

Data Driven Journalism at Zeit Online

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ABSTRACT *Zeit Online* is the digital sister publication of the German weekly newspaper, *Die Zeit*, running its own independent newsroom in Berlin. For *Zeit Online*, data-driven journalism has become an increasingly important way of telling stories. In addition to simply accompanying articles with static charts and infographics, rich interactivity provides a well-accepted instrument to let our readers investigate comparative details of a story. Interactivity is particularly valid when it comes to conveying large datasets, as the visualizations tend toward complexity in order to reveal the multi-tiered stories to be found within. Therefore, a well-designed interactive composition with intuitive navigation is a key to the success for users. This concept of a “guided tour” is becoming familiar among data journalists as a means to engage readers in extremely rich datasets.

Since the construction of interactive, data-rich visualizations are more time consuming than simple charts, requirements for a targeted proof of concept and thorough planning are an essential part of the design process. The team in our newsroom who take care of data visualization are confronted with both small and large datasets. Projects that are to be finished in less than a week run concurrently with long-term ones. Although we have no rigidly standard procedure for undertaking projects (as each kind of data varies in scope and scale), I would like to provide insight regarding the typical project phases and the main actors involved in the process. Additionally, I am providing *Zeit Online*’s practice-respecting data acquisition, graphics, and the approach to interactivity that allows us to make decisions on multiple design issues—both functional and aesthetic.

DIE ZEIT AND ZEIT ONLINE

Die Zeit (pronounced “dee tsite”) is Germany’s leading weekly newspaper. The editorial bias is toward serious journalism and reporting; given the fact that it is a non-daily periodical, there is a focus on background report and deeper context

to the articles. The editorial office is based in Hamburg. In contrast to the trend among other printed newspapers, *Die Zeit* has a growing number of readers; the circulation lies just above 500,000.

Zeit Online, the sister publication of *Die Zeit*, is a news portal with similar pretensions. The tenor is to avoid emotionalism and sensationalism as much as possible. Readers are offered comprehensive coverage with a supportive background on complex issues. Our newsroom, with around 60 permanently employed members, is based in Berlin and thus geographically divided from *Die Zeit*. Surprisingly, the overlap of the two readership groups for *Die Zeit* and *Zeit Online* is only 6 percent. *Zeit Online*’s audience is younger and much larger: 79 percent are younger than 49; 40 per cent are younger than 29. Every month, *Zeit Online* reaches about 5.5 million unique users and receives about 31 million unique visits; on average, the visits to the site are growing by 20 percent over the same month of the year before. *Zeit Online* is considered to be Germany’s highest quality online news site. As testament to this, *Zeit Online* won Germany’s two most important awards for online journalism: the Grimme Online Award and two Lead Awards in Gold in 2011. *Zeit Online* is also the first and only German publication ever to have won the coveted Online Journalism Award of the American Online News Association ONA. At this point, there is no content behind paywall; everything is financed by advertising.

ZEIT ONLINE AND DATA DRIVEN JOURNALISM

The core idea for data driven journalism at *Zeit Online* is the contextualization of an editorial piece: the actual event, the visual storytelling to support familiarization, and the background data supporting the argument of that which is conveyed. Readers of the *Parson’s Journal of Information Mapping* should be familiar with how good visual narrative forms help readers to understand background stories. As the graphic helps to tell the story, it accentuates the importance of its essential topic as well. Therefore, interest grows, and comparative knowledge is increased.

Sheer data visualization that comes with little or no editorial coverage is essentially bald, being unsupported it risks confusing readers. In the worst case, readers lose interest and turn away. To enrich a story, the visualization should elicit a dialogue using sophisticated editorial coverage. During interaction with the graphic, readership is supported by short formulated pieces. A balance must be created between leading the readers and letting them explore the interactive contextualization—this binds them to the story. Following are examples of four exemplary data visualization projects varying in scope and depth.

