



ELECTRONIC PUBLISHING  
AND DIGITAL STORYTELLING

Lesson 8

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# DIGITAL STORYTELLING

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Build the narrative of data  
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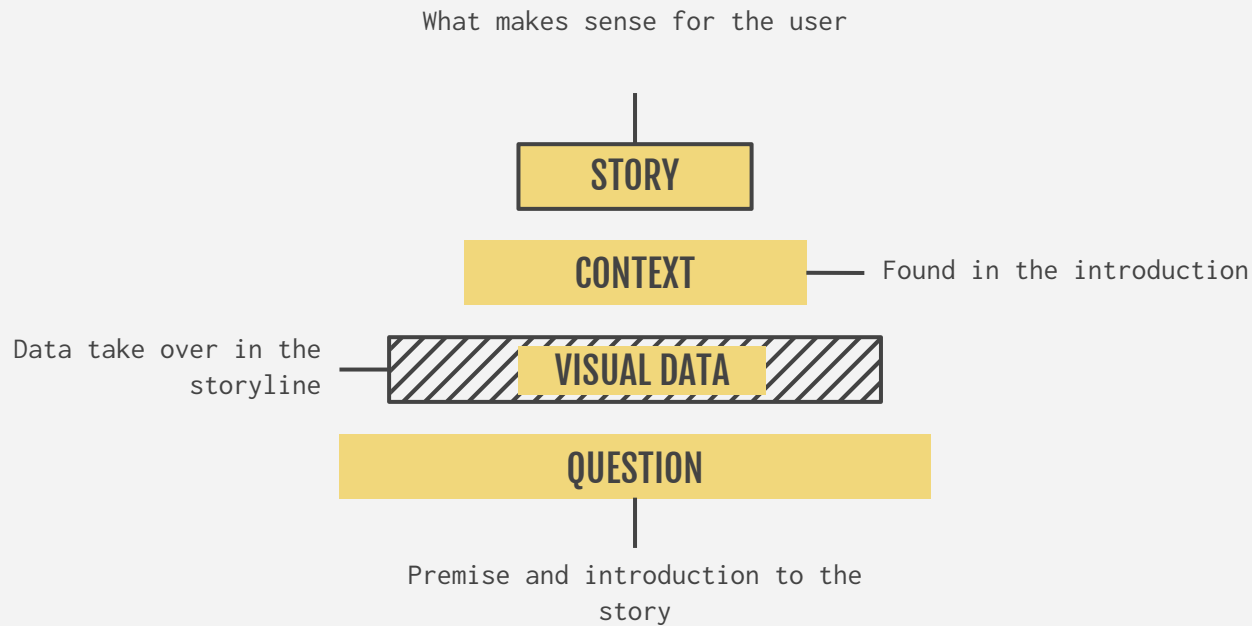


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# DIGITAL STORYTELLING

# STORYTELLING ASPECTS



# THE QUESTION

**Preliminary question(s)** are useful at the beginning when acquiring and filtering data.

The **final question** is often the result of several attempts, and might not be clear at the beginning.



# THE QUESTION

A question must be **data-centric**, meaning it should start with terms like **where, when, how much, how often**.

N.B. It is very difficult that visualisations alone can answer questions that start with **why** (which is domain of data analysis).



# THE QUESTION

## REMEMBER!

Data are abstractions of  
real-world entities.

When creating, selecting,  
manipulating data that are  
relevant to the question we  
are making choices, hence **the  
answer is never an objective  
description of the world.**



# THE QUESTION

## REMEMBER!

Data analysis is **instrumental**, it's not the final objective. You analyse data to highlight information and let users **make actions** on the basis of results.





## THE STARTER KIT: THE CONTEXT

Identify the type of analysis, whether you are trying to understand something (**exploratory**) or you are presenting something (**explanatory**).

### DISCLAIMER

While you have to perform some exploratory analyses in your Jupyter notebook, in your web project you are focusing on **explanatory visualizations**.

# THE STARTER KIT: AUDIENCE

Identify the audience:

**WHO is the audience?**

What do they care about?

**Narrow the audience** for the purpose of communicating effectively.

Common UI/UX design strategies include the definition of **personas** and **user journeys**

N/N group guidelines

<https://www.nngroup.com/articles/persona/>

<https://www.nngroup.com/articles/journey-mapping-101/>

## THE STARTER KIT: IDEA

**HOW** data you show will help you to make your point and will encourage users to make the action?

Identify in your data what is the **evidence** for proving your point.

