


# Data visualization: strumenti e tecniche di rappresentazione e comunicazione dei dati



# Benvenuti

Michele Ferrara

Responsabile Visualizzazione dati e Webpublishing

ISTAT, Direzione centrale per la comunicazione, informazione e servizi ai cittadini e agli utenti

Servizio Gestione e diffusione del patrimonio informativo

# Vi parlerò **di:**

- Introduzione e buone regole da seguire
- Web tool: un esempio pratico
- I prodotti Istat: le dashboard a supporto dell'analisi dei dati statistici; grafici per dati a cadenza trimestrale e mensile





# 1° ARGOMENTO

Introduzione e buone  
regole da seguire

# *Carte Figurative* des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite. Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par les largueurs des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zones. Le rouge désigne les hommes qui entrent en Russie, le noir ceux qui en sortent. Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M. M. Chiers, de Ligny, de Fezensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre.

Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps de Prince Jérôme et du Maréchal Davoust qui avaient été détachés sur Minsk et Mohilew n'ont rejoint vers Orescha ou Witebsk, aussitôt qu'ils ont marché avec l'armée.

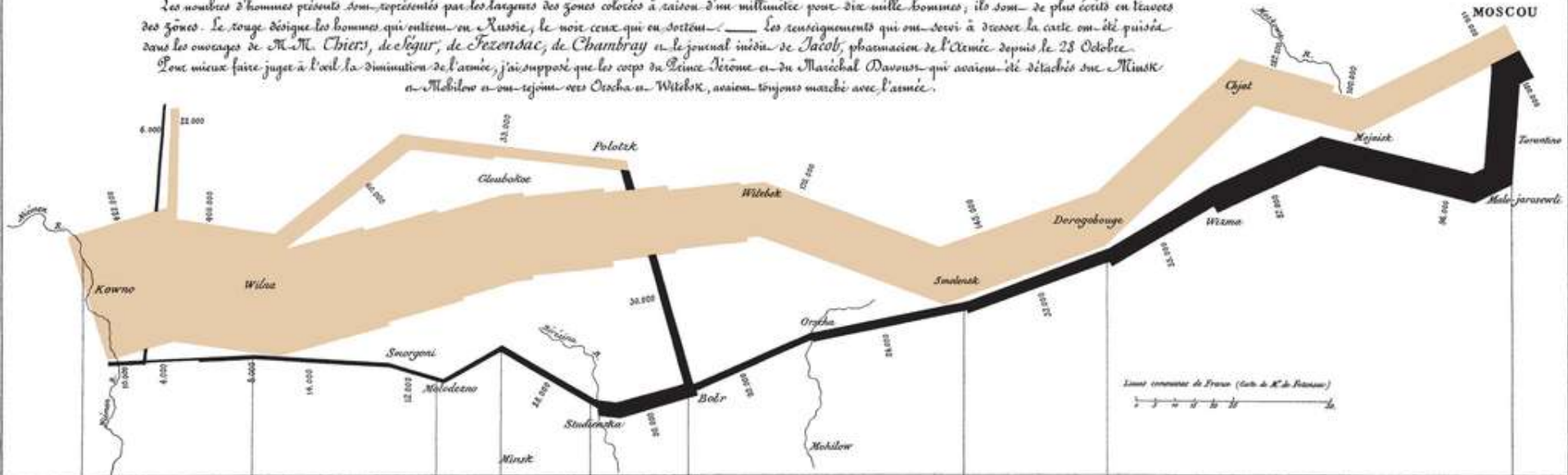
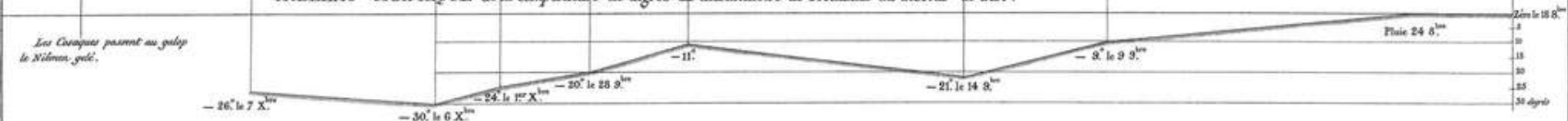
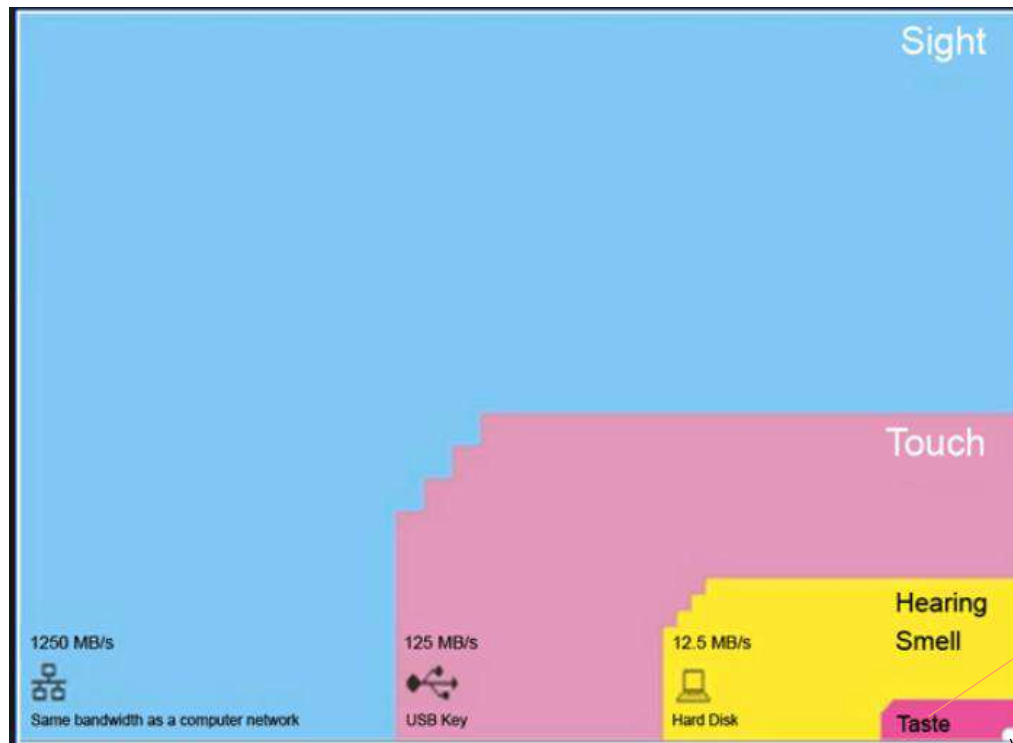


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.



**La vista** è il più veloce. Ha la stessa larghezza di banda di una rete di computer



calcolatrice tascabile

David McCandless  
Tor Nørretranders

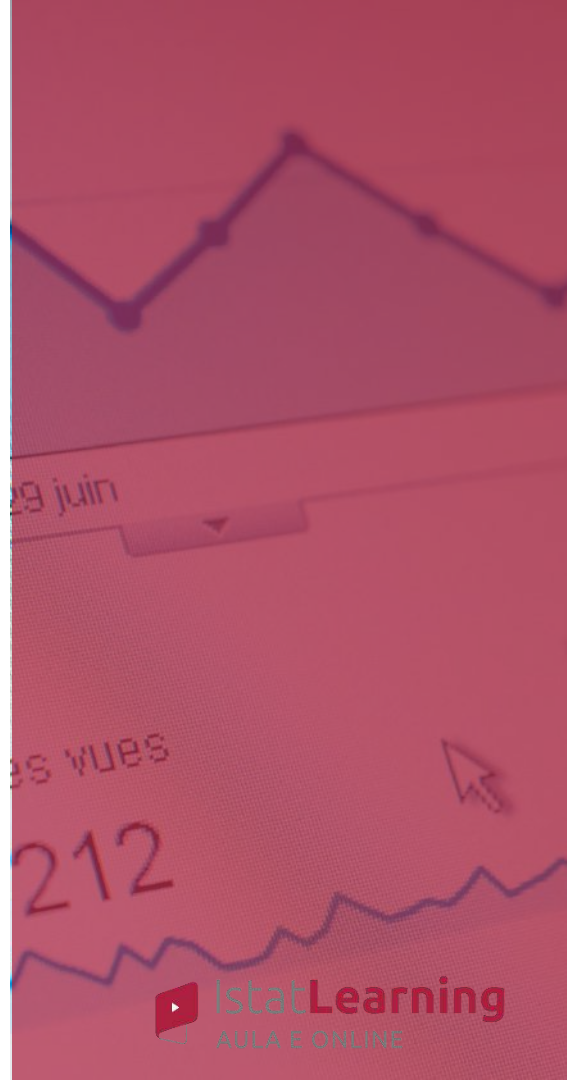
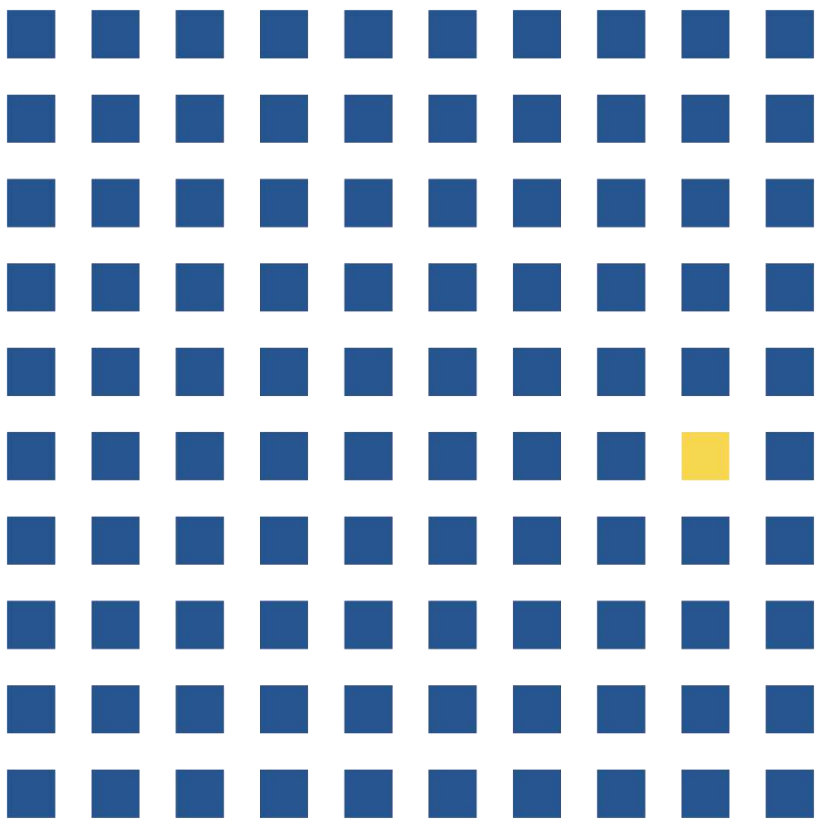
0,7 % **realmente consapevoli**

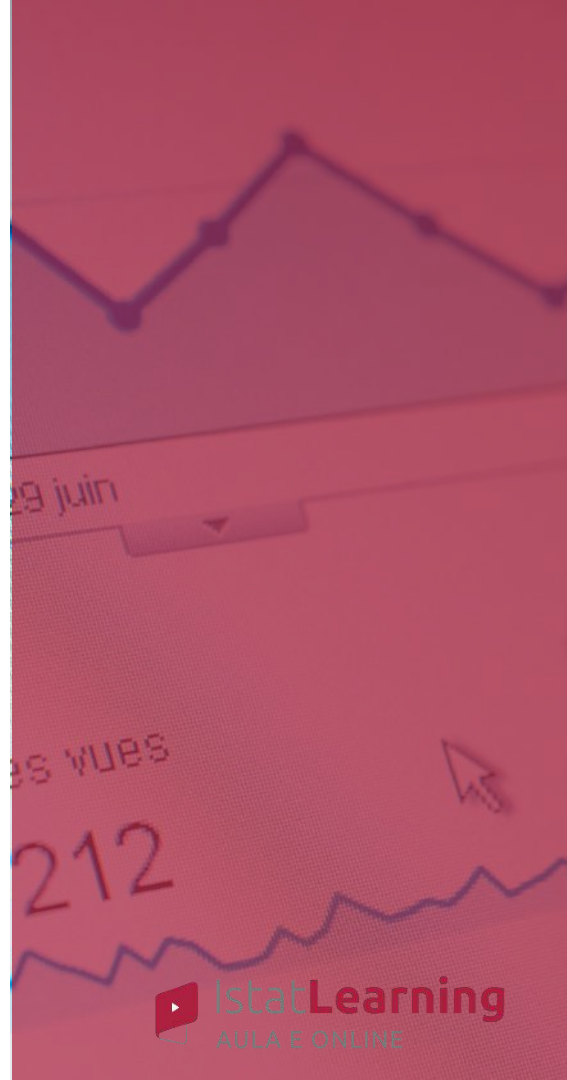
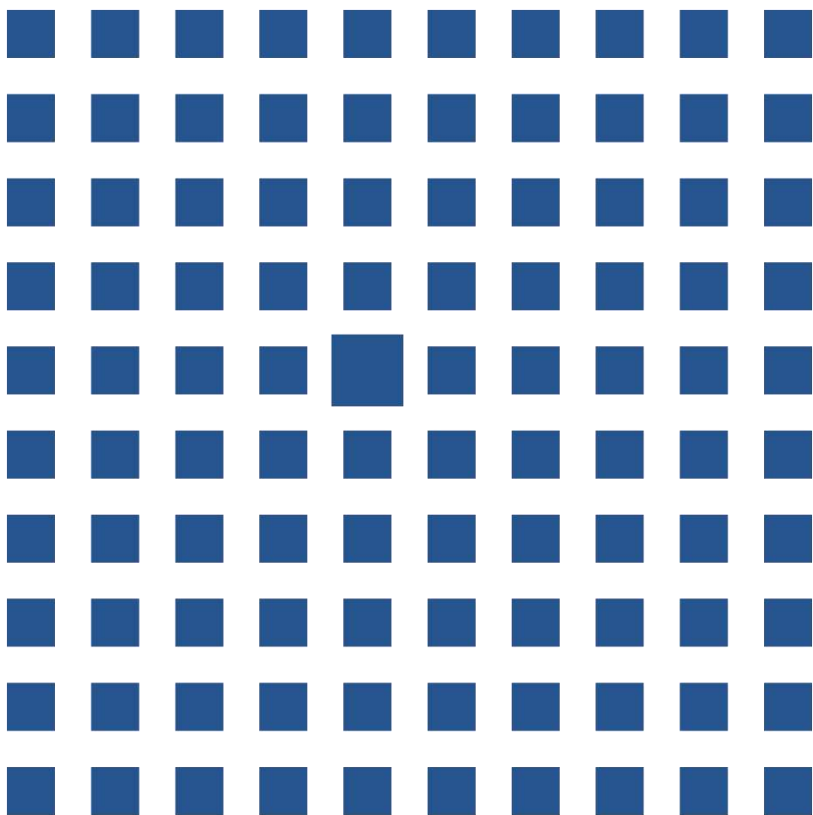


