

JOEL KATZ

Designing Information

*Human factors and common sense
in information design*



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As knowledge increases among mankind, and transactions multiply, it becomes more and more desirable to appreciate and facilitate the modes of conveying information from one person to another, and from one individual to the many.

William Playfair

The Commercial and Political Atlas, third edition,
1801



WILEY

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Information is not knowledge and
knowledge is not wisdom.

James Gleick

*The Information: A History,
a Theory, a Flood*

I certainly would be interested to
work with a serious agency that can
offer a flow of freelance projects.
My specialty is Information Design,
Branding, and Design Writing. You
can preview my portfolio and my
blog at....

Designer (not this one) responding to
recruiting agency inquiry

Hmm...I've actually never heard
of Information Design before (and
I've been working in the creative
industry for over 10 years now!).
Maybe it would be best for us to talk
over the phone. Call me when you
have a moment.

Recruiting agency responding to designer

We want the book to look different
enough so that teachers will want to
buy it, but not so different that they
feel they have to read it in order to
teach it.

Textbook publisher (not this one) to
designer (this one) on the design
of a new middle school geography
textbook

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Full disclosure. Philadelphia has been my home since 1972. I love it, and I would not dream of living anywhere else (in this country). I walk its streets, I read its newspaper, and I give my students assignments that engage them with local issues, problems, and people. The majority of my clients are regional. Philadelphia's designs are the designs I know. I hope that any criticism of Philadelphia design in this book will be taken constructively, in the spirit in which it is meant, and with the understanding that it is to some extent the result of geographic happenstance.

I have never had any direct client-designer relationship with any of the originators of the designs that I may appear to criticize in the book, nor are any of those designs by designers with whom I competed for work.

Every effort has been made to accurately credit the designers, artists, and authors whose work I have reproduced and discussed. Some of those acknowledgments and links may be unintentionally inaccurate. To the extent that inaccuracies may have found their way into this book, I sincerely apologize.

Everything is designed.

Most people have little understanding of the design process, but we all live with its results: a sign on the highway, an explanation of a medical procedure in an emergency room, a diagram on how to build a piece of furniture, a chart that shows us our assets, a ballot, a data-driven decision.

Not everyone realizes this.

Many people assume that things just emerge in their finished visual form, like Athena springing, fully armed, from Zeus's forehead. This may explain why design isn't always as good as it needs to be.

Our job as designers is to design with intent, so that the objects we design function as they are supposed to for those who need them and use them.

Our job as information designers is to clarify, to simplify, and to make information accessible to the people who will need it and use it to make important decisions. Information needs to be in a form they can understand and use meaningfully, and to tell the truth of what things mean and how they work.

The purpose of this book is to provide a description of issues that confront designers as we attempt to translate data into information so that our audience can understand it and apply it to answer their questions and meet their needs.

In its structure, this book endeavors to examine the many aspects of designing information. Its title is intentional: it is a book about ideas and process more than about showcasing designs and products that have already been designed to fill specific needs.

The velocity of the increase in accessible data is unprecedented, amazing, and increasing. Not very long ago in design history, cartographers (among the first modern information designers) were decorating their maps with sea monsters, locations of fictional characters, and imaginary islands, less for visual elegance than to fill the spaces where they had no information. "Terra incognita" had multiple meanings.