Identify the “**so what?**” of your project. Summarise in a sentence your point of view + the message.

Write a **three minute story**.

## THE STARTER KIT: ACTION

Outline possible actions:

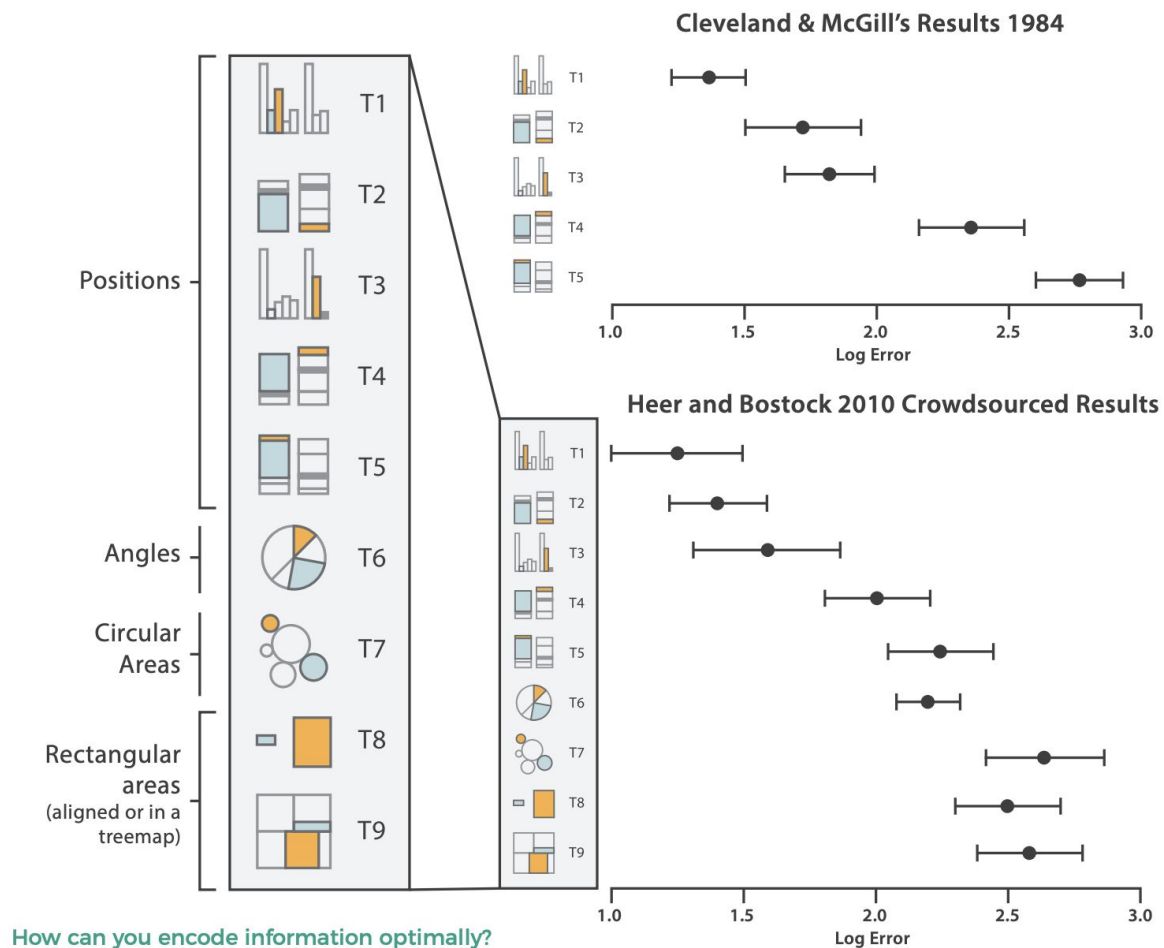
**WHAT** do you want users to do  
with the information you  
provide?

