Visualizing Data for Exploration and Explanation

IEEE Swiss Conference on Data Science

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Interactive Things
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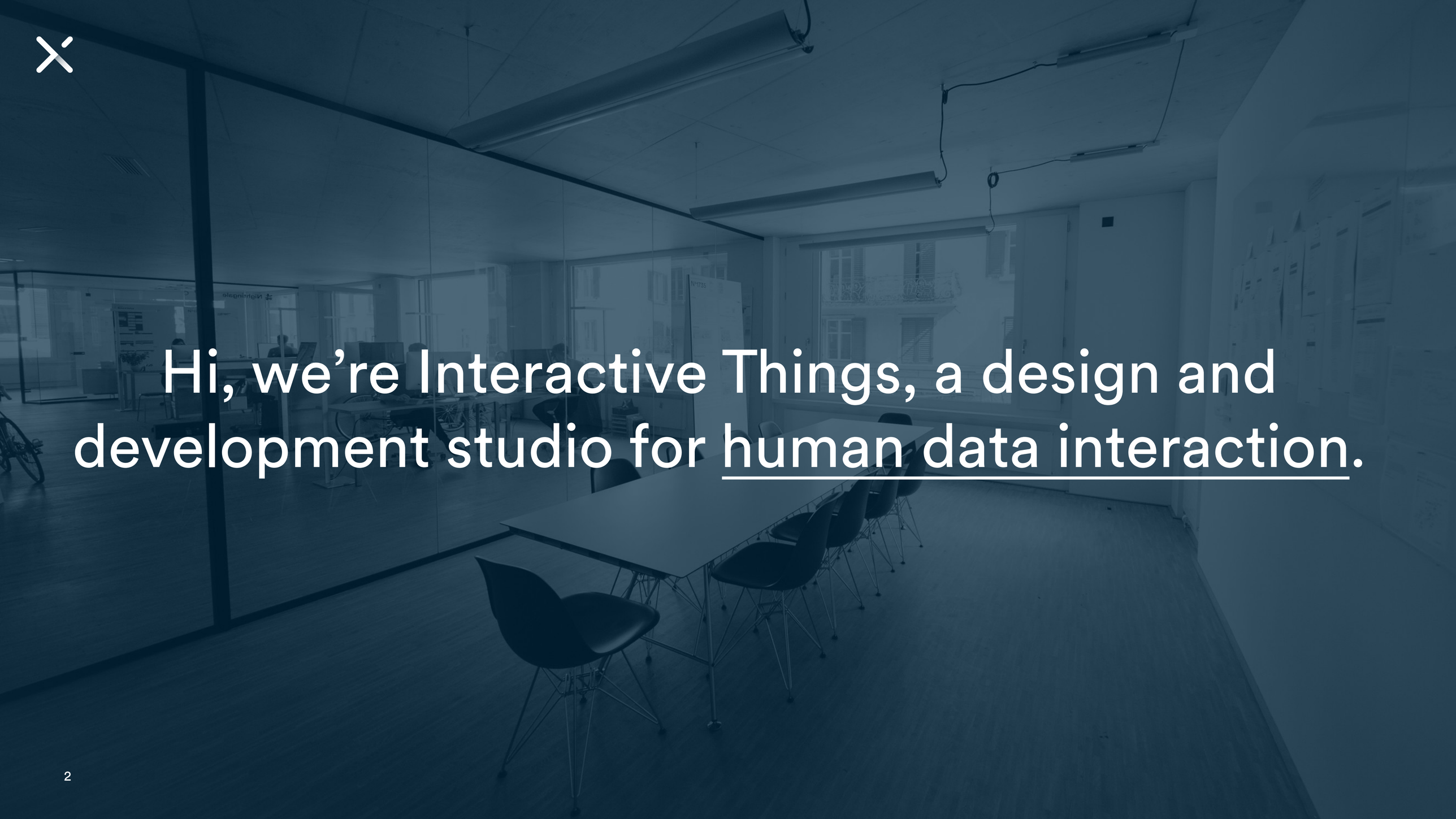


Hi, we’re Interactive Things, a design and development studio for human data interaction.

Three Jobs of Data Visualization

Helping people to find, understand, and share insights in data.

Exploration

We help organizations to search for significant facts within their data sources to discover meaningful insights.

Evaluation

We help organizations to examine and make sense of data to develop a better understanding of their business.