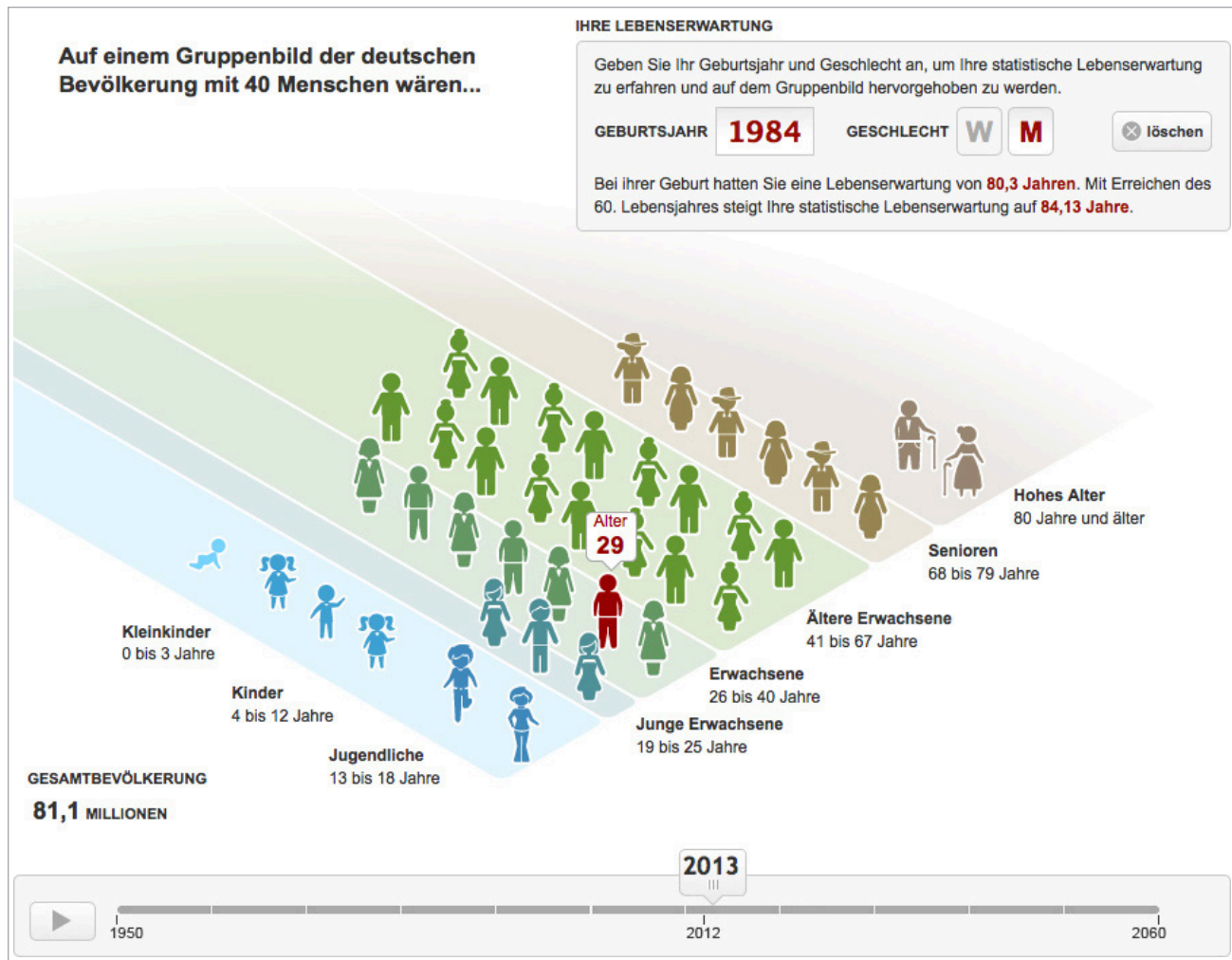


FIGURE 1: This graphic presents a comparative of life expectancy and percentage of population over time. Users can use a slider to see the shift of demographics across an 110 year period. A basis of 40 people within eight subgroups is laid out across a “2.5D” field as opposed to a typical, but less readable, pyramid layout.

LIFE EXPECTANCY (2012)

In 2012, the German Federal Statistic Office published a thorough dataset on vital statistics for Germany, including various demographic scenarios until 2060. The typical way to present these numbers is a series of population pyramids.

Together with our editors at the science desk we collaborated on a better way to let our readers explore the projected demographic data and grasp a possible picture of our future society. This graphic (FIGURE 1) presents a statistically representative group of 40 people within eight subgroups at different ages. It was visualized like a group photo to represent the German society at various points in time between 1950 and 2060, which the readers can choose via the slider. To animate a journey through all eleven decades, one can simply press the play button and

watch how the age groups shrink or expand.

This same data gives only a very abstract feeling of the situation when visualized in a traditional population pyramid. However, when it is represented as a group with kids, teens, adults, and elderly people, it means our readers can relate to the data more easily. One can also enter the own year of birth and gender to become part of the group photo to see your demographic as it journeys through the decades and your own life expectancy.

THE FEDERAL COUNCIL (2013)

The 16 German federal states have cycles for elections that are independent from the ones of the republic. Our graphic (FIGURE 2) shows how the state governments’ party constellations coincide with the one in the German Federal

Wechselnde Mehrheiten im Bundesrat

Durch Regierungs- oder Koalitionswechsel in den Bundesländern verändern sich die Mehrheitsverhältnisse in der Länderkammer. Wie stimmen die Parteienkonstellationen der Landesregierungen mit den Parteien der Bundesregierung überein?

Parteienkonstellation mit Bundesregierung identisch Parteienkonstellation teilweise identisch Oppositionsländer - Parteien nicht identisch

Regierungen Kohl — Koalition im Bundestag: CDU/CSU und FDP

	Rechnerische Mehrheit im Bundesrat (Stimmenzahl ≥ 35)												Regierungs- bzw. Koalitionswechsel												Stimmen im Bundesrat		
1991 Jan.	BW	BY	HE	MV	RP	SN	ST	TH	BB	BE	HH	NI	NW	SH	SL										35	11	22
Apr.	BW	BY	MV	RP	SN	ST	TH	BB	BE	HH	HE	NI	NW	SH	SL										31	11	26
Mai	BW	BY	MV	ST	TH	SN	BB	BE	HH	RP	HE	NI	NW	SH	SL										27	15	26
Juni	BW	BY	MV	ST	TH	SN	BB	BE	RP	HE	HH	NI	NW	SH	SL										27	12	29
Dez.	BW	BY	MV	ST	TH	SN	BB	BE	RP	HE	HH	NI	NW	SH	SL										27	15	26
1992 Apr.	BY	MV	SN	ST	TH	BB	BE	BW	HH	RP	HE	NI	NW	SH	SL										21	21	26
1994 Juli	BY	MV	SN	TH	BB	BE	BW	HH	RP	HE	HH	NI	NW	SH	SL										17	21	30
Okt.	BY	MV	SN	TH	BB	BE	BW	HH	RP	HE	HH	NI	NW	SH	SL										17	17	34
Nov.	BY	MV	SN	BE	BW	HH	RP	TH	BB	HE	HH	NI	NW	SH	SL										13	17	34
Dez.	BY	SN	BE	BW	HH	RP	TH	BB	HE	HH	NI	NW	SH	SL	ST										10	21	34
1996 Jan.	BY	SN	BE	BW	HH	RP	TH	BB	HE	HH	NI	NW	SH	SL	ST										10	24	35
Juni	BW	BY	SN	BE	HH	RP	TH	BB	HE	HH	NI	NW	SH	SL	ST										16	18	35
1997 Nov.	BW	BY	SN	BE	HH	RP	TH	BB	HE	HH	NI	NW	SH	SL	ST										16	18	35
1998 Mai	BW	BY	SN	BE	HH	RP	TH	BB	HE	HH	NI	NW	SH	SL	ST										16	18	35

