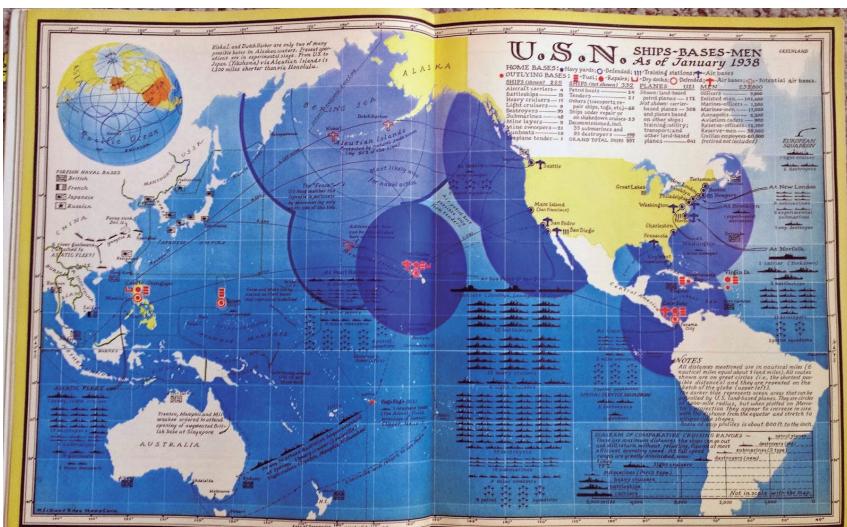


Figure H16

Career of a Hypothetical Naval Officer						
RANK	NUMBER OF BATTLES IN WHICH ADVANCE	AT SEA	SHORE DUTY	AVERAGE PAY PLUS ALLOWANCES	MATERIAL RETIREMENT PAY	SOURCE OF PAY
42			GENERAL BOARD	\$ 9,700	\$ 6,000	REGULAR PAY
41						
40 — REAR-ADmiral	10	COMMAND OF BATTLE-SHIPS, BATTLE FORCE				
39	(2.4%)					
38 (—Major)			ASSISTANT CHIEF OF NAVAL OPERATIONS	\$ 7,500		
37 (—General)						
36		COMMAND OF DESTROYERS, SCOUTING FORCE				
35						
34			INSTRUCTOR NAVAL WAR COLLEGE			
33			ADVANCED COURSE, N.W.C.	\$ 7,200	\$ 4,500	
32 — CAPTAIN	40	COMMAND OF BATTLE-SHIP OR CRUISER				
31 (—Colonel)	(0.5%)					
30			WASHINGTON BUREAU OF ORDNANCE			
29						
28			NAVAL WAR COLLEGE			
27			NAVAL GUN FACTORY, WASHINGTON			
26 — COMMANDER	80	EXECUTIVE OFFICER, BATTLESHIP		\$ 6,947	\$ 3,552	REGULAR PAY
25 (—Lieut., Colonel)	(19%)					
24			NAVY YARD, BREMERTON, ORDNANCE-INDUST. DEPT.			
23						
22						
21						
20 LIEUTENANT-COMMANDER	150	COMMAND OF DESTROYER, ASIATIC FLEET		\$ 5,682	\$ 2,126	REGULAR PAY
19 (—Major)	(36%)					
18						
17						
16						
15						
14						
13 LIEUTENANT	300	COMMANDER OF DESTROYER-SQUADRON				
12 (—Captain)	(71%)	COMMANDER	WASHINGTON BUREAU OF ORDNANCE	\$ 4,173	\$ 2,047	REGULAR PAY
11						
10						
9						
8						
7 LIEUTENANT	400	CRUISER (Gunnery Dept.)	POST-GRADUATE SCHOOL, ANNAPOLIS	\$ 2,584	\$ 1,008	REGULAR PAY
6 J.G. (97%)		Gets Married				
5 (1st Lieut.)		DESTROYER				
4						
3 ENSIGN	420	BATTLESHIP	(Age 22 yrs.)	\$ 1,719		REGULAR PAY
2 (2nd Lieut.) (100%)						
1						
0						
NAVAL ACADEMY GRADUATION—Supposed Class of 420.						
YEARS IN SERVICE	1 ASSUMES CONSTANT NUMBER IN EACH GRADE, ACTUALLY SOME RESIGN, DIE, RETIRE FOR DISABILITY.					
	2 ASSUMES MARRIAGE, SINGLE OFFICERS, DEPENDING ON RANK, GET \$900 TO \$1,000 LESS.					
	3 ASSUMES RETIREMENT FOR FAILING OF PROMOTION (EXCEPT REAR ADMIRAL BEACHING AGE LIMIT).					

Figure H17

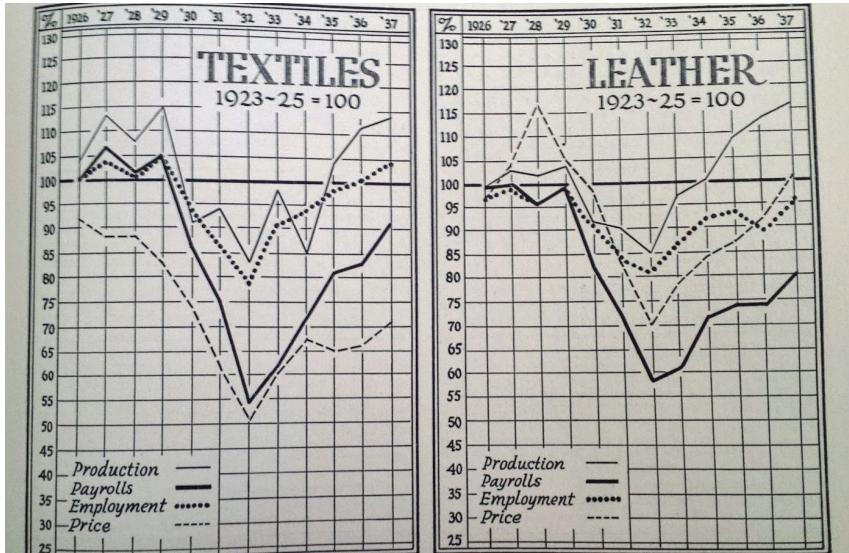


Figure H18



Figure H19

sultant, wrote that “*USA Today* has inspired a generation of journalists and designers globally with its color, use of graphics and short stories.” (Garcia 2012). The myth surrounding this newspaper has been strengthened by popular accounts of its origins (Prichard 1987), which justly highlight some of *USA Today* features, like its weather map, authored by designer George Rorick (Figure H20), as revolutionary.

According to the most common narrative, *USA Today* sent shock waves across the news industry because of its design, its focus on short features and visual elements to supplement them, its use of computers on every step of the production process, its reliance on abundant and colorful graphics, etc.

Historians of design have challenged this narrative (Barnhurst and Nerone 2001,) saying that *USA Today* was the result of stylistic trends with origins going back to the beginning of the 20th century, but the truth is that this newspaper did have a significant impact on news graphics.

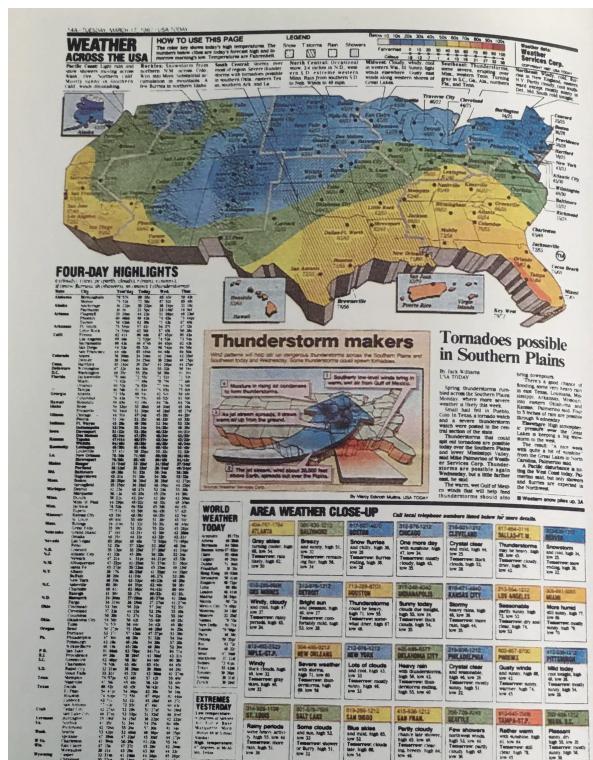


Figure H20

First, because its success helped expand the use of informational graphics in print publications; second because it tilted the stylistic balance even further toward the pictorial and the lighthearted, and away from the abstract. Charts and maps—and infographics, which also had a large presence in the paper—needed to first and foremost attract the attention of the reader, and then present the information in a clear and concise manner, following the philosophy advocated by *USA Today's* founder, Al Neuharth (Prichard 1987: 7).

Some top designers at the newspaper were vocal about their understanding of news graphics as a journalistic endeavor, rather than just an artistic one, though. García (2012) quotes George Rorick, the creator of the famous weather map, who worked for many other publications both before and after his tenure at *USA Today*:

Rorick believes in “good visual journalism, not just decorative images.” He wanted graphics that told stories; that explained things. He took that philosophy to the Detroit News. “George showed me that being a graphic artist at a newspaper didn’t mean cranking out locator maps. His ambition was to create a journalistically driven art department, something that was not really done at the time,” says Jeff Goert-



Figure H21

zen, a senior artist at the St. Petersburg Times who worked with Rorick in Detroit and calls that time “the defining moment of my career.” “We were renegades, graphic renegades. He paved the way for what graphics are today.” Rorick taught his staff the importance of getting information firsthand. Goertzen recalls once getting a 2 a.m. wake-up call so he could go to the scene of a hostage crisis. “We were being treated like photographers would with a breaking story,” he says.

What was possibly true of illustration-based visual explanations wasn’t so for charts and maps. At *USA Today* these were heavy on decoration beginning with the early prototypes, as it’s possible to see on Figure H21, including a map with perspective and depth effects. Maps were covered with thick arrows that cast deep shadows; bars in bar charts were regularly transformed into other objects such as pencils, needles, dollar bills, and even human teeth; 3D, heavily distorted pie charts were shaped as dishes, pizzas, and hamburgers. Most of the space in many charts was devoted to pictorial ornaments; *USA Today* charts (Figure H22 presented very few data points in relation to the page-area that was assigned to

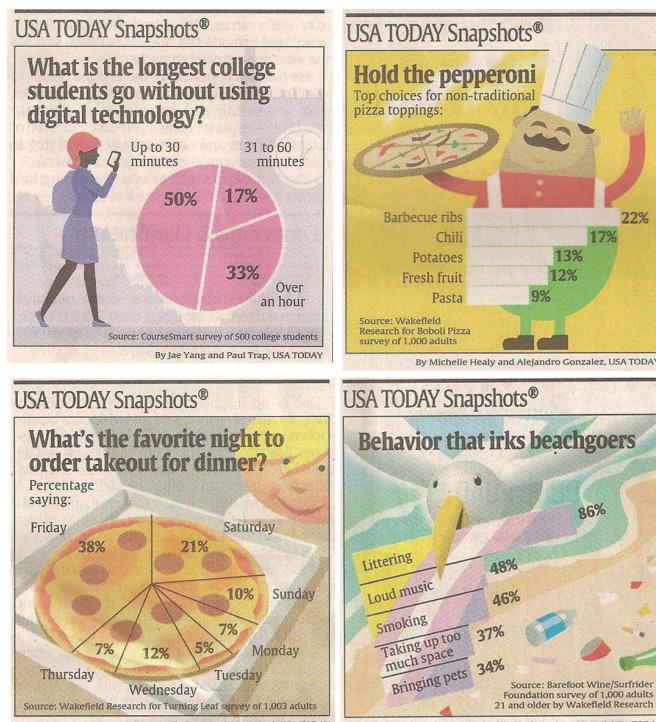


Figure H22

them. They were treated more as illustrations than as visual displays of data.

The Snapshot, a small regular graphics feature on page 1, consisted most of the time of a combination of statistical information with different kinds of pictorial, decorative elements. This style caught on. *USA Today* charts and weather map were imitated by many news publications (Prichard 1987: 231). James W. Tankard (1986) showcased examples of *USA Today*-like charts in other newspapers, like the Austin American-Statesman, and quotes Jan W. White 1984 book *Using Charts and Graphs*: “Charts have catapulted from the stock market pages into every section of today’s newspapers.”

Therefore, it is likely that *USA Today* opened the eyes of editors at other publications. The Society for Newspaper Design (today called Society for News Design) conducted a survey in 1984. 60% of 156 newspapers reported an increased use of news graphics, and an additional 22% said that they had just incorporated them into their pages (Mentioned in Lott 1994).

In a column for *Editor & Publisher* in July 1984, Howard Feinberg, who had been the editor for photo and graphics at the *Chicago Tribune*, said that “Most newspaper editors were not aware of the potential of informational graphics until they were used extensively in *USA Today*.” These opinions need to be qualified: As Monmonier (1989) has proven, information graphics in the forms of charts and maps were relatively common in print news publications before *USA Today*. What *USA Today* did, though, was to show the power of highly spectacular, and often large color graphics.

*USA Today*’s influence, however, took a bit to catch on. A survey of 30 newspapers by Edward J. Smith and Donnah J. Hajash (1988) discovered that none of them published nearly the same amount of graphics as *USA Today* did. Besides, the authors argued that the fact “that so few of the informational graphics employed color or were embellished suggests that they are not viewed as creative focal points but rather as basic communication tools.”

Key for a discussion about professional roles is that the same people who designed illustrations and pictorial visual explanations also created statistical charts and data maps. Here’s Tankard: “People drawing statistical graphs for newspapers have their training in graphic design rather than statistics.” Utt & Pasternack (1993) agreed:

Accompanying the proliferation of graphics, a new generation of artistically trained and oriented journalists has become an important part of newsrooms. In the 1990s, job opportunities for those with an art background may far exceed those for writers at newspapers. Even today, the industry demands journalists who are educated and

proficient in graphic design, though editors on the news side still call many of the shots on major graphics-related decisions. Graphics managers typically report to the managing editor, and many were previously employed in the photo department, reflected in the fact that three in four say that they learned their graphics duties on the job.

This subordination to word-centric editors was generalized in the 80s and 90s. Robert D. Hilliard (1989) wrote: “While the organizational charts of many of these newspapers place the graphics director/editor among the senior news executives, including several with titles of assistant or even associate managing editor, in reality at a number of these publications the graphics role still might be considered a service function or area and does not carry authority equal to the implied title. It appears that while the graphics potential has won acceptance as a news vehicle, some reservation may remain about the news judgment of the graphics director/editor as an arbiter of news values.”

This is one of the most significant differences with the present that the interviewees in following chapters highlight. Information graphics in many news publications in the 80s and 90s fell under the umbrella of “art,” “design,” or “visual” departments, rather than being considered part of the reporting side of the newsroom. A look at the curriculum vitae of people with long careers, such as Jeff Goertzen, John Grimwade (interviewed for this study) and Nigel Holmes himself reveals titles such as “staff artist,” “senior artist,” and “art director.”

In the 80s, visualization historian Edward Tufte explained: “Nearly all those who produce graphics for mass publication are trained exclusively in the fine arts and have had little experience with the analysis of data [...] Illustrators too often see their work as a exclusively artistic enterprise —the words “creative,” “concept,” and “style” combine regularly in all possible permutations, a Big Think jargon for the small task of constructing a time-series a few data points long. Those who get ahead are those who beautify data, never mind statistical integrity.” (Tufte 1983: 79).

This is a pattern that has changed in the U.S., but that remains prevalent in other areas of the world (Cairo 2012: 26). There were voices who were ahead of their time, though. Discussing the role of graphics creators in the newsroom, Peter Sullivan (1987) wrote:

The journalist’s role is clearly defined and thus generally understood, but this is not so for graphics specialists. Titles can influence the behavior of the holder—and the way they are seen by those with whom they work. On a newspaper, it is a misnomer to call a person who creates graphics an “artist.” An artist is concerned only with

making a personal statement; working to a set brief, with all its constraints, is alien to his nature. On some newspapers, the title “designer” is used to describe people who make graphics. This is equally misleading. Graphic designers select and determine the form of final artwork from elements produced by others [...] A new title is needed for such a person. The word “graphics” is generally accepted as describing the various forms of an image that combine words and drawn forms. The title “journalist” covers most people who work in the editorial sections of newspapers. The combination of “graphics” and “journalist” covers most people who work in the editorial sections of newspapers (Sullivan 1987: 27).

The dominance of artists and designers at this early stages of news graphics as an increasingly established professional field is something confirmed by several of the people we interviewed, and by the literature published at the time. A survey cited by Hilliard (1989) revealed that “most people working as graphic artists in newsrooms still come with commercial art backgrounds.” The style of all kinds of graphics reflected this dominance. On the one hand, data charts and

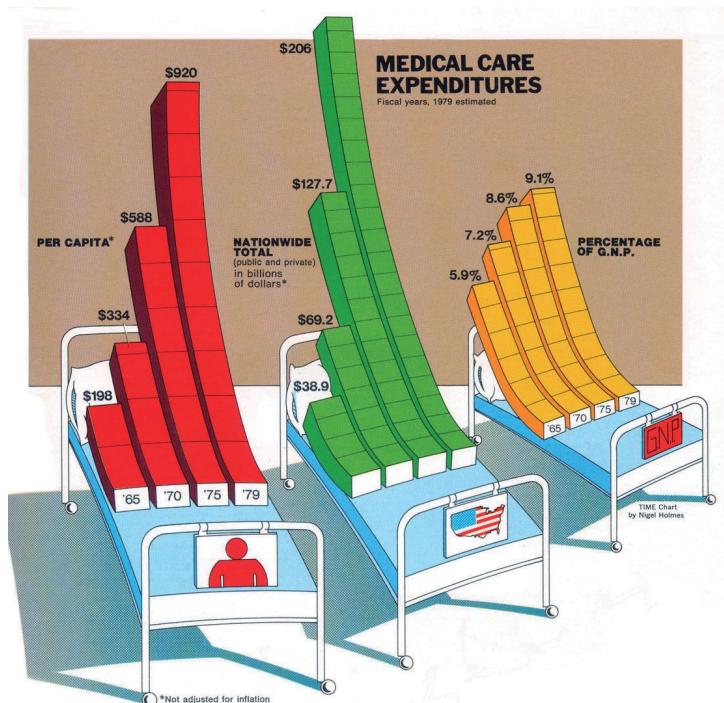


Figure H23

maps tended to be small and lack information density, presenting usually just a few numbers.

On the other hand, news designers' preferences focused on large illustration-centric feature graphics, rather than on the creation of data displays. This is a trend that continued until the early 2000s: Pictorial representations, as we'll see in the analysis of the Malofiej infographics, were the most common kind of dominant element in news infographics in the 90s, with data charts and maps relegated to a secondary role until the late 2000s.

Nigel Holmes (Figure H23), a British designer who worked for *Time* magazine between 1978 and 1994 (he became graphics director in 1988) reflected on the importance of pictorial charts and maps in books published in the 80s, and summarized the geist of the era like this:

As long as the artist understands that the primary function is to convey statistics and respect that duty, then you can have fun (or be serious) with the image: that is, the form in which those statistics appear. "Boredom is as much a threat in visual design as it is elsewhere in art and communication. The mind and eye demand stimulation and surprise." This statement from *A Primer in Visual Literacy* by Donis A. Dondis sums up the point. While some charts that appear daily in newspapers should be very straightforward and simple —precisely because they appear every day— most of the rest can do with some help (Holmes 1984: 72)

Other books about graphics published at the time emphasized the expressive over the functional. Jan V. White (1984: 23) suggested to enliven bar charts like this: "To make dry statistics more evocative of their subject, it is often wiser to concentrate the illustrative effort on the background against which the bars are to be seen rather than on the bars themselves," but then he added that "transforming the bars into pictorially descriptive symbols such as chimneys or stacks or coins, or rows of people is, clearly, also acceptable [...] The material of which they are made can be manipulated as the situation demands. For instance, if the bars are too long to fit into a given space, why not fold them back? You can break them, roll them back and even squash them."

White also suggested transforming pie charts into ellipses "to improve the visual liveliness of statistics, (Figure H24), transforming maps into 3D shapes, and adding perspective effects to charts to make them "visually interesting." Modern visualization researchers and experts have pointed out that distorting graphs, maps, and pie charts this way may make them less readable and effective (Skau and Kosara 2016 is a good summary of the literature about pie charts, for instance.)

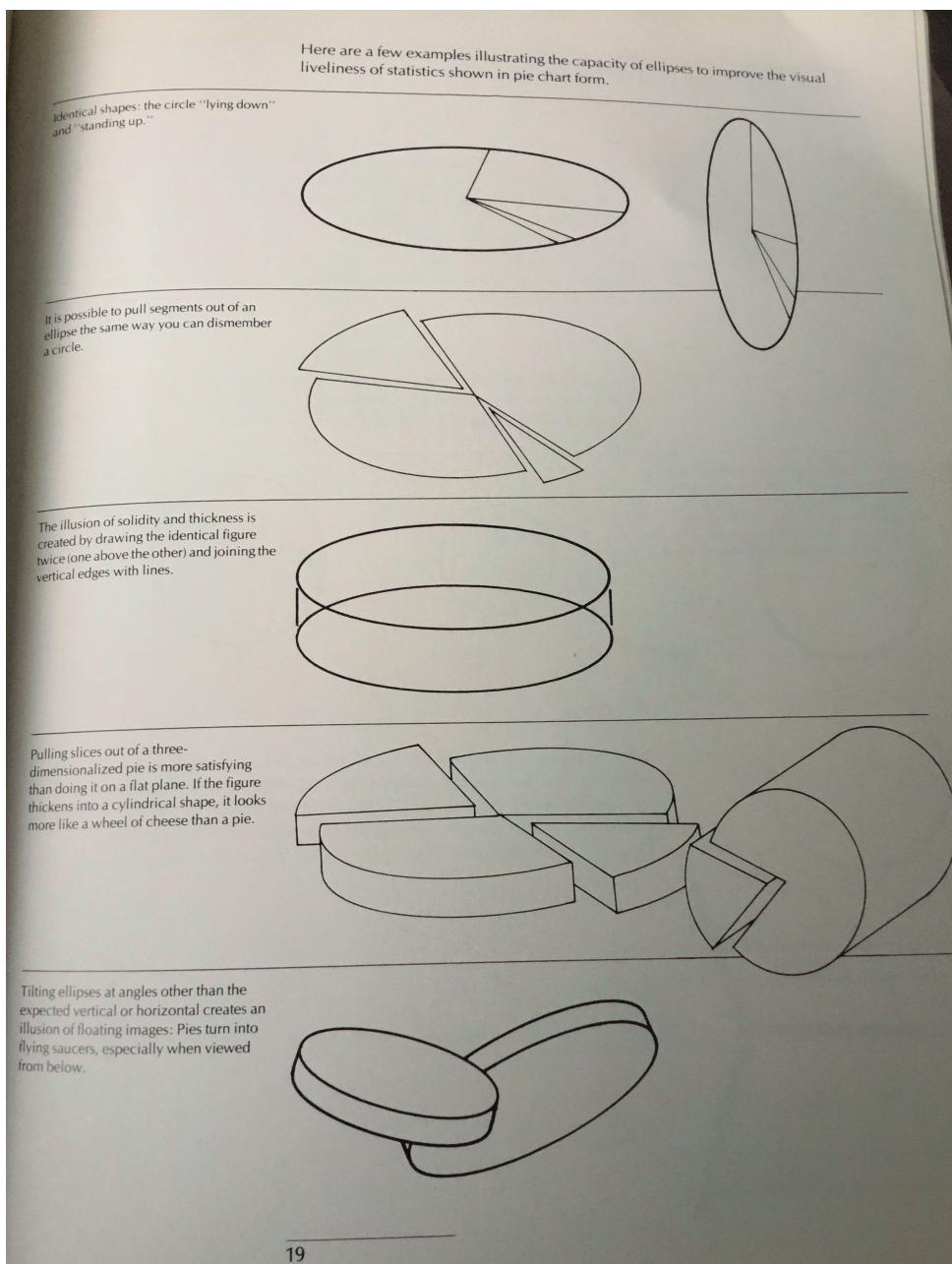
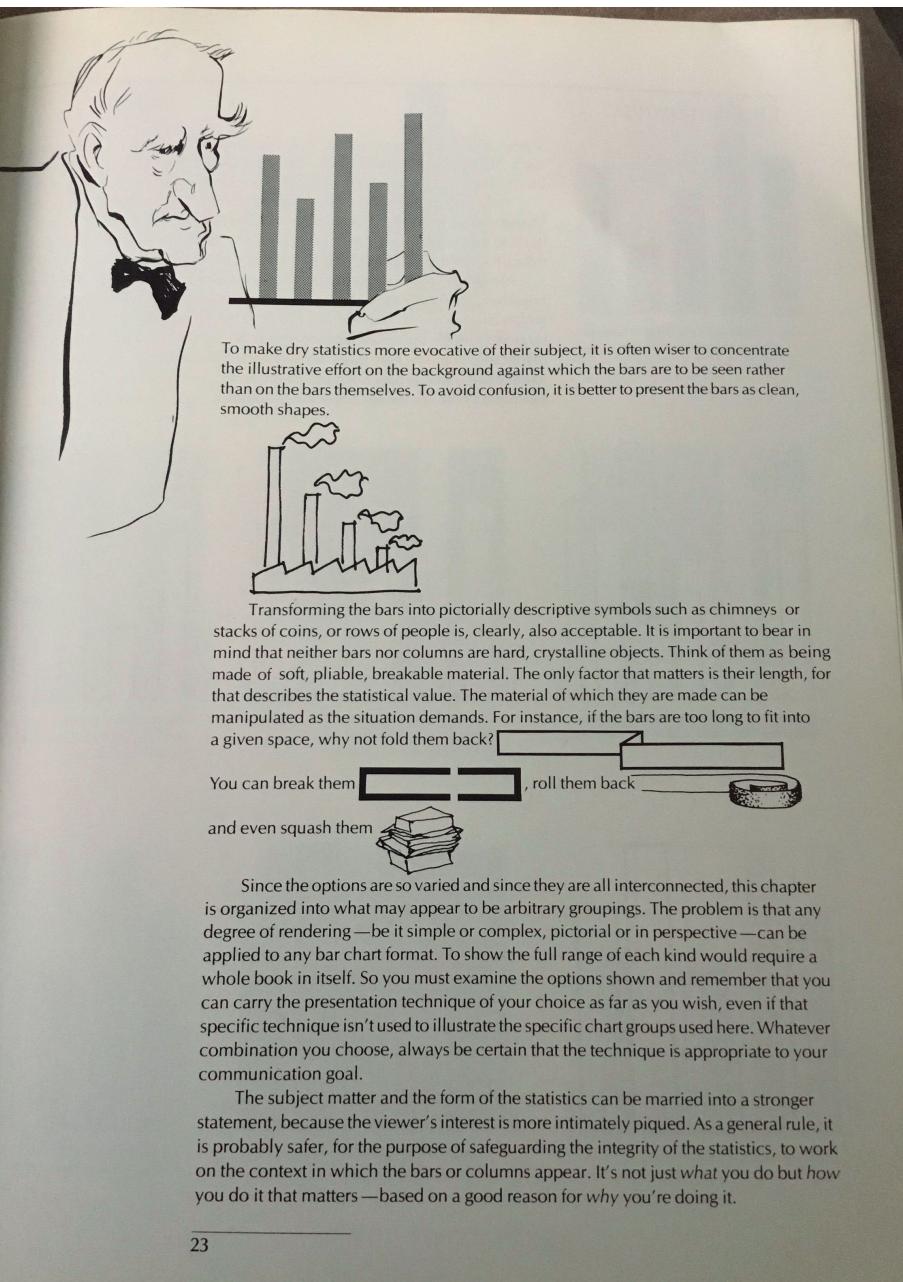
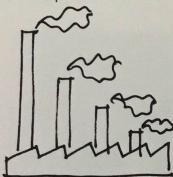


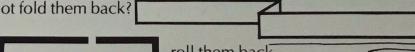
Figure H24



To make dry statistics more evocative of their subject, it is often wiser to concentrate the illustrative effort on the background against which the bars are to be seen rather than on the bars themselves. To avoid confusion, it is better to present the bars as clean, smooth shapes.



Transforming the bars into pictorially descriptive symbols such as chimneys or stacks of coins, or rows of people is, clearly, also acceptable. It is important to bear in mind that neither bars nor columns are hard, crystalline objects. Think of them as being made of soft, pliable, breakable material. The only factor that matters is their length, for that describes the statistical value. The material of which they are made can be manipulated as the situation demands. For instance, if the bars are too long to fit into a given space, why not fold them back?

You can break them  , roll them back 

and even squash them 

Since the options are so varied and since they are all interconnected, this chapter is organized into what may appear to be arbitrary groupings. The problem is that any degree of rendering —be it simple or complex, pictorial or in perspective—can be applied to any bar chart format. To show the full range of each kind would require a whole book in itself. So you must examine the options shown and remember that you can carry the presentation technique of your choice as far as you wish, even if that specific technique isn't used to illustrate the specific chart groups used here. Whatever combination you choose, always be certain that the technique is appropriate to your communication goal.

The subject matter and the form of the statistics can be married into a stronger statement, because the viewer's interest is more intimately piqued. As a general rule, it is probably safer, for the purpose of safeguarding the integrity of the statistics, to work on the context in which the bars or columns appear. It's not just what you do but *how* you do it that matters —based on a good reason for *why* you're doing it.

News designers who gained prominence in the 80s, like Holmes, Sullivan, Rorick, and Goertzen highlighted the ideal balance between making data charts and maps reliable, informative and attractive but, according to an analysis made by Emily Arnette Vines (1998), news graphics at *USA Today*, in particular, its daily Snapshots, were not subject to the same strict journalistic standards of accuracy that written pieces were required to respect.

Vines' quantitative methodology has its limits, but her qualitative analysis found several instances of charts produced without proper care for the quality of the data. When discussing her results, she pointed out possible causes. One of them was that "Snapshot producers are not trained journalists," adding that, at least in the cases included in her study, sources were rarely contacted by graphics journalists, who limited themselves to pull data from Internet sources and present it in a clear way in their charts and maps.

Other news organizations took a different path beginning in the 80s. In an interview for this project, Steve Duenes, graphics director at the *New York Times* since 2004, explained that three decades ago "there was a decision to put reporters in the graphics department [...] That was sort of rooted in the culture of the *New York Times*, which is really centered on original reporting [...] There was a recognition that in order to make compelling information graphics, even it's just for printed newspapers, you needed someone who is focused on reporting information, specifically for those story forms." That decision explains the "professionally diverse staff that we have now."

In visits to newspapers in the mid-80s, Monmonier (1989: 139) observed that news graphics work was done by art departments in many places, but others, like *The Washington Post* and the *Chicago Tribune*, had begun separating both tasks, and creating specialized positions and desks:

Because of a skilled artist might not be as adept as a graphically aware journalist in recognizing the need for graphics [...] some newspapers have hired a graphics editor or graphics coordinator to improve communications between artists and writers and to make the paper's information graphics more relevant to its text. An important distinction between the art director and the graphics editor or coordinator is that the latter need not have the artist's technical skill [...] The graphics editor is more likely to have a background in journalism than in art. Equally important is the emphasis placed on the job's title and duties on the coordination of art and words, with the emphasis on information graphics rather than decorative illustration.

Other professionals interviewed for this study agreed that decisions like this, made decades ago, shaped their culture in the long term. The 80s and 90s defined in the world of news graphics a divide between cultures that generally privileged form over content (without denying the importance of content,) and those that strived to do the opposite.

It's crucial to clarify that there is nothing right or wrong in either culture. Journalism has always been as much about presenting reliable information as it has been about doing it in a compelling, attractive, and engaging manner, although journalism codes of conduct give much more weight to the former than to the latter (Society for Professional Journalists 2014). In a book about the values of journalism, Kovach and Rosenstiel (2007) wrote that "journalism first obligation is to the truth" and that it "is a discipline of verification," but then they added that "it must strive to keep the significant interesting and relevant."

## THE FIRST COMPUTER AGE IN GRAPHICS

Newspapers graphics desks widely adopted computers towards the end of the 1980s. Here's USA Today's George Rorick in an interview with Mario Gar-

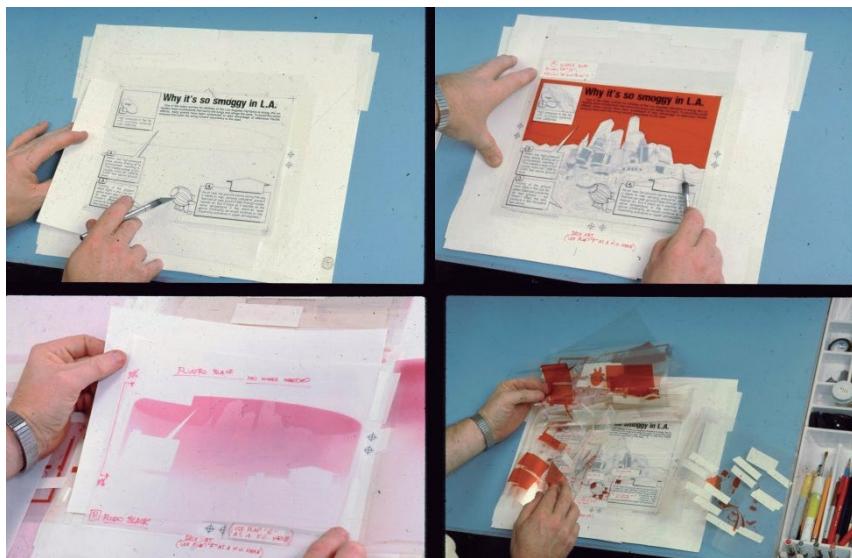


Figure H25

cia (2012), describing the graphic on Figure H25, which he designed without a computer:

This a typical example of a daily assignment. Assignment in at 11 AM and to production at 6 PM. There was no leniency for a late graphic. The process was cut/paste and then cut flaps for the color separations. In those days, before the computer, we had to cut flaps to add color to the drawings. I didn't especially like the effect, so I added more flaps. The purpose was to soften the hard flat color and create graduated color effects. In other words, I wanted to create the effect of reflective color. Some of the flaps were intended to serve as color separations, some were knock-outs, some were masks. In other words, there was a lot of flaps on a graphic. The other reason for doing this was to save production time. Yes, it saved time because I could do all the flaps in red, including the airbrushed flaps. I presented all colors in red with instructions to the color strippers as to what the color should be stripped in at. I wanted to create the effect of reflective color in my graphics. This process enabled the camera crew to shoot everything in black and white. Each flap. They loved the challenge, and I got the color effect I wanted. Then the Mac came along and changed things making it much easier to do professional graphics. Thank you, Steve Jobs!

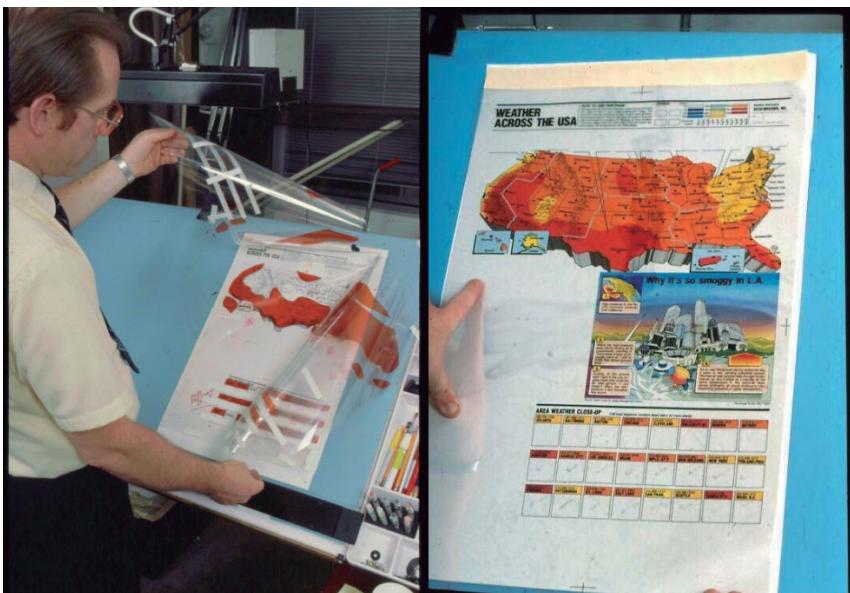


Figure H26

Figure H26 shows Rorick while putting together *USA Today's* weather map. The layering process he demonstrates was later mimicked by computer software applications like Adobe Illustrator, used in newsrooms to this day. According to John Grimwade during an interview for this dissertation, the fact that computers prolonged the way graphics had been designed up to that point —besides making the process faster and more efficient— was critical for their adoption:

It was massive change [...] They were the same people, but they were having to make the change from pens and pencils and paper to the computer. It was a huge change. Yeah, really a massive change, and people who go through that era, I think they have a different perspective, even now, of a computer. Because, for instance, even now, layers in Adobe Illustrator. Well, we worked in layers of overlays. They were the layers. So, to us, the computer layers were just an expression of real layers of artwork, and I think we always slightly think of them like that in the back of our minds, which helps us understand layers because layers were layers. That's sort of where that concept, obviously, comes from.

Grimwade adds that the quality of the graphics suffered for a while:

It wasn't so much new people came in, but all the people in the business had to rapidly educate themselves on the computer, and we sort of saw a dramatic drop in quality. There's no question about it. We went from some very nice illustrated graphics to some very poor computer-generated graphics, but that was the limitations of the technology, and it took about at least five years, maybe more, before we started to see the computer graphics start to rise up in quality.

Computers had been in used in newsrooms at least since 1952. That year, CBS predicted presidential election results base on early returns with a Remington Rand UNIVAC computer (Cox, 2000). Computers were then adopted by newspapers to aid in accounting, circulation, and production. They were not adopted by newsrooms until the late 60s and early 70s, which are the decades when the discipline known as Computer Assisted Reporting (CAR) was born.

The computer revolution in news graphics took a bit longer to happen, although there were graphics-drawing technical tools in the market already. The first graphics design tool, Sketchpad, was created by Ivan Sutherland in 1962 (Manovich 2013: 86.)

According to Monmonier (1989: 148), newspapers were wary about investing in software for visual design because of some early failed attempts: "*The New York Times*, for instance, acquired the SAS/GRAFH software, for making maps

and charts on its mainframe computer, as well as IBM's Interactive Chart Utility system," but the graphics generated by those tools couldn't be used directly, they needed to first be redrawn by designers. Cost and the difficulty of learning these tools probably played a role, as well.

Also, early pagination systems provided little software support for cartography and statistical graphics." The result was that computers were used to run analyses since the middle of the 20th century, but not so much to create the possible visual displays those analyses could yield.

Some exceptions could be found here and there. For instance, Monmonier wrote about Dick Furner, a cartographer and art director at *The Washington Post*. Furner, who had familiarity with the mathematics of maps projections and had experience with computers thanks to previous work at the *National Geographic Society*, created a map-making tool called *Azimuth* between 1979 and 1985. Initiatives like Furner's were rare at the time, though. They required advanced technical expertise, and they were time-consuming to produce, expensive, and didn't scale well, if at all. Most designers couldn't be tool-creators. They needed to be tool-users.

The situation in most newsrooms changed rapidly with the introduction of the Apple Macintosh computer (1984), the creation of the PostScript programming language for vector graphics (1985), and the launch of visual design software tools, from MacDraw (which was included in the Macintosh) to Adobe Illustrator (1987), Aldus Freehand (1988), or Adobe Photoshop (1989). These innovations, which fed into each other, launched the desktop publishing revolution (Pfiffner 2003). In comparison to the cost of technical drawing tools available before the mid-80s, these new tools were very affordable. The first version of Illustrator cost \$495.

News designers who were active at the time credit the Macintosh as the key to this revolution, and like to talk about how quickly it was embraced by themselves and their peers. A factor that may have contributed to the fast adoption of the Macintosh by designers was that it was a computer done by designers for designers. Its interface was graphical. Users could make the machine work without being forced to write complex commands. Also, Pfiffner explains that the founders of Adobe (John Warnock and Charles Geschke) and Apple (Steve Jobs) "shared a deep and abiding belief that technology could transcend ordinary computing to achieve a higher aesthetic purpose." Finally, the Macintosh was adopted because drawing tools like Adobe Illustrator were not available for other kinds of personal computers until the end of the decade.

The critical piece of the desktop revolution, though, was PostScript. This language, created by Adobe Systems, allowed personal computers to communicate

with printers without the need of any other driver. PostScript was designed to work with the new generation of laser printers whose most famous exponent is Apple's 1985 LaserWriter, but it was a truly device-agnostic. Once a file was created in a computer, it would appear the same when printed on any machine. Also, PostScript "could describe both text and graphics on one page, thus eliminating the need to literally cut and paste words and pictures onto paperboard" (Pfiffner 2003: 23).

Thanks to the combination of PostScript and the new laser printers with novel layout programs like Aldus PageMaker, designers could finally blend words and pictures on screen, and then see them printed. Before these innovations, text and graphics could only be blended manually and mechanically, after they had been printed separately.

PostScript led to programs like Adobe Illustrator —to this day one of the main news design tools— and Aldus Freehand. The reason is that the new language was based on describing font shapes as vectors. Computers can handle images in two different ways, as raster files or as vector files. A raster file describes images as a grid of small squares of varying color and shading, like tiles on a mosaic. A vector file describes images as geometric shapes, based on points with certain coordinates and the straight lines or curves that connect them.

A raster image isn't scalable: If a designer increases its size and then prints it out, the resulting image will look jagged, pixelated. A vector image, on the other hand, will look as crisp as the printer quality enables, regardless of how much it has been scaled or distorted because its shape is mathematically recalculated by the computer every single time it changes.

The first vector-based illustration program was Adobe Illustrator (1987) which was quickly followed by Aldus Freehand (1988). Originally, Illustrator could only create black and white illustrations, but it already incorporated tools that are familiar to any news designer today, like the pen tool which, with some practice, enabled any artist to "draw with code" without having to write code at all (Pfiffner 2003: 80.)

This is another reason why these new technologies were adopted by news designers used to draw graphics with pencil and paper: the way the software tools operated looked familiar. There were objects that, using a mouse, the designer could grab, move, magnify or shrink, layer, cut and paste, etc. These were all operations that simulated and mimicked the behavior of objects in the physical world. This is what John Grimwade describes in the quotes mentioned before.

A comparison between pre- and post-computer news graphics reveals that visual design software in newsrooms at the end of the 1980s made production faster, more copious and more efficient, besides making it easy to reuse objects.

However, it didn't affect style in a significant way. Publications that were adding special effects such as pictorial decoration, perspective, shadows, and relief to their charts and maps continued doing so; those that had adopted a more restrained style kept it, too.

## THE BACKLASH AGAINST “CHARTOONS”

In 1962, John W. Tukey published a paper titled “The Future of Data Analysis” which, according to Michael Friendly (2006) marked a rebirth of data visualization in statistics. Friendly explains that Tukey devised “a wide variety of new, simple, and effective graphic displays, under the rubric of “Exploratory Data Analysis” (EDA)— stem-leaf plots, boxplots, hanging rootograms, two-way table displays, and so forth, many of which entered the statistical vocabulary and software implementation.”

Tukey launched his landmark *Exploratory Data Analysis* book in 1977, ten years after Jacques Bertin had published his *Sémiologie Graphique* (1967), to this day considered a masterpiece of visualization scholarship. These books “began to make graphical data analysis both interesting and respectable again,” according to Friendly. Increasingly powerful computers and specialized software played a critical role, as they did in the world of news.

Tukey’s and Bertin’s treatises were highly technical, so they were unlikely to be read by journalists and news designers. Something similar could be said of William Cleveland’s 1985 *The Elements of Graphing Data*, written mainly for specialists. It was a series of books published in this decade that was widely read by statisticians and non-scientists alike: *The Visual Display of Quantitative Information* (1983) and, even more so, *Envisioning Information* (1990) by Yale statistics professor Edward Tufte.

In both books, Tufte promoted an extreme minimalistic style of data graph, chart, and map design. He is an advocate for removing all kinds of extraneous elements that might interfere with the data; he coined the term “chartjunk” to refer to those elements, and the term “chartoon” for graphics in which they are prominent. He proposed a “data-ink ratio” principle whereby the amount of ink devoted to present “data-information” should be maximized, to “draw the viewer’s attention to the sense and substance of the data, not to something else” (Tufte 1983: 91).

In his first book, Tufte clarified that decoration and ornament were not necessarily bad, but they could be badly misused:

Sometimes decoration can help editorialize about the substance of the graphic. But it is wrong to distort the data measures —the ink locating values of numbers— in order to make an editorial comment or fit a decorative scheme. (Tufte 1983: 59).

Tufte illustrated this point with plenty of examples of dubious pictorial charts coming mainly from the news media: *Time* magazine, *The Washington Post*, The Economist, *The New York Times*, *Business Week*, *Los Angeles Times*, etc. Echoing E. B. White's and William Strunk Jr.'s popular *The Elements of Style* (1920), Tufte added: "Just as a good editor of prose ruthlessly prunes out unnecessary words, so a designer of statistical graphics should prune out ink that fails to present fresh data-information."

When Tufte's first book came out, *Time* magazine's Nigel Holmes was finishing his 1984 *Designer's Guide to Creating Charts & Diagrams*. The lines below were written before Holmes read Tufte, even if they sound like the opposite was the case:

If you belong to the school of people who believe that charts should only present statistics in the most straightforward, plain way, with no other visual

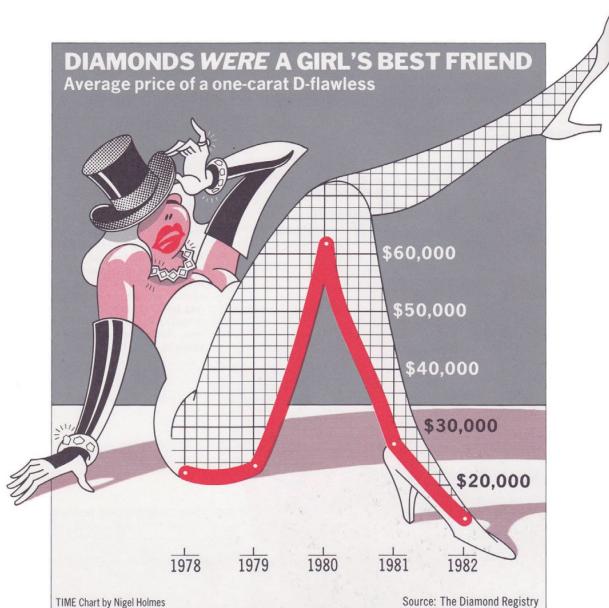


Figure H27

help to the reader, for example, than the bar of the bar chart, the line of the fever graph, the circle of the pie chart, or the rules of the table, then move on to another part of the book [...] Boredom is as much a threat in visual design as it is elsewhere in art and communication. The mind and eye demand stimulation and surprise [...] Even a smile will encourage a reader to look into the statistics he or she might not have thought of reading in a less embellished chart. (Holmes 1984: 72)

In personal communication, Holmes said:

Before I knew who [Tufte] was (or saw his book), I was aware that I was breaking some of the rules of the academic approach to making charts so I wasn't specifically referring to him in 1983 and 1984, more to academia in general.

In any case, Tufte's second visualization book (Tufte 1993) was far more aggressive against a style he profoundly disliked and despised:

Too many data presentations [...] seek to attract and divert attention by means of display apparatus and ornament. Chartjunk has come to corrupt all sorts of information exhibits and computer interfaces (Tufte 1990: 33)

Decoration wasn't bad, then, just when it obscured the data, as Tufte had said in his first book. Tufte excoriated one of Holmes's charts for *Time* magazine (Figure H27), without mentioning the publication or the author, for using figures that aren't adjusted for inflation and for its style:

Consider this unsavory exhibit at right —chockablock with cliché and stereotype, coarse humor, and a content-empty third dimension. Is it the product of a visual sensitivity in which a thigh-graph with a fishnet-stocking grid counts as Creative Concept. [...] Lurking behind chartjunk is contempt for both information and for the audience. Chartjunk promoters imagine that numbers and details are boring, dull, and tedious, requiring ornament to enliven. Cosmetic decoration, which frequently distorts the data, will never salvage an underlying lack of content. If the numbers are boring, then you've got the wrong numbers. Credibility vanishes in clouds of chartjunk; who would trust a chart that looks like a video game? (Tufte 1990: 34).

Tufte, then, admonished “commercial artists,” a group he commonly bashes to this day, conflating them to “content creators,” a vague professional category

he favors: “No matter what, the operating *moral* premise of information design should be that our readers are alert and caring.”

Early attempts to study how Tufte’s teachings could apply to news graphics quickly identified that what he presented as universal principles were in reality very personal design preferences and that the kinds of graphics statisticians need to use may not be the same as the ones that ought to appear in a newspaper. Pam Lott (1994) wrote:

If the type of pruning Tufte espoused were applied to text, he would delete the humanizing details, which make the story interesting and leave just the basic facts.

If one were to apply his erasing principle to text, he would take a *Miami Herald's* Pulitzer Prize winning story by reporter Edna Buchhnan that begins like this:

Gary Robinson died hungry. He had a taste for Church's fried chicken. He wanted the three-piece box for \$2.19, plus tax. Instead he got three bullets from a security guard who shot him when he ran. Police jailed the guard on a murder charge. Robinson, 32, walked into Church's, at 2701 NW 54th St., on last Sunday at 11:45 p.m., 15 minutes before closing time.”

and turn it into:

“A security guard shot and killed a man in Church's restaurant at 2701 NW 54th St. Police jailed the guard on a murder charge.”

Fortunately for newspaper readers and graphic artists, recent research on information graphics has not borne out Tufte’s assumptions.

Lott proceeded to cite empirical studies that revealed little difference in performance and knowledge increase when readers were presented bare Tufte-style charts and decorated ones. The authors even claimed that “these findings indicate that while there is a definitive possibility that mass media graphics distort data, what appears to be a violation of common graph-making principles may not, in fact, be that detrimental to accuracy” (David 1992). It wasn’t detrimental to retention, either (Kelly 1989). It is important to highlight, though, that the charts described and tested in these papers had very low data density, presenting just a few data points. The results may have been quite different had the researchers studied high-density displays.

Even if Tufte’s books became very popular and eventually sold hundreds of thousands of copies, their immediate influence on newsrooms is difficult to assess, although academics who studied visual journalism at the time often quote him. Newspapers like the *New York Times* were publishing “chartoons” in the late 70s, but seem to have changed focus in the 80s. Tufte (1983: 80) described a

1978 talk by *New York Times* art director Louis Silverstein: “[Silverstein] said that graphics are intended more to lure the reader’s attention away from the advertising than to explain the news in any detail. ‘Unlike the advertisements,’ he said, ‘at least we don’t put naked women in our graphics.’”

Silverstein retired in 1985, which coincides with the time that current *New York Times* graphics director Steve Duenes identified as definitive in creating its current graphics culture of priming the informative over the spectacular, and that seems to match Tufte’s suggestion:

Graphical competence demands three quite different skills: the substantive, statistical, and artistic. Yet now [note: in the early 80s] most graphical work, particularly at news publications, is under the direction of but a single expertise —the artistic. Allowing artist-illustrators to control the design and content of statistical graphics is almost like allowing typographers to control the content, style, and editing of prose. (Tufte 1983: 87).