Explanation

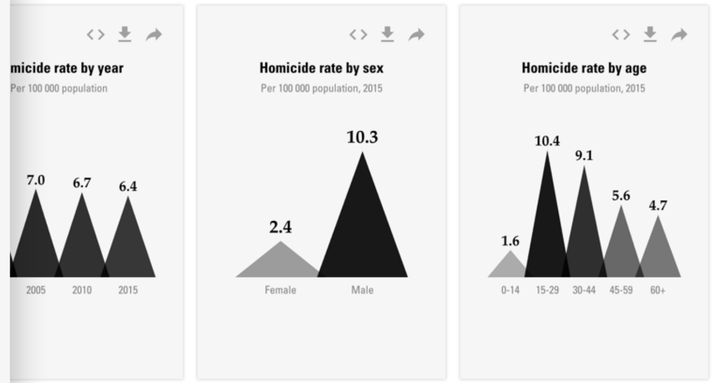
We help organizations to convey relevant insights to others to raise comprehension, awareness, and engagement.

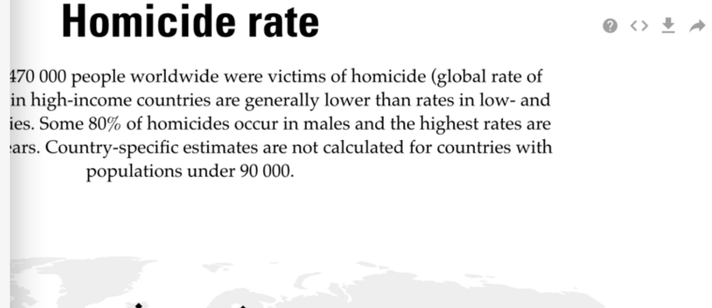
Few S — Why Do We Visualize Quantitative Data? (2014)

Violence Info

Global knowledge platform about violence prevention.

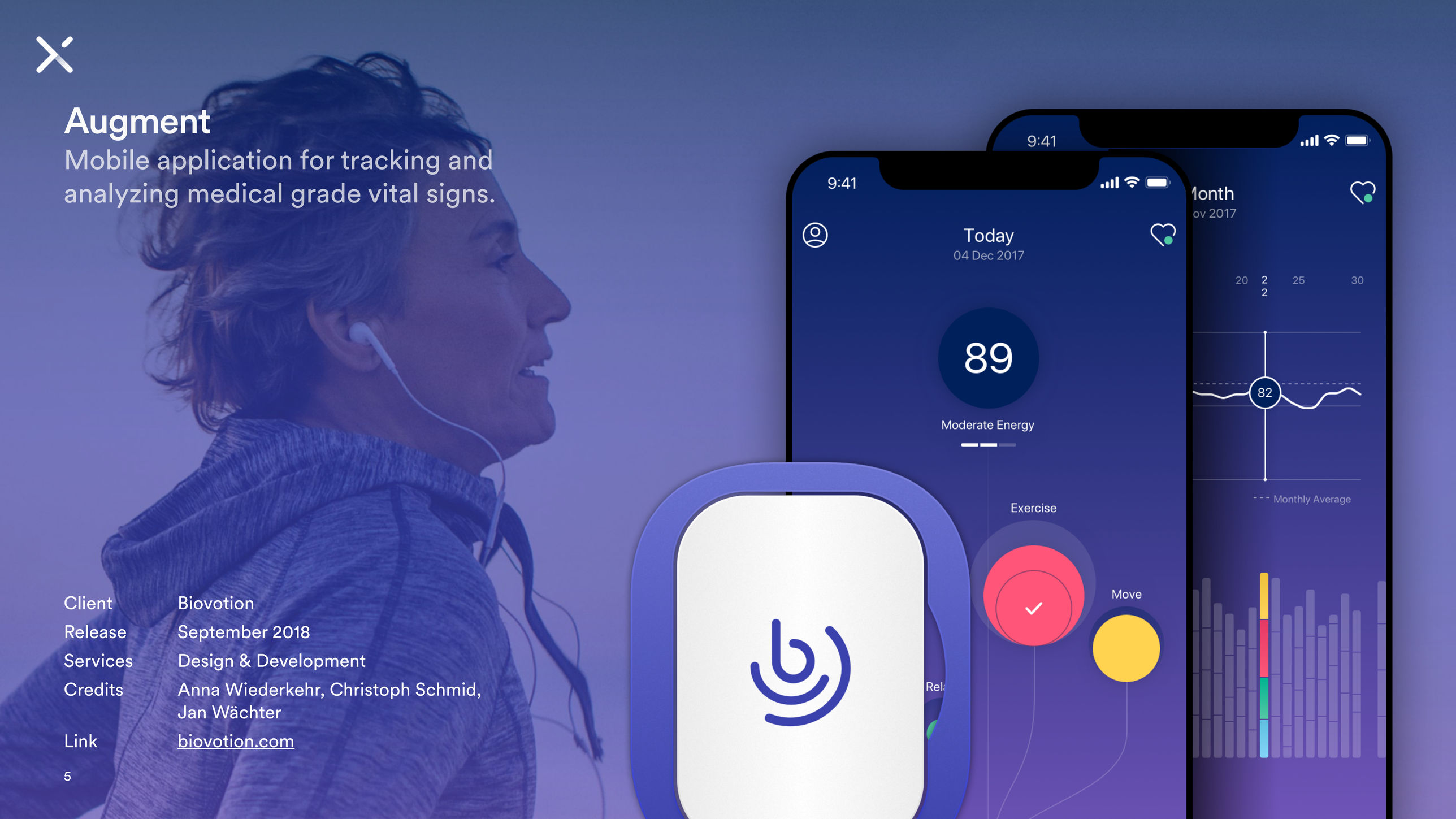
Client	World Health Organisation
Release	October 2017
Services	Design & Development
Credits	Gerhard Bliedung, Tomas Carnecky, Peter Gassner, Luc Guillemot, Ece Kavlak, Kallirroi Retzepi, Christian Siegrist
Link	apps.who.int/violence-info