# VISUAL DATA

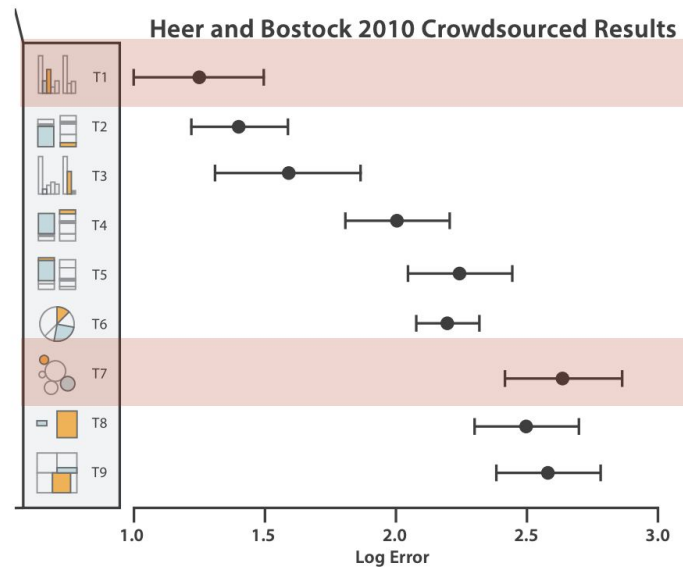
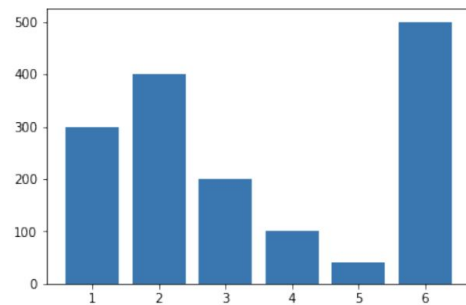
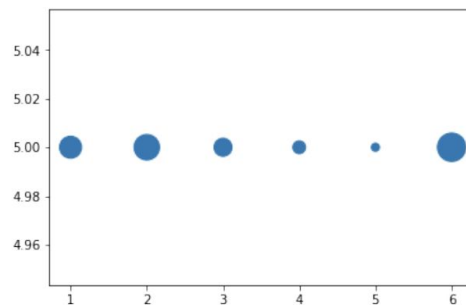
**WHAT** is the most effective way to convey the idea to your audience, given a certain context?