## THE CONFERENCES

The first half of the 1990s consolidated several trends in graphics departments that had originated in the previous decade. A survey of more than 20 newspapers by Ole Munk (Munk 1992) from the Graphic College of Denmark, showed that graphics desks had acquired a certain independence from art and design departments, but that their status in newsrooms was subordinate to non-graphics editors.

With just a few exceptions, graphics creators lacked journalistic knowledge, and rarely collaborated with reporters on equal footing, or even talked to them in person. Graphics departments in most publications were “service” departments that took “orders” from journalists —often by telephone,— and in some cases were not even placed inside the newsroom. Graphics professionals gave visual shape to content gathered by reporters, rather than gathering that content themselves. Graphics desks, according to Munk, were “a small, isolated crowd” whose relationship with the rest of the newsroom was handled exclusively by a graphics editor (*ibid.*: 33).

The exception was, again, *The New York Times*:

Almost all graphics [published by the *Times*] are produced accurately, rationally, and unpretentiously (perspectives and 3-Ds only when comprehension demands it). [...] Equally unusual is the way *The New York Times* has organized its graphics

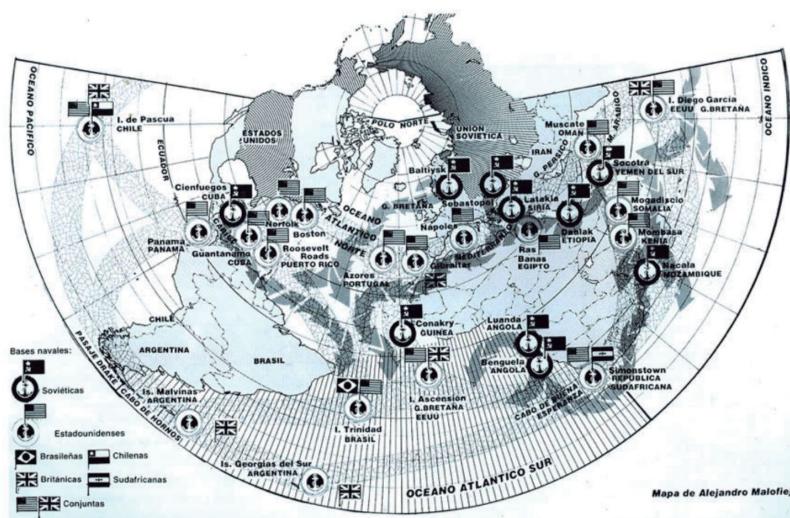


Figure H28

artists. Eleven graphic artists work as reporters. They have a journalistic education —are placed in the central editorial office, attached to special desks— and work independently with the contents and design of their graphics. They have direct contact with the editing staff, in contrast to the gate system, used at other papers with graphics departments of a certain volume [...] *The New York Times* has realized the theories talked about by so many: That graphics artists should not primarily be artists—but visual reporters (*ibid.*: 47).

Professional organizations, gatherings, and contests helped put news graphics designers in touch with each other. The Society for Newspaper Design (today called Society for News Design), or SND, was created in May 1979 and held its first annual workshop in September that same year. Since its inception, the SND has hosted a Best of News Design competition and published a book showcasing the winners, some of them being news graphics.

The Spanish chapter of the SND launched the Malofiej Infographics Awards in 1992, which has been hosted ever since by the School of Communication of the University of Navarra, in Pamplona, Spain. The Malofiej Awards, which are paired with a summit of professionals, were named after an Argentinian newspaper and magazine cartographer, Alejandro Malofiej, whose idiosyncratic work (Figure H28) caught the attention of several professors from the University of

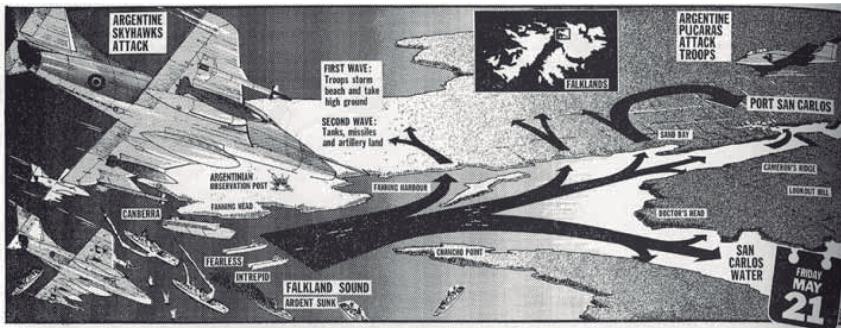


Figure H29

Navarra in the mid-80s. After Malofiej passed away in 1987, his works were donated to the University.

The books published by the Malofiej organization every year became a way for designers worldwide to get a glimpse of other organization's techniques and styles (SND-E: 2002). At a time when usage of the World Wide Web wasn't widespread, the Malofiej—and, to a lesser extent, the SND—books became a source of inspiration for news graphics professionals, and provided a sense of growing cohesiveness and legitimacy to the field. Some of the people interviewed for this study pointed out that the role that Malofiej played in the 90s is played today by social media tools like Twitter, which have become their windows to the world.

The early 90s were also a time of expansion of large feature graphics in many newspapers. Even if the bulk of the production of graphics desks was small and quotidian charts and locator maps, energies and resources were devoted to big, visually arresting standalone pieces combining statistical charts, maps, and explanatory illustrations (Henriquez 2014: 5). This style became very prominent during the Iraqi invasion of Kuwait, and the subsequent First Gulf War (1990–1991). Nigel Holmes links the large graphics produced at that time with the ones in the pre-computer era during the Falklands conflict (1982):

It took two other wars, first in the Falklands and then in the Gulf, to push Information Graphics to the next level. Both times the reason was a government refusal to allow photographers at the war front, and both times there was some over-reaction on the part of editors, art directors and the information designers themselves. Graphics departments were asked to fill large spaces with images that an otherwise visually-starved readership expected (SND-E 2002: 8)

The “over-reaction” Holmes refers to can be illustrated with a paradigmatic example of the kind of explanation graphic (H29, by The Sunday London Times):

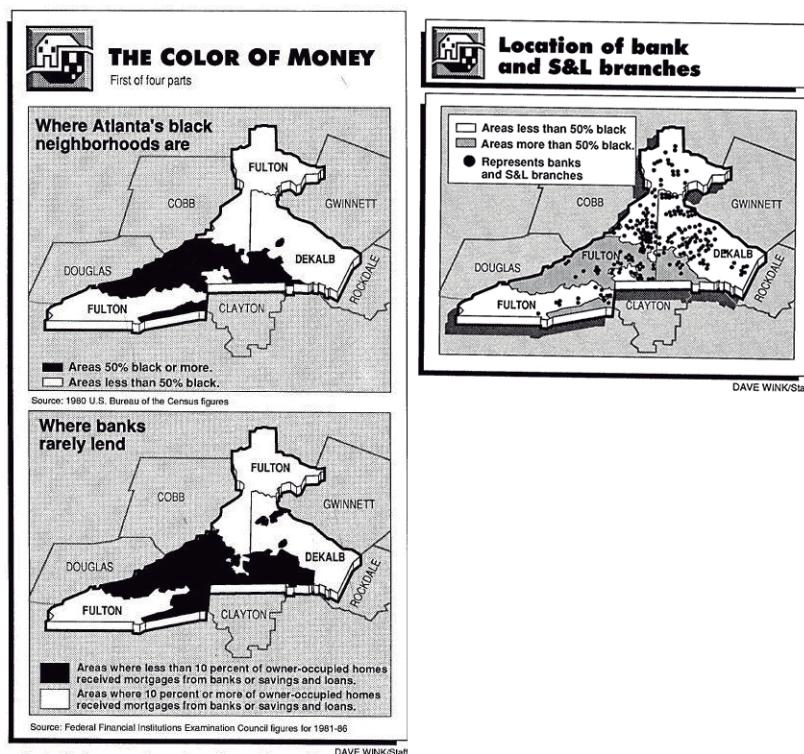


Figure H30

Exquisitely rendered fighters loom over a three-dimensional depiction of the Falkland islands, being invaded by land forces. This primacy of the spectacular over the merely informative would survive for decades.

In spite of the dynamics that Ole Munk described in his 1992 survey, the late 80s and early 90s were a time of increasing collaboration between graphics desks and other departments within newsrooms, at least in some quality publications. In several important coverages published at the time, graphics had a central role and were blended with other means of telling a story, like photographs or text, rather than being relegated to a supporting role.

An example is “The Color of Money,” a long series of stories, graphics, and opinion pieces published by The Atlanta Journal-Constitution in 1988, which won a Pulitzer Prize in 1989. Analyzing data about bank loans, the AJC reporters discovered that local banks regularly lent money to poor white citizens, but excluded even middle-class blacks systematically. The AJC stories included charts and maps that may look a bit rough to modern eyes, but that are still fascinating (Figure H30).

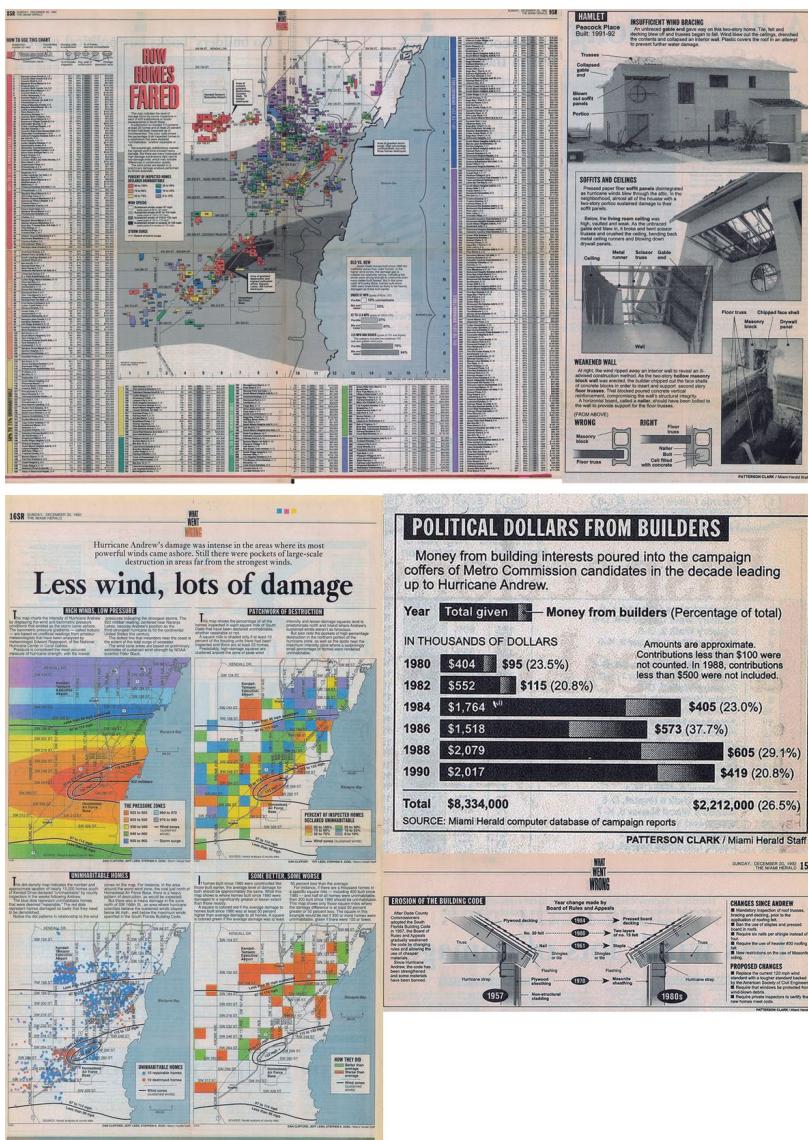


Figure H31

But perhaps the most famous example is *The Miami Herald's* 1992 coverage of the devastation caused by category 5 hurricane Andrew. The hurricane destroyed large swaths in south Miami-Dade county in August; in December, “the Herald published a special 16-page supplement titled ‘What Went Wrong’ (Figure H31) that revealed that houses built between the 1980s and the 1990s were more likely to have suffered serious damage than older ones, due to lax inspection of building quality and zoning. The supplement was supported by plenty of graphics and it won a Pulitzer prize for public service in 1993.” (Cairo 2016: 18). Projects like these reveal that the blending of computer-assisted reporting with visualization methods in the 2010s had early precedents.

## THE SECOND COMPUTER AGE: INTERACTIVES

The decade between 1995 and 2005 marks the rise of information graphics on the Web. This rise was tentative and timid, as newspapers and magazines continued being fundamentally print-centric, but it set the foundations for the expansion that occurred when Web professionals began to be fully integrated into newsrooms, in the second half of the 2000s.

Print newspapers started putting content on the web in the mid-1990s. According to Boczkowski (2004), 175 American newspapers had built websites by the end of 1995, usually ran by dedicated small web teams, not by the main newsroom. In this first stage web production, *shovelware* was the most common practice: Print publications transferred their copy, photos, and sometimes graphics from their print versions to their web editions with very limited repurposing efforts.

In some newspapers, like *El Mundo*, in Spain, the web team was an independent unit within the physical newsroom. In others, like *The New York Times* or *The Washington Post*, web journalists worked in an office located in a different building. At the *Times*, functional integration of the print and web journalists occurred in 2005 (Romenesko, 2005), although full physical integration had to wait until a new building was finished, at the end of 2007. Chronicles about this era highlight the many tensions and even distrust between print journalists and Online ones (Usher 2014).

Ethnographies conducted in the first two-thirds of the 2000s (Paterson and Domingo, 2008) showed that the separation between print and Online operations was a general pattern. According to Domingo (2008: 200), this isolation of Online news production units, and the fact that they were “populated mostly by newcomers and contingent employees” led them to be “quite distinct, to some

extent even countercultural departments within the profession.” This mimics the reaction of graphics professionals in the 90s, creating a professional identity of their own through professional gatherings and conferences. As we’ll see in the interviews conducted for this study, some graphics professionals nowadays still label themselves and their peers as “nerds” and “geeks.”

What happened in news graphics follows the broader trends in newspapers. Boczkowski (2004: 4) wrote that “Online newspapers have emerged by merging print’s unidirectional and text-based traditions with networked computing’s interactive and (more recently) multimedia potentials [...] In contrast with the discourse about revolutionary effects that has been prevalent in the dominant modes of understanding Online technologies and the web, my analysis shows innovations unfolding in a more gradual and ongoing fashion and being shaped by various combinations of initial conditions and local contingencies.”

This merging of old practices with novel technologies isn’t new. Remember that in the late 80s and early 90s, designers who were used to doing graphics by hand transitioned with relative ease to computers because the authoring tools mimicked the operations in the physical world (cut-paste, separate in layers, etc.) In the late 90s, print news designers transitioned to web authoring tools because these also reproduced operations of their print counterparts, like Illustrator or Freehand, with the addition of timelines to enable animation, and relatively simple code (“`goToAndPlay()`” was one of the many self-explanatory commands one could write in ActionScript, a language popular among news graphics journalists at the time) that enabled interactivity.

Multimedia authoring tools like Macromedia Director had become popular among designers since the early 90s and began to be picked up by news graphics designers in the middle of the decade. Director was a visual editor for Shockwave, a platform to produce multimedia content of all kinds, from interactive graphics to CD-ROMs and video games. Director was based on a graphical user interface, but it also offered designers the possibility of creating complex interactions through an embedded programming language, Lingo. Lingo’s syntax was quite verbose, and approached human language, a feature that was later inherited by ActionScript. An example of script is

```
on mouseUp  
go to frame 20  
end
```

Which means “when the reader clicks and releases this button, make the application go to frame 20.” In 1995, Macromedia released a plug-in that could be

installed on Web browsers. In 1996, Macromedia acquired a tool called Future-Splash Animator and rebranded it as Macromedia Flash. The structure of Flash was similar to Director's in the sense that it consisted of an editor and a plug-in that could be installed on web browsers for free. The first version of Flash was mainly conceived as a web animation tool, but further updates of the software added actions, which controlled the flow of the animation timeline, and later, in 2000, ActionScript, a scripting language (Dalziel 2008).

It is important to remember that “at the time, the only way to extend a Web browser to play back animation was through Java” (Bouhlel 2010), a programming language which was beyond the reach of most—if not all—graphics designers. Moreover, early Java web applications (“applets”) were notoriously cumbersome and buggy. JavaScript, the standard language most commonly used for web graphics nowadays, was designed in 1995, but it was not supported by all popular browsers. The early pioneers of web news graphics adopted Director first, and Flash later, as their tools of choice not just because their highly visual interfaces looked familiar, but also because there weren't more powerful tools available.

Many visual journalists at graphics departments began experimenting with web graphics at this time, but their efforts used to be isolated and done in their

#### FIRE ANT ATTACK: Researchers test interesting solutions to the ant problem.

**Migration** **Victims** **Retaliation** **Quiz**

**Fire ant problem spreads**

Researchers are studying the threat fire ants pose to species — and searching for ways to control them.

- Inside the ant
- Types of ants
- The mound

**CREDITS**

**Fire ant problem spreads**

Researchers are studying the threat fire ants pose to species — and searching for ways to control them.

- Exterior view
- Types of ants
- The mound

**CREDITS**

**Return**

**Biological controls considered**

**Overview**

Researchers at the University of Florida currently have two of the implants they are testing as natural enemies — a fly and an ant — under quarantine, where they are being bred and awaiting approval for release. A third natural enemy being studied is a disease caused by a protozoan.

● Phorid flies

● Disease

● Pirate ants

**CREDITS**

**Return**

**The victims**

**Overview**

Researchers are looking into whether fire ants, known for their burning sting, are threatening species native to South Florida, including some that are endangered. Other scientists are studying natural enemies from its native South America in hopes of fighting back the tide of fire ants.

● Lower keys marsh rabbit

● Key deer

● Stock Island tree snail

● Sea turtle

● Key Largo wood rat and cotton mouse

● Silver rice rat

**CREDITS**

Figure H32

## Guerra en Chechenia

Rusia ha movilizado 100.000 soldados para combatir a los rebeldes chechenos. (Tres veces más que en la campaña de 1994-96).

La acción militar, diseñada en tres fases, ha causado hasta el momento 356 bajas y 775 heridos en las filas del ejército federal. Se desconoce el número de bajas entre los guerrilleros chechenos.

Los combates entre rusos e independentistas continúan en la zona montañosa del sur de Chechenia.

Se calcula que quedan en la capital, Grozni, entre 8.000 y 30.000 personas.

Pulse para ver gráfico de la zona.



Figure H33

spare time. Very few organizations invested serious resources in the development of web graphics. One of them was the South Florida *Sun-Sentinel*. Wittekind is a visual journalist who taught himself some web skills when working at the Atlanta Journal-Constitution. In 1996, he was hired by Leavett Biles, graphics director at the *Sentinel*, who asked him to "come down here and produce multimedia informational graphics." Wittekind replied, "But Mr. Biles, I have no idea how to make multimedia informational graphics." Biles ended the conversation with a "nobody does. We're gonna invent them." (personal communication quoted in Cairo 2012). *The Sentinel* soon launched *The Edge*, a section of video, animations, and interactive graphics. The graphic on Figure H32 was published in 1996.

Other organizations, like the *Chicago Tribune*, *The Houston Chronicle*, *The Philadelphia Inquirer*, ABC News, or Spain's *El Mundo* and *El País* began experimenting with new technologies in this period, and even put together small teams that, like the rest of the online operations they belonged to, were not part of the print newsroom. The fact that the early pioneers of web graphics were mostly



Figure H34

print designers picking up new technologies explains why the style of their first creations looks derivative. Even when the content they produced was not a direct repurposing of a print graphic, it felt like such. Many online news graphics looked like photo slideshows: Interaction was limited to step by step sequential explanations, as Figure H33, published by *El Mundo* in 1999, reveals.

Boczkowski (2004) describes the creation of the “Blackhawk Down” series of articles by *The Philadelphia Inquirer* in 1997. The Online version of the stories, which chronicled the 1993 disastrous fights between U.S. soldiers and Somalian insurgents in Mogadishu, included graphics directly repurposed from the print newspaper (Figure H34), but also Director animations.

Another 1997 project highlighted by Boczkowski is the *Houston Chronicle's* Virtual Voyager, a multimedia presentation that combined copy, video and audio, 360° photos, and a map that updated automatically. A 2012 retrospective of the web presence of the Chronicle says that “we sent staffers on the road with

audio and video equipment to do multimedia stories. It was relatively advanced for its time, but of course, the video was postage-stamp-sized and usually delivered over dial-up. We tried to do long-form journalism as well, but people just didn't read it [...] (Subscribing to HCI via Prodigy did carry a price tag. This was back in the day when users had to pay for hours of usage. In this case, subscribers received 10 hours of usage for free within the first 30 days. After that, the charge was \$9.95 for five hours each month and \$2.95 per hour in overage costs.)" (Gonzales 2012). As it has always happened in history, novel technologies both enable and constrain.

Wariness of adopting web news graphics extended to the 2000s. It wasn't just a matter of audiences not being able to access them quickly, but also of production costs. According to the 2007 "State of the News Media" report by the Pew Research Center, "newspapers were early if often tentative entrants in the digital game. By the mid-late 1990s, most big papers had Online homes. But the content was often little more than what was in the newspaper, plus some occasional extras."

The authors added "the multimedia potential of the Web is also not as developed on many sites as people might imagine. Only six of the 38 sites earned top marks for offering a rich range of media formats. And nearly half the sites (17) earned the lowest marks. For those, more than 75% of their content was just narrative text."

Scott Goldman, senior editor/visuals at *The Indianapolis Star*, quoted by George-Palilonis and Spillman (2011) provided one possible explanation for the poor development of digital graphics: "There's a huge pushback on how much time and manpower it takes to create interactives. There are also issues with the metrics. A lot of sites don't know how to count Flash graphics [...] They see, say 1,000 page views on a graphic that took a week or more to complete, and ask, why?"

Years later, in 2013, Ball State University's Jennifer George-Palilonis and Mary Spillman expressed the confusion of this transitional time after comparing a survey she conducted among newspaper editors and the results of a content analysis of the websites of those same newspapers:

While most editors (87%) assert that interactive graphics are valuable story forms and that they add value to the news product (96%), only a few news organizations regularly and prominently feature information graphics on their websites [...] In addition, despite a clear concern that the production or interactive information graphics is not cost-effective and that the graphics do not generate enough page

views (or clicks), the content analysis showed that even on sites that do produce information graphics, they are often difficult to find or not prominently featured on homepages or easy-to-find multimedia landing pages (Palilonis and Spillman 2013)

Flash was hegemonic until 2010 among the of news organizations that made web graphics on a regular basis. Apple released the first iPad that year. The new device didn't support Flash content, as the iPhone (whose first version appeared in 2007.) Apple's CEO Steve Jobs considered Flash "buggy," "lousy," and a battery drain (Isaacson 2011, 514). In 2010 Jobs wrote an open letter about Flash and its owner, Adobe:

Though the operating system for the iPhone, iPod and iPad is proprietary, we strongly believe that all standards pertaining to the web should be open. Rather than use Flash, Apple has adopted HTML5, CSS, and JavaScript – all open standards. Apple's mobile devices all ship with high performance, low power implementations of these open standards. HTML5, the new web standard that has been adopted by Apple, Google and many others, lets web developers create advanced graphics, typography, animations and transitions without relying on third party browser plug-ins (like Flash). HTML5 is completely open and controlled by a standards committee, of which Apple is a member. (Jobs 2010).

Those open standards had been in use in newsrooms before 2010. JavaScript, a language created in 1995 with the goal of adding dynamism to web content, was adopted as the de facto standard for complex interactive and animated graphics thanks to becoming standardized and because of the ecosystem that grew around it in the early 2000s, before the iPhone and the iPad: JSON, a method for storing data as text, was launched in 2001; Ajax, which greatly expanded the interaction capabilities of websites, appeared in 2005; jQuery, a library that simplifies the process of writing JavaScript and facilitates the manipulation of the DOM (Document Object Model) was launched in 2006 (Rauschmayer 2014). Some JavaScript libraries, like Protovis (2009), enabled the design of interactive data visualizations.

Finally, D3.js, the JavaScript library for dynamic graphics designed by some programmers behind Protovis, appeared in 2011 (Bostock, Ogievetsky, and Heer, 2011). D3 is quickly becoming the tool of choice of many online news graphics designers. Mike Bostock, one of the creators of the library, was part of the graphics desk of *The New York Times* until 2015.

By 2010, web designers, developers, and programmers were already working in some newsrooms, either within graphics desks or in units that were created in parallel to them. What the iPad did, then, was maybe not to kill Flash, but to accelerate its demise.

## THE THIRD COMPUTER AGE: GEEK TAKEOVER

The third computer age in news graphics, which began between the late 2000s and the early 2010s, is defined by the ubiquity of data and code and the expanded role of professionals who understand both. In past eras, programming-savvy professionals in newsrooms used to be relegated to technical support activities, like maintaining content management systems, developing the back-end of the publication's website, or maintaining databases. Not anymore. Today, they operate alongside traditional reporters, editors, and designers. In many cases, journalists themselves have acquired data and coding skills, as well (Bounegru, Chambers, and Gray 2012).

The origins of this third era were hinted in previous pages. They are based on (a) the existence of groups of professionals who already did reporting based on data in newsrooms (computer-assisted reporters), of (b) a separate professional category who did data graphics, besides illustration-driven explanation graphics (graphics desk), and (c) on an interest in newsrooms to take advantage of the increasing availability of digital data to be scraped, interpreted, and presented to the public.

The role of pioneers and influencers can't be downplayed. Speaking in 2010 at the launch of the first British government datasets for spending by departments of more than £25,000, Tim Berners-Lee, the inventor of the World Wide Web, said that the press had the responsibility of poring over those data, and that "data-driven journalism is the future" (Arthur 2010). The success of journalists like Simon Rogers, leader of *The Guardian* data team until 2013, and Adrian Holovaty, are credited with showing news editors of the possibilities of digital data and novel software tools and programming languages (Usher 2016).

Holovaty, an advocate for curbing the story-centric mentality of traditional journalism, and even substituting it with a data-centric one, is the creator of the groundbreaking 2005 ChicagoCrime.org, a mashup that linked a live database to a Google Maps-based visualization (Figure H35).

The convergence of these factors led some professionals and scholars to start talking about data-driven journalism or, simply, data journalism, defined as the

**E CHICAGOCRIME.ORG AV  
4200 N**

A freely browsable database of crimes reported in Chicago.

Browse by: Crime type · Street · Date · Police district · ZIP code · Ward · Location · Route · City map

## / MINOR PERSONAL INJURY ACCIDENT (HIT AND RUN)

### Latest reported crimes

DEC. 22	<a href="#">HN772077</a>	1:23 a.m.	2700 block N. Kimball Ave. <a href="#">Street</a>
DEC. 11	<a href="#">HN753921</a>	6:02 p.m.	2200 block W. Division St. <a href="#">Street</a>
NOV. 27	<a href="#">HN730219</a>	7:42 p.m.	3300 block W. Madison St. <a href="#">Street</a>
OCT. 25	<a href="#">HN668430</a>	8:49 a.m.	5600 block S. Pulaski Rd. <a href="#">Street</a>
OCT. 18	<a href="#">HN654726</a>	2:22 a.m.	900 block E. 79th St. <a href="#">Street</a>
OCT. 3	<a href="#">HN627019</a>	6:40 p.m.	10100 block S. Wallace St. <a href="#">Street</a>
SEPT. 20	<a href="#">HN59575</a>	2:07 a.m.	3500 block W. Iowa St. <a href="#">Street</a>
SEPT. 15	<a href="#">HN591593</a>	11:57 p.m.	2300 block W. Fulton St. <a href="#">Street</a>
SEPT. 15	<a href="#">HN591461</a>	9:37 p.m.	2600 block S. Kostner Ave. <a href="#">Street</a>

Mapa · Satélite · Híbrido

Crime classifications key

Unknown - 20 crimes

4 CHICAGO TRIBUNE SECTION 2

TECHNOLOGY

MY TECH BY ALEX L. GOLDFAYN

## Web developer charts Chicago crime online

Adrian Holovaty hacked Google.

Actually, he has found a way to make modifications to Google's new mapping application (<http://maps.google.com>), which displays graphical maps and overhead satellite images for any location in the U.S.

Holovaty, 24, started a Web site called ChicagoCrime.org. The site, launched in May, provides what he describes as "an exploration of Chicago crime data from different angles, including ZIP codes, crime type, and police districts."

Here's how ChicagoCrime.org works:

On the home page, you search for crimes by street address or specific locations (think ATMs, bowling alleys or even CTA train lines).

The site returns the matching offenses in list form and plots them on a map with graphical "thumbtacks."

Click on a listed crime and a new screen offers details—such as the date and time it occurred and whether any arrests were made. Click on one of the thumbtacks and a pop-up appears with the crime's details.

"The obvious application is real estate," said Holovaty.

**Adrian Holovaty, 24**  
Web developer,  
The Lawrence  
(Kan.) Journal  
Resides  
in Chicago

**Jonathan Lewin, 37**  
Commander,  
Information  
Services,  
Chicago Police  
Department

You're looking for a place to move to, and you can actually find out what's happening in your potential neighborhood. And if you're selling, you can use [the site] to prove that you're in a good neighborhood."

The maps are borrowed from Google, which, Holovaty has heard informally, doesn't disapprove of such creative uses of its program.

The crime data comes from the City of Chicago's Citizen ICAM Web site, which is accessible at [www.cityofchicago.org/police](http://www.cityofchicago.org/police) and clicking on the "Citizen ICAM" link toward the bottom left of the site (it can also be accessed at <http://12.17.79.6>).

Citizen ICAM is the city's public "reported crime" database, which lists the core of the information Holovaty utilizes. It has been online for more than four years.

The police department is impressed by Holovaty's site, which he put together in about 30 hours during nights and weekends.

"I think it shows a lot of initiative," said Jonathan Lewin, commander of information services for the Chicago Police Department. "He repackaged all the information in a useful way. We're all very impressed with it."

And in an age of online prof-

partment. "It's good for parking lot people, if there has been a car parked there for three weeks. And it's good to check on a car parked in front of your house."

"It is also good if your own car is not where you parked it."

The information is available at [www.chicagopolice.org/ut20/tows](http://www.chicagopolice.org/ut20/tows).

teering, Holovaty has no plans to make money with ChicagoCrime.org.

"I made this purely as a public service," he said. "I love Chicago so I don't mind doing it free here. I don't plan on doing any money-grubbing evil things."

But the money may come anyway.

Holovaty has already been contacted by a number of police departments looking for his help on improving their own Web sites.

"I am very willing to help people with Web development. Maybe that will become a little side business for me."

*alex@technologytailor.com*

Figure H35

craft of “gathering, cleaning, organizing, analyzing, visualizing, and publishing data to support the creation of acts of journalism. A more succinct definition might be simply the application of data science to journalism, where data science is defined as the study of the extraction of knowledge from data.” (Howard 2014: 4) Some authors talk about a “quantitative turn” in journalism (Coddington 2015) and even say that data journalism is, at its core, the blending of computer-assisted reporting with news infographics (Knight 2015).

This doesn’t mean that most news publications began putting together “data journalism” teams. The skills that Howard listed are often distributed across different units that collaborate with each other. But it does mean that one of the tasks that were traditionally a domain monopolized by graphics departments began being tackled also by other professionals within newsrooms: the creation of data charts and maps for the web. Think of the aforementioned Adrian Holovaty: he was trained as a journalist, he learned to code and to hack Google Maps before its API was available, and he created an interactive application that is both a database and a news graphic.

Holovaty was one of the first journalists-engineers, and he is a very relevant example of one of the two ways journalists began adapting to the data and code-centric era. He didn’t have a heavy baggage in the form of traditional practices or tools. He graduated from journalism school in 2001, and he immediately began working as a developer for several newspapers.

The situation of news graphics professionals with years of experience was different. In the two previous computer ages, news graphics teams were presented with software tools that mimicked what they were already doing. Programs like Adobe Illustrator imitated what paper-pencil-and-scissors designers had been doing for decades before the late 80s, for instance. In the 90s, the graphical user interface of multimedia programs like Flash looked familiar to those who had been using Adobe Illustrator or Macromedia Freehand since the first computer age. But in the late 2000s, news graphics creators face an unprecedented hurdle: code. Code looked alien.

In the traditional division of labor within newsrooms, computer-assisted reporters took care of gathering and interpreting data, and then writing about it, while tech-savvy professionals helped with the design of databases. Charts and maps were left to news designers. Nowadays, these boundaries have blurred: in newly-created news publications like *ProPublica*, programmers, and journalists who have learned to code take a project from the beginning to the end: they do their own reporting, gather and analyze the data, and then write their stories and design their own graphics, static and interactive.

But not all newsrooms are equal. In the interviews and observations conducted for this project, I have identified at least four different organizational patterns in newsrooms.

The first one is the complete separation between a traditional print-centric graphics desk, and a loose group of tech-oriented professionals who produce visualizations for the web. This is the case of Spain's *El País* until 2015. In cases like this, one activity that was traditionally "owned" by a department begins being undertaken by another group. In newsrooms in which this first pattern is observed, the lack of skills (or interest) in web visualization of the graphics desk prompts professionals from other areas to step up, or leads the publication to hire tech-oriented designers and journalists who can code, while laying off print graphics designers (Henríquez 2014: 10). Henríquez adds:

Currently, many U.S. newspapers and news magazines rely mostly on traditional maps and charts to help explain the news in graphic form, even when events require more to visually explain a story. Although large metropolitan dailies such as *The New York Times*, *Washington Post*, *The Wall Street Journal* and *USA Today* still occasionally run explanatory graphics, most newspapers around the country have cut back because of their downsized graphics departments. A recent survey of 50 of the leading newspapers in the U.S. conducted by Jeff Goertzen, Senior Associate and Consultant for The Orange County Register, showed that graphics departments have been reduced in size by more than 54% since 2011 — and nine of those newspapers eliminated their graphics departments altogether. Of those that still have a graphics department left, they don't have enough staff to produce large explanatory graphics, let alone enough space in the newspaper to display that type of work.

What Henríquez describes is not the disappearance of infographics in the news, but its profound transformation. Between the 80s and 2000s, copy and visuals in newspapers pages were usually separated: columns of text on one side, photos, charts, maps, and diagrams on the other. The exception was the large feature graphic, which seamlessly combined words with graphic elements. Nowadays, that role is played by multimedia web stories like the one on Figure H36, by *The New York Times*.

The second pattern observed in news publications is the parallel development of graphics in different parts of the newsroom, as explained in Chapter 1. At the *New York Times*, for instance, until recently at least three different units



### Airport Attack in Istanbul Is the Latest in a Year of Terror in Turkey

(PHOTO) June 26, 2016

The assault on Turkey's largest airport on June 26 continues a string of deadly terrorist attacks that have struck the country. In the past year, Kurdish and Islamic State militants have staged at least 14 major attacks across Turkey, killing more than 600 people.



By The New York Times

The Islamic State has never claimed responsibility for any attacks in Turkey, but government officials have now linked the group to at least five bombings.

Kurdish militants have been in armed conflict with the Turkish government for decades. They attack security forces in isolated areas of the country daily, but are increasingly shifting to attacks in urban areas.

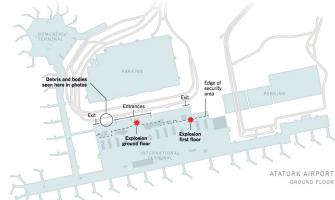
While the Kurdish attacks have mainly targeted police and members of the military, the Islamic State attacks have mostly struck at civilians in popular places.

Date	Location	Attack type	Dead	Group responsible
Jan. 5, 2015	Diyarbakir	Arson	2	Unknown
Jan. 6	Ankara	Cultural center	30	ISIS
Oct. 19	Ankara	Police rally	100+	ISIS
Jan. 12, 2016	Identified	Tourist area	16	ISIS
Jan. 13	Diyarbakir	Arson	5	ISIS
Feb. 17	Ankara	Military convoy	28	Kurdish militants
Mar. 13	Ankara	Public square	37	Kurdish militants
Mar. 18	Identified	Tourist area	1	Kurdish militants
Mar. 19	Identified	Tourist area	4	ISIS
Mar. 21	Nevsehir	Military convoy	3	Kurdish militants
Mar. 23	Oguzkent	Arson	9	Kurdish militants
Jan. 7	Identified	Tourist area	11	Kurdish militants
Jan. 23	Diyarbakir	Military outpost	1	Kurdish militants
Jan. 26	Identified	Airport	42	ISIS

The group responsible is known on some entries by aliases and names of responsibility.

On June 27, the State Department renewed a warning issued three months ago, telling Americans about the dangers of traveling to Turkey because of terrorist threats.

### Where the Attack Took Place at Istanbul's Main Airport



By The New York Times | Source: Medya Muhasebe News

A Turkish government official said that shortly before 10 p.m. Tuesday, the police found two attackers at the entrance to Ataturk airport's international terminal as an attempt to stop them from reaching a security checkpoint.

The two attackers then blew themselves up, the official said. A third attacker detonated explosives in the parking lot, another official said.



Photo: experts outside Ataturk airport after an explosion on Tuesday night. Credit: Sven Torfinn

By Sarah Amiskar, Mete Bilek, Lary Baskaran, Ford Fassenden and H.K. Roberts Lat

Figure H36

(the graphics desk, the interactive news technology group, and the multimedia team) produced work that could be labeled as web news graphics, after building the skills internally, by hiring tech-savvy journalists or pure programmers. These were separate groups within the newsroom structure, although they widely and often collaborated. (Nussbaum 2009).

This model is still at work at places like *Univision News Online*, in Miami, where data journalists, web developers, and news graphics professionals sit together, even if, in theory, each group has its own editor or manager.

The third pattern is one of complete integration. Professionals who gather data, report on it, use computing techniques, and present the data to the public in the form of interactive databases and news graphics belong to the same department, sometimes called “visuals” or “news applications.” This is more common in organizations that were born as web-only publications, like *ProPublica*, although more classic news publications, like *The Wall Street Journal* and *The Washington Post* have moved in a similar direction in the past decade. This comes from a report about the transformations that *The Washington Post* is going through after being bought by Jeff Bezos, CEO of Amazon.com:

In January, Bezos moved the paper out of its drab offices atop a former printing plant and into a sleek space on K Street that resembles a tech start-up. Around the newsroom, engineers and data scientists sit alongside journalists to integrate emerging technologies into everything the Post does — a far cry from the old Post, where, until 2010, the digital newsroom was relegated to a separate building all the way across the river in Arlington [...] Data is now at the heart of virtually every strategy discussion. (Payne 2016).

The fourth pattern, which often goes hand-in-hand with any of the previous three, is one of expansion: News graphics desks at places like *The New York Times*, *The Washington Post*, *The Wall Street Journal*, etc., are not properly “graphics desks” anymore. They have grown to embrace other forms of visual storytelling, such as video, virtual reality, etc., a phenomenon we’ll explore in Chapter 4, as it was mentioned by many of the professionals interviewed for this study.



## CHAPTER 3

# HYPOTHESES AND METHODOLOGY

This study employed a mixed-methods strategy that combines quantitative with qualitative data. It began with an ethnographic observations at *ProPublica*, a non-profit organization which focuses on investigative reporting, and at *Univision News Online*, in Miami. On a second phase, it continued with a series of more than 30 semi-structured interviews with professionals from different media organizations, and with a quantitative analysis of more than twenty years of Malofiej International Infographics awards, the most influential contest in the news graphics field. This chapter explains the relevance of this project, its purpose and goals, and each one of the aforementioned steps.

## JUSTIFICATION OF INTEREST

In the past decade, as mentioned already in this dissertation, news graphics of all kinds have become a cornerstone of journalistic publications, particularly, but not only, in the online editions of major newspapers and magazines. A 2013 interactive project titled “How Y’all, Youse and You Guys Talk” become the most viewed product in the history of *The New York Times* online (Taibi 2014), and it was recently transformed into a book by the same author (Katz 2016).

A substantial portion of the traffic of organizations like *The Texas Tribune* and *ProPublica* is generated by data-related products, including visualizations (Ellis 2014). In August 2016, during the presidential election campaign in the

United States, *FiveThirtyEight.com's* Election Forecast, a project based on a series of interactive data graphs and maps, “was the most popular piece of individual content across all of ESPN’s [*FiveThirtyEight*’s parent company] web properties.” (Coelho 2016.)

Since it was acquired by Amazon.com’s owner, Jeff Bezos, *The Washington Post* has invested in increasing the size of its news graphics team (Somaia 2014, Kennedy 2016.) Part of the reason is that graphics journalists are often considered to be at the forefront of technological and conceptual innovation in newsrooms (Nussbaum 2009) and, as a consequence, have recently begun occupying positions of influence. At *The New York Times*, for instance, former graphics director Steve Duenes is now the Associate Managing Editor, and Amanda Cox, who was part of the graphics desk, is now editor of The Upshot, the data section in the paper (Doctor 2016). Conferences focusing on visualization and infographics have grown in quantity and size.

Considering the increasing presence, power and influence of people who deal with data and design news graphics —as their core task, or as a considerable portion of their work— in newsrooms, it can be argued that it’s relevant to explore how they think and how and why they do what they do. Their values and goals may shape the future of journalism. This project, therefore, is mainly “interpretivist,” in the sense of “seeking information about how people understand their world.” (Cramer 2016:35.)

## QUESTIONS AND HYPOTHESES

As a summary, this dissertation aims to answering the following questions:

**Q1.** Have the increasing prevalence and usage of digital data and technology in newsrooms significantly change the values that news graphics professionals hold dear, and the way they define themselves, and how the aforementioned interact with each other?

**Q2.** Have digital data and technologies affected the kinds of professionals that are hired to undertake news graphics projects in media organizations, in particular the online versions of newspapers and magazines?

**Q3.** Has the need of dealing with digital data change the structure and the dynamics of news graphics groups and teams in news organizations?

**Q4.** Have new technologies shifted the focus of news graphics professionals in terms of the kinds of projects they create?

To come up with a series of corresponding hypotheses, as I'll explain in the following sections, I relied mostly on ethnographic observations and the review of the literature:

**H1.** The rise of digital data and technologies have indeed changed the values that news graphics professionals claim to hold. In the past, news graphics professionals talked about themselves as designers and artists, but today they stick to traditional journalistic values that are identical to other reporters and editors.

**H2.** As a consequence, the kinds of professionals hired in newsrooms have also changed, to incorporate more journalists who can take advantage of digital data and technologies, like web developers, computer engineers, etc.

**H3.** The need to deal with digital data, and subsequent changes in values among news graphics professionals, has affected newsroom dynamics, making news graphics teams more autonomous.

**H4.** News graphics professionals and teams are creating many more data-driven graphics, based on abstract charts, graphs, and maps, and fewer pictorial schemes and explanations.

It's important to clarify that these questions and hypotheses shouldn't be seen as a constraint, but as guiding principles. As I'm about to point out, I used grounded theory methodologies for a substantial part of this study, so the questions posed in this section may get shaped a bit differently once the coding of ethnographic observations and the interviews was analyzed.

## ETHNOGRAPHIC OBSERVATIONS

The first step taken to answer the questions was an ethnographic observation at *ProPublica*, in New York City. The reason to choose *ProPublica* is that the kind of news graphics they create is quite different to what I used to design when I was a professional journalist. *ProPublica*'s News Applications team uses largely the same elements —graphs, charts, diagrams, tables, etc.— and the visual and interactive design principles that guide them are essentially identical.

However, *ProPublica*'s news graphics are mostly exploratory in nature. They are often built not as linear stories, like mine used to be, but as visual databases that readers can explore at will.

Scott Klein, Assistant Managing Editor at *ProPublica* —in charge of data and visualization projects— has coined a mantra to explain their strategy: “the far and the near”:

In order to help a reader understand complex data, help them follow it from the general to the specific. We think of things in terms of a “far view” and a “near view.” Your far view is typically the landing page of your app, and is focused on broad meaning and context. This page should have the national picture of the data, with ranked examples, e.g., an ordered list of states, counties, companies, etc. Your near view is the page at lowest level of abstraction, where your reader is looking at her own school, his own town, etc. The near view conveys association and identity. It is the means through which readers will understand the whole by relating it to the example they understand best. Naturally, many apps have levels of abstraction in between the far and the near. Make sure to use visual consistency and make transitions obvious so the reader can understand the “zoom levels” as they go down them. Whenever possible, every number in your app should include a comparison to another, either to a similar example (e.g., my county vs. the neighboring one) to larger clusters (my county vs. the state average) or to the whole (my county vs. the national average). Make correlations visible. If there’s a correlation between two variables, show them together (Klein 2013).

During conversations and interviews, Klein and his colleagues emphasized the importance of letting readers find themselves in the data. The designer isn’t anymore the person who decides what story to tell, and what portion of the data is more appropriate to support it; instead, she designs tools that give people the choice of what to see or what to look for, to discover patterns and trends that may be relevant to their own lives.

*ProPublica*’s news applications team —whose members call themselves “nerds”— still creates projects that are similar to the ones I used to do when working in newsrooms, based on linear narrative structures, but they more often favor interaction and discovery.

The goal of my observation at *ProPublica*, then, wasn’t to test any hypothesis but to be able to pose questions that I could later explore with further observations, interviews, and analysis. Ethnographers call this the “formative theory.”

A formative theory can be dependent on the researcher’s previous experience in the field of study —as it was my case— on reading the literature related to it, and also on preliminary observations. I saw *ProPublica* as a hub of innovation, and I wanted to learn more about how it operates. I also wished to compare it with my own values and experience.

I contacted Klein on January 2014 to ask for permission for a one-month stay at *ProPublica*’s newsroom, in New York. The actual observation took place between June 9 and July 4 that year.

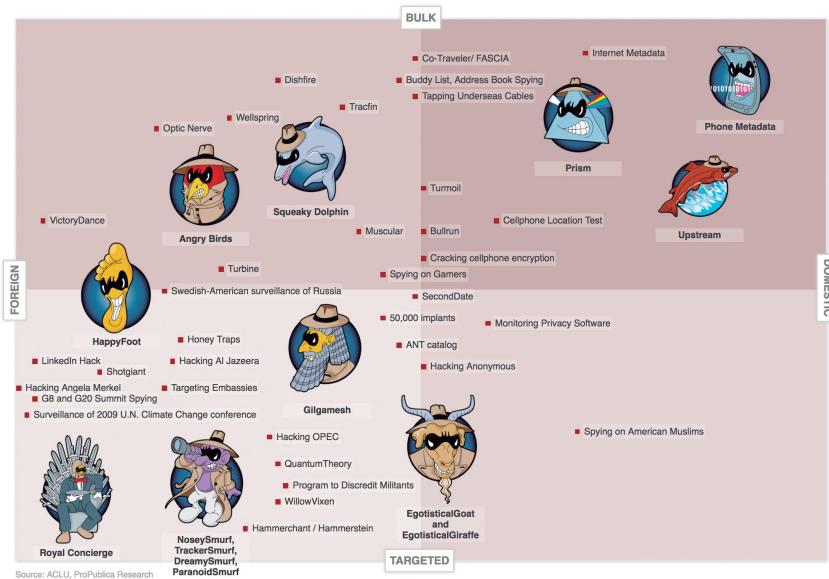


Figure M1  
<https://projects.propublica.org/nsa-grid/>

I approached the observation as “applied ethnography.” In this branch of ethnography, the observer is a stakeholder, someone who is interested either in solving a specific problem or, more broadly—and applicable to this case—in bettering the field (LeCompte & Schensul 1999: 13.)

My approach, then, differed from other journalism ethnographies that inspired my work, most notably Nikki Usher’s (2014) about *The New York Times*, Pablo J. Boczkowski’s (2004), and the ones collected by Chris Paterson and David Domingo (2008). The methods I applied—extensive notes, recursive analysis, in-depth interviews with all members of *ProPublica*’s news applications teams, etc.—were arguably similar, but I wasn’t a fully neutral observer. Moreover, I knew that the end result of this initial data collection wasn’t going to be an ethnography, but a different kind of book providing an overview of the current state of news graphics.

During my stay, I collaborated in a few projects. This is common practice in the kind of ethnographic observations mentioned above, and that inspired this project. I drew illustrations for an interactive visualization (Figure M1) and for a visual explanation about controversial child restraining techniques in schools

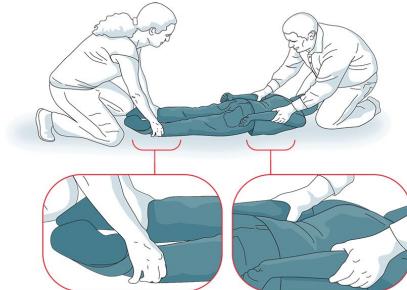
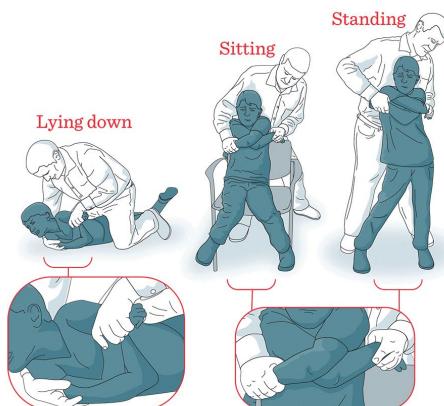
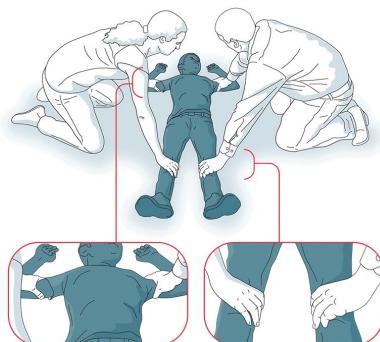
**Prone Hold****Basket Hold****Supine Hold**

Figure M2  
<http://projects.propublica.org/graphics/restraint-techniques>

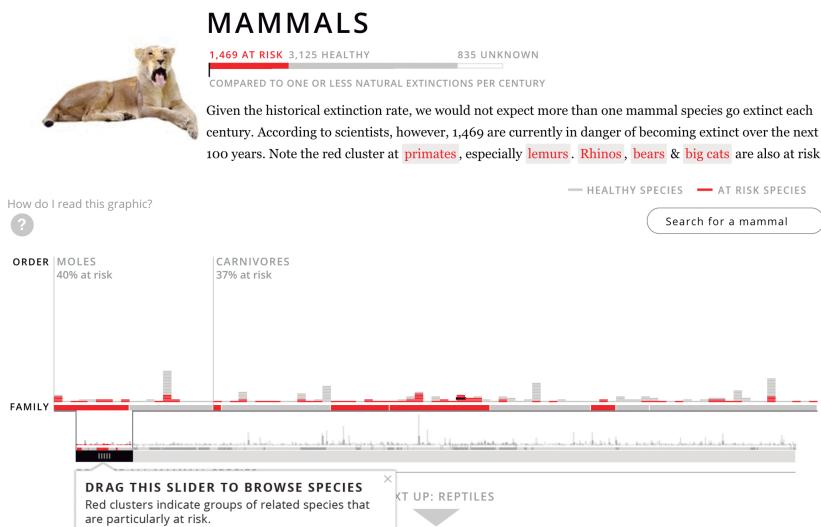


Figure M3  
<http://projects.propublica.org/extinctions/>

(Figure M2).

I also participated in daily meetings and provided feedback on other ongoing stories that weren't completed before I left (Figure M3), as *ProPublica* doesn't work with the same tight schedules as traditional publications. It was usual to see the publishing date of a project pushed ahead because the reporters involved needed more time to verify their information.

In the first half of 2016 I conducted a similar preliminary observation at *Univision News Online*, in Miami. I spent one day a week in the newsroom during three months, sitting with the people in charge of data reporting, news graphics, and web design.