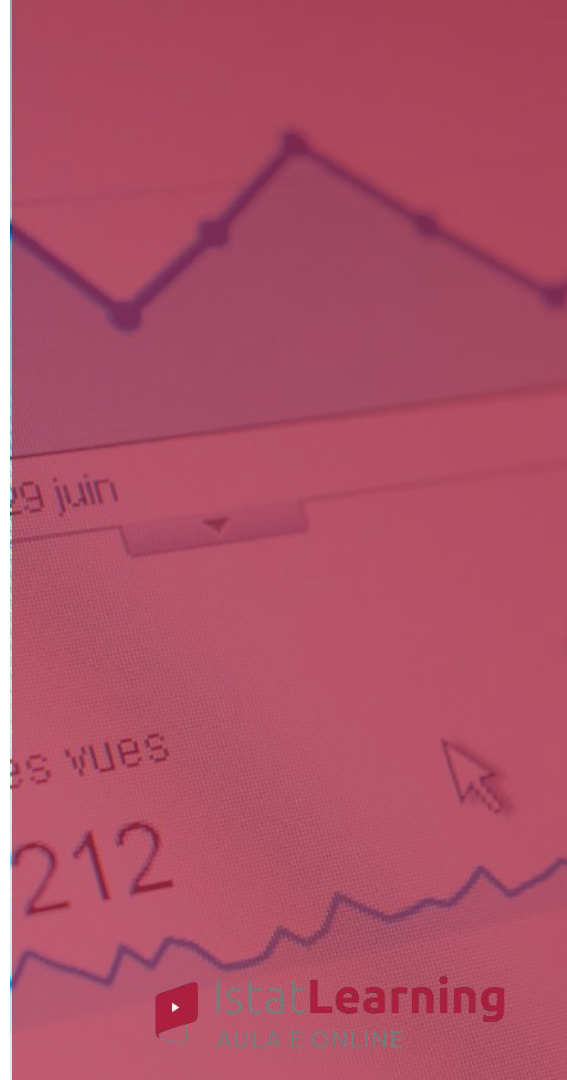
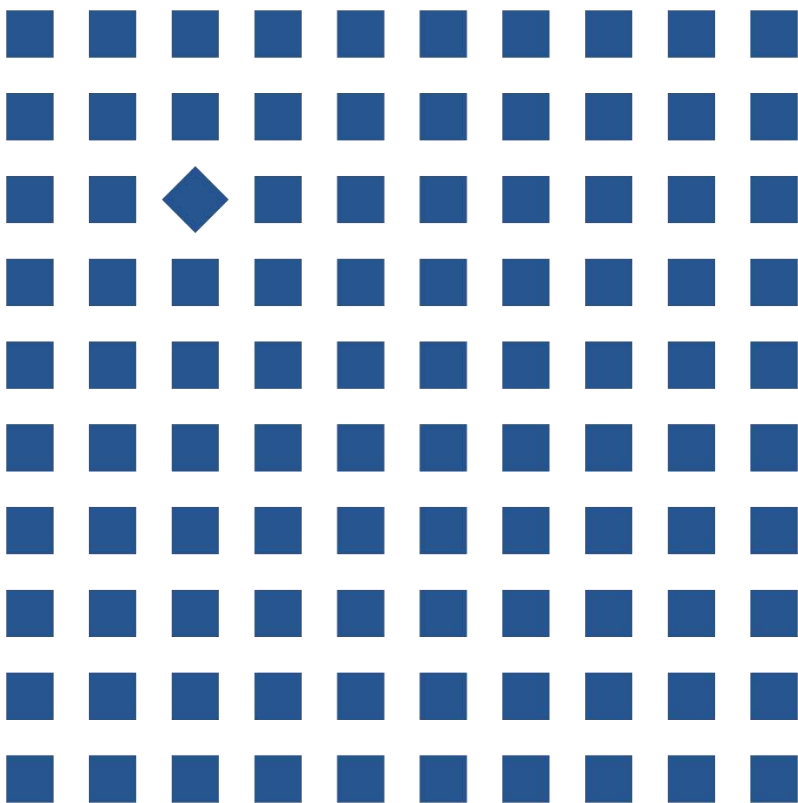
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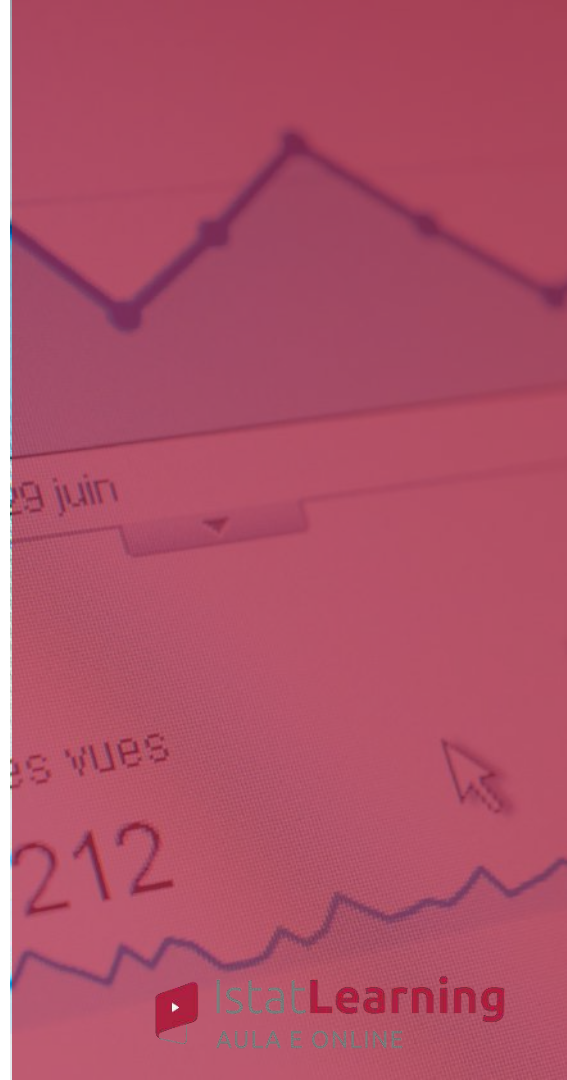
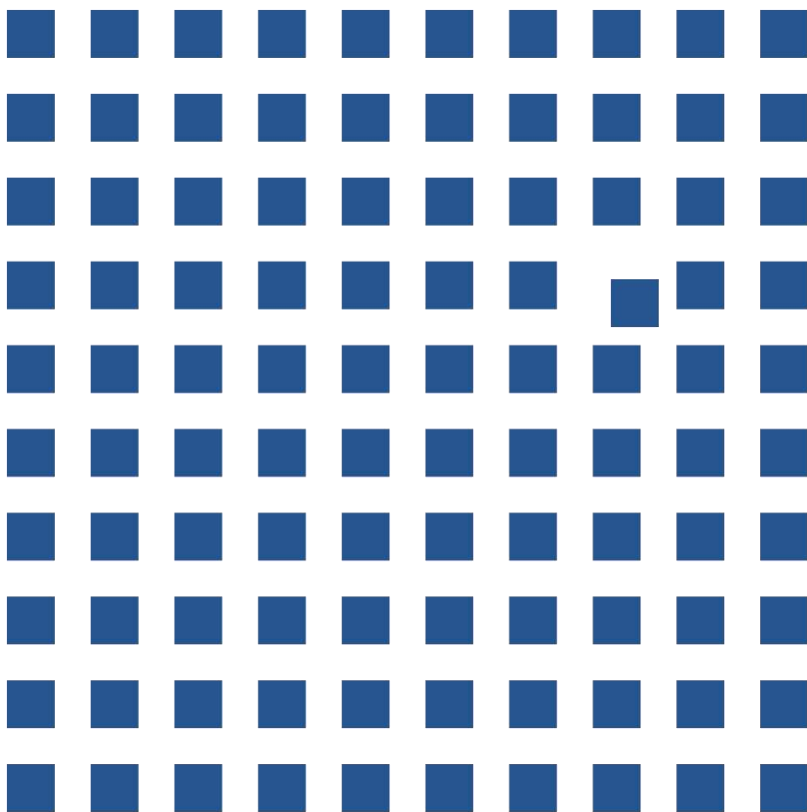
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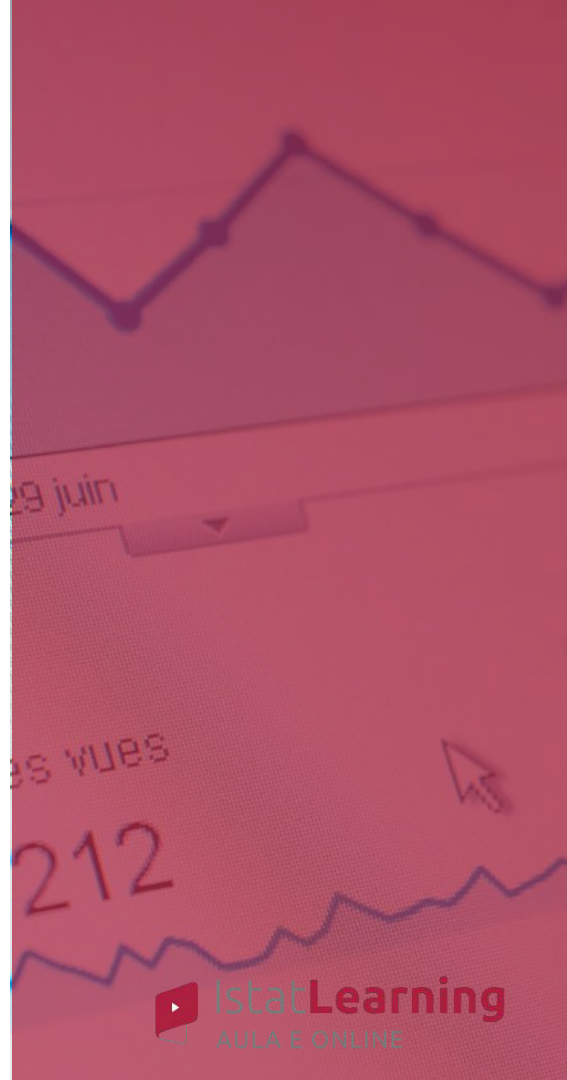
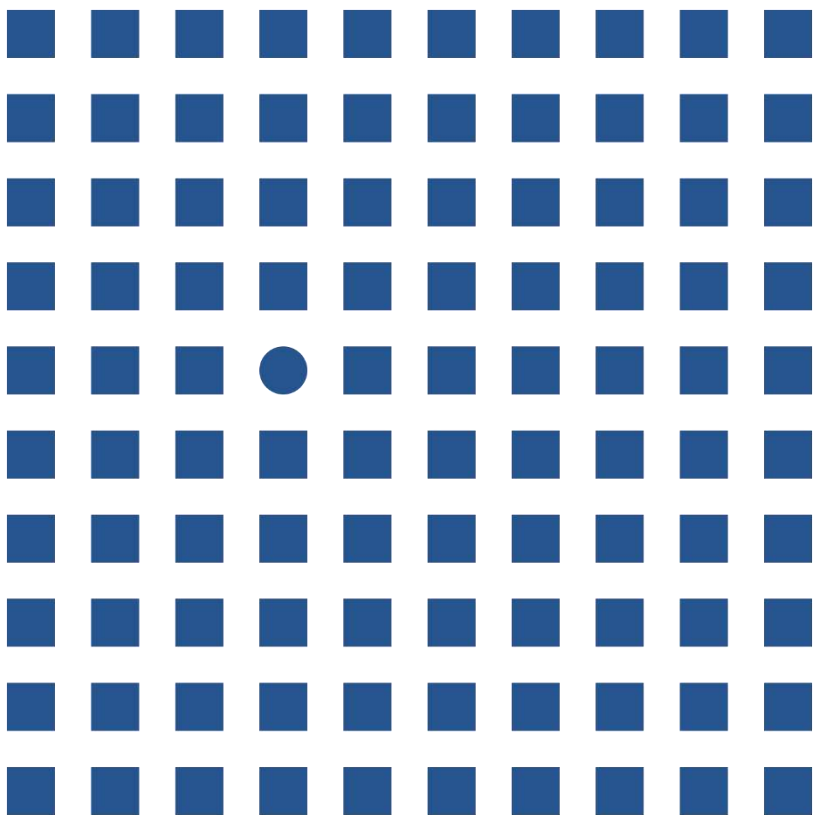