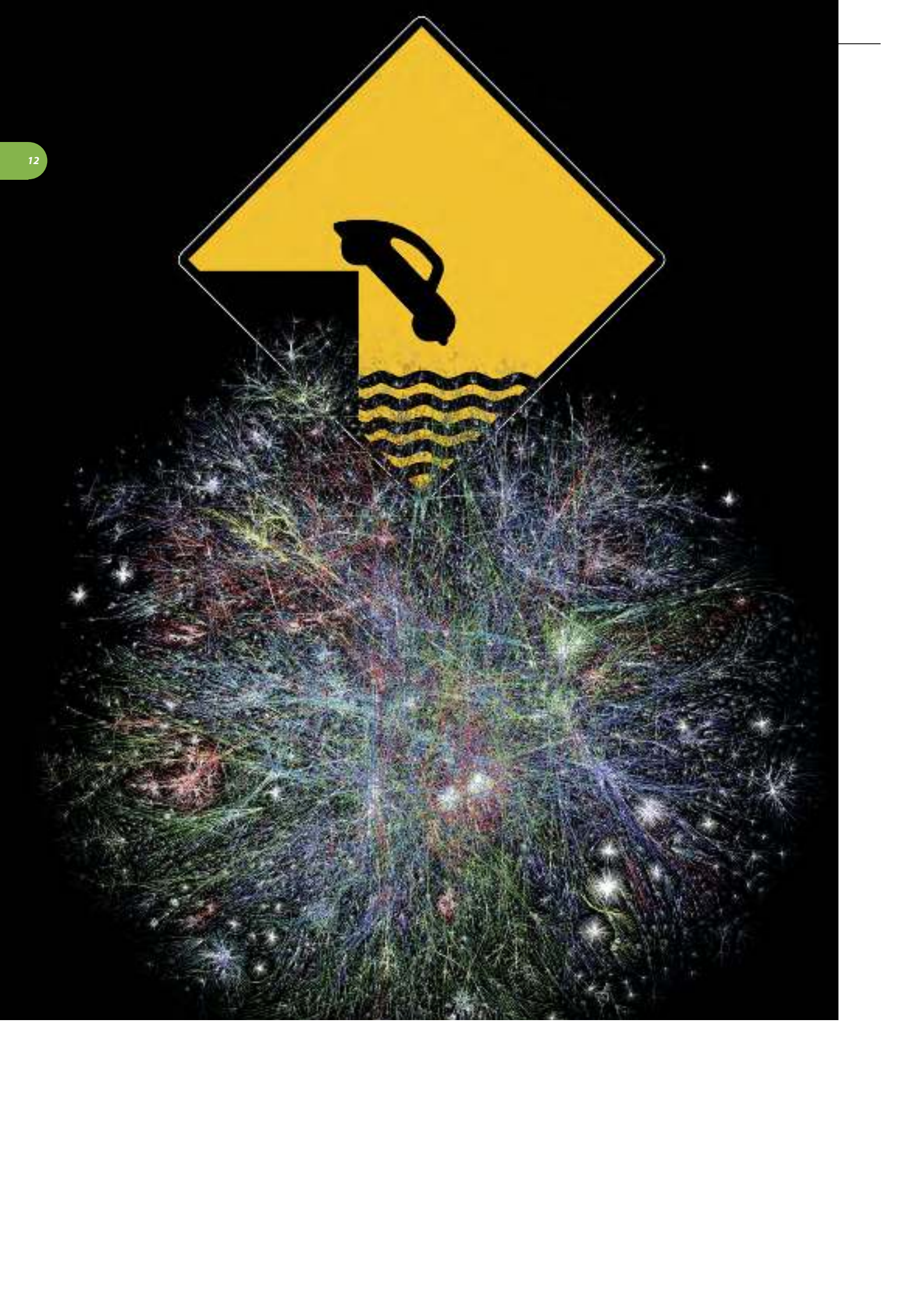
Our challenge today is almost the opposite from that of centuries, or even decades, past: to invent ways of sifting through the multitudes of data that bombard us daily, often numbing our senses and scrambling our brains.

In looking at and thinking about the issues of designing information rationally and functionally, I was informed and humbled by the work of preceding generations of information designers. As a teacher, I have learned as much from my students as I hope I have imparted. While I have occasionally found students a bit weak in cultural and design history, I attribute this in large measure to the ubiquity of technology, which permits some of the young to believe that everything happened this morning, or no earlier than yesterday. This makes technology part of the problem as well as potentially part of the solution.

The ideas in this book have been rattling around in my head for decades, in one form or another, and its goals and form have changed many times. I feel that many of the ideas and perceptions that occurred to me then have been confirmed.

Information design is a hot subject for books and websites and blogs these days. I've learned a great deal from the books I've read and the sites and blogs I've visited. To my great pleasure, as I communicated with peers and colleagues, I found that there is a thoughtful, generous community of designers who are willing to share and assist each other.

It is my sincere hope that this book may provide similar assistance and ideas to its readers.



1

Aspects of Information Design

The nature of information

To design it is to interpret it.

Chris Myers

Above. A reconstruction of my favorite Irish road sign, meaning "unprotected quay." It's simple, unambiguous, and powerful.

*Below. The OPTe project. "The first goal of this project is to use a single computer and single Internet connection to map the location of every single class C network on the Internet."
— Barnett Lyon*

Information
Complete for its purpose



Definitely true
Vitaly important

Uninformation



Probably not untrue
Probably not important
Possibly interesting

Noninformation



Possibly true
Possibly not true
Probably not important
Possibly confusing

Misinformation



Definitely not true
Vitaly important to avoid

Disinformation
Complete for its purpose



Deliberately not true
Used vengefully or
tactically to mislead

Like Caesar's Gaul, information is divided into three principal parts.