Regierungen Schröder — Koalition im Bundestag: SPD und Bündnis 90/Die Grünen

1998 Nov.	BB	HE	HH	NI	NW	SH	SL	ST	BB	BE	MV	RP	TH	BW	BY	SN									35	18	16
1999 Apr.	BB	HH	NI	NW	SH	SL	ST	BB	BE	MV	RP	TH	BW	BY	HE	SN									30	18	21
Sep.	BB	HH	NI	NW	SH	ST	BB	BE	MV	RP	TH	BW	BY	HE	SL	SN									27	18	24
Okt.	HH	NI	NW	SH	ST	BB	BE	MV	RP	BW	BY	HE	SL	SN	TH										23	18	28
2001 Juni	BE	HH	NI	NW	SH	ST	BB	BE	MV	RP	BW	BY	HE	SL	SN	TH									24	12	28
Okt.	BE	NI	NW	SH	ST	BB	BE	MV	RP	BW	BY	HH	HE	SL	SN	TH									24	14	31
2002 Jan.	NI	NW	SH	ST	BB	BE	MV	RP	BW	BY	HH	HE	SL	SN	TH										20	18	31
Mai	NI	NW	SH	BB	BE	MV	RP	BW	BY	HH	HE	SL	SN	TH											16	18	35
2003 März	NW	SH	BB	BE	MV	RP	BW	BY	HH	HE	NI	SL	SN	TH											10	18	41
Apr.	NW	SH	BB	BE	MV	RP	BW	BY	HH	HE	NI	SL	SN	TH											10	18	41
2004 März	NW	SH	BB	BE	MV	RP	BW	BY	HH	HE	NI	SL	SN	TH											10	18	41
Nov.	NW	SH	BB	BE	MV	RP	BW	BY	HH	HE	NI	SL	SN	TH											10	22	37
2005 Apr.	NW	BB	BE	MV	RP	SH	SN	BW	BY	HH	HE	NI	SL	TH											6	26	37
Juni	BB	BE	MV	RP	SH	SN	BW	BY	HH	HE	NI	NW	SL	TH											-	26	43

Regierung Merkel I — Koalition im Bundestag: CDU/CSU und SPD

2006 Apr.	BB	HE	SH	ST	BW	BE	BY	HE	HH	MV	NI	NW	RP	SL	SN	TH									15	54	-
Mai	BB	HE	SH	ST	BW	BE	BY	HE	HH	MV	NI	NW	RP	SL	SN	TH									15	54	-
2006 Nov.	BB	HE	MV	SH	ST	BE	BW	BY	HE	HH	NI	NW	RP	SL	SN	TH									18	51	-
2007 Juli	BB	MV	SH	ST	BE	BW	BY	HE	HH	NI	NW	RP	SL	SN	TH										15	54	-
2008 Mai	BB	MV	SH	ST	BE	BW	BY	HE	HH	NI	NW	RP	SL	SN	TH										15	54	-
Nov.	BB	MV	SH	ST	BE	BW	BY	HE	HH	NI	NW	RP	SL	SN	TH										15	54	-
2009 Feb.	BB	MV	SH	ST	BE	BW	BY	HE	HH	NI	NW	RP	SL	SN	TH										15	54	-
Juli	BB	MV	SH	ST	BE	BW	BY	HE	HH	NI	NW	RP	SL	SN	TH										15	54	-

Regierung Merkel II — Koalition im Bundestag: CDU/CSU und FDP

2009 Okt.	BW	BY	HE	NI	NW	SN	SH	BB	HH	MV	SL	ST	TH	BE	BE	RP									37	21	11
Nov.	BW	BY	HE	NI	NW	SN	SH	HH	MV	SL	ST	TH	BB	BE	BE	RP									37	17	15
2010 Juli	BW	BY	HE	NI	SN	SH	HH	MV	SL	ST	TH	BB	BE	BE	NW	RP									31	17	21
Nov.	BW	BY	HE	HH	NI	SN	SH	MV	SL	ST	TH	BB	BE	BE	NW	RP									34	14	21
2011 März	BW	BY	HE	NI	SN	SH	MV	SL	ST	TH	BE	BB	HH	NW	RP										31	14	24
Mai	BY	HE	NI	SN	SH	MV	SL	ST	TH	BB	BE	BW	HH	NW	RP										25	14	30
Dez.	BY	HE	NI	SN	SH	BE	MV	SL	ST	TH	BB	BW	HH	NW	RP										25	18	26
2012 März	BY	HE	NI	SN	SH	BE	MV	SL	ST	TH	BB	BW	HH	NW	RP										25	18	26
Mai	BY	HE	NI	SN	BE	MV	ST	TH	BB	BW	HH	NW	RP	SL	SH										21	18	30
2013 Feb.	BY	HE	SN	BE	MV	ST	TH	BB	BW	HH	NI	NW	RP	SL	SH										15	18	36