Some of the professionals who work in *Univision News Online* today, like Mariano Zafra, an infographics designer who has worked for *El Mundo* and *El País*, in Spain, and Ronny Rojas, an investigative reporter who for many years worked for *La Nación*, in Costa Rica, have experience in print media, so I was interested in collecting their views about the changes that their practice has experienced in the past decade. At Univisión, I also actively collaborated in several projects, like the coverage of the capture of famed Mexican narco Joaquín "El Chapo" Guzmán, on January 2016, and some graphics for the *Copa de las Américas* soccer competition.

## GROUNDED THEORY

At the core of much ethnographic observational methodology lies what theorists have called “grounded theory” (Wertz, et. al. 2011.) I’ll explain grounded theory and the particular kind I chose for this project in the section of this chapter about interviews. However, a brief introduction is necessary here.

Grounded theory (or *theories*, as there are at least three kinds) is based on coding and memo writing. “Coding” means that notes taken by the researcher, interviews conducted with the observed subjects, and other sources of data are broken up into small units, sometimes single sentences, sometimes even single words. Then, the researcher assigns to them labels that somehow are representative of their meaning. Codes are “conceptual reoccurrences” (Birks and Mills, 2015, pp. 89) that form patterns.

After each round of coding, researchers often write short summaries, or memos, for themselves with the goal of analyzing how codes relate to each other, and to come up with better, more accurate and general, upper-level codes that synthesize the original data. It is in this sense that grounded theory methods are called “recursive”: researchers usually return to the field to gather more data that can help them fine-tune categories they’ve identified in previous iterations.

In grounded theory, then, data collection doesn’t precede its analysis. They run in parallel, in constant interaction, until researchers get to a point of “saturation” when no more insight is gained from obtaining and analyzing new data. This process of increasing precision is called theoretical sampling, which consists of gathering “incidents, slices of life, time periods, or people on the basis of their potential manifestation or representation of important theoretical constructs.” (Patton, 2001, p. 238).

The goal of grounded methodologies is to build theories that *arise* from the data. A theory is “no more and no less than a description[...] A theory attempts to take text or quantitative data and organize them into a description or model of individual or group behavior in a specific time and place that predicts what people will do” (Schensul and LeCompte 1999, pp. 11.)

This was my goal with both the preliminary observations —which helped me frame some very rudimentary categories of analysis— and with the interviews I conducted later: to understand the goals and values of the people who create news graphics today, either as their exclusive activity, or as part of a broader set of tasks. The goals and values that people hold influence the products they cre-

ate; that's why I also decided to analyze the results of the Malofiej International Awards, as I explain at the end of this chapter.

Figures M4 and M5 are examples of notes taken at the *ProPublica* newsroom. Figure M6 is an example of rough memo. Figure M7 is a diagram drawn after my stay, in which I summarized my thoughts about what lurked behind the words of my temporary colleagues.

In general, I observed that the way my temporary colleagues at *ProPublica* and *Univision* talked about their work during informal conversations and formal—but only semi-structured—interviews could be summarized not only as codes but, at an upper level, as *transitions* between the way news graphics used to be done in the past—ten, twenty years ago—and in the present. As it will be immediately obvious, these transitions are closely related to the research questions and the hypotheses I've described at the beginning of this section.

The transitions shown on Figure M7 are listed below; they provided a foundation for the interviews described in the following section, and for the theory described in the last chapter:

**1. From the analogical to the digital and the data-driven:** Even if some of the people I spent time with came from print publications, they were now fully committed to digital, data-driven work. Also, they saw data and digital technologies as the main enablers of what they do.

**2. From the ethos of the visual designer/artist to the ethos of the data journalist/developer:** They called themselves journalists, and they talked about good reporting, information verification, but also about appropriate ways of collecting, processing, and delivering data. Very rarely I heard conversations about illustration styles, typography, color, etc.

**3. From service to autonomy:** As a consequence of seeing themselves as journalists, and being considered as such in the newsroom, the news applications team at *ProPublica* didn't take "orders" from other desks. They collaborated with other reporters and editors in all stages of story development, from the initial conceptualization to the very end. In some cases, they came up with their story ideas, and they made them happen on their own.

**4. From the pictorial to the abstract:** They focused largely on visual representations of abstract data, and much less on illustration-based explanations or descriptions.

**5. From tool users to tool creators:** the news applications team at *ProPublica* saw their interactive projects not as mere explanations of complex issues, but

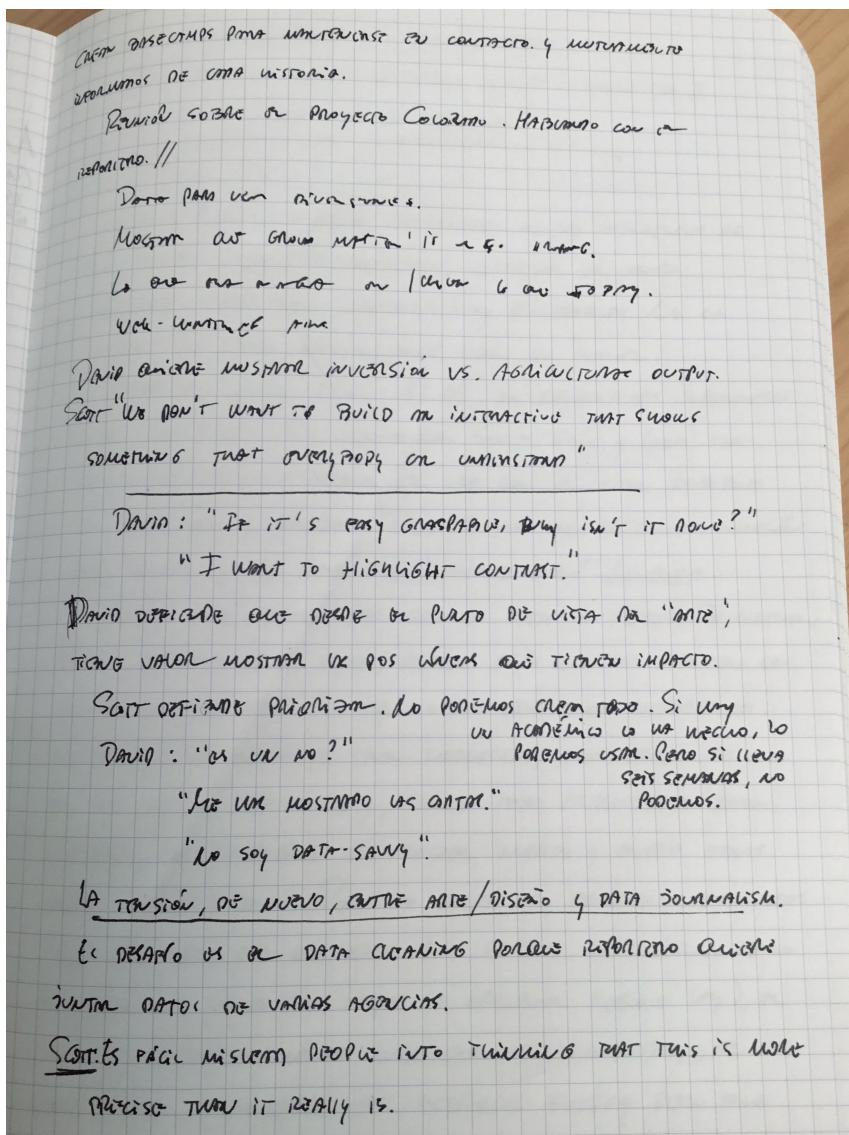


Figure M4

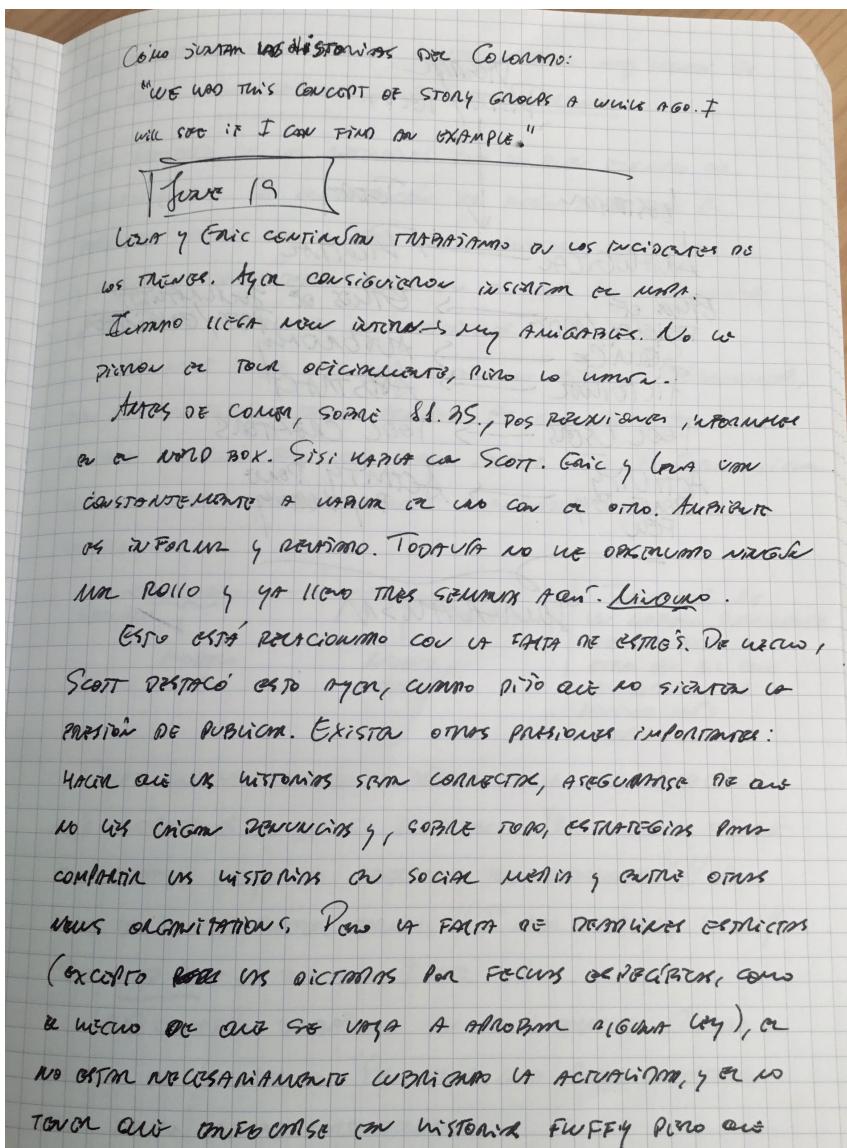


Figure M5

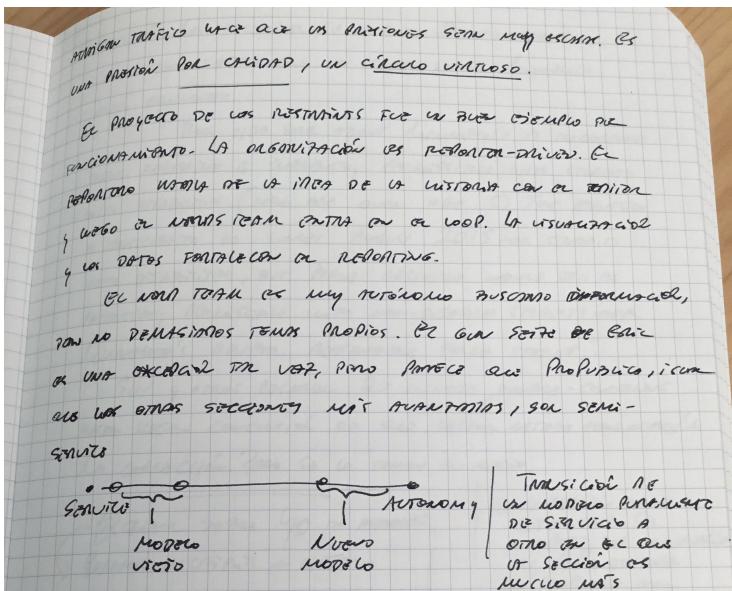


Figure M6

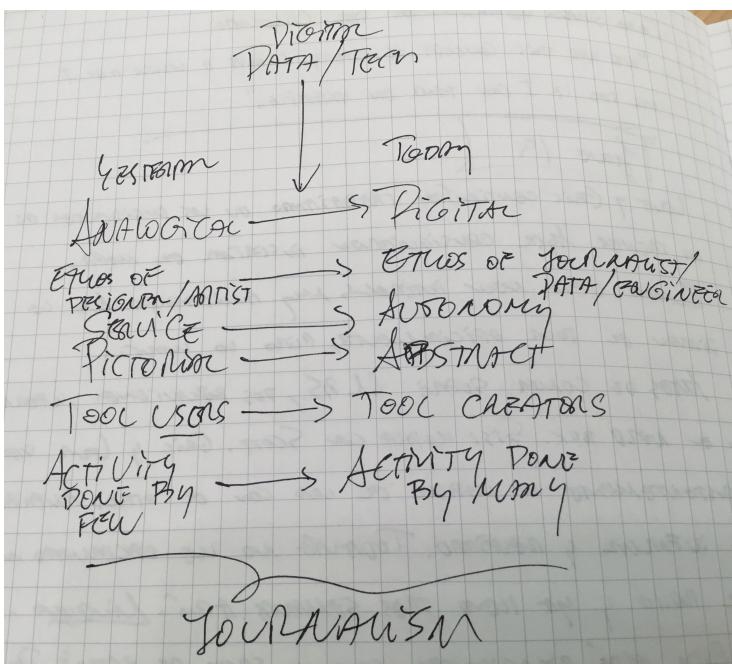


Figure M7

as tools that empower readers, and allow them to find themselves in large data sets. The graphics team at *Univision*, on the other hand, didn't just produce news graphics to be published, but also developed tools for internal use, which non-designers could use to create simple statistical representations, like bar graphs.

**6. From an activity done by a few to an activity potentially adopted by many:** In some conversations, professionals described a present when news graphics wasn't the exclusive domain of a small team within the newsroom, but a skill that could be embraced by anyone.

## INTERVIEWS

To develop a constitutive theory of transition in news graphics, and to face the hypotheses of this study, I decided to verify my observations at *ProPublica* and *Univision* with a broad comparison to the thoughts of news graphics professionals at other English-speaking newsrooms. First, two students of mine from the University of Miami attended the Malofiej International Infographics Summit in Pamplona, Spain, in March, 2016. They interviewed the following news graphics professionals:

From *Los Angeles Times*: LenDe Groot, head of data visualization.

From *The Guardian*: Xaquín G.V., head of the visuals department.

From *National Geographic* magazine: Fernando Baptista.

From *NPR.com*: Brian Boyer, head of visuals.

From Ohio University: Professor John Grimwade, formerly director of graphics at *Condé Nast Traveler* magazine.

From Augsburg University: Professor Michael Stoll.

In May 2016, another four students conducted interviews in New York City and Washington DC:

From *The New York Times*: Steve Duenes, head of graphics, Alicia Parlapiano, Hannah Fairfield, Archie Tse,

From *The Wall Street Journal*: Jessica Yu, global head of visuals, Carlos Tovar, head of graphics, Julia Wolfe, Chris Canipe, Stuart Thompson, John Keegan, Brett Taylor, Randy Yeip.

From *ProPublica*: Scott Klein, head of news applications, Sisi Wei, Lena Groeger.

From *FiveThirtyEight*: Allison McCann, Ritchie King

From *QZ.com (Quartz)*: Sarah Slobin, head of graphics

From *The Washington Post*: Kat Downs, head of graphics, Chiqui Esteban, Dan Keating, Samuel Granados, Ted Melnik, Tim Meko.

From *National Geographic* magazine: Kaitlin Yarnall, former head of graphics, John Tomanio, current head of graphics, Álvaro Valiño, a freelance designer.

From *Vox.com*: Javier Zarracina, head of graphics.

I complemented these interviews with conversations with data journalists and news graphics creators John Burn-Murdoch, from *The Financial Times*, and Nathaniel Lash, from the *Tampa Bay Times*. Some of the interviews are quoted extensively in the next chapter, while others were used to provide context and reach theoretical saturation.

There's a reason for students being in charge of conducting many of these interviews: Some of the literature about analyses based on grounded theory methods warn about "reciprocal shaping" (Birk and Mills 2015, pp. 55): the effect that mere presence of the researcher among the observers may have on what they share openly.

Reciprocal shaping wasn't something I worried about during my preliminary observation at *ProPublica* but in this new step of the project I wanted to see if the thoughts of news graphics professionals changed if it was students who elicit them. That's the reason why, for instance, part of the *ProPublica* news applications team was interviewed again in 2016. I didn't detect any significant differences between the semi-structured interviews I conducted, and the ones my students did, though.

The presence of the researcher among the observed is a matter of extensive discussion in the literature about grounded theory, so let me explain which grounded theory paradigm I adopted, the interpretative/constructivist one, as it is important to understand my role in the analysis.

The first generation of grounded theory began with *The Discovery of Grounded Theory*, by Barney Glaser and Anselm Strauss, published in 1967 (Urquhart 2013, pp. 58). According to Kathy Charmaz (2011, pp 168) by 1990 two versions of grounded theory had developed, each spearheaded by one of the authors of the foundational book.

Barney Glaser created the positivist version of grounded theory, which assumes "an objective and social world that exists independently of humans can be apprehended, characterized, and measured" (Urquhart 2011, *ibid.*) Anselm Strauss, in collaboration with Juliet M. Corbin, founded a postpositivist version which, according to Kathy Charmaz, "[forces] data into preconceived procedures,

thus losing the fundamental grounded theory emphasis on emergent analysis.” According to Charmaz, Strauss’s and Corbin’s technical procedures “undermine creating emergent theoretical categories” because they aren’t flexible enough.

In this study, I have adopted Charmaz’s constructivist grounded theory, a third paradigm established in the early 2000s. The reason is that it “seeks interpretive understanding rather than a variable analysis that produces abstract generalizations separate from the specific conditions of their production,” it treats methodological strategies “as flexible guidelines rather than rigid rules,” and “places the researcher as well as the researched within the field of inquiry” (Charmaz, *ibid.*)

Constructivism assumes that social reality is a construct that can’t be understood apart from the actors who operate in it, which includes researchers themselves. As a practicing news graphics designer and academic, and an active member of the news graphics community, the constructivist paradigm suits me better. I am part of the history of news graphics outlined in the preceding chapter, as I’m part of the present described in the interviews in the following one. In fact, I treated my experience and assumptions as a source of data that I could compare to other people’s experience, as hinted in the introduction.

Another important point in Charmaz’s constructivist grounded theory paradigm is that it de-emphasizes generalization. It prefers to interpret a specific reality in a point in time, even if it puts it in historical context, as I’ve done. This is a particularly relevant point highlighted by researchers who have conducted qualitative studies of news media.

In their introduction to a book collecting short ethnographic studies, Paterson and Domingo said that “findings in one country can, and probably should, be tested in other countries” (Paterson and Domingo, 2008, pp. 9) This applies to the present study as well. I can’t, and won’t, claim that the theory of news graphics I’ll describe applies to the entire news graphics field in all countries, or even to the entirety of news media in the two countries I focused on, the United States and, to a much lesser extent, the UK.

I studied only a sample of the most visible English-speaking organizations in the news graphics world, all chosen because either of their success in the Malofiej International Infographics Awards (*The New York Times*, *The Washington Post*, *National Geographic* magazine, *Los Angeles Times*, etc.) because they are considered at the forefront of the development of digital journalism based on data (*Pro-Publica*, *FiveThirtyEight*, *Vox.com*, *NPR.com*, etc.) or because they could serve as controls (*The Tampa Bay Times*, for instance.) The reality at smaller or less innovative organizations may greatly differ from what I describe in this study..

I did my best to include multiple people at some organizations following some advice from the academic literature: “Try to ensure that each question asked is answered by more than one data source. [This] ensures that information elicited from each key informant is corroborated by information from others—preferably people who have different perspectives on the subject or who occupy different positions in the project from initial informants” (LeCompte and Schensul, 1999, pp. 131).

I also interviewed professionals and academics with a long history in the field, like Fernando Baptista, John Grimwade, and Michael Stoll, to provide historical perspective and provide controls. This particular mixture of news organizations and individuals also has a comparative purpose: I was interested in seeing if the codes that emerged in all interviews were the same or differed in noticeable ways. The former is true. They were mainly the same.

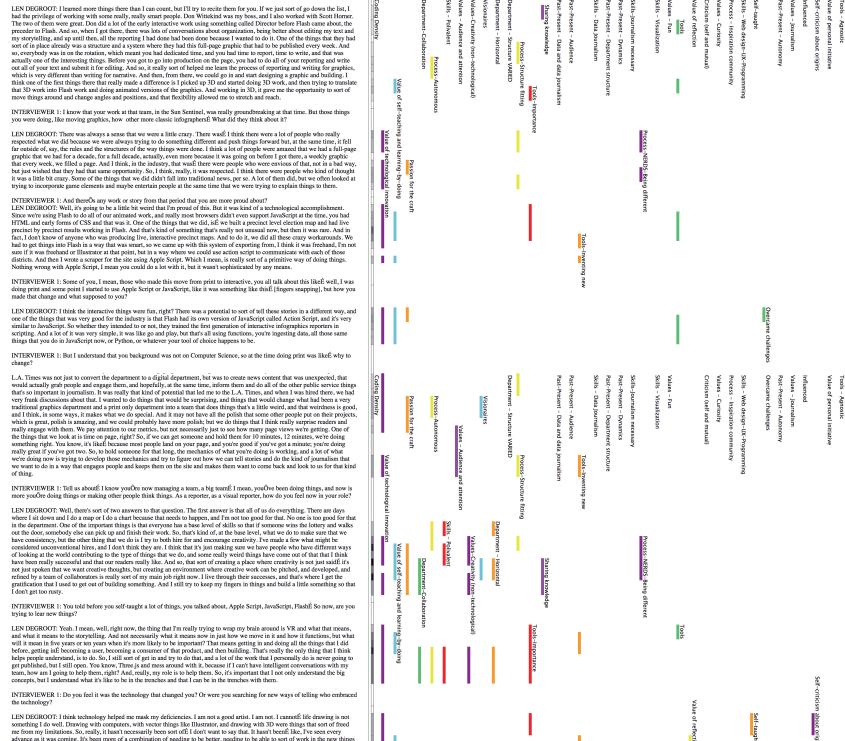


Figure M8

The goal of the combination of the preliminary observations and the series of interviews was to explore a culture, in the sense of “beliefs, behaviors, norms, attitudes, social arrangements, and forms of expression that form a describable pattern in the lives of members of a community or institution” (Schensul, Schensul, and LeCompte, 1999.)

This culture can't be said to belong to all news graphics individuals, groups or teams. It belongs just to the ones included in this study. However—and this is something that is hinted in the data—it is a culture that, according to the interviewees themselves, may ultimately permeate practitioners in other places, as elite publications like the aforementioned are highly influential in the field.

Students conducted semi-structured interviews. This means that they weren't provided with a specific questionnaire, but given some guidelines on what to look for. Semi-structured interviews are better conceptualized as conversations in which the interviewer creates the conditions for the interviewee to feel comfortable enough to share thoughts about the matters that relate to the study. We followed recommendations from the academic literature, such as:

1. Establish a level of comfort and ensure understanding of participant rights.
2. Move into broad questions that create openings for the participant to begin to speak from their experience.
3. Probe for clarification, when appropriate.
4. Note meaningful junctures in participant's story to which you'll return later in the interview for greater exploration and depth. Move to deeper questions.
5. Support the flow of the narrative by encouraging the interviewee to return to the most relevant thoughts. (Galletta 2013, 47-50)

As for the questions, students were first given a form to be read for and by the interviewees, explaining the scope of the project and their right to read the transcripts of their interviews, edit or tweak them, or even, in extreme cases, withdraw their words entirely from the final version of this study. Students were informed of the main goals of this project and instructed about focusing on the overall theme of “change,” based on—but not limited to—the transitions outlined in previous pages.

Appropriate opening questions, after the required introduction, would be “what are the most significant changes in the work that you do in the past ten or fifteen years?” Semi-structured interviews proceed by reciprocity, so further questions are built based on previous answers, encouraging interviewees to be-

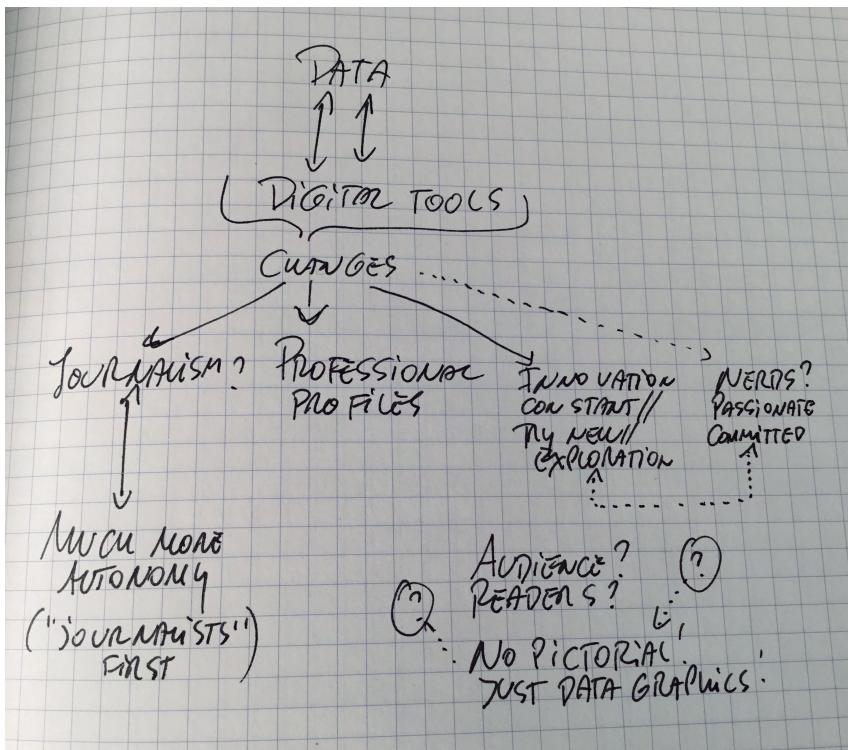


Figure M9

come more and more specific about what they mean. The main goals of these interviews were to identify:

1. The main changes observed by interviewees regarding professional values, technologies, departmental organization, and news graphics products.
2. What they thought about possible logical connections between those changes: How a certain novelty may elicit the appearance of another.
3. Their personal feelings about those changes.

Participants were also asked about their beginnings and professional backgrounds. Interviews were video-recorded and will be made available on this project's website, [www.nerdjournalism.com](http://www.nerdjournalism.com), along with their transcripts, for use by future researchers.

## CODING AND THEORY

Once the interviews were transcribed, I used NVivo, a qualitative research software tool, to do the open coding. This is the first coding step in grounded theory, in which the researcher may label each piece of speech in one or more ways.

This time-consuming process yielded more than 300 different codes that were likely meaningful to the researcher such as “data is central,” “feels good about changes,” “values journalistic skills above everything else,” or longer ones such as



Figure M10



audience, or the drive to be constantly inventing new ways of delivering useful information, so I could group them together, mapping the interactions between them.

In parallel, I drafted at least five versions of a formative research model, using integrative diagrams that portrayed the relationships between categories and the codes that they contain. An integrative diagram is a “visual device that furthers cumulative integration [...] These diagrams built on each other through a process of testing and questioning.” (Urquhart 2013, 114.) They also display

The first versions of this diagram were fairly simple (Figure M9.) The final integrative diagram, which is used to guide the theory built in this study, is shown in the first few pages of the next chapter. As explained before, certain qualitative methods, such as ethnography and grounded theory don’t necessarily test hypotheses, in the same way that other research methods do.

Rather, the initial theory—which is based on the questions and hypotheses outlined at the beginning of this section—gets expanded, transformed, and more fine-tuned, after taking the data into account. My study is more constitutive than causal, in the sense that it intends primarily to describe the way that news graphics creators see themselves and the forces that shape what they do and how they conduct their activities; the search for causal links is secondary in this kind of analysis (Cramer 2016: 21.)

## MALOFIEJ ANALYSIS

The final element of the theory of news graphics described in this dissertation was an observation of the Malofiej International Infographics Awards. This is a competition that was launched in 1992, and that is still being held every year at the School of Journalism of the University of Navarra, in Pamplona, Spain.

The Spanish chapter of the Society for News Design, which organizes the Malofiej, publishes a book every year showcasing the winners of the preceding edition. They have published books up to 2016. Figure M10 shows the covers of a few of them.

I collected data from all those books except one, which includes the 1995–1996 editions. It was impossible to obtain a copy of it. Another missing piece of information was a CD-ROM that was published along with one of the books, and that included the winners in digital/Online graphics categories. This limitation didn’t compromise the analysis, though, as the patterns and trends we’ll see are largely visible even without them.

The resulting spreadsheet (Figure M11,) available in [www.nerdjournalism.com](http://www.nerdjournalism.com), has 1,890 rows, each corresponding to one entry chosen by the Malofiej jury.

The columns correspond to the variables I counted:

- Volume: The book number
- Year of competition.
- Medal: Gold, Silver, or Bronze.
- If the entry received any special recognition, besides a regular medal.
- The type: Print or digital.
- The category: Malofiej organizes its awards in broad categories such as “breaking news and non-breaking news.”
- The subcategory: Within each category, the awards can be further subdivided into more specific ones.
  - The title of the entry.
  - The publication or author.
  - The region or continent of origin.
  - The country of origin.
  - The central element of each news graphic showcased.

For this last variable, as I'll explain on Chapters 4, 5, and 6, I was interested mostly in seeing if the values and goals expressed by professionals we interviewed were related to the kinds of products they create. One of the results I obtained is that news graphics that had at their center pictorial explanations or descriptions—illustration how physical entities are or work—used to be win the majority of awards up to the end of the 2000s. Today, on the other hand half of the awards in the Malofiej competition go to news graphics that prominently display abstract representations of data, such as statistical graphs, maps, and diagrams. This is a change that results from the increasing emphasis that news graphics professionals put on digital data technologies and tools, and also on their interest in being considered journalists, not just graphic designers or “artists.”

Additional columns in the data set quantified whether different kinds of elements—pictorial representations, data graphs, locator maps, data maps, connection diagrams, photographs or videos, etc.—were present on this entry. In these cases, regardless of if they were the main element of each news graphic or not.

The details, results, and limitations of this quantitative exploration of the Malofiej Infographics competition, and its relationship to the theory of modern news graphics we'll build, are discussed in Chapter 5.

## CHAPTER 4

# RESULTS: HOW GRAPHICS JOURNALISTS THINK

If it were true —it isn’t— that an image is worth a thousand words, I guess that an image depicting those thousand words would be worth even more. When analyzing the multiple interviews conducted for this study, one of the first things I did was to ask R, the programming language I used for part of the exploration, to generate a word cloud, a very rough depiction of the most frequent words uttered by the news graphics professionals interviewed (Figure R1).

Despite the fact that words cloud are essentially useless —or even misleading— as analytical tools (Harris 2011), they may serve as the first step towards identifying certain patterns —besides being nice-looking illustrations. The first striking feature is the overwhelming presence of the word “data.” News graphics designers don’t talk much about illustration or graphic design styles anymore. Their focus has shifted from illustration-based “infographics” (a term that was barely mentioned in the interviews) to web “visualization,” and from off-the-shelf tools to code. An in-depth exploration of the interviews and the quantitative data gathered from the Malofiej International Infographics Awards confirms this shift.

But the word cloud, as limited a tool as it is, reveals a second feature: words that are traditionally cherished in the world of journalism, such as “story,” are also very prominent. This reflects a systematic pattern in the interviews conduct-

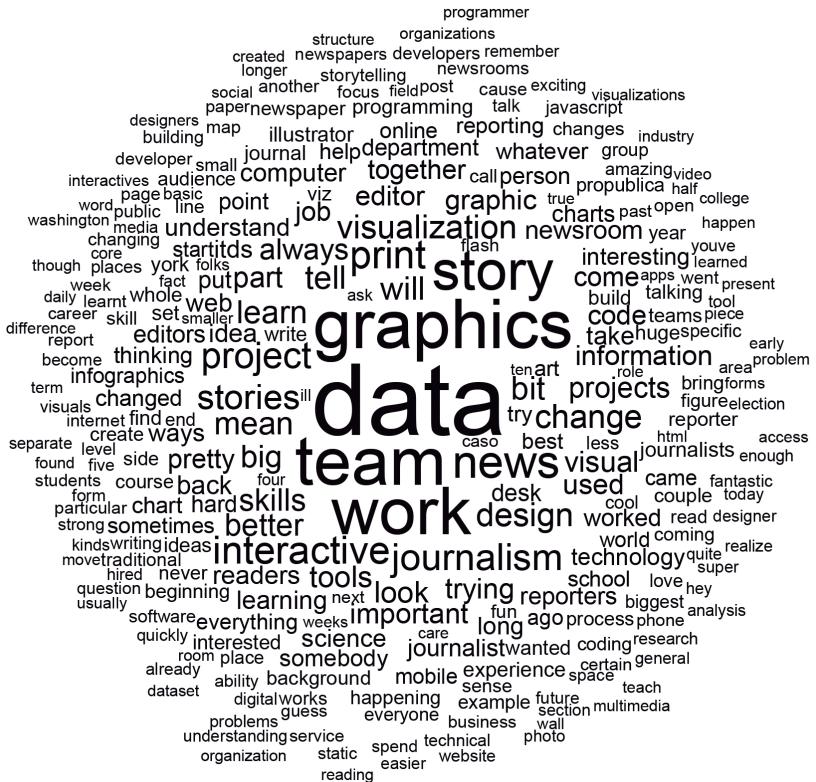


Figure R1

ed for this study: the field of news graphics has changed rapidly and profoundly in the past decade, but it sticks to professional values that precede the emergence of digital technologies.

News graphics journalists of the current third computer age speak differently than the pioneers of the first and second ages. The latter used the language of design and visual arts, with its emphasis on illustration, typography, color, etc., and rarely mentioned technology as a defining feature of their work. Professionals nowadays, particularly those with fewer years of experience, talk about software tools and programming languages much more often, and as a defining element of their daily practice.

Professionals who didn't experience the first computer age first-hand see digital technologies with great optimism, but without the messianic and salvific

rhetoric criticized by a streak of critical commentary that became common in the 2010s (Carr 2010, Lanier, 2011, 2014, Morozov 2011, 2013). These news graphics professionals aren't wary of the constant flux in the profession. They are enthusiastic about the possibilities of digital technologies but they see them not as a goal in themselves. They think of them as means to do better journalism. In this, they agree with those who have decades of experience in the field.

Something similar could be said about the increase of autonomy in newsrooms, which many of the interviewees mentioned. Following Edward Tufte's admonition quoted in preceding chapters, news graphics professionals today are fulfilling their old aspiration of being content creators, rather than content decorators. Rhetoric is giving way to reality.

Professionals who design news graphics nowadays often define themselves with labels like "reporter" and "editor," rather than with "designer" or "artist." It is with this phenomenon that I begin this exploration of the themes that appeared in the semi-structured interviews we did, and of the connections between them.

In Chapter 1 I explained that the term "news graphics" could be understood in four different ways:

1. The craft of doing journalism by using graphics displaying information.
2. The products of that craft, such as statistical graphs, maps, visual explanations, interactive data visualizations, etc.
3. A specific kind of department that, in many newsrooms, used to hold the monopoly of news graphics production.
4. The professional community created around the craft

This chapter focuses mainly on points 1, 3, and 4. Point 2 is covered, too, but it's described in greater depth in the following section. Both the interviews and the previous ethnographic observations helped shape and even depart from the initial hypotheses, which were listed in the chapter about methodology:

**H1.** The rise of digital data and technologies have indeed changed the values that news graphics professionals claim to hold. In the past, news graphics professionals talked about themselves as designers and artists, but today they stick to traditional journalistic values that are identical to other reporters and editors.

**H2.** As a consequence, the kinds of professionals hired in newsrooms have also changed, to incorporate more journalists who can take advantage of digital data and technologies, like web developers, computer engineers, etc.

**H3.** The need to deal with digital data, and subsequent changes in values

among news graphics professionals, has affected newsroom dynamics, making news graphics teams more autonomous.

**H4.** News graphics professionals and teams are creating many more data-driven graphics, based on abstract charts, graphs, and maps, and fewer pictorial schemes and explanations.

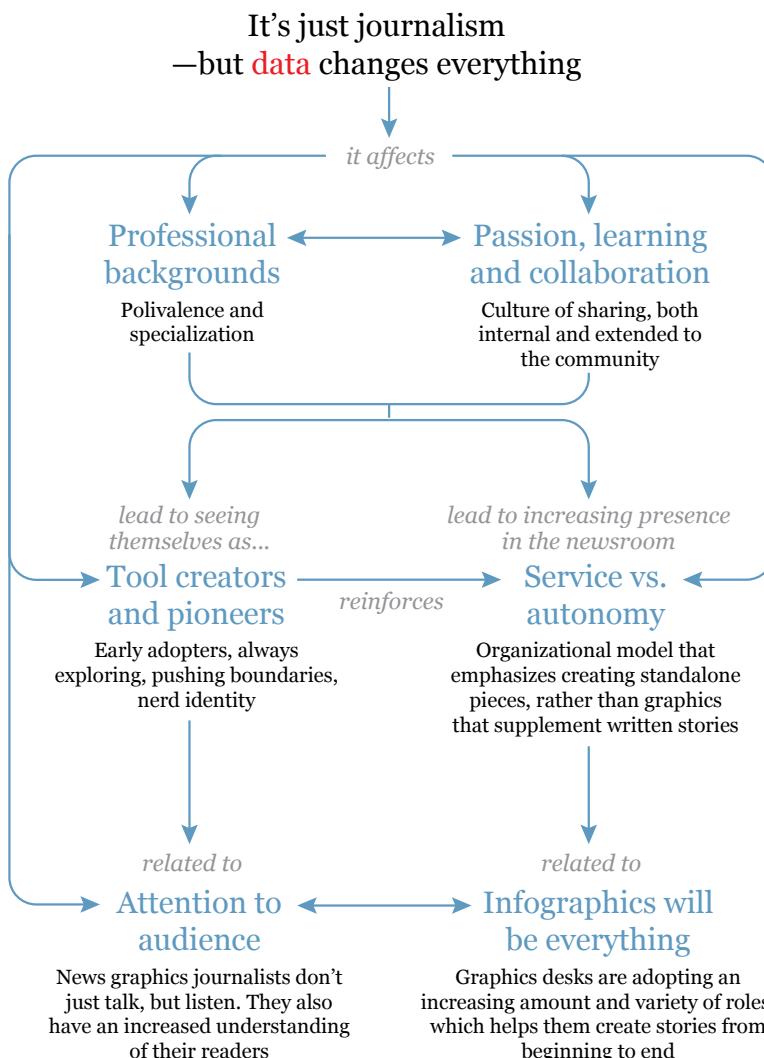


Figure R2: Final integrative diagram

Several examples of new theory elements that arose from the data, rather than be part of my initial set of hypotheses from the very beginning, will be described in the pages that follow. For instance, when developing my initial list, based on a study of the professional and academic literature, my own experience, and conversations during the ethnographic observations at *ProPublica*, I didn't foresee that the access to audience data would affect the way that news graphics professionals studied their readers, and reacted to their apparent wishes and wants.

Another new item that wasn't originally considered when posing the questions and hypotheses for this study was the fact that news graphics professionals see the product of their work not just as "graphics" alone anymore, but as complete multimedia storytelling experiences that can incorporate any kind of object, from text to videos, from news graphics to virtual reality technologies. News graphics professionals, as a consequence of this and other factors, consider themselves to be pioneers when it comes to technological innovation in news media.

The elements of the theory, and the relationship between them suggested by the interviews, observations, and quantitative analysis of the Malofiej awards, are outlined in the constitutive diagram on R2. This diagram will be completed with some extra elements in the conclusions section.

A summary of the interviews can be found at the end of this chapter.

## IT'S JUST JOURNALISM —BUT DATA CHANGES EVERYTHING

Despite the centrality of data —again, see Figure R1,— and tools in the discussions about the present state of news graphics, the most salient theme in many of the interviews with professionals was that journalism lies at the core of what they do. As we saw in the history chapter, graphics designers in the past insisted on this point repeatedly, but they did so as a way of gaining respect from traditional reporters and editors, who were generally educated to use words as their main means of conveying information to the public. (Munk, 1992, Sullivan, 1987.) It was also a self-reaffirming strategy for what was not yet a solidly established practice within newsrooms (self-reaffirming statements are still common today, though, as we'll soon see.)

It's important to begin this chapter emphasizing the centrality of journalism in all interviews conducted because it permeates what the interviewees said about many other topics we'll discuss: Professional backgrounds, team structures, relationship with other professionals in the workplace in terms of being a "service"

desk or an autonomous unit, the role of innovation and new tools, etc.

In the current section we'll see that quotes about the critical role that journalistic skills and values plays in news graphics can't be decoupled from the other many themes interviewees talked about.

☒☒☒

A single sentence from Len DeGroot, the head of data visualization at the *LA Times*, summarizes the centrality of journalism; DeGroot was discussing how tools, techniques, ways of presenting stories, etc., differentiate his team from other areas, and what the right label for a team like that should be nowadays (he entertained "transmedia.") In the middle of his exposition, he said:

I mean it's just journalism.

And he emphasized that journalism is, in great part, good editing and curating in service of readers, and works as an antidote to the temptation of using new technology just because it's novel —even if DeGroot and many others, as will be described in another section of this chapter, are great believers in the possibilities of technological innovation and experimentation:

Editing is a critical skill [...] And it's something that we need to continue to work on and continue to adapt to new mediums. Our editing skills for new mediums has not been fluid. [...] I've done things just because we could do it. I mean that's sort of the fun of technology. But that really does come back down to editing, right? It's the, that's the voice of reason. The fact of the matter is graphics departments are shrinking and we don't have the time to devote to that. It's like everything we do is precious not because we made it, but it's precious because it's an opportunity that we can't afford to waste. [...] We have to be aware of what we choose to do, and understand when we're choosing something for us as opposed to our reader or the story.

When questioned about the most important traits of a person who design news graphics, DeGroot added:

I think there is, and generally, it's curiosity about the world. I think that's what draws people to journalism, is there's a curiosity about the world. A sense of wanting to describe the world to other people. And I think that's sort of a core value that

I don't think has ever really changed. People may lose that sense of mission, and fall out of journalism, or decide to leave journalism, but the people who are in it, and stay in it, kind of have that need, right. It's not something that's facile; it's something that's deeply held within people. So really that's sort of the thing that I look at. Even then, compared to now, people who were doing good work were doing good work because they were creative. And they were willing to look at the world in different ways and try to explain it. That hasn't changed either.

These views were reproduced almost verbatim by many other of the professionals interviewed, regardless of their academic backgrounds, skills, or roles in newsrooms. Both newcomers and professionals with decades of experience expressed the same priority. This is also regardless of whether the companies they work for publish print products and have had a long life, or if they are web-only operations launched in the past five or ten years.

Hannah Fairfield, a graphics editor at *The New York Times*, talked several times about the importance of having good coders in the newsroom, but also added that “news judgment” is critical:

The department has a lot of developers, and they are extraordinarily good at front end development, and there has been a lot of evolution of JavaScript libraries like D3 and many others that really helped us be able to do our jobs better. So that evolution has been pretty exciting. When I think back to using just Excel, and just Illustrator it seems like a much simpler time. But all of these tools, are just tools, they are ways to allow us to produce excellent stories, excellent visual stories, and excellent journalism. But they aren't ends to themselves, understanding the software and the tools that we have are just one step towards getting to storytelling, which is full of wonderful things like excellent reporting, and excellent news judgment. Being able to shape and edit a real narrative whether that narrative be words, or visuals or the integration of words and visuals together and all of those things are really the most essential things. I think stories that are sometimes the best told are the ones where you don't see the technology behind it, it's just part of the whole storytelling experience.

Scott Klein, deputy managing editor at *ProPublica*, agreed on the point about the “news judgment” skill:

I always say that there are three things you have to know to work here in my team, one is journalism, one is design, so you have to be a good journalist, to have a what

we call an editorial sense, you need to understand what's a story, what's its intent, how to tell the facts and how to make sure you write things like that. Some design talents, so an ability to at least follow a design template. And code. And by far, the easiest of those three to teach someone is how to code.

Klein reflected many other interviewee's opinions when discussing what constitutes a successful visual piece, and what its impact is:

The same factors that you use to evaluate the success of a story, we use to evaluate the success of a graphic, or interactive database. Did it achieve the editorial goal we had set out for it? Did it tell the story that we thought we were gonna tell? Or that we realized what we had as we started to report things out. So it has editorial goals that we actually make sure it's gonna meet before we even publish it. So there are editorial goals that it must meet and successes based on whether it tells the story that we intended, that we thought we have at the beginning. But certainly, the mission of the organization [*ProPublica*] is to impact the world, so it's important to us in all of our projects that our graphic or interactive database teach people something about their world and help them make better decisions, help them make better policy decisions or help them see things in a way that they didn't see it before so they can make change. It's up to them to decide what the change is but they can certainly make a change. Obviously, traffic in today, the environment is also very important so we wanna make sure that lots and lots people see it. It's a great success if it generates other journalism. So if we can create something that inspires other newsrooms to write stories, or to do investigations, that's also huge success for us.

*Wall Street Journal's* (WSJ) interactive designer Chris Canipe, who began his career in 2011 as a print graphics reporter, said that the "it's just journalism" factor is the first thing to look for when doing new hires, as well:

One thing that I've learned in the last couple of years [...] is that it's the journalist part, like the idea that somebody can come in and really just execute a project from start to finish and do it simply. I think that if I were hiring somebody right now, the thing that I would be looking for is just the ability to tell a story. In a lot of ways, I think that we're, I think I would pull up the throttle a little bit on this idea that we need to have best coders on our team, the best developers, people that know the best libraries or can build really complex project really quickly. I think that what I do look for is somebody who can just tell a story visually well.

This point was confirmed by Jessica Yu, WSJ's Global Head of Visuals, who

said that when she was hired, the first skill her employers looked for was the ability to gather, process, and present information effectively:

I would say that it's not as much about the platform at the end of the day but more about the journalism. Choosing the right stories and figuring out what is the best way to present them visually and then iterating out what does that mean for mobile and desktop and for print, and what can you reasonably in the times spend with the number of people relative to the other stories that you have to deal with on any given day for each one. [...] I guess if you came from a traditional print Adobe Illustrator background, you might learn more about, HTML and JavaScript, CSS, all of that sort of interactivity stuff, mobile design, databases, things like that. Likewise, I think some people who came from a more programming background and somehow found themselves in journalism learn a lot more about journalism and data visualizations standards for that to how to tell a story, and so it's been a nice mixing of skills and talents. It's quite fluent. [...] I think at the point when I was looking for a job, they wanted to see a portfolio of work, it was obviously static, most of it. I did have some web skills at that point as well, but it was basically a plus. They wanted to really know that I understood the journalism and I knew how to find data and be fair about the presentation of it. All of those standards still hold true; we still like to see if you're given a story, how you would approach it. What is the right dataset that tells the story, what part of that dataset and how do you weave it together to really get that point across to the readers?

Carlos Tovar, the head of graphics at the *WSJ*, corroborates Canipe's and Wu's words, and describes the transition between being and art department to a content-creation unit that fosters collaboration and encompasses work that isn't just news graphics alone anymore:

Ten or fifteen years ago anybody would say that graphics department was a service desk. "We need a graphic." They come to you. [...] Technology has worked against to the industry for so many cases [...] When I started, they called us art department. And then we moved to graphics department, and we have the visual team. So when you were starting 10 or 15 years ago, you basically needed to have one skill. But we really had people with both skills. We have someone as a reporter, who is interested in doing visual skills, you have to learn technical skills to use Illustrator. Or you were a graphics designer who was interested in news; you have to acquire skills becoming a reporter and improve your news judgment. Now I think you have three skills. One is you have to be a good designer. You have to understand news and data visualization. You also need to have really strong technical skills. So knowing

how Illustrator, learn CSS, HTML, JS (JavaScript), and D3. And then you really need good reporting, news sense [...] It's really hard to find people can do the three of them. So usually people from school who are really good developers and have good science skills, but they don't have really strong news skills. So you really need to teach them.

*National Geographic's* head of graphics, John Tomanio, said that news graphics went through a brief phase when designers got blinded by technological wizardry, but now the craft is back to core journalistic roots. This is a theme we'll explore more in-depth later when discussing how news graphics professionals approach new technologies and platforms:

In the future I think there is going to be a bit of a backlash against data visualization and I am not the first to echo this, I mean this is sort of the Grimwade school of thinking, Nigel Holmes says that same thing, storytelling first, and there is a lot of data visualization for data visualizations sake with a lot of colored lines and I think that will run its course and we'll return back to like, what this is all about. It's about telling stories, not just the gee-whiz effect of a cool cloud of lines and shapes that don't really tell a story but make something nifty or artistic. I mean, there is space for that of course but that's more art than data journalism or visual journalism. So, I would like to think we will return to that and of course more and more things will be web based and we will see print dying away in most realms but I think, certainly *National Geographic* magazine with its slightly under \$4 Million domestic circulation, is going to be around for quite a while.

This tension between a blind passion for technology and maintaining a set of journalistic core principles is a common theme among professionals. Tools are means to an end, not an end on themselves, even for those professionals who are more tech-savvy. Here's the *WSJ*'s Jon Keegan:

I know Scott Klein from *ProPublica* had the line: Don't join any code churches. I like that idea a lot because I do see that from time to time [...] people getting so obsessed with technology and coding. It's almost like a distraction from what you are doing with it. For me, I want to make great visual and really interesting and unique experiences. The code is the means to that end. And sometimes I think the code itself can be distraction cause you could spend your lifetime mastering JavaScript or finding the next new thing, with Ruby as ascendant. And now there are a million different ways you could spend, just studying this little hot new topics with computing. But at the end of the day, it's good to learn, but don't be distracted and go all

in with one thing, thinking it's going to be the solution because I promise you there is always going to be something else. So try to stick to your core ideas you want to execute and don't be distracted too much by the technology you choose. I feel like that's an important thing to keep in mind in a newsroom that codes.

Kat Downs, head of graphics at *The Washington Post*, agreed:

We need to focus, as an industry, not only on the technical skills that allow us to do what we do but on the skills that really differentiate us. I really believe that those are things that are focused around using visuals to tell stories so they're not, can you create a complex interactive graphic with d3.js that has everything animated on scroll and that kind of stuff. It's can you process a news event and present it through visuals, can you illuminate something through cartography, can you illuminate something through visualization because that is really valuable [...]. That value that comes from thinking as a visual journalist and that value that comes from having a strong aesthetic and a strong contribution to journalism. That is something that will continue to differentiate us and keep our jobs and make sure that there is something else for us to do moving forward, even if tools make it easy for anyone to create a complex story.

Brian Boyer —who oversaw visuals at *NPR.org*, has a background in computer science, and only later in his career got a degree in journalism— was blunt about why he got into a newsroom after working as a software developer for several companies: because of a vocation for public service.

I just got sick of my job. I got sick off using my skills just to make rich people wealthier. Then [I thought] about getting a degree in Public Policy or Law, and this opportunity to study journalism at Northwestern just sort of appeared out of the blue [and] it just sort of struck a nerve with me. I said "oh journalism, that's cool," I had worked on my high school newspaper, I was the cartoonist and graphics editor. But I never thought about doing journalism for a living. And so I googled it and I read about the principles of journalism and I read the journalist's creed, which was from the founder of the Journalism School in Missouri [...] So very quickly next week I took the entrance exam, took the GRE's and the week after that I wrote an entrance essay and a few months later I was in school. It was a year at Medill, at Northwestern. It's been a fun eight years ever since.

