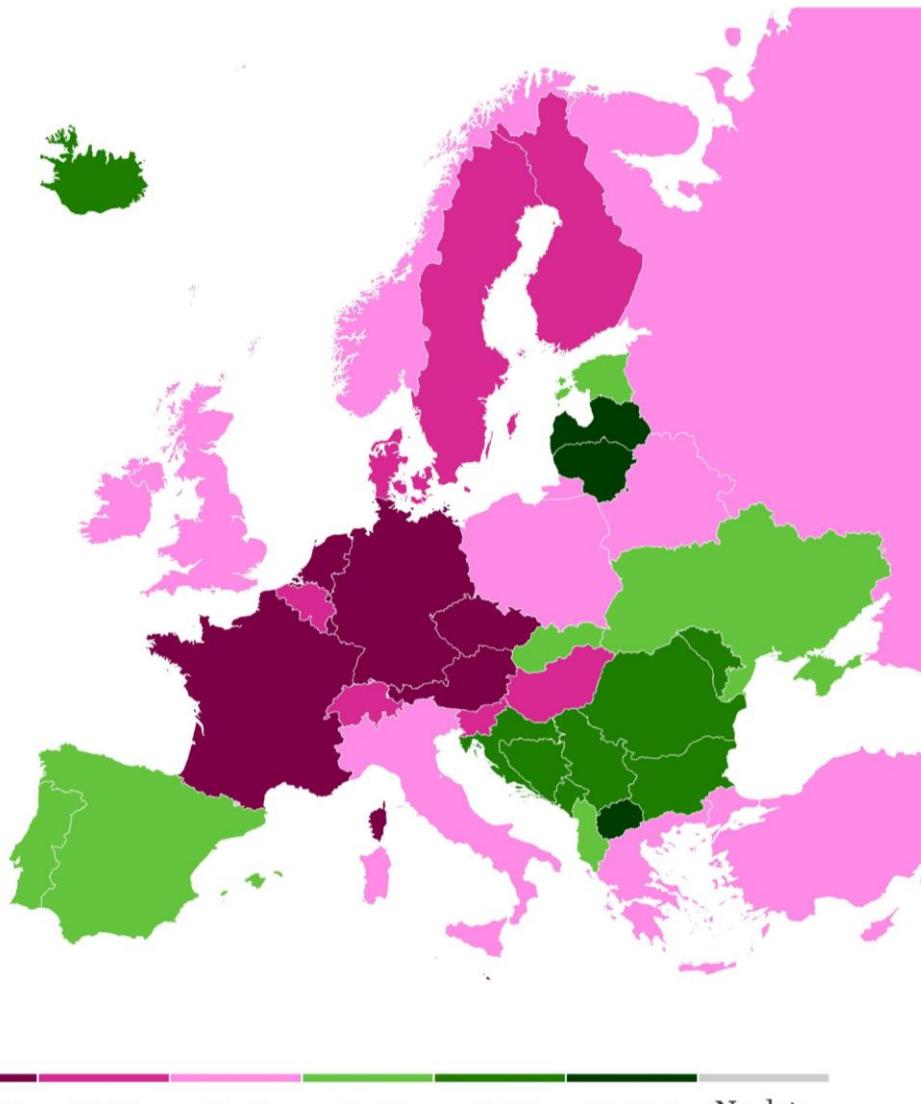


Female researchers as a % of total researchers (2017 or latest year available)

N. Macedonia	52.3
Latvia	52.2
Lithuania	51.6
Serbia	50
Bulgaria	49.1
Moldova	48.5
Croatia	47.7
Montenegro	47.6
Iceland	47.2
BIH	46.8
Romania	45.8
Ukraine	44.7
Albania	44.3
Estonia	43.6
Portugal	43.5
Slovakia	41.4
Spain	40.2
Belarus	39.7
Russia	39.6
UK	38.7
Greece	38
Norway	37.6
Cyprus	37.3
Turkey	37
Poland	36.4
Ireland	35.3
Italy	35.2
Slovenia	34.5
Belgium	34.1
Denmark	33.8
Sweden	33.7
Switzerland	33.6
Finland	32.5
Hungary	30.8
Austria	29.5
Luxembourg	28.9
Malta	28.7
Germany	28
France	27
Czechia	26.8
Netherlands	25.8



The Rise and Fall and Bee Colonies

Maps show percentage change in number of estimated bee colonies compared to 1990



1990



2000



2010



2020



Vizualizace dat

Smysl a estetika vizualizace

11. 11. 2021

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

Dessinée 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 largesses 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 pris dans les ouvrages de M. Chier, de Segur, 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 du Prince Jérôme et du Maréchal Davout, qui avaient été détachés sur Minsk et Mobilow et se rejoignent vers Orscha et Witelsk, avaient toujours marché avec l'armée.

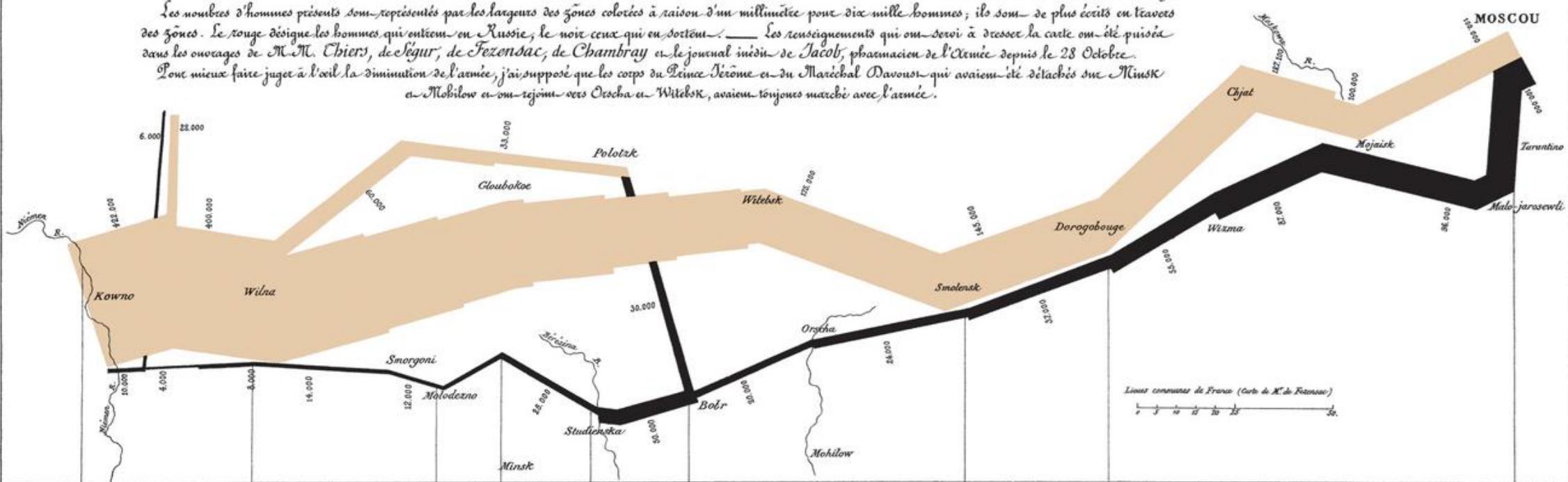
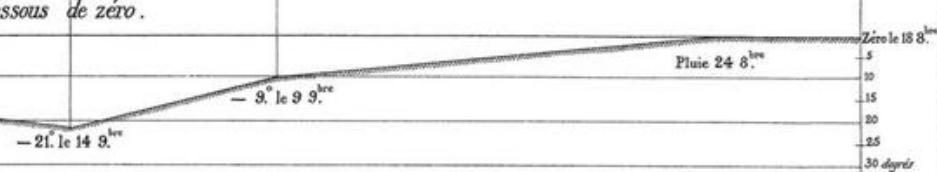
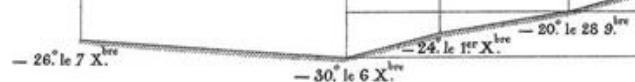
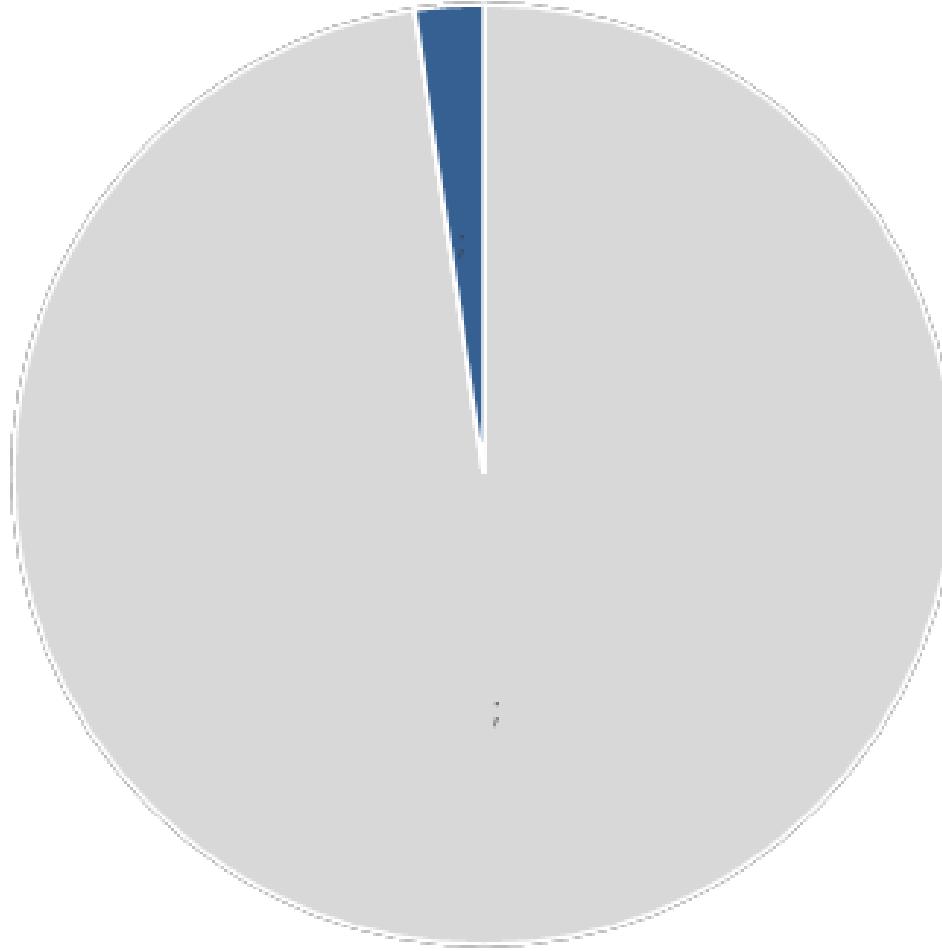


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.

Les cosaques passent au galop
le Niemen gelé.







Vizualizace je nástroj!

data + cíle + forma + publikum

Vložit graf

Doporučené grafy Všechny grafy

- Poslední
- Šablony
- Sloupcový
- Spojnicový
- Výsečový**
- Pruhový
- Plošný
- XY bodový
- Burzovní
- Povrchový
- Paprskový
- Stromová mapa
- Vícevrstvý
- Histogram
- Krabicový
- Vodopádový
- Trychtýřový
- Kombinovaný

Výsečový

Název grafu

Vložit graf

Doporučené grafy Všechny grafy

- Poslední
- Šablony
- Sloupcový**
- Spojnicový
- Výsečový
- Pruhový
- Plošný
- XY bodový
- Burzovní
- Povrchový
- Paprskový
- Stromová mapa
- Vícevrstvý prstencový
- Histogram
- Krabicový graf
- Vodopádový
- Trychtýřový
- Kombinovaný

Sloupcový

100% skládaný sloupcový

Kategorie	Část	Velikost (%)
Radikl	1	~45%
Radikl	2	~10%
Radikl	3	~10%
Radikl	4	~10%
Radikl	5	~10%
Radikl	6	~10%

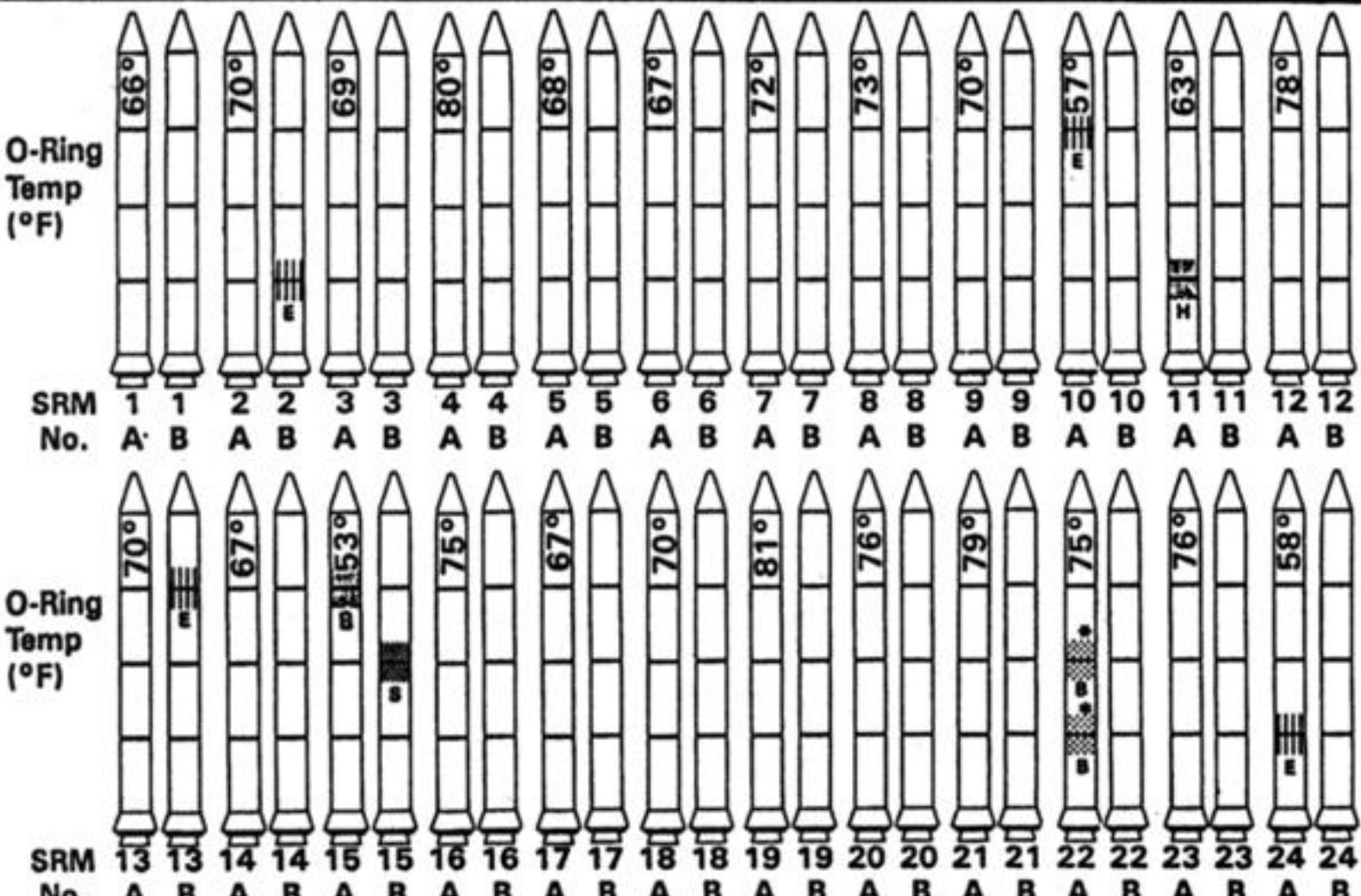
Kategorie	Část	Velikost (%)
Radikl	1	~90%
Radikl	2	~10%
Radikl	3	~10%
Radikl	4	~10%
Radikl	5	~10%
Radikl	6	~10%

OK Zrušit





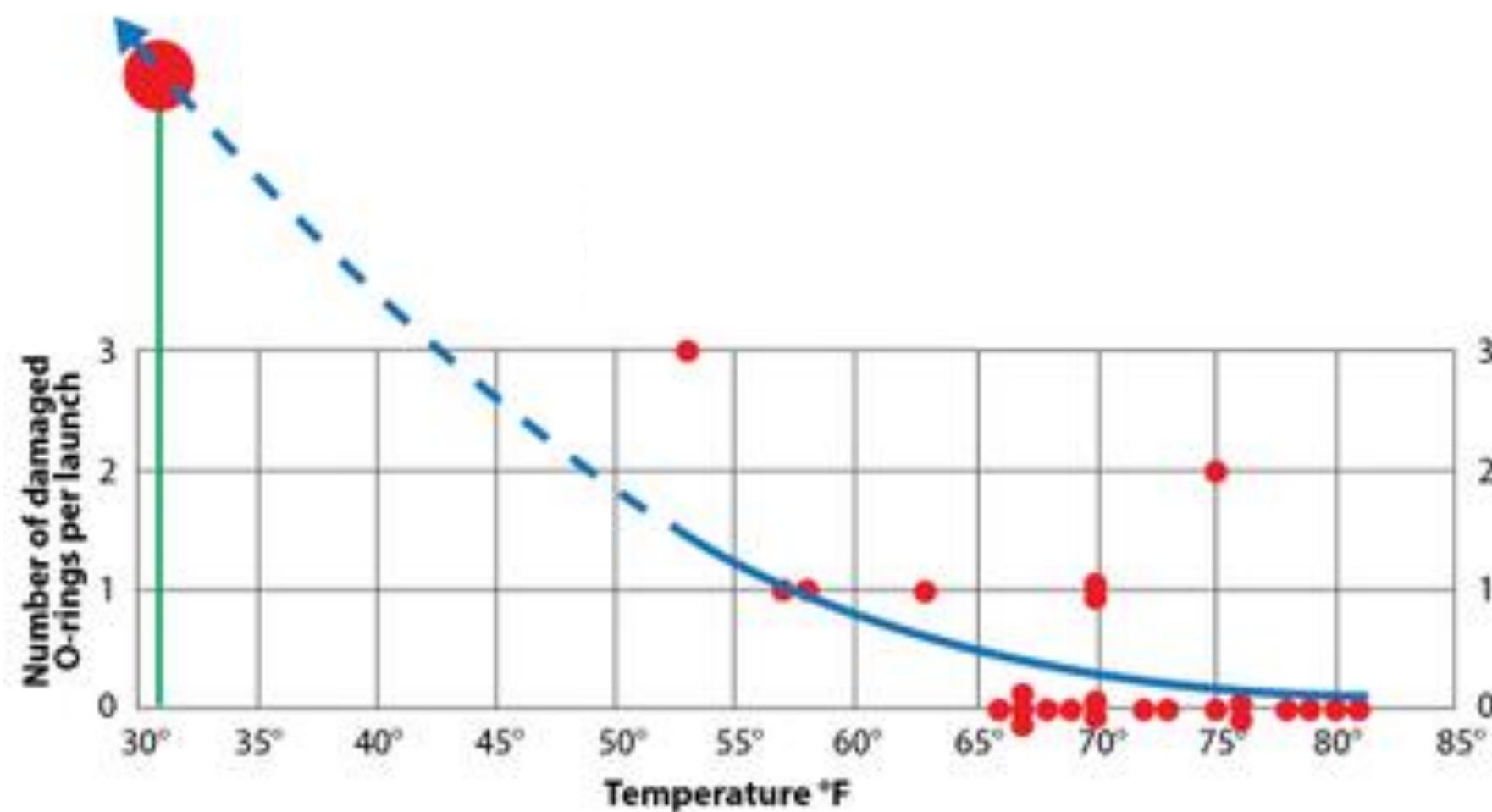
History of O-Ring Damage in Field Joints (Cont)



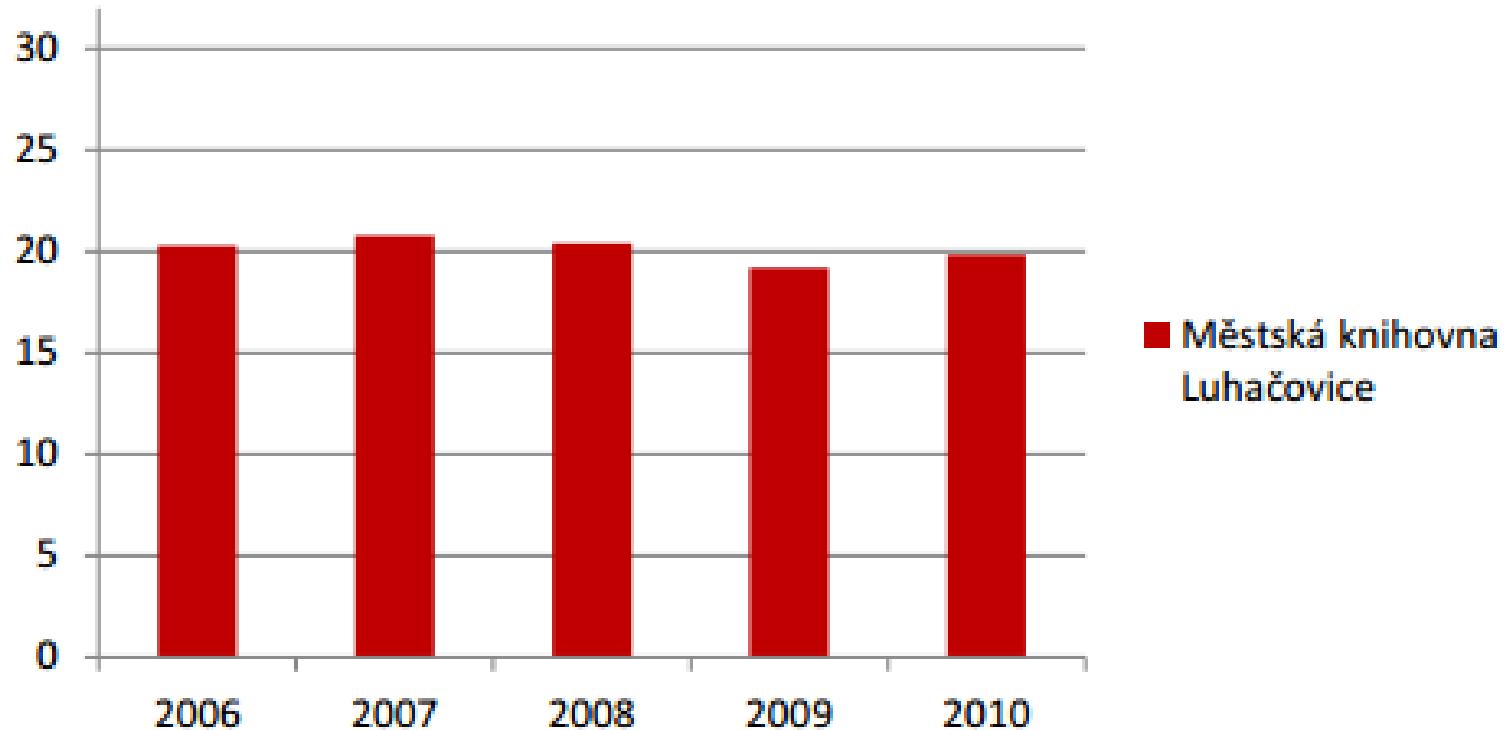
* No Erosion

MORTON THOKOL, INC.
Wasatch Operations

INFORMATION ON THIS PAGE WAS PREPARED TO SUPPORT AN ORAL PRESENTATION
AND CANNOT BE CONSIDERED COMPLETE WITHOUT THE ORAL DISCUSSION