Im Bundesrat haben die Bundesländer je nach Einwohnerzahl unterschiedlich viele Stimmen

BB Brandenburg	4	HB Bremen	3	NI Niedersachsen	6	SL Saarland	3
BE Berlin	4	HE Hessen	4 bzw. 5	NW Nordrhein-Westfalen	6	SN Sachsen	4
BW Baden-Württemb.	6	HH Hamburg	3	RP Rheinland-Pfalz	4	ST Sachsen-Anhalt	4
BY Bayern	6	MV Mecklenb.-Vorp.	3	SH Schleswig-Holstein	4	TH Thüringen	4

Quelle: Deutscher Bundestag

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FIGURE 2: A comparative graphic displaying how the state governments' party composition coincides with the German Federal Government

Government. Green stands for a state that has the same parties as the Federal Government, red means that there are only other parties, grey are states with a partial match.

In the Federal Council, each state has between 3 or 6 votes depending on its number of inhabitants. The number of votes is represented by the size of the block.

For every month holding elections the graphic has a row that displays the new composition of all votes in the Federal Council. The states where elections took place are shaded differently. Readers can activate those areas to get more information, including: the state's name, the governing party, and the head of government before and after the election. This graphic intends to demonstrate that, in the majority of cases of state reelections during one legislative term, delegates of the national opposition parties are elected. It clearly visualizes the trend during most legislative terms: a movement of the state governments from mostly compliant to mainly deviant, compared to Germany's government. The latter experienced a change through reelection when the majority of the votes in the Federal Council belonged to oppositional states.

UNEMPLOYMENT RATES (2012)

The Federal Employment Agency publishes various statistics about employment in every one of Germany's (currently 405) districts. We chose to show the unemployment rate and its development since 2005 not with a map, but with small colored cells (FIGURE 3 & 4.) Each district is shown in one row and each cell represents one month. The color intensity corresponds to the unemployment rate. Therefore, instead of showing choropleth in geographic boundaries, they are organized into a visual spreadsheet.

Readers can customize the view: pre-built filters show only districts with big cities, for example. Sorting by states or the newest unemployment figures is also possible. Via small buttons the readers can highlight districts of single states. By entering a ZIP code, the row of the corresponding district is highlighted.

A special function of the graphic is the possibility to change the coloring from absolute to relative unemployment, compared with the German average in the given month. A cell is then colored green if the district has less unemployment than Germany and red if it is higher. The bigger the difference, the more intense the color.

The graphic's functionality and control are explained to the readers through a short tour. It also contains the story of three districts that have typical patterns in their sequence of cells. One can read more about introductory tours in the chapter take the tour.

All told, around 65,000 data points are being processed

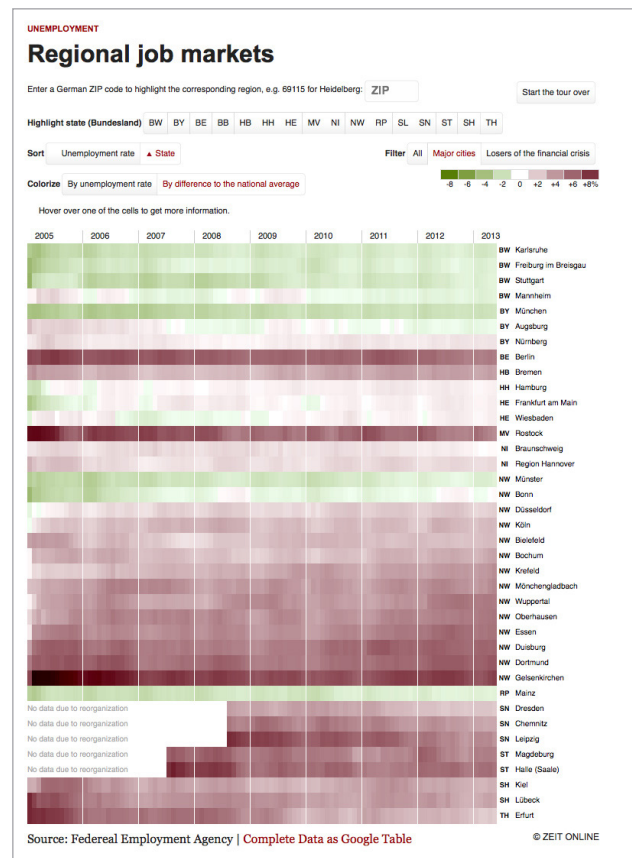
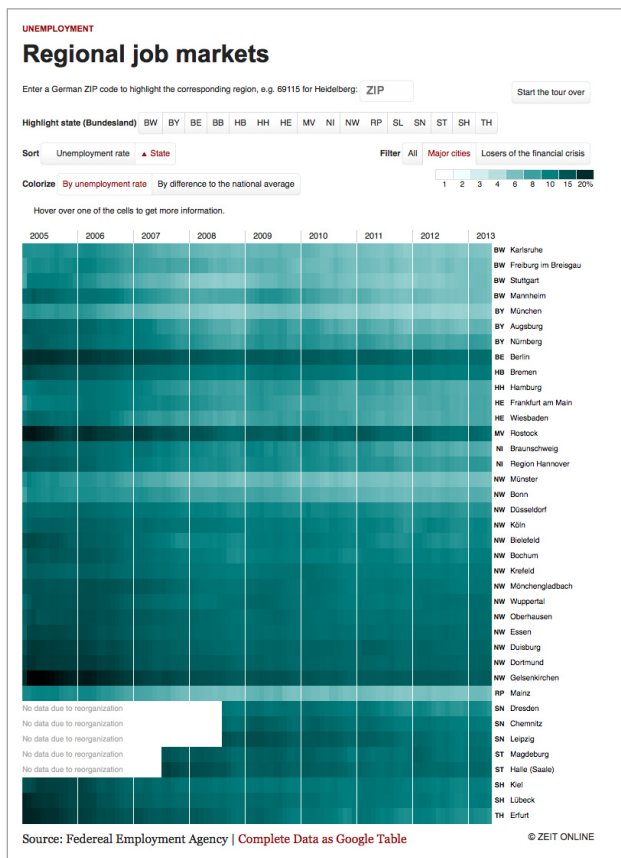