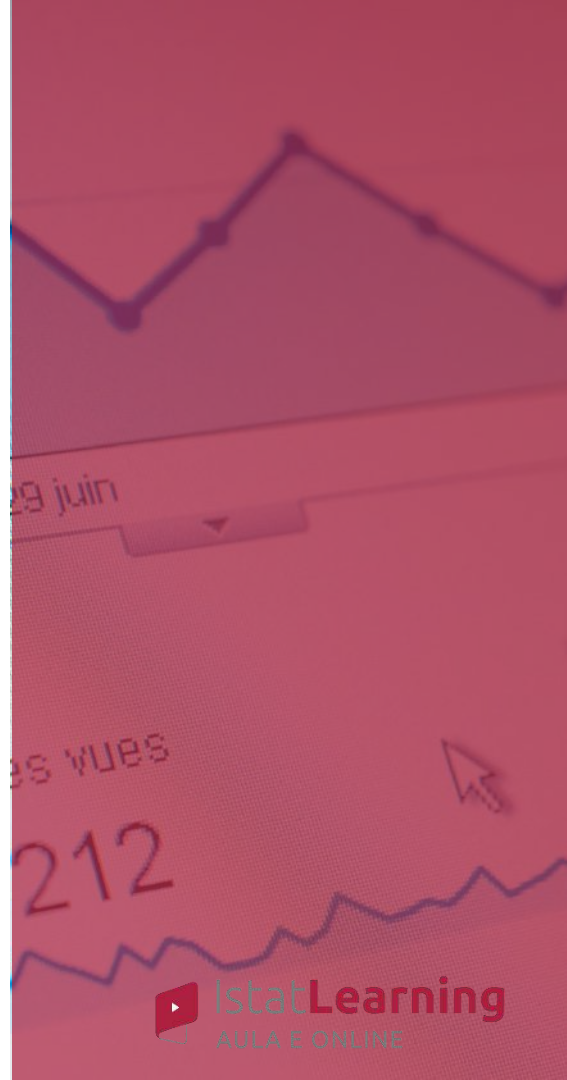
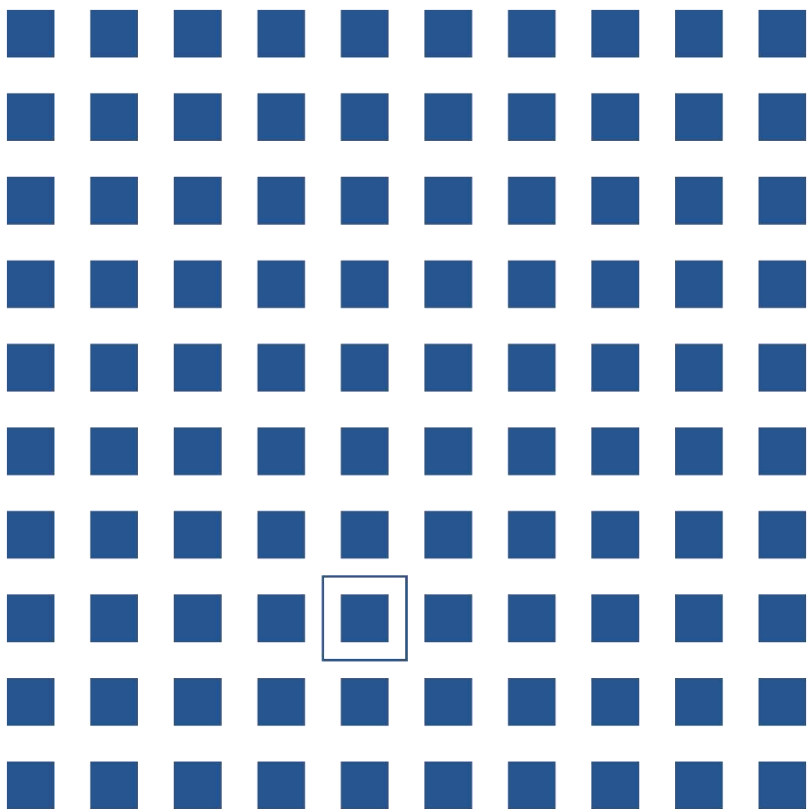






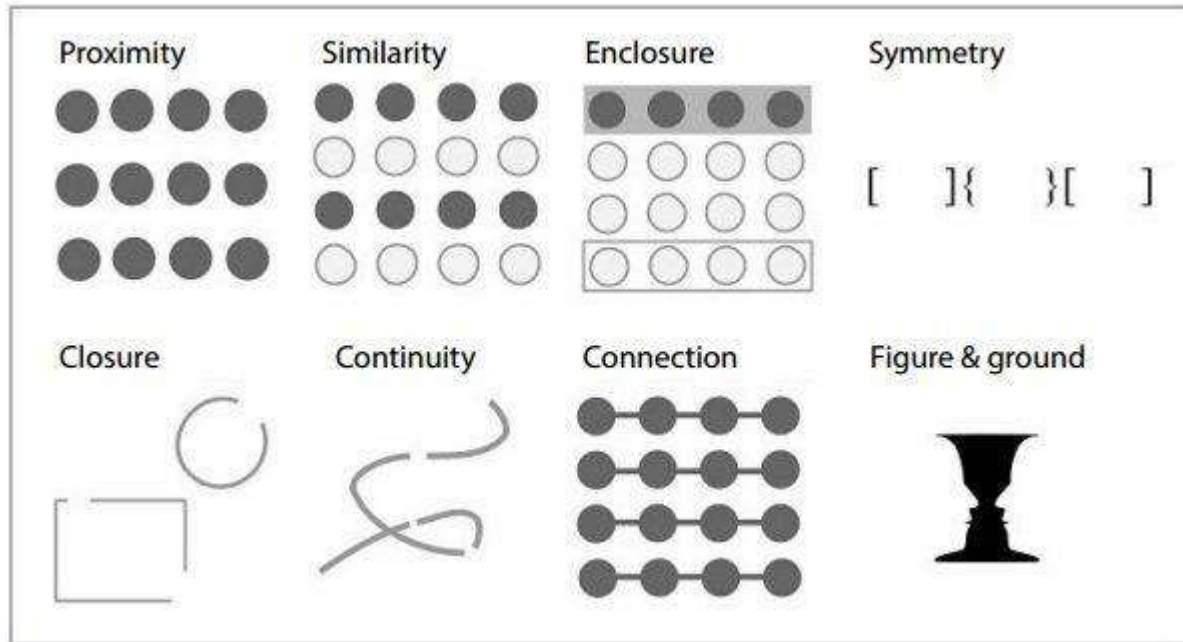




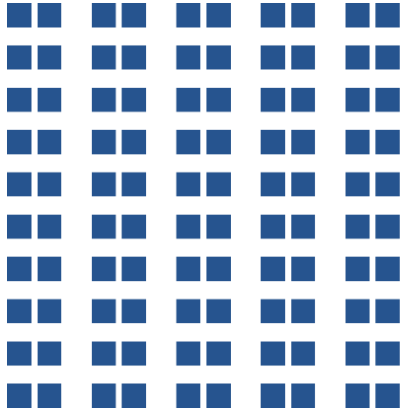




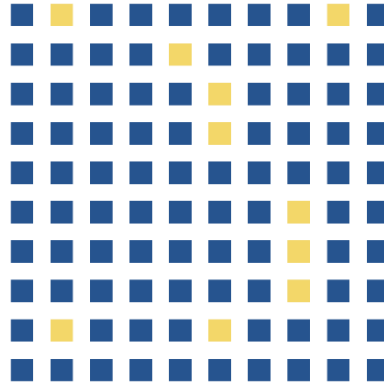
La psicologia della gestalt è una teoria di pensiero e corrente psicologica nata tra la fine dell'Ottocento e l'inizio del Novecento in **Germania** sviluppatasi poi negli Stati Uniti verso la metà del XX secolo.



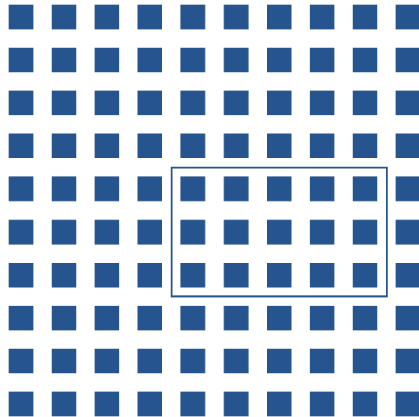
prossimità



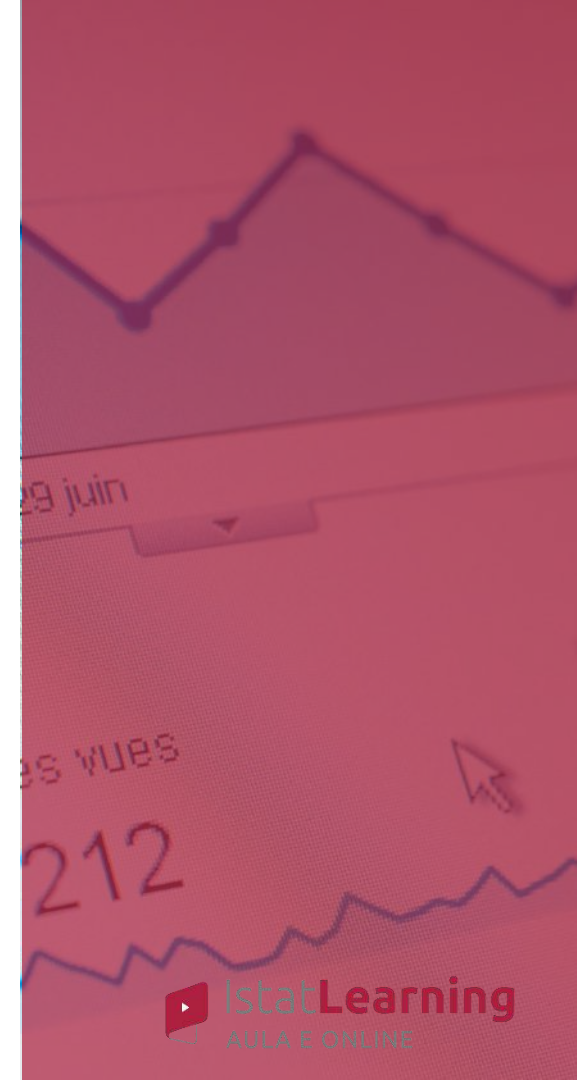
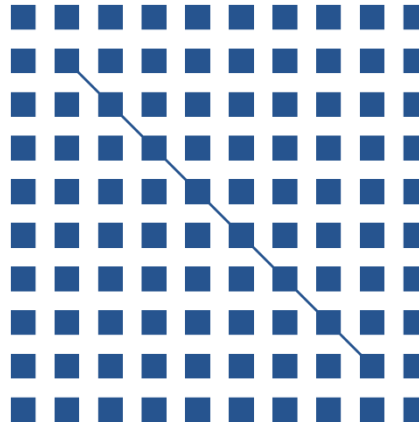
similarità