Augment

Mobile application for tracking and analyzing medical grade vital signs.



Client	Biovotion
Release	September 2018
Services	Design & Development
Credits	Anna Wiederkehr, Christoph Schmid, Jan Wächter
Link	biovotion.com

20 Years, 20 Titles

Data story about the career of the legendary Swiss tennis player Roger Federer.

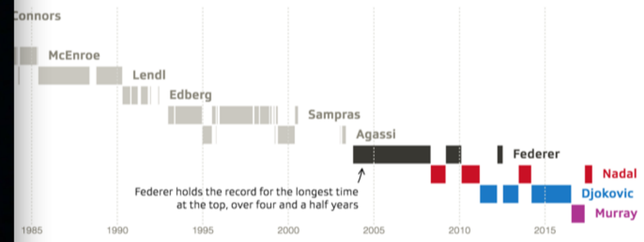
2004–2010

The most powerful five years of all time in tennis

off. 2004 was one of his best years. Out of 74 matches, he lost
ournaments he played in he won eleven, including three Grand
as first in the world was indisputable.

world

N°1 of the ATP ranking

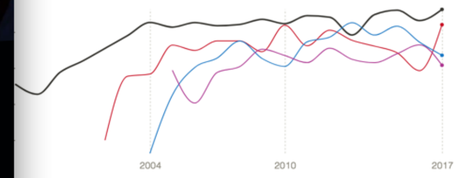


weapons was always his serve. The figures show: of the
the "Big Four" – Roger Federer, Rafael Nadal, Novak Djokovic
ederer has far and away the most reliable serve. He wins over
vice games. Every tenth serve is an ace.

2008 Federer won just about everything there was to win.
t was nearly always against his arch-rival: the Spaniard Rafael
l was already close behind Federer and remained a full 160
three years, right behind him.

vice games won in %

rer, Nadal, Djokovic, Murray



dominated the sport. Federer won four Grand Slam titles in

Client	SRG SSR
Release	January 2018
Services	Design & Development
Credits	Tania Boa, Luc Guillemot, Angelo Zehr (SRG SSR)
Link	srf.ch/static/srf-data/data/2018/

Exploratory
Information Needs

User-Driven
Nonlinear Ordering
Limited Messaging
Open interactivity

Types of Visualizations

Explanatory
Communication Goals

Author-Driven
Linear Ordering
Heavy Messaging
Limited Interactivity

Heer J, Segel E — Narrative Visualization (2010)

Education Inequalities

Exploratory

education-inequalities.org

Global Education Monitoring Report

Home Indicators Countries Popular About

Primary completion rate

Export Share

Percentage of (i) children and young people aged 3-5 years above primary school graduation age and (ii) young people aged 15-24 years, who have completed primary school.