FIGURE 3 & 4: Color intensity corresponds to the unemployment rate within each district of the country. By using uniform cells as opposed to more typical geographic areas rich insight is revealed concerning nationwide trends. The displays are highly customizable, for example, pre-built filters can be used to show only districts with big cities.

by this visualization. They are shown in the initial state of the graphic. All districts below each other lead to a several screen-high layering of data. The relevancy of this interactive graphic is continually maintained, as the topic of unemployment is always relevant, and new numbers are published every month, this graphic is being updated regularly.

THE CATHOLIC WORLD MAP (2013)

The pope's reelection in March 2013 gave us the occasion to generate this graphic (FIGURE 5.). It shows the worldwide distribution of members of the Catholic Church through proportionally scaled rectangles. The color intensity corresponds to the share of Catholics in the nation's population. When such an area is activated, a small bubble appears that contains the country name and the figures.

I would like to discuss the unusual workflow of this project, for in the creation of this cartograph we were not able to find a ready tool or algorithm that we could use or learn to use on short notice. So we fell back to other

resources: the raw data was already in a Google spreadsheet with which one can quite easily produce a treemap. Through this process we obtained correctly scaled areas. These could then be separated and manually arranged through an the asset making tool of Adobe Illustrator. Then we used javascript to activate the labels and data from the aforementioned spreadsheet.

PROJECT WORKFLOW

Suggestions for stories come from editors of all departments as well as the infographics and data journalism team. Members of the team must generate the correct "statement of the data" into words by analyzing it with proper tools. Ideally, these editors have knowledge of statistics. Furthermore, a team has to deliberate which visualization type is appropriate for the specific story and type of data. From this effort appropriate sketches can be created and delivered to subsequent creative members. A highly complex story with multiple entry points and possible outcomes makes

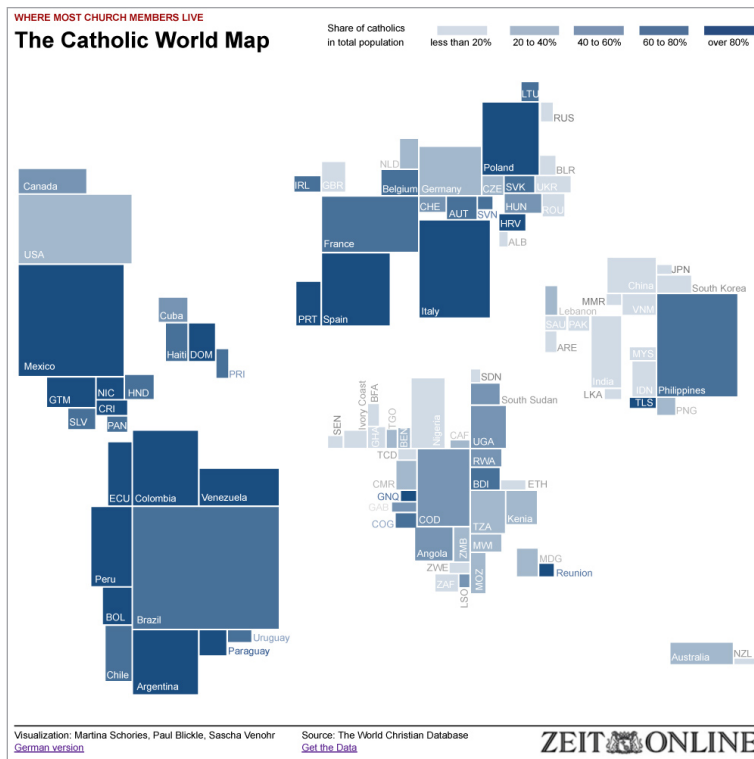


FIGURE 5:

The worldwide distribution of members of the Catholic Church are displayed cartographically instead of cartogrammically. Proportionally scaled rectangles reveal quantities more effectively than choroplethic methods of shading would do so.

it worth the effort to create an interactive toolset. This gives the readers possibilities to readily explore the multidimensionality of the data. In order to achieve this graphic designers and user experience experts need to come up with a concept for navigation and interaction. Finally, developers are responsible for the implementation of the graphic, whether static or interactive; naturally, there is considerable dialogue with all the persons involved. In the case of simple charts, diagrams, or illustrations, the graphics team that delivered the sketches does this implementation. It's even easier if the editors possess the tools and capabilities to generate their own graphics.

WHICH WAS FIRST: GRAPHICS IDEA OR DATA?