He said that the people who worked with him are, above all, journalists:

I will defend that everyone on my team —a photographer, a photo editor, a video producer, a programmer, an interaction designer, a graphic designer,— that they are all journalists, right? They were all doing acts of a journalist. Whatever. Reporting [...] The metaphor I used to use to describe what a hacker journalist is a photojournalist, except instead of a camera, they've got a keyboard. But we are, we were still committing acts of journalism with a piece of technology that you might not understand. You might not know how to use this piece of technology.

Boyer encouraged people who, like him, come to news organizations with technical backgrounds to learn from experienced journalists how to interrogate sources:

It may be an obvious one, but what the young guns could learn from the folks who have been doing this a while is pick up the fucking telephone. I've seen it on my team, were folks basically assume the data doesn't exist if it's not Online. It's absurd! Or you can't figure out how to use the data, and so you think it's messy you think it's broken. Just seriously call the source call the government just get that person on the phone it seems so simple and obvious, but I've seen a lot of folks just completely stumble on that. And I understand why I mean I hate telephones. I do not have a phone on my desk, I keep it in a drawer or unplugged so that people won't call me. It's a simple thing.

Both newcomers and seasoned professionals emphasized that traditional skills like storytelling and even sketching are at the core of news graphics. Here's Álvaro Valiño, an independent designer based in DC:

In the past there was more time to prepare the projects, more time to discuss and have conversations, do sketch sans drafts along the process. I find that it is pretty common with the younger generations, they jump straight to the code, and they start doing drafts or sketching directly into the code, and I think they are missing an essential part where you ask yourself the first question when you are in front of a piece of paper, and you have to put it in some ways. For me using a pencil and piece of paper is the best way because you remove yourself from every technology that in a way can force you to take some kind of way because it's easier with this technology. This is just my perspective; maybe I am wrong, but this is how I see these things because of how I started, and probably I feel more comfortable doing that. I supposed that other people say, you know that it doesn't make any sense and you can have exactly the same approach with different tools.

Steve Duenes, who until 2016 was the director of graphics at *The New York Times* (NYT) and now is the Associate Managing Editor in the newsroom, said that he's always searching for journalists, above all:

We're looking for good journalists. We express ourselves in a certain way. The organization depends on this department to be visually sophisticated in how we tell stories. So you're looking to really simplify things, in a journalistic way whereas all basic resource to getting information, and deep resources. And kind of creativity around the basic accurate reporting. And ability to visualize information, that can be one sort of deep skill or many variety skills. But there's no question that part of the point of being here is you're contributing to kind of sophisticated visual vocabulary that emerges from New York Times so your visual imagination and ability to execute ideas should be at high level.

As we saw in the history chapter, NYT changed the way graphics were produced much earlier than many other news organizations. As a reminder:

There was a recognition that in order to make compelling information graphics, even it's just for printed newspapers. That you needed someone who is focused on reporting information, specifically for those story forms [...] If you came here to make graphics, you were not just an illustrator taking information from some else, from a journalist who is outside of the department. The expectation was you're a journalist, and you need to be able to report information and to have a variety of visual skills to express that information.

Archie Tse, deputy graphics editor at NYT, added:

It's hard to say what the largest change is, one thing that I would say is that the one thing that has stayed the same, that is most important is that the reporting is still at the heart of what we do. Getting the data, betting the data is still the most important job. We have fancier tools now for visualizing the data, but the work of understanding the data and checking it and analyzing it, turning it into a story is sort of the same as it was when we were doing it before. [When estimating the success of a project] I still use the same measurement, which is like how well do I feel like this graphic present the story to our readers. Did it tell a really interesting story? If it did, then I feel good about it. I think that's always the measure how I judge things now and how I judged things in the past.

Tse then emphasized the independence of the graphics desk at NYT as a con-

tent-producing unit (which we'll explore in the following section):

The ideas come from throughout the department, Steve and I have ideas, things like ways of approaching things, but then people in the department also have pitch ideas, ways of telling stories and I think one of the strengths of the department is that many people in the department are thinking about the news and coming up with ideas about different stories that we can tell.

Tse's views and, as an extension, the *NYT* graphics desk's, are highly influential, as noted by several of the interviewees. Álvaro Valiño said:

I will say that the past few years we have seen a lot of things happening and I think that in a way we are settling down a bit. We are kind of maturing this field; it was an eye opener in the Malofiej this year when Archie Tse gave his presentation and spoke about how at *The New York Times* they are doing less interactive, and they are spending more time working on the journalistic part. For instance, working on better headlines, he kind of complained about the headlines that he saw at Malofiej. So I think that makes sense in a way, that we are kind of trying to, OK this is really cool, we have a lot of tools, we can explore a lot of different ways to tell a story, but we cannot forget about the essentials you know? And I suppose that after some years of a lot of fireworks it's now settling down and we are kind of trying to make sense of all of it. I think it's going to be great because we are probably going to get the best of everything. At the same time not trying to put what is essential to our work behind.

Part of the reason is that news graphics creators are taking on new tasks. Alicia Parlapiano, from the Washington DC office of *NYT*, explains that the graphics desk doesn't produce just visuals anymore, but complete stories, including the copy:

I think I do a lot more writing now [...] What we put out before was primarily charts and graphics with a little bit of text, and now it's much more of a mix. It's much more visual stories that have a fair amount of text kind of dispersed with images and charts or illustrations to kind of tell a story or give people a description of a topic or something that's happening in the world with brief amounts of text summarizing. Maybe something that 10 of our stories are getting at so then dispersing that with visuals in a way that any graphic would, to get across information visually, quicker, in a way that's more efficient than if it were just words, and more engaging than if it were just words. I do a lot more writing now for those type of

stories and we do a lot more coming up with our own ideas and pitching our own complete packages and complete pieces as opposed to taking data that is relevant to a story that someone else is working on just kind of making it fit. We are doing a lot more idea generation and staying on top of what's going on in the newsrooms and out in the world and asking questions and trying to figure out how can we add to the newspapers whole package, whole report, by giving a different kind of narrative a different kind of story on these topics that are important.

Parlapiano then added that the graphics desk's mission aligns with the core values of the *Times* and other quality news publications:

I think that the most important thing to me as far as being happy about the work that we do is sticking to the core value of what the New York Times or the news media stands for which is journalistic integrity and objectivity and telling these important stories whether or not they have a really large audience or not. So I think that the Times is still going to put a lot of its resources behind important stories, investigations, accountability, all of these important roles that the media plays that may or may not have the largest audience. Or may or may not get the most clicks but I think it's still part of our role and mission to continue that work even if it's a [...] smaller and not so important audience that's reading it. But just to stay true to that and not succumb to sacrificing that for what's going to make money even if it does keep us in business

A description of the current state of news graphics as a craft, or as a profession, should include, then the knowledge, skills, and values that are timeless, being the centrality of journalism the main one, but extending to principles of visual design or composition. However, it also needs to highlight the changes, such as the transition between "service" departments and independent units or professionals. According to most people interviewed for this study, there's one factor that lies behind the transformation of news graphics: Data.

John Grimwade, who has been graphics designer in publications in the United Kingdom and the United States, and now teaches at Ohio University, in Athens, said that technology alone doesn't explain changes in professional backgrounds, newsroom structures, and dynamics, or products:

Infographics didn't change at all for decades and decades, and I don't know how many years. Hundreds of years maybe. I don't know. And then suddenly, wham.

And it wasn't just technology, of course. It was data. There was no data around even, well, relatively recently. I mean I, there wasn't any data for anyone to do anything. And if there was, there was no way of handling it. So I mean that is a very new, we're talking about things that have only been around a very, very short time. So I don't think we should rush to judgment on that, because perhaps this is the dawn of a fabulous future. But I understand Fernando Baptista's point that, you know, as yet maybe we haven't seen anything from virtual reality beyond a sort of game, gaming, fun thing that, yeah, we just don't know if it's gonna be one of the tools that's essential. Maybe it is. I think it might be but, we'll see what happens with that. It's early, isn't it?

For *LA Times'* Len De Groot, the ability to deal with data is what differentiates new hires from past hires, much more so than being able to code or to use certain technologies:

Much better data skills, much, much better data skills [...] There's no way anyone really gets in the door if they're afraid of opening up Excel. And even if they come in with beginner data skills, it's one of the things we focus on first. That really wasn't very normal then. Back in Florida, we had this gentleman named John Maines who was our computer-assisted reporting person, and he did a lot of the data work, and then, slowly, we started to take it on. I started to take on a lot of the data work and do it in the department, but it really wasn't that widespread in the department. Now, pretty much anybody can do data work, and that's something that is not dependent on HTML, CSS to do, right? You can be able to look at data and sort of interview it and figure out where the story is. It is really something most people can do. It doesn't require, again, great brilliance. It requires doing it.

What's changed is there are some important proficiencies. Statistical proficiencies. They are much more widespread. It used to be, journalism was the field you went into because you didn't want to do math. There were newsrooms full of people that could vouch to you that either they said it, or someone they know said that. And that's no longer the case. I think there's a growing understanding in most universities that students have to come out being proficient in statistics, if not being able to question. That's really, in an age where graphics and data are so prevalent, if you can't question the data and question the source in a way that is smart; you're going to be misled. That's just the end of the day. People will be misled with graphics. And constantly mislead with graphics. Some intentional, some out of ineptitude. But it's our job as journalists to know the difference. So, that's really a core skill that I think has been a really strong change for the better.

Data not just as an input, but also as an output, and as something that influences all stages of story production. It's worth quoting De Groot extensively:

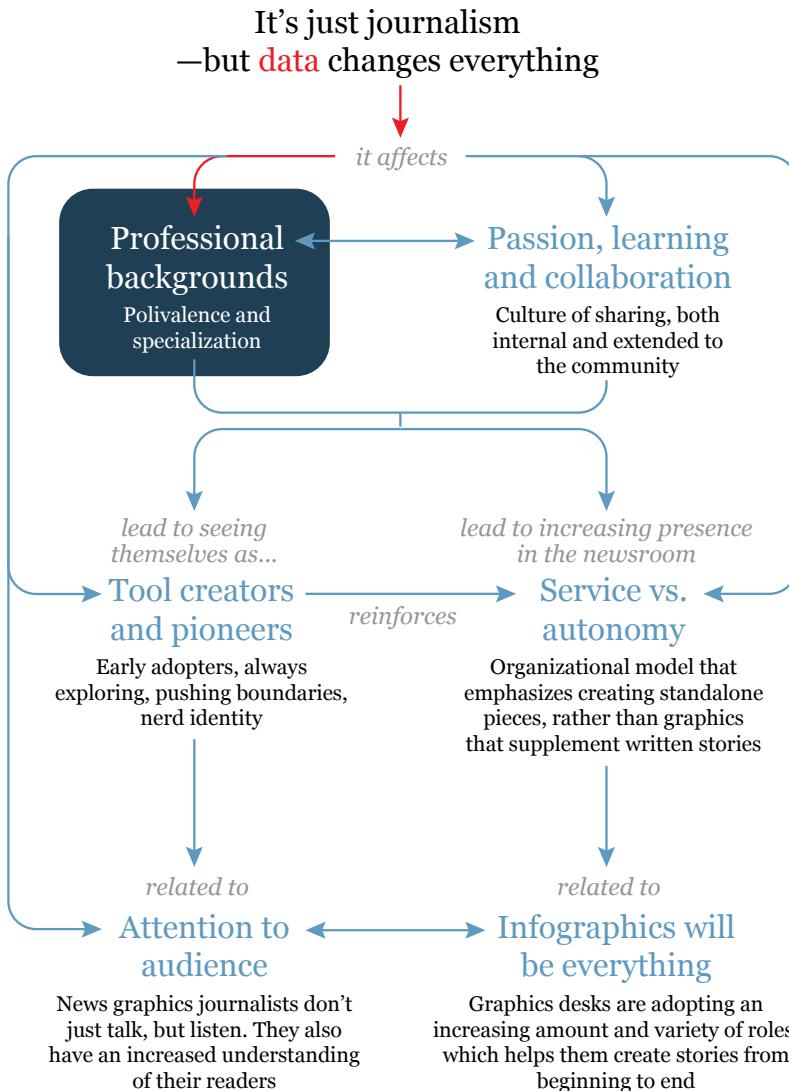
One of the biggest changes that have happened in the last 15 years is that it has been true for a long time that data has been an input to journalism. So it's been true for a long time. If you look at 1967, when the first modern car story came up, about the detour rights happened that year. He uses social science techniques, survey techniques, and data to help inform a narrative story. So the input was data, the output was words. And I think that one of the biggest changes is that the journalism is not just the input to the story, is also output. So the data comes in, we create a visualization, we create a database, and what comes out might be a narrative story, but it's also the data itself. So the data is both what comes in and what goes out. This is a huge and fundamental change in how we do journalism.

Even back then when we were doing graphics with stories, even though we were doing beautiful graphics with stories, it was almost always at large scales, like the *USA Today* a little bar chart. But when we're doing at large scale, the biggest point was always the narrative story. And the kind of the highest form of data journalism was the narrative investigative story. And I think that's fundamentally changed. I think that there are many examples now. Graphics desks around the country, who are creating graphics that though they have narrative within them, so they have lots of words in them, the point, is the data itself. And the journalism, the outcome of the journalism is the data itself.

So, as De Groot said initially, visual storytelling, of which news graphics may be considered a branch, is “just journalism,” and a part of its core hasn’t changed at all. But it is journalism that intertwines with a full embrace of data and the technologies that data enables. This interplay between old and new knowledge is what the following sections discuss.

## PROFESSIONAL BACKGROUNDS

A common theme in the interviews is the fact that data and digital technologies have made it impossible for a single person to master all tools and skills that are involved in the design of news graphics: Statistical charts, maps, pictorial ex-



planations, interactive displays, animation, multimedia storytelling, etc. However, many interviewees highlight the need for a good balance between polyvalence and specialization. Julia Wolfe, a news graphics journalist at *WSJ*, explained:

In the past, there was more of an idea that you had to hire for a specific role, especially through a kind of learning about the technology. You hire a front-end developer [...]; you hire a designer, and they did the design. Now those roles have started to break down a little bit. Most people have kind of titles intentionally because we might do all sort of things that we usually hire for having a few things unless you hire for 1 or 2 specific things. It's probably because you are fantastic at it or there is really a deep need for that. Cartography is one example, mapping is a skill that really has so much to learn, and it's a whole world on its own and a bunch of different software and skills, so we have few cartographers who can do other things too but they're really fantastic at that. So I think that is one example. But in terms of making interactives, I think generally you look for people who have a couple of things. Nobody's gonna have everything when it comes to getting data, cleaning data, analyzing it, visualizing, doing the reporting, that's a lot. But somebody who has 2 or 3 is often what people are looking for.

The alleged impossibility of being good at everything has been a constant in graphics teams since the 80s. However, according to the evidence collected from the interviews, it deepened radically in the second decade of the 21st century because of the explosion of novel ways of delivering information to the reader, enabled by the digitization of news (Boczkowski, 2004.)

This mimics broader trends in the world of journalism. As chronicled in multiple sources (Downie Jr & Kaiser 2003, Ryfe 2012), journalism as a business got disrupted and fragmented due, at least in part, to the rise of digital technologies which broke the monopoly of traditional news sources. This fragmentation could also be observed in the forms journalism adopted: In the past forms were greatly constrained by analog platforms (print, radio, TV), but when information got digitized—when what lied behind text, photos, videos, audio clips, graphics, etc., were sequences of digits—boundaries expanded. A sequence of 0's and 1's can potentially adopt any form.

Manovich (2001) calls this the principle of variability, and it is central to understanding the changes that interviewees describe, and that are at the core of the present study:

A new media object is not something fixed once and for all, but something that can exist in different, potentially infinite versions. This is another consequence of the

numerical coding of media, and the modular structure of a media object. Old media involved a human creator who manually assembled textual, visual, and audio elements into a particular composition or sequence. This sequence was stored in some material; its order determined once and for all. [...] New media, in contrast, is characterized by variability [...] Instead of identical copies, a new media object typically gives rise to many different versions. And rather than being created completely by a human author, these versions are often in part automatically assembled by a computer. The example of Web pages automatically generated from databases using templates created by Web designers can be invoked here as well. (Manovich 2001, 36)

To understand the principle of variability, it is useful to make an analogy with the world of news graphics: Imagine that you begin with a database of unemployment rates in the U.S., state by state and between 2000 and 2016. The database is a series of rows and columns in a spreadsheet. Data visualization consists of mapping numerical properties onto spatial properties such as length, height, area, color shade, etc., but which to choose in this case?

Those numbers could be transformed into maps (to highlight geographical patterns), time-series line charts (to emphasize temporal patterns), bar charts (to compare the states at a certain point in time), etc. The underlying data would always be the same, but its representations would be very different. Moreover, they can be automated, rather than being handmade.

A world where digital data is widespread begets professionals and teams capable of dealing with it. People who can embrace the current ever-changing nature of the field, and can master current trends and have the imagination to blend them or push their boundaries in novel ways. This is what explains the push to hire professionals with backgrounds in technical fields, like computer science, according to the interviews. The consensus was that modern news graphics journalists need to have a good understanding of all the aforementioned areas —writing, charts, maps, multimedia, and more that will inevitably appear — but then specialize in one, two, or three of them. These journalists also need to be excellent team players, always eager to acquire and share knowledge, and they need to be immensely curious and enthusiastic about the craft.

A consequence of this push for polyvalence, specialization, and intra-departmental collaboration —again, fostered by the ubiquity of data— is that teams that produce news graphics have increasingly become autonomous, rather than service units.



Let's begin with the need of acquiring an understanding of all tools and techniques in news graphics. Chiqui Esteban, who was the head of graphics at the *Boston Globe*, and now is a senior news graphics journalist at *The Washington Post*, compared the departmental structures he witnessed at the beginning of his career, fifteen years ago, with what he sees today, regarding specialization. In the past, said Esteban, graphics desks were comprised mostly of designers and artists. In the present, skill sets and backgrounds vary much more:

When I started, I was in little departments where there weren't as many specialists as you have now. For instance, when I was an intern at *El Mundo*, which was a big department we had around 15 people or so. All of us were the same kind of infographic people, but we had one researcher. Now you look at *The Washington Post*, and you have researchers, you have people who specialize in 3D and illustration. People who specialize in data, and we have a data team inside the team. People who specialize in some types of code. People who are more kind of designers. I think the difference that technology has also made or that Online graphics have made, is that now we can have very different skills in a team and before. I mean 10, 15 years ago it was more like the larger the team, the more infographic artist you have, but there weren't very different skills inside the time. I mean that might be true in the bigger departments, maybe the New York times had it, I don't know. But at least what I knew at the time was the profiles were much more similar. Now we have much more different people in the graphics department which I think is a very good thing and it also opens much more the field of what's a graphic. Before you could say, this is something that graphics does, this is something that design does, this is something that development does. Now, you can do whatever you want, and it also gives you more freedom. [...] I think collaborating now is much easier than it was before and that's a very good thing that technology has done. Like now we have very different skill sets, but we can understand each other very easily because we have better ways to communicate.

Jon Keegan, from *WSJ*, had a similar view of recent changes, adding that current trends have led news graphics to become autonomous:

The graphics team is a very different group. When I worked on it, it was almost exclusively people with a design background. Everybody went to art school. People know how to use Adobe stuff. The main requirement was "are you great in Illustrator and Photoshop?" And if you are good with that and cartography, you have a basic foundation of graphic design, skills. You are a good communicator. You are

good at numbers like that kind of thing. And you will have more computer person, and they will learn a little bit. But it'll take a long time for that mixed change, and I think the problem we started off the team was like the team was a service desk. The newsroom was broken up into different groups. We were not integrated into the newsroom. We were in different floor, work straight like members in the newsroom. And people will come to us and say, "hey, I don't know what you guys do. You are wizards. Can you make this magic thing happen? They were not really curious about how we did it and the time we've spent on doing this all. " And slowly we got integrated into the newsroom. I've been along side reporters and get to know them and get a better sense of the flow of the newsroom. That was really important because when you have people sitting in one corner and not hearing reporters on the phone, not hearing reporters work with editors how they craft their story and change it.

Cartographer Max Rust, with experience in the *Chicago Sun Times*, *Chicago Tribune*, and *WSJ*, talked about the past emphasis in design and cartography, and the current relevance of data skills:

When I started it, most people had an art background. My background is in journalism and geography, so I was more interested in sort of telling stories through maps, making special areas and most the people I worked with had art background. Art degrees. [...] And then slowly people started majoring in news graphics. [The work] became more reporting your own story through acquiring data. So there is more focus on obtaining and manipulating and understanding the data part of the story [...] So that is a major shift, I think, and another one has really been obviously Online interactive component of graphics, and now people are studying Online graphics, you know how to make something out of code. Students now are learning code before they learn other things about journalism I think. Or they are learning at the same time because you have to. So that has been a huge shift from just putting together a few charts. We are obtaining the data, cleaning the data, putting through some kind of code software whatever making it interactive for the web. [...] The biggest difference is most people now new to the industry have learned how to do computer programming in school.

Sarah Slobin, who has worked for *NYT*, *Fortune*, *WSJ*, and now is at *Quartz*. com, who talked about a chaotic, transitional time news graphics is going through:

Clearly, we started from the static environment ... there were fewer news sources. There has been broader, spreading way for people to get their news with the interactivity, the advantage of digital news. Really the biggest change is the pipeline, the ability to work with data. The different types of reporting we are able to do simply because there are more people opening their data sources, you can get things easily, the way we use to report things. [...] We started working with Flash. [...] Then when Flash went away, we had more data, and then people access to data and a lot of people began making infographics. [...] And everybody piled in and then a lot of bad things on the Internet because it is the Internet. And now we are beginning to have certain pockets of clarity what's worth of your time on the Internet. It is more dispersed. And there is no one answer to that. So we are really at the scattered dispersed moment of time where what sticks to the wall is questionable.

NYT's Hannah Fairfield, who also has extensive experience, compared the present to the past this way:

The department has a lot of developers, and they are extraordinarily good at front end development, and there has been a lot of evolution of JavaScript libraries like D3 and many others that really helped us be able to do our jobs better. So that evolution has been pretty exciting. When I think back to using just Excel, and just Illustrator it seems like a much simpler time. But all of these tools, are just tools, they are ways to allow us to produce excellent stories, excellent visual stories, and excellent journalism. But they aren't ends to themselves, understanding the software and the tools that we have are just one step towards getting to storytelling, which is full of wonderful things like excellent reporting, and excellent news judgment. Being able to shape and edit a real narrative whether that narrative be words, or visuals or the integration of words and visuals together and all of those things are really the essential things. I think stories that are sometimes the best told, are the ones where you don't see the technology behind it, it's just part of the whole storytelling experience.

So the increasing variation of professional backgrounds and skill sets needs to be balanced out with polyvalence, the broad understanding of everything that is required to be successful in the craft today. This is Allison McCann, who at the time of the interview worked for *FiveThirtyEight.com*, and today is a graphics designer at Vice:

For the graphics team, I think there is a baseline understanding of skills, so you know a little bit of design sensibility and a little bit of programming, a little bit of Illustrator and a little bit of data manipulation and R sort of skills I was talking about.

I think we expect at least some level being comfortable with those. But curiosity and a good new sense, we are still doing journalism, so being able to come up with new idea, report, and write and all these sorts of all traditional journalism skills are still super valuable, and we are looking for people that can kind of do a lot of things and also maybe have skills that we don't even know that we needed.

*LA Times's Len De Groot agreed:*

So, everyone needs to have sort of basic proficiency in being able to call someone up, ask them questions, and get information. That is, without a doubt, the most basic skill. So, once that's been established, from a technical standpoint, they have to understand how pieces of a graphic come together. They don't need to necessarily be really good at putting them together because we can make them better, but they need to understand what's a bar chart, what's a line chart, those kinds of things, what's a map, and they need to be able to build those things. Everyone has to do those, and they have to be able to do those both for print and for the web, and for mobile, and for whatever is next. That will always be sort of the base information or the base level of storytelling that's critical that we maintain. So, that's the base level, and the digital side includes knowing HTML and CSS. Everyone has to know it. Some people are better than others, and that's to be expected, but even the people who are five years from retirement are learning to go into HTML and be able to edit it to fix something or those kinds of things. They're not going to sit down and build a web page, but they can go in and edit and do the things that we need to be able to do on deadline.

*ProPublica's Scott Klein said that the fact that his team started small pushed him to promote polyvalence and sole authorship of projects, but also a constant collaboration:*

Depending on whether we have interns, or it's summer we get a little bit bigger, and in the fall we're a little bit smaller, the team is about ten people, including myself. Each of us is hybrids, so we don't split the team as many others do into functional specialties. So we don't have people who only do programming, and people that only do design, and people who only do journalism. Because we're doing largely project work, we have people doing all of those things together. I am a big believer that journalist should be the authors of their work. So it's important to me that somebody who works on my team understand the data deeply, so that they're the

people who got the data, who process the data, who analyze the data, who, while they were doing those things while thinking about the story that they want to tell with that data. And they're also the people who done the reporting. They've talk to sources about that dataset, then ultimately they're the people who write the story or who create the visualization based on it. When we started *ProPublica*, we created the team like this as a sort of authors instead of functional specialties as a necessity because we started so small. When we were three people, we couldn't say "you're just gonna do design, you're just gonna do development" cause it wouldn't have been able to do difficult projects, because if you were busy doing database stuff on another project, people are frozen. So when we were that small, we did this out of necessity. And one of the things we learned is that it helped us make much deeper, much better projects because you had people who could take the entire concept from just the generated idea through getting the data, through the design, through finally the story telling.

Klein added that a will to learn is much more important than hiring people with deep technical skills at the outset. Journalists and humanities majors can and should develop skills that traditionally pertained to the world of software engineering:

My team is not traditional software developers, they come mostly from a humanities background, so I don't think any of them is a computer science major. I was an English Major, my specialty in college was 19th Century Religious British Poetry, which was and is terrible terribly poetry. But I thought it was interesting, so I thought of study when I was in College. I know they're some other English major on my team. Lots of them come from journalism [...] What's important is they are people who have learned to be good coders and designers. But the most important thing is that they're journalist, they have an inner need to tell stories, to tell stories that matter, to tell stories with impact, to tell stories to help readers make good decisions about their lives and to bring accountability where it's needed [...] But now that we have grown, we actually have some people with statistical degrees now.

Klein mentioned that the polyvalence of his colleagues can be explained by the relative small size of his team, but larger organizations, like *NYT*, follow similar patterns. Archie Tse said:

We have a few raw divisions in the department. Like there's a whole department, and then they're a few subsections of the department that... It's hard to explain. The thing with our department is that we're... many people have many different skills

and there's not really... We don't put anybody into silos. There's no group that's only doing coding, and there's no group that's only doing reporting, there's no group that's only doing data visualization. Everybody sort of doing a little bit of everything. People, of course, have strengths. So they're some people who are better at reporting, and they're some people who are better at data visualization. But everybody does a little bit of everything. So on any project the person who likes to do data visualization will also do reporting on their story. And the people who do reporting will also do the charts and the mapping for their story. So we try not to compartmentalize people so that they're only doing one kind of thing at the time. One of the things we like to do is sort of like let pieces organically grow.

John Tomanio, who leads graphics at *National Geographic* magazine, explained that the specific nature of the publication he works for has led him to believe in a jack-of-all-trades model:

The question of how the department should be structured is one we debate quite a bit. Our thinking has evolved over time, and we go back and forth quite a bit. Right now we still think we want all-rounders, someone who could do everything. Again, do an exquisite print graphic, also take code and code that, or certainly bring it to life with After Effects and other basic tools for web design. For a while, we flirted with having specialists do the different things and then bring it together, but we are edging away from that now. We are kind of looking for the all a rounder who can do it all. The structure hasn't changed too much, if anything we have just grown a little bit because there's just more to do, in addition to the print stuff there are the digital versions as well.

However, in most places polyvalence is one side of the coin. The other is specialization. Here's Xaquín G.V., head of visuals at *The Guardian*, in the UK:

To be a graphics editor today, you don't have to have all the skills. It's not really possible. If you want to do a really nuanced story, it's really hard to think that you're going to be able to do it by yourself. Plus, everyone needs an editor. I'm sorry, even editors need an editor. Especially editors need an editor. So, you do need to specialize, but that doesn't mean you shouldn't learn from the other skill sets, and the great thing about having varied skill sets or people that have completely different skill sets than yours next to you is that you can see them doing their stuff and learn, and apply principles that they have to your own work. You can see how traditional designers build a hierarchy in diagrams and learn from them. When you do statis-

tical graphics, they are the same principles. You can learn from print designers how to do your UI—your interface or your layouts because the principles are the same. You can learn from how a computer scientist thinks in individualization for your traditional print output because the principles are the same.

Kat Downs, head of the graphics department at *The Washington Post*, tried to group all skills a modern news graphics journalist needs to have into three broad categories: Reporting, design, and development:

Our team is really multidisciplinary, a lot of our projects are team projects. There are sort of fundamentally three skill sets that I am looking for when I hire people. One is reporting, sort of storytelling skill set. One is design, and that would include things like data visualization or drawing skill, illustrating skill, modeling skill, strong aesthetic or UI design skill. And the last would be development skill, so that would include data analysis, front end development, full stack development and so typically all of our hires have two and sometimes three of those skill sets. But maybe one is their main, and then they've got like a second or third, but those are the main things that we are looking for. So we have the team based on that, artists, designers who are very focused on usability, visual design, reporters, data focused reporters, developers from junior to people with CS degrees who are extremely competent, sort of groundbreaking computer science people.

*The LA Times* is driven by a similar principle, according to Len De Groot, who added a fourth category to Downs' three: creativity:

All of us do everything. There are days where I sit down, and I do a map, or I do a chart because that needs to happen [...] One of the important things is that everyone has a base level of skills so that if someone wins the lottery and walks out the door, somebody else can pick up and finish their work. So, that's kind of, at the base level, what we do to make sure that we have consistency, but the other thing that we do is I try to both hire for and encourage creativity. I've made a few what might be considered unconventional hires, and I don't think they are. I think that it's just making sure we have people who have different ways of looking at the world contributing to the type of things that we do, and some really weird things have come out of that I think have been really successful and that our readers really like. And so, that sort of creating a place where creativity is not just said, it's not just spoken that we want creative thoughts, but creating an environment where creative work

can be pitched, and developed, and refined by a team of collaborators is really sort of my main job right now. I live through their successes, and that's where I get the gratification that I used to get out of building something. And I still try to keep my fingers on things and build a little something so that I don't get too rusty.

The modern news graphics professional, according to most people interviewed, finds the right balance between polyvalence and specialization in a landscape in constant and accelerating flux. On the one hand, the devices readers use to access content are today more varied than a decade ago, a topic we'll explore later. On the other, data and digital technologies cause quick advances in the tools that news graphics journalists use.

A 2014 Tow Center for Digital Journalism report (Anderson, Bell, Shirky 2014) says:

All of us are adapting to this changed environment; the existing institutions and the new ones, the full-time shapers of the news and the part-time ones, the generalists, and the specialists. And perhaps the single most important adaptive trait is to recognize that we are in a revolution, in its sense of a change so large that the existing structure of society can't contain it without being altered by it.

In a revolution, strategies that worked for decades may simply stop working (as many already have). Strategies that seemed impossible or insane a few years ago may now be perfectly suited to the current environment. This period is not over, and the end is not even in sight; the near future will hold more such reversals, so that even up-to-the-minute strategies of a few years ago (RSS feeds and staff blogs) may fade into prosaic capabilities, while new ones (the ability to hunt for mysteries instead of secrets, the ability to bring surprising new voices to public attention) may become newly important.

More than any one strategy or capability, the core virtue in this environment is a commitment to adapting as the old certainties break and adopting the new capabilities we can still only partially understand, and to remember that the only reason any of this matters to more than the current employees of what we used to call the news industry is that journalism—real reporting, about whatever someone somewhere doesn't want published—is an essential public good.

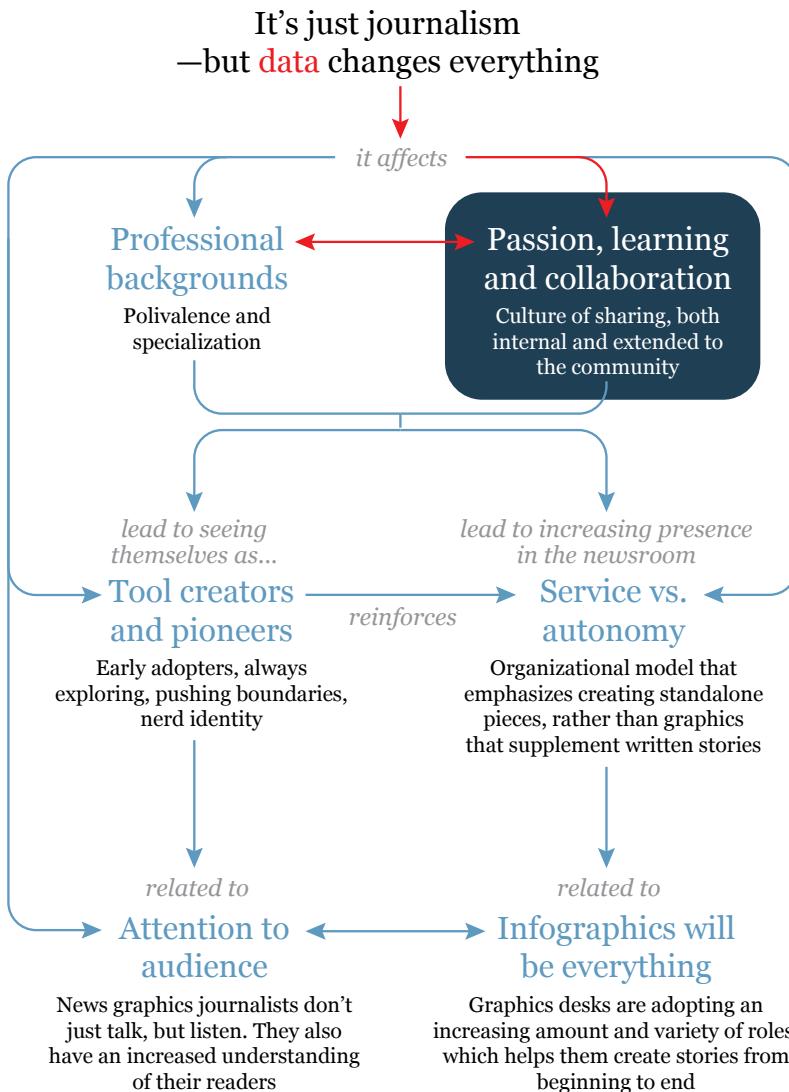
As a consequence, when asked about what were the traits that were more sought for in new hires, interviewees mentioned a journalistic mindset, certainly, but also curiosity, a passion for the craft, a drive to be a constant learner, and a

willingness to share what has just been learned with colleagues at the workplace. The need for these traits was strongly connected to the perception of an environment that changes in unpredictable ways. More importantly, these traits were deemed as more relevant than any technical skill, such as visual design, statistical thinking, or coding, which is a departure from how professionals talked about needed knowledge in the past, as we saw in the history section.

## PASSION, LEARNING, AND COLLABORATION

The passion that was visible in all interviews is well expressed in John Grimwade's words about what drives news graphics professionals, past and present, and what lies behind their curiosity and their drive to keep up-to-date with novel ways of conveying information. Grimwade has many decades of experience in Great Britain and the United States, and now teaches infographics at Ohio University:

You've got to be passionate about information; you always see that in all the good people. They love information. They're sort of curious, they want to understand how everything works, and they are like "oh, what's going on there?" You've got to have that. [...] In the really great infographics, you can see the joy of discovery, it's like "wow." And the joy of telling you, it's like a dinner conversation, and you're talking to a friend, and you say "hey, did you realize?" This is incredible, you know? [...] Or "did you know that this." It's just that enthusiasm [...] Without that it's all kind of dull. Or it doesn't work. All the good people that I know are so passionate about explanation. They're just into it; they love it. It's the thought that for just a few people, you've turned on the light. You know that thing? It's like "yeah!" I've made a diagram of this, and now anyone could understand it. It's amazing. And then you get some amazing feedback. People will say wow, I went to a museum and I used your little guide book, and it was fantastic, it made my day, you know like I knew exactly where to go. God, that's a good feeling then. It really is. And it's tons of fun [...] I say that to students. If that project is a real pain, something is wrong, probably. I mean there should be some fun about it, and you should give it a sense of fun so that the user senses that you are enjoying the process, you know? That's what I see in older people, you know, like Alberto [Cairo] and Xaquín [G.V., from *The Guardian*] and Fernando [Baptista, from *National Geographic* magazine,] and all of the others. They're all very passionate, and they're passionate about getting it right.



That's the other thing. It has to be right. They don't want to mislead people or have people disappointed later, so they're obsessed with research getting it right. But they're these sort of inquisitive people who keep asking questions. [...] And when that comes together, I have been around a long time, but I can see it straight away. Even with students, I can see it, you know, that kind of interest, you can really see it.

WSJ's Max Rust's words summarize the main themes in this section: Speeding change, constant learning, and collaboration:

The change before was slower and now is speeding up. Part of it is because there are more and more people interested in doing it and collaborating more. Everybody is getting better, faster and that just taking things to a new level I think. It started slow because not that many people were interested in doing it. [...] Before, people were kind of dabbling here and there. I can remember people use flash animation projects. We don't use flash anymore. But everyone used to think that's gonna be a new thing and kind of a dead way now. You have a focus on JavaScript and data visualization, stuff like that. That's really what's taken off, I think.

Rust then added that passion and enthusiasm —words that were repeated in many of the interviews— can help overcome the inevitable frustration anyone may experience when struggling with novel technologies:

Learning the programming thing is frustrating at first and once you get to work, it's terrific. It's very rewarding. It's like anything. It's a frustrating process. But once you understand it, even a little bit, you can get it to work, that's what's exciting about it. So that's where I am now. I'm still trying to get things to work. I'm really getting things to work through JavaScript more than HTML. I have a basic understanding like I can get HTML things to work and CSS but I'm trying to get things to work with JavaScript. So when I came get them to work, it's awesome. But it takes some frustration.

NYT's Hannah Fairfield offered the perspective of a professional who has been in the field for many years, and highlighted the connection between the need for experimentation and the excitement caused by this very process of experimenting, and also by its products:

When I first started at the Times we were really doing a lot of smaller charting, still data visualization but on a much smaller scale. The tools that we were using, cer-

tainly, Adobe Illustrator and Excel of course. But the sophistication of the charting was so much simpler. As the field evolved, we started using a lot of interesting, and new charting forms and experimenting a lot. In the year 2000 and 2001 we were experimenting less, the field was changing dramatically because of the Internet. But, the field of news information graphics really started, I think to start changing rapidly in the year 2004, 2005 and then the past decade has really been the most interesting decade in terms of growth in the field, in terms of the expansion of the field, the kind of people who want to get into this field has really changed as well. And that has been really exciting for someone who has been doing it for such a long time.

*LA Times'* Len Degroot mentioned the traits this section deals with, beginning with the passion for the craft, connecting it with a sense of fun and enjoyment:

I tell people that I expect them to pitch ideas, and that's one of the things that I tried to do from my very first day when I got there. When I got there, one of the things I asked everybody, I was like, well, what do you guys do for fun? What do you build that you enjoy? And I got some blank stares, and sort of the response was, "Well, that's not what we do here," right? "We do graphics," and, to me, if you're not doing something that you enjoy, you're not going to push things forward, and you're not going to really sort of break ground because the chances are that if you enjoy something, that somebody else is going to enjoy it, too, and it's going to be more engaging. People are going to connect with it. So, right away, one of the things I started to do is try to make sure that I was constantly, maybe to the point of being annoying, encouraging people to pitch ideas. And then, the second part of that is, when people pitched ideas, the answer is almost universally yes, right? If you want people to be creative, you have to get out of the way. So, my role there and the role of the team, really, is brainstorming, right? They have their idea, and then we might bring up some ideas or talk about, well, that may not work because of this, so how do you get around that? And then, as a team, we sort of brainstorm.

*ProPublica's* Scott Klein expressed an optimistic view of the present and future:

I'm thrilled. I'm never bored at work. I'm doing much different, much bigger, much better work than I was doing 3 or 4 years ago and I think that what I was doing 3

or 4 years ago was still pretty good. And I know that what I'll be doing 3 or 4 years from now will be much more sophisticated and much different and weirder and better and crazier than what it is we're doing now.

Values like self-teaching and knowledge sharing, and the sense of fun they may beget, are visible in the interview with WSJ's Chris Canipe:

I think that we were all kind of going through that a little bit of time. It's interesting being journalist in this role because we're not, I don't know what that process was like for somebody who works at a web developer company, or in a more traditional web developer role, but in the newsroom, I didn't go to school for computer science, I went to school for Journalism, so learning how to code is sort of just like ad-hoc process that you go through as a team. We certainly did. That was what I remember at the time that everybody was just kind of learning how to do things in a way, and different people on the team had different expertise, and so we were all kind of learning from one and another.[...] When I started, we were doing things so differently, we had such a different mentality about our roles was at the Journal, that it's been fantastically fun to be a part of that evolution and to have a voice to the extent that I get to have a voice in that conversation and to get to have a conversation about the way that we build projects and to see that change in ways that I think are really healthy and ambitious, I think they're ultimately better for the reader. I think we've just become better journalists, we've been better contributors to the role of journalism in news organization. And that we've gotten to do it in a way that is competitive with our peers. That's tremendously fun.

Brian Boyer, formerly at *NPR*, was even more explicit:

I like to learn stuff. I think it's fun!

A shared love for constant learning is common to journalists, designers, and coders, according to WSJ's Julia Wolfe, who didn't make a distinction between self-teaching tools or conceptual knowledge:

I think developers and journalists share a love of learning. That was always true about journalism and always true about coding that if you pick one of those career, learning new things for life. Journalism is kind of becoming an expert every day on a new topic, whatever it is you have to write about, and code is forever changing,

so if you're gonna be a developer, you sign up to do tutorials on the weekend and reading a lot about new things coming out, you messing about. If that's not fun for you, it's gonna be hard. I think for most people who I know, who I work with, who've gone here it doesn't feel terrible, we like learning, and we're given some time off work to mess around with that stuff, so we feel like we have this support to keep learning.

Related to constant learning, interviewees also highlighted the importance of personal transformation as a professional. Christ Canipe, from *WSJ*, explained:

When I started on the print side, I started as a print graphics reporter. I wasn't a programmer at the time I was hired, at all. At the time, January 2011, we were still doing most interactive work in flash. My role initially was a designer at the interactive team, which making a lot of mock-ups for graphics projects and kind of working as a print graphics person but actually pairing with developers to build projects. I knew a little bit of flash and a little bit of action script, but I wasn't a developer in any sense at that point. What I found was that I really wanted to be able to build projects. I found it really frustrating to design interactive projects and work with developers to build things. It was a really interesting time to start because everybody was kind of going through the same transition, we were trying to get away from flash. Because the Ipad had just come out and flash doesn't work. Not only just flash not work with the IOS platform or whatever your tablet platforms are, it doesn't work responsively. So 2011, 2012 we were really just changing the way that we work. We're starting to think about responsive design; we were doing everything in JavaScript and HTML5. As everybody else on the team who were developers, who are sort of learning doing this sort of thing, I was learning how to be a developer. It was kind of a natural entry point to learn at the same time everybody else is learning how to do new things and design in a new environment. That was a huge change. But I didn't realize necessarily at the time cause I was just trying to get a foot in being a developer.

More experienced designers, like Álvaro Valiño, who began his career in 1996, see a historical constant, and point out that a willingness to be always experimenting with new technologies and adopting them is intrinsic to news graphics:

I remember during this last revolution with data visualization and journalism, it kind of reminds me when I started a long time ago when I was 21 years old and

people had to go from doing graphics with their own hands and started working on computers and other software's, like 3D software's that started to appear, or Flash for animations. So it's kind of a never ending evolution. I don't think its changes I think it's more of an evolution, that's how it's working, it's just a steady process of picking up new technologies, new techniques, new ways of doing things. So you have to accept that as part of your job, you know, keeping yourself updated with the new technologies and trends, trying to fit in that scene of what's going on.

NYT's Archie Tse, who also has decades of experience, agreed with Valiño, but added that the pace of innovation began accelerating around 2010:

I didn't really learn coding until maybe 2008,2009, I began to study HTML and CSS. There were a couple of people in the department that could do HTML, CSS or Flash, they were the ones who can do those kind of graphics. More people wanted to learn how to do it. So many more people began to learn toward the end of 2010. We hired more people that could do web programming. Then the department began to grow in that area. [...] One of the things I think that remained constant overall my career so far, is that even in the pre-web era, there was still like always new technology that you wanted to learn, whatever it is. Like a new 3d program, or new GIS thing to doing mapping. There's always new technology to learn, I think people in the graphics department generally love to learn new skills and like find new technology. And I think today, the pace of that is increased a lot, but it's still the same ethos that you want to keep learning new skills.

Chiqui Esteban talked about the accelerating pace, but also about how news designers embrace it with curiosity and excitement:

When I first started nobody asked me if I knew coding, or if I knew Flash but they asked me if I knew Illustrator or if I knew other things. There has always been that technology challenge. I think right now the problem is everything goes faster. You learn Flash then you have five years until they ask you to learn something new. Or you ask yourself to learn something new. Now every year there is something different that you have to learn. But that's exciting, and that's a good opportunity, and you only need to know how you are going to tell the story, and you have to be able to find a way to do it. Now you have much more tools so you can learn much more things. Before, you had Illustrator and maybe if you could do hand drawings or building things that was your opportunity. But now you have hundreds of ways to tell a story and that's a change in the meaning that you have to learn much more to tell a story but also you have much more ways to do things.

Kat Downs, from *The Washington Post*, talked extensively about the relationship between technological change and the need for constant update on the part of professionals, connecting it to a feeling of sheer fun due to the very act of exploration:

Some of our software is the same, the Adobe Creative Suite has been central and core to what we do for a long time [...] When I first entered the field everyone was using Flash, that was sort of the pivotal change and if you were using Flash and using it in a programmatic way and writing action script with it wasn't terribly difficult to transition those skills to more native web development. What I mean by that is not developing for a plugin like Flash, but developing for a browser. I think it was like 2010 when really started just developing in JavaScript and since then there have just been tons and tons of JavaScript libraries that have come out and made things easier at this point, we work more than ever in Python and other languages that allow us to build our projects server side without putting a lot of pressure on clients to render complex projects, which gives us some of the speed and flexibility that we loved having with Flash that we could finally have again. It's been really interesting to see a lot of the things that were possible with Flash that then were not possible with JavaScript for several years and are now possible again. And those are the things like 360 video, or panoramas and interactivity with rich media, especially once the mobile environment was introduced. The mobile environment was terribly difficult because of bandwidth and slow speeds and bad browsers. And now, things are looking great on phones; there are some limitations, but a lot of the possibilities are back, which is pretty cool. And it's really funny because people were sort of like, "we never done this before!" And it's like well we haven't done this in 10 years because it hasn't been possible but we have done it before. So it's been really fun to see that evolve. But a lot of the sort of fundamental drawing and art tools are the same.

Downs is worth quoting extensively because she also showed that graphics professionals not only use tools, and explore technologies that could be used in the future, but also reflect deeply about their implications:

As to how technology will change the next five years I think, this is something I talk a lot about with my team, and the design team here is that I don't think that in five years we will still be hand coding. There will still be a high level of customization

that requires coding but the tools are going to be better so that people can just make things on the web in a way that they can't now. And that's a combination of templating or just visual interfaces for things that happen Online. I have seen a couple of vendors come in here with tools that make things that we can build by hand, but why would we, if there is a tool that's going to let us do it and it's going to offer us all the customization that we would want in order to make it look like something that works for our brand.

Downs sees the present situation in news graphics as a transitional phase:

I think that over the next, I don't know how soon it's going to happen, but certainly in the next five to 10 years coding as a sort of fundamental tool, is going to become not truly necessary for most people. Obviously for the high-end stuff you are going to need to break out of the box a little bit, so you are going to need a team of people who are going to do development. But at most smaller papers and stuff I think that the tools will be in a place where it's much easier, and you can use something like Illustrator to make simple SVGs that animate, or you can use some tool that we never heard of before to build a video and lets you ask questions to the video, and it will respond. I think there is going to be a lot more development of tools [...] that let people make websites when they have no experience. That's going to come to our space, and you are going to see, with something like Medium that lets people create digital stories, and lets them drop in photos and videos and have these in-line edits, those tools are only going to get better and stronger. And so that's not where we need to put all of our investment, we need to put all of our investment in something that makes us special, and that's using programs for data analysis, and scraping and figuring out how to do experimentation with things like R to figure out what kind of visualizations would work and really focus on finding information, analyzing it, and presenting it in a way that illuminates something for readers. So that's going to be something really interesting to see how we respond as other people are able to do the work that we do. I think we just have to focus on what we do best and what differentiates us and that's going to be cool.

Jessica Wu, from *WSJ*, described the convergence in skills within her news graphics operation: journalists learning technical skills, and professionals with a background in programming learning journalism and design:

I guess if you came from a traditional print Adobe Illustrator background, you might learn more about, HTML and JavaScript, CSS, all of that sort of interactivity

stuff, mobile design, databases, things like that. Likewise, I think some people who came from a more programming background and somehow found themselves in journalism learn a lot more about journalism and data visualizations standards for that to how to tell a story and so it's been a nice mixing of skills and talents. It's quite fluent.

Len Degroot's spoke admiringly about one of his collaborators, emphasizing his willingness to learn without external nudges:

I hired someone who was working as a copy editor in Alaska. Some of the people I work with met him at a NICAR Convention. And they were like, oh have you met this guy yet? And I didn't get to meet him. But he wanted to learn to how to code, and so rather than wish he could, he just started building things. And sort of became a one-person graphics team for this small paper in Alaska. And did all of their Online elections work, and that kind of stuff. And the thing about him that really caught my attention is the kind of projects he decided to teach himself with. So he wanted to learn how to write a Twitter bot. And he wrote two. He wrote one that tweets out pictures from the Hubble, either that or from the Andromeda collection of photos. And he wrote another one that tweets out images of burrito patents. Having that sort of unique way of looking at the world is a huge asset. It's really valuable.

Self-teaching and personal progress, then, are values held in high esteem by all interviewees. However, they also mentioned that, due to the increasing complexity and variety of tools and techniques available, collaboration, sharing, and mutual teaching were also critical. *Vox.com's* Javier Zarracina said:

Part of the philosophy of the company is to have a lot of teamwork and help each other. Another thing is most of the people that work in data visualization really enjoy technology, and they really enjoy learning new skills so it is very easy to share skills. All the people on my team are very eager to learn things and try new things; that is something that is part of the DNA of the company. [...] All of the members of our teams are what we call authors, so they create the stories themselves, they pitch the stories to me and other editors, and they fully research, write and create the story. Each of them on the team have different interests, have different beats and different sources. The way we work together is when someone wants to tell a story, and he doesn't have the skills or a particular expertise in a piece of the story then we pair two people together.

Steve Duenes, from *NYT*, explains that constant collaboration is critical for the success of the graphics desk:

There's no question that part of the point of being here is you're contributing to kind of sophisticated visual vocabulary that emerges from New York Times so your visual imagination and ability to execute ideas should be at a high level [...] And because the newsrooms are set up certain ways and the department now requires both the collaboration among its members. There has to be a high level of spirit of collaboration and interpersonal communication skills. Both of these are pretty important.