Information is what you absolutely must clearly communicate.

Uninformation is stuff that isn't necessarily important and that probably isn't untrue.

- Within uninformation is where the designer plays and dances.
- Within uninformation is **noninformation**, which is often uninformation appearing to be information.

Misinformation is stuff masquerading as information that is likely to distort, confuse, and mislead (and possibly injure, maim, kill).

- Misinformation is not necessarily deliberate but may be the result of unintentional incompetence, noncurrent data, or failure to correctly interpret source data.
- At the nadir of misinformation is **disinformation** (from the Russian *dezinformatsiya*), misinformation deliberately used to achieve a financial, political, or military objective.

Read Charles Seife. *Proofiness*. Seife identifies a host of ways in which numbers are used, or misused, to convince people and the media that things that are demonstrably not true are, in fact, verifiably true.

Go to <http://charlesseife.com/books>

See also Numerical integrity; Page 192 top left and bottom center.

Indicium est omne
divisa in partes tres.

(All information is
divided into three
parts.)

Paraphrase of Julius Caesar,
in *Commentarii de Bello Gallico*,
ca. 40s BCE.

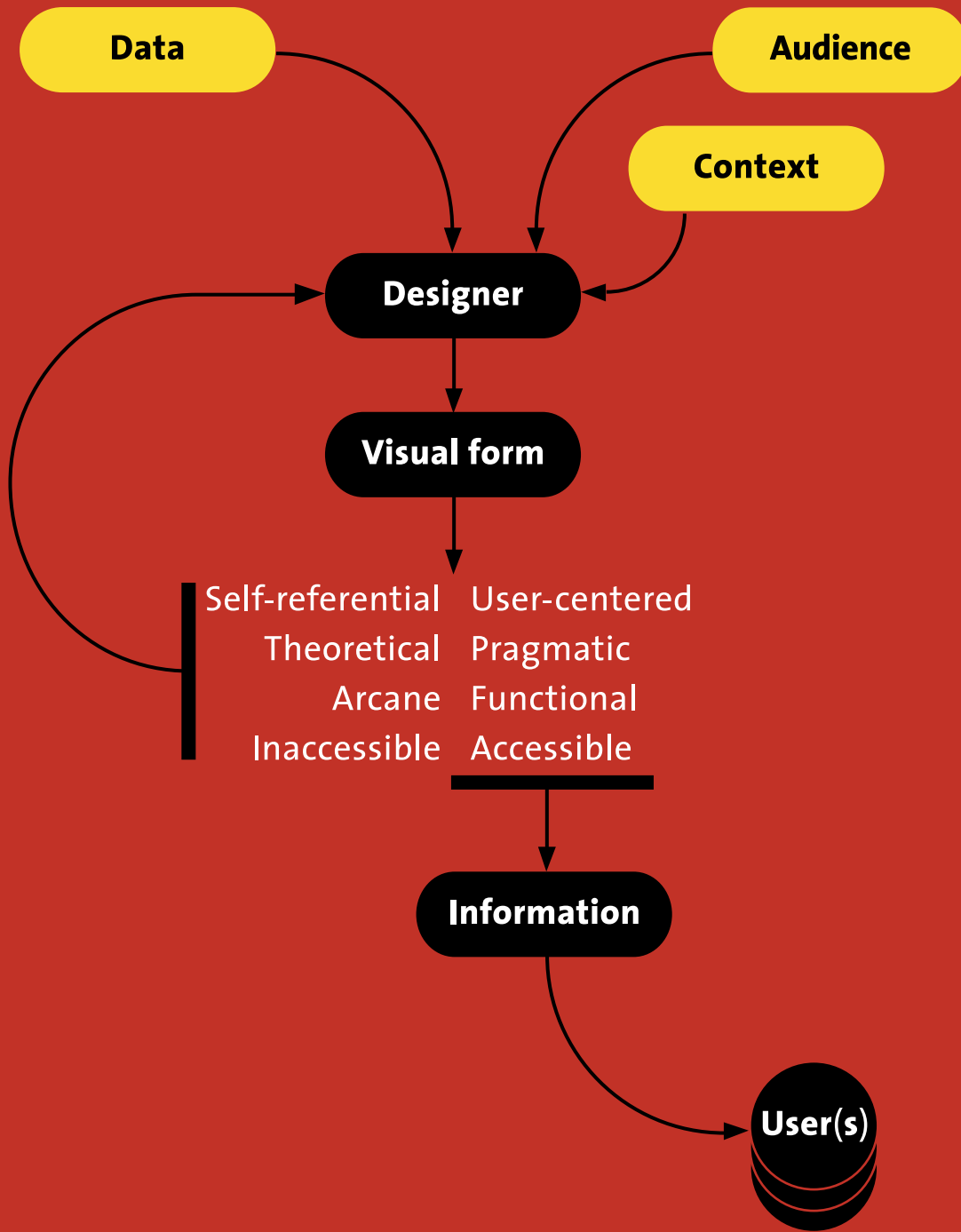
If the Hippocratic
oath were written for
designers, it would
begin, "First, tell no
lie."