Frequently, the ideas for visualizations originate from the editors. As they obtained data initially, or are editing an issue that is full of statistic data, they are best able to explain the essential idea of their piece. However, in many other cases the idea emerges in the department of data journalism and through the visualization teams. Sometimes, editors approach the graphics team with a very specific design suggestion. It is also possible that a graphical look and functionality may be made without any specific proof of concept. In this case we need to make a step back and check if these first proposed visualization ideas support the questions and objectives of the story; discoveries of better

storytelling may emerge, or a graphic may be considered inaccurate or cross-purposeful to the mission of the content.

For example, is a map with slider and play button really the best way to show regional data over time? This is a typically submitted, or suggested, implementation idea. It might work in some cases, but until now we refrained from creating such a graphic: the comparability between different points in time or specific regions—if there are many—is elusive. There are other ways to handle the dimension time, e.g., timelines, small multiples, or small charts that pop up. It depends on whether you want to offer the highest granularity in your graphic and if single data points are meant to be considered individually. Change over time is oftentimes the most important comparison criterion.

Initially it is about the basic approach of the story. Did the editor bring up the data in order to prove or disprove? (This was the case with the graphic about the Federal Council: see above). Or does the data make a point itself? The answer will help during the first steps of data handling: appropriate sources are picked and the research conducted accordingly.

THE STEP DATA TO GRAPHICS

Apart from organizational and logistical questions (such as whether the team has capacities to implement a suggested

graphic) multiple issues concerning the data itself need to be specifically addressed when it comes to deciding whether there will be a visualization.

If the editor provided only incomplete data (or no specific quantifiable data) then successful research will be key. Obviously, no data visualization can be produced without valid datasets. Also, no graphic needs to be created if the entire content can be outlined in one sentence. The opposite case holds true respecting the telling of a story: when so much data can be conveyed there are multiple story-paths, in this case there will be enough “material” for several graphics.

The most important questions after data analysis are: do the results make a special or unexpected statement? If the data was analyzed because of a thesis: was it proven true or false? Would a graphic offer any additional value? Finally, a cost evaluation needs to be made to assure the amounts of the invested resources corresponds to the benefits.

We want to induce an aha moment in as many readers as possible. Interestingly, this aha moment does not necessarily arise through a point envisaged by the editor, instead it is “uncovered” through our explorations with the graphical explanations. Incidentally, it does not even have to be interactive to be revealed. Giving the readers a chance to discover something by themselves will ideally effect a better learning outcome, and leads to a subconsciously stronger esteem of the medium they behold.

These are some other barriers that have to be considered respecting graphics targeted to any given data. These thresholds of whether to go forward arise for every project and they always vary somewhat. It may be the case that data acquisition—be it successful or not—is so immensely difficult that we want to tell our readers about this process in form of a post in our data blog. Or, when we handle sensitive data, for example from the *Zeit Online* Briefkasten, a mailbox where anyone can upload data anonymously—we will consult our lawyer.

THE GRAPHICS CONCEPT

Volume and complexity of the data presented to our readers are deciding factors for the inclusion of an interactive component into the graphic. Even large amounts of data can oftentimes be presented with static graphics. If a data point has many dimensions that we want to show, even the real estate on our screens is limited; we have a commitment to hide as little as possible from our readers, we present the data in layers and give them an easy to use possibility to navigate through them.

The dimensions and depth of the datasets need

to be considered. How many are there? Can the omission of one or more improve readability by reducing the risk of confusing the readers? For the basic decision on what type of graphic is best suited for a specific kind of data, we use a taxonomy of design patterns. I would like to refer to Christian Behrens’ (2008) *The Form of Facts and Figures – Design Patterns for Interactive Information Visualization*,¹ as well as the digital supplement *InfoDesignPatterns.com*² (Behrens, 2008).

INFLUENCES IN THE CREATIVE PROCESS

Beside the classification in the aforementioned taxonomy of interactive graphics there are further questions that can be answered by taking a look at logically identifiable aspects. They also concern the type of graphic but mainly the visual style: we assess the target audience by considering the topic and the department the story runs in. Less serious topics can be more pictorial; factual ones should be presented more pragmatically.

Input from colleagues is indispensable. This is why there are brainstorming sessions in the initial phases as well as regular exchange with the art director. All graphical details are discussed, evolved, and adapted if necessary. Issues of technical and organizational nature arise constantly: what is the availability of tools for creating specific types of graphics? Is there enough time to learn and experiment with these tools that may be unfamiliar to us? Our intuition plays rewarding role: we let the expertise from creating earlier graphics and navigation designs slip into current projects. As well as the inspiration we collect from all the other sources we deal with and activities we engage in. Additionally, we need to address less rewarding issues, such as the integration of data with our content management system, as well as browser compatibility. Fortunately our colleagues from the technical staff are instrumental in these issues of compatibility and integration.

INTERACTIVITY AND NAVIGATION

Visualizations of large datasets may offer the possibility of sorting the data points so the readers can orient themselves better. Also very helpful are filters with which one can hide and unhide parts of the dataset. Alternatively, or additionally, the navigation can offer the option to highlight subsets or single data points. Please refer to the unemployment graphic as an example of where these kinds of mechanisms were used.

Some readers will feel uncomfortable if the operation of the graphic claims so much attention that they cannot concentrate on the content. Effects like animations and transitions should only be used where they have a meaning

and support readability.

Frustration induced by visualizations that are rendered on mobile devices that have restricted interactivity (for technical restrictions or incorrectly sized interface elements) is understandable. Layouts that effectively work at all resolutions: on desktop devices, tablets, and smartphones will continue to challenge all visual designers.