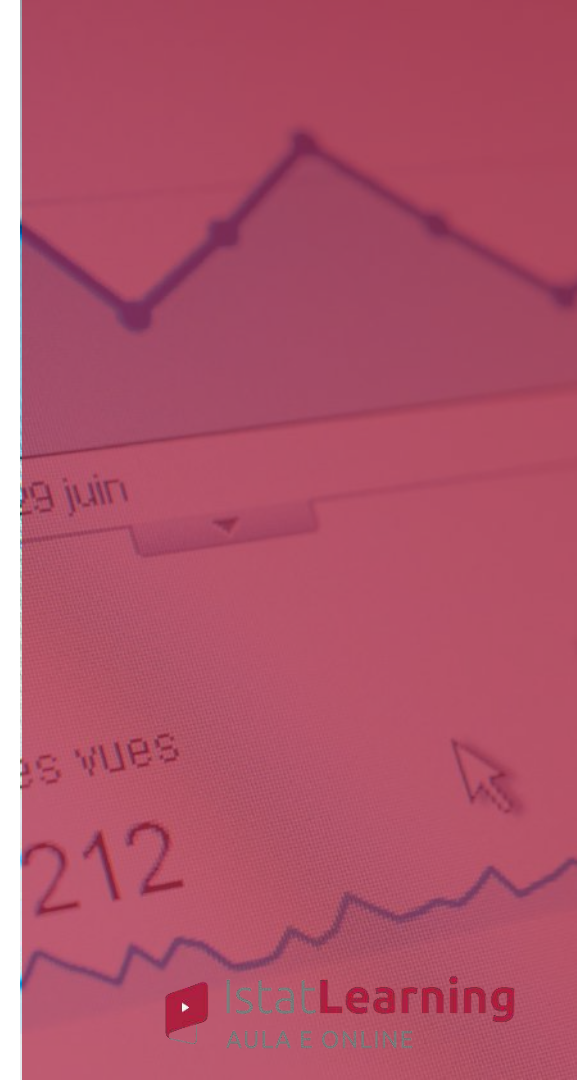
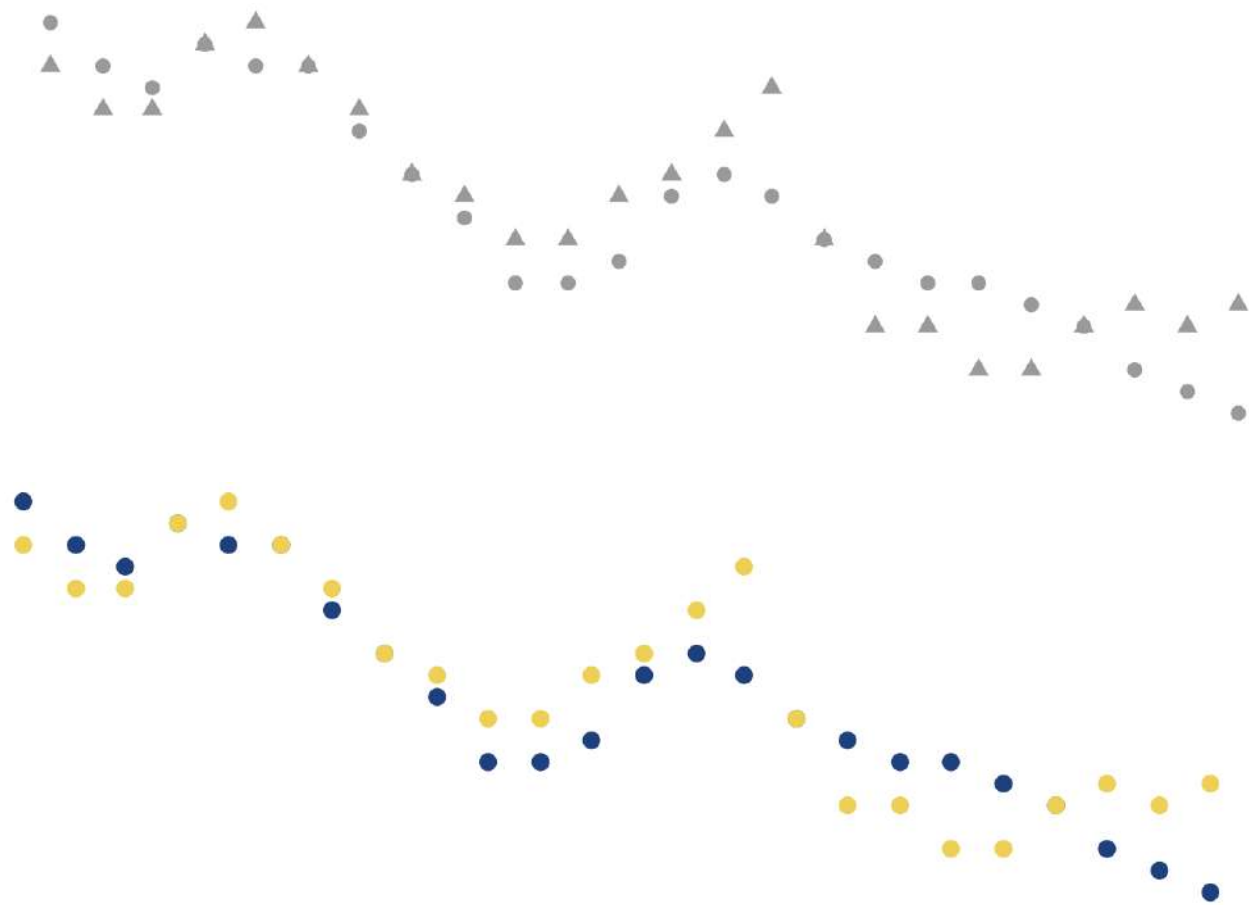


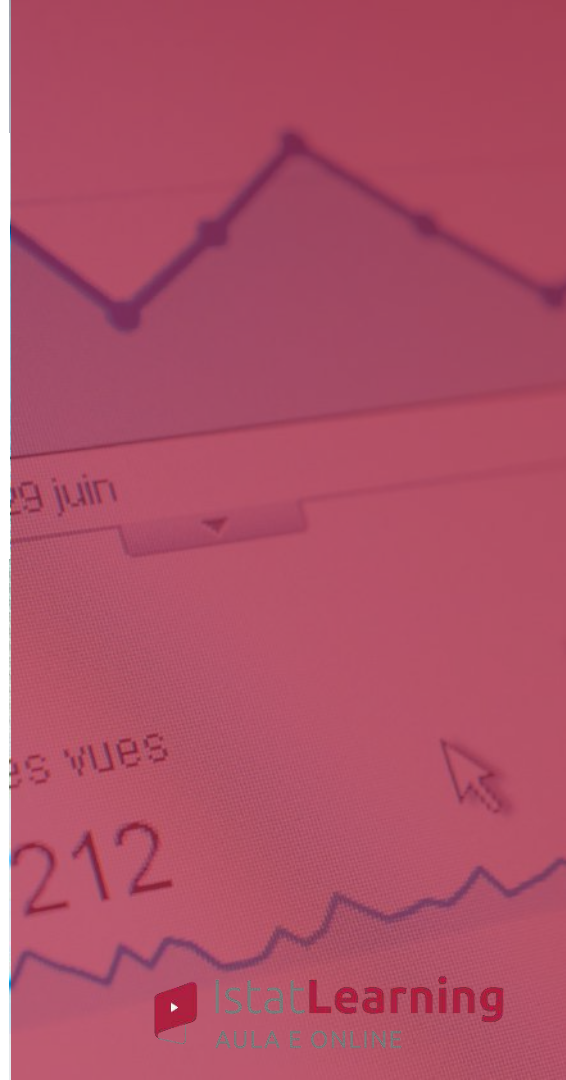
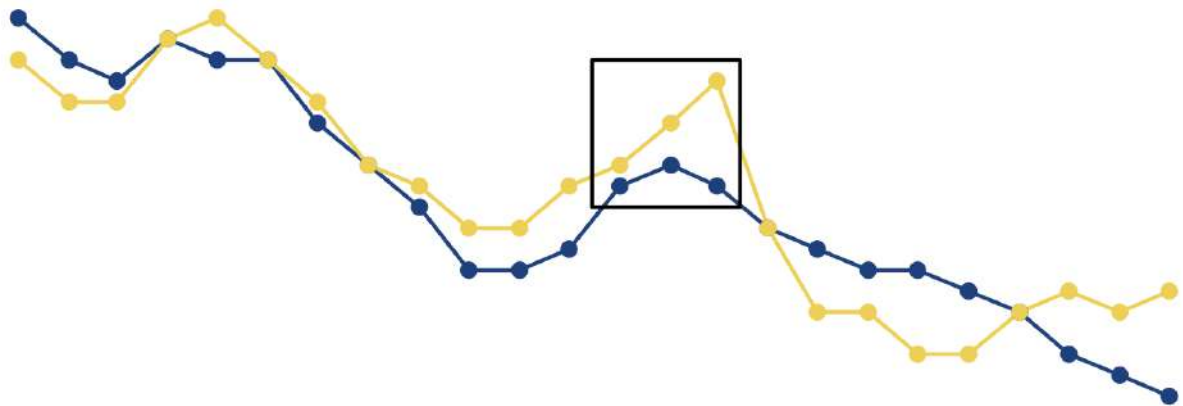
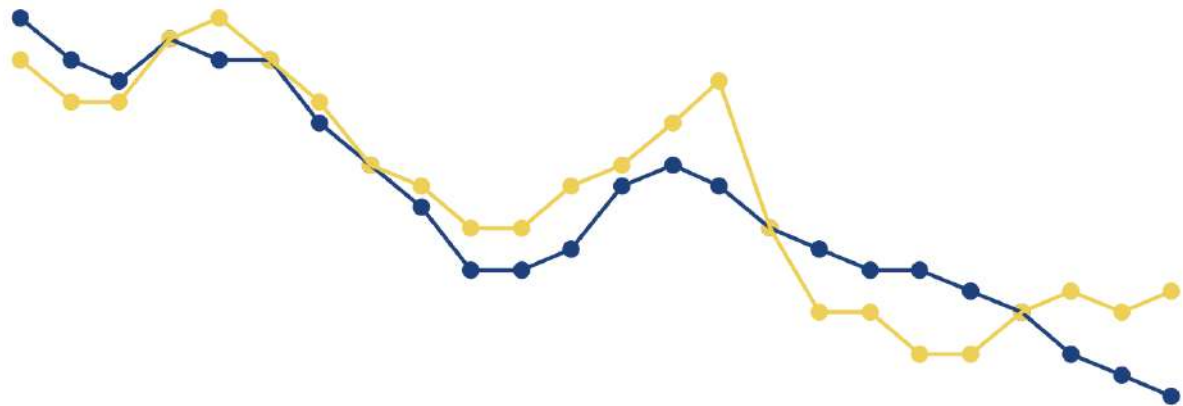
chiusura