Propaganda. Could be true; could be false; probably incomplete. Politicians just love small children, don't they? This photograph is from a 1940 pro-Hitler propaganda booklet.



This inflatable tank is an example of disinformation used prior to the Normandy landings in 1944. Operation Fortitude, as it was called, involved the creation of fake field armies both north and south of the actual invasion landing site to divert Axis attention away from Normandy. It was one of the most successful military deceptions of the war.



Self-referential design is where (only) the **designer** understands.

Pragmatic design is where the **user** understands.

Whatever the medium and whatever the content, the purpose of information design is to convey information to the user. If the user can't understand it, the design and the designer have failed.

The difference is not unlike the difference between school and the world. In school, students function largely within a relatively homogeneous community of their peers and instructors, where they learn to research a problem, explore alternatives, and defend their solution in terms of their thinking and design process. In the world—in life—designers, especially information designers, deal with communicating information visually to a user group sometimes very unlike themselves.

Often the designer, in life as well as in school, falls into the trap of designing for appearance, and using the data, or content, not as the core of a communications process but as the foundation for explorations of visual excess and irrelevance. Many graphic and information design curricula are responding to society's needs and teaching that form grows organically out of the need to communicate content.

This conveys a powerful responsibility upon—and a great opportunity for—the designer.

“Intellectual”—non-user-centered—design, and personal explanations of self-referential design, lead back only to the designer, not forward to the user.

Read Jorge Frascara. *Communication Design: Principles, Methods, and Practice*.

Like good writing, good graphical displays of data communicate ideas with clarity, precision, and efficiency.

Michael Friendly

The data, the designer, and the audience are the fundamental continuum in information design.

If it doesn't work for the user, no amount of explanation can make it any better.

Accessible symbolism: the 168 chairs in the Oklahoma City bombing memorial.
Inaccessible symbolism: the 1,776-foot height of the Freedom Tower.



A seminal quote by Richard Grefe, Executive Director of the AIGA, on the back of a t-shirt worn by information designer Paul Kahn. I have said, “the designer is the medium between the information and the user.” As with many quotes in this book, the identical idea can usually be attributed to many people.



Chaos out of order. We are used to seeing ads like this in the automotive section of our newspaper (those of us who still read newspapers). Interestingly, this ad is comparatively well organized, but—not content to leave what might have been well enough alone—overcrowding and a riot of fonts and exhortations destroys what—in the hands of a capable designer—might have been much better than terrible.

It's not enough to know the base data—in its most literal sense—of an information graphic. One has to understand what it means, which requires knowing how the particular set of information being visualized was selected and, from there, the designer's point of view.

Information, even after it has been distilled from data, and even when it is "true," has intention, interpretation, and often an agenda that has governed its selection: political, social, religious, and "pack-everything-in" are examples of possible motivations behind an information graphic.

Many data sets and information designs, past and present, have been constrained by a lack of data, geographic or statistical, the other side of the mirror of many current "infographics" that are overloaded with data just because it exists. It could be said that the task of information designers in the past—particularly cartographers—was to create "information" where no data existed, and that the task of information designers today is to refine and reduce an overabundance of data into meaningful and usable information.

Information design, when successful—whether in print, on the web, or in the environment—represents the functional balance of the meaning of the information, the skills and inclinations of the designer, and the perceptions, education, experience, and needs of the audience.

Often, these components are out of balance for any one or more of a number of reasons.