Hide Help

Most deprived group National average Most privileged group

Sub-Saharan Africa 0% 100%
Southern Asia 0% 100%
Northern Africa and Western Asia 0% 100%
Latin America and the Caribbean 0% 100%
Eastern and South-Eastern Asia 0% 100%
Europe and Northern America 0% 100%

Low income countries 0% 100%
Lower middle income countries 0% 100%
Upper middle income countries 0% 100%

Somalia, MICS, 2006 0% 100%
Niger, DHS, 2012 0% 100%
Rwanda, DHS, 2010 0% 100%
Guinea-Bissau, MICS, 2006 0% 100%
Burkina Faso, DHS, 2010 0% 100%
Chad, MICS, 2010 0% 100%
Burundi, DHS, 2010 0% 100%
Mozambique, DHS, 2011 0% 100%
Madagascar, DHS, 2008 0% 100%
Uganda, DHS, 2011 0% 100%
Central African Republic, MICS, 2010 0% 100%
Afghanistan, MICS, 2010 0% 100%
Malawi, MICS, 2013 0% 100%
Mali, DHS, 2012 0% 100%
Guinea, DHS, 2012 0% 100%
Ethiopia, DHS, 2011 0% 100%
South Sudan, MICS, 2010 0% 100%
Mauritania, MICS, 2011 0% 100%
Côte d'Ivoire, DHS, 2011 0% 100%
Senegal, DHS, 2014 0% 100%
Liberia, DHS, 2013 0% 100%
Benin, DHS, 2011 0% 100%
Togo, DHS, 2013 0% 100%
Timor-Leste, DHS, 2009 0% 100%

Sort by
- Most deprived
- Absolute disparity
- Relative disparity

Age Group
- Primary graduation age
- 15–24

Disparities
- All
- Gender
- Location
- Region
- Wealth
- Ethnicity
- Religion

Options
- Share of population

Regional groups
- All
- Caucasus and Central As
- Eastern and South-Easte
- Europe and Northern Ar
- Latin America and the C
- Northern Africa and We
- Southern Asia
- Sub-Saharan Africa

Income groups
- All
- High income countries
- Upper middle income cc
- Lower middle income cc
- Low income countries

Unwanted

Explanatory

lab.interactivethings.com/unwanted

unwanted

The ongoing war against daughters in India

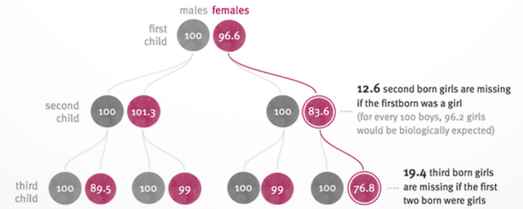
629'000 girls (aged 0–6 years) are estimated to be missing in India every year.
The majority of them are aborted, others are killed, abandoned or neglected to death just because they are girls. The roots of this problem lie in a strong patriarchal society that has translated into an obsessive preference for sons and discrimination against girls.

This is an analysis of the problem from the inside, a research of reasons and related factors to draw a picture of the foeticide and infanticide in India.

> ***"We accept the first girl, the second should be killed, then the third will be a son.***
>
> *— Rassamal, a traditional healer. She gives advices how to kill unwanted children [1]*

NO MORE YOUNGER SISTERS

The first girl is usually allowed to live. Also for girls born following a boy the biological ratio (on average 96.2 girls per 100 boys) is respected. But in families with a firstborn daughter, a second girl has less chances of being born, a third girl even less. [2]