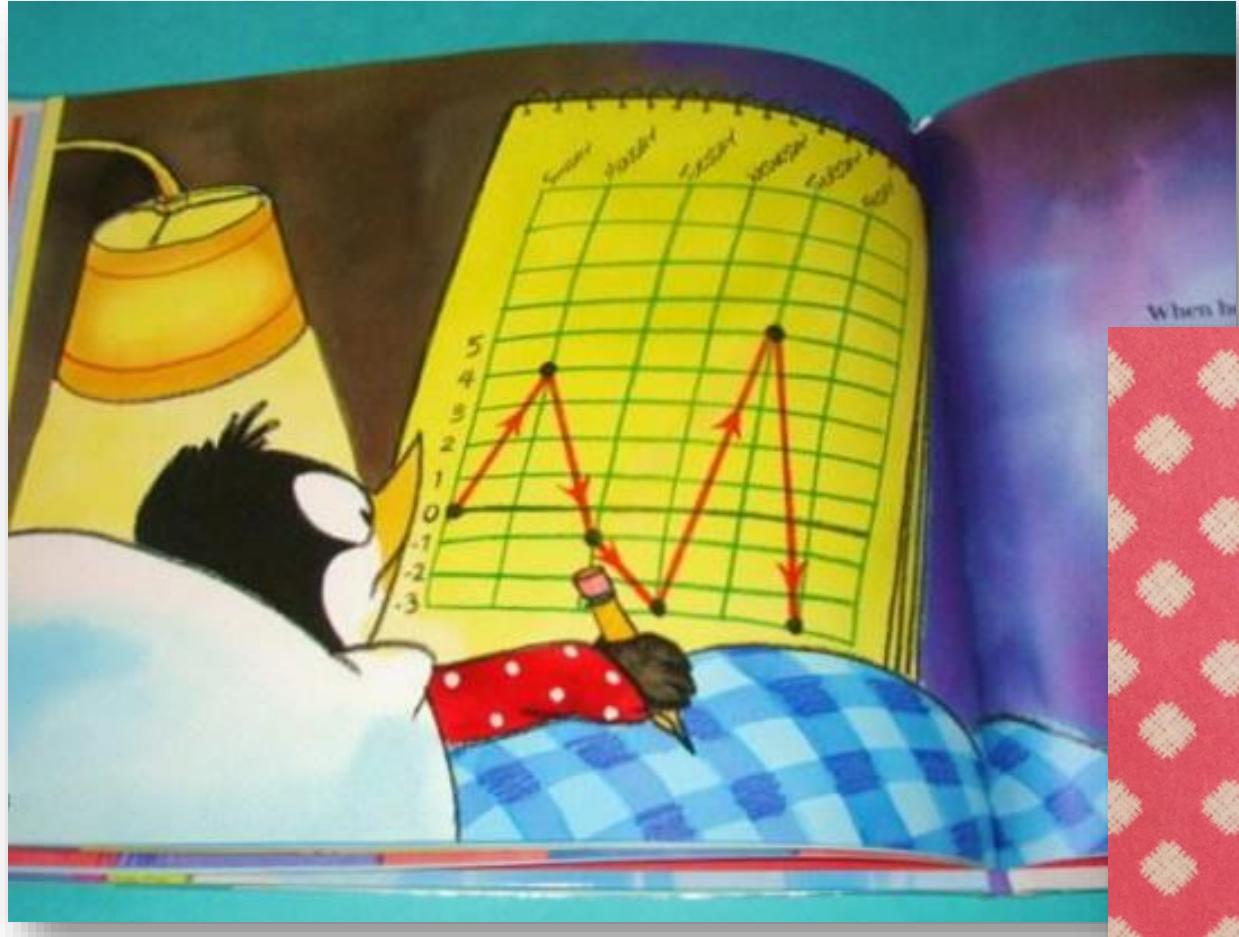
Městská knihovna Luhačovice

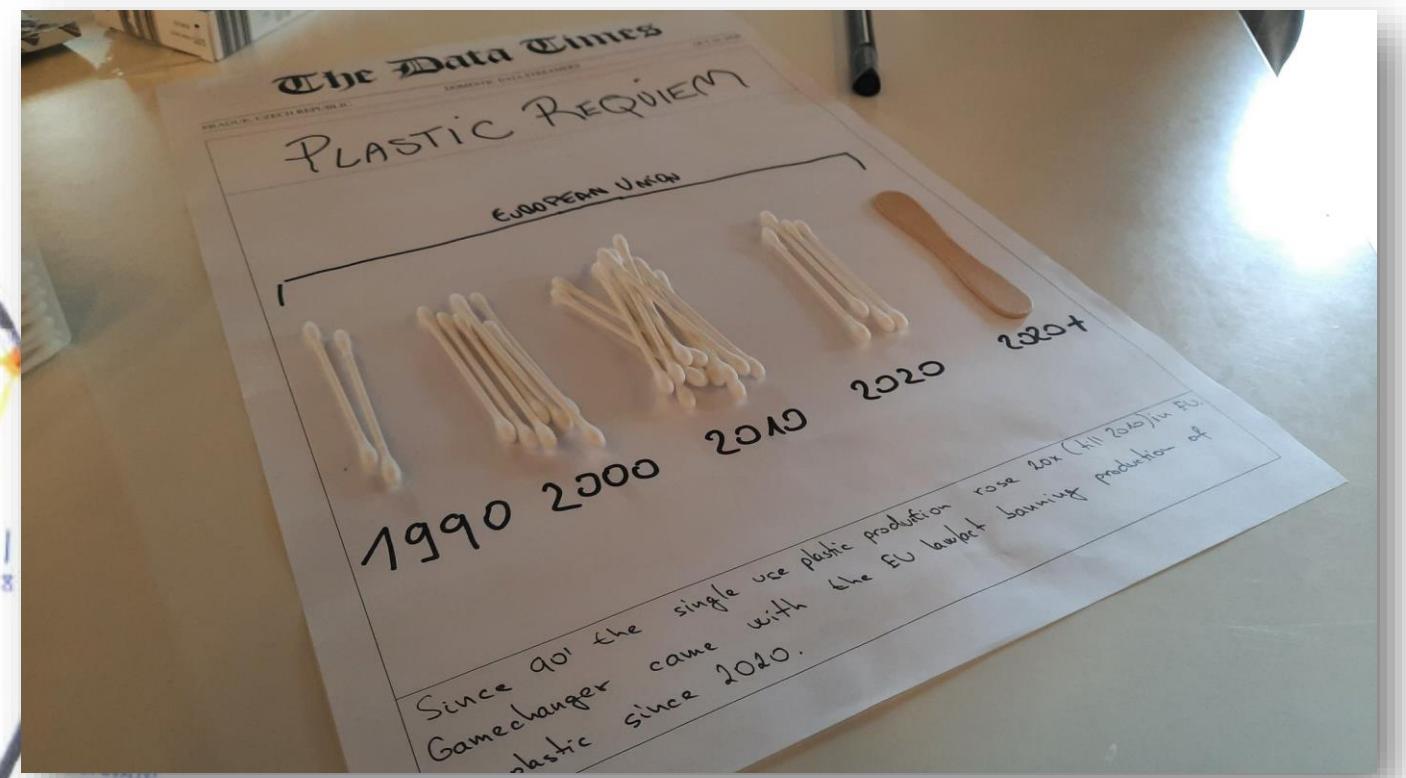
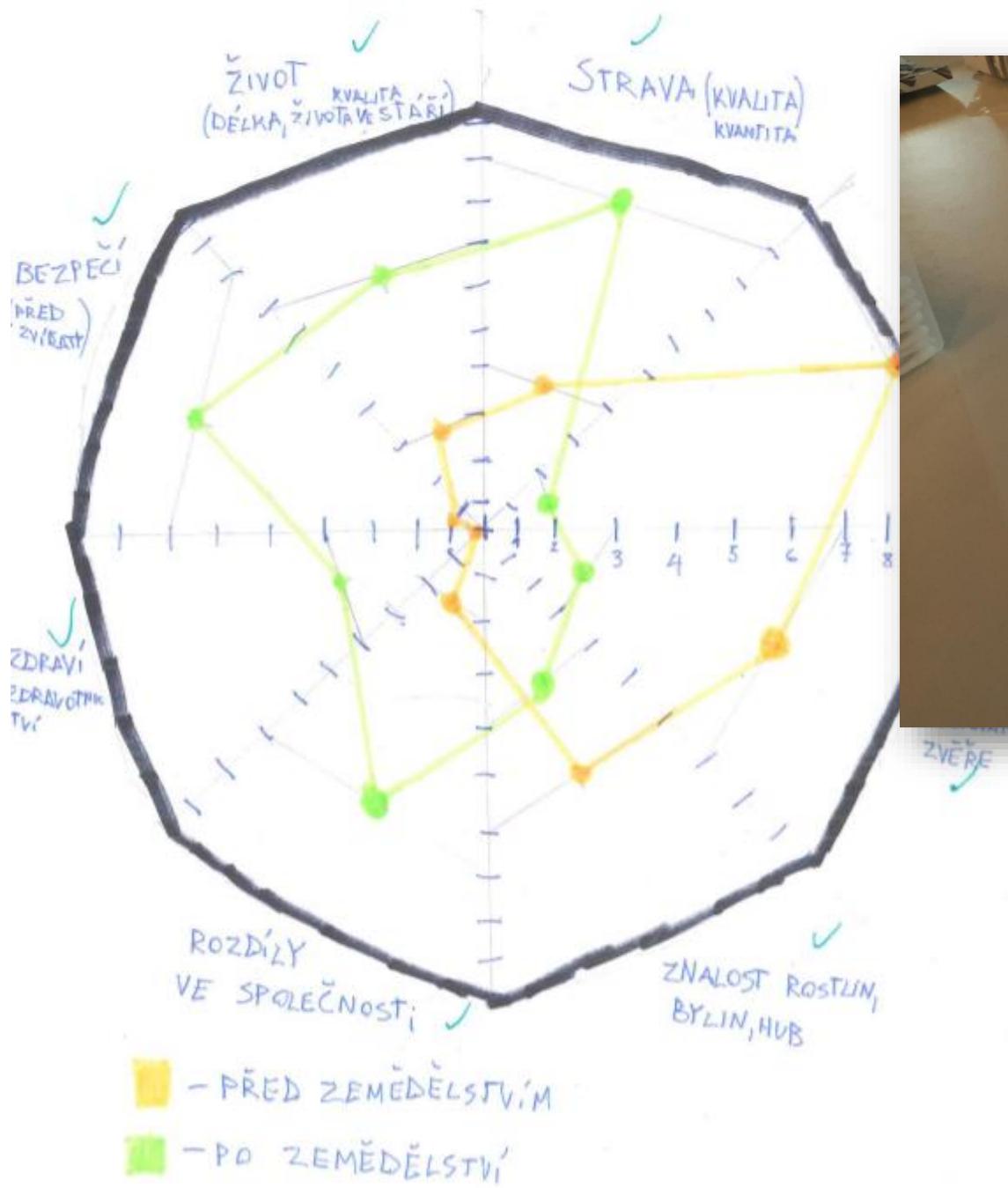


Graf 2: Registrovaní čtenáři MěK Luhačovice

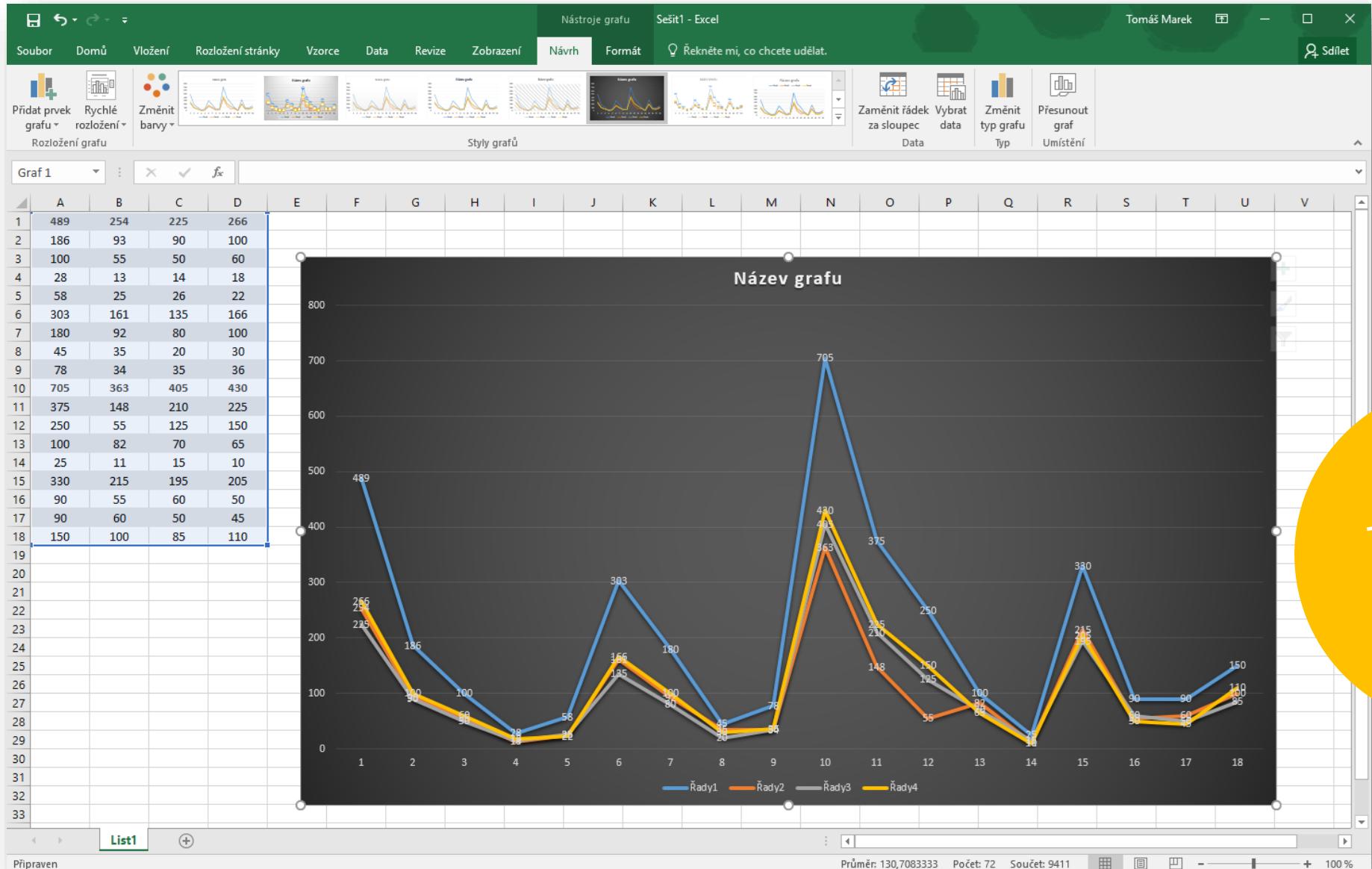
Unlike, say, language arts, the subject of information graphics is rarely taught in schools, nor is it part of on-the-job training. This leaves professionals in every industry scrambling to express themselves graphically.

Dona M. Wong

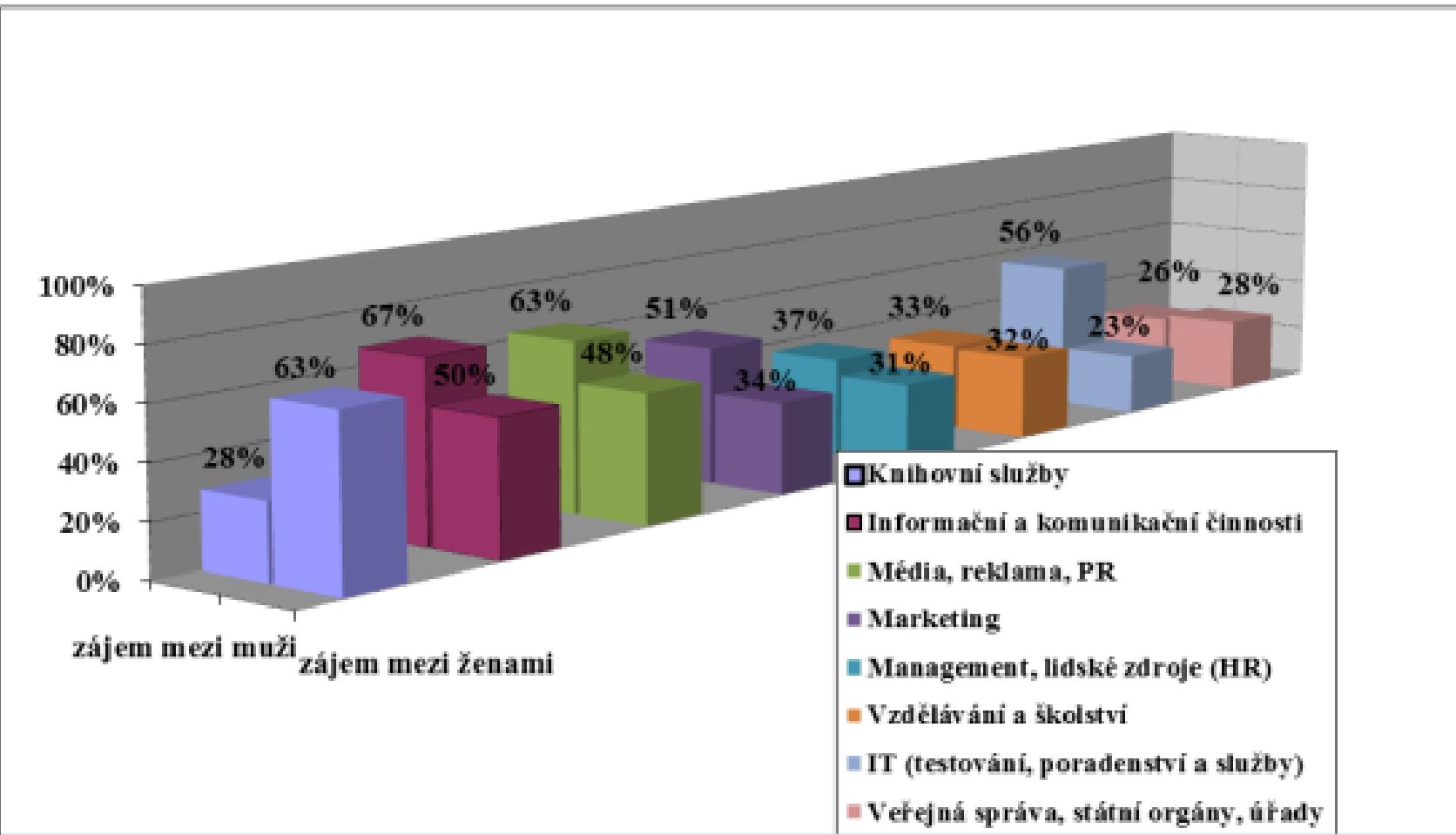


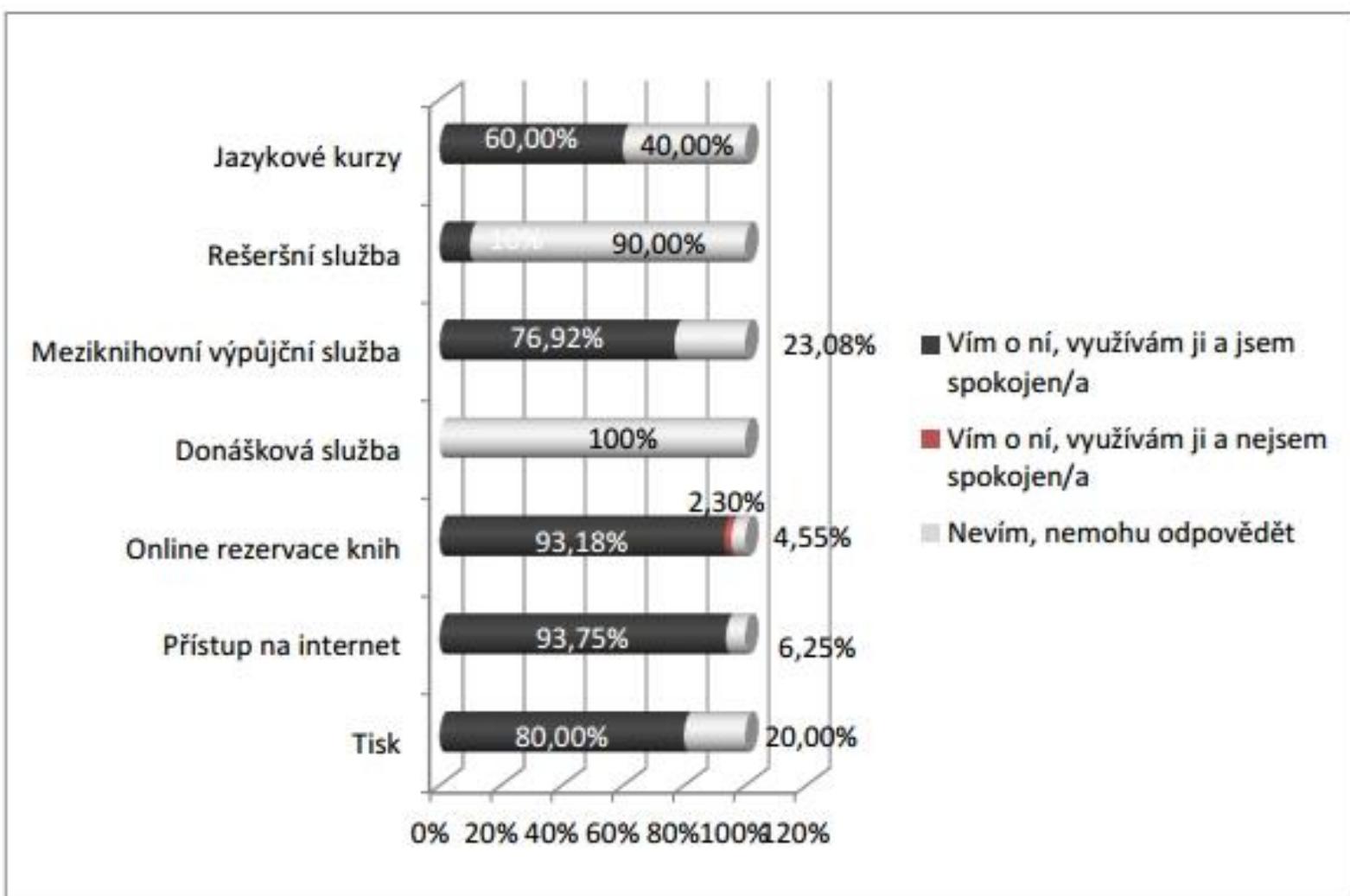


<https://twitter.com/PanUcitel89/status/1448346256921833478>
<https://twitter.com/dvoriik/status/1452976359693762572>

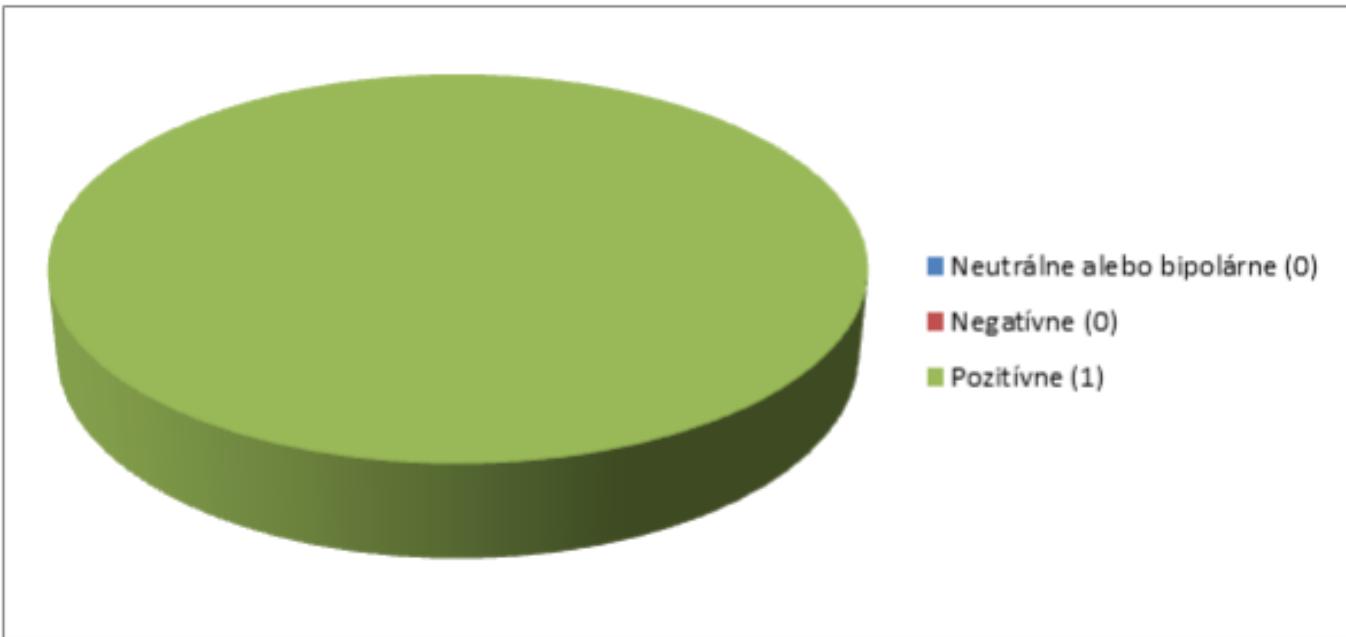


Termíny
v ISu

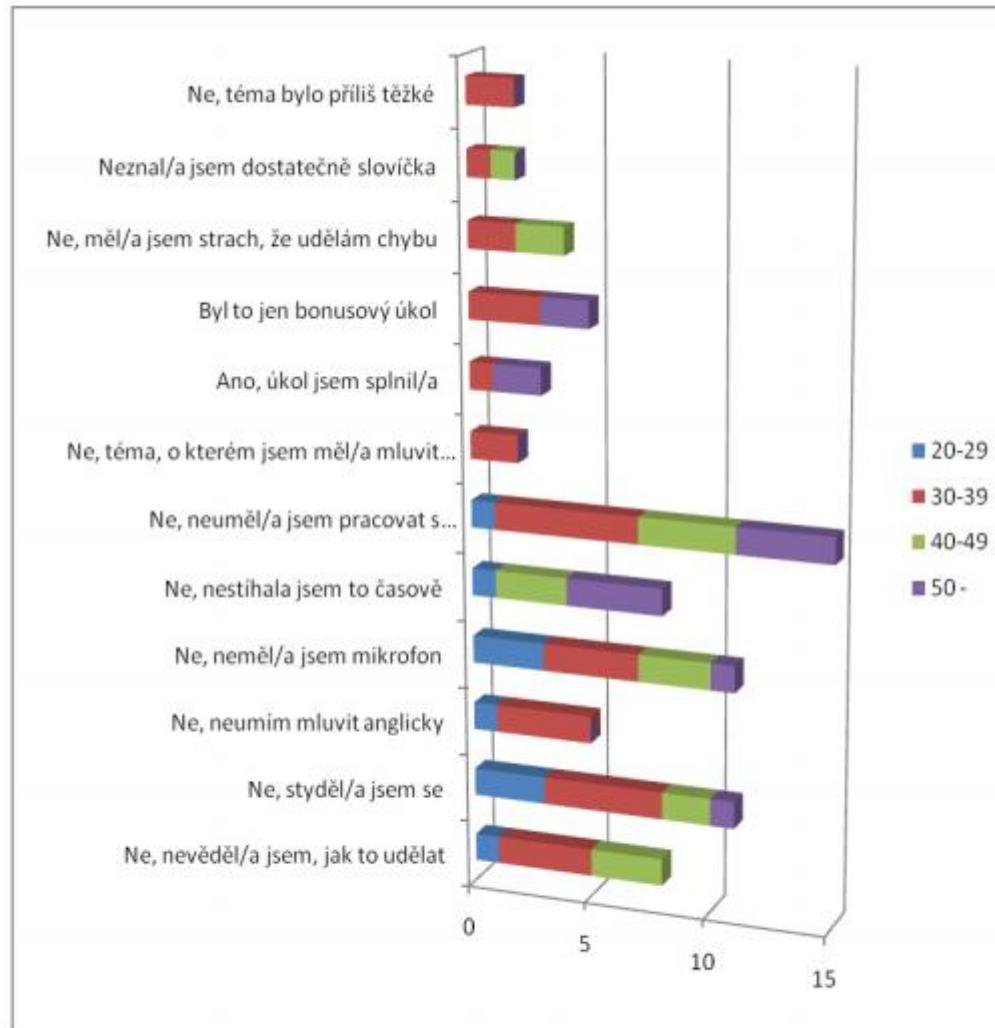




Graf 12: Ostatní služby



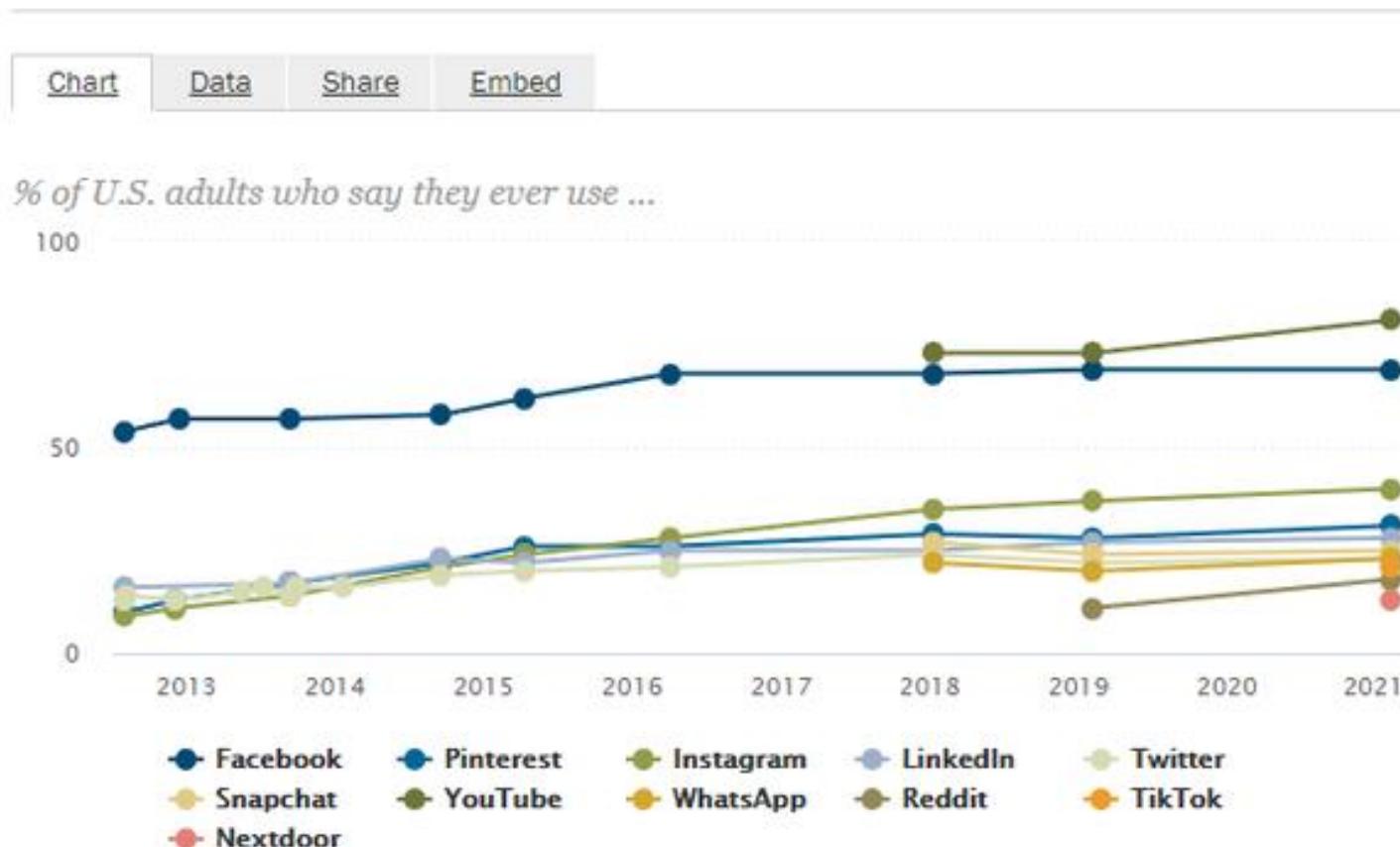
Obrázok 9 – Graf analýzy komentárov spotu *S námi chybú neuděláte*