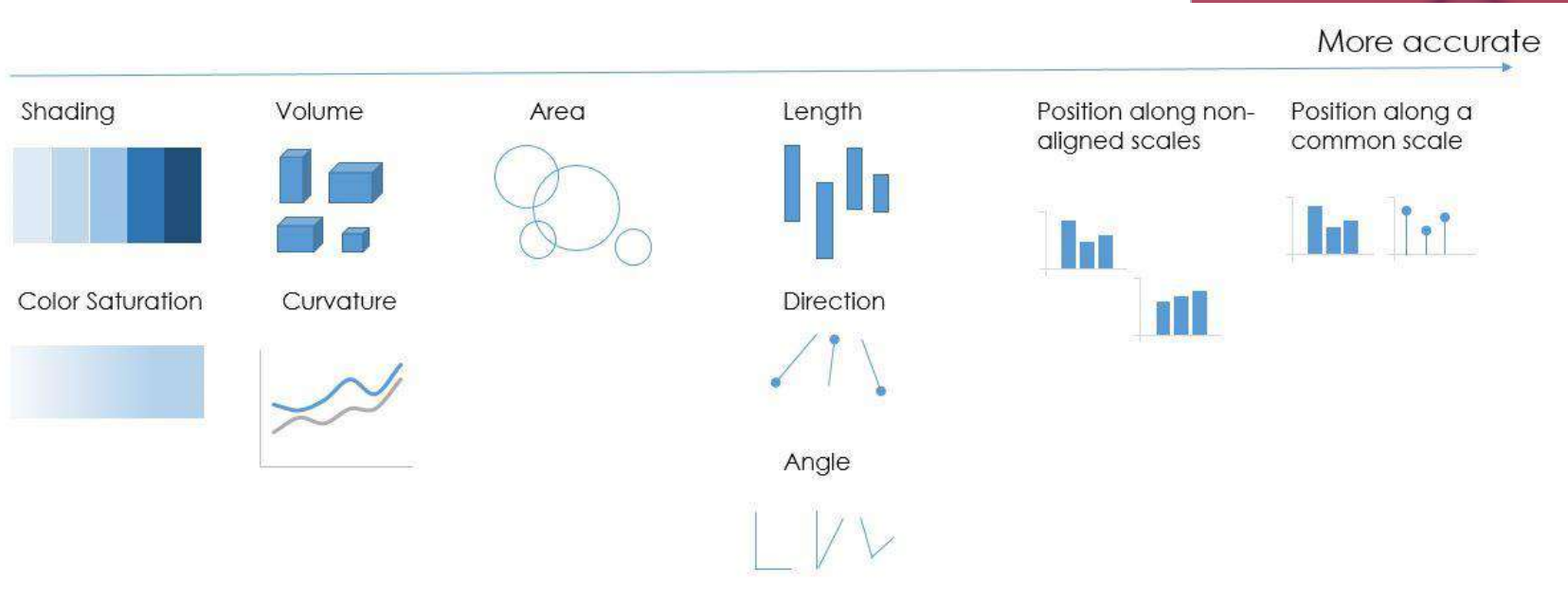


connettività



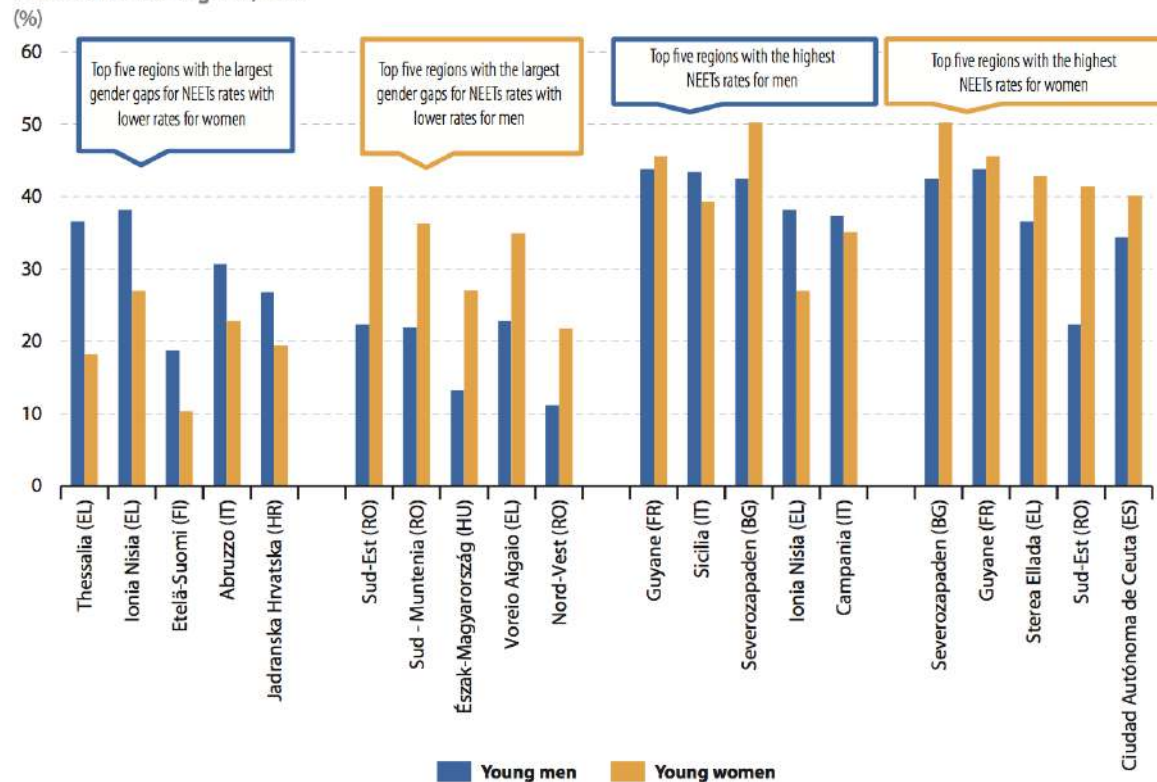




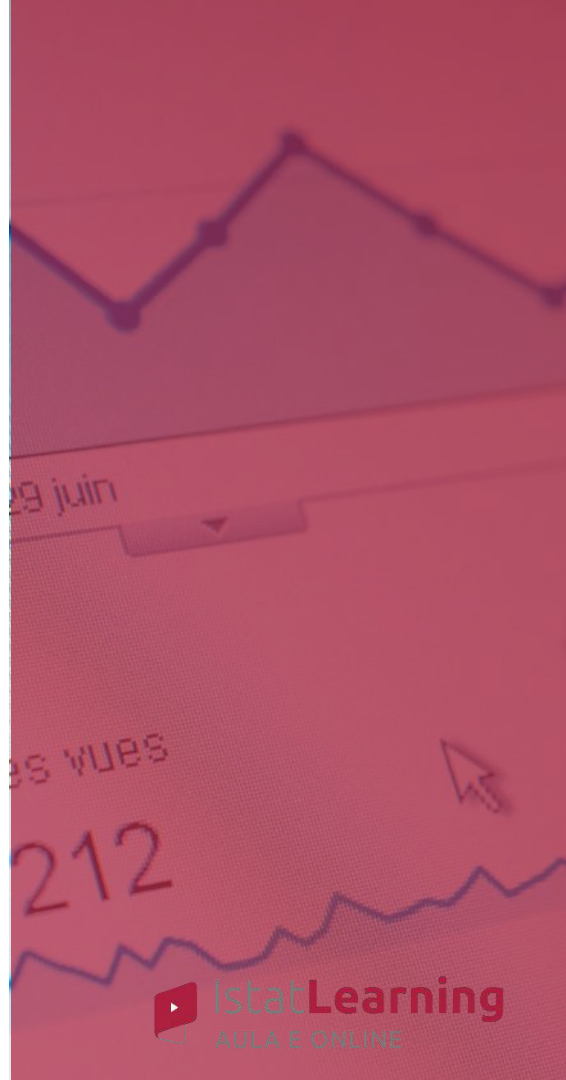
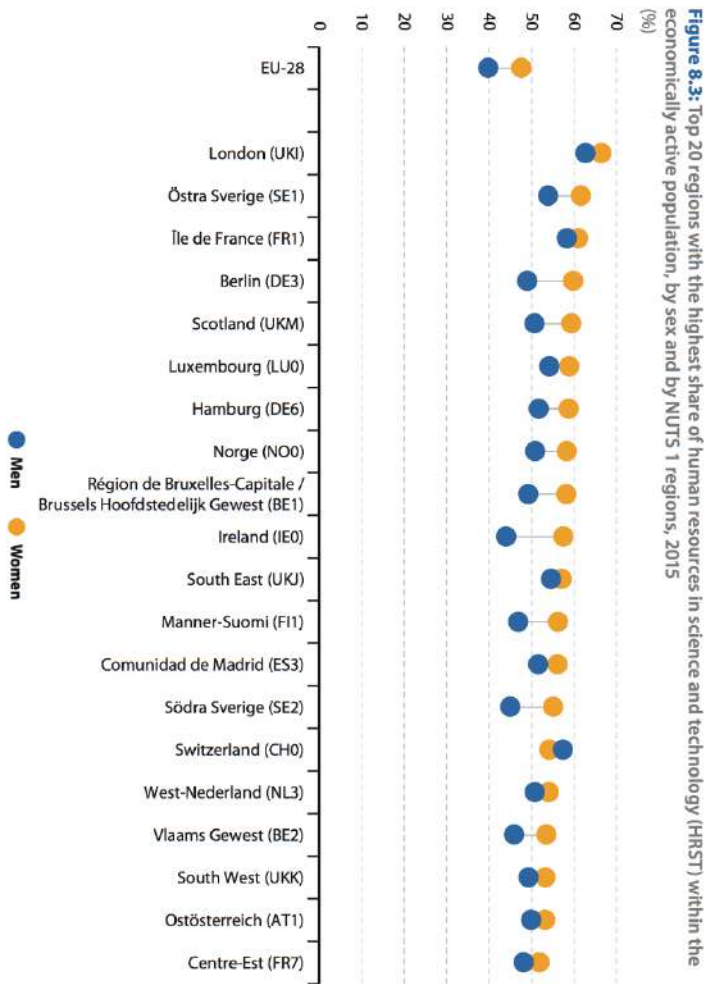


Cleveland, McGinnis  
1984

**Figure 4.4:** Share of young people aged 18–24 neither in employment nor in education or training (NEETs), by sex, selected NUTS 2 regions, 2016 (%)



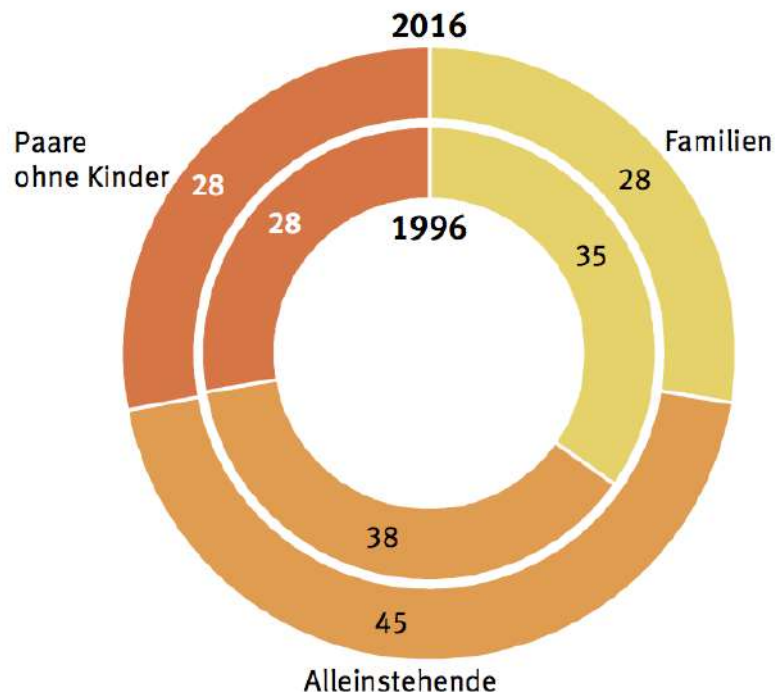




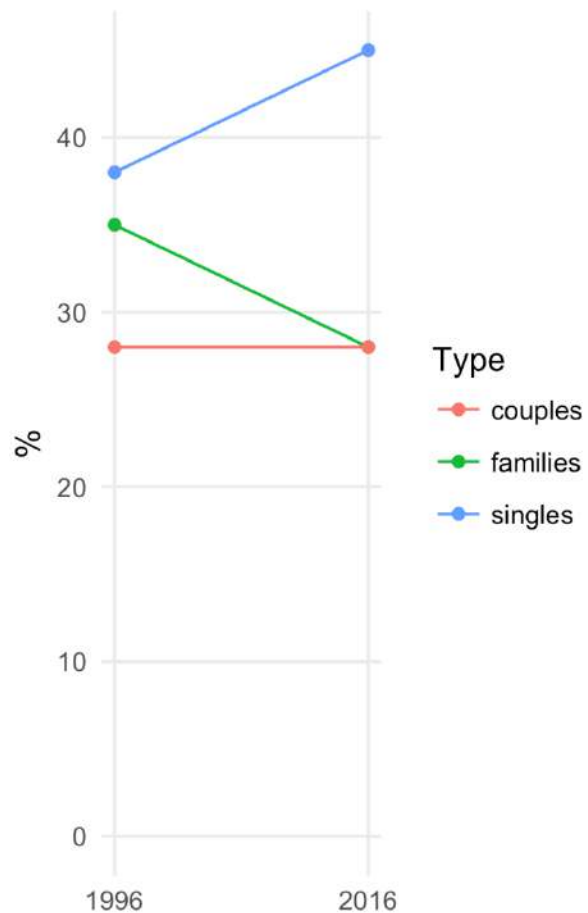
Questo tipo di grafico introduce una distorsione nella lettura dell'informazione perché a parità di angolo la lunghezza degli archi è diversa, dato che sono due anelli concentrici e quindi uno inferiore all'altro per circonferenza.

Per la categoria «Paare ohne Kinder» (coppie senza figli), che presenta gli stessi valori per i due anni a confronto (28%), nel grafico la lunghezza dell'arco rappresentante il 1996 è inferiore al 2016.