Alicia Parlapiano, part of the graphics desk at *NYT*, confirmed Duenes' words:

I think that our department, in particular, is really collaborative and it only helps the organization and work dynamics because when there are these tools that most of us, if not all of us are able to use and understand it makes it easier to collaborate on projects. Someone is putting in illustrations, someone's putting in text, someone is working on the structure of the whole thing and it makes working together on these things a lot easier as opposed to if my only skill was writing and someone's only primary skill was programming then we would be working together, but we wouldn't be touching the same pieces of the project. Now a lot of us have an ability to work on a lot more aspects of a project, and it makes it a little easier to collaborate and a little bit more easier to respond to things more quickly that happen in the news because more of us are able to get up a web graphic that renders text and HTML and is responsive to every device possible than before, and maybe before you needed those fewer people who were able to build that kind of page, now most of us, if not all of us can get that up quickly ourselves.

The collaborative dynamics within the *LA Times* graphics team was described by Len De Groot in the following terms:

I have a former social media editor. I have somebody with a degree in animation from Mass. Art. I have two students who came out of schools who, where they were already starting, like had fledgling data journalism programs, so they came out knowing how to work with JavaScript, and the command line, and they were comfortable building their skills. I have a copy editor. [...] Bringing a copy editor

into sort of a data visualization department is not necessarily an intuitive thing. But he's a good editor, too. He's a good copy editor. [...] The social media editor, Kyle, helped us change the way we think about putting our graphics together. Because he understands the audience better than we do. And he's helped everyone else understand the audience. I have someone else who's a really good GIS guy [...] I have a couple of people who are sort of traditional artists. Both in hand-drawing and in vector, 3D. And then I have someone who is, really his real strength, is as an illustrator. And as our last line of defense. He's a really good copy editor as well. And he's someone who, when I got there, was underutilized. Because illustration had kind of fallen out of favor. And once I saw what he could do, it was like oh my gosh. That's a huge asset. That's an important skill set. So we just started looking for ways to pair him up with someone who could program. And see if we could build things in interactives that actually had drawing behind them, or had that more engaging, humanized experience for people. That's one of the big advantages to illustration.

Notice the reference to a social media editor, which is relevant for an upcoming discussion about the attention that news graphics groups pay to audience these days: De Groot added that his team was much more diverse today than a decade ago:

Yeah. Yeah, I think so. I think they have to be. My team isn't huge. It's ten people, which is big for a lot of places, but still smaller than a lot of other places. Like it's smaller than *The Washington Post* and New York Times, Wall Street Journal, et cetera. And we really, that diversity of skills is really critical for us to do creative work, because someone might have an idea and have no idea how to pull it off. But having someone that they can pair up with that has the skill or the appropriate skill for that makes a huge difference. It makes, it gives us some flexibility and allows us to be nimble in a way that we couldn't be otherwise.

Chris Canipe, from *WSJ*, described several early web projects he coded from scratch, when he was teaching himself programming languages, and said:

I was lucky to share desk space with Jeremy Singer who's now at *Buzzfeed*; he was a great developer who [...] had lots of experience on projects. He sat down with me, like three separate occasions, we would spend the entire day; he was a great coding mentor for me at the time. I'm so grateful for Jeremy for this. I built the project that was a total mess with a tangle of repetitive functions and terribly structured code.

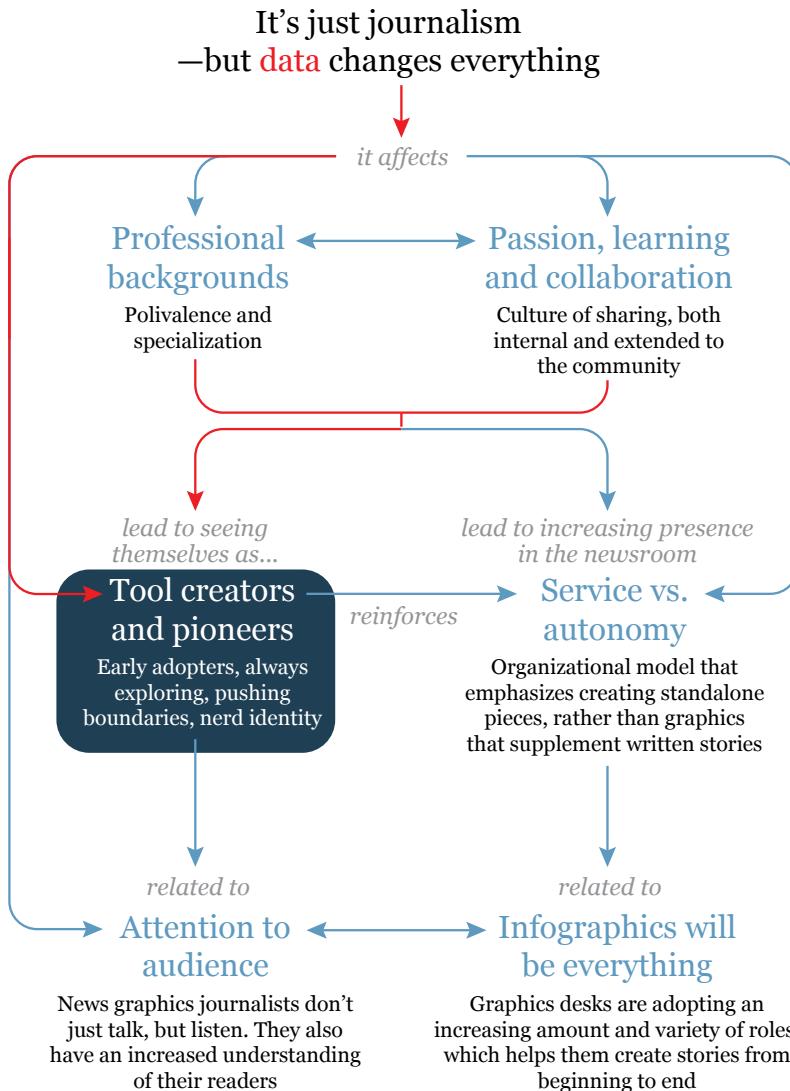
What Jeremy did was sit down with me and spent the entire day refactoring the project. So we go through it, he's like "what's going on in this function, what's going on in this block of code, we can turn this into a returning function, we're just gonna send the value and just gonna get something back." That was my first introduction to that concept. My attitude at the time about it was I loved it. I was lucky, first of all, to be in an environment where I could spend three month working on one project, learning how to do it. But also I think that everybody that learning how to code at some point you just kind of catches fire with you. It's just become a thing that you end up having dreams about coding while you're learning, a new language especially. That was that period of time for me. It was exciting.

The spirit of collaboration and mutual teaching extends not just to colleagues in the newsroom, but to the field itself. Many of the interviewees referred to the culture of sharing embodied in websites and organizations whose sole purpose is to spread knowledge of technological innovations and tools freely. They also mentioned social media platforms, like Twitter and Facebook, which they believed are critical. *WSJ*'s John Keegan said:

I feel that the thing that's been most exciting is the spirit of openness and collaboration we've seen across the field. Twitter is my lens of the industry. I see everything through Twitter. And I find out what's happening. And I think for a while that was my main window. When our team was a little bit less mix of people from an art background and interaction with people from journalism. I feel Twitter means to be a lens to that world. And that's really exciting to see a mix of people become more aboard. So you do have people from computer science, journalism, design and art background, all collaborating and sharing tools they've created.

Álvaro Valiño sees online platforms as a means to overcome the isolation any independent news graphics designer may experience;

Since I am freelancing now, I think learning is good way to keep me updated and you have to balance the busy months with not so busy months when you are not so busy it is a good way to keep myself busy or active is just trying to learn new stuff. You know the good thing about this digital revolution is that there is a huge community of people trying to help each other and I really value that a lot. You



know coming from a more traditional background as I've said its really helped me a lot and encouraging me a lot of try new things and to push me forward. So I really value that kind of open mind that this new generation has in supporting each other and trying to get the best out of everyone

Giving back to the field extends to data and tools that are created for internal use in newsroom, the topic of the following section. News graphics creators today regularly disclose not only their sources, but also their methodology, code, and full data sets through repositories like GitHub, in an effort to be more transparent. This is a pattern identified by scholars like Nikki Usher (2016: 53), who quotes *NPR*'s Brian Boyer:

As Boyer noted, "Now you're standing on the shoulders of giants," referring to the fact that the best minds creating software are sharing their work and making it possible for others to create high-quality work with similar utilities —and perhaps improve on them.

For her ample observational study, Usher visited various newsrooms and said that every single one of them had a GitHub page. Sometimes the data and code shared in online repositories is limited to individual projects, but in others, it can be entire tools. An example is *NYT*'s Archie Tse's AI2HTML tool (<http://ai2HTML.org/>), a plugin for the commercial software Adobe Illustrator. Illustrator was originally designed to create static graphics, mainly for print use. AI2HTML takes an Illustrator file and transforms it into a package of images, HTML and CSS, with the possibility of making the result responsive —adapting to multiple screens.

## TOOL CREATORS AND PIONEERS

Therefore, one consequence of the factors we've outlined so far —the transforming power of digital data, the increased presence of tech-savvy professionals in newsrooms, close collaboration, etc.— is that in many cases, news graphics professionals and departments have stopped being mere software users. They have become software creators, adopting tasks that used to be the realm of Information Technology (IT) departments. The same can be said of departments that have news graphics as one of their duties, but that don't necessarily call themselves "graphics desks," but "Interactive News," or "News Applications."

As explained in the history section, news graphics creators have always seen themselves—arguably for a good reason—as early adopters of tools. Also, creating their own software isn’t a new phenomenon (Monmonier 1989: 148). What is new is that it’s becoming widespread, and some of the resulting tools get released freely. *NYT*’s Archie TseAI2HTML has been adopted by many newsrooms—some of the interviewees explicitly mentioned it—but it is hardly the only example. Cartographer Nathaniel V. Kelso, who used to work for *The Washington Post*, was creating and making available Adobe Illustrator plug-ins as early as 2009 (Kelso, 2009.) *ProPublica*’s Mike Tigas is the author of Tabula, a tool to extract data from PDF documents (Aristarán and Tigas, 2013.) Google News Labs, which has journalists on staff and produces news graphics, paid for the design of Tilegram, a tool to design cartograms (Rogers, 2016.)

Perhaps, this shouldn’t be surprising. The very nature of digital data enables this phenomenon. Lev Manovich quotes Noah Wardrip-Fruin’s *Expressive Processing*, saying that modern computers are designed for “the continual creation of new machines, opening new possibilities, through the definition of new sets of computational processes” (Manovich 2013: 103.) The computer and its software are meta-generative. Digital tools beget more and better digital tools. It’s not that, as Brian Boyer told Nikki Usher, we stand on the shoulders of giants. It’s that those giants also stand on the shoulder of other giants who precede them.

Moreover, conversations with modern news graphics designers will reveal a noticeable overlap with the ideals of the classic hacker ethic of information freedom and sharing. In her book about hacking, Gabriela Coleman says:

The hacker ethic is shorthand for a list of tenets, and it includes a mix of aesthetic and pragmatic imperatives: a commitment to information freedom, a mistrust of authority, a heightened dedication to meritocracy, and the firm belief that computers can be the basis for beauty and a better world (Coleman 2013, 17.)

The ethics of hacking sounds, then, very much like the ethics of many contemporary journalists who work with data and its visual representations, particularly, but not only, at online organizations like *ProPublica* and *FiveThirtyEight*, as revealed by interviews and observations.

Self-described hackers have been working in newsrooms for a while, as chronicled by Usher (2016), and that may have had an impact in the way that news graphics professionals understand transparency. (Bounegru, Gray, and Milan 2015.) Discussions about transparency in journalism, particularly that which uses data, visualization, and computational methods and algorithms, are becom-

EDITOR DE GRÁFICOS

States 2016 - Preguntas 18 -



## Barras

1 Título  
Republican Party

2 Descripción  
Who is the one person that you trust the most in the Republican Party?

3 Fuente  
Escribe aquí la fuente del gráfico

4 Nombre (uso interno solamente)  
States 2016 - Pregunta 18

5 Introduce tus datos en la plantilla  
[Descargar Excel spreadsheet](#)

6 Unidad de medida (opcional)

Antes del dato  
Por ejemplo: \$

Después del dato  
%  
%

7 Barra destacada (opcional)  
0

8 Marca esta casilla cuando quieras ver comparados los porcentajes sobre el total (100%)

9 Marca esta casilla si quieres relacionar los valores de las columnas entre sí

10 Pega aquí los datos del Excel spreadsheet (incluyendo las cabeceras):

Candidato	Florida	Arizona	Nevada
Donald Trump	28%	8%	13%
No one	52%	44%	53%
Paul Ryan	2%	7%	1%
Mike Pence	0%	3%	1%
John McCain	1%	22%	3%
Ted Cruz	0%	2%	1%
Marco Rubio	4%	2%	1%

[Enviar](#)

Crea en Brightspot un Raw HTML y Copia y pega este código:

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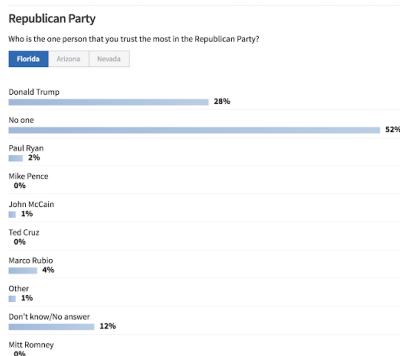


Figure R3

ing standard (Germuska 2014, O’Neil, 2016.) Some authors say that journalism ideally “should emulate the openness of science,” so its results would be reproducible (Keegan 2014).



Many of the professionals interviewed mentioned data analysis, graphing, and mapping tools developed internally for the use of other journalists. During my observation at *Univision Online*, for instance, I witnessed the development of an online-based platform to design simple tables and statistical graphs to insert in stories (Figure R3 is a screenshot.)

Univisión’s tool has limited capabilities, as it is intended to be used not by news graphics designers or developers, but by reporters with no technical expertise whatsoever. The creators were all part of the news graphics team. Not one of them has a background in computer engineering. At the time of this writing, they don’t predict to make the tool available outside the newsroom, but that’s just because they don’t feel it’s finished.

*Vox.com*’s Javier Zarracina, a professional with decades of experience as a print artist, said that the company he works for has tools integrated with its Content Management System (CMS) that were developed with the participation of his team.

Allison McCann, formerly at *FiveThirtyEight*, talked about the variety of programming languages and software tools she uses, but highlighted an internal tool:

We do a lot of our static graphics [with Adobe Illustrator]. We are bringing data to R and sort of analyzing, processing and figuring out what are our interested in, and maybe do some sketchy of the charts in ggplot. And then we will bring the ggplot charts to Illustrator and do some more tweaking and designing in Illustrator. We also have some in-house charting tool that writers and editors can use to make their own basic charts. But if it’s a quick post, we often use the tool to get started and also bring it to Illustrator and take further [...] And for the bigger interactive projects, we are using more d3.js for most of the data visualization. And other we just do some JavaScript in general.

Ritchie King, also from *FiveThirtyEight*, described the dual role of news graphics designers and programmers. As creators of stories to be shown to readers, but also as software developers:

38 is sort of an unusual publication that we, especially for the size of our team publishing extremely high volume of static charts. So I think that they're sort of more traditional graphics experience, like knowing Adobe Illustrator inside and out, having a good design sense. Those are really important skills particularly for the junior members of the team. But at the same time, we also do interactives, maintain tools for the newsroom, like charting tools and table making tools. Also having somebody who is really interested in data visualization and is a programmer is appealing. I think that there is kind of two separate categories.

John Keegan, from *WSJ* compared a past of “competition and secrecy” to a present when news graphics professionals shared openly:

It's just dizzying to see the amount of platforms and tools that have been created by journalists who code to help everyone move forward. Things like Tabula, which will take a PDF and extract out the data you can take, copy and paste, putting in machine readable. API is a good example for *NYT* where you take, even the AP, the stuff AP sends off for election results and make it easier to use, doing the same task, knowing all the different news organizations have the same responsibilities and the same task they have to do when given a set of data. So that's been nice to see rather than just share competition and secrecy.

*National Geographic* magazine has a long history of creating its own mapping tools and data bases. Kaitlin Yarnall, a designer and now Deputy Director of the Centers of Excellence in Photography, Mapping, and Journalism at *National Geographic* Society, said news graphics professionals have always been involved in this tools, and that now they are updating them to the mobile age:

We have our own [technology] and that's why we've built our own database over, you know, a hundred years. But because that, it makes mobile cartography very hard. So one of the things we're working on, we've been working on in the last year is a big infrastructure project to overhaul our database. So if we can overhaul our database and do some of the very boring techwork, devwork, but also just crunching through generalization of geographic features and names, then the end goal will be we'll produce our own tile set. So we will have tiles that are rendered, vector tiles that are rendered in *National Geographic* style with our typography, with our policy, and the ultimate goal would be you have the data. It all comes back to the data, right? You have the data. Then from there, you can just put style sheets on top

of it. So here's what a map a *National Geographic* map for kids should look like. Here's what a *National Geographic* map for travel should look like.

*LA Times'* Len De Groot talked about his dual role as a pure graphics designer, and as someone who has always been developing small tools for limited use, such as "data scrapers [tools to extract data from a website] with Apple Script" and simple mapping tools:

So one of the things that I did was I built a little tool so that producers can make a simple map. So they can get the story up. They can go over, make a simple map in ten minutes, put it on top of the story and they have something that they can work with until the rest of the stuff can come in. And often that initial map that they put up doesn't last very long. Maybe it lasts 20 minutes. If it happens in the middle of the night, maybe it lasts three hours. But really, it's more a recognition that we have to be immediate. And that we have to respond immediately and have tools that let us do that.

*The Guardian's* Xaquín G.V. talked about his days at *The New York Times*, and explained that there are multiple reasons to develop new tools, such as speeding up production processes, but also freeing up time to focus on more ambitious projects:

In most places, graphics desks are a service desk and I think it's terrible. Because you're wasting everyone's talent. If the journalist or traditional journalist can't make a bar chart for his story and he needs another person to do it is a waste of time. That's why we are creating tools. *The New York Times* has created tools for reporters to produce very simple charts. We have created tools for reporters to create very simple charts, because that's not what we're supposed to be doing. We're supposed to be creating stories, not add-ons to other people's stories.

A long-term goal of the development of a multitude of new tools and templates that add a layer of abstraction to pure code-writing may be to lower the barriers of entry to the craft. *The Washington Post's* Kat Downs is keen on the idea that core principles are timeless, but tools change all the time, and coding may not be a need for all news graphics professionals in the near future:

I think that over the next, I don't know how soon it's going to happen, but certainly in the next five to 10 years coding as a sort of fundamental tool, is going to become

not truly necessary for most people. Obviously for the high end stuff you are going to need to break out of the box a little bit so you are going to need a team of people who are going to do development. But at most smaller papers I think that the tools will be in a place where it's much easier and you can use something like Illustrator to make simple SVGs that animate or you can use some tool that we never heard of before to build a video and lets you ask questions to the video and it will respond. I think there is going to be a lot more development of tools [...]. That's going to come to our space and you are going to see, with something like medium that lets people create digital stories, and lets them drop in photos and videos and have these inline edits, those tools are only going to get better and stronger. And so that's not where we need to put all of our investment, we need to put all of our investment in something that makes us special and that's using programs for data analysis, and scraping and figuring out how to do experimentation with things like R to figure out what kind of visualizations would work and really focus on finding information, analyzing it, and presenting it in a way that illuminates something for readers. So that's going to be something really interesting to see how we respond as other people are able to do the work that we do. I think we just have to focus on what we do best and what differentiates us and that's going to be cool.

This kind of deep thinking about the future of the craft was common in all interviews, and it is connected to another very visible feature: Graphics news creators tend to see themselves as early adopters of technology and pioneers at the workplace, always experimenting and pushing boundaries. Here's *NYT*'s Hannah Fairfield:

As many things that have changed in the past 10 years, I think one of the things that has stayed the same, and I think will always stay the same is the need for a really high level of curiosity and a high level of experimentation and creativity. The people that are in this field of data journalism, data visualization, news graphics. They are people who are curious, they're excited, their learning curves are huge. They are like education sponges in a way, they want to learn all kinds of news and interesting techniques, sometimes its tools, sometimes is philosophies. Learning how to report if it's something that they have not been able to do before. And I think that level of interest and excitement and curiosity is what ends up making this field grow and change so much. So that remains consistent and I expect to keep that momentum going. I think that it's a field that's growing a lot faster than other areas of journalism this kind of visual explanatory journalism, I think it interests a lot of people and I expect that that is where it's going to grow a lot in the future.

*Vox.com*'s Javier Zarracina didn't use the metaphor of "learning sponges," but he suggested it, quickly listing all the novel technologies he feels excited about, and how that enthusiasm becomes contagious in the newsroom:

[...] It's much more exciting and it's much more rewarding because you can do things that were beyond anything I could dream of 15 years ago. And so the newsroom too, I think the newsrooms are surprised of the things that data visualization and the graphics teams can do now. [...] We are much more in power forward and backwards to create a much more ambitious piece. This is beyond my dreams when I started working there wasn't Internet. But even when we started creating things for Internet I still thought, well this is still very limited. But now the capacities of getting data, analyzing the data visually and creating tools and words with this data is something that intimidates me every day. Everyday I look at what my team is doing or what other media is doing and now I am like wow this is fascinating. I am very excited about motion graphics and VR I think that they are two technologies that certainly will give a lot of opportunities for graphics and multimedia and for interactive stuff. I think that the audience always wants new experiences and new stories so there is a lot of opportunities to tell new stories in VR and in video too. Here at Vox we have a strong video department and our visual team work very closely together and we use a lot of motion graphics and it's something that is very powerful and the audience is giving great feedback.

News graphics journalists are proud of being constant learners and also leading the way in experimenting with new technologies and techniques. They often put this in contrast to attitudes perceived in more "traditional" reporters and editors, who are portrayed as conservative and even overly cautious. This is in line with what Nikki Usher described in his ethnographic observation at *The New York Times*:

Traditional journalists saw the importance and, generally, the value of interactive journalism, but they were conflicted by the changes to their old routines. And aside from Pulitzer projects, there was little clarity about who these "new people" in the newsroom were and what the process was for creating a Web interactive (Usher 2014: 14)

*ProPublica's* Scott Klein had a “who are these new people” experience when he was hired:

When I was interviewed at *ProPublica*, I interviewed a job they called “web master.” And I told them that there was no such thing anymore. Just it was 2008 and I said it was weird that people that job title anymore. But that they should think about somebody who can help them, and again the word web product hadn’t been a thing as well, but I said you should essentially think about somebody who can help you with the platform but also help you understand who a news organization can take advantage of the huge datasets that being released. Well everything was brand new right? So when you at a start up there’s no tradition, there’s no rules, there’s nobody who did it a certain way. And that’s a great thing, so you can sort up make up your own rules and do things your way. But it also means that you’re kind of responsible for everything. So I remember at the time we were at a different office that there were 3 people on my entire half of the office, otherwise is completely empty. So we had to build our website and to start thinking about what we’re gonna be without any stories, without any reporters, and without any.. We kind of made it all up. So whatever rules that we’re now and whatever tradition there is now at *ProPublica* didn’t existed when we first started. So you know, everything we were doing, we did it for the first time.

*ProPublica* is a web-only operation that was created from scratch by a group of journalists coming from news organizations like *The New York Times* and *The Wall Street Journal*. Even so, according to Klein, the organization was able to overcome the temptation to apply job positions, departmental structures, and newsroom dynamics inherited from the print world, something I could confirm during my observation.

Nonetheless, it's not just journalists at recently created, web-only organizations that see themselves as pioneers and trend-changers or trend-setters. Len De Groot, from the *LA Times*, is an enthusiastic early adopter of new technologies:

I think technology helped me mask my deficiencies. I am not a good artist. I am not. [...] Drawing with computers, with vector things like Illustrator, and drawing with 3D were things that sort of freed me from my limitations. So, really, it hasn't necessarily been. I don't want to say that. It hasn't been like, I've seen every advance as it was coming. It's been more of a combination of needing to be better, needing to be able to sort of work in the new things that were happening and really just

paying attention, paying attention and seeing what's happening, what's the world like. It doesn't take much more than time and thought to see a year or two in advance what's coming. The really hard stuff is looking down the road five years, ten years, but I think what's coming in the next year or two is really never that hard to see in terms of the big picture. The little details are different. Obviously, it doesn't apply to that but sort of the bigger trends: that we're going to have better broadband connection, which means we can do more things; and that we are going to have phones that are a main way of consuming things, and that's going to change how we do things; so, graphics in two years are going to be completely different than they were before the day the iPhone launched. So, [...] you don't have to be prescient. You don't even really have to be that smart. You just have to be paying attention.

*Financial Times'* John Burns-Murdoch said that constant learning is his favorite feature of his work:

One of my favorite things about visual journalism, digital journalism in general, is that you never really reach a point where you can sort of sit back and think I have completed digital journalism, I have learned all the skills. So although D3.js is a big step change it doesn't change the fact that I think anyone working in this space knows that there is still a huge amount to learn. Things like Twitter are great for keeping you on your toes and you see fantastic work from other people. You see people posting D3 blocks that they have been tinkering around with. Over the last 18 months it has been a constant skill development process but alongside publishing a couple of things a week.

Kat Downs, from *The Washington Post*, compared the attitude of her department to others, and their role in moving the newsroom in new directions:

And I think part of why we do so much teamwork is that as people work together they develop respect for each other for the types of skills each other has. And hopefully they learn a little bit through osmosis about what it takes to do other people's jobs. And I think that has catalyzed the cultural change that we needed from, these are the real artists, like real journalists, who like make real things and these are people that just take that stuff and put it Online. Which used to be the attitude of every news organization 10 years ago. It was like, we have people who do real journalism and we have people that do it Online and that attitude is still happened not really in our space, because I think that in graphics and data visualization and news apps, we don't see it that way because we have to see it in a sort of fully integrated story

telling endeavor but there are still some producers working in some corner of a news rooms and their teams see them just as someone who sticks things Online. And that has to change, it is changing, slowly. But it still requires a lot of evangelizing from those people, and just teaching and educating. You know cultural changes in big organizations takes a long time. But I mean it's incredible to see it happen. I mean here at the Post its mind-blowing and really awesome, because we are a totally different place than we were 10 years ago. Not only is like 50% of the staff different but the product is different, it's so much better, everything is better so it's been fun to be a part of that.

*WSJ's Chris Canipe emphasized that "there's no other part of the newsroom" like the ones that deal with data and graphics:*

There's no other part of the newsroom that is as concerned with their tools and how to be as good as with software or with coding languages as ours is. If you're a journalist, you know how to use Microsoft you know how to write, how well you write that's a whole different thing, but as far as the actual task like writing as story, like you know how to use those tools particularly. But when you work as either on a print graphic side or on our side, you have to get to a point where you're articulate with your tools, with Adobe Illustrator, with JavaScript, with HTML and CSS. [...] To get to a point where we're also in the mindset of being journalists and thinking about story and thinking about writing and thinking about narrative, about hierarchy, and where we put a larger news cycle, I think that's a really difficult thing to bring everybody up to speed on.

*Vox.com's Javier Zarracina, explained that the people who work with him embody the philosophy of constant innovation that the company promotes:*

Part of the philosophy of the company is to have a lot of team work and help each other. Another thing is most of the people that work in data visualization really enjoy technology and they really enjoy learning new skills so it's very easy to share skills. All the people on my team are very eager to learn things and try new things, that is something that is part of the DNA of the company.

*Chiqui Esteban, who was worked in publications in Spain and the United Spain, talked about the continuity between the past and the present when it comes to news graphics requiring constant learning:*

Even in *El Mundo* when we already had the Internet on home computers, but we were still were using maps that we bought from libraries are when somebody went on a trip they had the task to bring a map to the department so we could have a map for the different cities. That's completely different than how it is now and technology has always been changing and will always be changing. I don't think that in these new days technology is changing, technology has always been changing. Before we got Online graphics we had to learn 3D modeling, and then we learned Flash, and now we are learning JavaScript, and now we are learning Python. Technology challenges are not new, and even before people had to learn Illustrator and free hand it's always been changing and it will always be. And that is one important thing for graphics and why graphics have been innovators inside of the newsrooms because visual journalists are people who are used to innovation and have had to deal with it always. So it is not people who are scared of innovation and trying new things.

It's important to emphasize that last sentence about always being open to innovation, and also the fact that Esteban sees a thread that connects past attitudes with modern ones. The drive to embrace change, according to many of the interviewees, has always been a personality trait of news graphics professionals. Digital data and technologies have not changed that, but they have strengthened it, by enabling faster and more productive experimentation.

Archie Tse, from *NYT*, many others, went a bit beyond, expressing a positive feeling towards the impact of technology on journalism:

I'm always positive about the changing.

Here's a more extensive quote by Tse:

It's like a freedom to be able to grow in the areas that you wanna grow. I think the best way to grow in an area is actually do work in that. If you want to learn how to do 3d stuff, then you kind of just need to do graphics, 3d graphics. Of course, when breaking news happen, people kind of go to their strength, so they do what they're strongest at, but when you have longer term projects then you get a little bit more freeway to do .. try things that you haven't done before. We look for people who are very curious, who want to figure things out, who want to understand things and then want to try to explain them. With that basic curiosity, we look for people who are particularly good at some areas of that, like coding or reporting or storytelling

or modeling. The base of it is somebody who engages in the news and is really excited about telling stories.

Steve Duenes, also from *NYT*, talked about the progressive spirit that has existed in the news graphics desk for decades, something that was discussed in the history section of this dissertation:

I think this unit as I pointed out, this sort of like historical progressive thinking that has been a part of who the desk should behave, that progressive spirit has persisted. So that means that there's sort of embrace of change generally, the way we publish, the things that we publish are not static, we don't want a set numbers of visual forms that we continue to make again and again. We want to surprise readers and to constantly question whether or not our practices are what they should be. That sort of built in is part of our work flow and so change kind of occurs as a result of thinking on it.

*ProPublica*'s Lena Groeger highlighted that part of this openness to innovation derives from the fact that news graphics designers, developers and, in general, any journalist who works with data, pay close attention to other fields, like statistics, science, etc.:

I think it's pretty hard to predict the future, but I think there is a lot to learn from the scientific visualization community because they've been visualizing, you know it's kind of visualization like here is how it grows or deviates, or here is the what the metal-country or something. Those are all another visual display of information. It's a little bit different, but scientists are also some of the first people ever to put sort of graphics and charts into their own papers. So I think that history, there are a lot we can learn. They are relatively putting charts into newspapers relatively recent phenomenon. It's not that recent like 1800 or something. But scientists have been doing this for a long time in sort of recording observations and doing that in a visual way [...] And now because of different open source tools and sharing data that sort of stuff are coming together I think in a more productive way.

This trend isn't new, and it is a consequence of the varied backgrounds news graphics professionals have: Journalists, visual designers, cartographers, statisticians, computer scientists, etc., who work in newsrooms call themselves reporters and editors and see themselves primarily as journalists, but they still keep

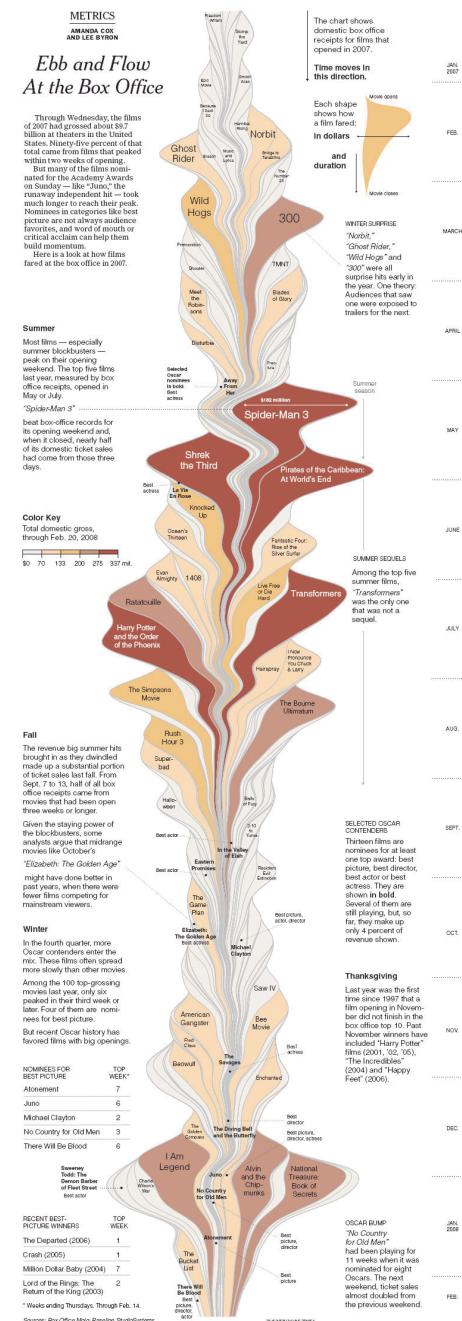


Figure R4

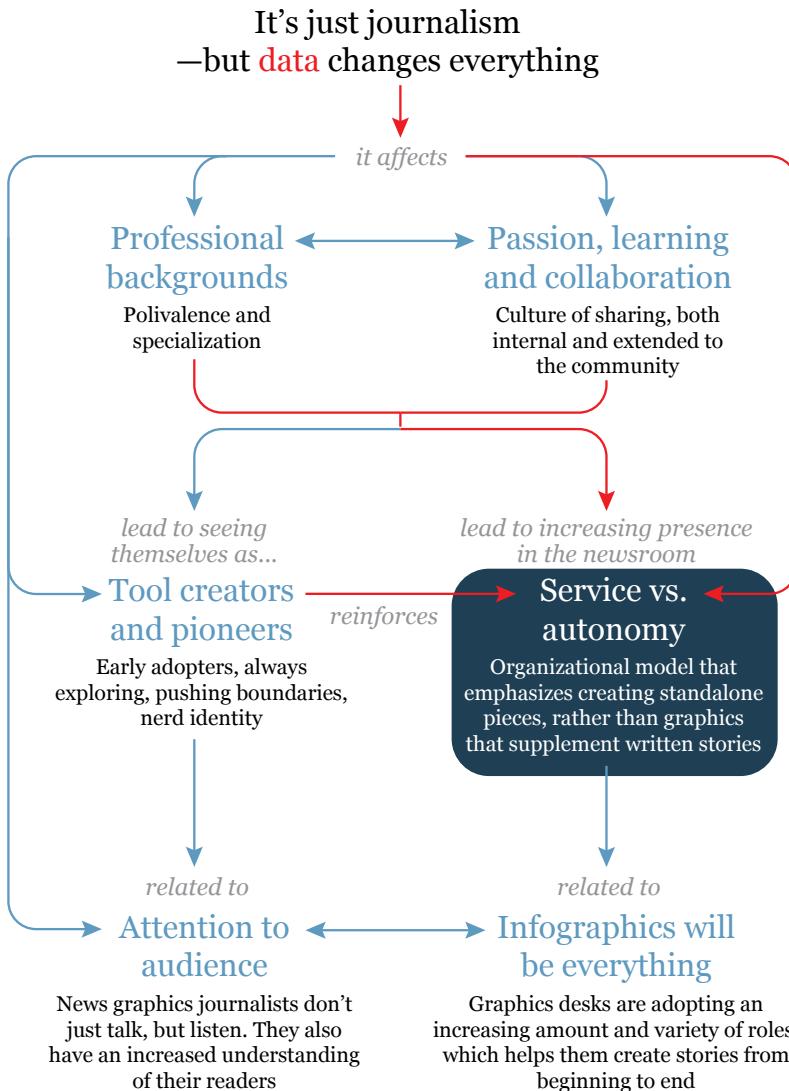
strong ties to their original communities. In *The New York Times*, for instance, some members of the news graphics team have done Ph.D. dissertations about mapping (Wallace 2016) or regularly get ideas from the worlds of statistical and scientific visualization.

Arguably, the most famous case was a visualization titled “Ebb and Flow at the Box Office,” by Amanda Cox—who has a Masters degree in statistics—and Lee Byron (Figure R4.) The method of representation here called a streamgraph or ThemeRiver, was based on Byron’s work in collaboration Martin Wattenberg, a computational scientist, and visualization designer now at Google, and described in a paper they co-authored (Byron & Wattenberg 2008). Byron was inspired by earlier work by other scholars (Havre, Hetzler, and Nowell 2000.)

In many of the interviews, it became clear, then, that professionals who create news graphics, either as an exclusive activity or as part of their duties, see themselves as pioneers and early adopters of new trends and technologies. In the most extreme cases, professionals openly and self-consciously label themselves as “geeks” or “nerds.” Scott Klein’s team at *ProPublica* maintains a blog called “The Nerd Blog” (<https://www.propublica.org/nerds>).

In my observations both at *ProPublica* and at *Univision Online*, and also in non-systematic observations during my career, I have seen that labels like those are not just self-mocking. Many of the professionals who work on these teams are knowledgeable on cherished tenets of nerd culture, such as comic books, science fiction and fantasy movies and, more recently, TV shows like *Game of Thrones*. One of the interviewees, Brian Boyer, was worried about this self-perception, saying that news graphics professionals and data journalists should become more inclusive, and stop using labels that may potentially segregate them from the rest of the newsroom:

There's a lot of words we use in the software world like “wizard,” and “ninja,” and “rock star,” and “unicorn,” and all those fucking words are bullshit. They create a notion that this kind of work is magic, that it can only be conducted by freaks, and that you don't disturb the programmers; they're special. And that's horse shit. It's not magic. It's just practice, and when we use words like that, we further the idea, we promote the idea that this is fundamentally different than other work that only certain people can do, and that is bad for the field. That's bad for journalism. It keeps people out, and we shouldn't use words like that because we shouldn't be keeping people out. We should be as inclusive as possible. All right. That's my soapbox speech. I think it's really important.



## SERVICE VS AUTONOMY

One of the main differences between news graphics professionals and departments in organizations that have their origins in the pre-Web times, and those in publications created in the last decade is the approach to the service-autonomy dichotomy.

As hinted in the history section and also in some of the quotes that preceded this section, news graphics desks in most newsrooms used to be considered “service” groups: they got “requests” from other departments, and they were supposed to execute them, playing a very limited role in the conceptualization of stories and the reporting.

Autonomy is taken for granted in online-only publications since their inception. On the other hand, news organizations with a long history, according to the professionals interviewed, have experienced a long —and sometimes difficult—transition to depart from the service model.

The result in both cases is teams that, regardless of if they call themselves “graphics desks” or not, can either act as autonomous units, producing their content or can organically ally to other departments in the newsrooms on equal footing.

*FiveThirtyEight’s Allison McCann explained this dual role:*

There were sort of seven or eight of us in this like interactive and graphics team, so some people come from more like computer science background. We have pretty serious programmer types that do a lot of back end work and setting up the things that are sort of the data that power the visualizations, or grab the live scores from sports things. There are basically four of us now do more of visual journalism sides. You know we are reporting, coming up with ideas, thinking about ways to tell a story with visualization. And some of us again come from different skill sets. Some people are better at mapping, people at design, or working with data. So it’s a good mix of skills at our 538 [...] We can come up with ideas ourselves and sort of report and get data if you have interesting idea and pitch that idea to one of our editors. So the idea can come from us and it can also come from people on our editorial side of writers and editors who are working on the story. They’ll say we have this great dataset. I think it might lend itself well to chart, or map or whatever. So they can sort of pitch the graphics people and say hey is there anything that we can do with the data we already have. So it can definitely go both ways in our newsroom.

McCann compared her days at *FiveThirtyEight* (she's now at Vice News) to her prior job at *Bloomberg Businessweek*, a magazine that has both a print edition and a website:

I think it was more top-down mandate then of stories that people already had and we are making most for the print magazine. There were features we already wrote and sort of like hey there is a four by four grade here let's put a graphics there. There were definitely opportunities to pitch your ideas to work on things. But I think that was less than the norm at the time and having print deadlines staff; you don't have a lot of time to work on your own things. And at 538 we have a lot more sort of autonomy to have our own projects going in addition to working with writers and editors or working with our team projects. We do a lot of forecasts, big sporting event, election stuff like that. That is always five or six of us all working on one project.

*FiveThirtyEight*, though, is a special kind of organization, according to McCann, in the sense that a majority of reporters have a deep familiarity with data and visuals:

I think coming to *FiveThirtyEight*, the biggest change for me is getting to work with everyone in the newsroom here is really comfortable with working with data, and seeing things visually. So even the people are not necessarily a part of the graphics team, there are tons of people who do you know their work in R and data, and they do make their own visualizations with charts, so people here, just even the writers, are all comfortable with data, and thinking about things graphically.

Chris Canipe works for the *WSJ* today, but he used to be at *Quartz*, another online-only organization. He described a culture in which news graphics were everybody's responsibility, and news graphics professionals were treated as any other journalist in the newsroom:

In my experience, I've been observing a huge amount of change, but I think it's just because I've been working at startups, where the exhibit has been done sort of differently. Like I said I worked for *Quartz* for a couple of years. I think *Quartz* was like very ahead of the game. They hire people who can make graphics, but they were very much like we'll not set up our graphics desk. Every individual writer is sort of responsible for their entire story. The people who make graphics are sort of expected to pitch and write and make graphics for their own stories. In my entire

career, it sort of always been like you're a journalist who tells stories with data visualization as opposed to you're somebody who makes charts for other people stories.

Scott Klein, who works for *ProPublica*, another Online-only organization, compared the dynamics he experiences today with the ones he witnessed when he worked at publications with a much longer history:

We very much see the work we do as journalism itself. We're not, you know, in the old days, there was the art department, and you will send them a story, and you will say "make a chart for me," and they will make a chart for you, and they did sort of help themselves outside to newsroom, and they're just kind of help to make some charts. But we very much think of ourselves as many of the other teams who do this nowadays, as a news desk like any other group of people in the newsroom. So we're enterprising our own projects and also reporting out the graphics that we make, and the databases that we make even when we're working together with other reporters in the newsroom. So this is an important point. And what follows from that is really, lots of things that follow many other desks in the newsroom. So I'm an editor, I'm just as one of the more traditional teams has the editor who edits stories, I help edit graphics and interactive databases. Are we telling a story that people understand, are we accurate, how do we know that we're right, what is the flow of readers are in this, where do they start, what's the middle, what the end, are we telling a cohesive story, are we helping them understand this phenomenon. So too, the promotional techniques to getting people to regular stories also apply to graphics and databases.

According to *The Washington Post*'s Kat Downs, the graphics desk she leads made the transition from being mostly service to being mostly autonomous under the former head of the department, Hannah Fairfield, now at *The New York Times*. Downs said:

I feel like we have a lot of freedom, but we also have respect and people really value what we do here, and that's different than how it was ten years ago. I think that what we do here at *The Washington Post* by our management, by our leadership is considered very core and central to the brand, to the company, to our journalism and that's great because that means that we are considered and were at the table and our thoughts can shape and form a lot of the work that we do. From the stories that we cover to the way that we cover them. And that's a good trade to make; that's a

good place to move to, and that's the evolution that should happen as something sort of launches and is iterated upon and becomes more formalized, and it becomes more successful over time as you sort of prove the value and the worth of the thing that you are trying to do.

*LA Times'* Len De Groot described that transition at his newspaper, right after he took over:

Even before I joined them, the previous group, it was set up differently than I tend to set things up, but they were more, probably, more responsive to editors in other parts of the newspaper and generated less of their own content. We generated a lot of our own content, and oftentimes, we would come up with an idea and pitch it to a reporter and see if they want to help us or be part of it. So, I think that's a pretty big shift. I think it's highly valued in the newsroom. I think it's really highly valued. I think the people throughout the newsroom do understand that, yeah, they're not going to get every map and chart that they want, but when they do get something, they're going to be very happy with it because we're going to take the time and the care to make sure that it really serves the story.

Steve Duenes, from *NYT*, pointed out that the culture of the newspaper enabled the transition:

If you came here to make graphics, you were not just an illustrator taking information from some else, from a journalist who is outside of the department. The expectation was you're a journalist, and you need to be able to report information and to have a variety of visual skills to express that information. And because the newsrooms are set up certain ways and the department now requires both the collaboration among its members, there has to be a high level of spirit of collaboration and interpersonal communication skills. Both of these are pretty important.

At *The Guardian*, Xaquín G.V. the head of Visuals, compared his current experience to his past as a news graphics designer for several publications in Spain, like *La Voz de Galicia* and *Elmundo.es*, the Online version of *El Mundo*, considered one of the pioneers in interactive news graphics. Xaquín G.V. attributes the creative freedom he experienced at *Elmundo.es* —where he worked with me, as I was the infographics director at the time— to its being an experiment that most old-time editors and reporters didn't understand at all:

When I was at *La Voz de Galicia*, it was thought of as a service desk. I tried to change their minds, and I think, to a degree, I did, but I was 20 and 21 when I was there, and it wasn't easy. And, plus, at that age, you are super cocky, and you say whatever comes across. When I was at *El Mundo*, we did the same, but at *El Mundo*, we had the advantage of the freedom that we had because nobody else could do that stuff. Nobody else thought about that stuff, and the editors at that time saw something that differentiated our product, and they let us do experiments. They let us do stuff, and they treated us as journalists when we did breaking news or enterprise stories. Because we did our own research, we collaborated very, very well and at the same level with reporters, and that was great.

In 2007, Xaquín G.V. moved to the U.S., where he worked for *Newsweek* and the *NYT*, and he witnessed the “service desk mentality” that was still pervasive. In some cases, the attempts to change that mentality led to conflicts with individuals from other areas within the newsroom, something that he's still seeing at *The Guardian*:

But at *Newsweek*, I realized the service desk mentality was still very deeply engraved in some people's minds, and even at *The New York Times*, in a few instances, we've had some very small confrontations with reporters that didn't understand that we were not there to add beauty to their articles. We were not there to produce a bar chart because they didn't know how to. We were there to add value, and if that part of your story was silly, and it wasn't worth producing a graphic for it, we would tell them, or if their data was wrong and it contradicted their stories, we would tell them, which I think is something that not everybody can take. When I was at *National Geographic*, it's a completely different world, and now, at *The Guardian*, you still see that. At *The Guardian*, you still see that European mentality of graphics as a service desk, but I think there are enough smart people in the newsroom, and they're usually the loudest, that understand what visual storytellers, what a very strong graphics desk brings. And it's a different approach to news stories. That's it. We do produce news stories in individuals' desks. It was very different ten years ago. I think we were known as the art desk. There was a little bit of daily counter mentality where it was like oh we need a graphic on page one, here's your data, here's what we need, can you make out an illustrator. I think the role of a visual journalist in the newsroom has definitely come up a lot where we're seen as journalists as well, just with the different tools that we just tend to use, as many roles as the normal reporters would.

WSJ's Max Rust also talked about recent culture changes in the newsroom:

A lot of editors still feel graphics are these weird sort of sidebar thing like they say we need a photo so let's call these people and they'll make something for us with some photos. I think it's changed a little bit. Because now people see graphics as sort of a fundamental part of a news report in many ways. It's not always necessary, but it's sort of something that is expected now.

Chris Canipe, an interactive graphics editor at WSJ, provided context to the transition between service and autonomy:

I think at the time we were much more focused on being a developer team first. The other thing I would say about that is that we were much more... everybody who does this job in news organization talks at some point about are we a service desk, are we a desk in the newsroom to which people submit a request, and then we build things for them. Or, are we a news desk like sports desk, or the national desk. Like do we pitch stories? That's one thing we definitely weren't doing then, that we're doing much better now. We really make an effort to bring ideas to the table, and to kind of have our own ideas for stories. Especially the election cycle right now, where we're trying to produce projects week to week. That's definitely changed.

John Burns-Murdoch, from *The Financial Times*, talked about the changes he has seen in the months since he was hired:

[There was] a feeling that the print graphics side at least, that they were there to simply finish charts off. Absolutely not the case across the board there were fantastic people and processes where people have always been strict about maintaining absolute creative control and taking on their own stories and projects. I think more so than now at least, there were times where people were simply given tasks, and it just finish this one, we want the next one, certainly over the last six months here that has changed quite rapidly, aided by the fact that a lot of the routine processes in chart making have been automated or sped up and I think that has given people a lot more creative control and the conversations between visual journalists at *The FT*, and when I use that term I am talking about all of the graphics, interactive, stats desks, the conversations now between us and any given member of the core news reporting correspondence staff is a lot more even-handed so there is an acceptance

that for us visuals is just as important, and the control of them is just as important to us as a piece of writing is to predominantly text journalists. So the conversations are no longer, I want you to make a line chart, it's more here is the story we are trying to convey, and then the visual journalist will determine whether this should be a static piece of work or interactive or should of be a line chart, bar graph, a scatter plot a population pyramid, all sorts of stuff. I think that is something that has quite noticeably changed over the last six months to a year.

Burns-Murdoch said that this fast transition occurred thanks to Alan Smith, the current head of data visualization at the paper. In the following quote, he also anticipated a theme we'll explore later in this section: the fact that news graphics today are being produced by different teams within most newsrooms —print and online graphics teams, statistics teams, interactive teams,— and that an increasing drive to more collaboration is making them converge into larger units that take over other tasks other than charts, maps, or graphical explanations:

A couple of years ago *The FT* was similar [to other news publications in the sense of being “service” desks.] What we are seeing happen quite quickly here largely since Alan Smith head of data visualization joined from the office of national statistics last year, a lot of the change we are seeing here is a more a breakdown of the silos is sort of buzz-worthy way of describing it, everybody talks about this need in newsrooms or any kind of media organization. I think it's a process that a lot of places have gone through recently. Places like the New York Times, *The Wall Street Journal*, *The Washington Post* have led the way in that respect. But yeah for us it's been a very conscious decision to stop talking about the statistics team, the interactive team the graphics team and even then talking about Online and print graphics separately, to stop that distinction and increasingly have a data/visuals team as it were to where people can swap between different types of projects in terms of fast and slow print and Online, interactive and static. Similarly, any given project can be passed between people, so it's not reliant on an individual. That included a lot of skill sharing, and this is very much an ongoing process. I definitely don't think that any of us would say that the finish line is even in sight on that. I think this is very much an evolving process. But we are already seeing some fruit from that in terms of the speed that various tasks can be done now. We used to have a couple of years ago something similar to what we had at *The Guardian*; we had the same thing at *The FT* where I would be making a web graphic, and a print designer would make

the print version where the paths diverged after the spreadsheet and everything was done twice. And one of the really big technological developments which many people talk about, like graphics templates, one of Alan Smith's first big projects here was to use things like D3.js to make that process much more of a single path with different end points, so a print graphic and web graphic, different version for social media, or used in videos, are all made in the same work flow. There is still that very final step where a print designer uses Crowbar to pull out and SVG from a page, but there is very little redundancy in that work flow. The great thing that it has allowed us to do is that it's allowed everyone who was doing routine jobs of converting graphics to different platforms to spend more time on developing entirely new skills.

When asked about the organization of the “graphics desk,” and how many people created news graphics at *The Financial Times*, Burns-Murdoch mentioned instead the people who effectively designed graphics:

I think maybe 15. It really depends on where someone draws the line. There is probably 13 of those 15 who are part of the graphics team and a couple of people in our statistics desk that are engaged. That is people who a couple of years ago would have been defined as graphics journalist, so not including the interactive team, or the statistics team. But I think the stats team, the team that produces these more fairly routine fast-paced graphics for any given developing news or financial story. So that team as well has increased exposure in terms of the actual process of making these graphics instead of just clicking some buttons they are more involved in the conversation about how to display information. I have left the interactive team outside of these 15 on the basis that we are not doing this stuff every day. The interactive team is three of us in a role similar to me in terms of combining, writing, finding data and visuals and then we have three developers and one designer specifically assigned to that team. Sometimes we are working much more on the data analysis or writing sort of thing, and we go a week or more without producing anything visual.