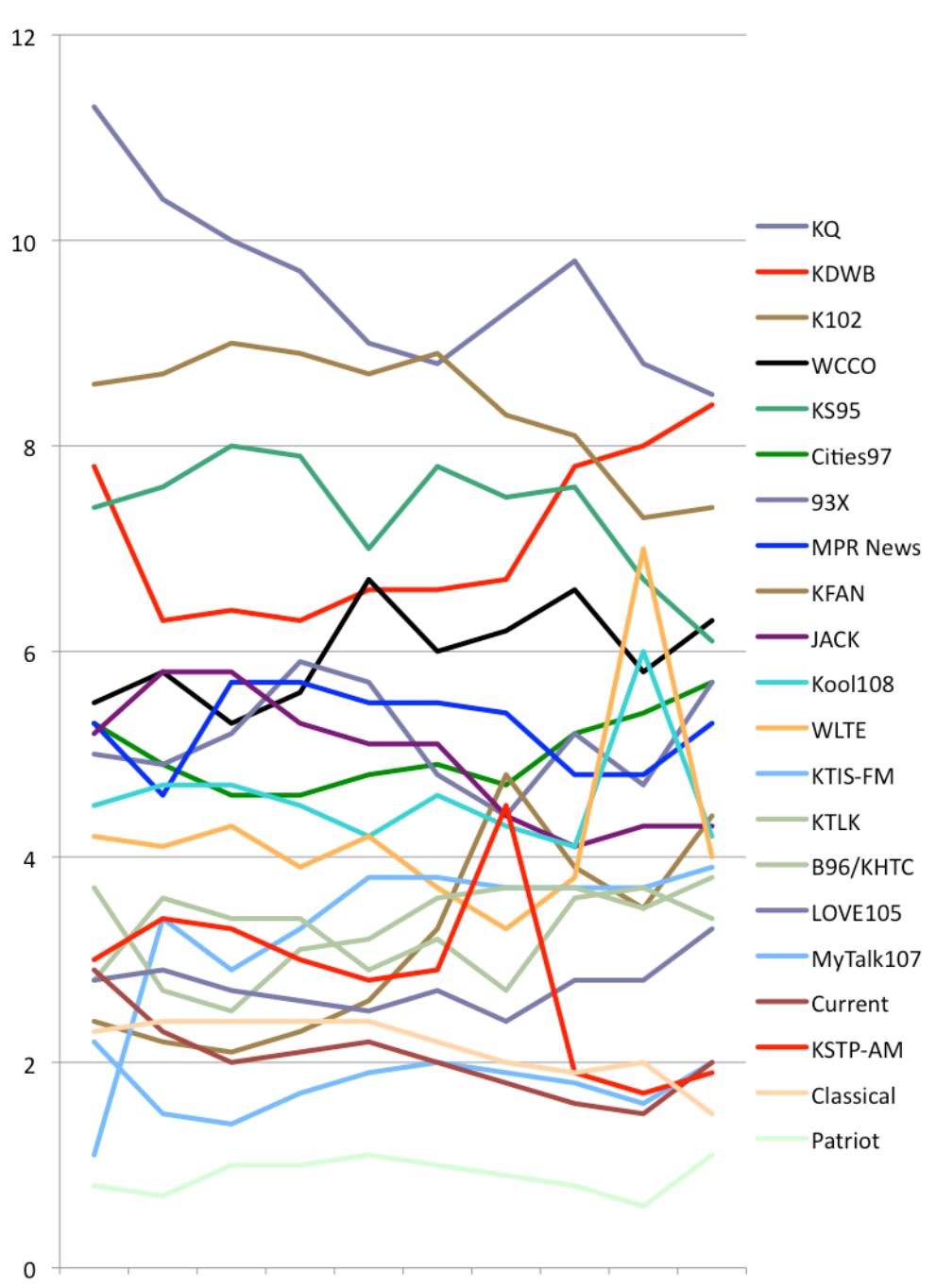


GRAF 27 – Bonusový úkol odeslání audionahrávky.

Which social media platforms are most common

YouTube and Facebook are the most-widely used online platforms, and its user base is most broadly representative of the population as a whole. Smaller shares of Americans use sites such as Twitter, Pinterest, Instagram and LinkedIn.





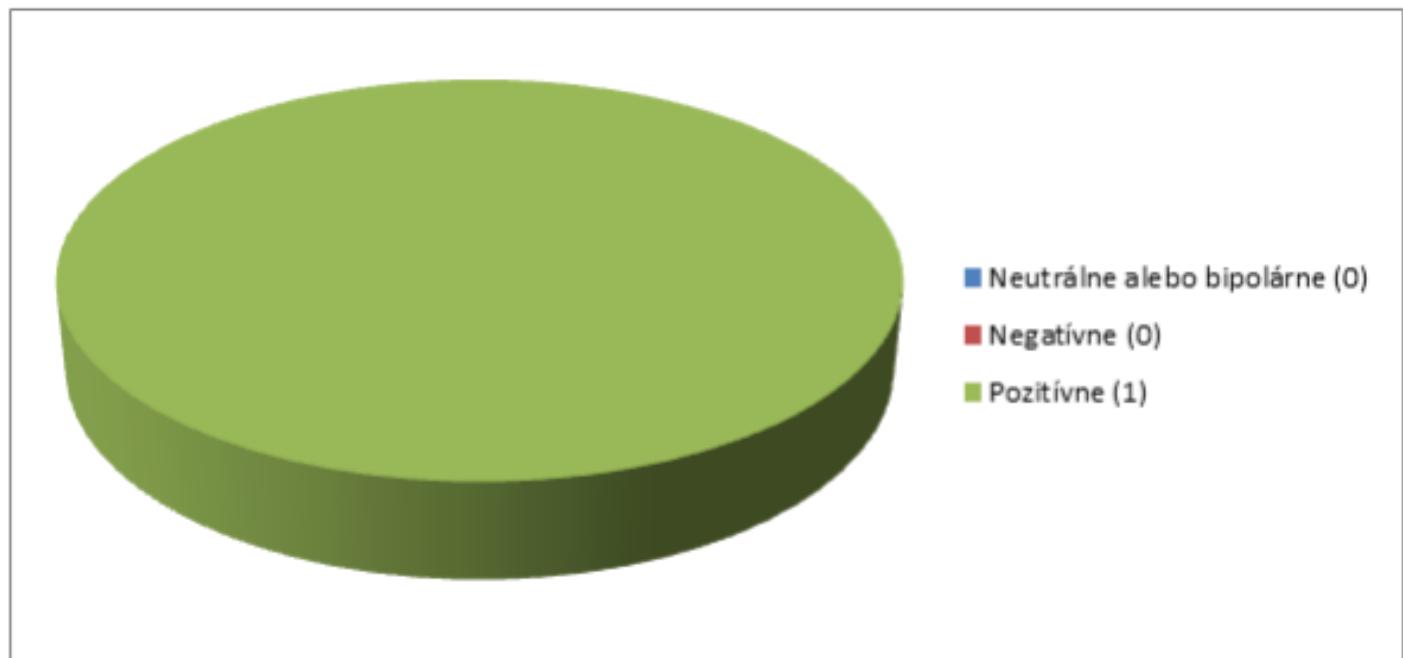
Základní koncepty funkční vizualizace

Smysl vizualizace

The purpose of visualization is insight,
not pictures.

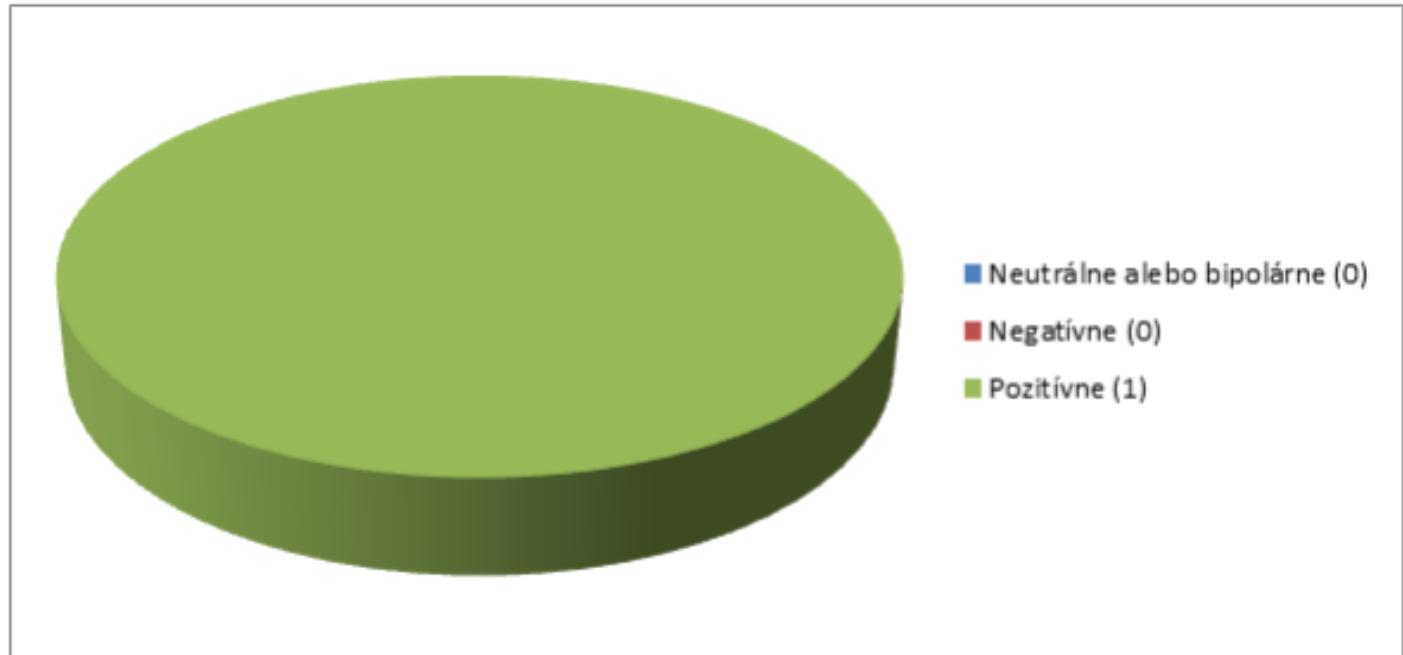
Ben Shneiderman

vizualizace není povinnost



Obrázok 9 – Graf analýzy komentárov spotu *S námi chybu neuděláte*

vizualizace není povinnost

$$\text{data density} = \frac{\text{number of entries in data matrix}}{\text{area of data graphic}}$$


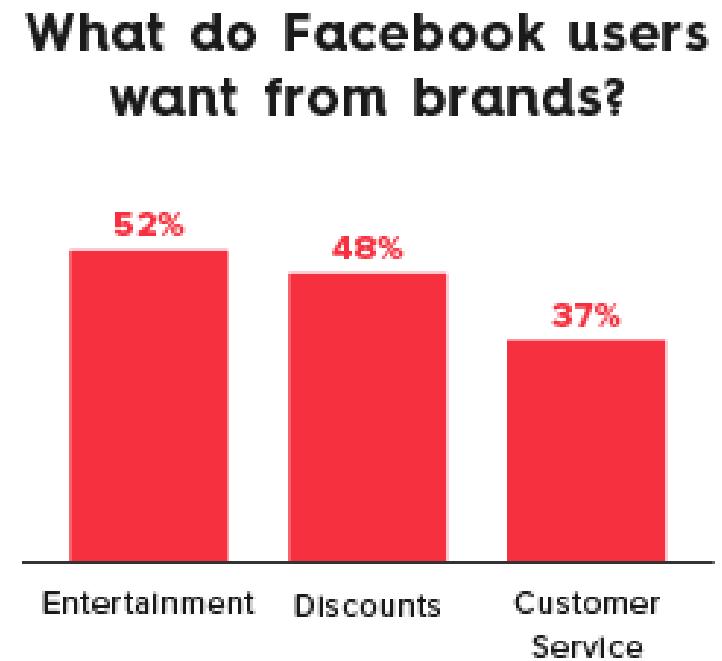
Obrázok 9 – Graf analýzy komentárov spotu *S námi chybu neuděláte*

cíle určují formu

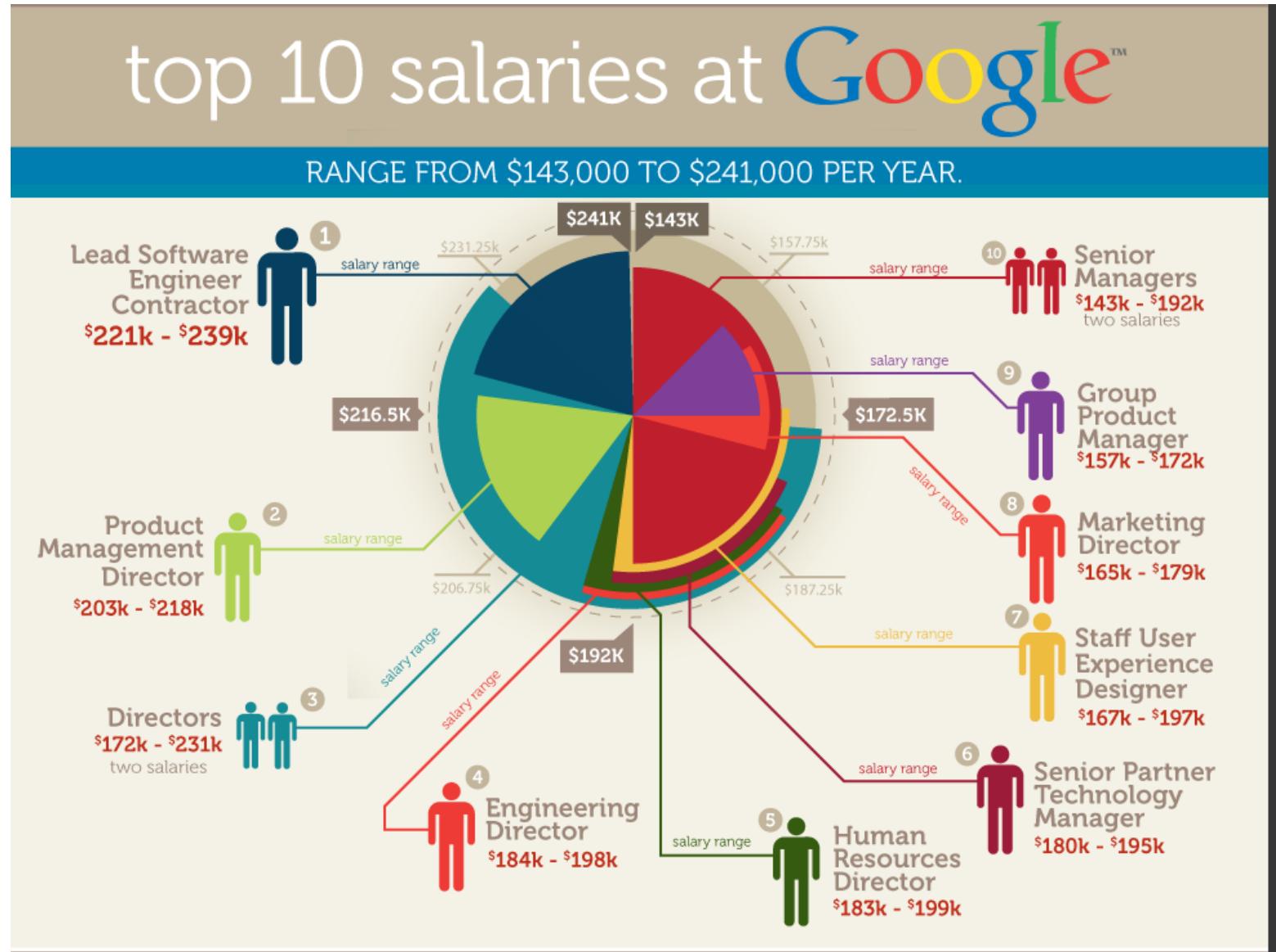
What do Facebook users want from brands?