**Familien, Paare ohne Kinder und Alleinstehende**  
in %

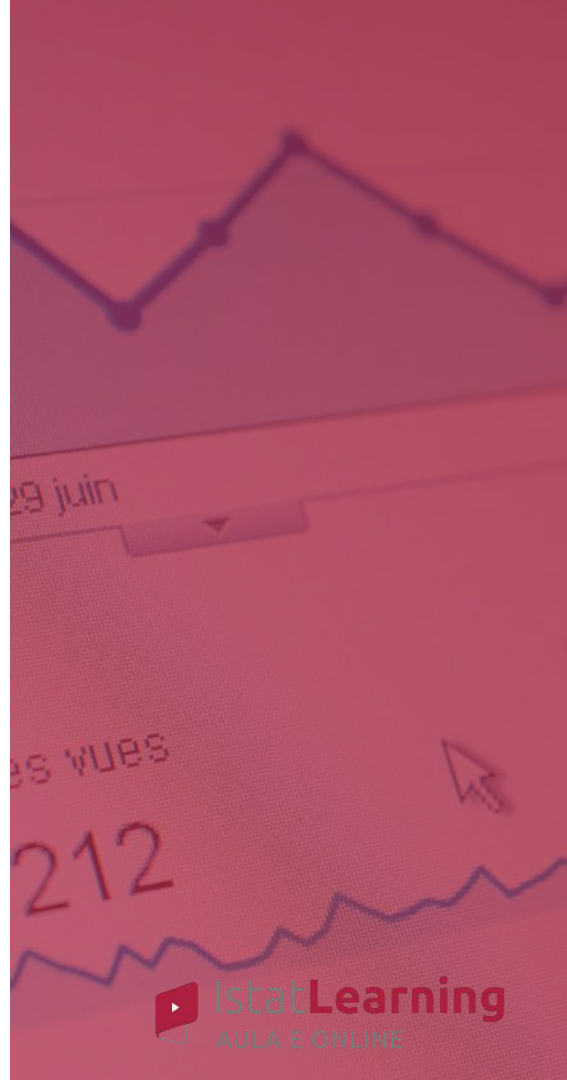


## Couples, singles and families



## Quartetto di Ascombe

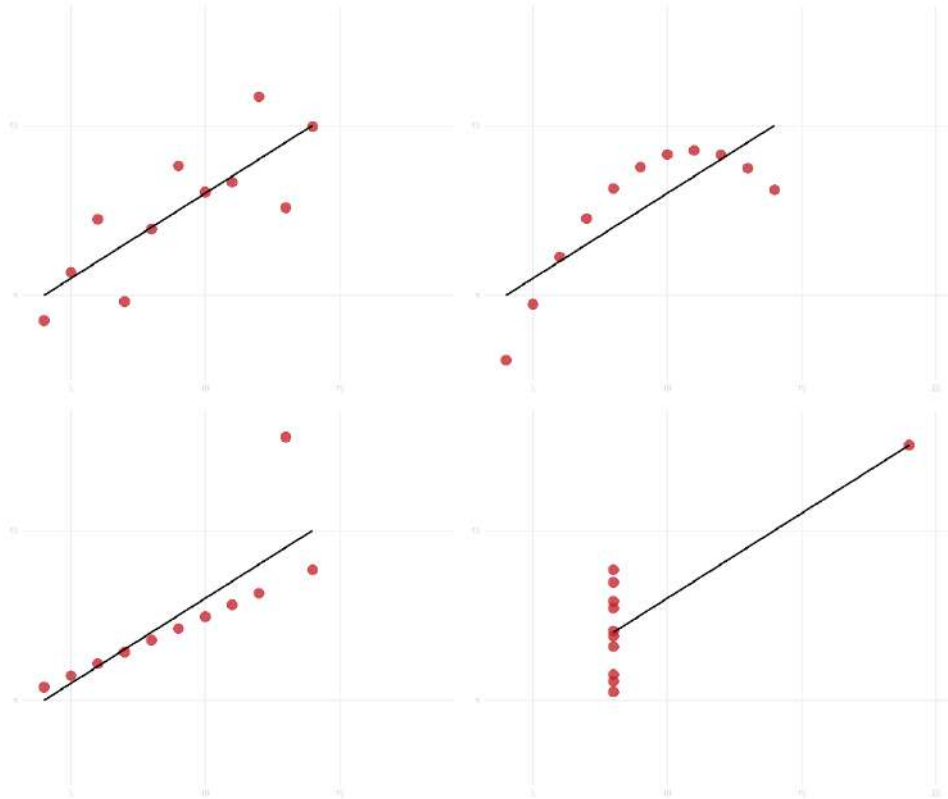
x1	y1	x2	y2	x3	y3	x4	y4
10	10	10	8	8.04	9.14	7.46	6.58
8	8	8	8	6.95	8.14	6.77	5.76
13	13	13	8	7.58	8.74	12.74	7.71
9	9	9	8	8.81	8.77	7.11	8.84
11	11	11	8	8.33	9.26	7.81	8.47
14	14	14	8	9.96	8.10	8.84	7.04
6	6	6	8	7.24	6.13	6.08	5.25
4	4	4	19	4.26	3.10	5.39	12.50
12	12	12	8	10.84	9.13	8.15	5.56
7	7	7	8	4.82	7.26	6.42	7.91
5	5	5	8	5.68	4.74	5.73	6.89



## Perché funziona?

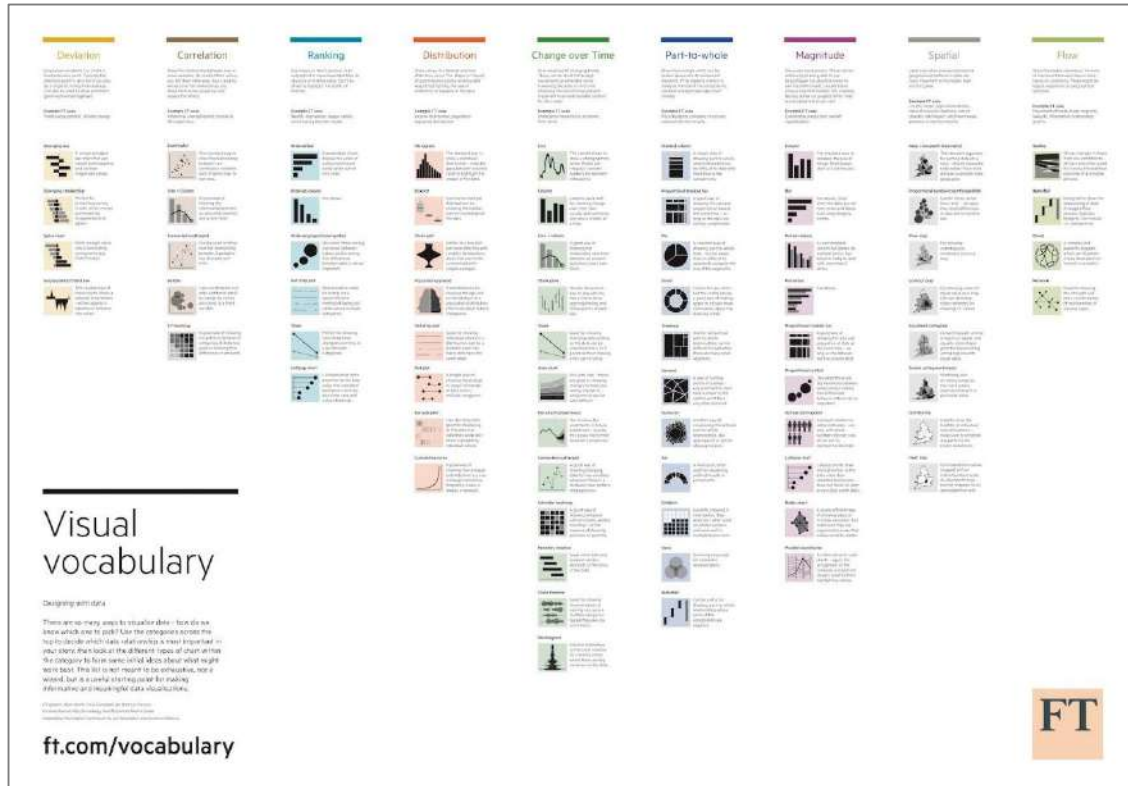
Proprietà	Valore	Accuratezza
<a href="#">Media</a> di x	9	esatta
<a href="#">Varianza</a> di x	11	esatta
Media di y	7.50	alla seconda cifra decimale
Varianza di y	4.125	con uno scarto massimo di 0.003
<a href="#">Correlazione</a> tra x e y	0.816	alla terza cifra decimale
<a href="#">Regressione lineare</a>	$y = 3.00 + 0.500x$	alla seconda e alla terza cifra decimale, rispettivamente

Perché funziona?



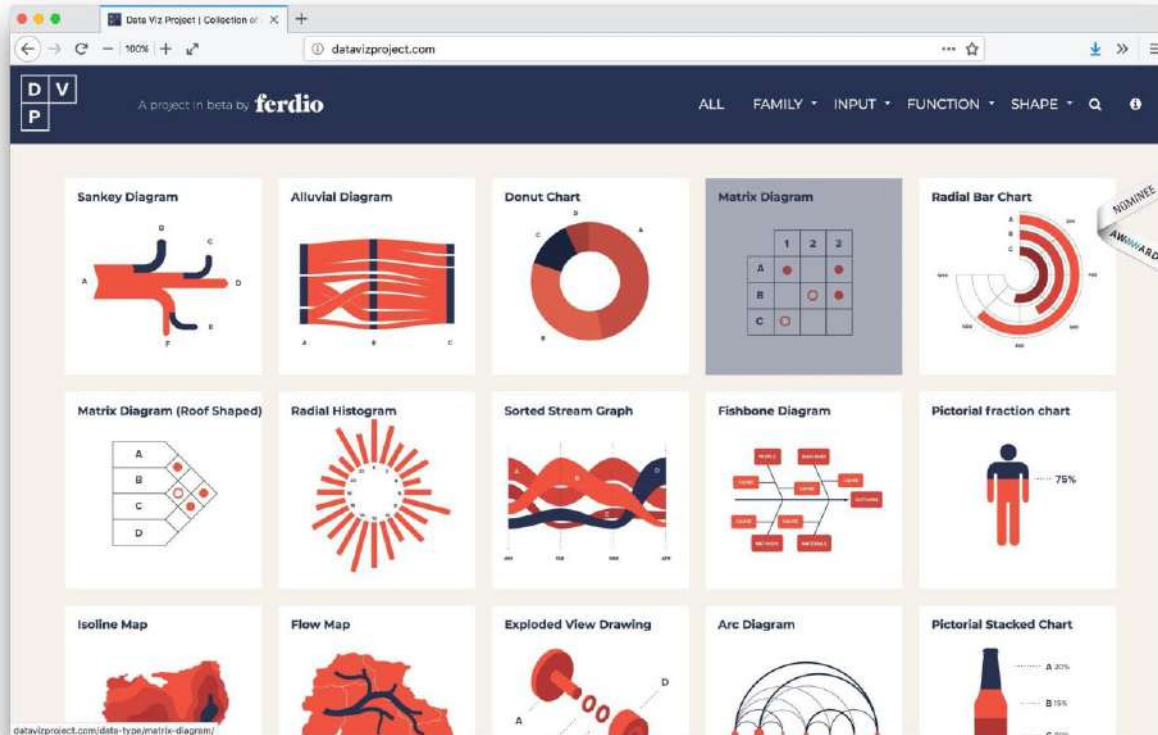


# Modelli



<https://raw.githubusercontent.com/Financial-Times/chart-doctor/main/visual-vocabulary/poster.png>

# Modelli



<https://datavizproject.com/>

# Una guida per valutare l'efficacia del grafico



## Data Visualization Checklist

by Stephanie Evergreen & Ann M

This checklist is meant to be used as a guide for the development of high impact data visualizations. Rate each aspect of the data visualization circling the most appropriate number, where 2 points means the guideline was fully met, 1 means it was partially met, and 0 means it was not at all. n/a should not be used frequently, but reserved for when the guideline truly does not apply. For example, a pie chart has no axes lines or 1 to rate. If the guidelines has been broken intentionally to make a point, rate it n/a and deduct those points from the total possible. Refer to the Visualization Anatomy Chart on the last page for guidance on vocabulary and the Resources at the end for more details.

	Guideline	Rate
<b>Text</b>  Graphs don't contain much text, so existing text must encapsulate your message and pack a punch.	<b>6-12 word descriptive title is left-justified in upper left corner</b> Short titles enable readers to comprehend takeaway messages even while quickly skimming the graph. Rather than a generic phrase, use a descriptive sentence that encapsulates the graph's finding or "so what?" Western cultures start reading in the upper left, so locate the title there.	2: 1
	<b>Subtitle and/or annotations provide additional information</b> Subtitles and annotations (call-out text within the graph) can add explanatory and interpretive power to a graph. Use them to answer questions a viewer might have or to highlight specific data points.	2: 1
	<b>Text size is hierarchical and readable</b> Titles are in a larger size than subtitles or annotations, which are larger than labels, which are larger than axis labels, which are larger than source information. The smallest text - axis labels - are at least 9 point font size on paper, at least 20 on screen.	2: 1
	<b>Text is horizontal</b> Titles, subtitles, annotations, and data labels are horizontal (not vertical or diagonal). Line labels and axis labels can deviate from this rule and still receive full points. Consider switching graph orientation (e.g., from column to bar chart) to make text horizontal.	2: 1
	<b>Data are labeled directly</b> Position data labels near the data rather than in a separate legend (e.g., on top of or next to bars and next to lines). Eliminate embedded legends when possible because eye movement back and forth between the legend and the data can interrupt the brain's attempts to interpret the graph.	2: 1
	<b>Labels are used sparingly</b>	2: 1

[http://stephanieevergreen.com/wp-content/uploads/2016/10/DataVizChecklist\\_May2016.pdf](http://stephanieevergreen.com/wp-content/uploads/2016/10/DataVizChecklist_May2016.pdf)

## Modelli

**Remove**  
to improve  
(the **data-ink** ratio)

Created by Darkhorse Analytics

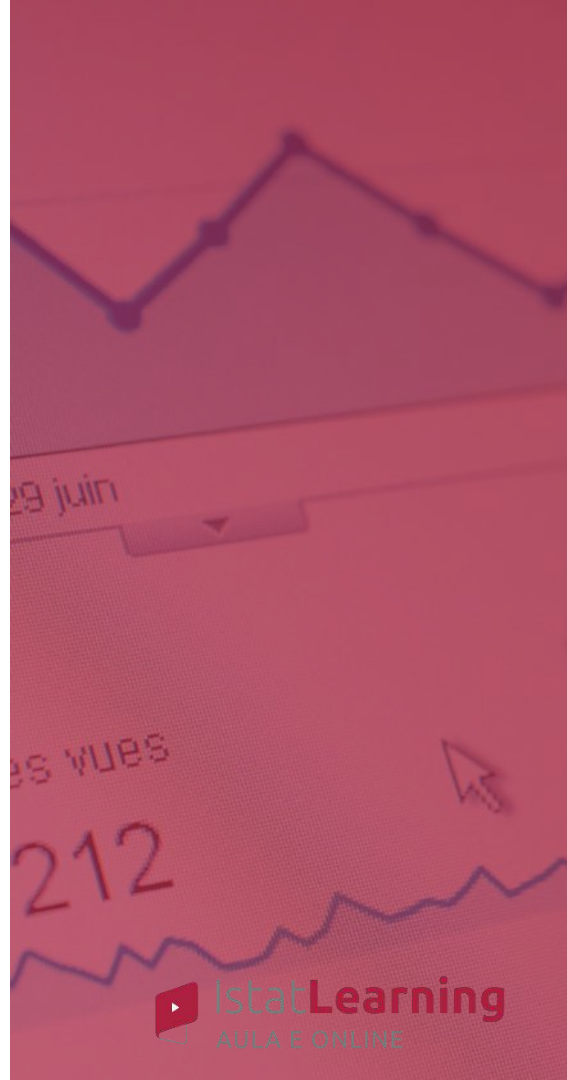
[www.darkhorseanalytics.com](http://www.darkhorseanalytics.com)