The complexity of the graphic and its navigation can be reduced by consolidating parts of the data that are less relevant for the story, or by distinguishing them optically. Ostensibly irrelevant information can be omitted under certain circumstances. This way, the readers' cognitive load is kept in a tolerable range.

We offer buttons for sharing the graphic on major social media platforms. But when readers can customize an interactive graphic by entering bits of personal data, the motivation to share it with friends is even greater. This works best if deeplinking is implemented into the graphic's functionality so that readers can show personalized results or highlight out specific parts of the data.

INNOVATION

An urgent matter that arises particularly in relation with innovation is: are the chosen visual means understandable? Infographics artists continually advance new ways or

modified styles to represent special data best.

For the unemployment visualization (FIGURE 6), for example, we introduced rows of small colored boxes. They are reasonably self-explanatory. One draft used *horizon charts*¹ that proved to be ideal for presenting the deviation from the German average. As we realized that this visual style was largely unknown, we refrained from implementing it. This decision is accounted for by the already quite comprehensive navigation. Having the readers learn how to understand new visual styles is only reasonable if the handling is really easy or if it is a static graphic.

In most cases it is simply better to go back to learned or self-explanatory styles. Innovative storytelling can get along without novel means. Nevertheless, the common "vocabulary" of visual styles is being extended on the side of the readership; line, bar and pie charts are not the lowest common denominator any more. Interactive users are continually gaining capabilities to work with more innovative renderings.

TAKE THE TOUR

In order to explain and convey complex visualizations and navigations one may want to offer a tour right at the start of the graphic. This can be accomplished through a series of small popups hovering (FIGURE 7)

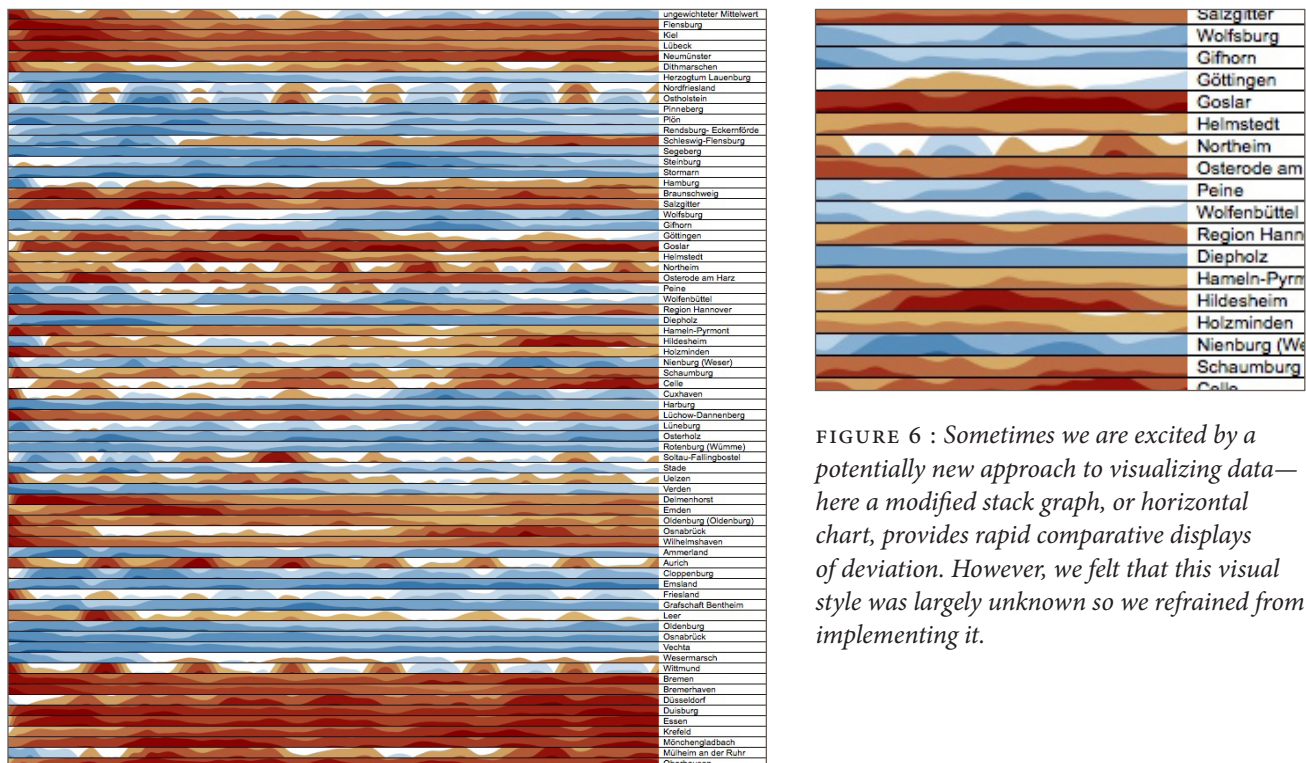


FIGURE 6 : Sometimes we are excited by a potentially new approach to visualizing data—here a modified stack graph, or horizontal chart, provides rapid comparative displays of deviation. However, we felt that this visual style was largely unknown so we refrained from implementing it.