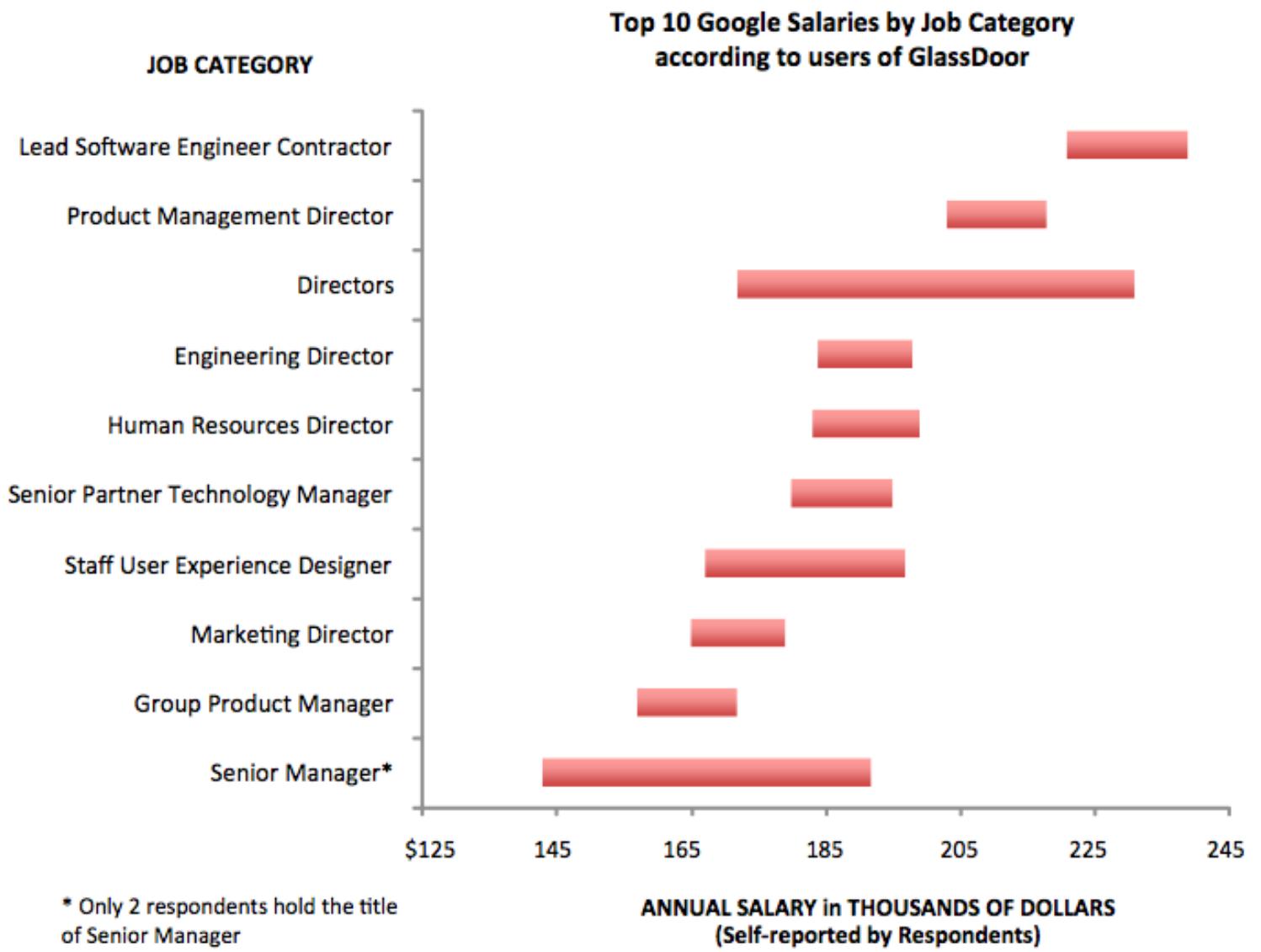
cíle určují formu



cíle určují formu

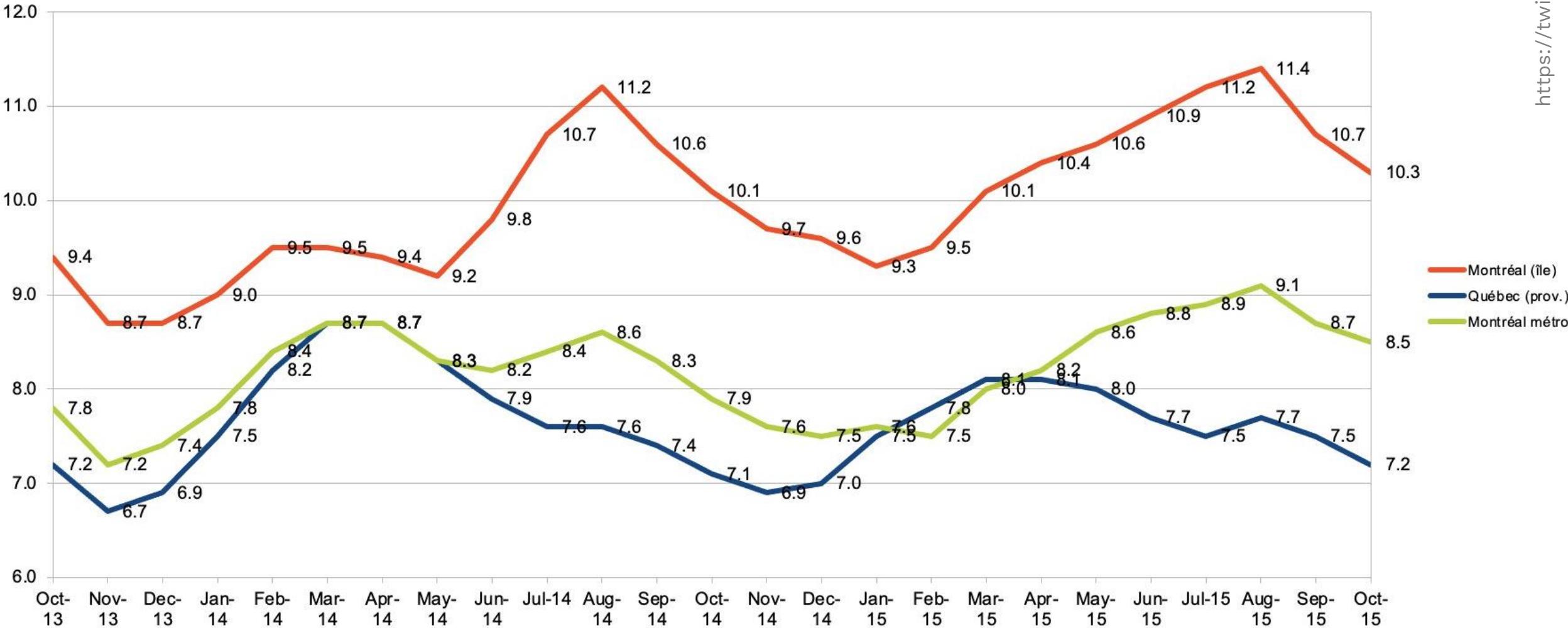


cíle určuje formu



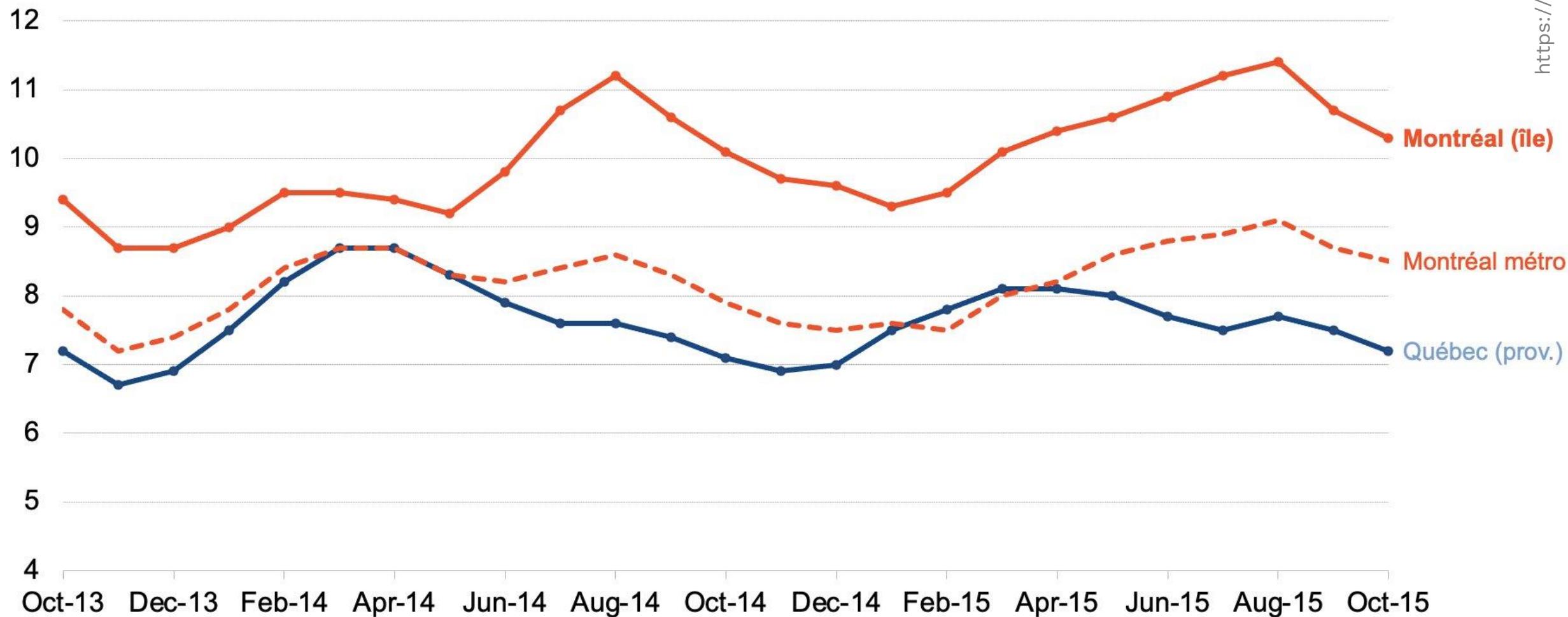
cíle určují formu

Taux de chômage, octobre 2013-octobre 2015

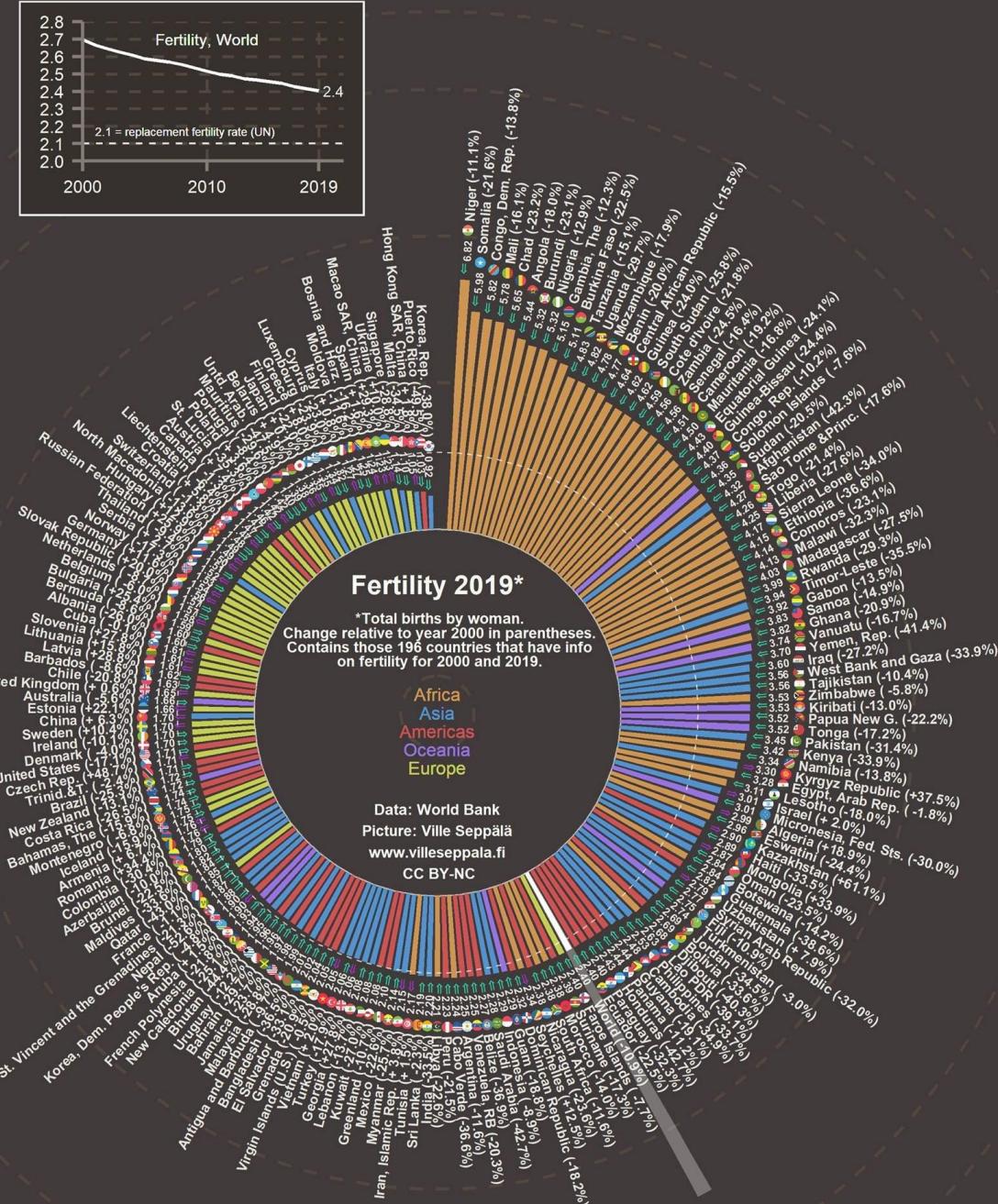


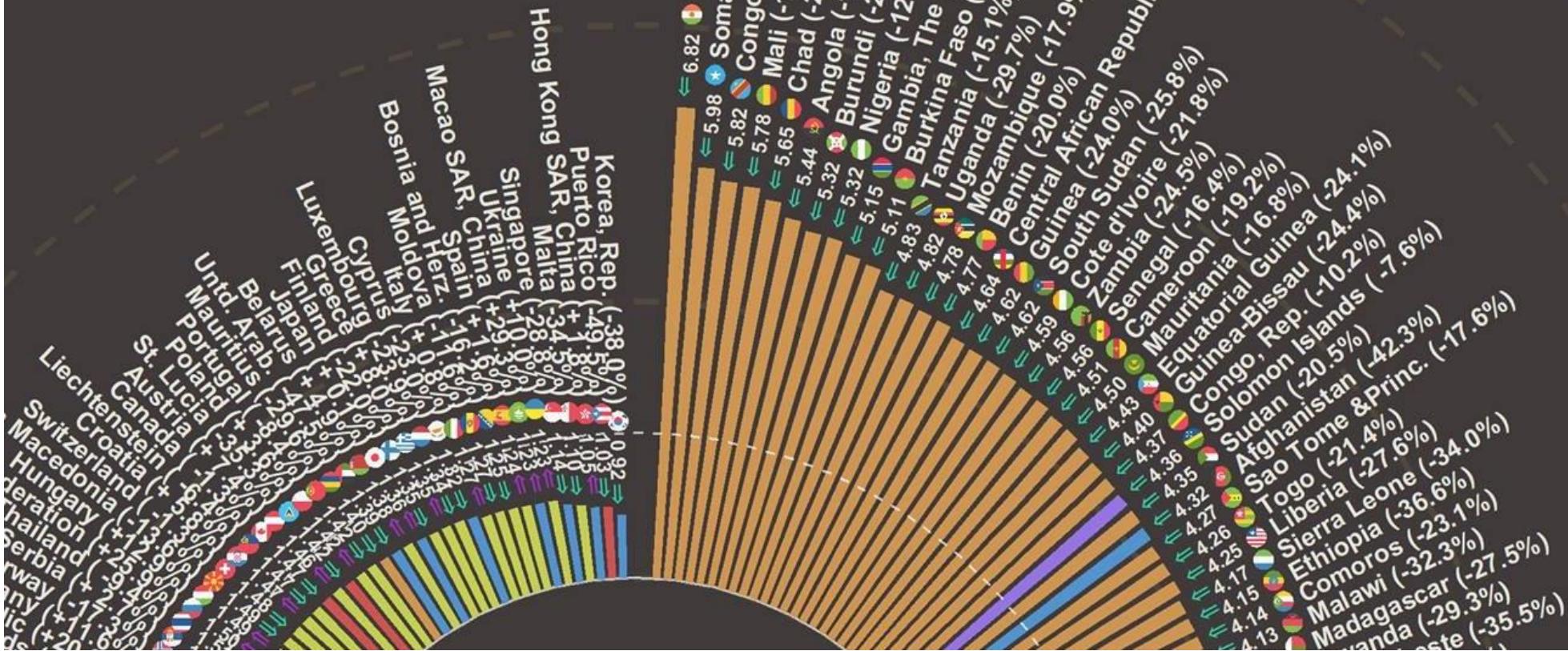
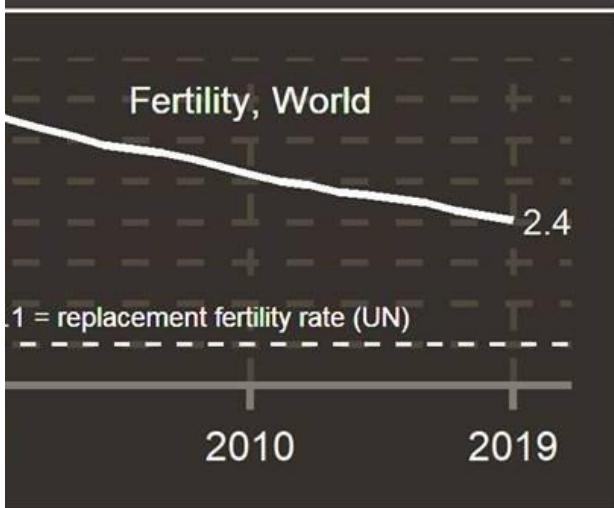
cíle určují formu

Taux de chômage (%), octobre 2013-octobre 2015

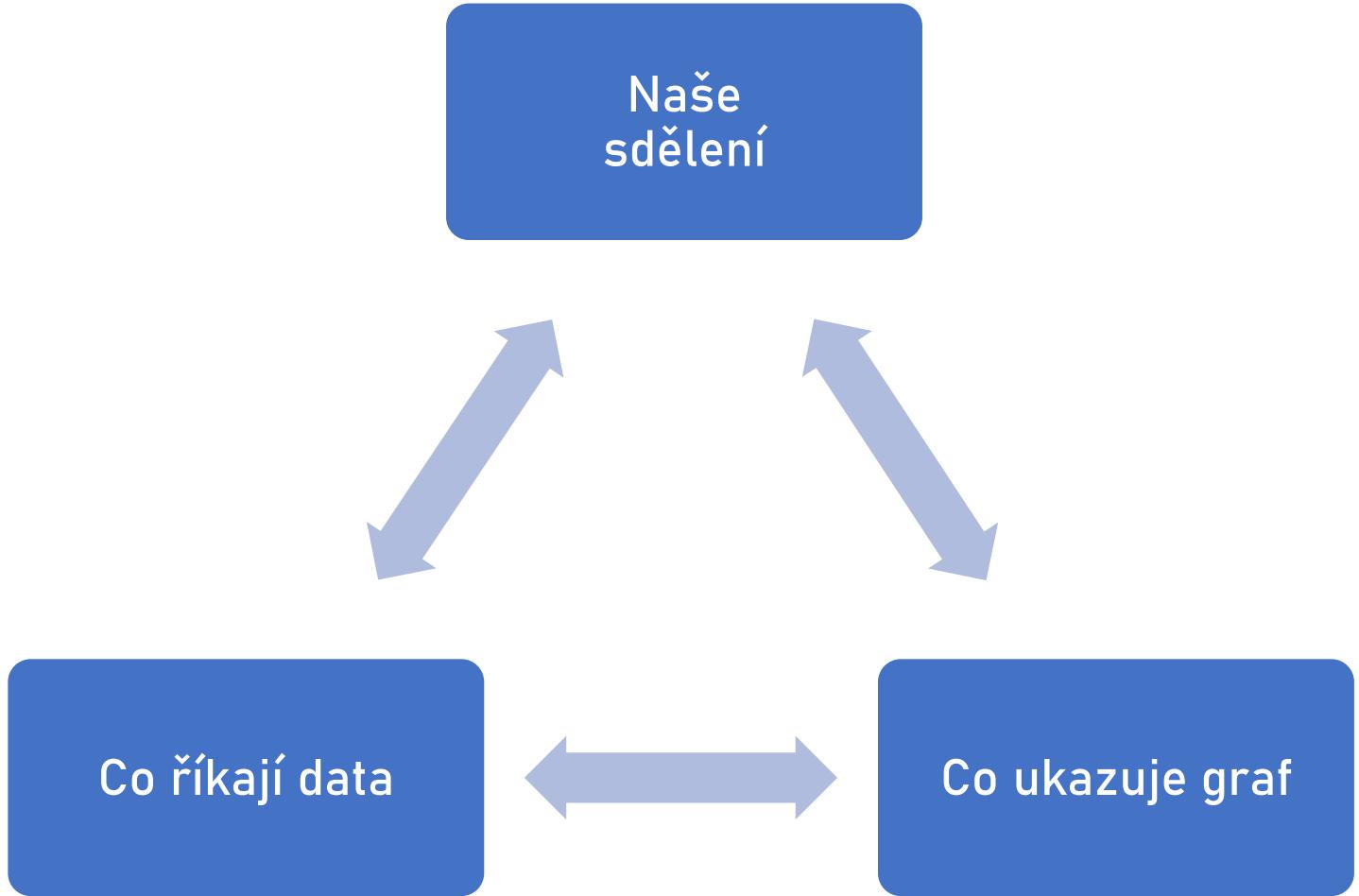


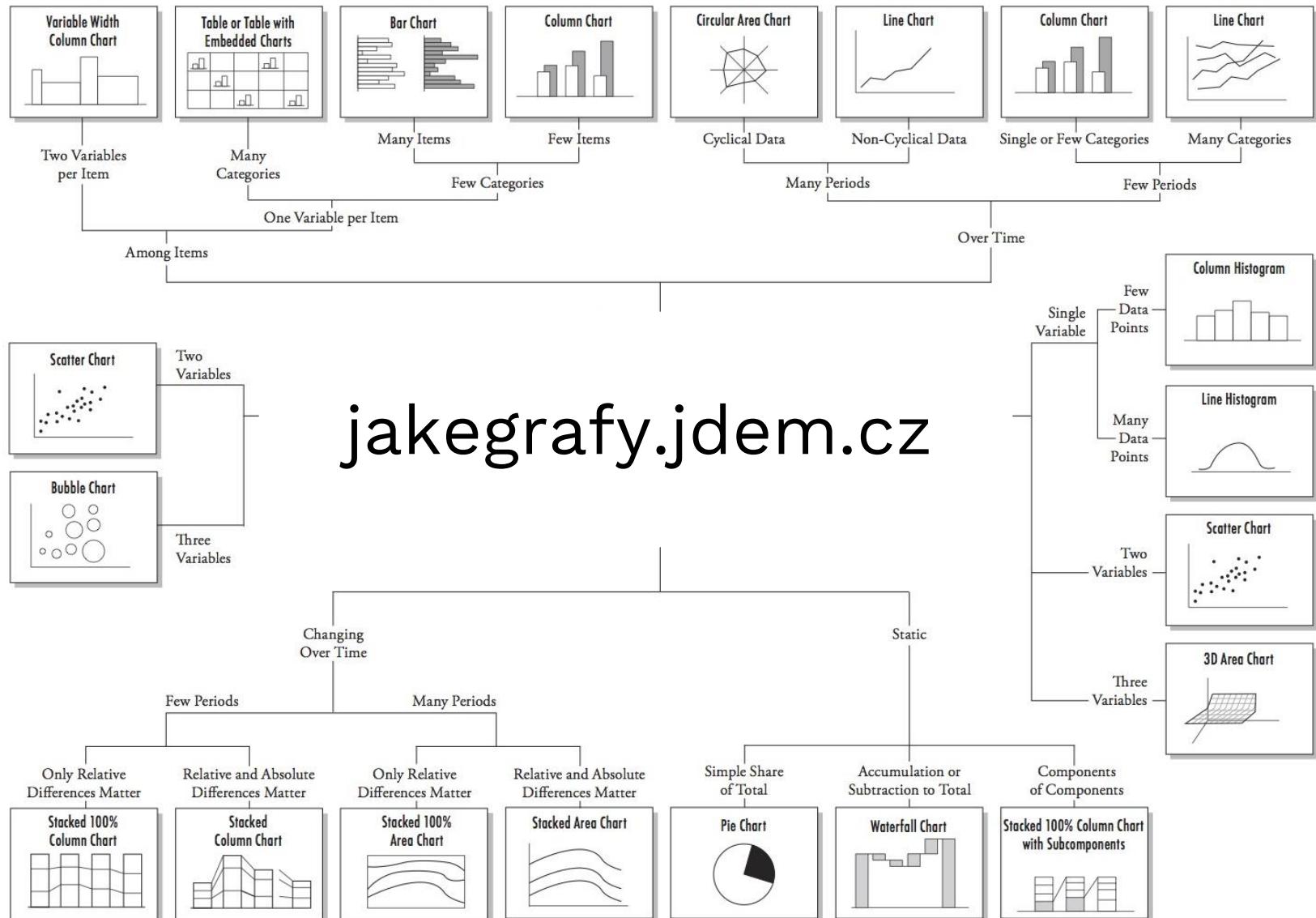
cíle určují formu





cíle určují formu





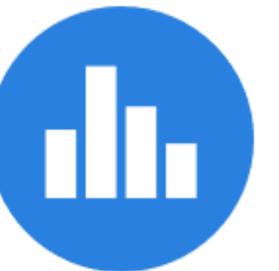
jakegrafy.jdem.cz



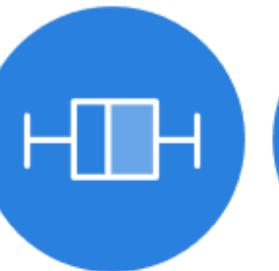
Arc Diagram



Area Graph



Bar Chart



Box & Whisker Plot



Brainstorm



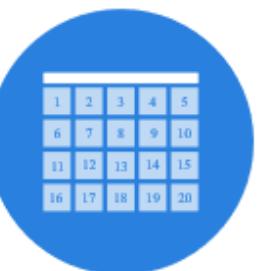
Bubble Chart



Bubble Map



Bullet Graph



Calendar



Candlestick Chart



Chord Diagram



Choropleth Map



Circle Packing



Connection Map



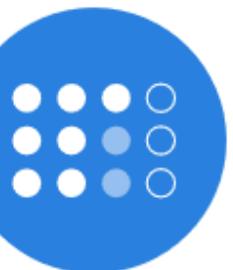
Density Plot



Donut Chart



Dot Map



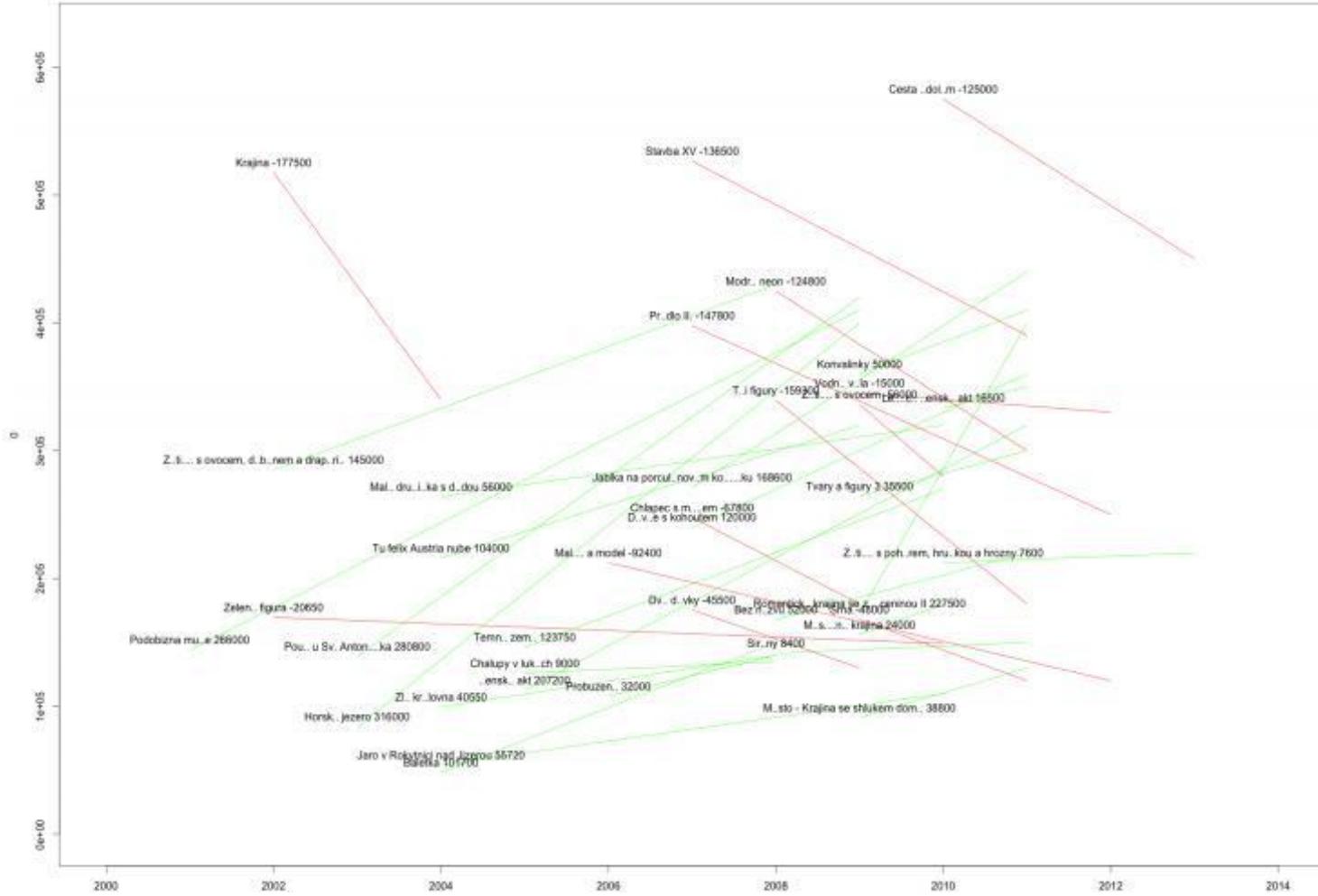
Dot Matrix Chart

<https://datavizcatalogue.com/>

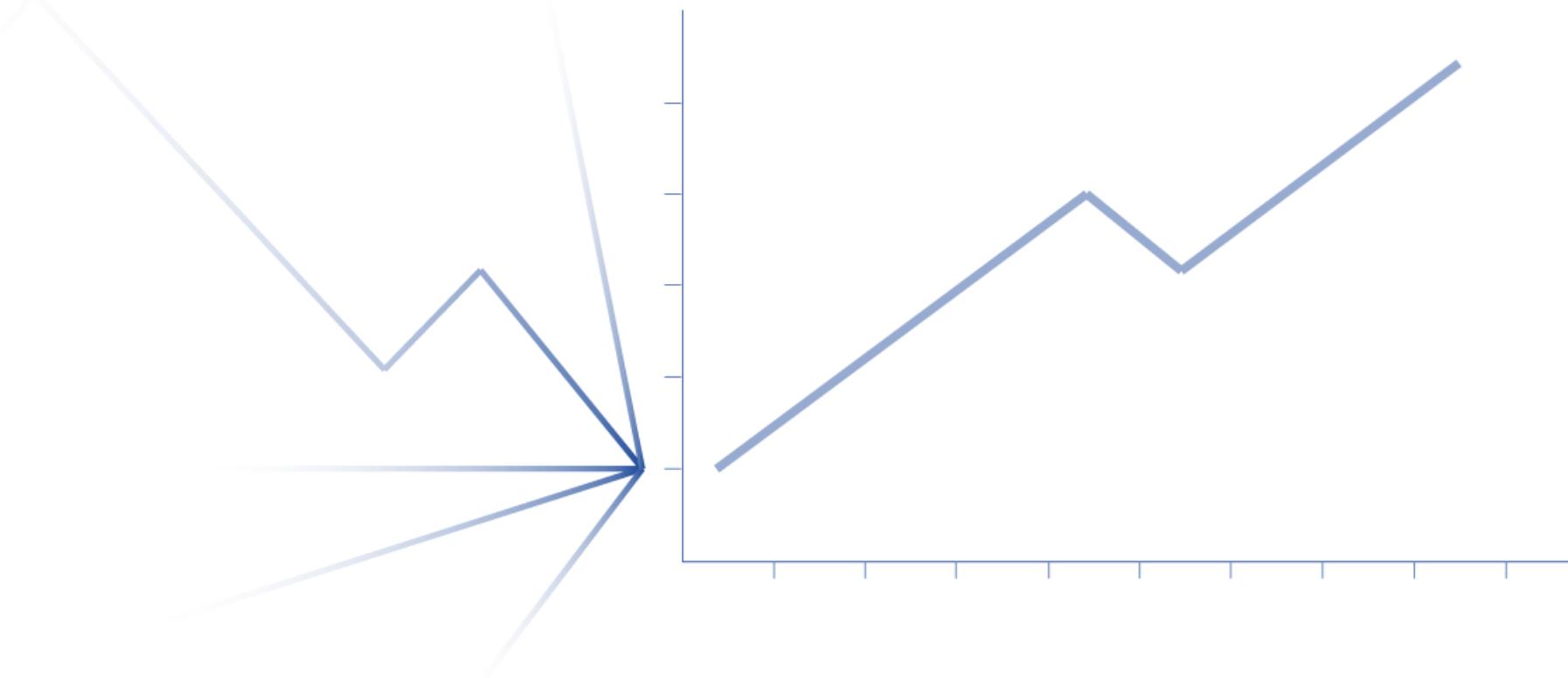
explorace není k prezentaci

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Obrazek
1	Název	Autor	Vytvorenlo	Sírka	Výška	Hloubka	Polomér	Technika	Singovanlo	Aukcni_sir	Misto_p	Datum_prod	Vyvolavaci	Konecna_cena	Provize	Poznamky	
2																	
3	Myslivci	Anderlová Alena	2009-07-01 16:48:37	55.0	45.0	0.0	0.0	Olej	sign. na rubu	Prague Auctions	Praha	2003-09-28	6000.00	0.00	15.00		http://www.artplus.cz
4																	
5	Svatý	Balcar Martin	2009-07-01 16:48:37	80.0	120.0	0.0	0.0	Olej	signováno	Prague Auctions	Praha	2003-09-28	25000.00	0.00	15.00		http://www.artplus.cz
6																	
7	Pláštěnky	Anderlová Alena	2009-07-01 16:48:37	40.0	30.0	0.0	0.0	Olej	sign. na rubu	Prague Auctions	Praha	2003-09-28	5000.00	5000.00	15.00		http://www.artplus.cz
8																	
9	Na třešních	Bím Tomáš	2009-07-01 16:48:37	50.0	60.0	0.0	0.0	Akryl		Prague Auctions	Praha	2003-09-28	50000.00	50000.00	15.00		http://www.artplus.cz
10																	
11	Insinuace	Istler Josef	2009-07-01 16:48:38	44.0	58.0	0.0	0.0	NULL	signováno	Dorotheum Praha	Praha	2008-11-29	15000.00	0.00	20.00		http://www.artplus.cz
12																	
13	Sv. Lukáš ml.	NULL	2009-07-01 16:48:38	74.0	88.0	0.0	0.0	Olej	nesignováno	Dorotheum Praha	Praha	2008-11-29	60000.00	0.00	20.00	Autorství:	http://www.artplus.cz
14																	
15	Kuňák	David Teniers ml.	2009-07-01 16:48:38	29.5	39.0	0.0	0.0	NULL	nesignováno	Dorotheum Praha	Praha	2008-11-29	70000.00	0.00	20.00		http://www.artplus.cz
16																	
17	Rybáři	NULL	2009-07-01 16:48:38	32.0	22.0	0.0	0.0	NULL	nesignováno	Dorotheum Praha	Praha	2008-11-29	50000.00	60000.00	20.00	Autorství:	http://www.artplus.cz
18																	
19	Na dvoře	Hondecoeter Melchior	2009-07-01 16:48:38	74.0	85.0	0.0	0.0	Olej	nesignováno	Dorotheum Praha	Praha	2008-11-29	70000.00	0.00	20.00		http://www.artplus.cz
20																	
21	Noční setkání	NULL	2009-07-01 16:48:38	36.5	45.0	0.0	0.0	NULL	nesignováno	Dorotheum Praha	Praha	2008-11-29	150000.00	0.00	20.00	Autorství:	http://www.artplus.cz
22																	
23	Lovecké zátiší	NULL	2009-07-01 16:48:38	16.0	21.0	0.0	0.0	NULL	vpravo dole WIBF	Dorotheum Praha	Praha	2008-11-29	30000.00	0.00	20.00	Autorství:	http://www.artplus.cz
24																	
25	Kytice ve váze	NULL	2009-07-01 16:48:38	17.5	26.5	0.0	0.0	NULL	nesignováno	Dorotheum Praha	Praha	2008-11-29	80000.00	80000.00	20.00	Autorství:	http://www.artplus.cz
26																	
27	Zátiší s ovocem	Hohenberger Franz	2009-07-01 16:48:38	55.0	68.0	0.0	0.0	Olej	vpravo dole Hohenber	Dorotheum Praha	Praha	2008-11-29	50000.00	0.00	20.00		http://www.artplus.cz
28																	
29	Sv. František	neznámý	2009-07-01 16:48:38	67.0	123.0	0.0	0.0	Malba	nesignováno	Dorotheum Praha	Praha	2008-11-29	180000.00	180000.00	20.00	Autorství:	http://www.artplus.cz
30																	
31	Krajina s hořicemi	neznámý	2009-07-01 16:48:38	68.0	55.0	0.0	0.0	Olej	nesignováno	Dorotheum Praha	Praha	2008-11-29	28000.00	0.00	20.00	Autorství:	http://www.artplus.cz