Migliorare un grafico

# Remove to improve the **pie chart** edition

Created by Darkhorse Analytics

[www.darkhorseanalytics.com](http://www.darkhorseanalytics.com)

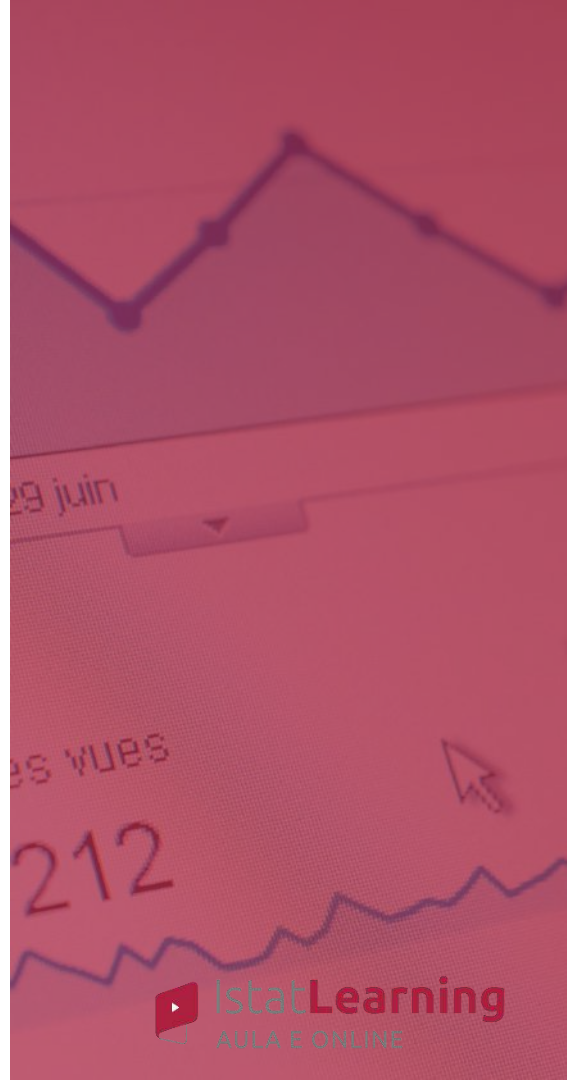


Migliorare un grafico

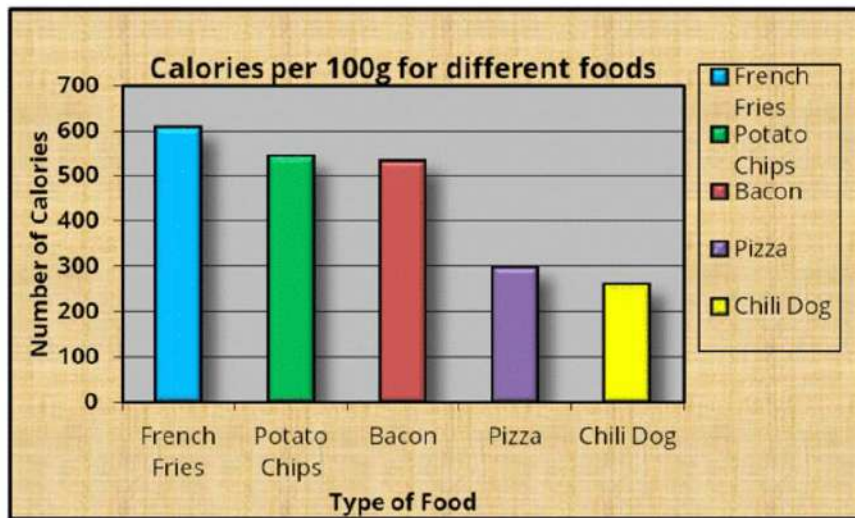
# Remove to improve the **data tables** edition

Created by Darkhorse Analytics

[www.darkhorseanalytics.com](http://www.darkhorseanalytics.com)

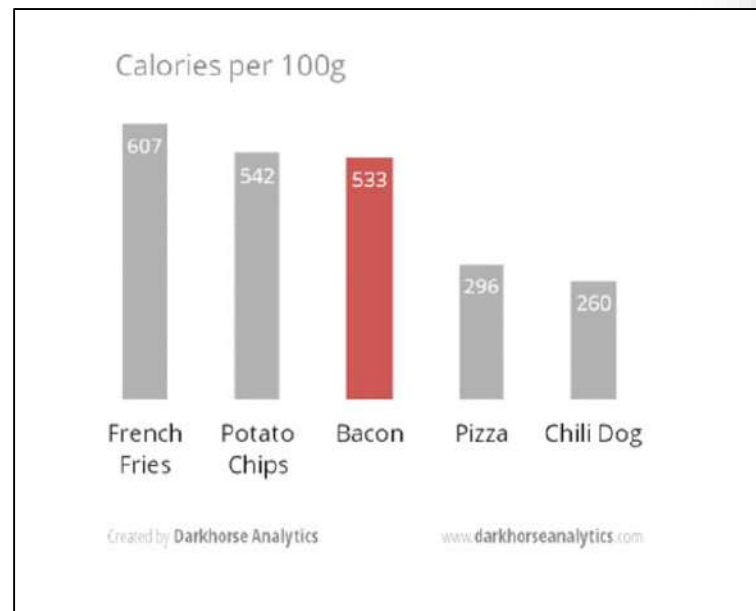






Created by Darkhorse Analytics

[www.darkhorseanalytics.com](http://www.darkhorseanalytics.com)



Created by Darkhorse Analytics

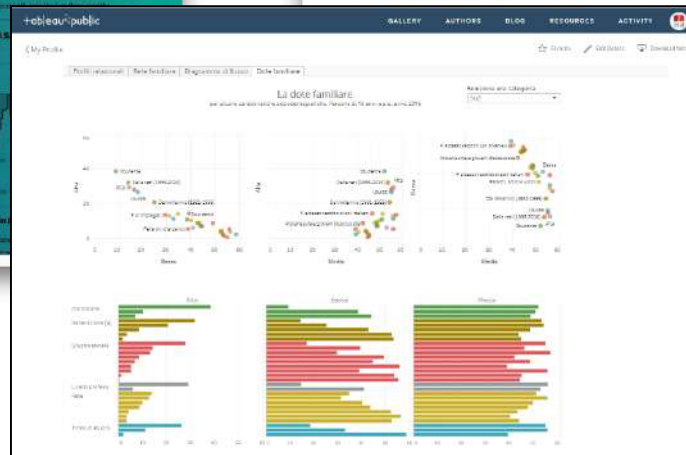
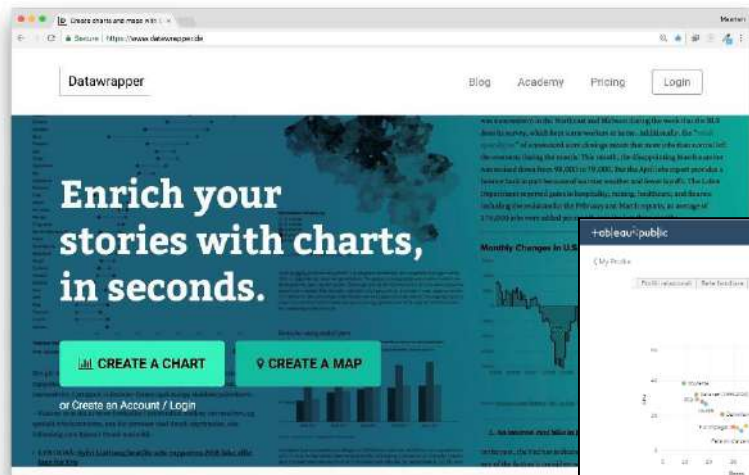
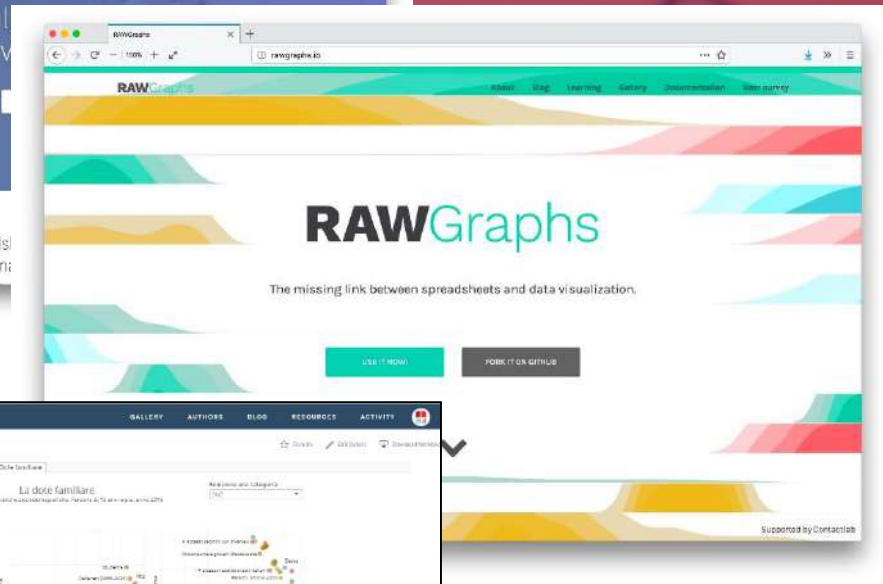
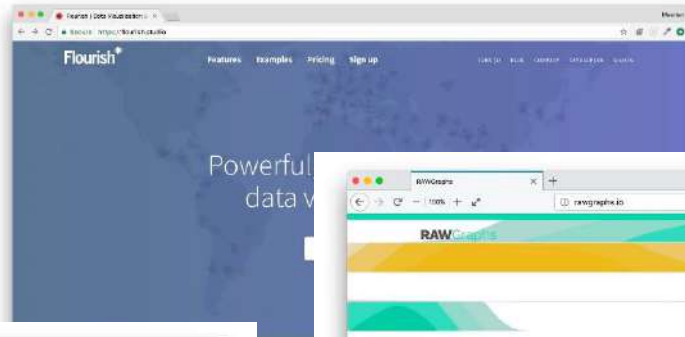
[www.darkhorseanalytics.com](http://www.darkhorseanalytics.com)

# 2° ARGOMENTO

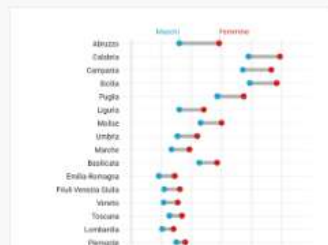
## Web tool: un esempio pratico

# Web tool

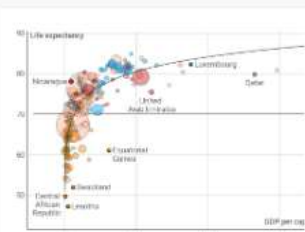
## Esempio pratico



Valori in due colonne  
separate, singolo anno

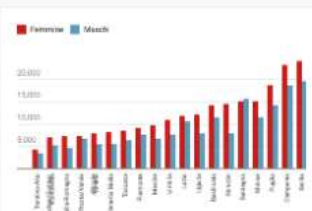


Tasso di disoccupazione  
sesso e regioni 2018



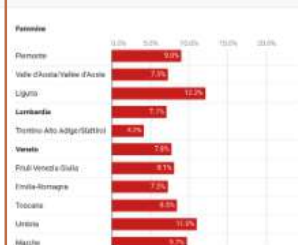
gapminder example

Valori in due colonne  
separate, singolo anno  
(trasposta)



Tasso di disoccupazione  
per sesso e regioni 2018

Valori in unica colonna  
ripetuti per modalità,  
singolo anno



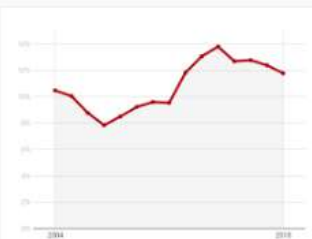
Tasso disoccupazione per  
sesso e regioni 2018