Start from data in a table and make it better

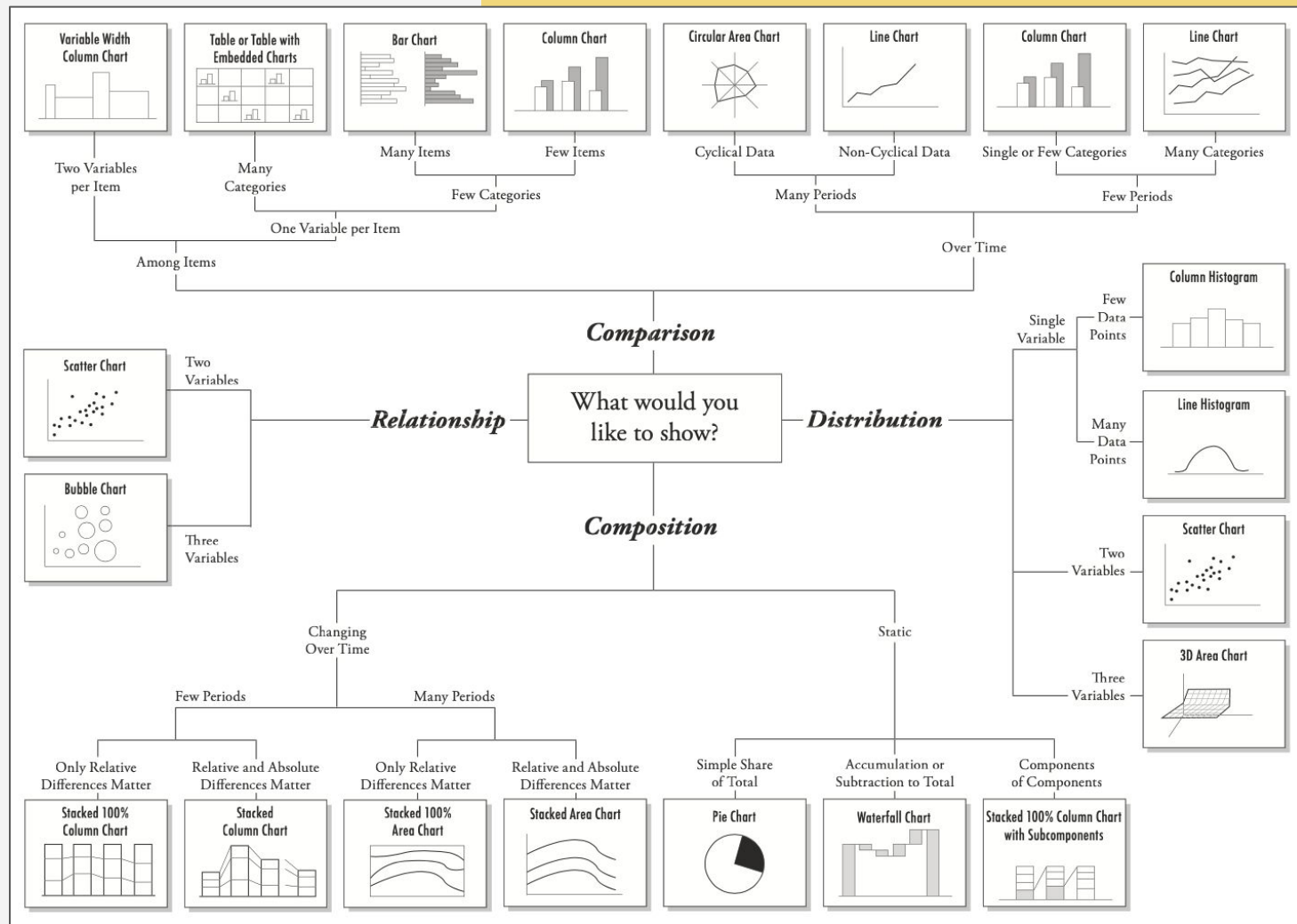
# PICK THE OPTIMAL VISUALISATION



# REDUCE THE ERROR IN INTERPRETATION



# REMEMBER THE DECISION TABLE?





# USE GESTALT PRINCIPLE TO REDUCE THE COGNITIVE LOAD

When creating a story, we first need to understand what are **similarities** and **differences between visual aspects** that we are going use.

When two objects are placed next to each other, a user perceives those as part of the same group. When they are far from each other, those are perceived as different types of information.

A. Law of Closure



B. Law of Similarity



C. Law of Proximity



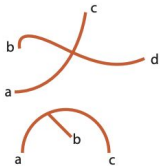
D. Law of Connectedness



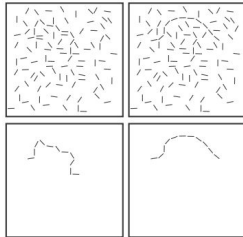
E. Law of Symmetry



F. Law of Good Continuation



G. Contour Saliency



H. Law of Common Fate



I. Law of Past Experience



J. Law of Pragnanz



K. Figure/Ground



# MAPPING SHAPES TO SEMANTICS

## Graphical Code

## Semantics

Small shapes defined by closed contour, texture, color.



Object, idea, entity, node.

Spatially ordered graphical objects.



Related information or a sequence. In a sequence the left-to-right ordering convention is borrowed from written language (English, French, etc.).

Graphical objects in proximity



Similar concepts

Graphical objects having the same shape color, or texture.



Similar concepts

Size, position or height of graphical object



Size, quantity, importance, 2D location

Shapes connected by contour



Related entities, path between entities.

Thickness of connecting contour



Strength of relationship.

Color and texture of connecting contour



Type of relationship.

Shapes enclosed by a contour, a common texture or color



Contained/related entities.

Nested/partitioned regions



Hierarchical concepts.

Attached shapes



Parts of a conceptual structure.

# REHEARSE: VISUAL ASPECTS PRIORITY

## Quantitative validated

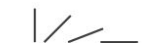
Cleveland and McGill, 1983  
Heer and Bostock, 2010  
MacKinley, 1986



position (2D)



length (1D size)



angle



area (2D size)



volume (3D size)



texture density



color saturation



color hue



texture pattern



connection



containment



shape

## Ordinal not validated

MacKinley, 1986

position (2D)

texture density

color saturation

color hue

texture pattern

connection

containment

length (1D size)

angle

area (2D size)

volume (3D size)

shape

## Categorical not validated

MacKinley, 1986

position (2D)

color hue

texture pattern

connection

containment

texture density

color saturation

shape

length (1D size)

angle

area (2D size)

volume (3D size)

Suitability of Channel

## CHOOSE IN AN INFORMED WAY!

Look what is suggested in chart catalogues

Data visualisation catalogue

<https://datavizcatalogue.com/index.html>

Visme

<https://visme.co/blog/types-of-graphs/>

Chart maker matrix

<https://chartmaker.visualisingdata.com/>

PolicyViz

<https://policyviz.com/books/better-data-visualizations/policyviz-data-visualization-catalog/>

## GET INSPIRED!

Learn from the best

Information is beautiful awards  
<https://informationisbeautiful.net/>

Reddit data is beautiful thread  
<https://www.reddit.com/r/dataisbeautiful/>

Tableau gallery  
<https://public.tableau.com/it-it/gallery/?tab=viz-of-the-day&type=viz-of-the-day>

## GET INSPIRED!

Learn from successful projects

Women will

<https://dataexplorer.womenwill.com/intl/en/the-divide/>

Where is Poland?