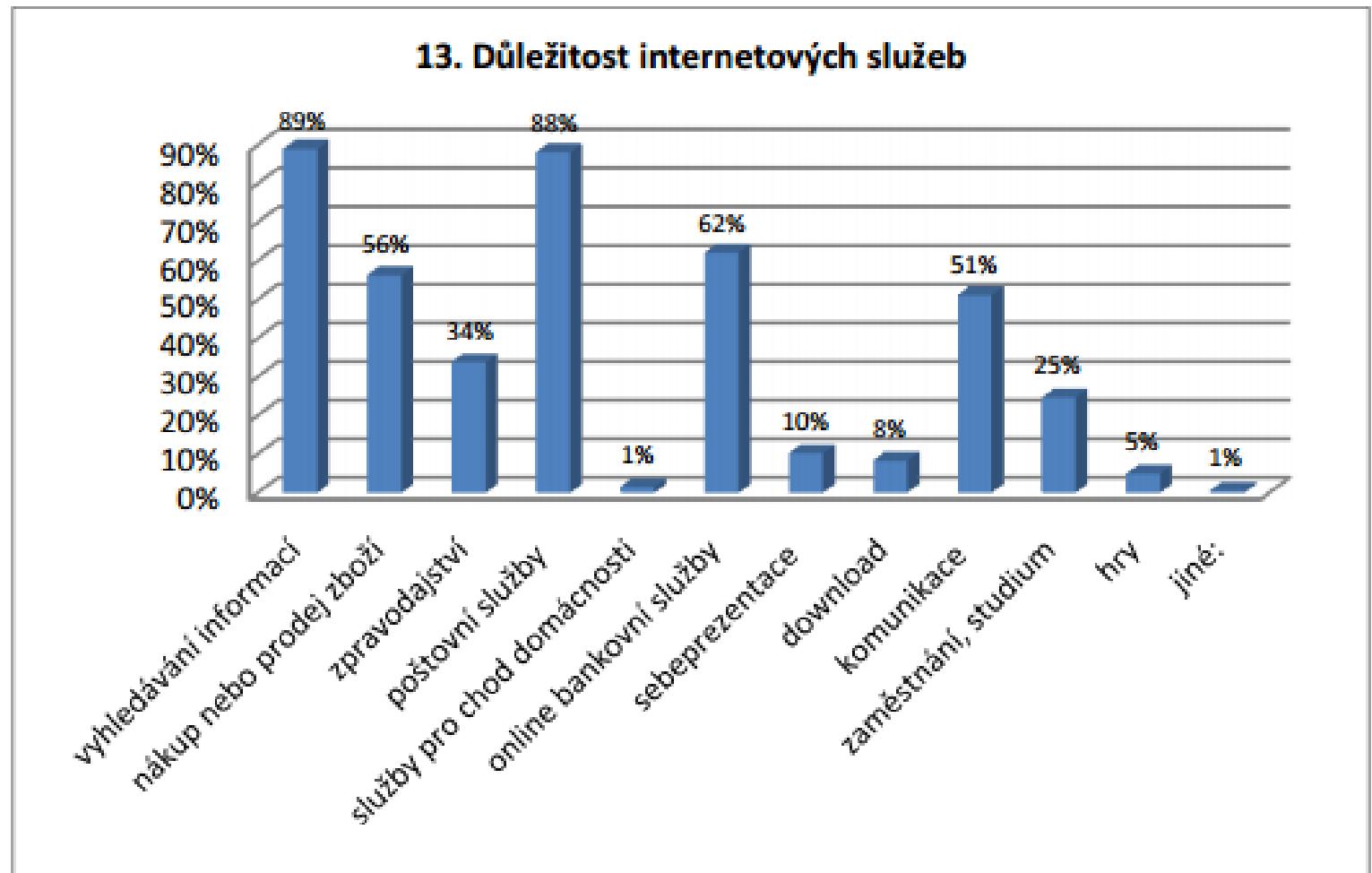
explorace není k prezentaci



rozsah na vstupu
je vědomá volba

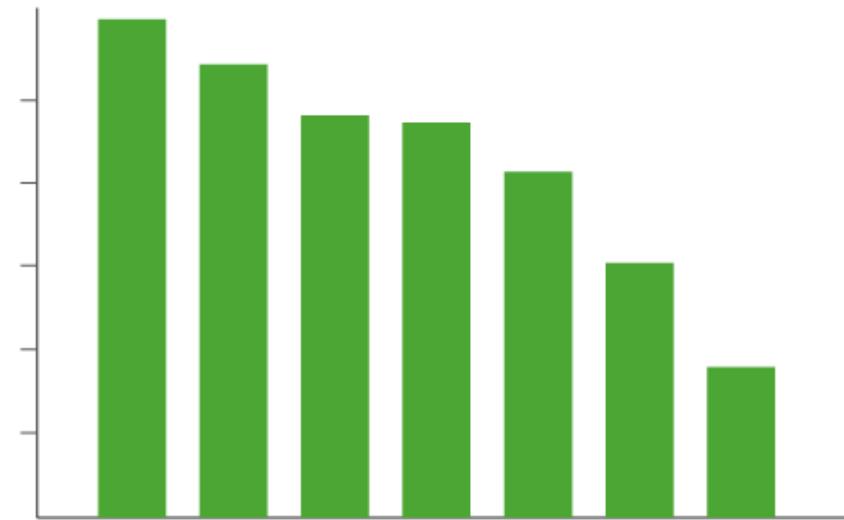
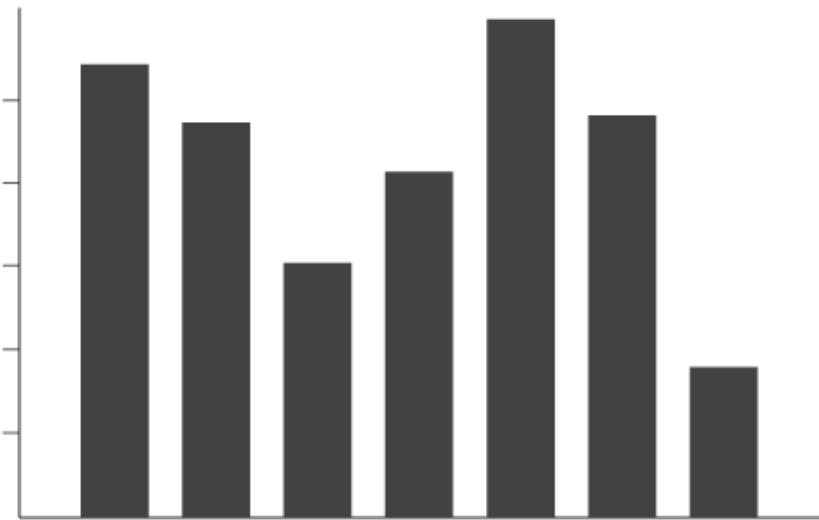


GI = GO



Graf 16: Které služby byste se nejhůře vzdávala?

GI = GO



konzultace není slabost



Graphic Design
is máj Passion

Estetika vizualizace



Estetika vizualizace





ZEN VERSION OF WHERE'S WALDO?

PIRARO © DAN PIRARO 1996

7-2!

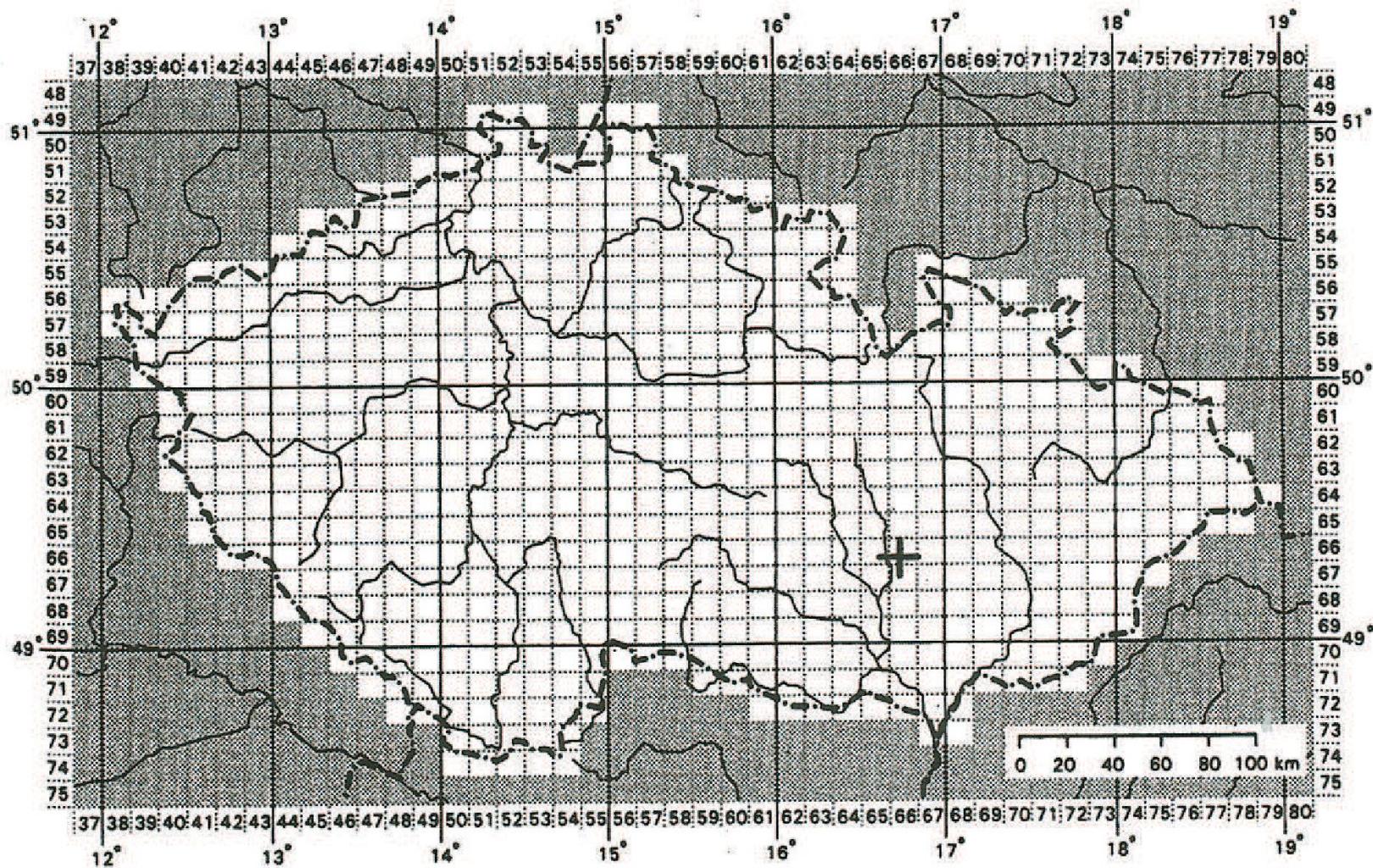


Fig. 1. Location map of the Barová Cave (South Moravia, Czech Republic) – black cross.

data-ink ratio

$$\text{data-ink ratio} = \frac{\text{datový inkoust}}{\text{veškerý inkoust}}$$

„Maximize the data-ink ratio, within reason.“

Edward Tufte

data-ink ratio

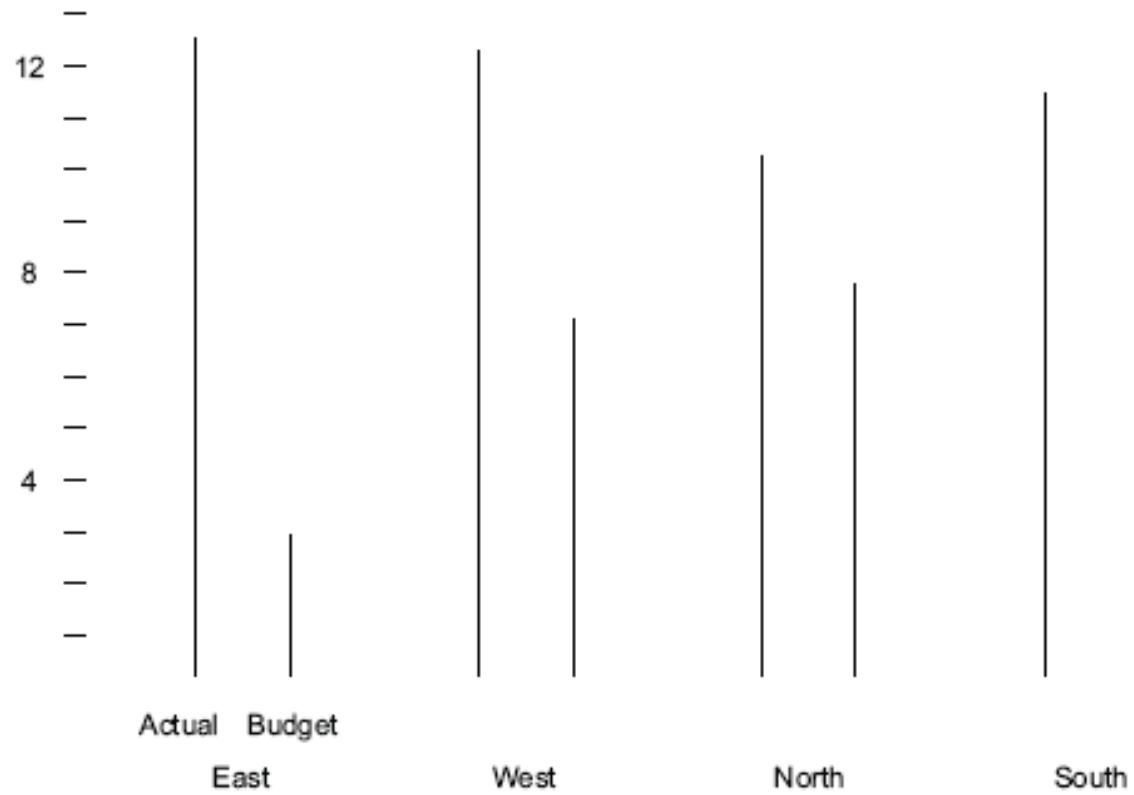


„Erase non-data-ink, within reason.“

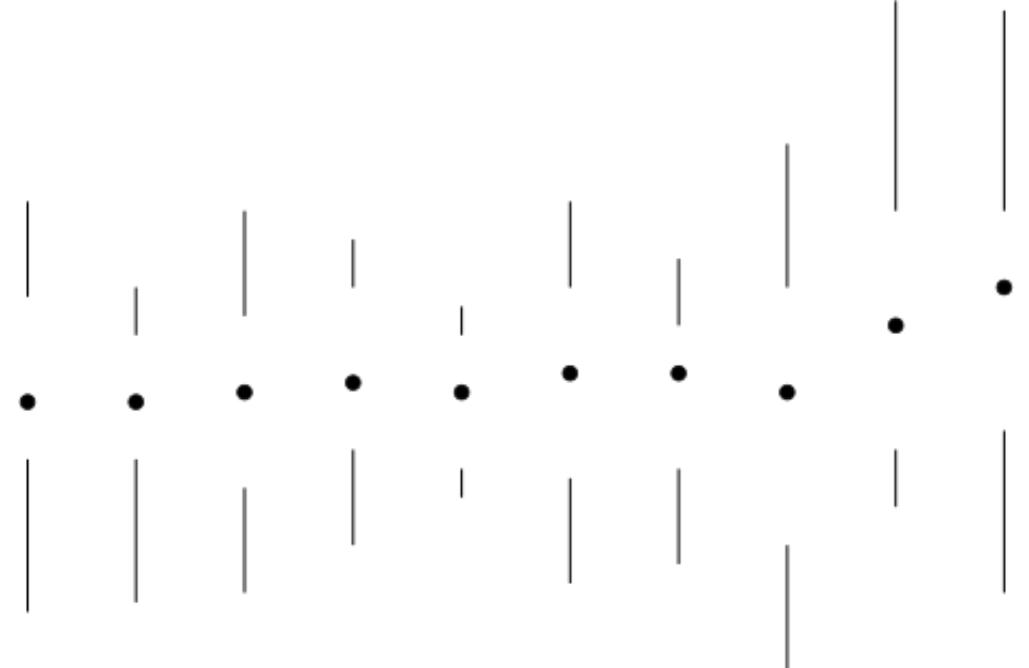
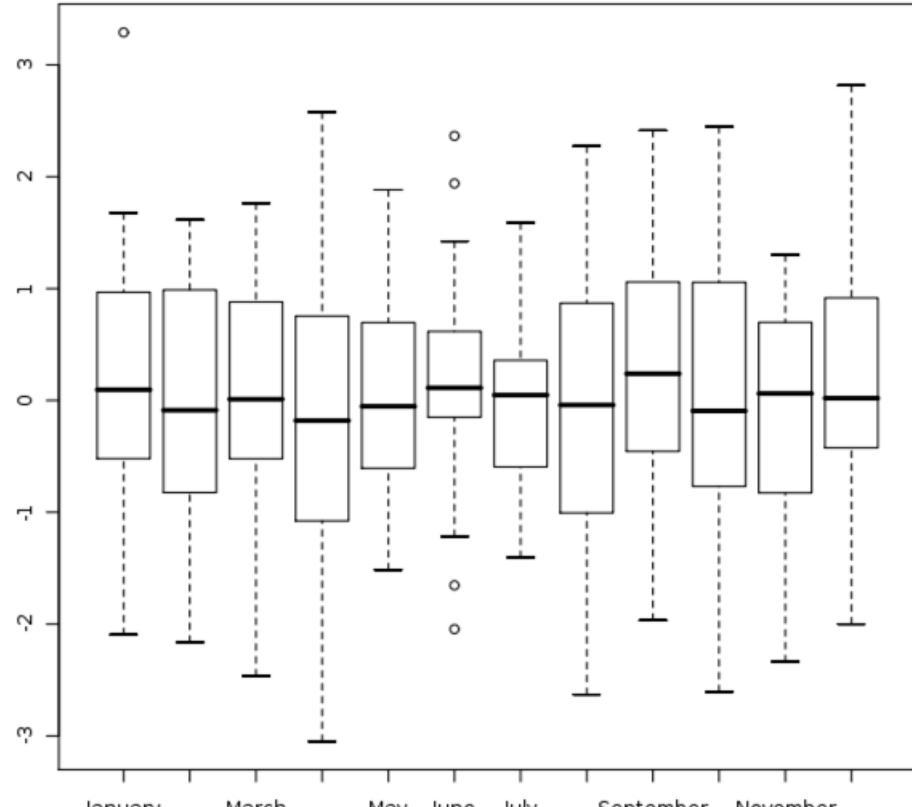
„Erase redundant data-ink, within reason.“

Edward Tufte

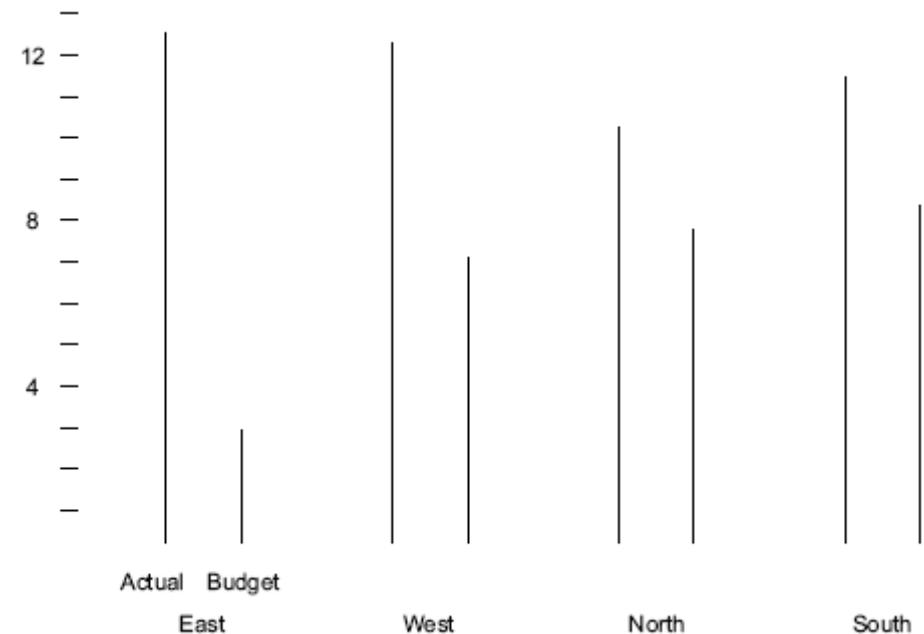
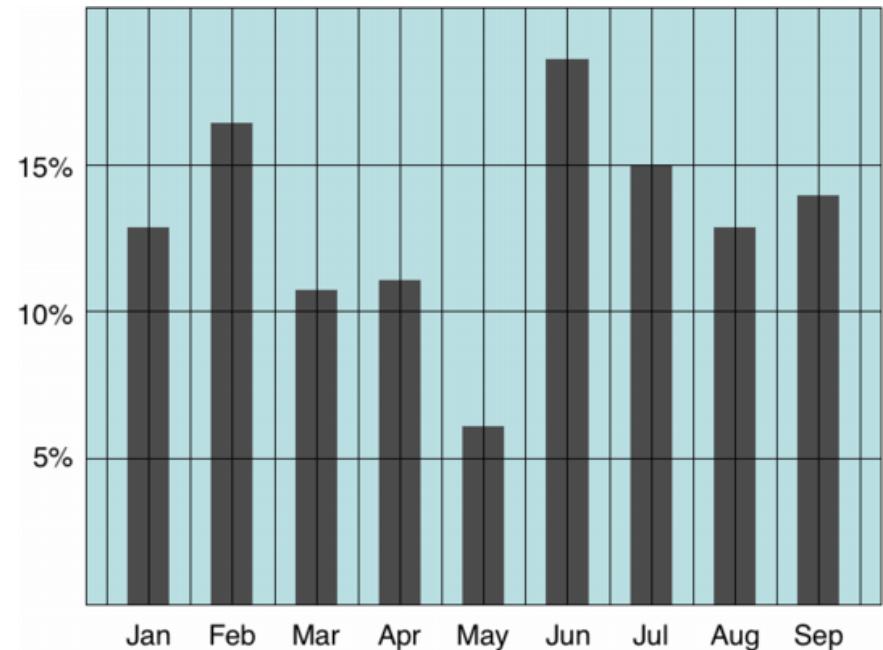
limity minimalismu



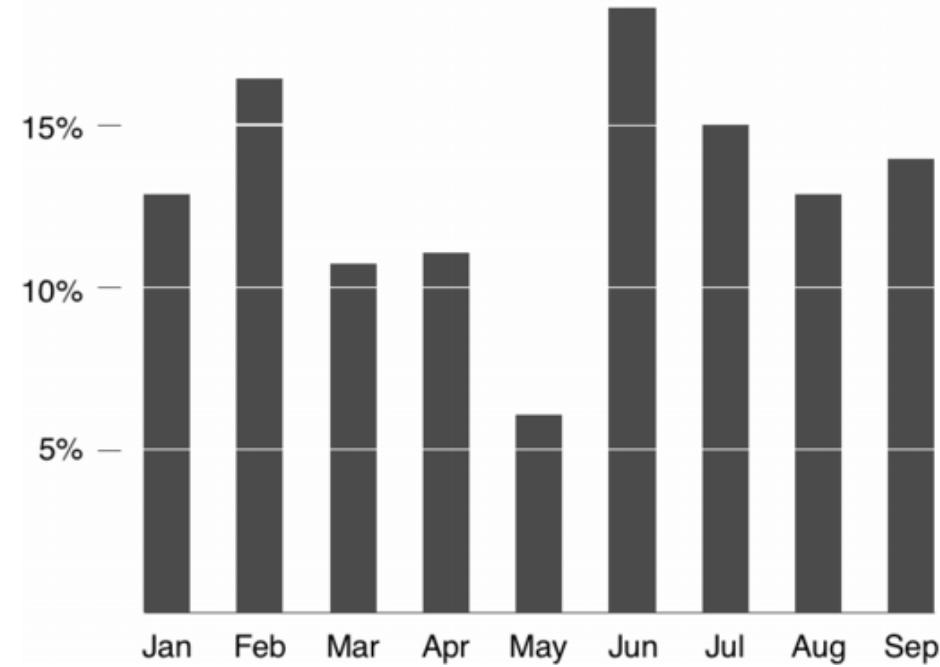
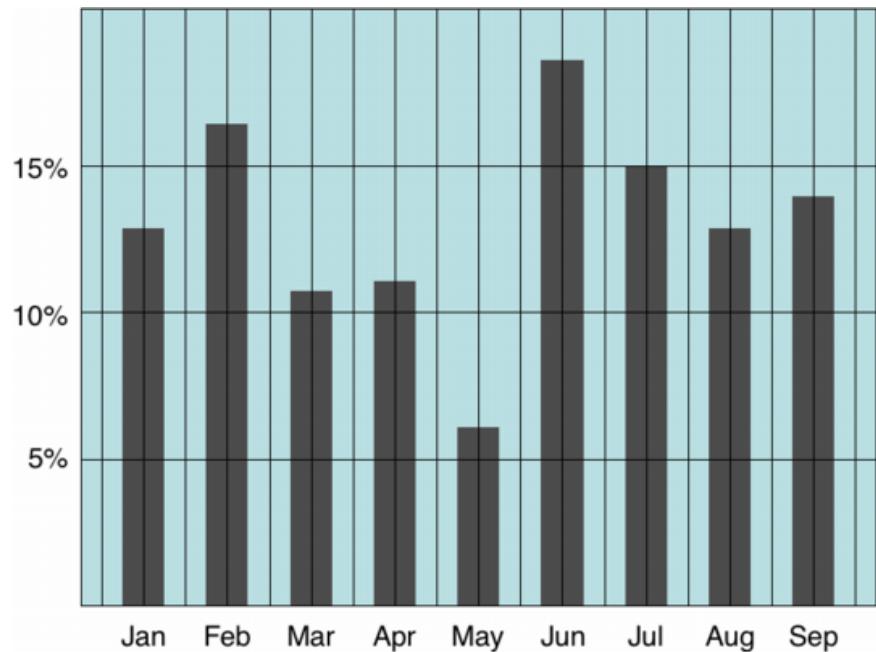
limity minimalismu