Tasso di disoccupazione  
femminile 2016 UE28

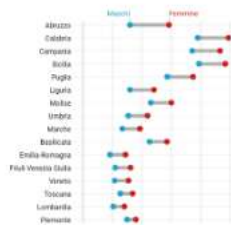


Tasso di disoccupazione  
femminile 2018

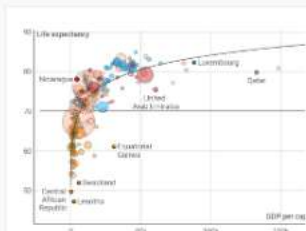


Tasso di disoccupazione  
femminile 2004-2018

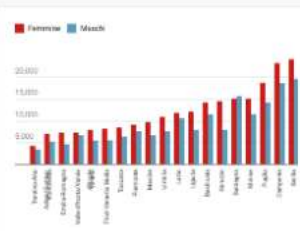
## Valori su colonne separate + gerarchia territoriale



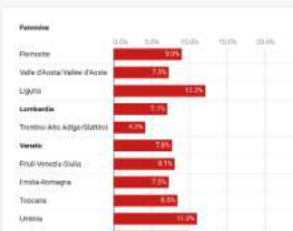
Tasso di disoccupazione sesso e regioni 2018



gapminder example



Tasso di disoccupazione per sesso e regioni 2018



Tasso disoccupazione per sesso e regioni 2018

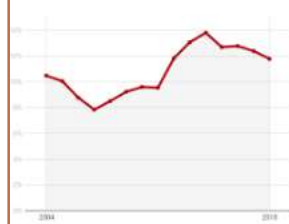
## Valori in unica colonna



Tasso di disoccupazione femminile 2016 UE28



Tasso di disoccupazione femminile 2018



Tasso di disoccupazione femminile 2004-2018

## Valori in serie storica in colonna, una modalità, un territorio





Istat Learning  
AULA E ONLINE

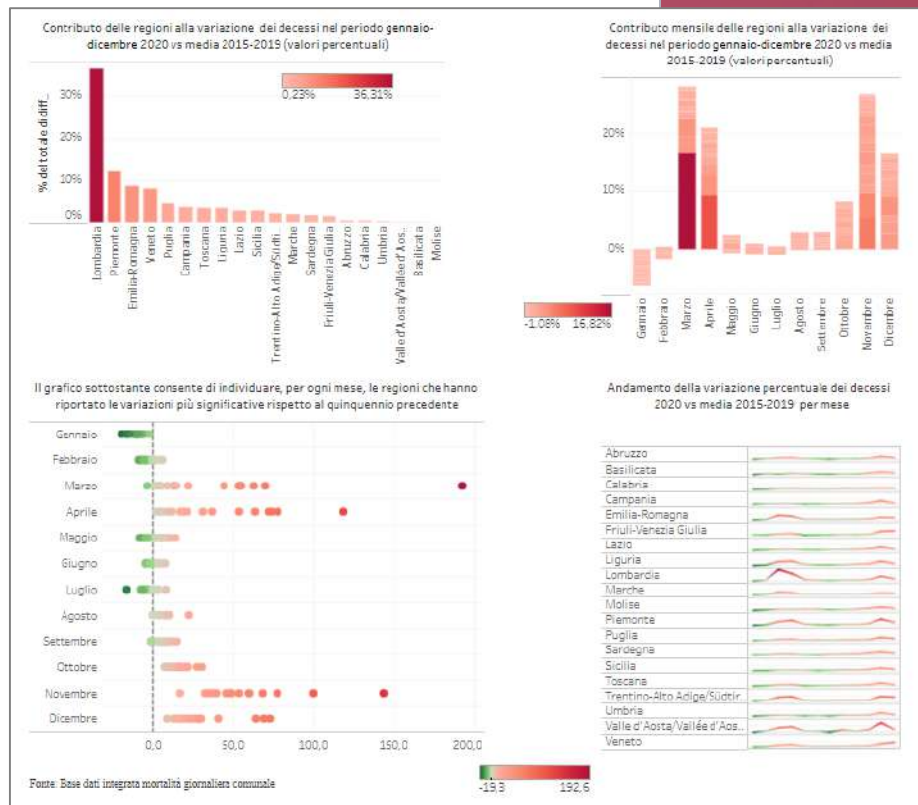
# 3° ARGOMENTO

## I prodotti Istat

# Cosa è una dashboard?

Un sistema di visualizzazione dati avanzato che consente di analizzare un insieme di dati più complesso in un unico ambiente di lavoro

Si presenta come un pannello composto da più grafici che fornisce una informazione più dettagliata e articolata di un fenomeno.

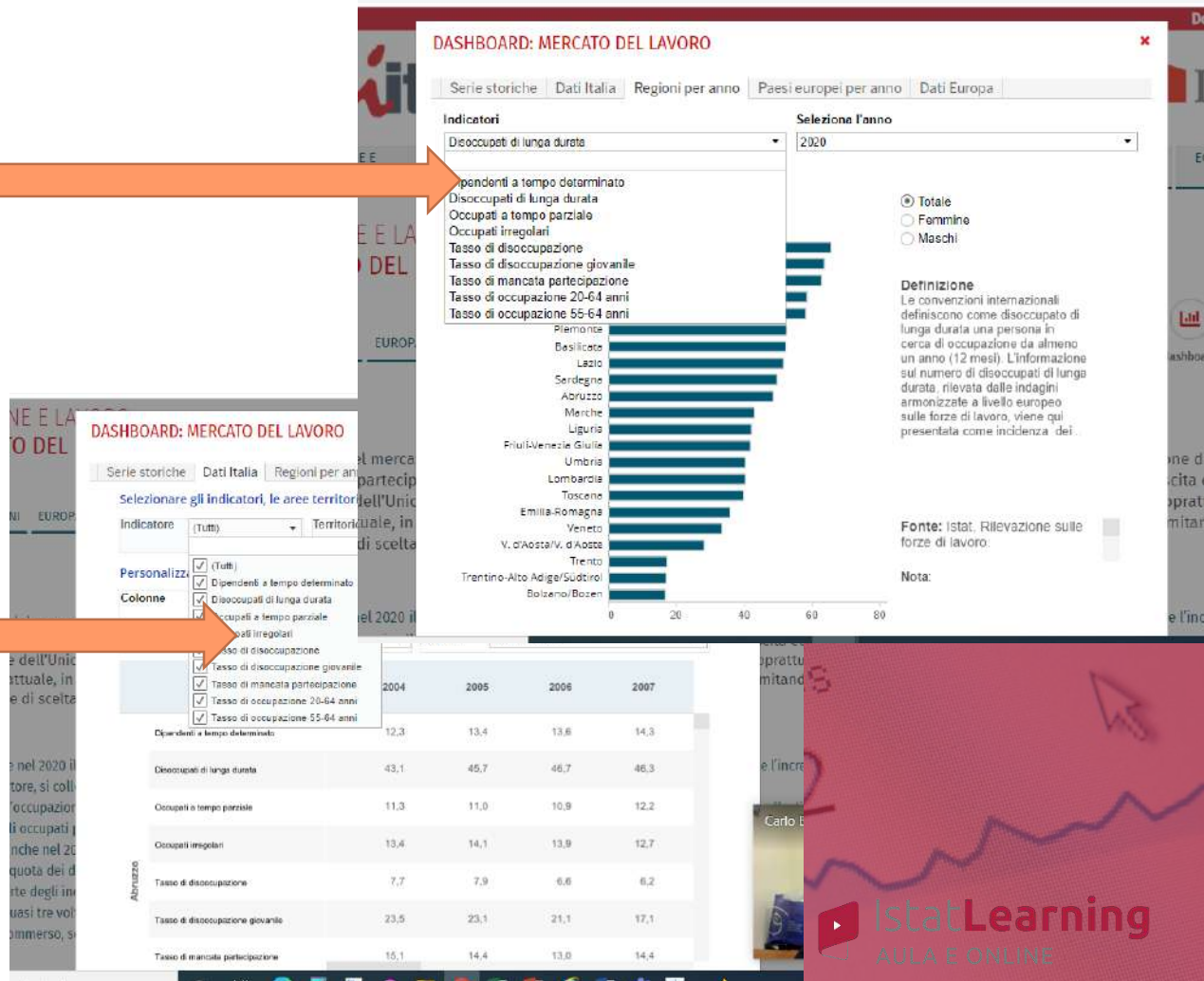




# Cosa visualizza una dashboard?

L'utente ha la possibilità di filtrare i dati secondo più variabili e visualizzare più informazioni contemporaneamente

La dashboard è progettata per visualizzare diverse tipologie di grafici e tabelle



# Le dashboard dell'Istat

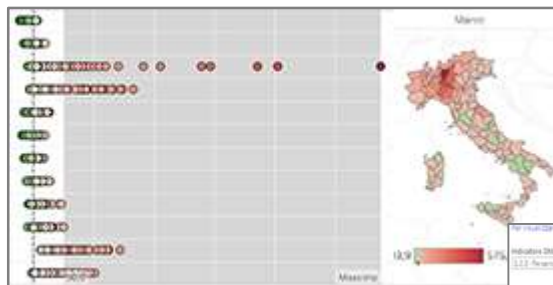
## Pubblicazioni generali

- Annuario statistico
- Noi Italia
- Rapporto annuale

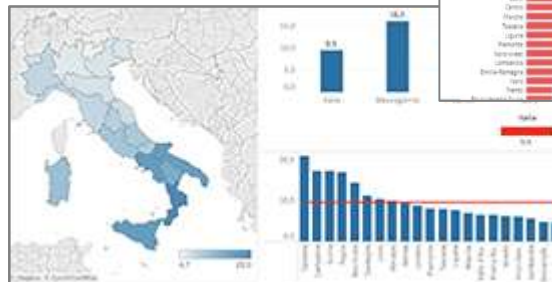
## Rapporti tematici

- Rapporto BES sugli indicatori del Benessere Equo e Sostenibile
- Rapporto SDGs sugli indicatori per lo sviluppo sostenibile

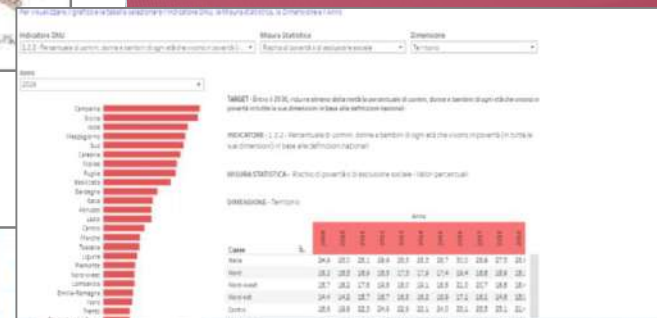
#IstatperilPaese  
dashboard sui decessi



BES



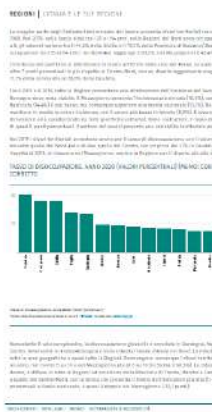
SDGs



# Che cosa è la grafica interattiva integrata?

Grafici singoli e di facile lettura utilizzati a supporto del commento ai dati, inseriti all'interno delle pagine del sito o delle pubblicazioni web.

Il grafico può essere realizzato con strumenti web ed è un oggetto html «agile» che ha reso possibile l'innovazione del sito istituzionale

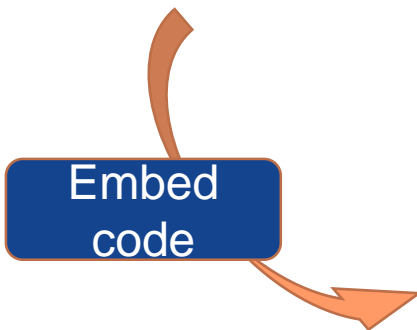


# Le applicazioni web

dedicate alla produzione di grafici interattivi consentono, attraverso semplici passaggi, di agganciare i dati e visualizzarli.

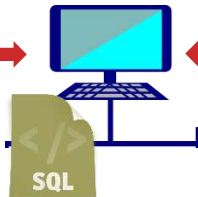
L'output è una URL o un codice html (embed code) integrabile nella pagine del sito istituzionale.

Si adattano (responsive) anche ai dispositivi smartphone e tablet



## Grafici per dati a cadenza trimestrale e mensile

Una procedura software progettata e sviluppata in house in linguaggio R effettua l'estrazione dei dati del data warehouse I.Stat via web service SDMX e consente la generazione e l'aggiornamento automatico di grafici interattivi e dei corrispondenti file dei dati (CSV) finalizzati a popolare una pagina dedicata del sito web istituzionale.



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# Link utili

<https://raw.githubusercontent.com/Financial-Times/chart-doctor/main/visual-vocabulary/poster.png>

[http://stephanieevergreen.com/wp-content/uploads/2016/10/DataVizChecklist\\_May2016.pdf](http://stephanieevergreen.com/wp-content/uploads/2016/10/DataVizChecklist_May2016.pdf)

<http://datavizproject.com>

<http://Datawrapper.de>

<http://Fluroish.studio>

<https://app.rawgraphs.io>

<https://public.tableau.com/app/profile/istat.istituto.nazionale.di.statistica/>

<https://www.istat.it/it/dati-analisi-e-prodotti/visualizzazioni/grafici-interattivi>

<https://noi-italia.istat.it/>

<https://webpub.istat.it/progetto/storia-demografica-italia>





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**GRAZIE**

**PER L'ATTENZIONE**

Michele Ferrara  
[miferrar@istat.it](mailto:miferrar@istat.it)