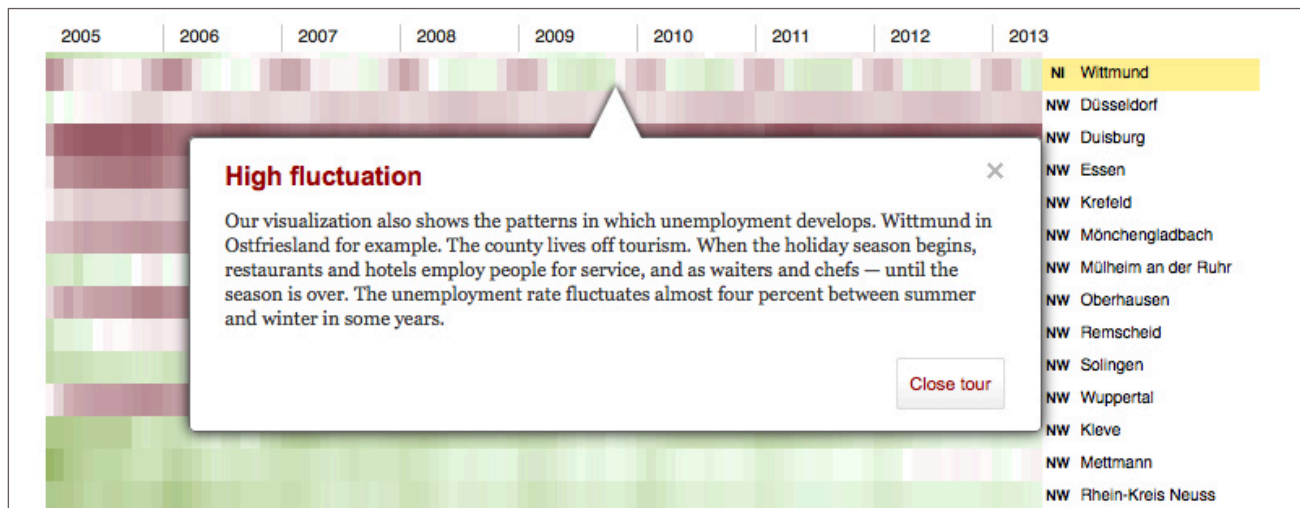


FIGURE 7: What we call, a “tour” is used to orient a user to a graphical display—these are particularly valuable for interactive displays and supplement the key. A tour may be required in order allow conveyance of complex visualizations where appropriate navigations equips the reader with the knowledge they need for exploring the data insightfully.

in front of it. With the click on the “next” button they are presented step by step; something every computer user knows.

We developed a couple of rules during the conception of our unemployment rate graphic, which would also be valid for future applications. The number of steps should be limited to about eight. During the tour, the reader should be informed about the number of steps he already made and how many lie ahead. The option to close the tour or restart it should be given at any time. We feel this is good sequence:

First part, one step: short introduction to the content of the graphic and the prompt to close or continue the tour.

Second part, two steps maximum: explanation of the graphic elements’ basic layout.

Third part, three steps maximum: how the interaction works, with examples.

Fourth part, three steps maximum: examples of notable data points and stories behind them.

With this tour, the readers are equipped with the knowledge they need for exploring the data by themselves via the navigation. Additionally they have learned (in part four) how to interpret indicators of data points. Thus

it should be easy for them to spot other features in the presented data and match them with the stories learned. An alternate approach to explaining interactive graphics and navigation is to provide a static layer that can be superimposed on the graphic via a simple toggle or control—it is felt, however, that this does not work as well as the stepwise tour.

COMMUNITY FEEDBACK

With all our data journalistic projects we offer the readers access to the raw data that we used to create the graphics. Observant and engaged readers can send us constructive criticism this way. For example: after publishing the interactive about life expectancy an expert in demographics realized that we made a mistake by mentioning the wrong scenario with which the future age groups are calculated. This was fixed quickly by correcting the text and adding a footnote. We also decided to point out our mistake in another footnote, and explain the prognosis variants more thoroughly. There is exchange between members of the community of data visualizers about our finished graphics. It is mostly about the choice of visual styles. Here, we often find confirmation of our work as well as criticism.

CONCLUSION

At *Zeit Online*, we see data driven journalism not as a temporary fashion but as a steady feature of our journalistic work. The innovation character of this field and play through instinct, and trial and error, leads us to experiment

with many visualization techniques. We constantly try to find tools that are easy to use so that every editor in our office could make his or her own charts or maps and embed them directly through the content management system. The aim of this objective is to free up time and resources for the work of the data journalism team expanding our opportunities for the creation of even more sophisticated data visualizations.

Zeit Online regularly hosts events like Hacks&Hackers where journalists and coders meet to present and talk about their current projects and ideas. In June 2013, a Hackathon organized by the Global Editors Network took place at *Zeit Online*. Our team also participates in such events in other locations. We seek international connections and believe that this is a good networking strategy.

Through the constant development of our tools and skills, our discussions, and analysis of results, we seek innovative ways of storytelling. This allows us to further our goal: to deliver beautiful, exceptional, true, and interesting content.

BIOGRAPHY

Paul Blickle graduated from the *University of Applied Sciences Augsburg*, Germany. Since 2009 he lives in Berlin, where he first was employed at *Golden Section Graphics* as Infographics Editor and Art Director of the *In Graphics* magazine. He works at *Zeit Online* since 2011 where he runs data visualization projects.

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NOTES

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3 Jeffrey Heer, Nicholas Kong, and Maneesh Agrawala, "Sizing the Horizon: The Effects of Chart Size and Layering on the Graphical Perception of Time Series Visualizations" (2009), <http://vis.berkeley.edu/papers/horizon/>