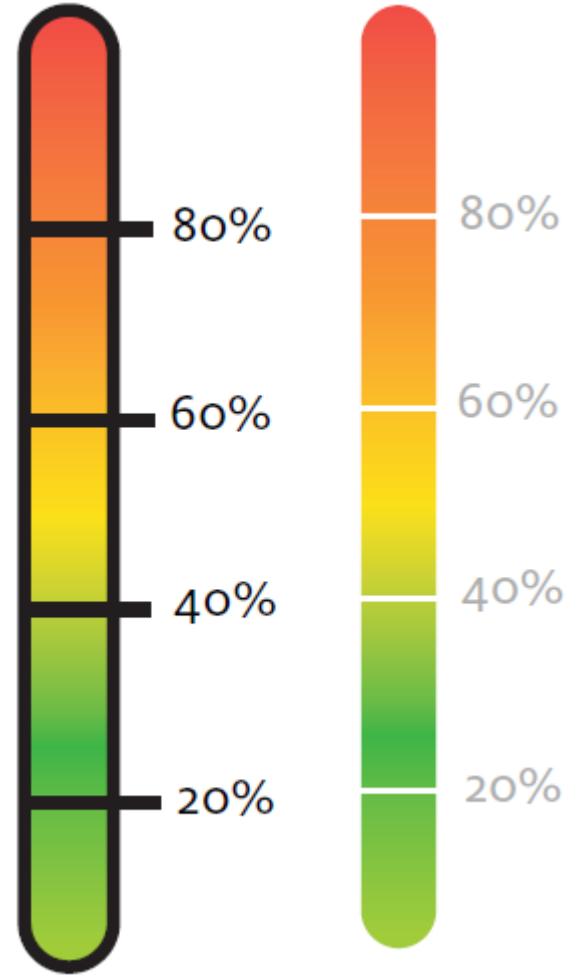
limity minimalismu



limity minimalismu | MAYA



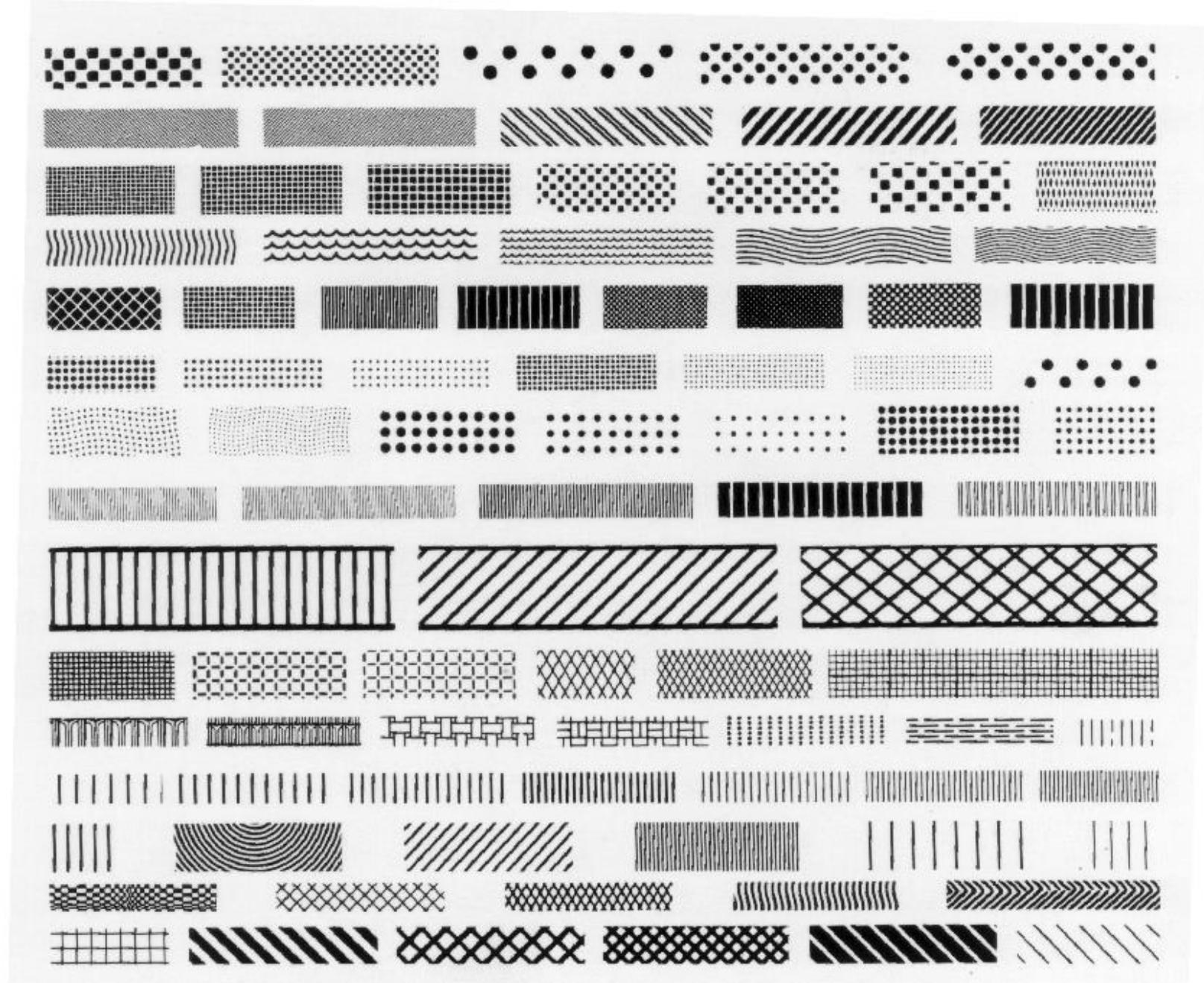
limity minimalismu



chartjunk

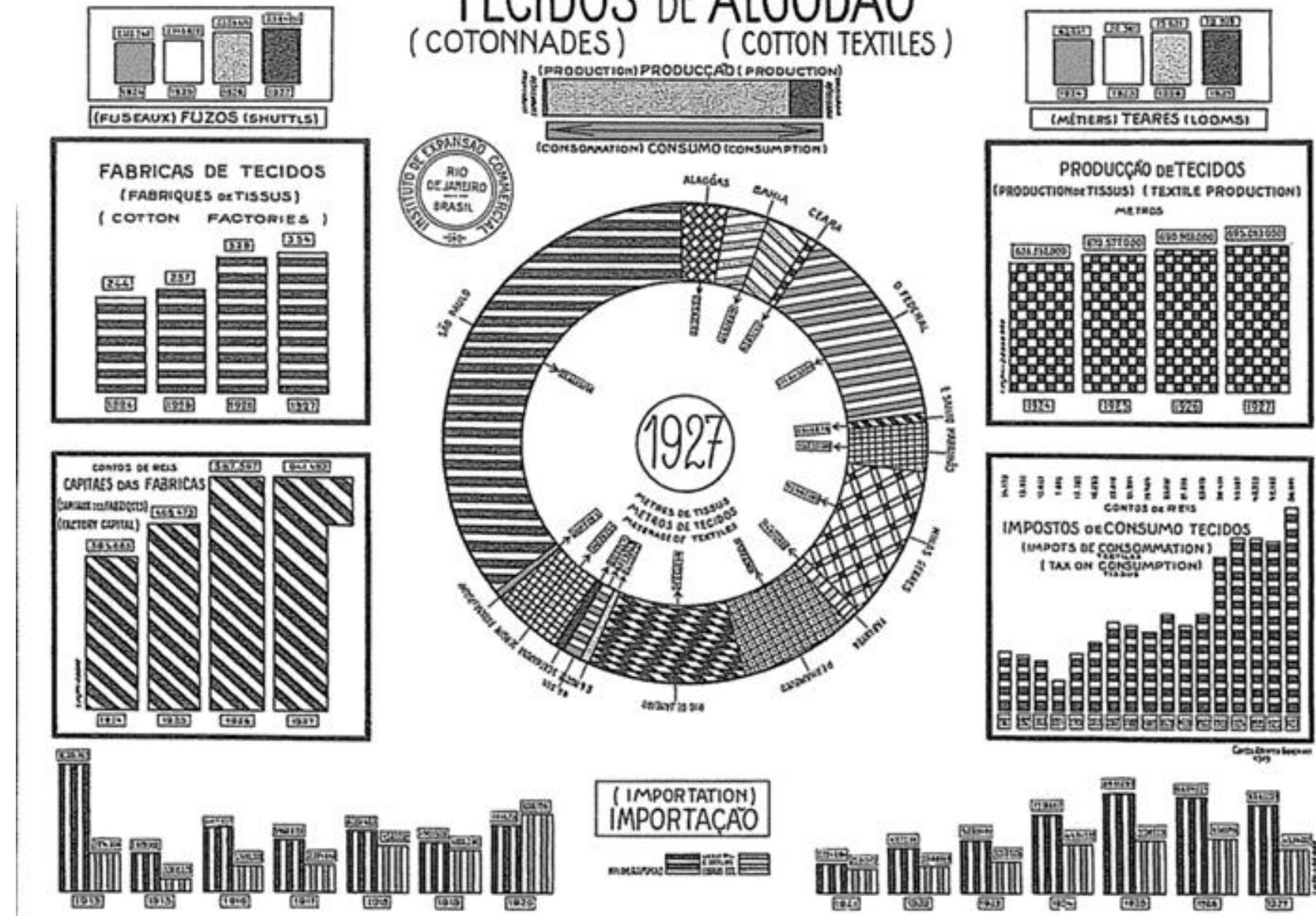


chartjunk

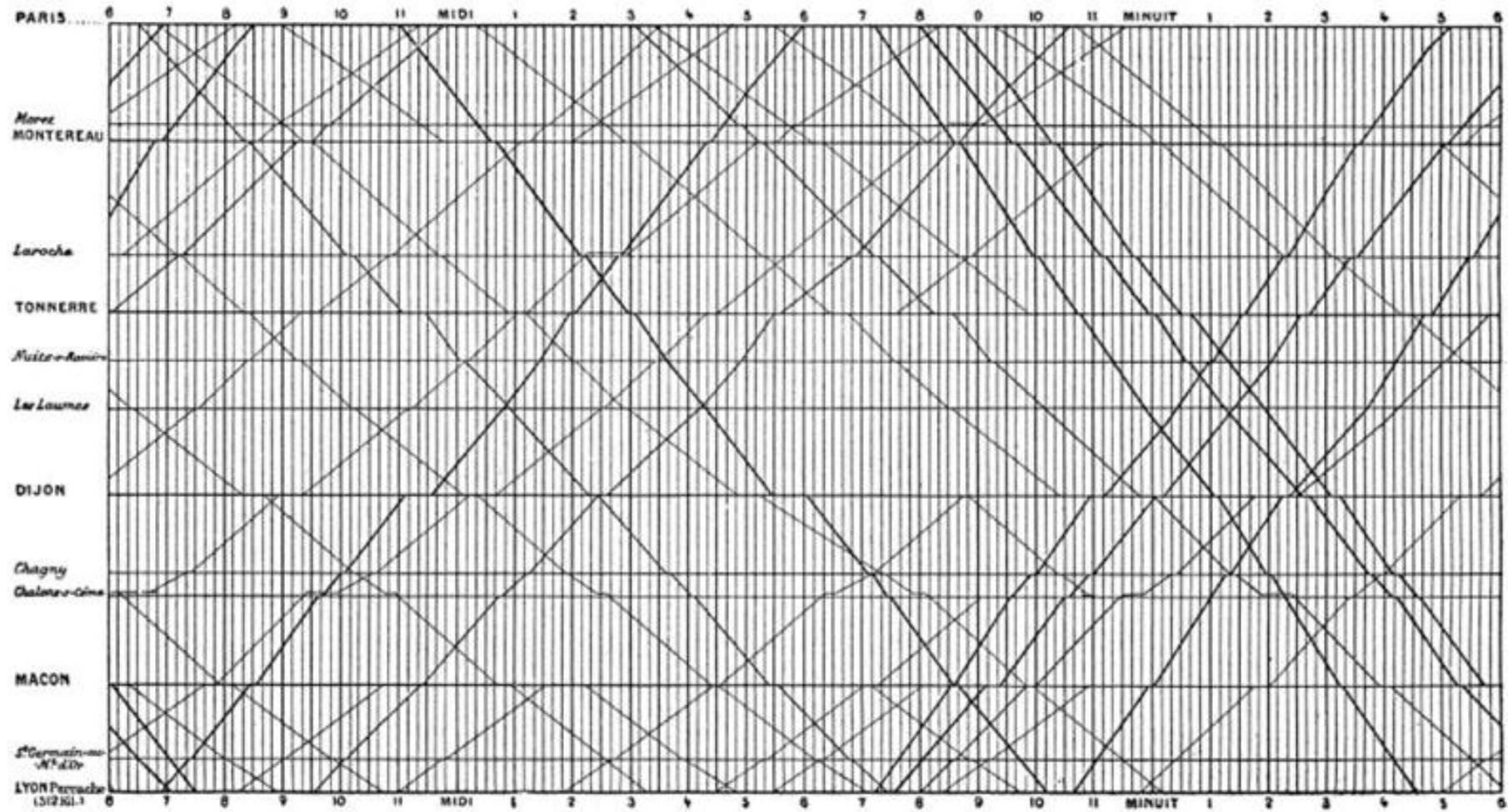


chartjunk

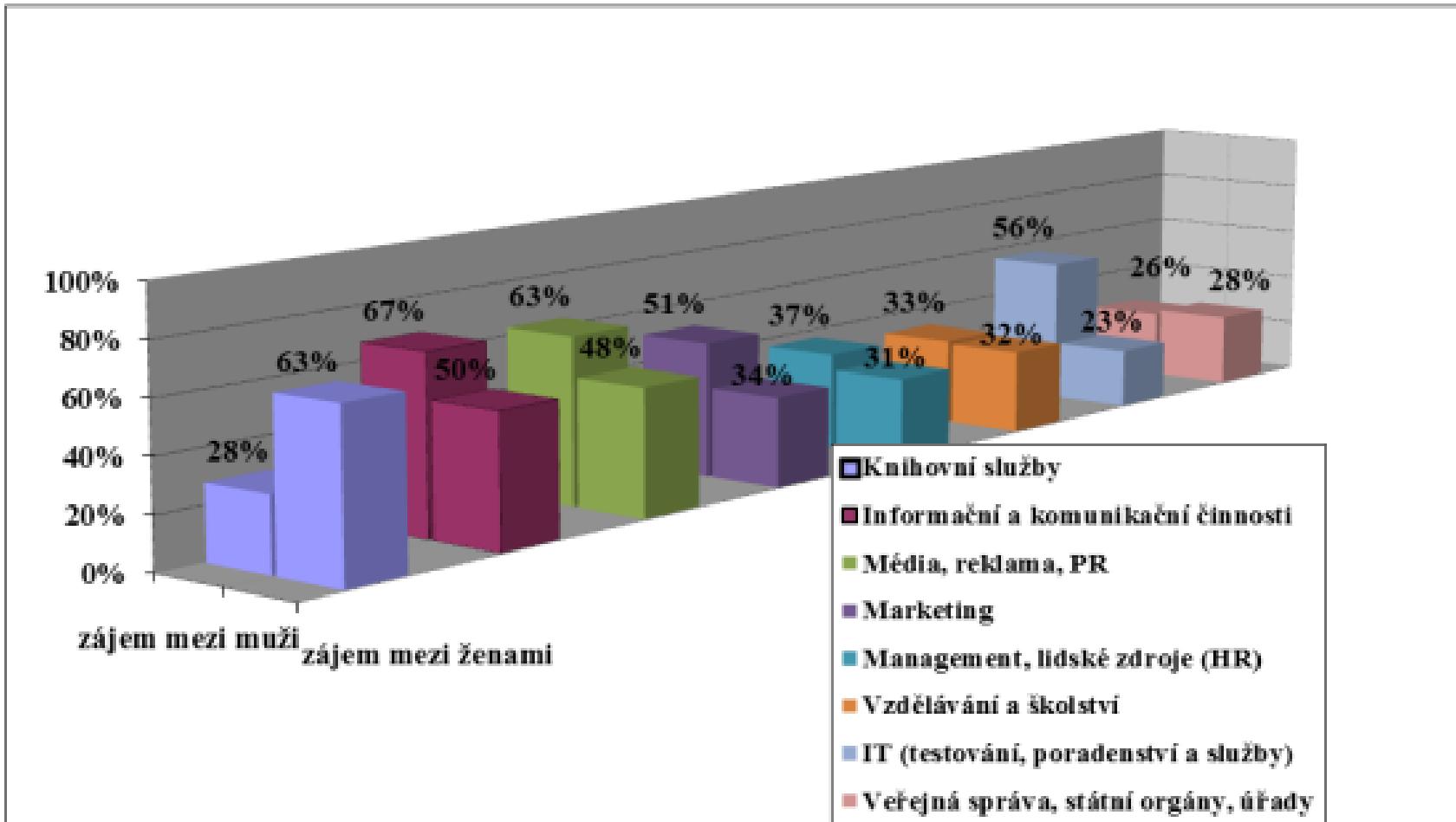
TECIDOS DE ALGODÃO (COTONNADES) (COTTON TEXTILES)



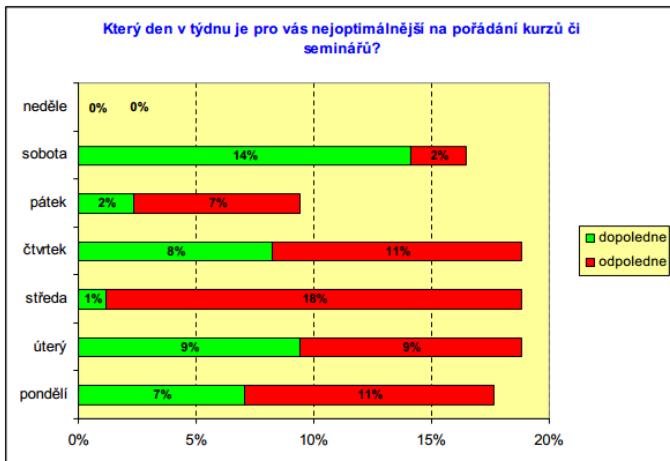
chartjunk



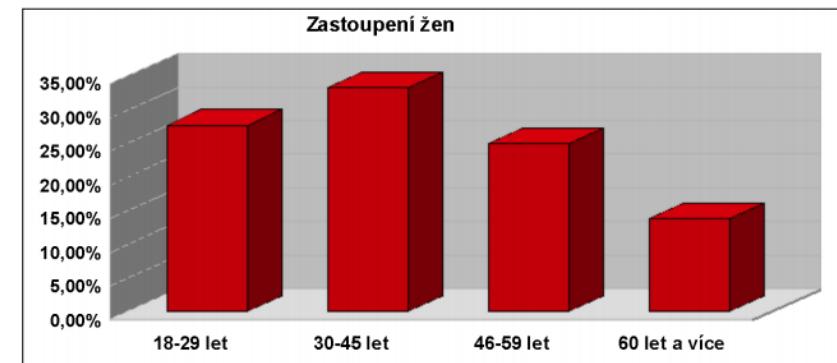
chartjunk



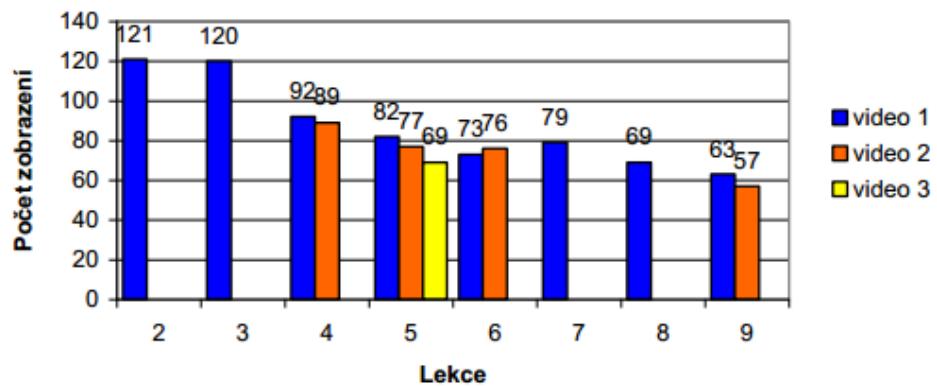
chartjunk



Graf 1

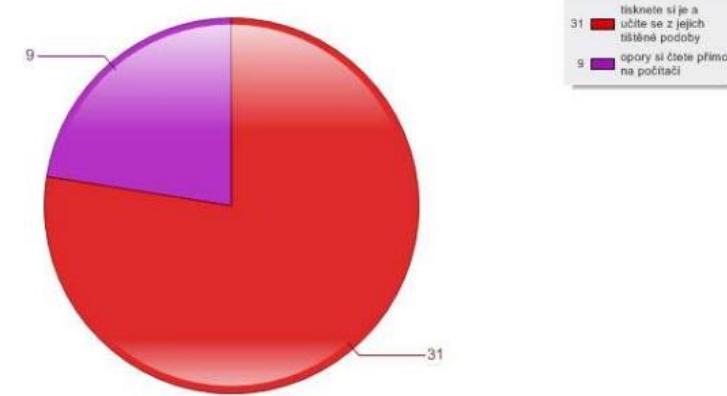


Výuková videa



Graf č. 7: Počet zobrazení výukových videí v prvním běhu kurzu.

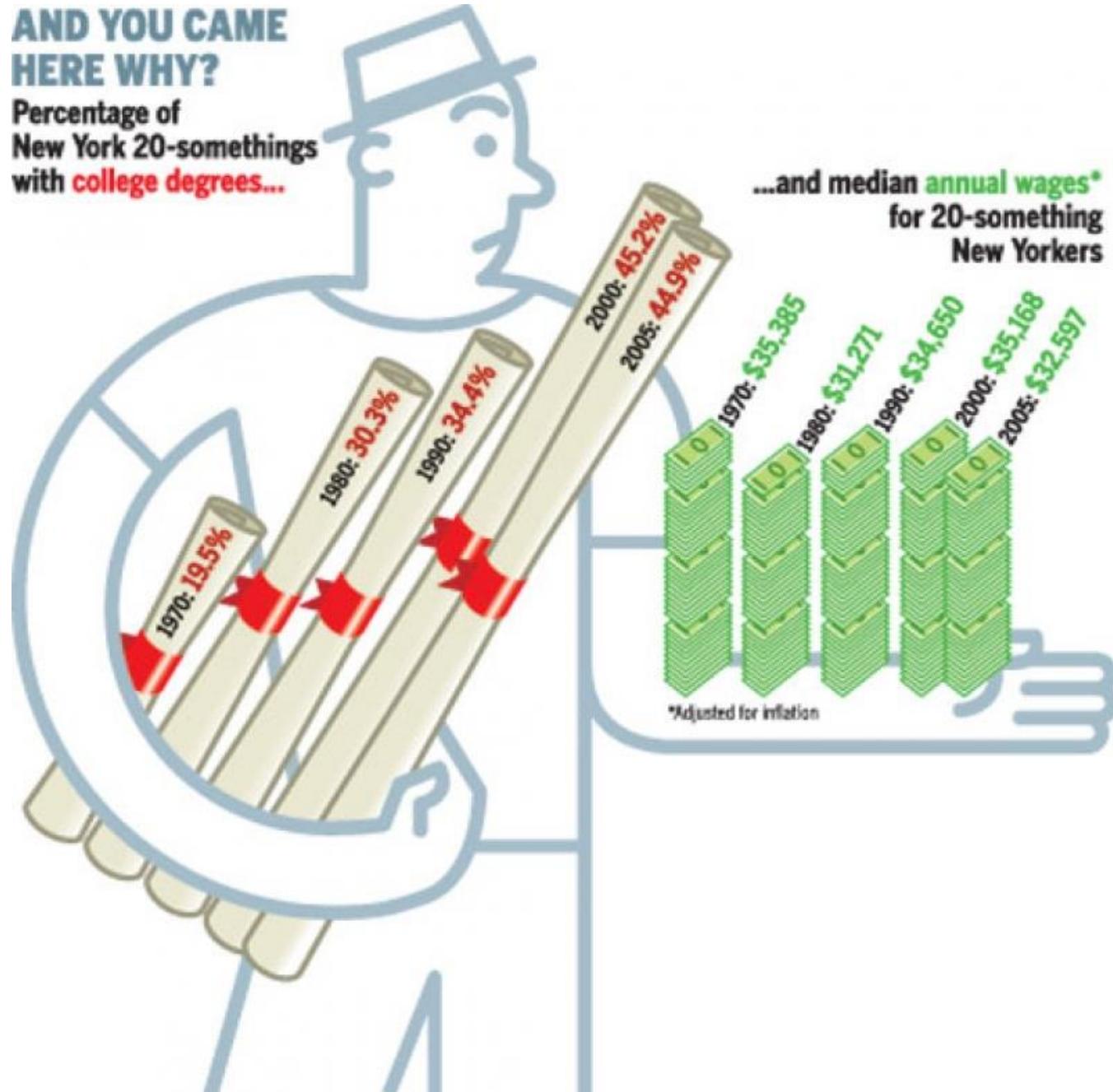
Vyberte, jak pracujete se studijními opory:
(N=45)



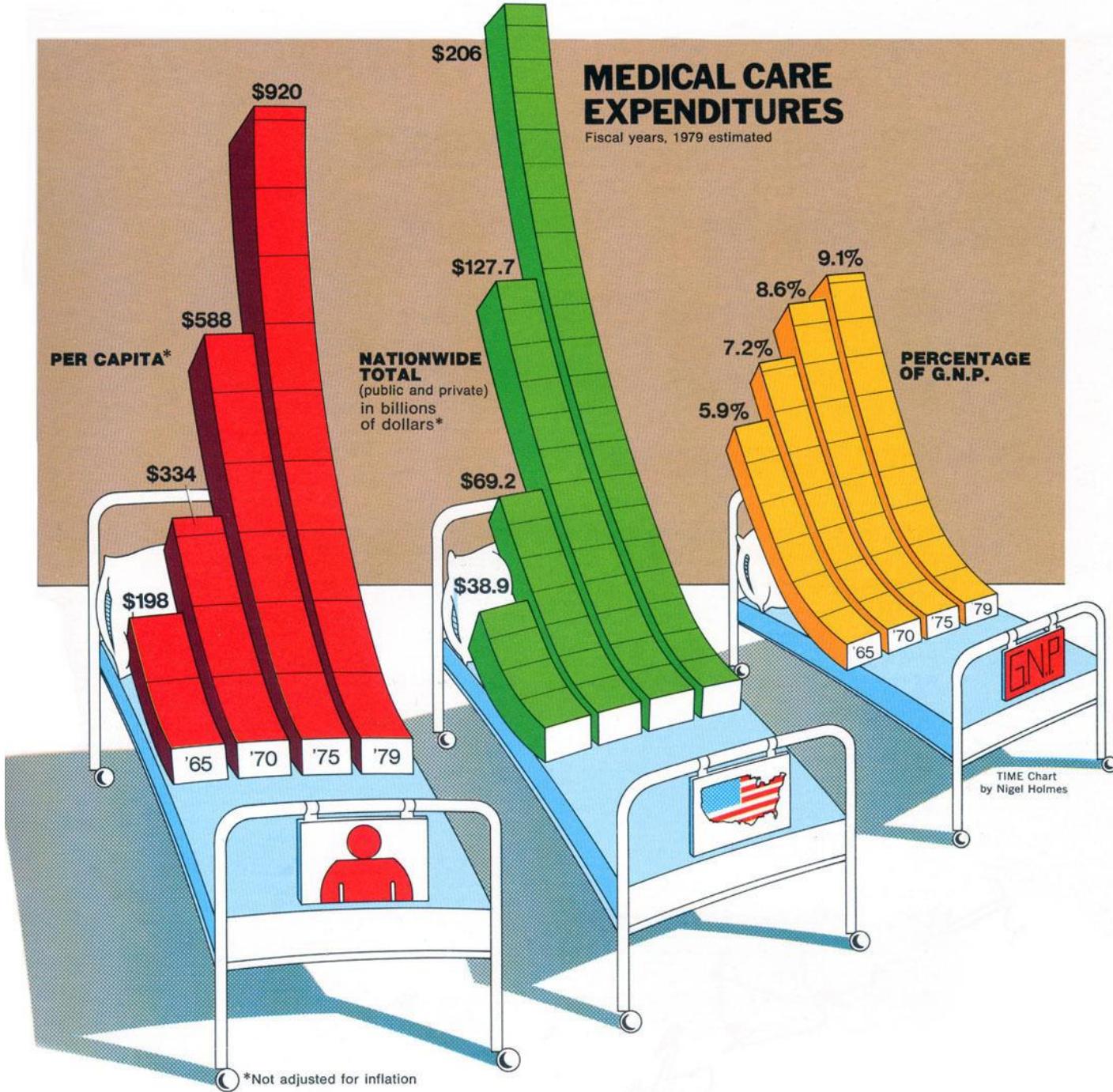
Obrázek č.: Grafické znázornění preferencí uživatelů při práci se studijními oporymi
(zdroj: evaluace druhého běhu kurzu)

AND YOU CAME HERE WHY?

