Rethinking Data Visualization: From Dynamic Illustration to Analytic Narrative

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Beginnings
Thoughts from Tufte
Integrity

• No more dimensions than the data contains;

• No deceptiveness in proportionality of representation to content;

• No data out of context;

• No unlabeled data.
What Not To Do
Figurative Map of the successive losses in men of the army that Hannibal led from Spain to Italy while crossing the Gauls (according to Polybius).

Drawn up by M. Minard, Inspector General of Bridges and Roads in retirement.

Legend.

The numbers of men remaining with Hannibal are represented by the width of the colored zones at a rate of one millimeter for ten thousand men; they are further written across the zones.

There is no final opinion on the point where Hannibal crossed the Alps; I have adopted that of Larosa without pretending to justify it.

Carle Figurative

des peres successivas o homens de la armee qu'Annibal conduisit d'Espagne en Italie ou Naveutam-les Gauls (Selon Polybe).

Dessinée par M. Minard, Inspecteur Général des Postes et Omnibus en retraite.

Paris, le 20 Novembre 1869.

Légende.

Les nombre d'hommes restés à Annibale sont représentés par la largeur des zénos égale à raison d'une millimètre pour 10,000 hommes, ils sont de plus écrites sur les zénes.

Il n'y a pas d'opinion assurée sur le point où Annibal a traversé les Alpes. J'ai adopté celle de Larosa sans prétendre la justifier.
Excellence

- Avoid chartjunk;

- Maximize the data-to-ink ratio;

- Look for multifaceted representations.
  - In particular: look for small multiples.
2000: State-level support (orange) or opposition (green) on school vouchers, relative to the national average of 45% support

- All voters
- White Catholics
- White evangelicals
- White non-evang. Protestants
- White other/no religion
- Blacks
- Hispanics
- Other races

Orange and green colors correspond to states where support for vouchers was greater or less than the national average. The seven ethnic/religious categories are mutually exclusive. “Evangelicals” includes Mormons as well as born-again Protestants. Where a category represents less than 1% of the voters of a state, the state is left blank.
cogniti à noi, mà da ogni nostra immaginazione. Ma quella che pone Apelle del mostrarsi Saturno hora oblongo, & hor' accompagnato con due stelle à i fianchi, creda pur V. S. ch'è stata imperfezione dello strumento, ò dell'occhio del riguardante, perche sendo la figura di Saturno così , come mostrano alle perfette viste i perfetti strumenti, dove manca tal perfezione apparecise così non si distinguendo perfettamente la separazione, e figura delle tre stelle; ma io che mille volte in diversi tempi con eccellente strumento l'ho riguardato, posso asserirà, che in esso non si è scorta mutazione alcuna, e la ragione stella fondata sopra l'esperienze, che hauia-

Wordlike sparklines should often be embedded in text and tables, which in turn may provide a helpful context for interpreting the rather free-floating sparklines. Text and data surrounding the quantitatively inexact sparkline may now and then show more precise numbers and scaling information in an image/text/number format, as we saw for the glucose sparkline: glucose 128. Of course the wordlike quality of sparklines creates the wonderful possibility of writing with data graphics. Thus the image “ ” means like a word and shows like a graphic “the last 80 readings of glucose, compared to normal limits, with the most recent reading indicated by red.”
The Rise of Interactivity
The Digital Humanities
Figure 10: Protagonists of Parisian novels, and objects of their desire

★ objects of desire
The anomaly constituted by the epistolary novel's slump in the 1770s is only apparent, and easily explained: what declines in these years is the publication of all novels, and in fact, as figure 8 shows, epistolary novels were then even more hegemonic on the market—as in 1776, when an impossible 71 per cent of new titles were novels in letters.
The Valley Project details life in two American communities, one Northern and one Southern, from the time of John Brown’s Raid through the era of Reconstruction. In this digital archive you may explore thousands of original letters and diaries, newspapers and speeches, census and church records, left by men and women in Augusta County, Virginia, and Franklin County, Pennsylvania. Giving voice to hundreds of individual people, the Valley Project tells forgotten stories of life during the era of the Civil War.