<https://whereispoland.com/en/where-is-poland/2>

Lemonade

<https://www.lemonade.com/giveback-2019>

Google and NASA

<https://showcase.withgoogle.com/nasa-fdl/>

Atlassian - time wasting at work

<https://www.atlassian.com/time-wasting-at-work-infographic>

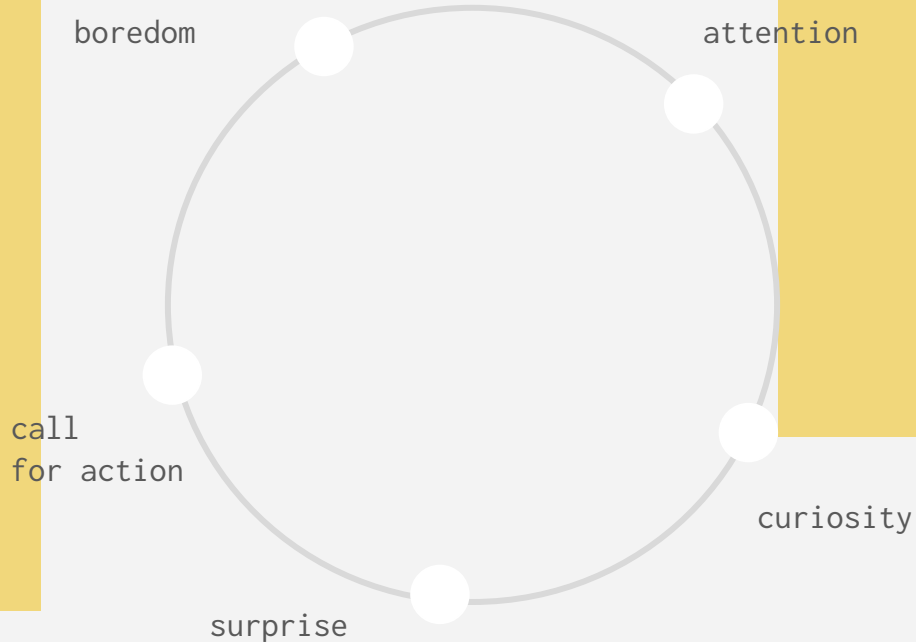
This side of rice

<http://rice.jennytypes.com/>

## THE STORY

**Facts are forgotten. Stories are memorable.** That's why we use them to convey messages effectively.

# ENGAGEMENT CIRCLE



**Entertainment** usually triggered by boredom (e.g. in waiting room, cafeteria)

**Draw attention** attract the user (e.g. give her a screen)

**Stimulate curiosity** provide introductory information

**Discovery** by visual storytelling to learn something unexpected (the *so what*)

**Recommendation** call for action (read a book or article, listen to music, watch a movie)



# THE NARRATIVE STRUCTURE

*Go back to the original idea (what is at stake?) and find the tension, to create a **climax** towards the evidence.*

*Some examples:*

**Tension:** *the data show an inconsistency*

**Action:** *devote resources to fix it, or to develop something new*

**Tension:** *given the trend, there is an expectation*

**Action:** *discuss and make strategic changes*

**Tension:** *given two or more competing phenomena, which one is more important (e.g. quality or efficiency)?*

**Action:** *collaborate with domain experts to define targets and balance the competing phenomena*

## BEGINNING

Introduce the **plot**

Build the context and introduce the tension

Explain the motivation (why should you care?)

## MIDDLE

Illustrate with examples the problem (your evidence)

Articulate what would happen if no actions are taken  
(build the **rising action** and the **climax**)

## END

Call to **action** (what to do to solve the problem)

# THE NARRATIVE FLOWS

## **Example chronological:**

*[plot] Study of problem x is strategic for user y's activity z.*

*[rising action] We surveyed / analysed data. Show examples.*

*[climax] Results show Z is doing well while Y is doing worse in X key area.*

*[falling action] It will keep going worse if nobody does anything. We looked into some solutions.*

*[ending] let's do this and that to improve the situation.*

## **Chronological**

Problem

Analyse data

Show findings

Recommend action

## **Lead with ending**

Call for action

Show multiple supporting points

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# WEB COMMUNICATION STRATEGIES

Focus the audience's attention  
and let them do as less effort  
as possible in interpreting  
charts.