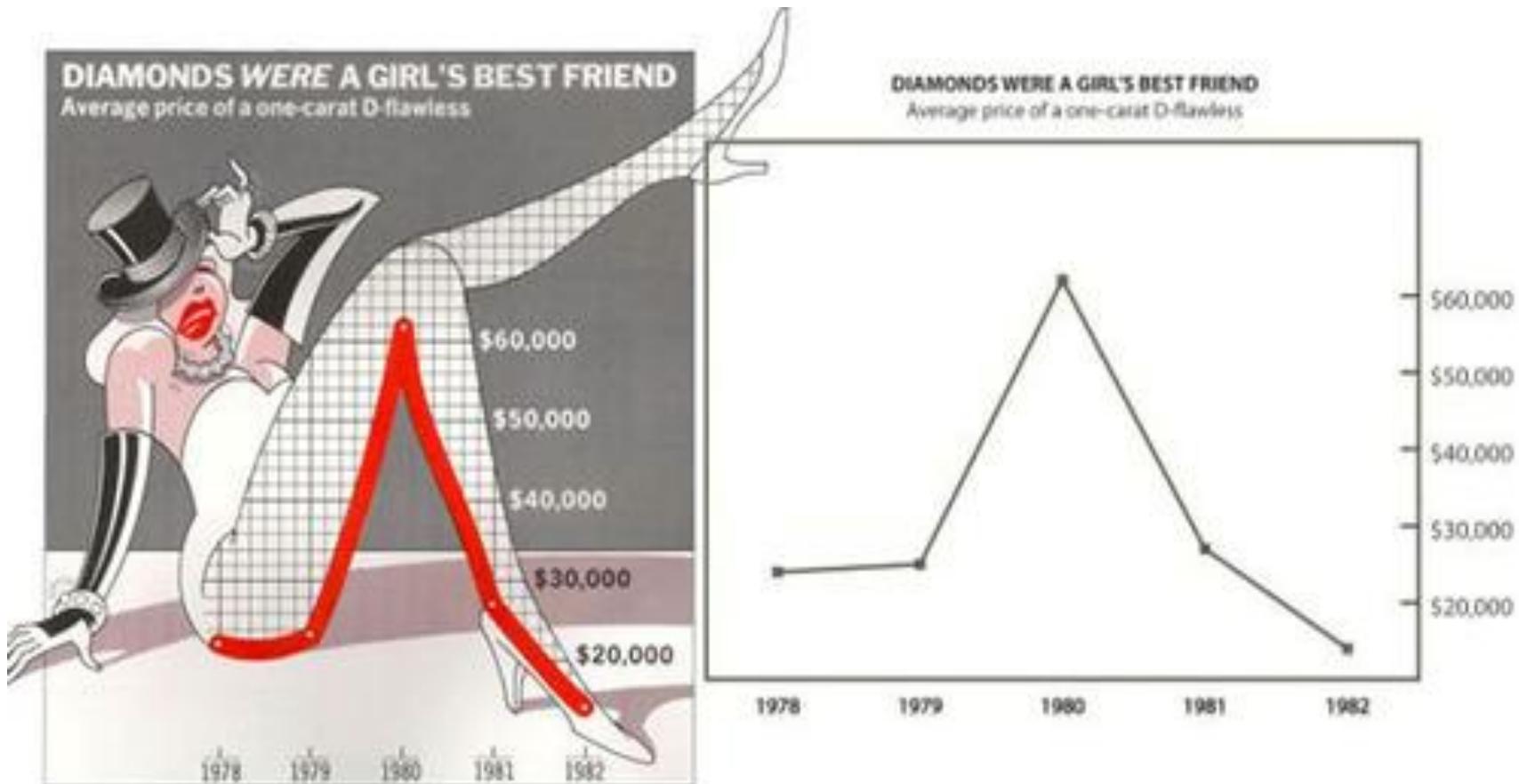
Percentage of
New York 20-somethings
with college degrees...



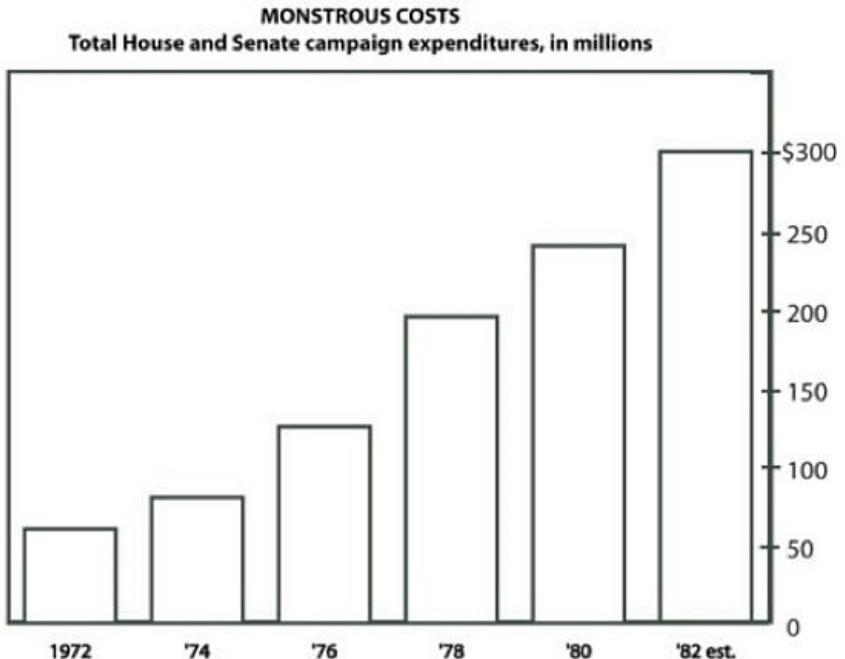
Nigel Holmes



memorability X přesnost

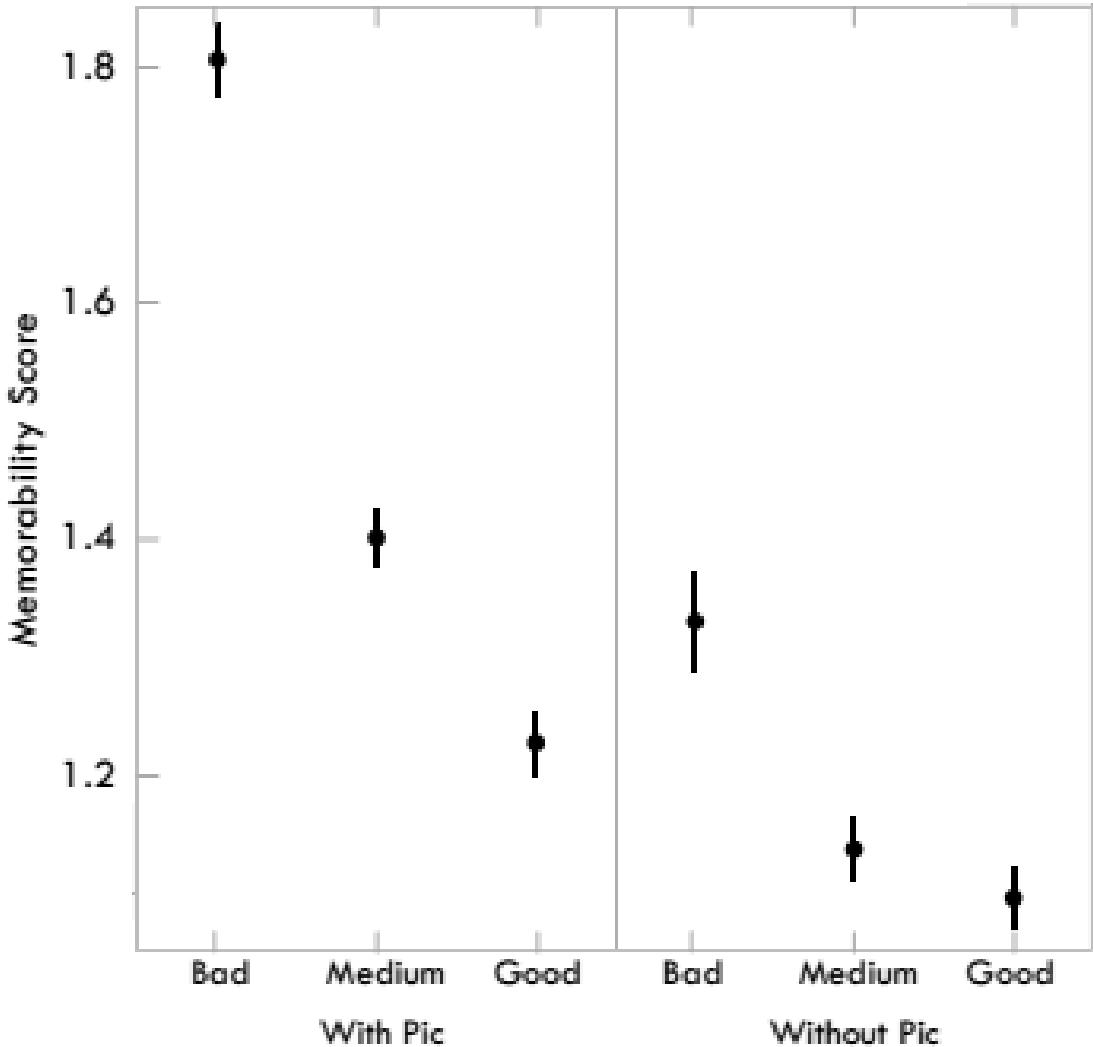


memorability X přesnost



memorability X přesnost

Memorability plotted against data-ink ratio



„[...] we compared interpretation accuracy and long-term recall for plain and Holmes-style‘ charts. We found that people’s accuracy in describing the embellished charts was no worse than for plain charts, and that their recall after a two-to-three week gap was significantly better. In addition, participants preferred the embellished charts.“

Useful Junk? The Effects of Visual Embellishment on Comprehension and Memorability of Charts

Scott Bateman, Regan L. Mandryk, Carl Gutwin,
Aaron Genest, David McDine, Christopher Brooks

Department of Computer Science, University of Saskatchewan, Saskatoon, Saskatchewan, Canada
scott.bateman@usask.ca, regan@cs.usask.ca, gutwin@cs.usask.ca,
aaron.genest@usask.ca, dam085@mail.usask.ca, cab938@mail.usask.ca

ABSTRACT

Guidelines for designing information charts often state that the presentation should reduce ‘chart junk’ – visual embellishments that are not essential to understanding the data. In contrast, some popular chart designers wrap the presented data in detailed and elaborate imagery, raising the questions of whether this imagery is really as detrimental to understanding as has been proposed, and whether the visual embellishment may have other benefits. To investigate these issues, we conducted an experiment that compared embellished charts with plain ones, and measured both interpretation accuracy and long-term recall. We found that people’s accuracy in describing the embellished charts was no worse than for plain charts, and that their recall after a two-to-three-week gap was significantly better. Although we are cautious about recommending that all charts be produced in this style, our results question some of the premises of the minimalist approach to chart design.

Author Keywords

Charts, information visualization, imagery, memorability.

ACM Classification Keywords

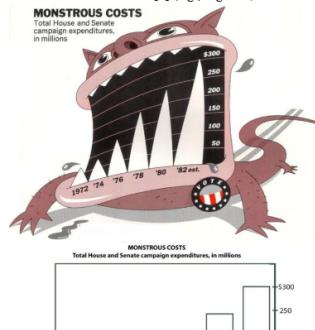
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms
Design, Human Factors

INTRODUCTION

Many experts in the area of chart design, such as Edward Tufte, criticize the inclusion of visual embellishment in

data-ink – or the ink in the chart used to represent data. Despite these minimalist guidelines, many designers include a wide variety of visual embellishments in their charts, from small decorations to large images and visual backgrounds. One well-known proponent of visual embellishment in charts is the graphic artist Nigel Holmes, whose work regularly incorporates strong visual imagery into the fabric of the chart [7] (e.g., Figure 1).



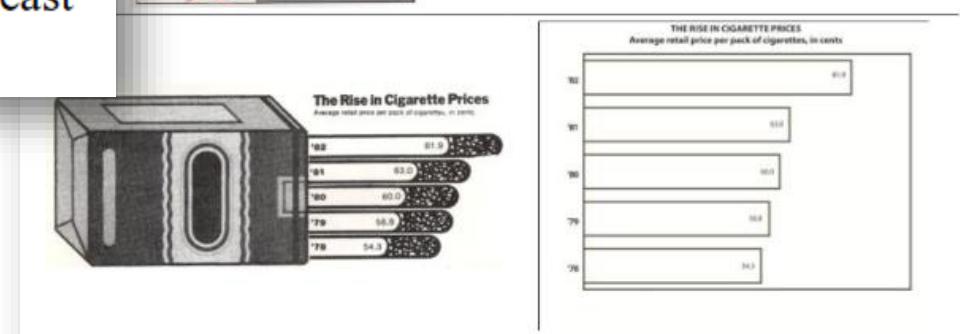
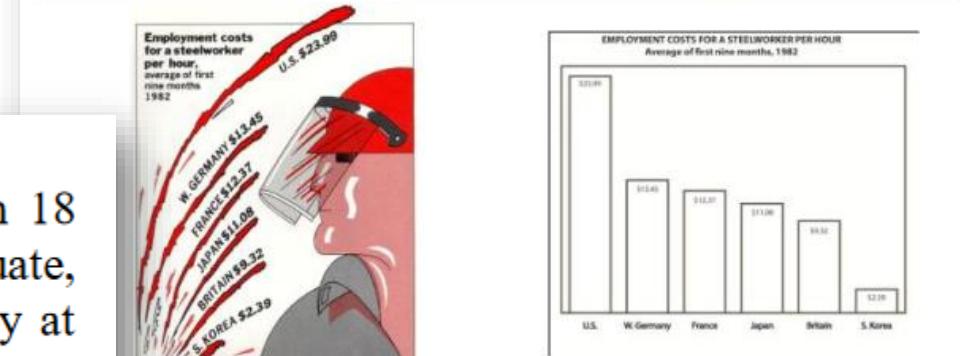
Potíže s metodologií

- Stephen Few
- Kaiser Fung

Participants and Apparatus

Twenty participants (9 male, 11 female), aged between 18 and 40 were recruited from a local university (7 graduate, 13 undergraduate). Of the 20 participants, 17 said they at least occasionally created charts and 19 said they at least occasionally read or interpreted charts.

WEIRD bias





McKinsey & Company
@McKinsey

...

If cows were a country, they would be among the top greenhouse-gas emitters 🐄

Holding global warming to 1.5°C will require major reforms for the food and forestry industries.

Join our daily #COP26 🌎 events to learn more
mck.co/3C4wAqH

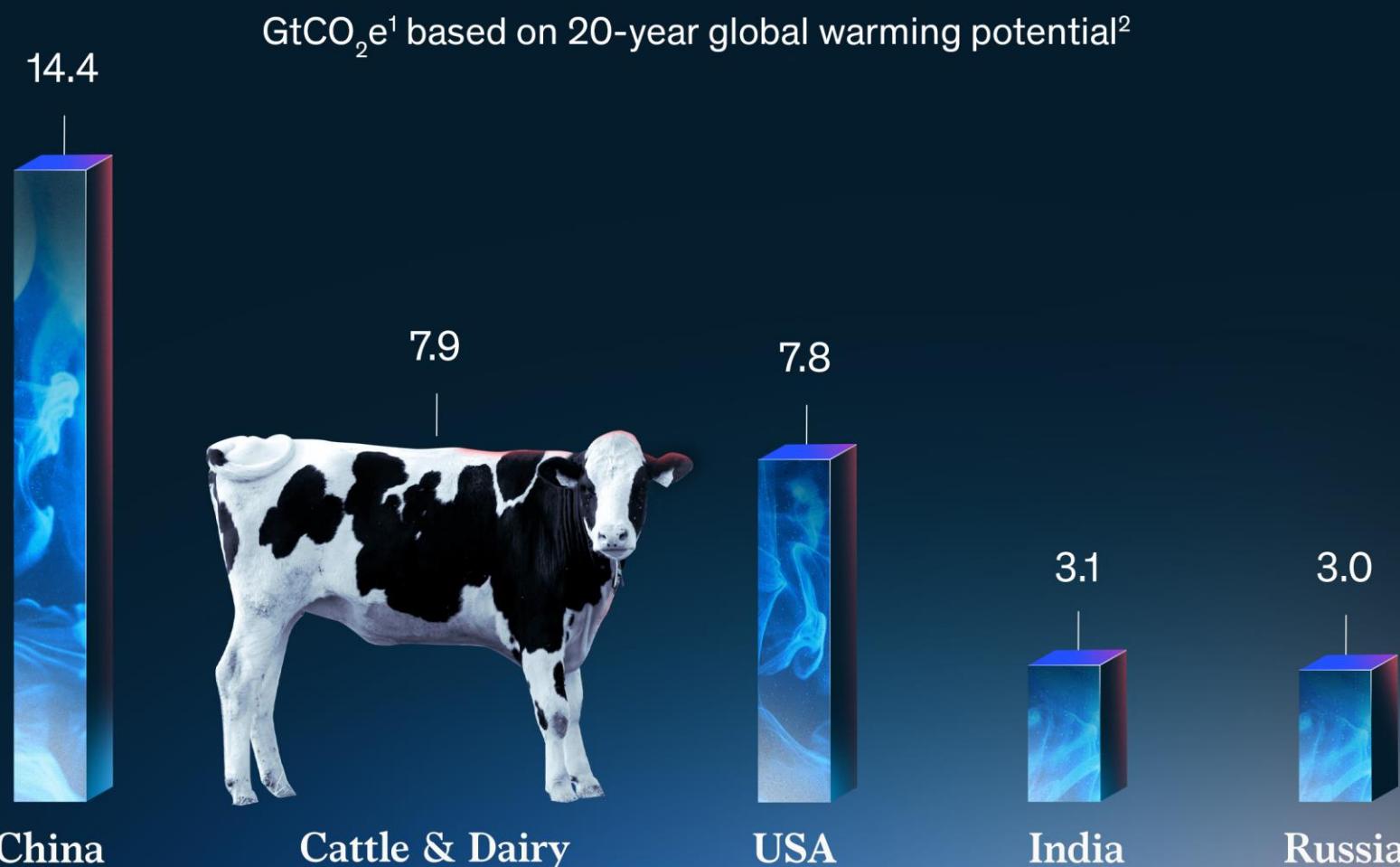
Přeložit Tweet

If cows were a country, they would be among the top greenhouse-gas emitters

GtCO₂e¹ based on 20-year global warming potential²



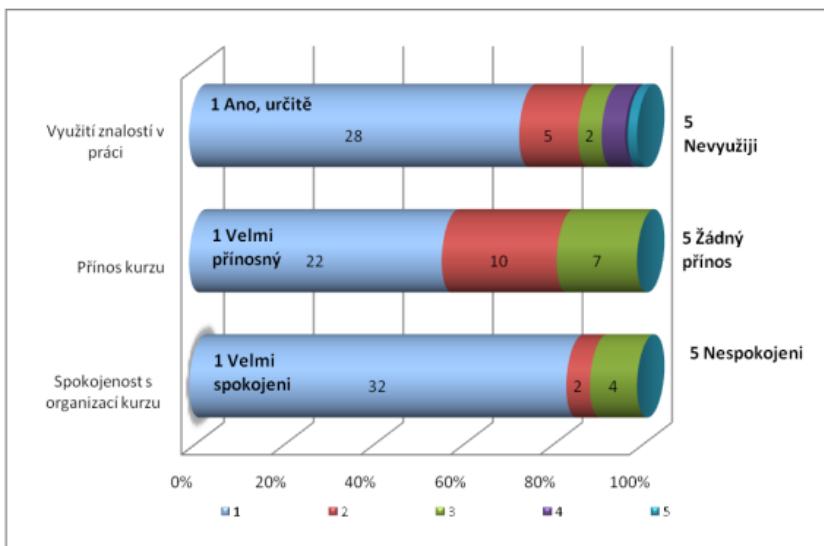
If cows were a country, they would be among the top greenhouse-gas emitters



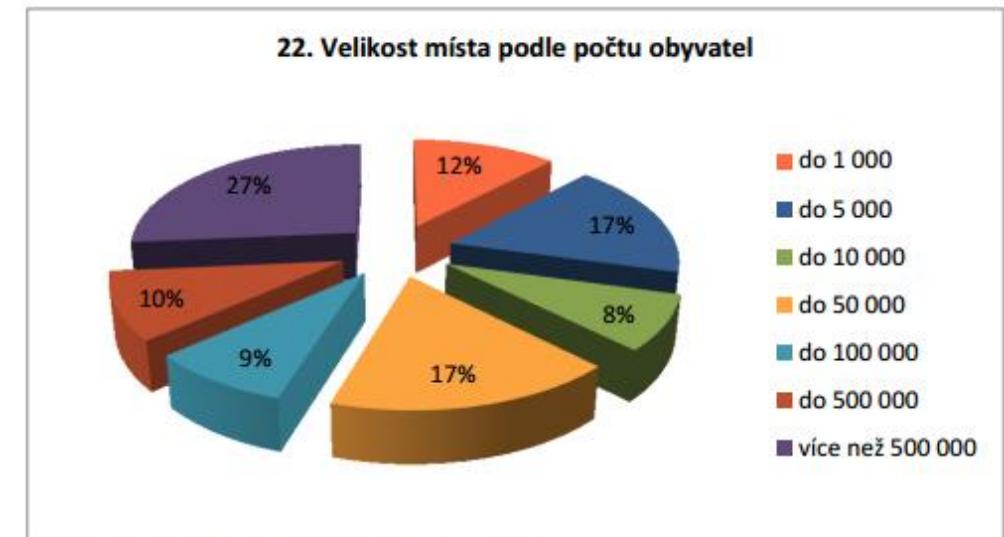
¹Billion metric tons of carbon dioxide equivalent.

²2016 data or most recent available; 20-year global-warming-potential values from IPCC's Fifth Assessment Report (AR5).