The appearance of various desks within newsrooms that end up producing news graphics, either as the sole task, or as one task among others, is not uncommon. At *The Guardian*, for instance, Burns-Murdoch worked for the Data Blog, a unit then led by Simon Rogers —today at Google News Lab— that created in-

teractive visualizations with limited input or participation of the traditional news graphics desk at the newspaper:

Part of it was a print-digital divide. A lot of the charts that we were producing on the Data Blog either would not appear at all or would be produced by a completely separate team with a different process. The one thing in common would be the CSV or the Google spreadsheet. But the production of the graphic as it appeared on the Data Blog and in the paper was completely distinct. There was a conversation and a good relationship between the Data Blog and graphics, but ultimately the form that it would take was up to whoever was producing it, so something might be presented differently in the papers to how it was Online. For the bigger pieces, showcase pieces there was much more of a constant dialogue between the graphics team and the data blogs. We would be attending the same meetings, but it was very hands on as well. Regularly people going to each other's desk to make sure things were going as planned.

At online-only organizations, the existence of multiple departments that use news graphics as a language —rather than graphics being “owned” by a single area—is seen as normal. Here’s Ritchie King, from *FiveThirtyEight*:

Our team, we have a team of what we call like computational journalists. And we have a team that we call visual journalists. And there’s a little bit of overlap in skill sets between the two. So the computational journalist is a more doing stuff on the back end. For instance, we have a database reporter, who’s the main task is to build and maintain the database that we use to store all of the public opinion calls. That kind of power our elections forecasts. That’s a huge job. Then we also have a computational journalist too, is kind of really good at building him own predictive models, he’s really in sports so that he will build these kind of code based predicted models for different supporting events. We also have somebody on that team who is a little bit more of a graphics person, who focuses on politics interactives. And then on the visual journalism side, there are sort of like four of us. We do a combination of making static graphics for the site and then also building interactive to kind of showcase our predictions and analysis that were done. Then also, here and there, kind of doing some of our own reported stories that either have a sort of interesting graphic that go with them or sometimes are just pretty much written stories. We always think of ourselves as journalism reporters first and foremost with traditional data visualization as a communication tool.

In some organizations with a long history of analog products, like *El País*, the traditional news graphics desk never actually made the transition from being a print-centric unit to one that could produce content for multiple platforms. That led to the creation of other areas in the newsroom, pushed by professionals with backgrounds in technology, which began designing interactive graphics work and data visualizations.

At *The New York Times*, before 2010 at least three different groups were producing projects that could be considered news graphics: the traditional graphics desk—which produced both for the print and Online editions,— an interactive news department, and a multimedia desk. In the past few years, the work of these departments has converged, and in 2016, news graphics, interactive news, and digital news design are the responsibility of former graphics director, and now Assistant Editor, Steve Duenes (Mullin 2016.)

A similar integration has happened at organizations like *The Wall Street Journal*. Another peculiarity of the *WSJ* is that it discarded a completely centralized model for news graphics production, and chose a hybrid one. According to the multiple *WSJ* news graphics creators interviewed for this study, many news graphics professionals are embedded with other desks. Here's how Carlos Tovar, head of graphics, describes these dynamics:

I think one of the revolutions of the graphics department is to have more specialist people that cater certain sections. I think that happened in *WSJ* when I started. They wanted someone who was really specific about certain sections. So when I was hired to the *WSJ*, my main job was to do international news. So I was the graphic editor for international. Actually, I was in the politics. There was people having the specific knowledge. So they don't have a lot of general journalists. And then I think after that happened, a few years later, there was one point mainly because we move offices and they want to go back and have a big team that catered to everyone. They have all these different people who worked as cartographers, people who did infographics, people who did charts and you have more people with specific skill sets rather than a specific beat. And one of the problems was that in a few years after that when we integrated interactive graphics department we realized that we need to go back to always, being closer to sections, in cater to a specific section. We have people who understand those sections, those beats, and those stories. So when we break the department in half and move people away into the sections, you have an art director, photo editor and news app developer, graphic editor and a lead visual person who kind of acts as visual editor for each section.

John Keegan, also from *WSJ*, talked about the traditional separation between the print side and the online side, and how it ended. Then, he added that the fact that news graphics people are flexible, creative, and constantly learning new techniques leads to an increasing respect inside the newsroom:

I feel like the biggest change I've seen is the ability for our paper to adapt and realize you need smart and intelligent people who can express their ideas in different forms. Before I think, the things were very rigid. If you are a reporter, you have a beat. And you are stuck with it. You have editors to work along for a long time. And you have a structure, and everything had to flow through this different path. And you really didn't have a lot of crossovers there. And how they reflect their graphics team was you had people who did print graphics. And you have people who did interactive work. For a long time, we run different floors. You actually didn't know who the people were who are doing the print graphics. [...] So you had a wired mix of people. You had people doing charts in Illustrator. You had people drawing. You had people running code. Eventually, over time, I feel like our paper got better at just saying "Look, you are a talented person. You have a lot of great instincts here when given proper challenge can rise the occasion in, learning new ways to express yourself. That's been really gratifying to see over the past a few years. And I think it was kind of slow, steady transition that has rapidly taken effect.

Keegan's point about increasing respect was reinforced by Jessica Yu, *WSJ*'s head for visuals, in charge of news graphics, but also of any other kind of visual content, such as a photo. The *Journal* went through a process of integration of all its visuals under a single umbrella, and then a process of dispersion of its professionals all over the newsroom:

I'll tell you we're about 120 right now globally for everybody who's involved in visual journalism, which is quite large. We've definitely grown by handful positions every year in the last few years. I wasn't really involved in hiring ten years ago. I couldn't tell you the number, but it was definitely smaller. What we have is most of our team is embedded onto a desk, so that means they have a place as any other reporter would. We have people that specialize in US news or world news or money investing or business and tech or sports or features. So on each of those desks, there are people that are from photo editing background, graphics background, dev background, design. And then within that group there is one person who's called

the visual editor, who looks at the visual journalism holistically and determines what projects they're gonna be working on a day to day basis, what is the big breaking news that's happening right now, what is the long-term project that we want to achieve and balance all of that out. In some ways, we have, in some ways, more independence. We are more integrated into the newsroom now as a whole. We definitely have more independent projects; we're more respected as journalists now.

Chiqui Esteban, who now works for Downs at *The Washington Post*, compared his current experience with the beginning of his career in several Spanish newspapers, and attributed autonomy to the fact that professional backgrounds are more varied today than they used to be in the past:

When I started, I was in little departments where there weren't as many specialists as you have now. For instance, when I was an intern at *El Mundo*, which was a big department we had around 15 people or so. All of us were the same kind of infographic people, but we had one researcher. Now you look at *The Washington Post*, and you have researchers, you have people who specialize in 3D and illustration. People who specialize in data, and we have a data team inside the team. People who specialize in some types of code. People who are more kind of designers. I think the difference that technology has also made or that Online graphics have made, is that now we can have very different skills in a team and before, I mean 10, 15 years ago it was more like, the larger the team, the more infographic artists you had, but there weren't very different skills inside the team. I mean that might be true in the bigger departments, maybe the New York times had it, I don't know. But at least what I knew at the time was the profiles were much more similar. Now we have much more different people in the graphics department which I think is a very good thing and it also opens much more the field of what's a graphic. Before you could say, this is something that graphics does, this is something that design does, this is something that development does. Now, you can do whatever you want, and it also gives you more freedom.

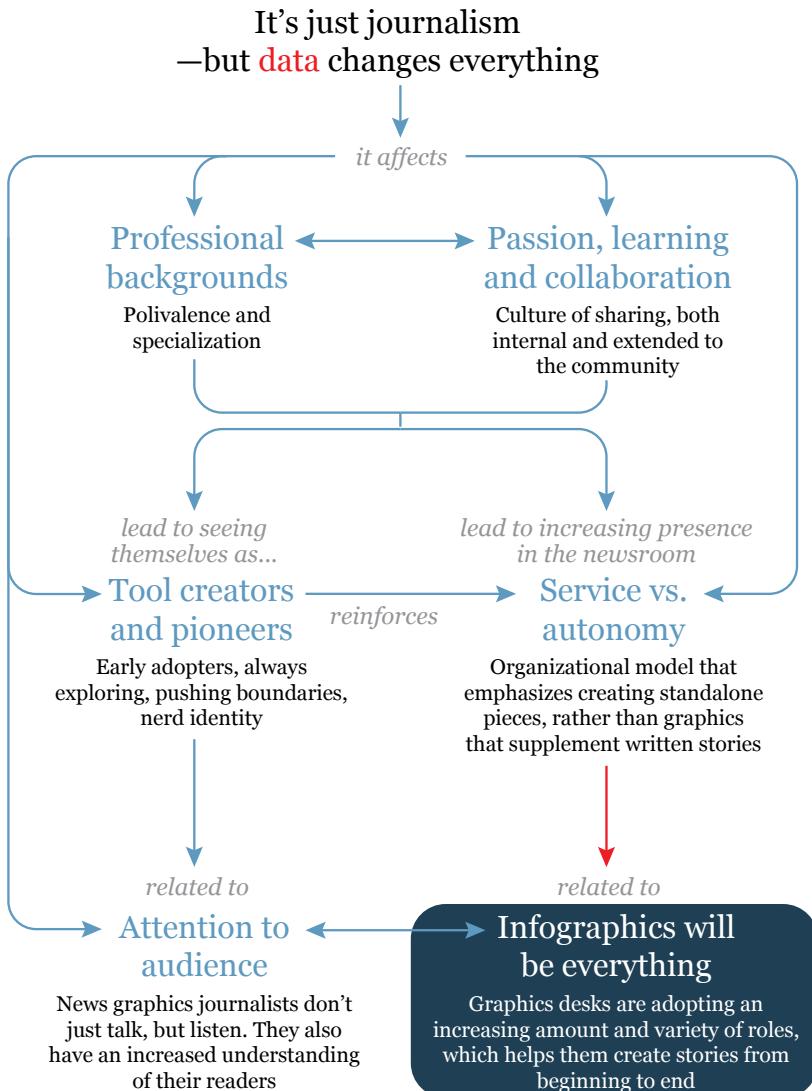
What Esteban said about "opening up the field" is connected to observations in several other interviews about the expansion of the tasks news graphics professionals have embraced in some newsrooms. Hannah Fairfield herself talked about such a pattern at *NYT*, where the fact that the department is considered a "content production" desk has led to owning the entire production of stories from beginning to end, from coming up with the idea and the angle, conducting

the reporting, and then producing all the assets for the story, not just necessarily the visualizations or infographics:

I loved working in the graphics department in 2000, but in the past 10 years or so, so much has changed in terms of ownership within the department. The graphics department at the New York Times is really considered a news department in the same way that the foreign desk is or the national desk is or the business desk is. And many years ago when I was first hired it was considered more of a service desk. Where one of the content-producing desks like national, or foreign would say I think it would be good to have a graphic to go with this story. And then over time, because of the people that were in the department, and because of the excellence in a lot of people reporting they started to move toward what used to be called stand-alone pieces, where the whole story would be a graphic. We did many of them for the science section, many in other news sections where it would be maybe a half page of visual diagrams. There was a column that I did for our Sunday business section that was called "Metrics," and it was a half-page, and It ran every other week or so. It was entirely a data visualization exploration. It usually had maybe 100 words of text with it that I would also write, but I could sort of do the whole thing. Later we had something similar in the science section that was called "Visuals" and those I think really began to sort of pave the road toward where we are now, which is a fully content-producing desk. So when there is breaking news, we will produce what we might call a Visual Explainer, that doesn't necessarily go inside of another story, it is not an accessory, it's its own story from beginning to end. It's got much more text than it might have . Otherwise, it might have several charts that build an argument or that get inside that might build a piece of news, and we simply weren't doing that in the 2000's. So the idea that we really sort of evolved to this point where we are really able to have full ownership over all of the content that we are producing is pretty exciting. I wouldn't want to go back.

What all these quotes show are two paths that lead to similar outcomes. On the one hand, places like the *WSJ* have integrated news graphics completely with other "visual" disciplines, such as photography or video; in other newsrooms, such as the *NYT* or *The Washington Post*, graphics team have became extremely multidisciplinary, and have expanded their boundaries to the point that they encompass tasks that were not historically parts of the duties of graphics desks, such as data collection and processing, programming to create new tools, multi-media journalism, etc.

The result is the same: a "visuals" team, instead of just a "graphics" one.



## INFOGRAPHICS WILL BE EVERYTHING, EVERYTHING WILL BE INFOGRAPHICS

When asked about the future of news graphics —or “infographics”— Ohio University’s Professor John Grimwade, who for decades worked for news publications, gave an intriguing answer:

I think it was [Dutch designer] Frédéric Ruys who [...] said that “in the future, we won’t call infographics [...] The public certainly won’t, they will just be how we understand things. And if he’s right about that, that’s kind of fantastic. I mean I’d love that. I mean I don’t care if people know it’s called infographics or not, but if it’s so integrated that they can just use it in their daily lives, wow, yeah. It’s sort of happening. People don’t realize that every time they’re using an app or something, they’re using some sort of interface. I just see it as a complete integration of all types of infographics. I don’t think we’ll be talking about print or Online or any of those categories. Hopefully, it’ll just be a fluid mixture, using whatever new technologies there are. It’ll just be part of learning. That’s what I would like to think. I don’t know of course; I don’t have a crystal ball.

The words that Grimwade quoted implied that, in the future of news, infographics may become everything because everything will be an infographic. According to what it was suggested by most interviewees, a sharp separation between news graphics and the rest of varieties of visual journalism in the newsroom doesn’t make much sense. This is what Grimwade meant by “fluid mixture, using whatever new technologies there are.”

In this sense, news graphics professionals don’t just create visualizations of information, but are in charge of design in the broadest sense of the term: visually structuring information in a way that can be understood by the public, and also producing the information itself in many cases. Visualization is just one of the multiple ways that goal can be achieved.

*ProPublica’s Lena Groeger explained it this way:*

Maybe just because of the web, it’s a lot easier to sort of combine visual, words and pictures in new ways. That was traditionally harder when you had, here is the text section, and here is where I put my photo, and so I think people are experimenting

a lot more with interpreting those two. Also, designers working with developers working with journalists, that kind of merging of different fields is beneficial, especially in thinking about ways to design information in a way which best conveys some point or tells a story. So I do like that people think that visual designers are more respected maybe in the news business. While the designers working in the newspaper magazine like that would probably have seen that as more like you are just the person that makes things look pretty. I think maybe now there is a bit more respect in sort of designer as crafting. So maybe the design has been more serious in a lot of different contexts.

Chris Canipe, from *WSJ*, said that the holistic approach that Grimwade and Groeger hinted can be achieved because people in newsrooms who are tech-savvy are much less constrained on the web than they were on the print medium. Digital technologies opened to door to endless combinations and possibilities:

Coding [and] bringing news app developers to the news team has changed the way we present information. It has opened the door to a lot of ways to tell a story. I mean before you usually use Illustrator to tell a story with a graphic that is usually static. There are so many ways besides the paper or something they have the big file was. But now because you have so many ways to show information, there are so many tools available for someone who is interested in data visualization that the world has opened. [...] I think on the web because you have so many different elements to play with like you have time, you have motion, and you have 3d-ish stuff you can expand the possibility of telling a story. I think there are plenty of ways to tell a story in print. But we've been doing it for a long time, people have been innovating for a long time, so I think there is less perhaps space there to innovate something or on the web, we've been experimenting with this for not that long. So there is much broader which wider space. And I think there is a lot of the things you see on the web in terms of telling stories you know, especially in a journalistic setting a lot of time just coping what you used to do in print, but we don't need to do it anymore. So I think people should be starting to innovating and experimenting that way. Again, it will take a little while because we are very used to reading an article that starts with a headline and a byline and has some photos. But I think over time; that will also change. You'll start to see a lot more GIFS and things like that sort of interaction and motion and sound will become more important for sure.

NYT's Hannah Fairfield emphasized the connection between news graphics and other means of visually delivering information, like video and photography, besides mentioning the importance of focusing on mobile platforms, a topic we'll cover in the following section. According to Fairfield, the news infographics field was "well positioned to work fluidly and easily on the phone" which is another factor to explain its growing popularity:

In the future, I see much more growth in terms of visual journalism and visual storytelling, and that is going to incorporate visualization, as well as strong photography and strong video. But I think what I see much more is this sort of full integration of visuals with good strong explanatory journalism. I feel like there is a big audience out there for that kind of explanatory journalism and I feel like we have a nice growth curve ahead of us to be able to see that. I also see that kind of journalism working enormously well on phones and these sort of new platforms that are emerging as we are talking. I am not exactly sure how everybody is going to be getting their news in the next five to 10 years, I think that's going to be exciting. And I feel like if you asked that question 10 years ago, I don't think that I would have necessarily guessed that we all would be getting news on our phones. But the idea that this kind of infographics and visual journalism was well positioned to work so fluidly and so easily on the phone. I think that's been a real advantage for the whole field. I feel like we are going to be seeing more of that. That isn't something that is going to slide backward, or I think, change dramatically. I see the trajectory in front of us getting more focused on visual journalism and readers are getting more sophisticated. 10, 15 years ago I don't think a lot of readers necessarily would understand some of the charting forms that we were beginning to develop at the time. And now lots of people are very comfortable with reader scatter plots and connecting scatterplots and tree diagrams and all kinds of slightly different experimental charting forms that some of the software like D3 has allowed us to be able to experiment with and experiment on different platforms. I think we are going to see a lot more with experimentation in terms of data visualization in the future as well and that's exciting because as the data visualizers get more sophisticated, readers get more sophisticated so they go step by step and that's pretty neat too.

Brian Boyer, ex-head of Visuals at *NPR*, talked about the origins of his former department, and why they chose its name:

We decided to call our team the Visuals Team because we just needed a word that could catch everything. And so we've [...] I edit a lot of data work, and honestly, I

edit a lot more visual storytelling where we're integrating photography with things on the web and that sort of thing.

At *The Guardian*, news graphics belongs to the *Guardian Visuals* team, led by Xaquín G.V. It is worth quoting him extensively, as he explained the philosophy behind the idea of bringing together data, news graphics, and other kinds of visual communication:

I can tell the story of how *Guardian Visuals* came to, came to be. So, Aron Pilhofer [, formerly head of the Interactive News team at *NYT*] was convinced to join the *Guardian*, and become the executive editor for digital. To renew the effort, the *Guardian's* efforts to be a digital powerhouse [...] So they brought him over to run what wasn't written word. So, the two things he first thought about, we're a data team. And a visual team. And he was exploring how this visual team could be. And he emailed me, he said, so this is what I want to do, but I don't want to admit, I don't know what it is, I don't know if it's a graphics desk, or if it's more than a graphics desk. I'm not sure what the shape of this could be. And I told him that when I was at the Times, I thought that it should be so the multimedia team, the interactive news technologists, and graphics should be a single team.

After that, Xaquín G.V. referred to his days at *NYT*, where he also worked with Aron Pilhofer, as a prelude to their vision of full integration of all kinds of visuals so a single team can be in charge of creating all assets within a story, integrated in a “holistic” manner:

We [the graphics desk, where G.V. was] did collaborate with Interactive News technologists, where Aron Pilhofer was. And we did collaborate with the multimedia team, and with the video team [...] We did collaborate, but sometimes in stories that were not thought of as cross desk. Each team was in a silo when they could have been working together. So I told [Aron] that I thought that a single team could do much better visual storytelling. And at the same time, he had been talking to Brian Boyer, who came up with *NPR Visuals* [...] So he was like, maybe we can do something like what they're doing but much, on a much larger scale. So it's kind of like four times bigger. But, he then was like, okay, I can do that, but who's gonna run that? And, at that time I was at *National Geographic*, and I was like, I'm fine here. But then I started thinking about it, and it's kind of like, it's my dream job. For the first time, we could think of, think of visual stories in a holistic way. It's no longer, this is a separate piece, like a separate picture that goes into this story that

has been written, or this is an interactive that goes within this story that has been written. No, we think of the story as a whole. And there are parts of the story that can be told in a different way. That way it can be interactive; that way it can be a little animation, or it can be a static chart or a set of pictures. And it was something that I had done, at the Times, and that I had really enjoyed. So I told him well, maybe, like maybe I can do it.

Next, he described the integration process at *The Guardian* Visuals:

What we brought together was the graphics desk, the interactives desk, these two interactive documentary producers, motion graphics, and the photo desk, and a couple of people that do motion graphics. And we put everyone together, and we have a team of Special Products Editors that are part of the leadership of the team, people like Feilding Cage, who's [...] won two Emmy Awards for his news and documentary new approaches. We have Troy Griggs. He was a fantastic interactive editor that used to work at *The New York Times*. I don't think Steve Duenes [former head of graphics at NYT] has forgiven me for stealing him. I'm kidding. I know he's forgiven me. We have Fran Panetta, who's another Special Products Editor who does interactive documentaries. We have Sean Clarke, who is a Special Products Editor with a focus on national politics and business, and we have a great Graphics Editor, Cath Levett, and that group makes and then Roger Tooth and Fiona Shields, who are the Director of Photography and the Deputy Director of Photography, and that makes the leadership of the team. So, the team has a very broad set of skills, but also, the people that are running it with me have a very, very varied set of skills, which is incredible, and it's great when we're in the room discussing projects. It's great to have all those points of view.

According to Archie Tse, from *NYT*, a similar process is taking place in the newsroom. In this quote, he compares the present to the recent past:

Here's another thing that changed. In the past five years, we are doing many more stand-alone graphics stories where we are doing a story that does not belong with another story, like a written story by a reporter. We're doing our own stories, that text and visuals will be together, and so I think that has been a big change recently. [...] I would say like the majority of things that we do now are probably things that are standalone. Things that don't go with another story but a part of the newspaper's coverage of a topic. Whereas before we might have a few pieces, one or two pieces a week that might be a stand alone piece. I feel like, it is where exploring how to

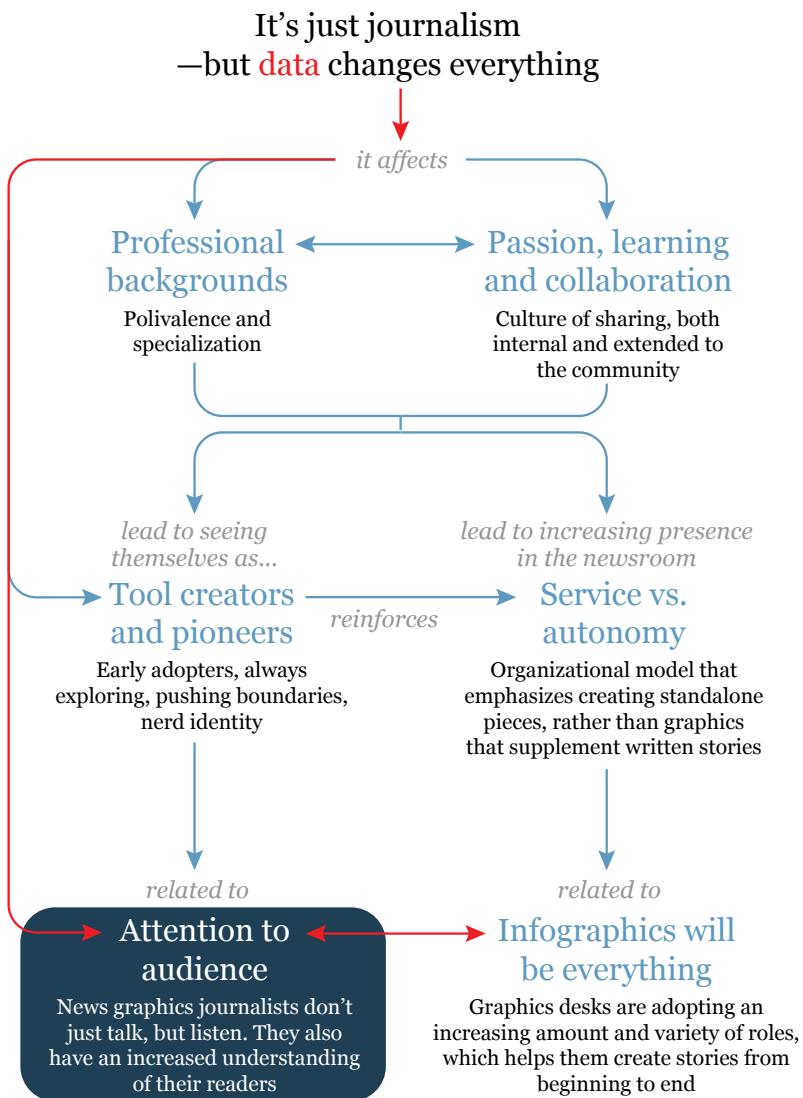
make visual stories as its own medium of storytelling. We've been quite figuring it all out. It's a great, exciting period.

Kat Downs, head of graphics at *The Washington Post*, mentioned her background as a multimedia designer as one of the reasons for her interest in moving the graphics desk in new directions:

So we started focusing a lot more on infographics, data visualization, explanatory graphics, user interface design, database design, and creating story-driven things. And so, since then I have moved into a variety of different roles. First, it was an information designer; I did that for a couple of years, then I was an innovations editor, which means that I did a lot of training and templates on things to make the transition to digital easier for other people in the department and other people in the newsroom. And then I briefly did a job that we called interactive projects editor which was a cross-departmental role where I was working again more with video, photography, and graphics trying to bring different types of storytelling together into singular experiences. Then I became the deputy graphics director, so I started helping to operate the graphics department as a whole, and then I became the graphics director, so I run the team, it's a team of about a couple dozen people who do everything from interactive story design to more traditional infographics, to database design, and news app design, building APIs, building tools, and templates. And we work on the newspaper, we work on the website, we work on our apps. So we do a lot of different types of things.

Len De Groot also talked about the expanding boundaries of visuals in the *LA Times* newsroom, saying that they avoid "strict adherence to form":

I think it has to. I think our work is changing. Our work is much less traditional. For a long time, multimedia meant video. And I don't think that's the case anymore. We keep saying that a lot of our work involves data and audio and video and photos and text; we are less concerned about the strict adherence to form, and we're much more concerned about being effective journalists. And if that means that we need to do a bar chart, it's a bar chart. If it means we need to do some beautiful data visualization, it's that. If it means we're working with audio and HTML, then that's what that is too. It's just trying to look at some of the best ways to tell a story rather than going into it with a, well this is the type of work we do. Or this is, we're going to make it fit the type of work we do. Trying to go into it and just say what's the best way that we can help people understand the story.



## ATTENTION TO AUDIENCE

Another change in news graphics brought about by digital data is the increasing attention paid to how audiences interact with the news. In the past, journalists had a very rough understanding of how readers read content. Direct, experimental evidence available was scarce and based on very limited eye-tracking studies (Quin 2007, Ruel 2007) which were largely ignored by professional designers. John Grimwade, from Ohio University, explained this change, emphasizing the importance of engaging audiences:

In the era before the data era, we didn't have any metrics. So, we didn't—apart from some focus group kind of feedback—we didn't have any way of knowing how well our graphics were understood or used. But the modern audience, of course, we can track exactly how they've used the graphics and interacted with them. So, now that you're in a new era where you have all this feedback, and that can make some huge changes in the way you work, potentially. [And] it's true that we're dealing with a different audience. [...] There was zero feedback, pretty much, for most of my career. I just did what I thought people wanted, and I just hoped I was right. I think [information designer and creator of the TED conference] Richard Saul Wurman said a similar thing. He said that, yeah, he did it for himself, almost. Like, he thought of himself as a person who didn't know much, and he just explained it like he would've wanted it explained to him, and then hoped it worked for the audience. But it is a different era now. That's absolutely true. Yeah, but if it brings infographics to the public, as I've said a few times in this interview, I'm all for it. Infographics for the people. That's it. Let's get them involved and enthusiastic and on board. That's the way to go.

The news graphics journalists interviewed for this study said that nowadays they think much more deeply about their readers: Who they are, what they know, how much they would be willing to spend decoding a graphic, etc. And they do it based on using social media platforms constantly, and by reading analytics data: they pay close attention to navigation patterns captured automatically while a reader explores the information, with the goal of presenting stories that have the right balance between being attractive, informative, and deep.

Here's Len De Groot, from the L.A. Times, saying that news graphics jour-

nalists have finally understood to listen to their readers, and quickly adapting to what they need and want:

I don't know if the audience has changed. I think we've started to care about the audience, and that's a change. We used to care about the audience in a different way. We used to care that we were telling them the things that they needed to know, or things that might interest them. But now, we have to, because there's so much competition, do it in a way that people, we're telling people stories in ways that they're interested in getting them. And that does mean a whole host of different techniques. When it comes down to it at the end of the day, it's not about us. And it can't be about us. The moment that it's about us, we lose our audience. I think it's one of the reasons we've seen smart startups do well. Because they realize an audience wanted something and they gave it to them. Whereas journalists would say, well we don't do that. We don't put numbers in headlines. We have a style of writing a headline that contains some gravitas and is very important. And meanwhile, no one reads, it. I don't know that that's changed. Does human nature change that rapidly? I don't know that it does. I think what's happened is we've started listening, and I think that that's sort of an important thing. I don't know. I don't know if the core values of human nature changed, or how frequently they change. My suspicion is that people will go to whatever is the best for them. There's an equilibrium in the world that doesn't involve us. And it's up to us. That equilibrium may be on a screen, or in a phone, or in something else. And it's up to us to understand where that equilibrium is and be able to tell a story there. And that doesn't mean we don't do the other things too. We do. But we have to be effective at communicating where they are, and where they want to get information. And it may not be a phone. It may be something completely different. In fact, I will bet, that it's going to be something completely different that we don't know of yet. That in 10 years. Actually I'll make this promise: if in 15 years if things aren't different, I'll retire. Because frankly, I'll be bored. I do think it's going to change a lot. If it's not changing, then it's probably due to our faults, not the audience.

John Tomanio, from *National Geographic* magazine, said that audiences have become more knowledgeable:

Well, we think of the *National Geographic* readers as being well-informed sort of 12th grader, of course, there is a visual literacy, the entire culture has sort of grown

and gotten better and more sophisticated. So we did visualizations that are a little more complex than we would have considered you know, five or 10 years ago. But I think all publications are doing that as well. I think ultimately, though; we don't want anything too technical. We always strive for clarity and less is more, and the whole ideal of telling a story with less ink and fewer pixels were possible. We are all for clever presentations, novel, or new presentations as long as their clear. But we never do, you know a clever presentation that complicates the story or makes the storytelling more difficult, that's not what we do.

Archie Tse, from *NYT*, agreed that the team perceives that audiences are getting more perceptive:

There's a lot more data viz on the web now. Our readers are exposed to a lot of data viz, and they have access to a lot of data visualization [But] I think there's a lot of data visualization on the web that isn't really clarifying things for readers. So it may look beautiful at first, but it doesn't really help them to understand what's happening. So I think one of the challenges that we have is trying to create visualizations that also explain clearly. The goal that we have when we create a visualization is not only does it look compelling but how does it help people to understand the issue that we're trying to explain.

Ritchie King, from *FiveThirtyEight* said something similar about the knowledge audiences have:

One thing I have noticed is that there seemed to be more and more people, at least on Twitter who have a kind of baseline knowledge, like graphics 101, so that they would call out charts that, like bar charts that are not zero-based line, for better or worse. Sometimes people will be super dogmatic and complain about the things that are bending the rules. At the same time the fact that people even have this basic awareness of this standards, I think it's kinda cool. I think it's a good thing.

WSJ's Julia Wolfe was excited by the fact that readers can now understand graphics that would have been considered too complex just five years ago, to the point that they can provide valuable feedback:

It's great to see how much more [readers] can take in terms of how complicated things are and we can really push the boundaries of a data visualization. But also,

now the conversation doesn't have to be one-way with readers anymore, because of all the different social aspects of reaching out and a lot of newspapers have built amazing social communities, and the Journal has a fantastic one. So suddenly you don't just publish something and walk away from it, you really try to engage communities. There have been some amazing works happening in that field; people have created this kind of entire standing Facebook group, building communities as part of the newspaper. That conversation is just so exciting; you get to hear what people think and what they want, and suddenly you don't just have to shout and make a phone call, you get to sit and have conversations with your readers. [...] That's tricky because that also is the devil sort of the comment sections and some of the really rough feedbacks you have to get used to. But that's why there's such great work happening; the core project is a great collaboration looking and how to make our comments better, just looking at reader analytics in a meaningful way. I mean that's an area that I think is right for a better communication because I do believe there are readers that want to have that great conversation, and sometimes we find them, but sometimes we don't. That's something I think we're getting better at and we also have so much further to go. It's gonna be very exciting.

Álvaro Valiño, an independent designer, based in DC, talked about the increasing expectations of audiences, particularly younger ones:

I think that the audience's literacy has changed towards their literacy of data visualizations. I think since us as creators are pushing the boundaries of what is our job, I think the audience is demanding different ways of, or at least are more open to different ways of receiving information, especially younger generations. Also, in the media, there is this obsession with capturing the young audiences so all together it makes sense that we are using the tools and all the skills that we have in our hand to present information the best way we can. If it's video, if it's an interactive, if it's a static, it doesn't matter. What's important is if it works for the audience. And I think the audience is much more prepared in a way because they have been exposed to different kinds of pieces. Everything has evolved in the way we consume TV, everything. You cannot expect the user of media is just using news or just watching TV or just watching films is just all part of the same, the audience is very well equipped and trained. But you cannot expect if you put it the other way that you are not training the audience, you are just giving them what they want, it should be like that I suppose.

Visualization literacy was also mentioned by *Washington Post*'s Kat Downs, citing the virtuous loop described by Valiño: More innovation, combined with ubiquitous social media usage, creates a virtuous loop in which readers get more and more sophisticated:

It has also been really exciting to see in terms of the change in industry the visual literacy of the audiences is just blossoming, I mean part of that, is just that the Internet has just gotten better, bandwidth has gotten better, speed has gotten better, mobile devices have gotten better, social networks introduce images, Facebook lets you put images on your wall, Twitter started letting you put up images. Things like Pinterest came out, the rise of images as the currency of the digital world was awesome because that's what we do. I mean that was fantastic because then it was like, oh this is really important, this is a way to communicate, especially to younger audiences that are sort of native to this environment in a way that it wasn't before. And that has been very cool because people are really into graphics. You can see it not just in our world but spreading across all kinds of industries obviously business and law but like PR, but people are all about some graphics and that's different than it was even just a short time ago and that's partly due to technology, but it's also partly due because the more graphics that people see, the more they like them, the more they engage with them and the more that they are created. And so I always thrilled when I tell people I work in graphics, and they're like "Oh my god, I love graphics. I love chart's, did you see that chart about blah." And you're like yeah I made that. That is really, really cool; it's just that visual literacy is critical and you have to develop it over time. Because some forms of charting you can say that they are intuitive but most forms of charting are not super intuitive, they are information encoded, so there is a bit of decoding that has to happen. And so as people experience charts and visualization it's graphics they develop an understanding of them, and it's getting easier and easier to understand and easier and easier to process and the speeds it up and creates8 a better experience for them. So we have started to sort of reach a critical mass of visual literacy. Or literacy for data visualization that makes our jobs easier because we have to do less of the hand holding while we are doing it.

NYT's Hannah Fairfield described the role of social media:

I think audiences and journalists have come much closer together with the advent of things like Twitter and comments on stories and even things like Facebook Live

and Facebook commentary. A lot of these social platforms sort of just shrink the space between the journalist and the people who are reading the journalism. That's been pretty exciting as well. I like to be able to see people's response. It's always nice when it's positive but I am also very interested when people have strong, or even negative reactions to some of the things we produce. And we are fortunate that all of the content at the New York Times is highly moderated so that the comments that we see, and that are public facing are high quality, really good and thoughtful comments. But of course, there are lots of different ways that readers can now reach us [...] Lots of times readers send direct emails to us, and its fun to be able to respond to those, and sometimes people tweet directly at us [...] Even 10 or 15 years ago that wasn't possible. They certainly could have emailed us, but fewer did, and there were always letters to the editors that could be written and published in the paper in a very formal way, but it was rare that you would get someone's sort of immediate thought or visual reaction to something that you published. Also, I think people find the accessibility of journalist incredibly valuable. A lot of times when people see something that we created, and they're interested in what's behind it. It's nice that we can respond and say here's where I got my data, I talked to this person. And you know a lot of times its researchers who are interested in something that we've done, and they want to be able to add it their body of research, and it's nice to sort of build communities like that.

*ProPublica's* Scott Klein mentioned the importance of user testing during the development of a project, acknowledging, at the same time, that it's something relatively recent:

Our responsibility to tell a story that readers understand is not changing. So as I said, we wanna make sure that we're explaining the things that we create to people. We wanna make sure that we're not making bad assumptions about what they understand and what they don't understand. We wanna make sure that it's useful, one of the things that we've started doing, especially is we got more sophisticated, is to interview some readers. So we do some user testing where we ask a few people to do a screen-share, take a look at the graphics that we're making and make sure that they're understanding, they see all the buttons that we've created it. They see the graphics we made, and they're interpreting it in the way we mean them to understand. [...] Now, to be honest, we probably should have done that before when we were doing much simpler graphics. But it's been very helpful; it made our work sharper and more, I think, responsive to readers.

Alicia Parlapiano, from *NYT*, said that they focus much more on user-generated data, rather than on other techniques like focus groups:

It's hard to know what the audience preference is because we don't do any focus groups. We have evidence of what people want and what they are looking at because we know how many people are clicking on it and we know how much time they are spending on it. So in that way we have some sense of how much time they want to spend and what they are going to click on and what they are just going to scroll through quickly.

Len De Groot mentioned the attention to the needs of the audience as one of his main focuses when hired:

One of my main focuses in coming to the L.A. Times was not just to convert the department to a digital department but was to create news content that was unexpected, that would actually grab people and engage them, and hopefully, at the same time, inform them and do all of the other public service things that's so important in journalism. It was that potential that led me to the L.A. Times, and when I was hired there, we had very frank discussions about that. I wanted to do things that would be surprising, and things that would change what had been a very traditional graphics department and a print only department into a team that does things that are a little weird, and that weirdness is good, and I think, in some ways, it makes what we do special. And it may not have all the polish that some other people put on their projects, which is great, the polish is amazing, and we could probably have more polish; but we do things that I think surprise readers and engage with them.

Then, De Groot highlighted the role of metrics in designing better visual experiences:

We pay attention to our metrics, but not necessarily just to see how many page views we're getting. One of the things that we look at is time on page, right? So, if we can get someone and hold them for 10 minutes, 12 minutes, we're doing something right. You know, it's like because most people land on your page, and you're good if you've got a minute; you're doing great if you've got two. So, to hold someone for that long, the mechanics of what you're doing is working, and a lot of what we're

doing now is trying to develop those mechanics. And try to figure out how we can tell stories and do the kind of journalism that we want to do in a way that engages people and keeps them on the site. And makes them want to come back and look to us for that kind of thing.

In relationship to the increasing attention to how audiences consume news graphics and other kinds of visual stories, most interviewees explained the profound recent changes in the way people get their information. In organizations like *Univision News Online*, around 80% of their traffic corresponds to mobile phones. Others mentioned figures in a range between 50% and 70%. These numbers confirm the findings of several recent studies of news media consumption (Pew Research Center 2016).

This sharp increase in mobile traffic has already led to changes in the way news graphics are designed. In a talk delivered at the 2017 Malofiej Infographics Summit, *NYT*'s Archie Tse said that, based on an analysis of their metrics, the news graphics team decided to not only adopt a “mobile-first” approach. But also to reduce the amount of interactivity of their graphics to a minimum, a strategy that is becoming widespread (Stabe 2016).

Hannah Fairfield, also from *NYT*, said during her interview:

Many projects nowadays we are designing mobile first. It does depend on the project. But I find even on our bigger enterprise pieces now we will start with the phone design and work back up to the desktop, and that's a switch in our work flow even from a couple of years ago. In 2012 when we published a big project called “Snow Fall” we had spent a lot of time on the desktop version of that and the phone version, which looked good and was functional, we spent much less time focused on that. And I would contrast that to a project that we published last year called “Greenland is Melting Away,” which was something we focused on the phone version. Not necessarily first but very much in tandem with the desktop version. It had some dramatic videos, and it was important to me that we cut the videos on the phone so that they would look really good on the phone, that they weren't a horizontal cut, but that sort of natural vertical view that you would usually get on the phone. So we did that really in lock step. I am working on projects right now where we haven't even started thinking about the desktop version were just focused on making sure that the phone version is going to be as good as it can be and we will work on the desktop design when we have the phone version nailed down.

NYT's Alicia Parlapiano described the team's strategy as "less interaction and more presentation":

It wasn't an instant moment when it all flipped but I think we more and more started thinking about the web presentation first and even more so now the mobile presentation first because more than half of the people who look at our graphics look at it on our phone so thinking about how can we design something that will work on a phone and also be able to translate them to desktop, and then later we will think about if or how it will translate to print. So that's definitely flipped (...) o we don't do as much of the kind of hiding information behind a rollover or you know having to click to access, we do a lot more scrolling, it makes it easy. And that also translate to the desktop I think, kind of like the BuzzFeed model, you know people will scroll for a really long time looking at something they are interested in, but unless the type of visualization warrants it. We do a lot less interaction and more presentation.

*The WSJ* is doing something similar, according to Jessica Wu, Global Head of Visuals:

There are many challenges. One is obviously keeping up with technology, and it changes rapidly. Much quicker than any print technology or print processive technology had changed when I was in college. That was a difference of like oh we're not using Quark anymore or page maker, we're using whatever. But technology changes every single day and audience's expectation changes as well. It's been a really rapid change from basically Internet where we're not preferable to have a lot of photos and graphics and things like that to very very visual Internet. As load times get even faster, you'll expect a much more visual Internet. But at the same time, you have things like instant articles right now. It's interesting, you've got mobile web as well, and that's huge now, that's now more than 50% of our traffic, and so the constraints that puts on you as far as how do I tell this really complicated story with this tiny little space and where you only have these really fat fingers to interact with things. We don't have mouse overs anymore; it changes your thinking a lot.

Chris Canipe confirmed this observation:

We're building fewer very complex interactive data-heavy projects. We're building fewer news applications. We're building a lot lighter way narrative, visual projects.

There are a few things behind that. One, developing is hard, and the payoff isn't always there. You can have three people dedicated to one project three weeks, and it might not get great traffic. Not say it's a reason not to do it, but it happens over and over, you start to question your methods. Versus being able to turn around three or four projects quickly and have one of them do really well.[...] One thing that we've learned going through both of those processes over and over again, is that we do better work when we do interactive, and when we work quickly, we build projects are not that complicated code-wise, not complicated interactively. I think that one thing that you're gonna start to see is that a lot less interactivity. I think that's already happening; I think that we're building things. Like we said the other day, static is the new interactive. We're building a lot more static charts; we are building better tools and better templates, and we're thinking more in terms of just a straight narrative stories.

Stuart Thompson, graphics director at *WSJ*, said that complex data visualizations —that he calls “data dumps” — are becoming much less common:

One of the biggest changes in the format has been towards narrowing down the storytelling with data visualization. So there's a period of maybe like a couple of years ago, or probably longer where data dumps were really popular, so you will have this huge dataset and you put it online, you have this big splash visual with a thousand bubbles or something, and you have like 16 filters and like 12 drop downs, and you can just like get so into that data, like you can tab right into one specific piece of it, and everyone's like “ah cool, that's so much fun!” and then we just see that readers just don't use that and they don't want to spend half an hour digging into data, if there's something interesting in that data, just show it to them. [...] So that's the change that we've seen here. And we're trying to encourage everybody to do, is focus on the story first. So, instead, if we have a big dataset, we'll try to not present that big dataset but focus on specific things. One thing that we're doing right now on our team is to focus more on the actual stories that. The experience with our work is more like a story than something else. And then it comes down to having it further the spine of the story, so it will be like the actual story experience is like reading paragraphs, interact with charts and reading more paragraphs, stuff like that. And less, kind of jumping around with a bunch of sub-heads and items. We just see that people, when they go to a page, if we can convince them just to read it and just experience it, then we're more likely to read it and complete it and get something out of it. [...] I guess we're trying to move a little bit away from just kind

of scattershot takeaways from data and stuff like that and really learn from our reporting, like traditional reporting parts, trying to craft a story and doing that in a narrative fashion. [...] I think the shift to mobile is like, not necessarily simplify, but just like really think about what's essential and the best way to tell that.

Allison McCann's, formerly at *FiveThirtyEight*, explained that she prefers narrative graphics that are organized similarly to traditional print graphics:

I think people are saying we are learning that people maybe don't click things, and people may not hover on things [...] So a lot of interactive visualizations I love best are on the web but like have this sort print mindset like a big, clean spread, and there is not a lot of things I have to find. It's showing me everything.

Here's *National Geographic*'s John Tomanio:

The goals are digital first, and our mantra is digital first, in fact, we're phone first because all the numbers have shown, and it's pretty well known that people are getting more and more content from their phone, over 50% of our stuff is viewed on the phone first. But, our print process, because we are a magazine and newspaper, and because we are a print magazine that takes great care in how it's printed. We usually start working on things several months in advance before the magazine is even on the newsstand or even printed.

Kat Downs described the very fast transition from print-first to mobile-first at *The Washington Post*:

It's a totally different environment, pretty much everything has changed. I think when I started working in the field a lot of the projects, all of the projects were being done for the paper. And then if you wanted to do a little something extra for the web you could do that. And so there would be a team, but it was sort of like what can the digital people do with the thing that we made for the newspaper. So the artworks, the writing, the reporting, all of that stuff was done for one format and was sort of taken. What can you create with it on the web? Now our work flow is opposite; we don't have people who work only on the website, or only on the newspaper, or only on mobile or apps. Everybody works across platforms, so we have something that I call a single story ownership. [...]

So mainly what has changed is a shifting of the focus of the primary media that

we are working in and the way that we think about conceptualizing projects. You know breaking down the way people in the team see themselves. So they don't see themselves as a digital person or a print person, they see themselves as a visual journalist [...] I think that in a lot of newsrooms that has caused a lot of stress for people because they weren't comfortable operating outside of their zone. The digital team wasn't comfortable operating in a print environment. [...] One thing that has changed along with that has been, when I first started working with the this, the stuff that you did Online was like an experiment. No one was paying attention to it really; it was just sort of something that, "oh look at the cool thing that we did." Whereas now what we do Online is fundamental to the experience that our users have.

Downs then added:

When I first took over the department, there were some things that we had to do that were sort of things that almost felt like sacrilege. I had one cartographer who made these amazing full page maps, six columns; it's a full spread in the newspaper, and we couldn't get them Online because they were too big and there was no way to do it. Every time he would do one, it would be this disaster of how we were going to get it Online, you have to totally redesign it and a certain point I just had to say you can't make maps that big anymore, they can be no bigger than for columns because that is something that we can put Online and make it work. That sort of shift in thinking was really important. Or another time someone said I couldn't do both, and then said okay just do the digital thing and if it doesn't make it the paper it doesn't make it in the paper. As sort of a learning curve to try to get them to recognize what our priorities were which was also hugely freeing and liberating, I think for people because they realized it's okay. It's one day's paper; we will be fine and move to the next day's paper. We get better at managing time, and we will get better at managing our process and work flow. Now we don't have that issue anymore; we can do both. We can manage it all in time. We have the right kind of processes and the right kind of flows to make it work. There are some bumps along the way, but I think we are in a much better place.

Javier Zarracina said that *Vox.com* is even moving beyond mobile-first, and thinking about platforms instead:

We are moving into mobile first and actually; we are going, beyond mobile first. One thing that we see at *Vox* is that we are working with other platforms like Face-

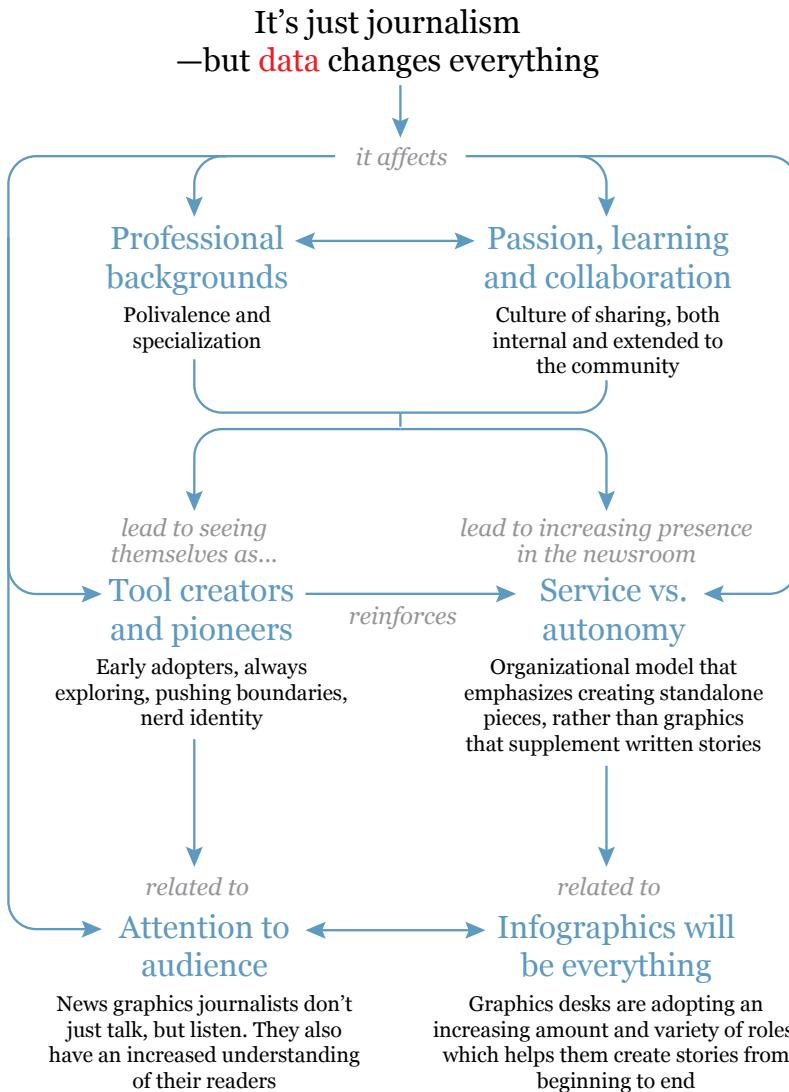


Figure R2

book or Apple or other platforms and we are even moving beyond the commitment between Desktop and Mobile. We are kind of thinking ok, we need to expand our stories on many different platforms, and we need to start thinking of how we are going to adapt this to Instagram for instance or to social media. Is my graphic going to work not only in mobile, but correctly on social media, or is it going to work on Facebook? And these are new questions that we are really aware and now looking into to it. On the other hand, there are new things coming too I am pretty sure we will see new skills in the newsroom. For instance, here at Vox, we started SnapChat, and we are creating graphics for SnapChat. I think that new skill sets that we are seeing are a motion graphics designer and someone that can create graphics for video motion graphics. I think that the big exploratory interactive works very well on the desktop, but I haven't seen many good examples on mobile, and I think that we need to think of simpler graphics for mobile or simpler approaches that are not really that big exploratory data visualizations that we have seen from time to time.