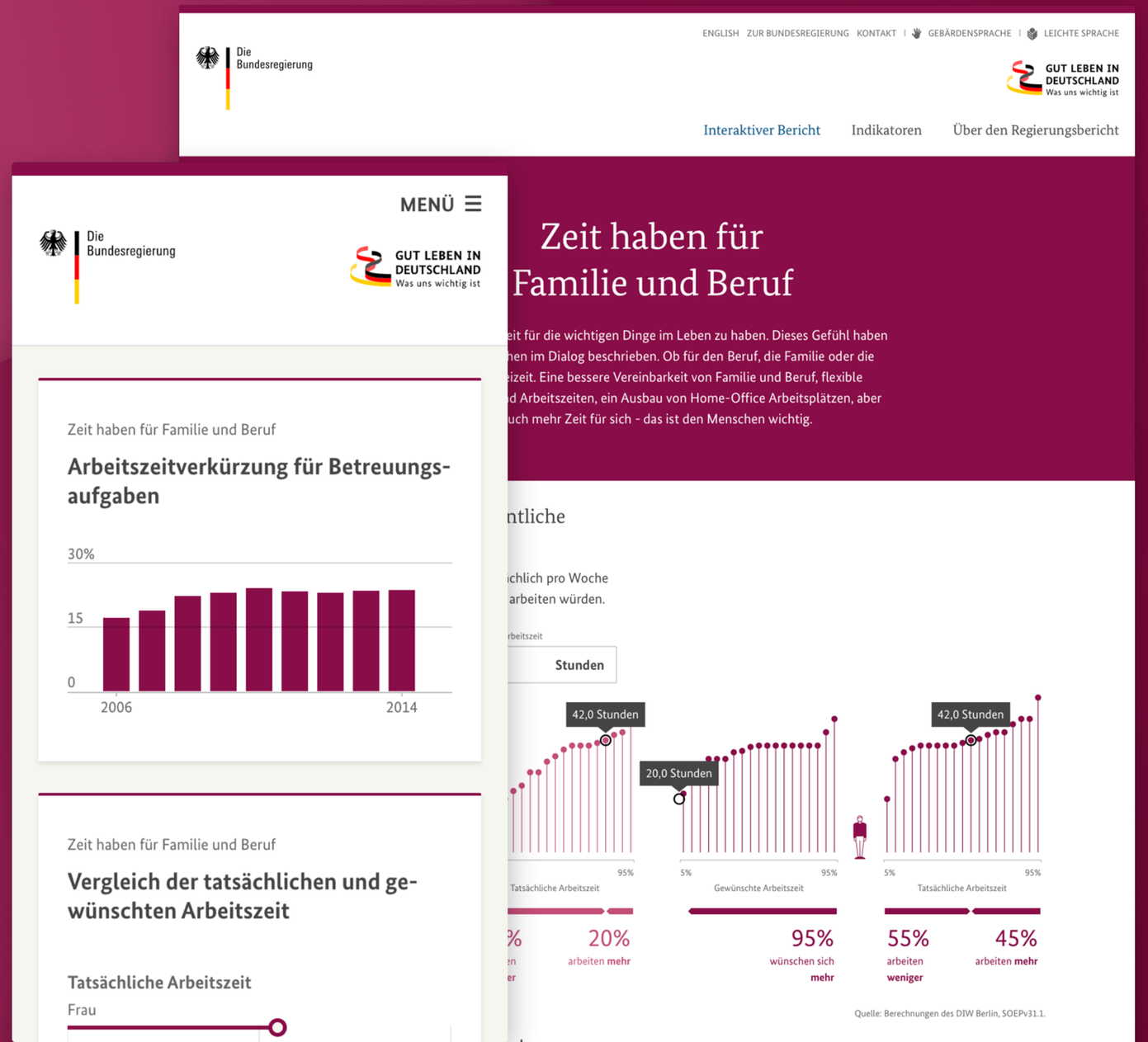


Explanation

How to provide guidance and reveal insights.

Wellbeing in Germany

Data report and indicator dashboard on the wellbeing of German citizens.



Client	German Government
Release	October 2016
Services	Design & Development
Credits	Benjamin Wiederkehr, Christoph Schmid, Ece Kavlak, Jeremy Stucki, Tania Boa, Thomas Preusse, Tomas Carnecky
Link	gut-leben-in-deutschland.de

Explanation: Provide guidance and reveal insights.

The structure of a narrative provides your audience with the necessary guidance to understand context and allows you as the author to gradually reveal insights.

Exploration

How to encorage inspection and validation.

Going Digital Toolkit

Data platform on the state and progress of digital transformation of governments worldwide.

Client	OECD
Release	March 2019
Services	Design & Development
Credits	Christoph Schmid, Luc Guillemot, Tomas Carnecky, Solange Vogt, Jeremy Stucki, Flore de Crombrugghe
Link	goingdigital.oecd.org

Exploration: Encourage inspection and validation.

The ability to independently inspect the visualization and validate the insights will empower the audience to ask questions, find answers, and draw conclusions.

Exploratory
Information Needs

Invite participation
Enable question asking
Promote fact finding

Spectrum of Visualizations

Explanatory
Communication Goals

Guide the user
Steer the conversation
Define the message

Exploratory and Explanatory Data Visualization

Guidelines for balancing user-driven and author-driven characteristics.

Exploratory

The ability to independently inspect the visualization and validate the insights will empower the audience to ask questions, find answers, and draw conclusions.

Attributes

- Nonlinear Ordering
- Limited Messaging
- Open interactivity

Benefits

- Invite participation
- Enable question asking
- Promote fact finding

Example

Going Digital Toolkit by OECD

Explanatory

The structure of a narrative provides your audience with the necessary guidance to understand context and allows you as the author to gradually reveal insights.

Attributes

- Linear Ordering
- Heavy Messaging
- Limited Interactivity

Benefits

- Guide the user
- Steer the conversation
- Define the message

Example

Wellbeing in Germany by German Government

References

- Heer J, Segel E — Narrative Visualization (2010)
- Hullman J, Diakoloulos N — Visualization Rhetoric (2011)
- Henry Riche N, Hurter C, Diakopoulos N, Carpendale S — Data-Driven Storytelling (2018)

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Many Thanks!

Don’t hesitate to get in touch.

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