Enter the Valley Archive

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The Landscape of Digital Storytelling
Analytic Narrative
Stories in Space
Stories in Time
Connected Stories
Stories as Pattern

Stevedore knot, figure eight knot

Input Interpretation:
Stevedore knot | figure eight knot

Images:

Stevedore knot | figure eight knot

Notations:

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<thead>
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<th></th>
<th>Stevedore knot</th>
<th>figure eight knot</th>
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<td>Alexander–Briggs notation</td>
<td>51</td>
<td>41</td>
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<tr>
<td>Conway notation</td>
<td>42</td>
<td>22</td>
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<tr>
<td>Dowker notation</td>
<td>4  8  12  10  2  6</td>
<td>4  6  8  2</td>
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</tbody>
</table>

Braid representations:

<table>
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<th>braid word</th>
<th>Stevedore knot</th>
<th>figure eight knot</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\sigma_1^{-1}\sigma_2\sigma_1^{-1}\sigma_2\sigma_1\sigma_2$</td>
<td>$\sigma_2^{-1}\sigma_1\sigma_2^{-1}$</td>
<td></td>
</tr>
</tbody>
</table>
Shakespeare's Macbeth
The top 100 words in Macbeth, after removing stage directions and regularizing spelling. —Ruben Puentedura 1 year, 9 months ago
Three Key Frameworks from Scott McCloud
This is the realm of the art object, the picture plane, where shapes, lines and colors can be themselves and not pretend otherwise.

Below me, the area described by these 3 vertices: “reality,” language and the picture plane represents the total pictorial vocabulary of comics or of any of the visual arts.
MOST PANEL-TO-PANEL TRANSITIONS IN COMICS CAN BE PLACED IN ONE OF SEVERAL DISTINCT CATEGORIES. THE FIRST CATEGORY—WHICH WELL-KNOWN AS MOMENT-TO-MOMENT—REQUIRES A VERY JUMPY AHREOF.

NEXT ARE THOSE TRANSITIONS FEATURING A SINGLE SUBJECT, ACTION-TO-ACTION PROGRESSIONS.

THE NEXT TYPE TAKES US FROM SUBJECT-TO-SUBJECT WHILE STAYING WITHIN A SCENE OR IDEA. NOT THE DEGREE OF READER INVOLVEMENT NECESSARY TO RENDER THESE TRANSITIONS MEANINGFUL.

DESCRIPTIVE READING IS OFTEN REQUIRED IN READING COMICS SUCH AS IN THESE SCENE-TO-SCENE TRANSITIONS, WHICH TRANSPORT US ACROSS SIGNIFICANT DISTANCES IN TIME AND PLACE.

A FIFTH TYPE OF TRANSITION, WHICH WELL-KNOWN AS Aspect-TO-Aспект, SYMBOLOGICALLY CONNECTS THE MOST PART AND SETS A MAPPING BETWEEN THE DIFFERENT ASPECTS OF A PLACE, IDEA, OR MOOD.

AND FINALLY, THERE'S THEN-SEQUITUR, WHICH OFFERS NO LOGICAL RELATIONSHIP BETWEEN PANELS WHATEVER.
Sources


• Pilar Utrilla et al., “A palaeolithic map from 13,660 calBP: engraved stone blocks from the Late Magdalenian in Abauntz Cave (Navarra, Spain)”. Journal of Human Evolution 57.2: 99-111. (2009)


Analytic Narrative Examples and Tools

- David Rumsey Historical Map Collection: http://www.davidrumsey.com/
  - MapLib.net: http://maplib.net/
- Heilbrunn Timeline of Art History: http://www.metmuseum.org/toah/
  - TimeRime.com: http://timerime.com/
- Visualcomplexity.com: http://www.visualcomplexity.com/vc/
  - bubbl.us: http://bubbl.us/
  - Wolfram|Alpha: http://www.wolframalpha.com/
  - Many Eyes: http://manyeyes.alphaworks.ibm.com/manyeyes/