Data

- The data are incomplete, skewed, or missing; or too gross in grain, oversimplified, or lacking in meaningful detail;
- The data do not reveal their meaning because of lack of definition or misleading relationships within them;
- The data are too dense, arcane, or technical to be transformed into understandable information.

Designer

- The designer is unable to understand the meaning of—and therefore unable to distill and visualize—the data;
- The designer is not adequately sensitive to human factors issues and may not be able to model the needs, abilities, and limitations of the audience;
- The designer might be overly concerned with designing a visually compelling graphic, resulting in counter-intuitive or, worse, misleading or inaccurate design solutions.

Audience

- The audience may be unable to understand the information because of lack of visual literacy or education, unfamiliarity with visual conventions of the subject, lack of specialized intelligence, lack of interest in the subject, or other factors.

Go to <http://blog.metmuseum.org/penandparchment/introduction/>

See also Simple and complex; Connections among people; Connections in products; Information overload; Too much information; Page 192 top center.

Indifference toward people and the reality in which they live is actually the one and only cardinal sin in design.

Dieter Rams

Unsuccessful design happens when:

- no one understands;
- no one cares;
- it's not anyone's job;
- some or all of the above.

Determining the appropriate content for the communication of information requires a rigorous process of examination:

Is it true?

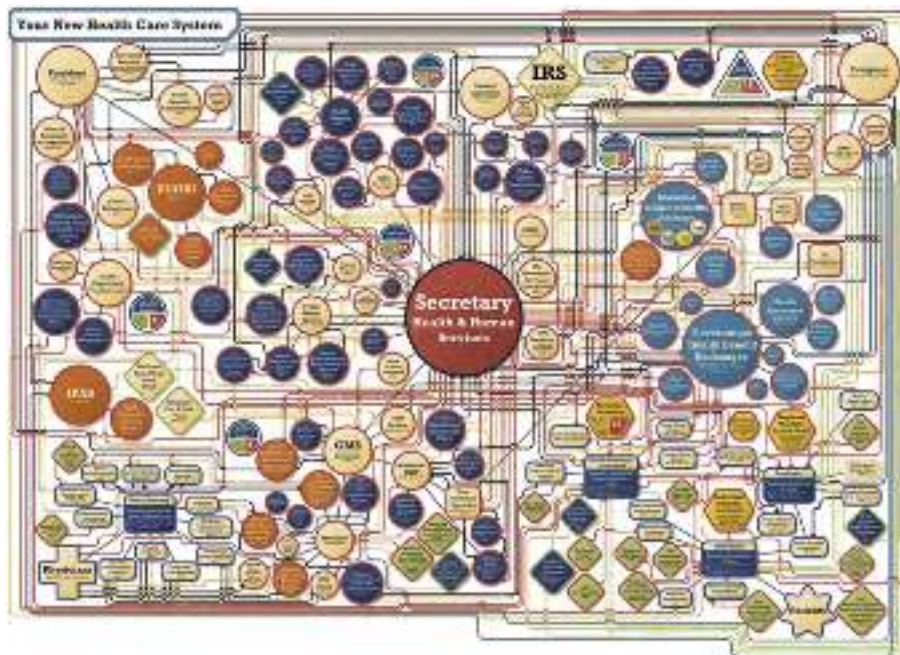
Is it relevant?

Is it necessary?

Does its inclusion add or detract?