Quick technological change, as in other cases described in this chapter, isn't seen with reluctance but embraced openly and enthusiastically. Here's Xaquín G.V., from *The Guardian*, ending his statement conceding that he has no idea what the future may bring, but hinted that he feels excited about it anyway:

Working for mobile devices is hard, but it has lots of advantages. You've do have a smaller canvas, but sometimes that's good. You've got a geolocated device. You have a device that is always with you. You always can reach that person. You can keep feeding them small bites of information. You don't have to give them, hey, here's the package! There are so many things that we can still do that we haven't explored, and I think well, and then, watches. We have no idea what we're going to do on those devices. *The New York Times* came up with one-sentence stories, but I don't know. Maybe in the future, a team is going to come up with five flights interactive graphics, like boom, boom, boom, four small things that have a complete thought, and there you go. You've got a news story there, like a visual news story there. I don't know. I have no idea what the future is going to bring.

## SUMMARY

To summarize the main themes in the interviews described in this chapter we'll need to go back to the integrative diagram (R2) we've been using to track

their connections, and that will be completed with more items in the conclusions chapter.

The most prevalent theme is the centrality of journalism as a core value, which precedes any other consideration about professional practices, department structures, newsroom dynamics, etc. News graphics creators, regardless of whether they work for a department that holds such a name, or others like “news applications” or “interactive news,” declare themselves to be journalists, reporters, and editors, above all. This addresses my first hypothesis, which was related to shifts in the values that news graphics professionals hold dear.

In the past, as we saw in the history chapter, this kind of statement was a defense mechanism against a tradition in newsrooms which treated designers, developers, and artists as second-class citizens, one step—or two—below “real” journalists. Saying out loud that one was a journalist, not just a designer, was a means of reassuring oneself, of boosting self-confidence, and an argument to be used when conflicts arose in daily interaction with reporters and editors.

In the interviews conducted, some of that sentiment still exists. News graphics professionals often spoke about frictions in newsrooms, about their work being misunderstood by other journalists who don’t have a background in data, code, or design. But they also said that they felt valued, that their work wasn’t considered secondary, or merely complementary to written stories.

Many also said that the way of being considered a “true” journalist is to act as such, by caring about truth, good editing, and fairness above all, and only secondarily about visuals, or digital data and tools. When asked what was the most important skill they looked into when interviewing potential candidates for new positions, professionals in management positions, like Kat Downs (*Washington Post*), Jessica Wu (*Wall Street Journal*) or Steve Duenes (*The New York Times*) mentioned journalistic skills first: Being able to gather information, interviewing sources, interpreting data, and organizing it into an understandable narrative. Technical knowledge was necessary, too, but it came after.

Even if journalism is the core value that drives all decisions in terms of who gets hired to do news graphics, or how their production is undertaken in the newsroom, professionals also acknowledged that the increasing availability of digital data and technologies has affected them profoundly in the past five or seven years.

Data changes the professional profiles that are sought for, and also the focus of departments that do news graphics. This addresses my second and fourth hypotheses. This is something we’ll return to in the next chapter: if in the past news graphics journalists often produced graphics that had pictorial elements—visual

explanations and illustrations, photographs, etc.— at their center. Today, pictorial explanations are still being produced, but graphics creators are increasingly focusing on displays that encode digital data: Static graphs, charts, and maps, or interactive visualizations and databases.

Digital data and tools affect professional backgrounds in multiple ways. This is related to my third hypothesis. If in the 80s and 90s news graphics desks were made mostly of graphic designers and artists, today the variety of backgrounds is staggering. In many of the interviews, managers mentioned designers, journalists, web developers, computer scientists, statisticians, cartographers, etc. as part of their teams.

Managers also said that they value skills polyvalence, rather than strict specialization. What was suggested was that a successful news graphics professional today should be a generalist with some sort of deeper knowledge in one or two areas.

In organizations like *ProPublica* and *The Washington Post*, often a visual story is assigned to a person, who acts as a leader and “owner.” That person is expected to take care of all steps of a project —reporting, coding, design, writing, etc.,— even if it is seeking help from colleagues who can make up for her lack of skills in certain areas. Similar dynamics were described at other organizations, like *The New York Times*, although the size of this graphics desk enables it to develop projects more collaboratively, sometimes partnering up more than five or six people.

As a consequence, new graphics professionals today put a lot of emphasis on collaboration, constant learning, optimism, and a passion for the craft. Words like “fun” and others that suggested enthusiasm and optimism about the present and future of the field were common. They want to inform the public and be true to journalistic professional values, but they also declared themselves ready to enjoy the thrill of being in an environment of constant flux.

This contrasts with the gloom in many recent books and reports about the state of news (McChesney and Pickard 2011, Pew Research Center 2016) and with the attitude of traditional journalists, who have been described as reluctant to experimentation and change (Rosenstiel and Jurkowitz 2012.)

Constant learning is related to a culture that claims to foster constant sharing. A common theme in many of the interviews is the relevance of continuous mutual teaching within the newsroom, and also beyond its boundaries. News graphics professionals mentioned social media tools like Twitter or Facebook as means of discovering novel ways of gathering or presenting data, by taking a look at what groups in other organizations are publishing; and they also said that they

often—if not always—disclose their data and code in repositories like GitHub, so others can repurpose it. As mentioned in the commentaries during this chapter, this may be related to an embracement of portions of the classic hacker ethos.

Optimism and a culture that allegedly embraces constant learning and experimentation leads news graphics designers to see themselves as early adopters of new digital tools and pioneers in developing new ways of telling journalistic stories, which doesn’t differ much from the vision that print news graphics designers voiced in the 90s and early 2000s, though. News graphics teams and departments have traditionally been populated by many professionals who consider themselves “nerds” and “geeks” because they were fans of cultural products such as *Star Wars* or, more recently, *Game of Thrones*, or because they paid close attention to innovations in hardware and software. Nowadays, though, some teams have openly adopted those labels, only half-jokingly. *ProPublica’s* weblog about data and visualization, for instance, is called “The Nerd Blog.”

Along with the importance of journalism as the central value of the news graphics craft, the other theme that appeared in a vast majority of the interviews was the transition between service and autonomy. This corroborates my third hypothesis. As repeatedly explained in this dissertation, most teams in newspapers in charge of producing news graphics—regardless of if they named as such or not—were considered “service” desks in the past (Munk 1992). Their duty was to wait for information from reporters and editors, and then shape it and embellish it visually. This is a pattern explained in the history chapter. Visualization historian Edward Tufte, for instance, saying that many news graphics professionals acted as “commercial artists” instead of as “content creators” (Tufte 1983, 1990.)

An early exception to this pattern was *The New York Times*, which gave autonomy to its graphics desk in the 80s. According to the professionals who work for newsrooms that still have a print version, one of the most consequential changes they’ve experienced in the past decade is the adoption of *The New York Times’s* model of autonomy. That transition hasn’t finished yet in some places, and it was often described as arduous.

News graphics teams—at least those in elite publications—still get “orders” from other desks in the newsroom but, increasingly, they are producing their own content: Coming up with ideas, reporting them, interviewing sources, and developing products that don’t just complement written stories, but are stand-alone pieces. They say that it is a consequence of factors such as a heightened status in the workplace—thanks to the popularity of graphics among readers—and to the respect that their perceived technical prowess brings. News graphics professionals may see themselves as pioneers, but they are not the only ones.

Other journalists see them like that, as well.

This transition between being a service department and an autonomous, content-producing one didn't occur in online-only organizations, such as *FiveThirtyEight*, *ProPublica*, or *Quartz*. The autonomy of news graphics professionals was granted from day one.

A consequence of this autonomy in content decisions, embracement of digital data and tools, and collaboration of professionals of very diverse professional backgrounds is that teams that do news graphics are also adopting many other visual communication techniques. *The New York Times* graphics desk still calls itself “graphics” but it puts out projects that include 3D animations, video, virtual reality experiences, besides text and traditional news graphics. A similar expansion is happening at *The Washington Post*. None of these teams is properly only a “graphics” in the sense of producing only graphs, charts, and explanatory diagrams, illustrations, animations, or interactives. This was something that arose from the data in the process of coding the interviews, and it wasn't contemplated in my initial list of questions and hypotheses.

In some cases, stories generated by news graphics journalists don't include visuals at all. On Thursday, November 24, 2016, *The New York Times* published a piece titled “How Hard (or Easy) It Will be for Trump to Fulfill His 100-Day Plan,” by Larry Buchanan, Alicia Parlapiano, and Karen Yourish, all part of the Times graphics desk. The story was a textual list of pledges Donald Trump made during his presidential campaign and an explanation of how hard or easy it'd be to fulfill them.

In other places, like *The Guardian* and *The Wall Street Journal*, news graphics is part of “visuals” teams that also include photographers, videographers, and audio professionals. Moreover, news graphics as a craft isn't owned by a particular department anymore. The conversation suggests that it may become a transversal skill, used by different groups within a newsroom.

Another change enabled by the ubiquity of digital data and technologies is the attention to the needs and preferences of the audience, which wasn't included in my first list of questions and hypotheses, but was revealed by the data. According to professionals with decades of experience, like John Grimwade or Álvaro Valiño, news graphics designers didn't traditionally receive much feedback from their readers. They acted hoping that the way they were presenting information was interesting and understandable, but they didn't test their assumptions. In contrast, in the present news graphics, journalists don't talk to readers anymore; they talk with them, listen, and what they hear changes the way they design future projects

Nowadays, news graphics professionals pay attention at social media responses, and also to internal analytics data to shape their design decisions. The most dramatic case recently is the decision by *The New York Times*'s graphics desk and others to reduce the amount of interactivity in their visualizations, once it was observed in their analysis of readers' navigation patterns that most readers see news graphics on mobile device, and that they don't really interact much with them, other than scrolling up and down.

Interviewees also talked about their visually savvy readers. According to them, their audiences today are more used to seeing visualizations, and so understand their syntax and vocabulary better.

In the conversations, professionals finally mentioned their interest in attracting people's attention in a time when digital information is abundant. The constant experimentation with new formats and tools is directly related to increasing and improving audience attention and engagement. In fact, going back to first item in the diagram in R2, the emphasis that all interviewees put in journalistic values is also related to this challenge. Many of them mentioned trust as a key to keeping the public's interest. This echoes discussions not just in the world of news graphics, but of journalism in general (De Aguiar and Stearns 2016.) In his book about how to make journalistic products engaging, Jake Batsell wrote:

Until recently journalists could afford to disengage from their audiences because it was economically practical to do so. But today's news consumers have boundless digital options. Modern news organizations must continually demonstrate commercial relevance by actively filling a need for their audiences. If engagement is to be effective and meaningful, journalists must earn their audiences' attention, build loyalty, and deepen trust while finding new revenue streams to subsidize the public-interest journalism that market forces have never supported anyway (Batsell 2015: 5)

As a final note, and as already discussed in the methodology chapter, the newsrooms chosen for the interviews quoted in this chapter cannot be claimed to be representative of the news industry as a whole. They are part of an elite in English-speaking countries, notably the U.S. However, they are arguably the trendsetters. Their way of doing and thinking about news graphics ends up trickling down and influencing others. The following chapter provides some tentative evidence to support this notion.

## CHAPTER 5

# QUANTITATIVE ANALYSIS OF THE MALOFIEJ AWARDS

Since visualization historian Edward Tufte published *The Visual Display of Quantitative Information*, in 1983, counting the number of news information graphics in certain publications with the goal of analyzing them has become common practice. Tufte's goal was to offer "a rough measure of graphical sophistication."

This chapter is also based on counting graphics, and it's related to the fourth hypothesis of this study:

**H4.** News graphics professionals and teams are creating many more data-driven graphics, based on abstract charts, graphs, and maps, and fewer pictorial schemes and explanations.

We'll focus first on the transition between a news graphics world where graphics in which pictorial elements (illustrations, visual explanations, locator maps photographs, etc.) were dominant, to one in which abstract representations of data (charts, graphs, thematic or data maps, etc.) are rising.

To achieve this goal, we used the database collected of the Malofiej International Infographics Awards, available in this study's website, [www.nerdjournalism.com](http://www.nerdjournalism.com). The scope and limitations of this data set were explained in the methodology chapter, but let's recap: (a) We can't assume that the projects recognized in this contest are fully representative of what is being published everywhere; (b) we can't even say that they are representative of all the work produced by the individuals and organizations who won.

What can we say, then? First, that the winning projects are representative of what the judges of the competition considered the best work submitted to the competition every year. Second, the Malofiej organization tries to select the

jury in a way that reflects the makeup of the industry; the judges are a reflection—an imperfect one, though—of it. In the first editions of Malofiej, most of the judges were visual artists and designers; in the most recent ones, programmers and web developers have had a much larger presence. Moreover, these judges are considered leaders in the field. Even if their selection is not random or blind, professionals and academics are invited to be judges only after a long career or after they've proven to be innovators.

It's impossible to tell if the fact that these judges are often at the forefront of the industry has an influence on the kinds of projects that get awards and, as a consequence, the willingness of news organizations to take risks and win in subsequent editions of the Malofiej competition. Future investigations may want to explore this possibility. It is not far-fetched to think that if a jury chooses several highly innovative news graphics in one edition, news graphics creators who read the Malofiej books will be inspired by them, and they will be more willing to take creative risks.

Third, based on the claims of news professionals themselves, we can say that certain news organizations that have received numerous Malofiej awards, like *The New York Times*, Argentina's *Clarín*, or Spain's *El Mundo* and *El Correo*, have had a considerable influence in how other many newsrooms design news graphics. This influence has recently helped shift the focus from pictorial graphics to abstract, data-driven graphics. We'll see this shift in the data.

## MALOFIEJ WINNERS

The relative decline of pictorial and explanatory news graphics —those based on illustrations, photo compositions, locator maps, etc.— and the parallel rise of abstract visualizations of data has been documented by some authors. In 2014, Hiram Henríquez, a designer who has worked for the *Miami Herald* and *National Geographic* magazine, and who today teaches at the University of Miami, claimed that large explanatory graphics have virtually disappeared in the United States in part because the increasing interest in data-driven graphics (Henríquez, 2014).

Dan Kopf, a writer at *Quartz*, revealed a noticeable increase in the use of data charts in *The New York Times* since 1855. Kopf's sample was very small—"a weekday, September edition of the paper every five years from 1855 to 2015"—but it revealed an upward trend (Figure D1):

## The Rise of the Chart in the Newspaper

The # of Charts in a September Issue of the New York Times (Checked Every Five Years)

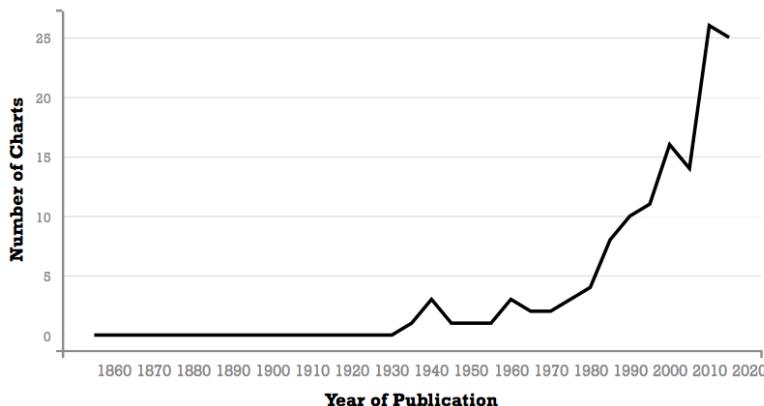


Figure D1

*The New York Times* was first published in 1851. From nearly the beginning of its existence, the Times brimmed with data like stock prices, weather statistics, and sports scores. But for the first century of publication, the use of charts to display that data was rare. [...] Though statistical graphics were already in fairly common use by the turn of the 19th Century, the pre-1930 editions we examined had exactly zero charts. Every paper since 1930 has had at least one chart, and the 2010 and 2015 editions each included more than twenty. (Kopf 2016)

We observed a similar rise in the Malofiej awards. Before we take a look at it, though, it's crucial to understand some peculiarities of the data.

Figure D2 shows all awards showcased in the books that collect the Malofiej awards. Beginning with the 9th edition, these books were published every year and were numbered. Before this one, a single book could collect the awards of several editions (1993-1994, 1998-2000). Also, one book, the one corresponding to 1995-1996, is missing from this analysis, as explained in the graph. This doesn't compromise the observation, as the upward trend in data graphics becomes constant only after 2004-2006, as we'll soon see.

Figures D3 and D4 show the countries of origin of the publications that have won more awards, and also the top 10 publications. The United States is the country that has received more awards, mainly thanks to three organizations, *The New York Times*, *National Geographic* magazine, and *The Washington Post*. Many other U.S. publications, like the South Florida *Sun-Sentinel*, the *Chicago Tribune*,

the *San José Mercury News*, *Los Angeles Times*, etc., also appear in the data set, but their presence is much smaller.

These figures connect with some of the biases and limitations of this data set we've already discussed. The drop in awards given to European and Latin American organizations, and the rise of Asian and U.S. entries, may have several causes. The first one is that Malofiej juries might indeed be seeing better graphics coming from these regions every year. But it can also be an effect of many more entries being sent by organizations from Asia and Non-Latin America. Our data doesn't reflect the number of entries per continent or country, just the awards given to a few of those entries.

In the 90s, Malofiej was a relatively obscure competition, known only to a handful of news publications in Spain, Europe, and the United States. As years passed by, word-of-mouth helped popularize it, and more organizations began sending their graphics. In the case of Asia, for instance, the recent rise may be due to several Spanish designers, like Adolfo Arranz—who has worked for the *South China Morning Post*—moving to places like Hong Kong, Singapore, and the Middle East. Those designers may have talked to their local peers about Malofiej, encouraging them to participate.

The variation of the time-series line graph on Figure D4 could also be a result of the crisis media organizations are suffering. This crisis may have affected publications in Europe—particularly in Spain (Minder 2015)—much more deeply than their counterparts in other regions. Tighter budgets lead to less money to pay to submit work to international competitions.

Moreover, the Malofiej organization tends to invite employees of winning news organizations as judges. As hinted at the beginning of this chapter, the composition of the jury, with fewer pictorial artists in recent years, and more data visualization designers, probably had an effect on the variation shown on Figure D4, as well. This is another possible path for future research, analyzing the backgrounds of the judges of all editions, probably more than 100 professionals.

Regardless of all these caveats, several news graphics professionals interviewed for this project observed the transition discussed by Hiram Henríquez from a field dominated by pictorial explanations to another one in which data-driven graphics have more weight. And the data collected from the Malofiej awards support this view. Here's *Vox.com*'s Javier Zarracina:

In 20 years I have seen a lot of trends and different products. One thing that I have always been interested in, is the design of the information and in the use of illustrations for graphics. I think that now the trend is going more with abstract data visualizations. I kind of miss the diagrammatic graphics and the more illustrative

## NUMBER OF AWARDS PER EDITION

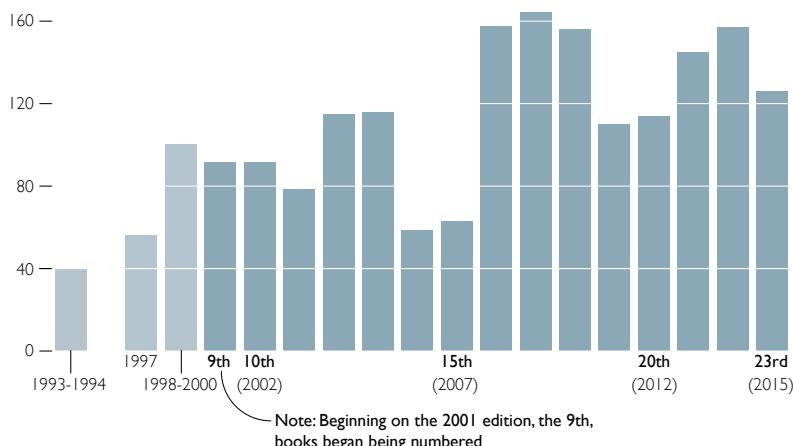
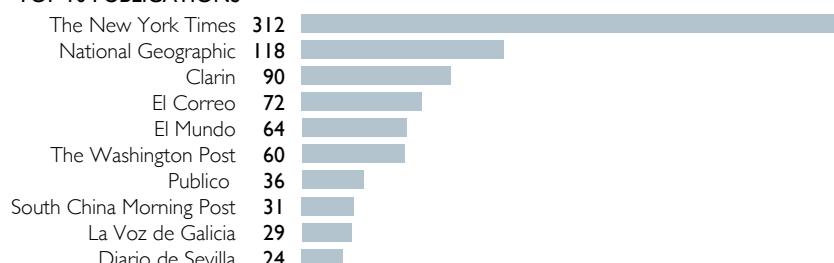


Figure D2

## AWARDS PER PUBLICATION

### TOP 10 PUBLICATIONS



### PER EDITION

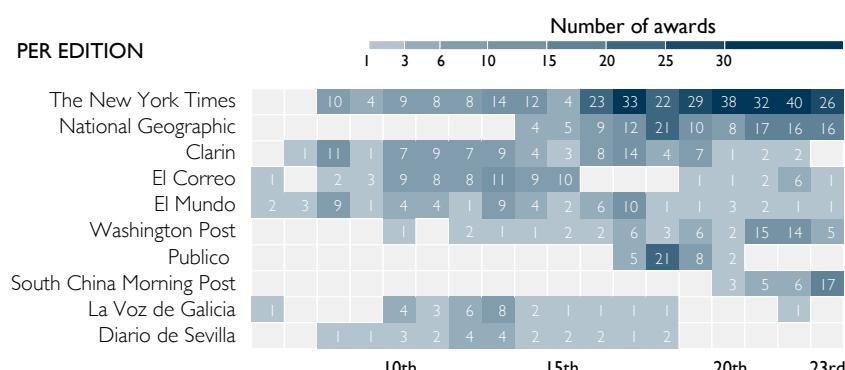


Figure D3

## ORIGIN OF WINNING ENTRIES BY REGION AND COUNTRY

### TOP 10 COUNTRIES

USA	737	███████████
Spain	446	██████████
Argentina	123	██████
Brazil	108	██████
Germany	107	██████
UK	58	███
Portugal	54	██
Italy	27	█
Sweden	22	█
Peru	18	█

### REGIONS

Europe	759	███████████
Non Latin America	742	███████████
Latin America	288	██████████
Asia	73	███
Other/NA	28	██

### COUNTS BY REGIONS

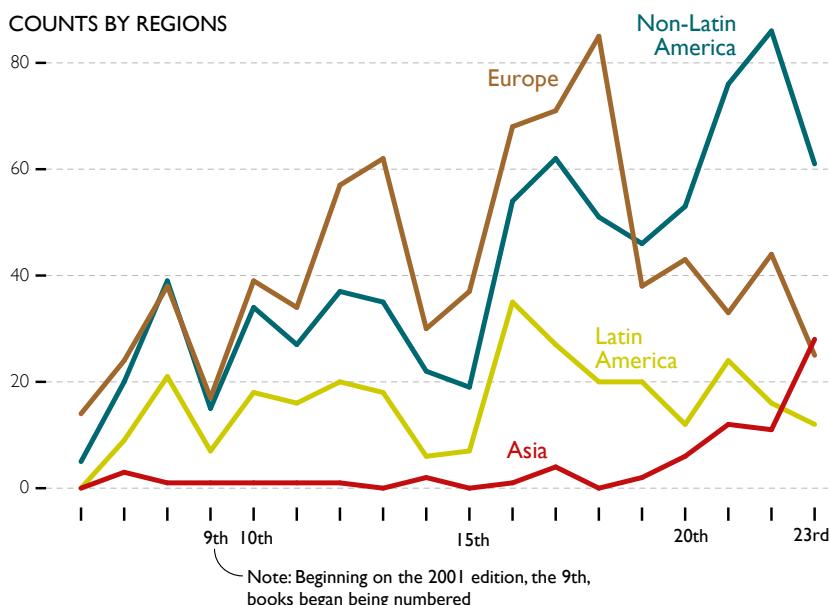


Figure D4

graphics, but this is something that will probably come again. I think that in the last year we have seen a resurgence of illustrations in websites so I am pretty sure that it will come.

Xaquín G.V., from *The Guardian*, talked about the reasons from some of these changes, emphasizing how shifting values in the news graphics field —from fine arts and graphic design to data and visualization— have helped shape its current state, and the influence of U.S publications:

Most of the graphics that were coming out of Spain were very, were very artistic. From people that came from a fine arts background [and] they liked to draw and to visualize real life things. That wasn't the case of other media organizations. Like *The New York Times*, *Washington Post*, *Chicago Tribune* or L.A. Times back in the day, or Wall Street Journal. They were more statistics related. And with the decline of the industry in Spain and the first few folks that left Spain to go to Argentina, or go to the U.S., or go to other places, Spain lost the weight in the graphics world. And this other places that have completely different visual culture took over, and people started to follow that other trend. I think we've realized that there's a, there's a bigger, there's a broader way of telling visual stories. And we've realized with the influence of statisticians, within newsrooms. We've realized that they're a very powerful way of revealing stories. And, it's moved to, to a more data-driven world. Plus the rise of data journalism in Spain and Europe due to the influence of data journalism, coming from the U.S. has changed everything.

Also, interviewees declared that they paid attention to social media and international awards, like Malofiej, and they explicitly said that publications that have dominated the latter, like *The New York Times*, influence their decisions. Here's Xaquín G.V. again:

*The New York Times* does, in terms of how their graphics team or their visuals team, however you want to call it, does, and what the rest of the world does, or at what point in the evolution the rest of the world is, is kind of like light-years away [...] For sure the New York Times, not just the clichés, in terms of their style that particularly appealed to me. Very clear, crisp graphics and what caught my eye initially was the more abstract side. The almost Tufte-esque removal of chart junk and focus on the data itself. [...] A lot of that stuff around 2011/2012 were what I was looking at for inspiration. I think throughout the years the change has been from new organizations emerging. So *FiveThirtyEight* is a huge influence at the moment. The specific type of work stories project that I do has a lot of overlap with what *FiveThir-*

*tyEight* does in terms of the focus not being purely on visuals but being on finding and telling stories and this sort of focus on stats, So I think a lot of the stuff that Ritchie King and others over there are doing has definitely influenced me not just subconsciously but also looking at their charts and thinking about how did they approach this, how can I learn from the way they have done something. *The Washington Post*, *The Wall Street Journal*, as well again. I think the interesting thing is the extent to which the playing field may be leveled a bit. There is certainly still the size, and the ability of teams like the *NYT* means that every now and again they will produce something that is just, on the next level. It is not the kind of thing that we could even think about of replicating. The interesting thing is the extent to which most visual journalism is done now could be done by most people in the field.

And Brian Boyer, formerly at *NPR.com*, highlighting the leadership of *NYT*, and the fact that former graphics editors at that organization have adopted managing roles, like Amanda Cox taking over the *Times's* data-driven section, The Upshot:

I mean Amanda Cox is the editor of The Upshot, right? She's a statistician and a designer. And she's an editor of a section of *The New York Times*. That is bad-ass, right? And there were you know, you look at the work, the work that they're doing, it's data first, it's graphics first, I mean, and it's not to say that graphics first is saying that graphic is superior to the rest of the story, I mean often it is, right? But it's the idea of it's really the idea of just doing it at once, right? Or having a story and telling it with graphics and data and design.

Let's focus on each of these items —the rise of data-driven graphics and the influence of top U.S organizations— separately.

## THE RISE OF THE DATA-DRIVEN GRAPHIC

The charts in the following few pages provide an overview. Figure D5 shows the number of winning projects considering their most dominant element, that which uses more space on the print page or screen: Pictorial graphics such as explanatory or descriptive schemes, in comparison to data graphs, charts, and maps, and photographs or videos.

Figure D6 offers a clearer picture. It aggregates all types of graphics in two large categories: Pictorial and abstract. “Pictorial graphics” refers to representations of objects that exist as physical entities; these are schemes, illustrations,

locator maps, photographs, and videos. The aggregate “abstract graphics{ refers to non-pictorial representations, such as data charts, graphs, and thematic maps.

Until 2007, fewer than 25% of the winning projects at the Malofiej competition had an abstract graphic as the dominant element. On the other hand, between 2008 and 2012, abstract graphics were at the center of between 30% and half of the news graphics that won any award.

For the sake of comparison, the first iPad by Apple was released in April 2010. Several news graphics creators interviewed for this study mentioned that event as crucial, as the iPad didn’t support Adobe Flash, the tool that many were using at the time to produce interactive graphics. They suggested that the appearance of

## CENTRAL ELEMENT OF WINNING ENTRIES

COUNTS (Showing just the 4 top)

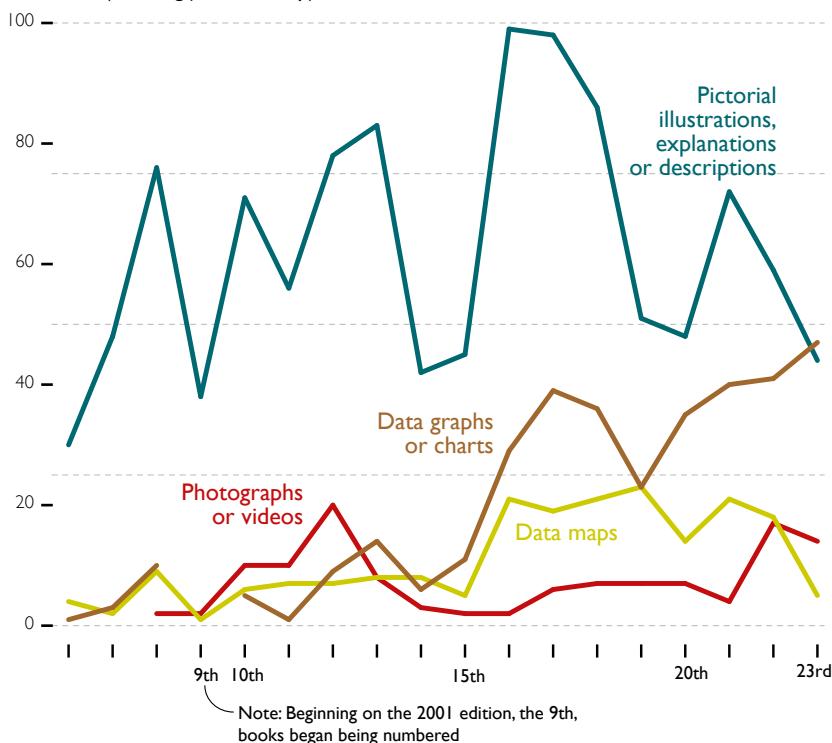


Figure D5

## MAIN VISUAL ELEMENT ON EACH WINNING ENTRY: PICTORIAL VS. ABSTRACT

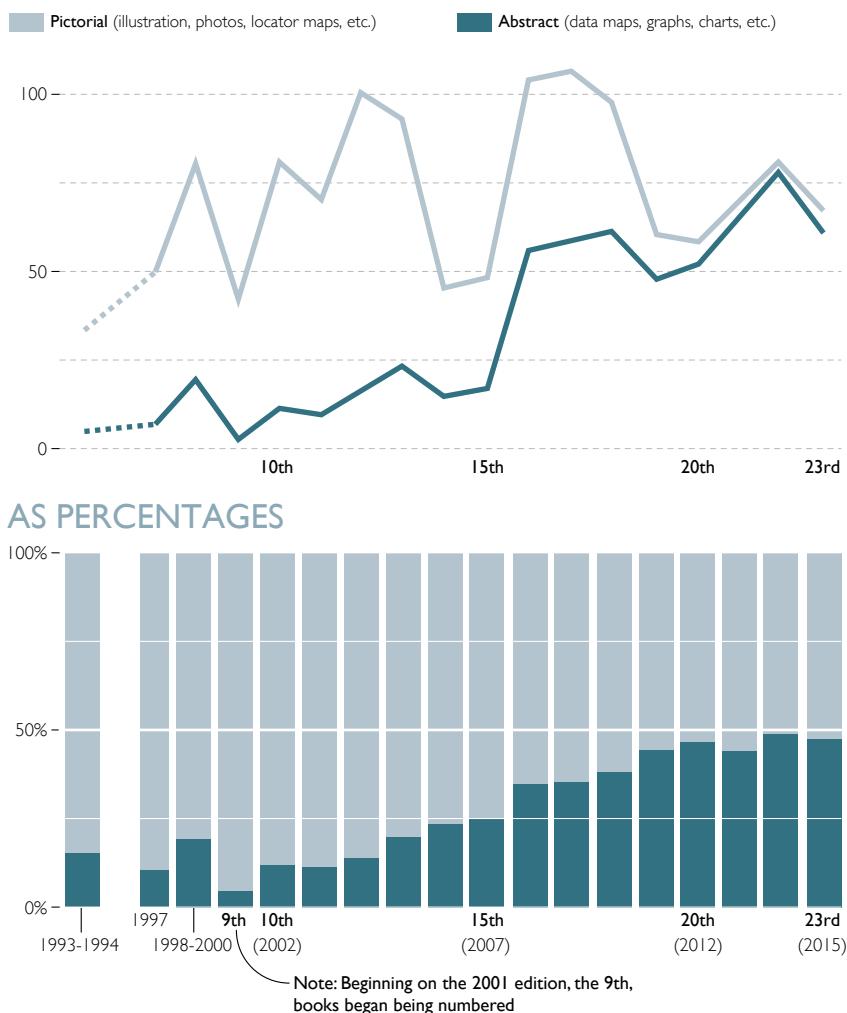


Figure D6

## MAIN VISUAL ELEMENT ON WINNING ENTRIES, PER CATEGORY OF ENTRY

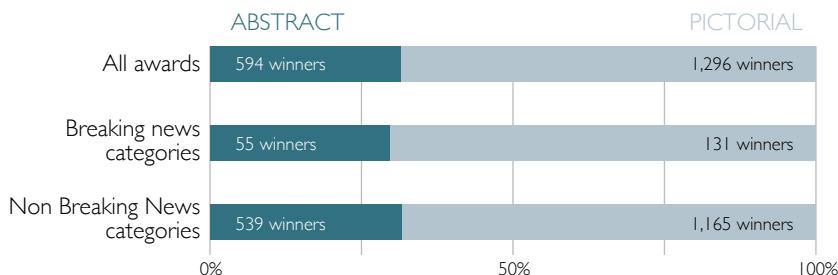


Figure D7

the iPad prompted news graphics groups to hire more coders, to tackle projects built in languages like JavaScript. This may have had some impact, but it's not visible in the Malofiej data. The sharpest upward change happened in 2008.

This pattern of growth of abstract graphics as dominant elements is independent of the category to which each project was submitted by its authors. As Figure D7 shows, there isn't a significant difference between graphics produced on a deadline ("breaking news") and those that didn't (features.) It is also independent of whether the project receiving the award was a print graphic or a digital one. See Figure D8. The only visible difference between print and online graphics occurs in the last two years observed, 2014 and 2015.

Figure D9 offers a different view of the transition between pictorial graphics and abstract ones. In this case, we do not see the dominant element within each news graphic recognized at the Malofiej competition, but the percentage of projects that included at least one pictorial explanation, locator map, data chart, etc., regardless of whether they are the main element or not.

In the 2015 edition, just half of the winning entries had any pictorial graphic, but more than 60% included at least one data chart, and nearly one out of four had a data table. On the other hand, though, the percentage of projects that included data maps decreased.

Therefore, the hunch by authors like Hiram Henríquez and by several of the news graphics designers interviewed, like John Grimwade or Xaqiñ G.V., has some base. We can't claim that media organizations are producing more data graphics than pictorial graphics overall; for that, we'd need to observe the total production of as many publications as possible.

However, what we can say is that, nowadays, the organizations and profes-

## CENTRAL ELEMENT OF WINNING ENTRIES

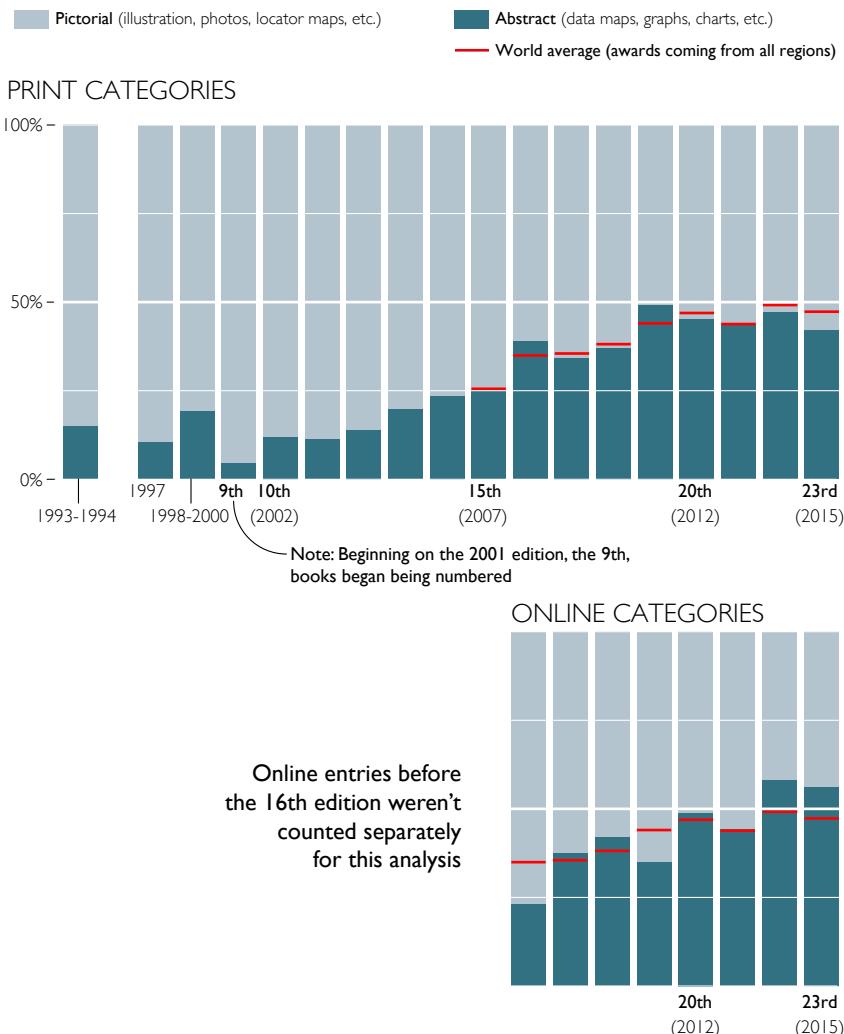


Figure D8

## ELEMENTS IN THE WINNING ENTRIES

Percentage of winners that include at least one of the following elements

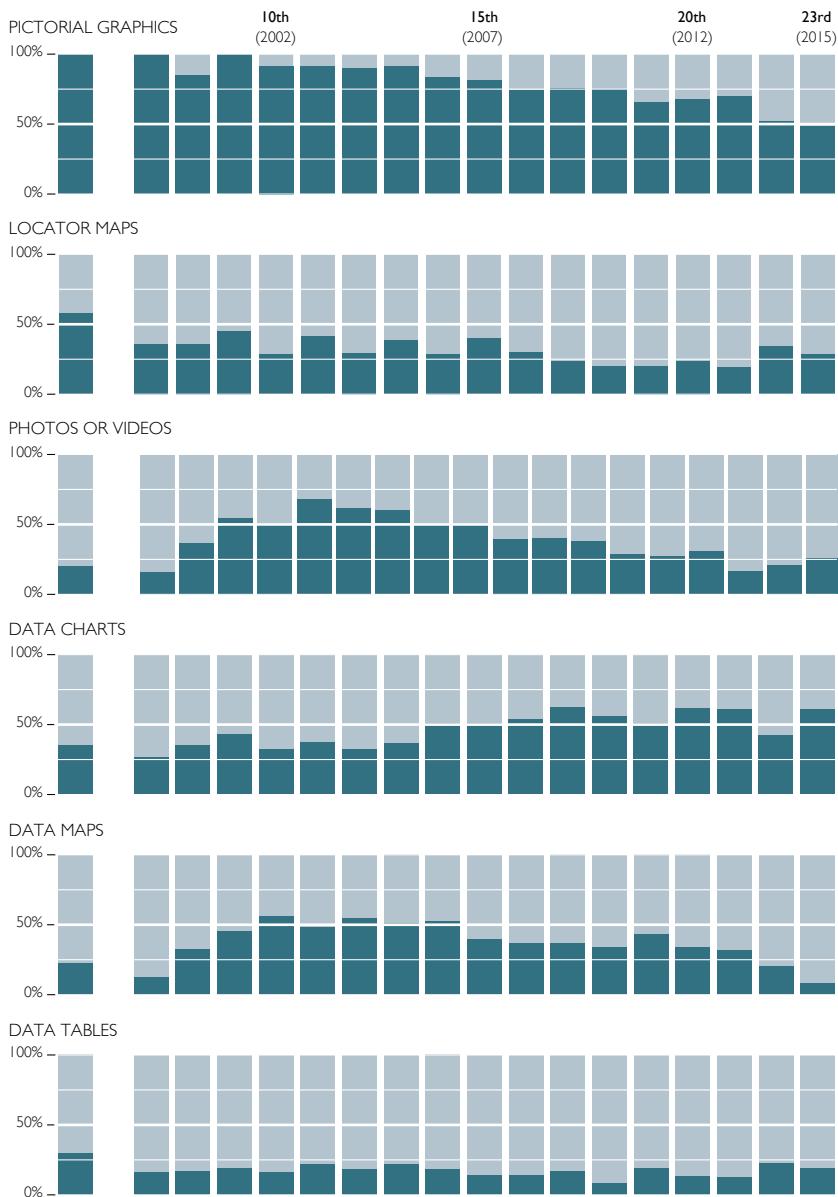


Figure D9

sionals who participate in the most influential international competition of the news graphics field are interested in abstract representations at least as much as pictorial ones., and they have them in high enough regard to send them to the most prestigious competition in the field. We can also say that the jury of the contest—which, again, is chosen from the industry itself, and often includes winners of past editions—shares this interest.

## REGIONAL DIFFERENCES

The transition between pictorial graphics and abstract ones occurred first in Non-Latin America, and only much later in Latin America or Europe.

As we can see on Figure D10, as early as 2006, around half of the entries coming from Non-Latin America—which largely encompasses publications from the United States—had an abstract graphic as their dominant element. It's only in 2012 that we see something similar happening in Europe, and just in 2014 and 2015 in the entries coming from Latin America.

If we explore the data of the top six countries—the U.S., Spain, Argentina, Brazil, Germany, and the UK—we obtain similar results. See Figure D11. Focus on the charts of U.S. winners. A noticeable proportion had an abstract graphic at their center since the very beginning of the Malofiej competition.

Now, in the same figure pay attention at the middle portion of the U.S. percentage chart. The red lines indicate the percentage of worldwide winners that had an abstract graphic as a dominant element. The dark blue bars represent the U.S. percentages.

You will notice that the distance between the red lines and the top of the dark bars is enormous around 2005 and 2006, but it becomes much smaller the closer we get to 2015. That shows the rest of the world catching up, to the point that European countries like Germany and the UK surpassed the U.S. in the percentage of winning entries that had abstract graphics at their center. In 2014, for instance, all projects coming from the UK had an abstract graphic as the most dominant element. This is likely an artifact of the very low number of UK winning graphics, but it's still interesting.

In Spain, Argentina, and Brazil, on the other hand, pictorial graphics still make up a significant proportion of the total, although the latter consistently approached the world average in the latest editions of Malofiej.

## MAIN VISUAL ELEMENT ON EACH WINNING ENTRY BY REGION

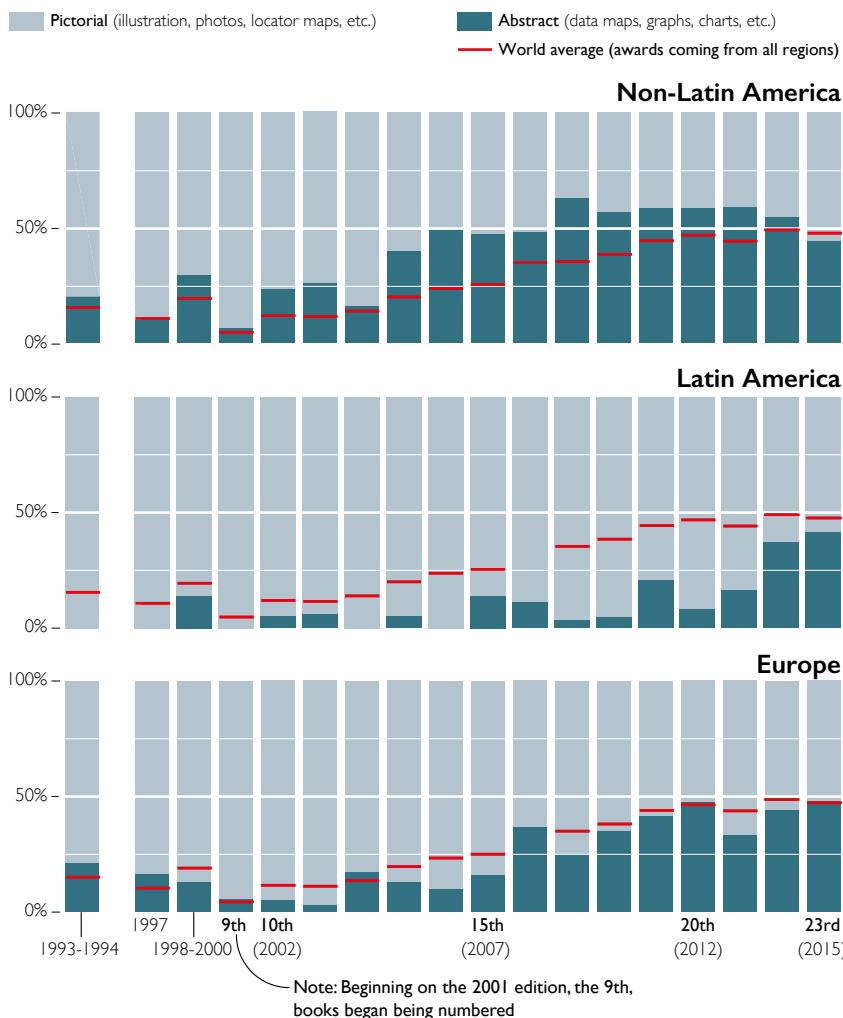


Figure D10

## MAIN VISUAL ELEMENT ON WINNING ENTRIES, TOP SIX COUNTRIES

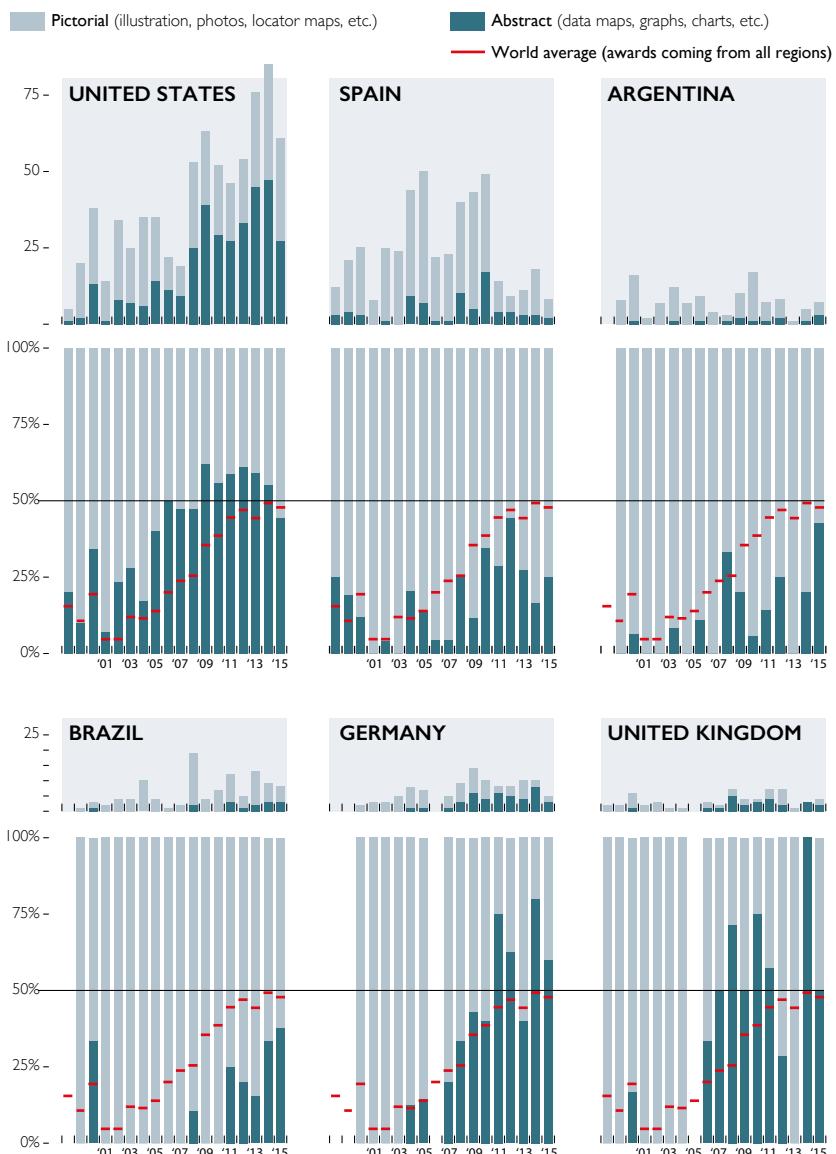


Figure D11

We can dig a bit deeper into the data and see the transition between pictorial graphics and abstract ones as dominant elements at the publication level, as in the figures showcased at the end of this chapter, D12 (*The New York Times*), D13 (*National Geographic* magazine), D14 (Clarín) and D15 (*The Washington Post*).

*The New York Times* and *National Geographic* magazine are, by far, the publications that have won more Malofiej awards, historically, and their weight in the split between pictorial and abstract representations is considerable. Between 2006 and 2013, between nearly 3/4 and all winning entries from the *NYT* had an abstract graphic as a central element.

The case of *National Geographic* magazine is even more interesting. Abstract graphics became dominant elements also around 2006, but after 2009 NatGeo received more awards for projects that emphasized pictorial graphics.

This may be related to a change in management. Charles Blow, who had been graphics director at *The New York Times* since 1994, became Art Director at *National Geographic* in 2006. It is not illogical to think that Blow brought to *National Geographic* practices acquired during his tenure at *NYT*. He stepped down in 2008, and designer Juan Velasco took over the department.

Perhaps not coincidentally, Hiram Henríquez mentioned Velasco in his study about the disappearance of large pictorial graphics in U.S. newspapers:

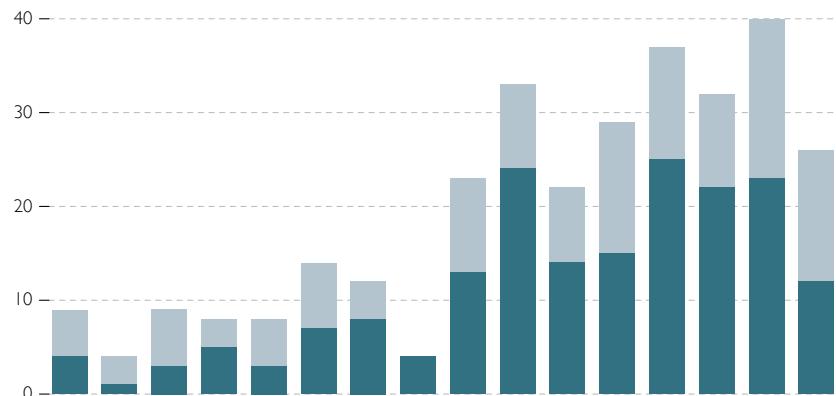
Juan Velasco, the Art Director at *National Geographic* who worked at *The New York Times* from 1996 to 2001, believes that newspapers moved to data visualizations and away from explanatory graphics because of the influence of *The New York Times*, which slowly reduced the presence of large explanatory graphics, especially illustrated ones, during the 2000s. Data-driven and unadorned charts. Replaced them, and over time, this trend was widely imitated as illustrated graphics came to be seen as less “serious.” Due to that trend, many newspapers stopped hiring people who could draw well, or who can design complex infographics with multiple elements. Developers are preferred to personnel with artistic and design skills. Velasco believes that graphics are resolved as “data visualizations” even at times when an illustrated graphic would be better, due to lack of vision and skill. (Henríquez 2014, pp. 10)

To be clear, we can't conclusively claim causation just by observing two events that follow each other in sequence. However, in the case of the influence of U.S. news graphics professionals and teams in publications from other countries we have some evidence to hint that this may have been the case. First of all, because the rise of abstract graphics in U.S. winners precedes the same rise in winners from other countries.