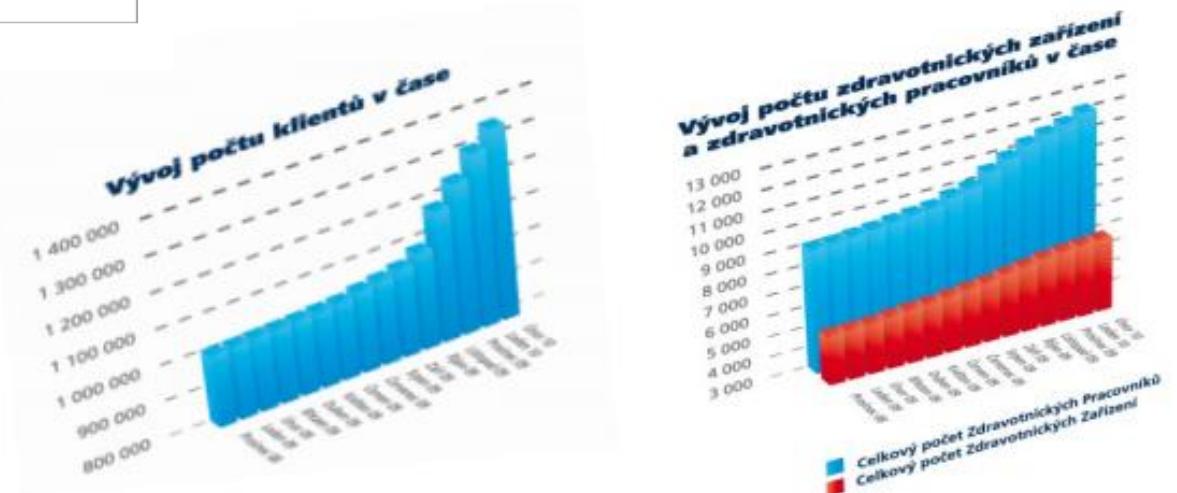
3D chartjunk



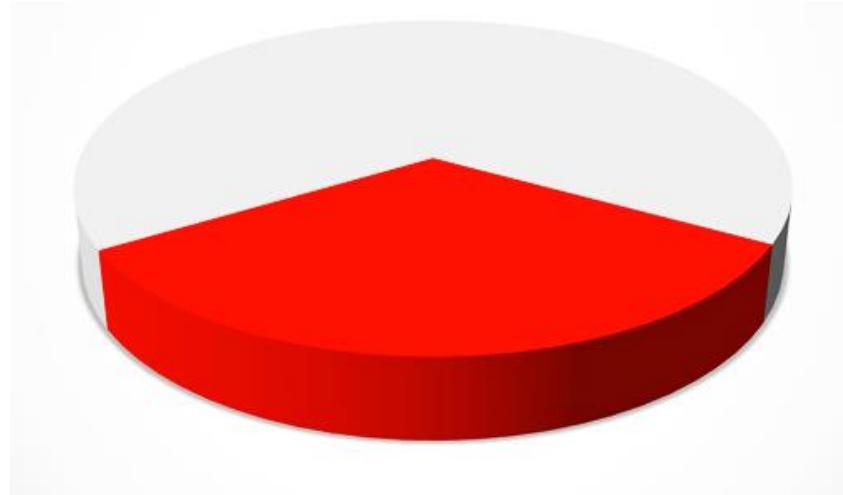
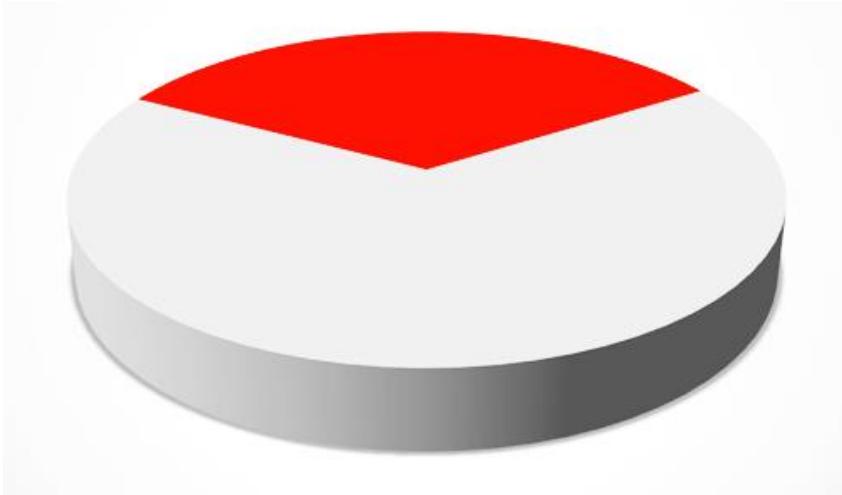
GRAF 2 – Využití znalostí, přínos, organizace kurzu.



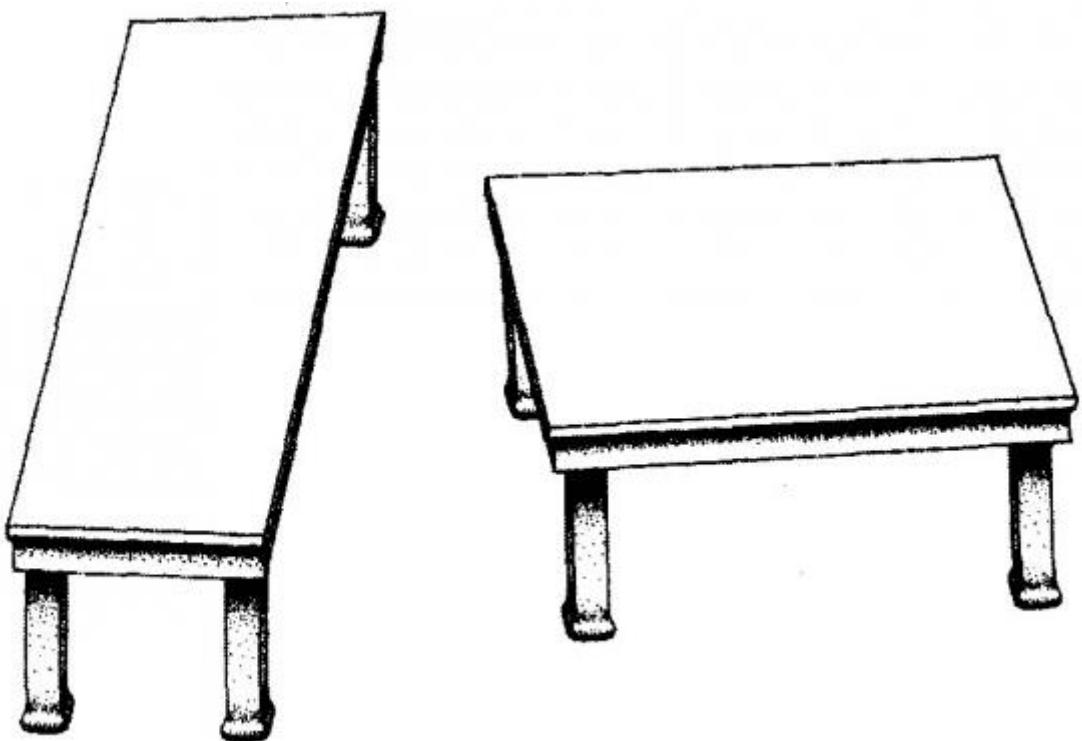
Graf 5: Místo, kde žijete, má zhruba počet obyvatel?



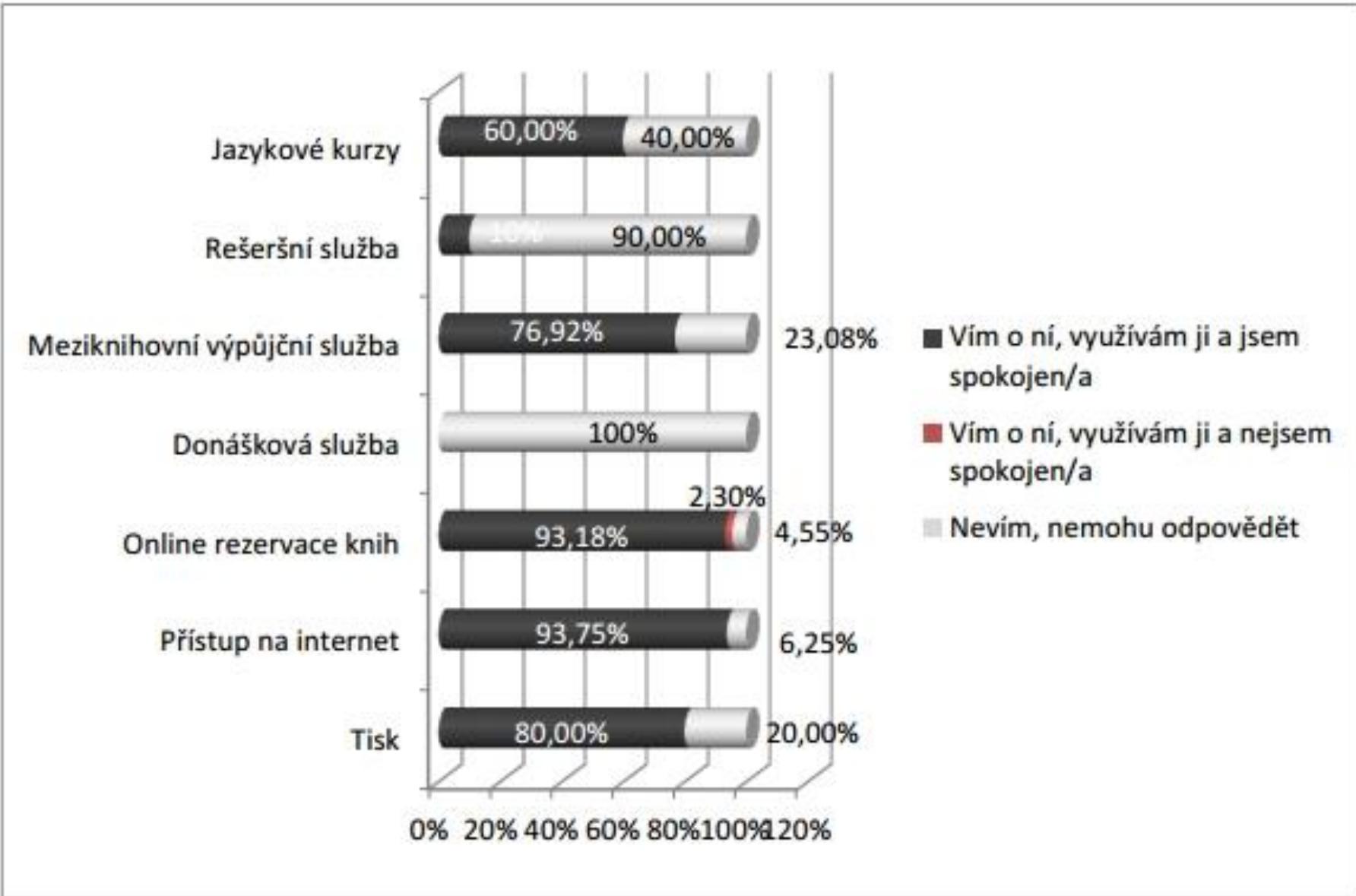
3D chartjunk



Shepard's table

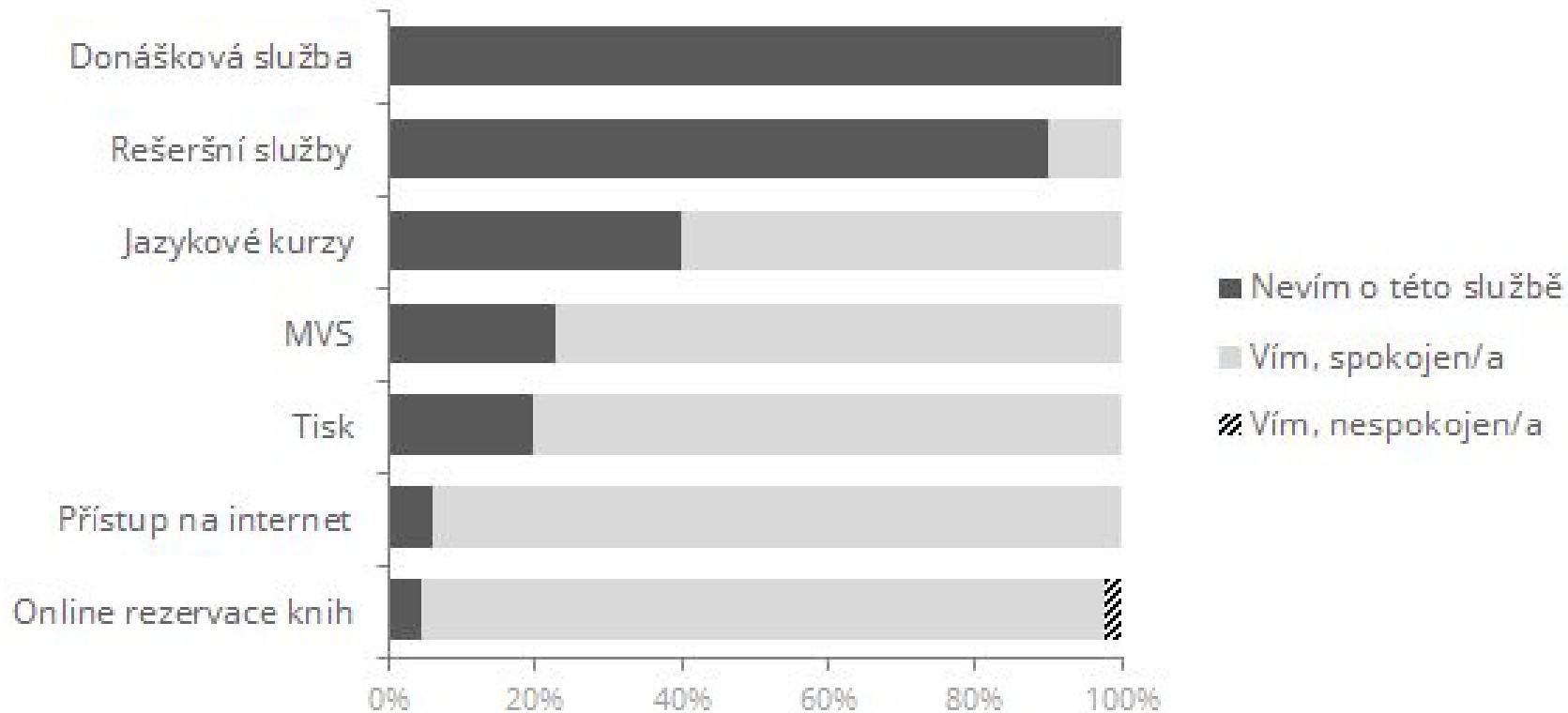




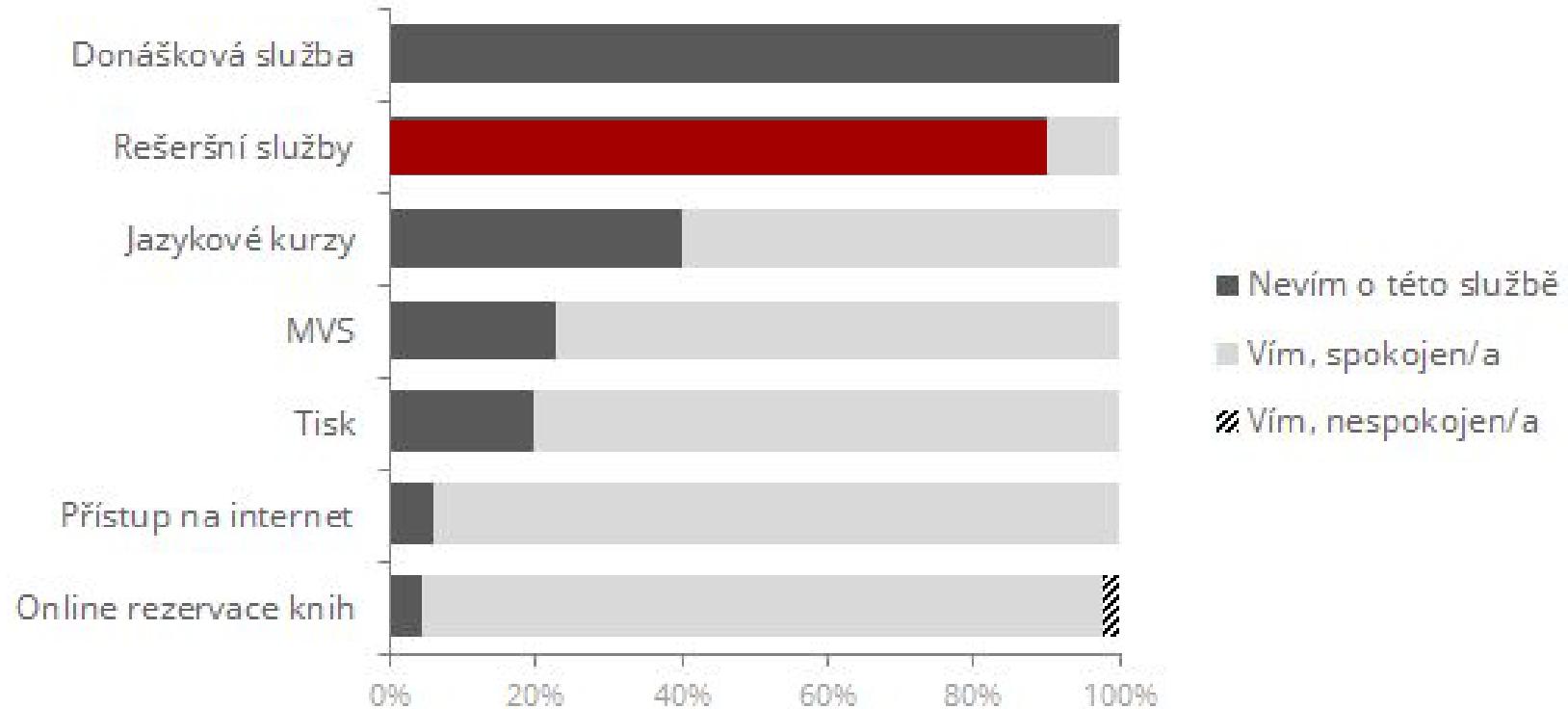


Graf 12: Ostatní služby

Čtenáři nevědí o důležitých službách knihovny



90 % zákazníků neví o rešeršní službě



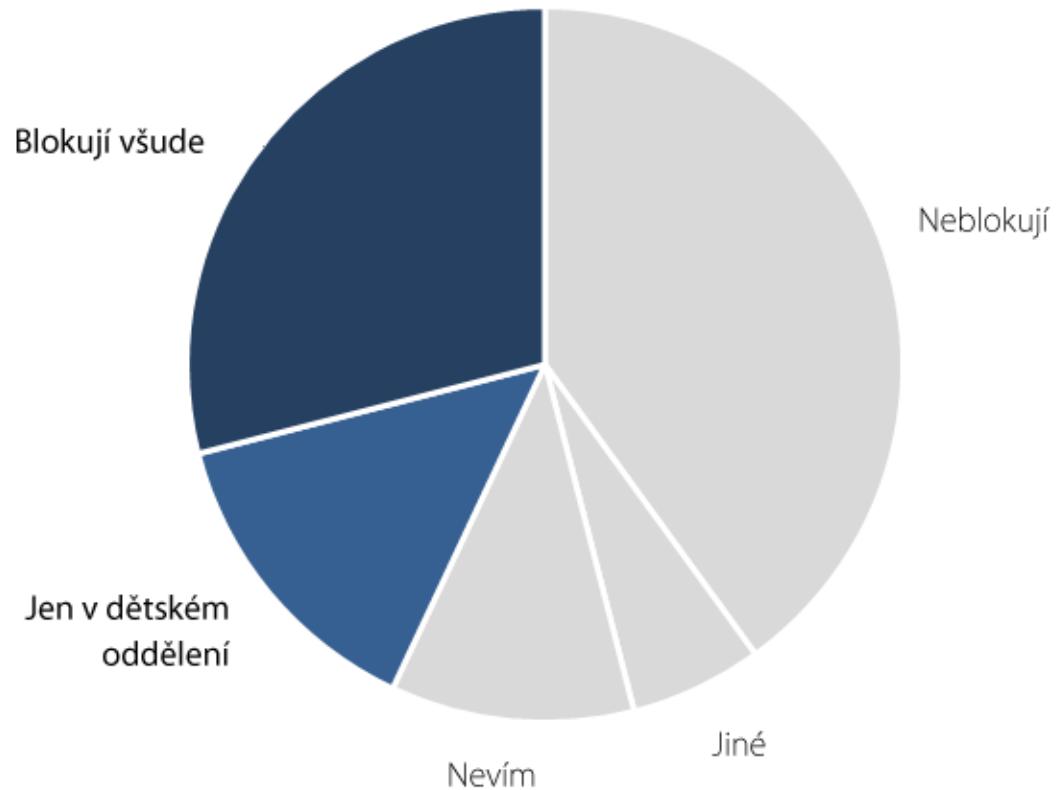
Zásadní služba knihovny trpí nedostatečnou propagací.
Zlepšení propagace by prospělo i dalším nabízeným službám.

Blokování nevhodného obsahu



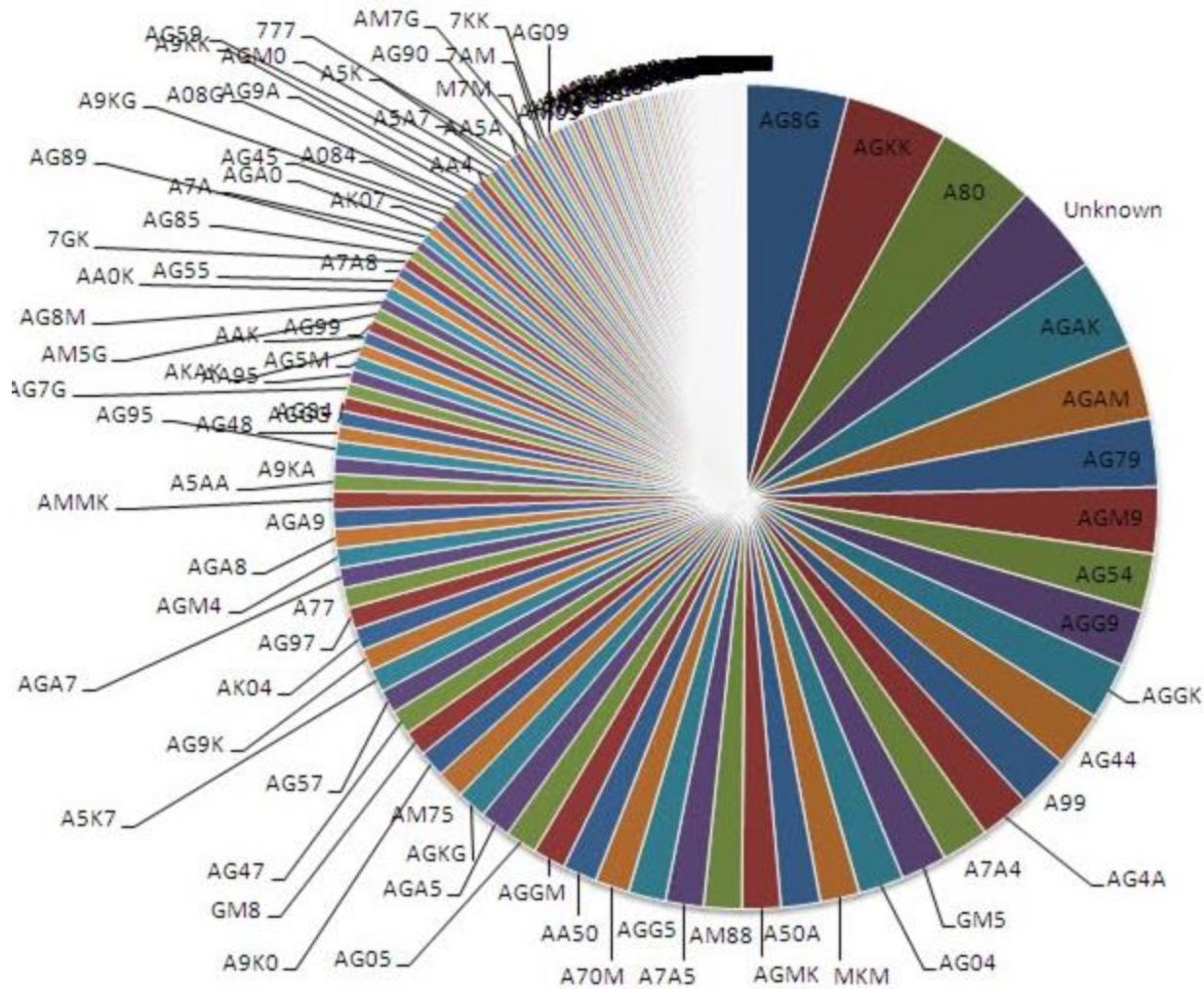
Graf č. 6 - Používá knihovna blokování webových stránek s nevhodným obsahem?

Nevhodný obsah blokuje 43 % knihoven

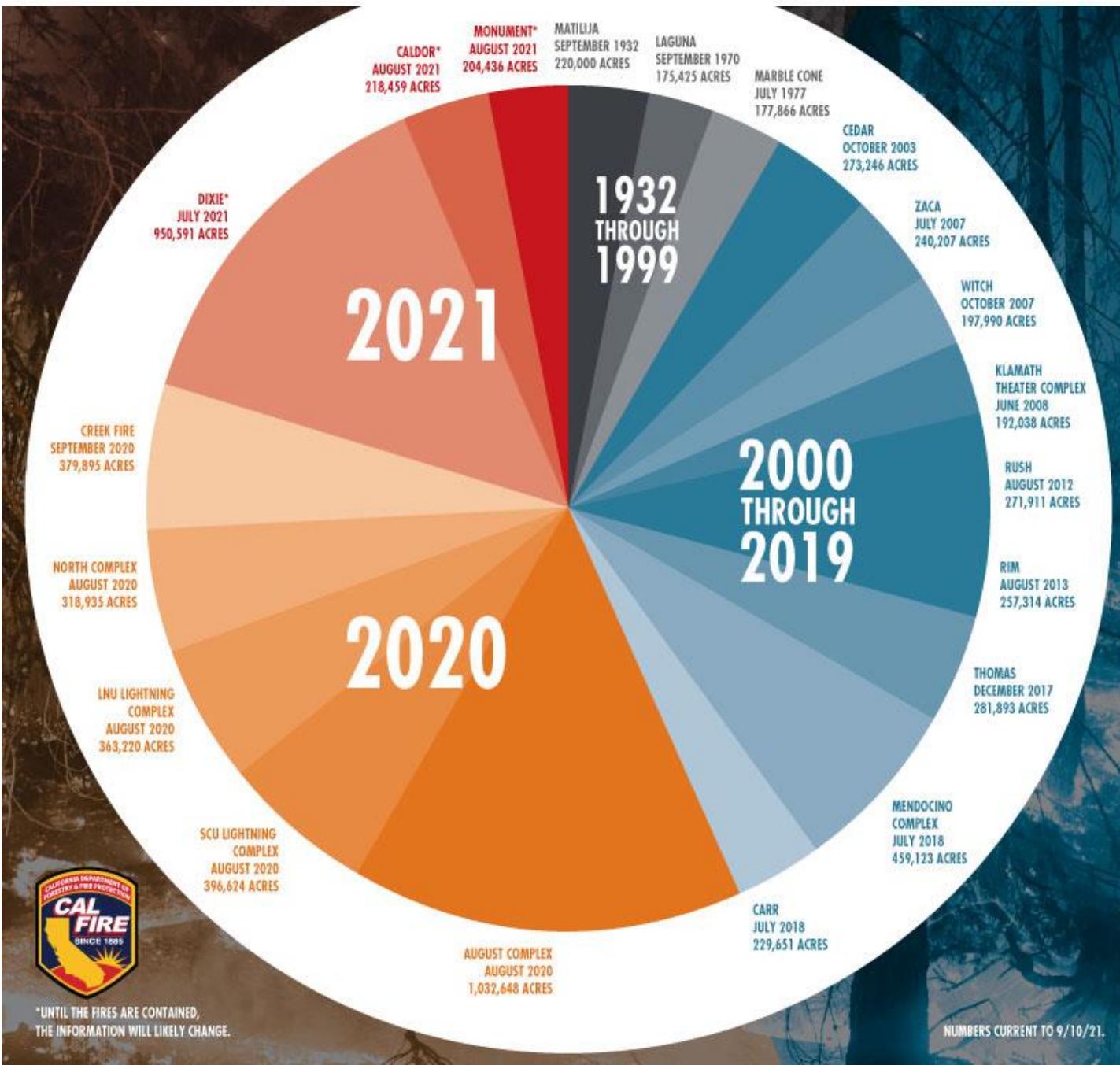


Graf č. 1 Blokování nevhodného obsahu v knihovnách.

14 % ze zkoumaných knihoven blokuje nevhodný obsah pouze v dětském oddělení. 29 % blokuje nevhodný obsah napříč všemi odděleními.



TOP 20 LARGEST CALIFORNIA WILDFIRES



viz.wtf
junkcharts.typepad.com