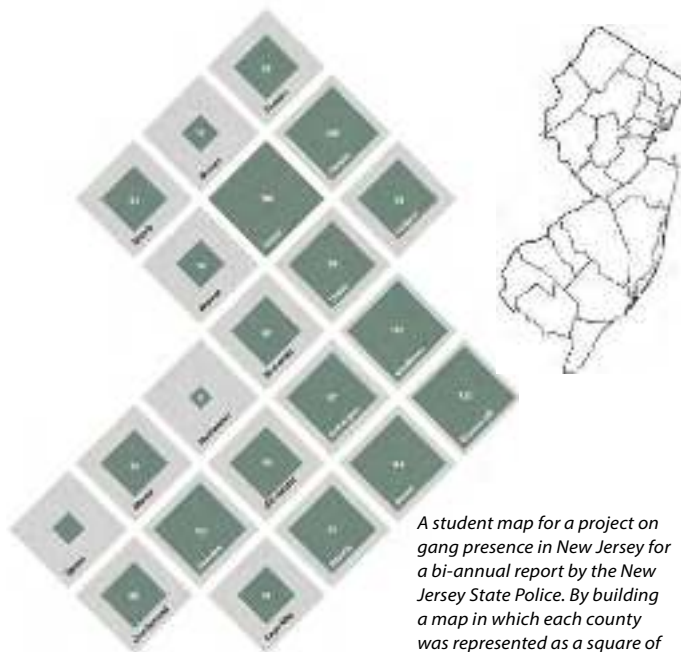
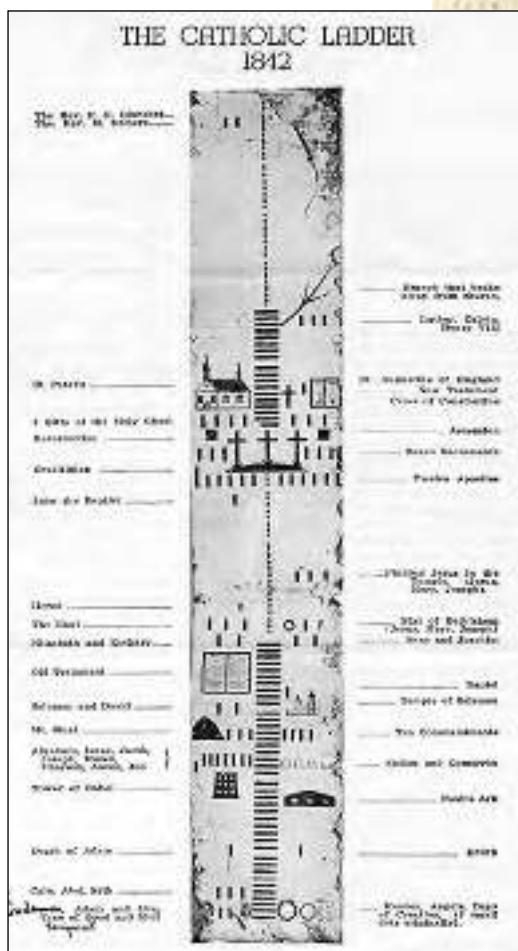
Is it in a form that its audience can understand?

Intentional chaos. This "chart" of President Obama's proposed health care system was released by the Republican side of the Joint Economic Committee on 28 July 2010 (www.freerepublic.com/focus/f-news/2650278/posts), purporting to show "Obamacare's bewildering complexity." It does not compare the plan's complexity either with the existing health care structure nor to any proposal put forward by the Republicans in Congress. A good example of misinformation. (The legend has been deleted.)



Rev. Father F. N. Blanchet made first use of this "Catholic Ladder" in July 1842 at the Cowlitz Mission to teach the Indians the main truths of the Catholic faith. Many copies of the ladder were made and presented to the Indian chiefs.

The 40 horizontal bars represent the 40 centuries BCE (when the world was declared by James Ussher to have been created in 4004 BCE). The 33 dots represent the years of Christ's life on earth. The 18 bars represent the 18 centuries CE and the 42 dots represent the 42 succeeding years.



A student map for a project on gang presence in New Jersey for a bi-annual report by the New Jersey State Police. By building a map in which each county was represented as a square of equal size, numerous quantities, both in actual numbers and in percentages, could be consistently and visually expressed.

Left. The “T-in-O” map (so called for the letterforms created by the bodies of water and the surrounding ocean) is one of a large number of maps that emphasize theology over geography. Based not on geographic ignorance, as occasionally thought, its intent was to summarize a Christian world view in a simple and memorable form (not unlike Harry Beck’s iconic London Underground map of 1931, which created a simple and memorable image of a complex movement network).

Although the map is shown as a flat disk for simplicity, it was well known that the earth is roughly spherical. Its construction is theologically governed: east is at the top, as it was believed that Paradise is to the east; Jerusalem is at the center; the three continents show the division of the world by the sons of Noah.

I categorize non-wayfinding maps and diagrams into four basic categories:

- 1 Geographic (not illustrated on this spread): the most familiar type of maps, they represent space with geographic accuracy and at a constant scale. They are the predominant map type in most atlases. Included in this category are simplified geographic maps designed to make wayfinding and movement networks more easily understandable.
- 2 Conceptual: these maps (and diagrams) may take extreme liberties with geography, or ignore it almost entirely, to describe or promote a concept or point of view. Many of these maps, especially in the past, when accurate geographic knowledge was incomplete at best, are often based on a theological or users’ affinity view of the world.
- 3 Experiential (not illustrated on this spread), often diagrammatic: how place and space are experienced, felt, measured, and perceived, often very different from geography. Each of us experiences space and time uniquely. Children’s perceptions of a place and the geographically distorted units of space and time experienced in transit travel with no visible geographic references are in this category.
- 4 Numerical/statistical: maps that adjust geography to reflect place-specific statistics. They are used to show change, relationships between and/or among places or political entities, and other numerical or statistical (non-geographic) comparisons.