Second, because of the Malofiej awards, combined with social media, serve as an amplifier of new trends and innovations in news graphics, according to some interviewees. Finally, and more importantly, because the interviewees themselves claim that they pay close attention to publications like *The New York Times* or *The Washington Post*, which they consider at the forefront of innovation.

## MAIN VISUAL ELEMENT ON WINNING ENTRIES, THE NEW YORK TIMES

Pictorial (illustration, photos, locator maps, etc.)       Abstract (data maps, graphs, charts, etc.)  
— World average (awards coming from all regions)



## AS PERCENTAGES

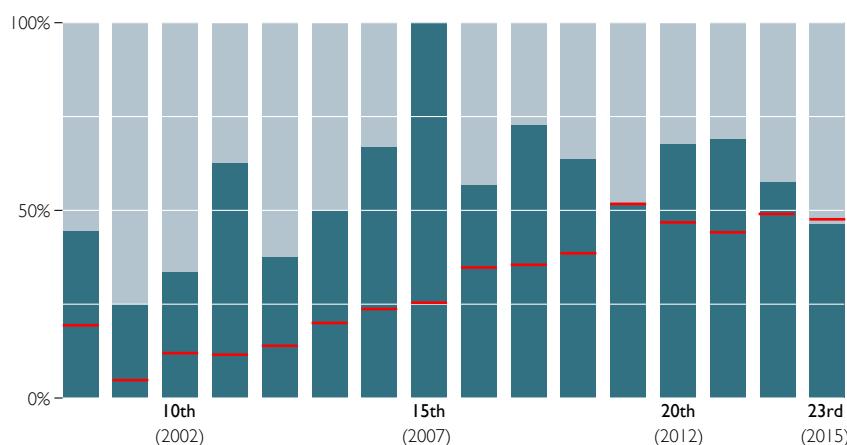


Figure D12

## MAIN VISUAL ELEMENT ON WINNING ENTRIES, NATIONAL GEOGRAPHIC MAGAZINE

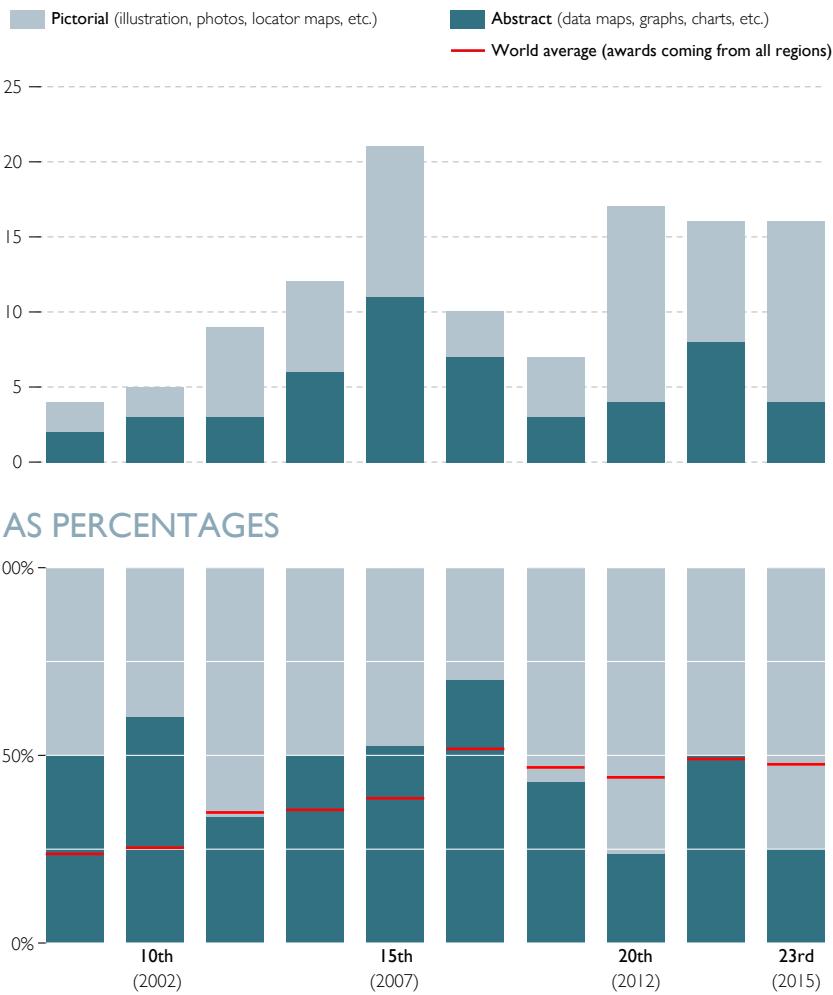


Figure D13

## MAIN VISUAL ELEMENT ON WINNING ENTRIES, CLARÍN

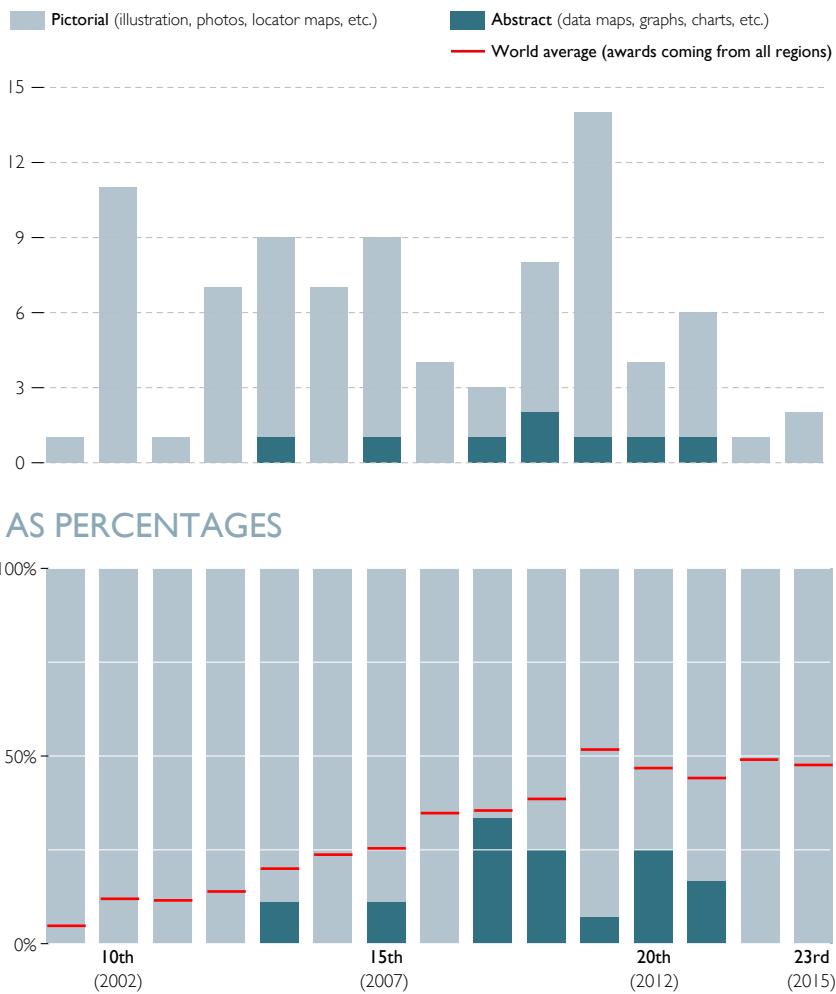


Figure D14

## MAIN VISUAL ELEMENT ON WINNING ENTRIES, THE WASHINGTON POST

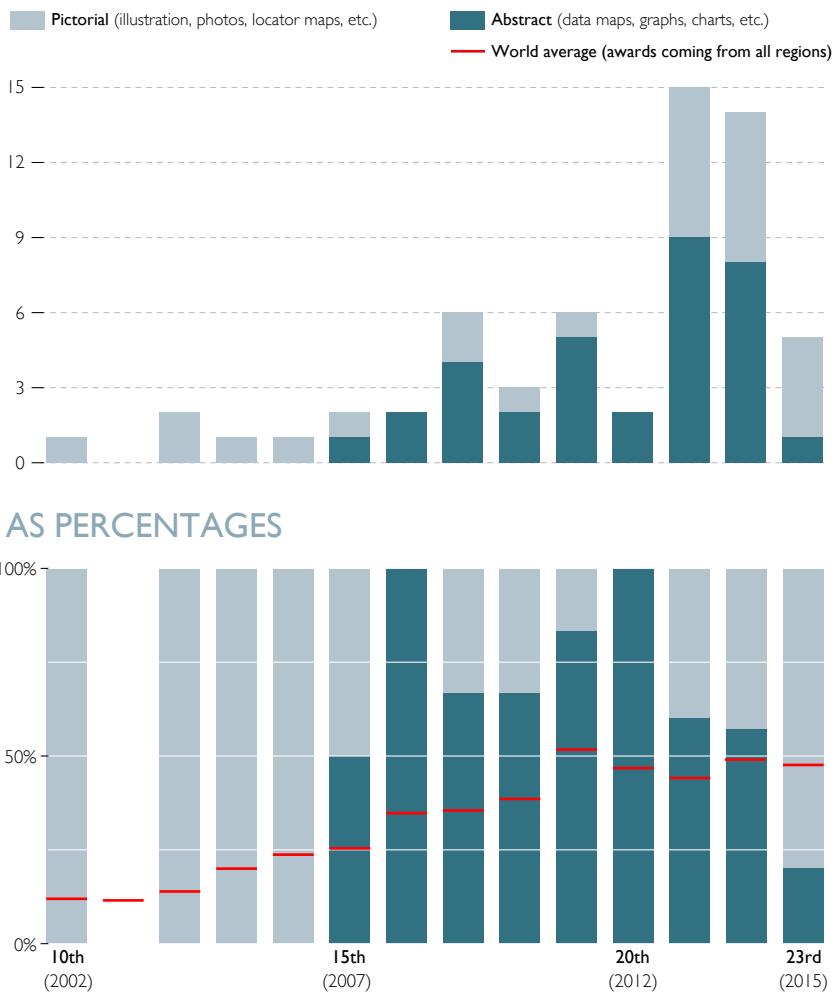


Figure D15



## CHAPTER 6

# CONCLUSIONS AND FUTURE RESEARCH

Lev Manovich's ideas about new media are fundamental to develop a theory of change in news graphics, the goal in the present study. According to him, new media "represents a convergence of two separate historical trajectories: computing and media technologies [...] The synthesis of these two histories? The translation of all existing media into numerical data accessible for computers. The result is new media: graphics, moving images, sounds, shapes, spaces and text which become computable, i.e., simply another set of computer data." (Manovich 2001, p. 44) The computer —a universal machine that manipulates data— isn't just a means to create "new media objects" (Manovich's term,) but also to mix them, and distribute and share them.

New media objects are, ultimately, data shaped by algorithms designed by a breed of professionals who, up to quite recently, were a rarity in news graphics desks. These people can take advantage of the "variability" of new media objects:

A new media object is not something fixed once and for all, but something that can exist in different, potentially infinite versions. This is another consequence of the numerical coding of media, and the modular structure of a media object. Old media involved a human creator who manually assembled textual, visual, and audio elements into a particular composition or sequence. This sequence was stored in

some material, its order determined once and for all. [...] New media, in contrast, is characterized by variability [...] Instead of identical copies, a new media object typically gives rise to many different versions. And rather than being created completely by a human author, these versions are often in part automatically assembled by a computer. The example of Web pages automatically generated from databases using templates created by Web designers can be invoked here as well. (Manovich 2001, p. 36)

As explained in the methodology chapter, the organizations chosen to conduct the interviews differ in fundamental ways: *The New York Times* is a well-established company that empowered its news graphics desk much earlier than any other; *The Washington Post* is another venerable newspaper, but one that is currently going through a profound technological upheaval (Pope 2016); *The Wall Street Journal* experimented with a major newsroom reorganization that put data journalists and designers within other desks; *National Geographic* magazine tries to balance out digital innovation with a deep respect for classic ways of doing pictorial news graphics; newer, digital-only organizations, like *FiveThirtyEight* or *ProPublica*, see themselves as part of an emerging journalistic ecosystem that tries to stick to journalistic norms without being burdened by dynamics inherited from print-centric world.

Regardless of their differences, however, professionals who create news graphics, either as their sole task or as part of a broader set of tasks, show a noticeable degree of consensus in the way they view themselves, their field, and the products they create. This consensus is the core idea behind our theory of change in news graphics, summarized on Figure C1, an update of the diagram described in Chapter 4. Originally, we began with four questions that led to these hypotheses:

**H1.** The rise of digital data and technologies have indeed changed the values that news graphics professionals claim to hold. In the past, news graphics professionals talked about themselves as designers and artists, but today they stick to traditional journalistic values that are identical to other reporters and editors.

**H2.** As a consequence, the kinds of professionals hired in newsrooms have also changed, to incorporate more journalists who can take advantage of digital data and technologies, like web developers, computer engineers, etc.

**H3.** The need to deal with digital data, and subsequent changes in values among news graphics professionals, has affected newsroom dynamics, making news graphics teams more autonomous.

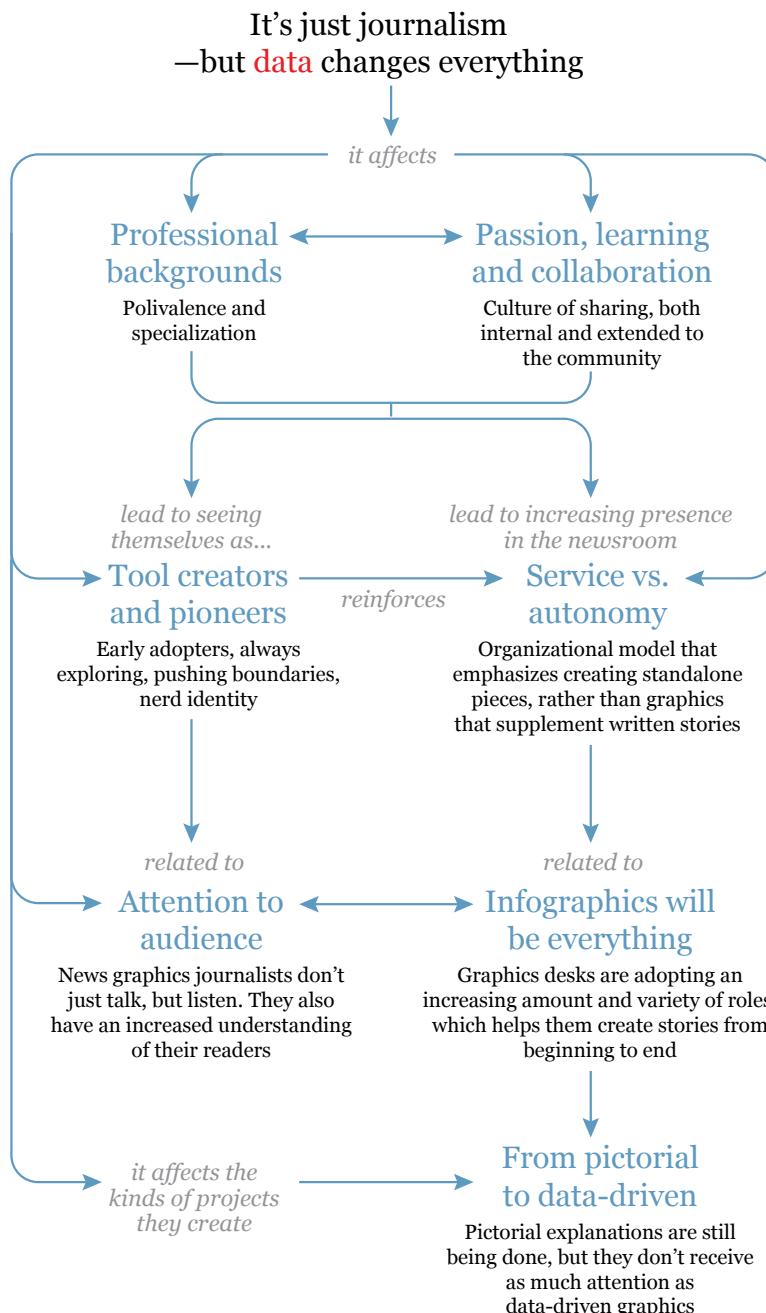


Figure C1

**H4.** News graphics professionals and teams are creating many more data-driven graphics, based on abstract charts, graphs, and maps, and fewer pictorial schemes and explanations.

These hypotheses are corroborated by the observations, interviews, and quantitative analysis. However, the grounded theory analysis applied to the coding of transcripts made them much more complex and rich, and added elements that were not originally contemplated, as described at the end of the interviews section. In a research project that uses methodologies like these, questions and hypotheses aren't rigid constraints, but starting points, rough constructs that can be later chiselled and modeled based on later discoveries, in a constant iterative cycle. Our constitutive diagram reveals how the changes hinted in our hypotheses, and other elements, that were revealed by the data itself, are related to each other.

## DATA AND VISUAL JOURNALISM

The first element of this consensus is the centrality of journalism and data. Professionals who create news graphics, both those who began their careers in the pre-Internet days, and those who became journalists more recently, say that the increasing availability of digital data and tools is the most important change they have witnessed.

Up to the mid-90s, data was scarce, difficult to access, and hard to manipulate; today, plenty of it is a mouse-click away, and the tools used to work with it are, in many cases, free and even open source. Not all data is available, of course—a limitation news graphics professionals are quick to acknowledge—but project choices are often “motivated by availability of data” (Irizarry, Peng, and Leek 2012.)

Data and digital technologies are seen as means to produce better journalism. As discussed in the interviews chapter, after expressing enthusiasm for innovative tools and techniques, showing their optimism about the future, declaring their concern about attracting the public's attention to the projects they create, etc., news graphics professionals went back to *LA Times'* Len De Groot statement: “It's just journalism.”

The meaning of “journalism” for the news graphics creators interviewed for this study aligns to fairly standard definitions, like the one that Jack Fuller described in his book *News Values*: Journalism is dedicated to producing news, “a

report of what a news organization has recently learned about matters of some significance or interest to the specific community that news organizations serve” (Fuller 1996: 6.) Journalists help people “master their world” by taming “complexity.”

One interviewee, Alicia Parlapiano, from *The New York Times*, said that, at its best, the “news media stands for which is journalistic integrity and objectivity and telling these important stories whether or not they have a really large audience or not.” Parlapiano’s words were echoed by many others.

One key difference with the past, though, is that, even if they use “story” as a general term to refer to the products of their work, news graphics professionals also say that they don’t stick just to traditional linear stories anymore. The outcome of their efforts could well be, for instance, an interactive data base that readers can explore to find data that affects them directly. *ProPublica*’s Scott Klein often talks about “the far and the near” strategy to describe projects like “Dollars For Docs” (Figure C2): Provide an overview of the data (“the far”) while

## Dollars for Docs

### How Industry Dollars Reach Your Doctors

*By Charles Ornstein, Lena Groeger, Mike Tigas, and Ryann Grochowski Jones, ProPublica. Updated December 13, 2016*

Pharmaceutical and medical device companies are now required by law to release details of their payments to a variety of doctors and U.S. teaching hospitals for promotional talks, research and consulting, among other categories. Use this tool to search for general payments (excluding research and ownership interests) made from August 2013 to December 2015. | [Related Story: We've Updated Dollars for Docs. Here's What's New.](#) »

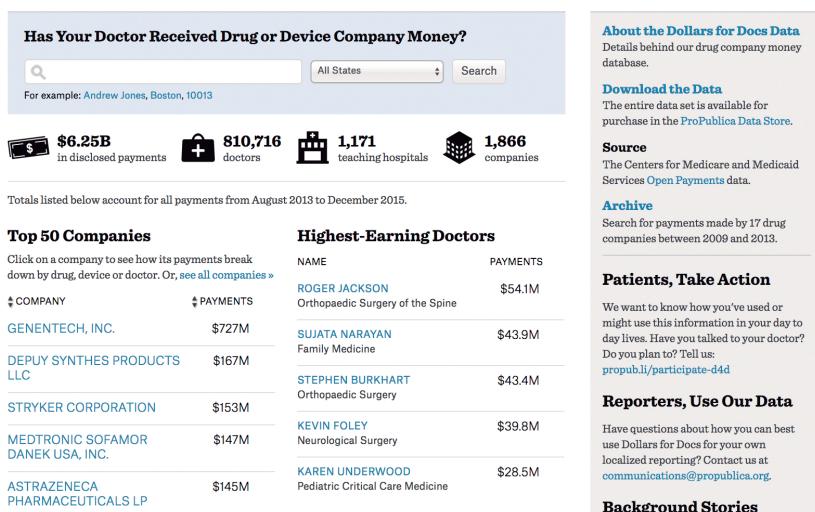


Figure C2 <https://projects.propublica.org/docdollars/>

letting people find themselves in it (“the near.”) Interviewees don’t see “stories” as the ultimate goal. Their ultimate goal is to provide a service to citizens.

## FROM SERVICE TO AUTONOMY

News graphics professionals at the organizations explored for this study, then, don’t call themselves artists or designers, primarily. They prefer labels like reporters or editors, and they say that they do journalism, not just design—or that they do journalism through design. This corroborates my initial first hypothesis.

In the history chapter, we saw that this was also the case of those professionals who designed news graphics in the 80s and 90s, and who attended conferences like the Society for News Design Annual Workshop or the Malofiej Infographics Summit. The difference is that, at that time, this was a rhetorical strategy, a way of reaffirming one’s status in newsrooms where news graphics designers were often part of “art” departments and took “orders” from real journalists (Munk 1992.) They were treated as content designers, those who made pages look pretty, rather than as autonomous content creators. Professional autonomy and an equal standing to journalists were a goal and an ideal, but a largely unrealized one.

The situation today, as described by interviewees, is entirely different, at least in the U.S and UK publications we explored, and it corroborates my third initial hypothesis, at least in the newsrooms that were part of this observation (we can’t claim that they are representative of all news graphics worldwide.) From a “service” model of news graphics production—graphics desks and professionals sitting at their computers, waiting to be told what to do by other desks,— they have moved to a content ownership one. Professionals who do news graphics don’t take orders; they collaborate with their colleagues from other departments. Moreover, in many cases, they pitch their own “stories,” and they complete all stages of production on their own, from the initial reporting to the final art.

Why has this changed occurred? Why was this model of autonomy an ideal a decade ago, but a reality today, at least in the newsrooms chosen for this study? What the interviews suggest is that it’s due to a confluence of factors, one historical, and others much more modern, related to new professional profiles and the perceived need to take advantage with digital data and technologies. This is closely related to the second initial hypothesis listed at the beginning of this dissertation.

The historical one is the unrelenting rhetoric that, at least since the 80s, professionals who create news graphics have used with the goal of self-empower-

ment, and of convincing editors and reporters who use words—written and spoken—that visual design is also a legitimate way of doing journalism.

This rhetoric is still alive, judging by the content of recent presentations at the Society for News Design Workshop and the Malofiej Infographics Summit. This makes sense as, outside of top publications in the United States and in certain European countries, a majority of news graphics departments are still service departments.

The transition from service to autonomy in the publications we analyzed began at *The New York Times* decades ago, as explained in the history chapter, but it happened quite recently at *The Washington Post* (Cairo 2012, p. 264) and *The Wall Street Journal* (Thompson 2016):

Graphics desks often struggle with being a “service desk” for print sections. Over a year ago, we started moving some developers from our department to specific desks. Now we have around half a dozen graphics editors and developers embedded with several sections around the building. For example, there’s one news apps developer who sits near the U.S. editor and develops projects directly with people on that desk, working with the visual editor who coordinates all visuals for the section (including photos and page design). The decision was made to address how disconnected graphics teams can feel from the newsroom overall. Now, instead of prodding the graphics team for help on a project, sections can consult directly with a graphics editor who’s essentially on their own team. This lets graphics editors develop deep knowledge about the section—and the people who work there. Now it’s only natural for them to be involved at the very start of the storytelling process, helping craft the story instead of being the cherry on top. We believe developing institutional knowledge with the subject matter—and being on a first-name basis with people across the newsroom—is key to creating strong work on a daily deadline.

At newer, Online-only organizations, like *Quartz*, *FiveThirtyEight*, or *Pro-Publica*, no change was needed. Since their inception, these organizations granted autonomy and equal standing to the professionals who worked with data or designed news graphics. These professionals were expected to work as others editors or reporters: They came up with their own “stories” and they produced them.

## PIONEERS AND INNOVATORS

Rhetoric and internal evangelizing aren’t the factors that explain the transi-

tion from service to autonomy. Something else had to happen at places like *The New York Times*, *The Washington Post*, the *Los Angeles Times*, or *The Wall Street Journal* to explain the transition from service to autonomy. Another factor is related to modern attitudes about technological innovation within newsrooms. News graphics creators see themselves as early adopters and pioneers and, more importantly, they are also increasingly seen as such by their managers. This is something that was not contemplated in my initial list of questions and hypotheses, although it could be seen as a natural consequence of the second hypothesis: the change in professional backgrounds hired by newsrooms, incorporating more tech-savvy profiles, such as programmers and data scientists.

In his observations at newspapers, Boczkowski identified a fundamental contradiction in newsroom's embracement of digital technologies: In some cases, they "wished for failure while striving for success." (Boczkowski, 2004 p. 20.) This ambivalence was also identified by C.W. Anderson (2013) and David M. Ryfe (2012).

Ryfe wrote that traditional journalists' apparent resistance to change isn't mindless, but "strategic and intentional"; reporters and editors invested so much time and energy in acquiring skills and habits that they thought that "the costs of giving up investments in the practices" would outweigh "the benefits of change" (Ryfe 2012: 85.) Ryfe added that his argument is similar to the one proposed by business management theorist Clayton Christensen in his bestseller *The Innovator's Dilemma* (1997.)

Reporters and editors often see technological change as negatively disruptive, and their accounts are often gloomy and negative. The titles of the articles collected in a book about the future of journalism include words and sentences like "collapse," "death," "crisis," "frenetic mills," or "surfeit of crises," and even its section about how journalism can move forward is tinted with a pessimism and even fatalism (McChesney and Pickard, 2011.)

News graphics journalists who have embraced data and digital technologies, on the other hand, are mostly optimistic about the future. They are aware of the many challenges the organizations that pay their salaries face, but they see technology and data not as threats, but as opportunities to be seized. They declare themselves excited about their possibilities. Their enthusiasm is evident when reading their words in the interviews. They are hopeful, and they see themselves as the bearers of that hope.

More interestingly, this is true not only for those professionals who began their careers recently, and therefore are more familiar with data and digital technologies. It's also true of professionals who, like Sarah Slobin or Jon Keegan, had a long experience in the field before the Internet, and later taught themselves

digital skills; and it's true of those who, like John Grimwade, Fernando Baptista, have mostly kept producing the same kind of artisanal, non-data-driven news graphics they used to do thirty or forty years ago.

The way people who do news graphics —again, as their sole activity, or as part as their output— see themselves seems to be aligning with how they are perceived by their colleagues. In March 2014, an internal “innovation report” written by journalists at *The New York Times* got leaked, and it was immediately called “one of the key documents of this media age” (Benton 2014.) Its pages mention several individuals who have appeared in this study such as Steve Duenes and Aron Pilhofer; Duenes is a former graphics director who is now an Assistant Managing Editor, while Philhofer was head of the Interactive News desk—a team that produced news graphics on a regular basis,— and who later became director of digital at *The Guardian*:

We need more digital talent overall, but we also need more digitally inclined leaders [...] An important shift happened recently with the promotion of Aron Pilhofer and Steve Duenes to the masthead. The promotions paid off quickly: Both are responsible for hiring much of our best digital talent and for launching ambitious digital initiatives. They watch competitors and notice trends —making the conversation about our mobile efforts or new products richer ( *The New York Times* 2014, p. 92)

The report also mentioned Mike Bostock, who was part of Steve Duenes’s graphics desk at the time. Bostock is a computer scientist and designer who created a JavaScript library , d3.js, which is becoming a standard in interactive, data-driven news graphics.

In 2015, Matt Ericson, who was a deputy graphics director at *NYT*, was promoted to Associate Editor. The press release announcing it said:

We're pleased to announce that Matt Ericson has been promoted to Associate Editor, a new masthead position that will be responsible for guiding how we publish and present news across all of our platforms [...] Matt is uniquely qualified for this role, bringing editorial, graphics, technical and managerial experience to the table. In a former life at *The Philadelphia Inquirer*, he helped engineer a content management system. As deputy graphics director at The Times, he has played an important role in building our reputation for visual and interactive storytelling. Matt provided thousands of ideas for projects that ranged from simple charts to the design of the homepage on election nights, often guiding those ideas to completion by offering expert advice in data analysis, editing and design. He has also identified some key recruits for the department, and he played a major role in shaping the vision for

how the desk transformed from a print outfit to the multidisciplinary shop. (*The New York Times* 2015)

A few months later, Amanda Cox, who was also part of the graphics desk, was named editor of The Upshot, a section in *The New York Times* which uses data and analysis to report stories. The press release, written by executive editor Dean Baquet, said that visual journalism was a “growing part” of the paper:

I have asked Amanda to take on this job because she is the best person to lift The Upshot to new heights. But I also want to note an underlying message in her appointment. Visual journalism – graphics, interactives, photography, video, virtual reality – is a growing part of our report, and it’s an area where we excel. In the future, visual journalists, and those, like Amanda, whose background spans both words and visuals, are a crucial part of the future leadership of The Times. (*The New York Times* 2016)

It’s possible to find accounts about the importance of graphics —and visuals in general— in online Journalism referring to other news organizations. For instance, after *The Washington Post* was acquired by Amazon.com’s founder Jeff Bezos, an immediate expansion was announced; three out of four roles in the announcement were related to visual journalism: “The Post will hire new political reporters, photo editors, data visualization staff, and Web designers.” (Somaiya 2014). As repeatedly discussed in several chapters in this dissertation, this may respond to the fact that many of the most popular pieces published by online news organizations in the past few years are news graphics and interactive databases.

## CHANGES IN FORM AND ROLES

The increasing weight of departments that produce news graphics in news organizations is, according to the interviewees, also related to the professionals who have been hired in the past decade, as we’ve already pointed out in relationship to hypothesis 2.

This is another major difference in comparison to the recent past. From the 80s to the 2000s, when news graphics was consolidating as a social field, many of the professionals had backgrounds in art, design, or written journalism. Beginning in the 2010s, though, the newsrooms we’ve explored began incorporating more professionals who could take advantage of digital technologies, such

as programmers, data scientists, and web developers. A good portion of them ended up either working on graphics desks or producing news graphics as part of their daily activities in departments with names such as “interactive news,” “news applications,” or “multimedia.”

The result is that the interviewees see the teams they work for or direct as places that, to quote Columbia Journalism School’s Emily Bell, can help “bridge the gap” between “tech and editorial.” (Bell 2016.) This was something that was not part of my initial set of questions of hypotheses, but arose from the interview transcripts. Many researchers (Boczkowski, 2004, Ryfe 2012, Usher 2014, 2016) have chronicled the mistrust that journalists feel towards those who they perceived as “techies.” Bell wrote that the gap is disappearing:

The cultures of journalism and software development are ostensibly working toward the same goal —organizing information, informing the public, generating money from advertising— but in most respects they are very different [...] While many fields have been disrupted by automation and computation, few have converged as abruptly and as publicly as software engineering and journalism [...] In most newsrooms, what was once a hostility by journalists toward “the techies” has become an admiration and understanding that journalists with the right technical skills hold the keys to the survival and health of the field. Diversity in thinking about how to tackle stories or harder problems in the organization of our reporting and information has undoubtedly made journalism better. (Bell 2016.)

Professionals who produce news graphics aren’t the only ones thinking about novel ways of tackling stories, but they are certainly quite visible among them. Even if, as we’ve just seen, they claim that they are journalists first, they also see themselves as tinkerers, as not just tech users, but as tech creators. Graphics desks, empowered by new hires who can handle digital data and programming languages, are capable of inventing new tools to be used in the newsroom.

Not only that. They are also experimenting with new forms thanks precisely to the newly acquired skills. This is a result of one of the principles that Lev Manovich identified as definitory of new media objects, their “variability”:

A new media object is not something fixed once and for all but can exist in different, potentially infinite, versions. This is another consequence of numerical coding of media (principle 1) and modular structure of a media object (principle 2.) Other terms which are often used for new media and which would be appropriate instead of “variable” is “mutable” and “liquid.” Old media involved a human creator who manually assembled textual, visual and audio elements into a particular composi-

tion or a sequence. This sequence was stored in some material, its order determined once and for all. Numerous copies could be run off from the master, and, in perfect correspondence with the logic of an industrial society, they were all identical. New media, in contrast, is characterized by variability. Instead of identical copies a new media object typically gives rise to many different versions. And rather being created completely by a human author, these versions are often in part automatically assembled by a computer. [...] Thus the principle of variability is closely connected to automation. Variability would also not be possible without modularity. Stored digitally, rather than in some fixed medium, media elements maintain their separate identity and can be assembled into numerous sequences under program control. Also, because the elements themselves are broken into discrete samples (for instance, an image is represented as an array of pixels), they can also be created and customized on the fly. (Manovich 2001: 56.)

In the print past, then, according to Manovich's analysis, journalistic products, news graphics among them, were "stored in some material, its order determined once and for all" in a "fixed medium." After all, media becomes digitized, though, those products became "mutable" and "liquid." Imagine a numerical database saved in a server; its graphical representation could be potentially anything: A map or series of maps, graphs, diagrams, etc.

News graphics designers working for web operations in the past could take advantage of this "variability" principle using off-the-shelf tools like Adobe Flash—or, more recently, data visualization software like Tableau or Microsoft's PowerBI. But, according to interviewees, the potential of modern news graphics can only be fully realized when you have professionals who can code in your teams, at least until—this is something pointed out by *Washington Post*'s head of graphics, Kat Downs—newer off-the-shelf tools become much more flexible than they are right now.

A result of the confluence of newly available digital technologies and data, the arrival of tech-savvy professionals to newsrooms, and the autonomy of news graphics creators is two dramatic changes in form. The first one is the transition from a tradition of pictorial news graphics to one that prioritizes data-driven presentations; the second one is the expansion of the role that news graphics professionals and teams play. As described in the chapter describing the quantification of the Malofiej awards, this tentatively corroborates hypothesis 4, but just in those newsrooms that participate the most in this competition, which may not be representative of the entire universe of news graphics teams.

Between the 80s and the 2000s, a significant portion of news graphics cre-

ators, according to the literature (Tankard 1986, Munk 1992, Utt and Pasternack 1993,) were graphic designers and artists. Today, according to the interviewees, the composition of graphics teams —or of teams that produce news graphics, among other tasks— is much more varied, including statisticians, cartographers, reporters, developers, etc. As we saw in Chapter 5, this change in department composition is parallel to an increase of projects that have data/abstract graphics at their center receiving awards in the Malofiej International Infographics competition. We can't claim causality (more programmers -> more data graphics,) just co-variation.

Nonetheless, co-variation is often the first clue to identifying causality, and the interviewees themselves mentioned that more data and programming skills, combined with the fact that they know that many interactive data-driven news graphics are popular with their readers, have led these professionals to create more of them.

The shift between pictorial and abstract was gradual, but it has accelerated in the past six years, to the point that roughly half of the projects that receive awards at the Malofiej competition have a data-driven visual as their central element. This transition has been led by publications that dominate in the contest, like *The New York Times* but, as we saw in the graphs of Chapter 5, it's happening more recently in organizations from other parts of the world.

The second change regarding form is the expansion of the role of traditional graphics desks in those publications that had such a thing, such as *The New York Times* or *The Washington Post* or *The Guardian*.

Interviewees reiterated that they don't do "just graphics" anymore, in the sense of statistical charts or graphs, maps, or pictorial explanations and animations. In parallel to their increasing professional independence —this connects to the transition from "service" to "autonomy."— They have increasingly producing standalone stories that seamlessly combine news graphics with text, photographs, video, etc. In an interview with Ken Doctor for the Nieman Lab website, NYT's Steve Duenes said:

Th The graphics department is a news desk and works in parallel with the other news desks like Metro and National and International. There is coordination, and there's a positive effect from that coordination, but especially with news coverage and breaking news, it is independent work. The graphics department figures out lines of reporting does the reporting, and starts to build visuals. There are small teams that form organically and quickly around how we're going to respond to these stories [...] The graphics desk can publish something on its own and then,

the next day, point it out to the national editor and have the value of that piece be apparent. That's the kind of thing you need to make that cultural change, and that's what happened in this department. The graphics department decided — before the newsroom got into the swing of switching into a digital-first operation — that that's how they were going to work. It's just grown from there: The desk has grown, the reporting resources in the department have become stronger, and the additions have been people with deeper, specialized skills, developers, cartographers who are also coders. (Doctor 2016.)

The conversation among professionals who create news graphics, according to Duenes, has moved from discussing *graphics* forms to discussing *story* forms. Professionals who create news graphics interviewed for this study see themselves well-positioned to lead the discussion not only of innovation in graphics, but in journalism as a whole.

This was something that emerged in the conversations with *LA Times'* Len De Groot, *Washington Post's* Kat Downs, *The Guardian's* Xaquín G.V., and others. Their departments may still be called "graphics desk," but that's an inherited misnomer. In the case of *The Guardian* or *NPR.org*, it's called "visuals," a more general term that suggests an all-encompassing embrace of multimedia. Moreover, judging by the attendance to journalism conferences like NICAR (Investigative Reporters and Editors,) news graphics may be overlapping with other journalism branches, like investigative reporting.

At newsrooms like *ProPublica's*, the department that does news graphics is called "news applications" but they do much more than data tools, data bases, or graphics. They produce their own stories. Ohio University's professor John Grimwade, who has four decades of experience in news graphics, said that "infographics will become everything," in the sense that modern web journalism is experimenting with story structures and combinations that somehow mimic the large infographics from the past, which merged words with visuals of different kinds (Henríquez 2014). Here's Grimwade's quote from Chapter 4 again:

I think it was [Dutch designer] Frédéric Ruys who [...] said that "in the future, we won't call infographics, infographics [...] The public certainly won't, they will just be how we understand things. And if he's right about that, that's fantastic. I mean I'd love that. I mean I don't care if people know it's called infographics or not, but if it's so integrated that they can just use it in their daily lives, wow, yeah. It's happening. People don't realize that every time they're using an app or something, they're using some interface. I just see it as a complete integration of all types of infographics. I don't think we'll be talking about print or Online or any of those categories. Hope-

fully it'll just be a fluid mixture, using whatever new technologies there are. It'll just be part of learning. That's what I would like to think. I don't know of course; I don't have a crystal ball.

One possible consequence that will need to be explored in future research is the unraveling of news graphics as a burgeoning social field. On chapter 1 I explained that the term “news graphics” could be applied to a craft or skill — putting together graphic images that display information,— the products of that craft, and the teams that produce them. There’s a likely fourth layer: the community.

As explained in Chapter 2, in the 80s and 90s news graphics professionals began moving out of general “art” departments to create dedicated “graphics” desks, in charge of pictorial explanations, maps, charts, graphs, etc. They also began gathering in conferences such as Malofiej, the Society for News Design, and, more recently, the Infographics Conference, in Zeist, the Netherlands. Arguably, constant socialization could have led to the seeds of a professional identity, or of a “social field,” as defined by David M. Ryfe, referring to journalism in general:

A social “field” is precisely the kind of organized, insular social space which journalism became in the mid-twentieth century [...] At this time a set of “properties,” as scientists call them coalesced in journalism to give it a greater integrity and sharpened the boundary between the inside and outside of the profession. These properties are the core values and practices (objectivity, balance, fairness, and the like.) (Ryfe 2012: 93)

There are some hints that news graphics was indeed in the path of becoming a social field in the words of old-time designers like John Grimwade, Fernando Baptista, Álvaro Valiño, etc., and the literature about news graphics. If this is the case, news graphics as an embrionary field has suffered the same lost of coherence as journalism as a whole, according to Ryfe:

The boundaries of journalism are blurring. It is increasingly difficult to distinguish the inside from the outside of the field [...] Journalism is losing coherence as a distinctive social field [...] We may come to see the period from the early 1900s to the 1990s as a historical anomaly, a time when journalism briefly inflated into a distinctive social space, when, for a brief time, professional journalists controlled the production of news. And we may be entering a more normal time when news production goes on in the absence of an integrated social field we call “journalism.” (Ryfe 2012: 140.)

A similar “unraveling” may have happened in news graphics, according to the results of our interviews. News graphics may have experienced a short period of increasing field coherence, between the late 80s and the late 2000s, but today news graphics may be better defined just as a craft or skill—which can be adopted by professionals from different backgrounds and working for different desks—and the products of that craft, explanatory and exploratory graphics. A non-scientific observation of the winners and juries of the Malofiej awards yields a hint that this may be true, as their compositions have become much more varied.

## PAYING ATTENTION AT ATTENTION

Another salient change enabled by the rise of digital technologies and data is the increasing interest that news graphics creators show for the wants and needs of their audiences. I didn’t predict this in the initial list of questions and hypotheses, but was prevalent in the interviews and observations, so it arose from the data. According to their own words, news graphics professionals pay attention to metrics and readers’ feedback, and they take them seriously. They are aware of some challenges journalism faces, and they try to act in consequence.

The first challenge is a crisis of the business model of the organizations that have traditionally produced journalism, which is linked to a decline in circulation and audiences, and one of advertisement. Contrary to popular intuitions, the former didn’t begin with the web; newspaper circulation in the U.S., for instance, became stagnant in the 1970s, even in population kept growing, but the rise of the web may have accelerated it (Edmond 2016.)

As for the latter, the crisis of advertising, the business of journalism was disrupted by the collapse of what some authors have called the “advertising subsidy.” Since the 1990s, it has been possible for advertisers to reach potential clients directly through the Internet, circumventing newspapers and TV channels. The rise of social media accelerated this process:

The past 15 years have also seen the rise of advertising as a stand-alone service. The loss of classified ads to superior services like Craigslist, HotJobs and OkCupid has been widely commented on; less noticed is the rise of user-to-user recommendations in a transactional environment, as on Salesforce or Amazon. These recommendations take on some of the functions of business-to-business or business-to-consumer advertising while involving no subsidy of content (or even a pay-

ment to anyone who looks like a publisher). Those services themselves also provide little or no subsidy for media outlets: after a 15-month test of television advertising, Amazon abandoned TV for most products, concluding that the ads would be less effective in driving sales than spending the same amount of money to provide free shipping (Anderson, Bell, Shirky 2014.)

Another challenge triggered by digitization is an identity crisis, which is related to Ryfe's notion of "social field." Suddenly, "the people formerly known as the audience" (Rosen 2006) began being able to publish almost anything they wanted, first in the form of online conversations, then as simple HTML websites, weblogs and, today, social media posts on platforms like Twitter, Facebook or LinkedIn. The term "citizen journalism" became popular in the early 2000s (Gilmor 2004).

Some called this "disintermediation." Adrian Monk, managing editor at the World Economic Forum, asked himself during an interview "We have twice the number of followers as *The Financial Times*, so why should readers go through gatekeepers? Why not bring eyeballs directly to content?" (Caffaso 2014). Some journalists and academics, longing for the good old days of analog platforms, have responded with disdain, using words like "blogger" almost as an insult (Cagé 2016).

Some others talked about the contrast between a recent past of "vertical" media, where news organizations acted as gatekeepers, deciding on what to report and how to report it, and a present of "horizontal" media in which people talk directly to each other, and even create their own niche Online publications, whether with the goal of profit from it or just for the sheer joy of it. Theories of agenda setting, which began in 1972 with the seminal article "The Agenda-Setting Function of Mass Media" by Maxwell E. McCombs and Donald L. Shaw, experienced major updates. Berger and Freeman (2011) provide a good summary.

News media today, then, compete with non-traditional providers. Besides, according to some theorists, journalistic organizations should stop talking to people and begin talking to people, or even enabling conversations among people about matters of shared interest. (King 2008.) Journalists need to listen and stop being just "educators" to become also "advocates" and "organizers" for the communities they serve (Jarvis 2014.)

News graphics professionals are aware of the fierce competition for attention not only with other news organizations but with society in general. In interviews, they said that part of their efforts is focused on attracting people's attention to topics that may be of importance or interest to them. They do this by different means. During my stays at *ProPublica* and *Univision*, for instance, I observed that

there was repeated communication with professionals in charge of social media outreach.

In the case of *Univision News Online*, in Miami, news graphics creators designed not only the graphics that were published as part of daily stories, but also small snippets and animated GIFs to be inserted in social media posts on Twitter, Facebook, and other platforms. They didn't talk about these items as add-ons but as an integral part of what they do.

Paying attention to user data helps news graphics creators analyze people's behavior. An example of this is the recent change in focus at *The New York Times*, explained in Chapter 4. For a while, data-driven graphics in the *Times* website were richly interactive, with plenty of buttons and menus for readers to play with.

However, in recent years the *Times* observed that most readers don't interact much with any kind of presentation, beyond simple a "next" button or scrolling up and down. Graphics-driven projects produced from 2014 on are, in general, much less interactive and more linear than six or seven years ago. This is also related to the mobile-first approach that is said to have been adopted by most interviewees in this study. A large percentage of traffic to their websites happens through mobile phones, sometimes as high as 80%.

News graphics journalists at the *Times* or the *Post* said that they didn't let user metrics guide their editorial choices on what topics to cover and develop stories about. They said that they chose to focus on stories that they perceive as relevant, and then strive to make them engaging and visually attractive.

However, at *Univision*, I observed a much more nuanced reality. In July 2015, Mexican narco Joaquín "El Chapo" Guzmán escaped from prison, only to be captured again on January 2016. *Univision News Online* covered this story extensively and deeply not only because it was newsworthy—arguably, it was—but also because, according to informal newsroom conversations, it attracted huge amounts of readers. Historically, news organizations have always tried to find the balance between what they need to write about to serve their audience, and what that same audience regularly consumes, as shown in metrics.

## FURTHER EXPLORATION

In the course of this dissertation, I have hinted multiple potential lines of future research. Part of them can be based on the interviews and data collected for this study, all available in [www.nerdjournalism.com](http://www.nerdjournalism.com), but much of it will require much more field work and data generation and analysis.

It can be argued that the scientific process doesn't consist of answering ques-

tions, but of coming up with better ones. Every exploration advance understanding not by closing doors behind us, but by discovering new ones ahead of us. I'd like to conclude offering a few suggestions of what those doors may be:

- The first one is —needless to say perhaps— analyzing the interviews and data generated for this project in other ways. Grounded theory methodology is a set of particularly interpretative techniques, which are largely dependent on how coding is conducted, how items are classified, organized, interrelated and mutually influential, etc. Interpretations different than mine are possible, and they won't necessarily contradict the findings here —they well might!— but run in parallel to them, expanding them, enriching them, making them sharper and better. The goal of grounded theory is, as its name suggests, to produce theory; theories aren't settled artifacts. They must be subjected to constant scrutiny, and be discarded if their validity is properly refuted.
- As discussed in the methodology chapter, the results of this study can't be said to apply to news graphics professionals and teams everywhere. They apply just to certain organizations in the English-speaking world, particularly in the United States. It can be argued —as I've done— that changes in news graphics departments at very influential organizations, like *The New York Times* or *The Washington Post*, influence publications both in the United States and in other countries, in a sort of trickle-down effect; however, the evidence I have provided needs to be greatly supplemented, and challenged. It'd be very interesting to read systematic interviews with professionals from all over the world, ethnographies written based on newsroom observations, and reflections about how digital technologies and data have affected daily practices, about whether graphics journalists in other countries have also seen a transition between “service” departments and autonomous ones, and about if they've hired more professionals with coding skills in recent times, etc.
- As parts of those observations, it would be possible to analyze whether news graphics was indeed on the path of becoming a “social field,” in the sense theorized by David M. Ryfe, or not. And if a new social field may be emerging nowadays, as journalists who use visual means of communication group together in larger, more varied departments, often called “visuals.”
- It'd also be relevant to explore whether and how professionals who produce news graphics —exclusively or not— interact with and even become part of desks that aren't necessarily “visual,” such as investigative reporting. On August

2016, for instance, Gabriel Dance, a visual and interactive journalist who has done graphics and multimedia work for organizations like The Marshall Project or *The Daily*, became part of *The New York Times*'s Investigations Department. And, as mentioned in Chapter 5, *The Wall Street Journal* makes at least part of their news graphics and design journalists sit with other desks. News graphics may be on the path of becoming a skill potentially adopted by anyone, rather than being a craft certain professionals specialize in 100%.

- Regarding the quantification of professional competitions, I'd suggest paying attention not just to the awards given, but to the composition of the juries. This will require to create professional profiles of each one of them, and then analyze whether a relationship exists between their practice and their preferences, as expressed in the choice of projects to recognize. It'd also be relevant to analyze the profiles of speakers at the conferences that, as Malofiej and the Society for News Design, are sometimes ran alongside competitions. Speakers are, arguably, trend-setters, pretty much like judges in professional competitions, and they may contribute to self-reinforcing dynamics: By rewarding a certain kind of project, they may encourage professionals to produce more of the sort.
- In this study I have highlighted the transition between news graphics that emphasized pictorial elements and news graphics that are more abstract and data-driven. That trend was visible in the data. It's possible that a second trend exists, one between less sophisticated and more sophisticated data-driven news graphics, in the sense of univariate versus multivariate displays. I am referring to something mentioned in the history chapter, Edward Tufte's "rough measure of graphical sophistication —the share of a publication's graphics that are relational. Such a design links two or more variables but is not a time-series or a map. Relational graphics are essential to competent statistical analysis since they confront statements about cause and effect with evidence, showing how one variable affects another. The design idea is a simple one, although not quite as simple as the bar chart, time-series plot, or data map." (Tufte 1983: 82).

Out of curiosity, while writing the last lines of this dissertation I browsed through the pages of several Malofiej books, both old and new, and my hunch is that, indeed, data graphics —graphs, charts, thematic maps, etc.— have become much more sophisticated, in the sense of multivariate and relational. It'd be another piece of evidence to strengthen the changes identified in this study.



In the methodology chapter I explained that I can't claim to be a detached observer of news graphics. There are ways to strive for objectivity, fairness, and balance when conducting ethnographic observations, grounded theory analyses, semi-structured interviews, and quantitative explorations, and I've done my best to apply them. However, I am both an observer of news graphics professionals and a news graphics professional myself. I have a vested interest in bettering the practice, its products, and the lives of people who are involved in them.

It is my hope that this dissertation will help with that goal, and that it will inspire many more researchers and practitioners to contribute to it. News graphics —explanations, data visualizations, maps— are becoming ubiquitous and, as any other kind of technology, they can be used for good or for ill, to inform and enlighten, or to deceive and mislead. We must strive for the former and fight against the latter with all our heart.



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