# WORK ON TYPES OF MEMORY

## ICONIC

Very short-term memory that works on pre-attentive attributes

## SHORT-TERM

Focus on 4 variables at most - these move to the long term memory, the rest disappears.

## LONG TERM

The message understood. It is affected by the way the message is conveyed (e.g. a story)

## FOCUS THE EYE ATTENTION

Close your eyes and then look  
back at this slide. Where  
does the eye go?

That's where you should put  
the attractive information.  
Again, remember the Gestalt  
principles!

# FOCUS THE EYE ATTENTION

Close your eyes and then look  
back at this slide. Where  
does the eye go?

That's where you should put  
the attractive information.  
Again, remember the Gestalt  
principles!



Consider the F pattern (Nielsen).  
Break the F Pattern (use short paragraphs)

Consider readability patterns  
Do not show text lines > 40 characters.

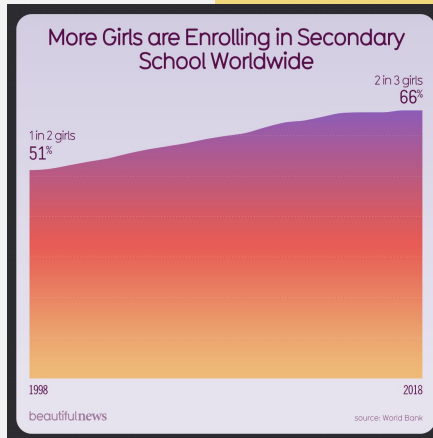
## DESIGN IT PROPERLY

Studies have proven that **titles** improve **memorability** and **recall** of information shown in graphs. Do not be descriptive, make clear in the title what the graph returns

**Point out** (e.g. with arrows, colors, font size, circles, opacity, thickness, animation) where the viewer should look at.

Use **titles** to make explicit the takeaway message.

**Label your data**, do not give things for granted.



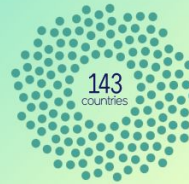
## DESIGN IT PROPERLY



### A Global 'Green New Deal' Could Eliminate 99.7% of CO2 emissions

New roadmap aims at 100% clean, renewable energy by 2050

Stanford researchers found low-cost, stable grid solutions for



with specific roadmaps for each country to transition to carbon zero

Transitioning to renewable energy could

reduce global energy needs

-57%

create more jobs than are lost



+28.6 million

reduce energy, health & climate costs

-91%

This would require

% of countries' total land



0.65% including spacing (e.g. between wind turbines)

initial investment worldwide



\$73 trillion

beautifulnews

source: One Earth (journal)

Be smart with **colors** (remember it's the fastest pre-attentive attribute) and images

Curate the **alignment** (texts, graphs, titles, labelling)

Leverage **white space** (avoid cluttered contents)



## DESIGN IT PROPERLY

The Dutch city of  
Utrecht has covered  
300 bus stops with  
plants & vegetation

supports biodiversity  
improves air quality  
captures dust  
stores rainwater

beautifulnews

source: The Independent

### EXPLAIN

Address the assumptions needed to understand the graph.

Answer possible questions in interpretation (that are not obvious).

Draw conclusions.

Articulate the benefits.

## AVOID THE “SLIDEUMENT”

When presenting live we use **slides** (less text, more catchy slogan).

When we send **documents** (e.g. via email) we include more detail.

When creating a website, avoid the imbalance between memorability and need to detail everything. You cannot satisfy both needs (attract / detail) at the same time.

***NB.** That's why we separate the analysis (jupyter) from the presentation (webpage)*

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# HANDS-ON

Based on C. Knaflik, Storytelling with data Let's practice. Wiley. 2020

## OUR GUIDING EXAMPLE

### TRENDS IN THE STUDY OF ARTISTIC PERIODS

Let's brainstorm.

In every slide I'll ask you a question related to the development of this idea and then we will see new ideas.

Answer [in this google form](#). Watch out, for every slide I'll set up a timer!

Solutions and winners will be announced during the last lecture :)



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# THANKS

Does anyone have any questions?

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[github](#)