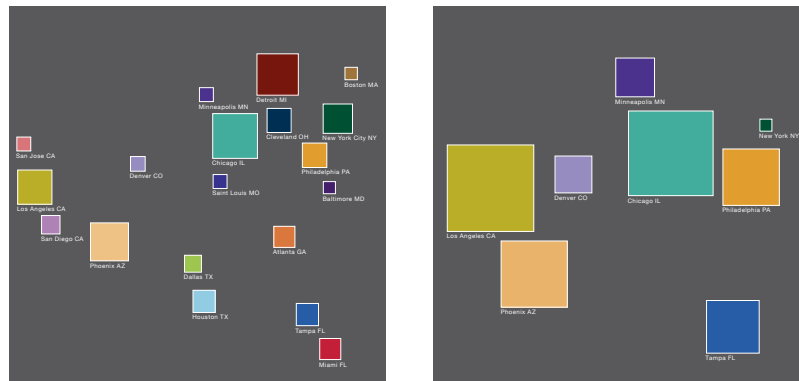
Many maps and diagrams embody a combination of these categories.

Read Alessandro Scafi. *Mapping Paradise: A History of Heaven on Earth*.

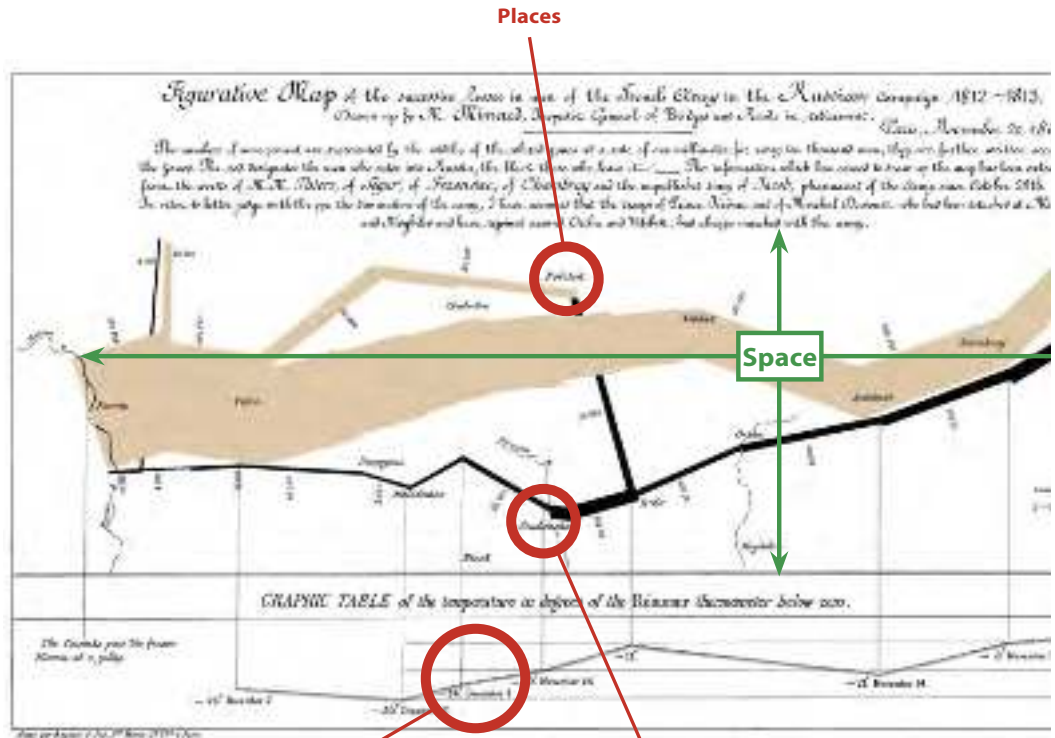
Go to Cartographia: <http://cartographia.wordpress.com/about>
http://blog.metmuseum.org/penandparchment/exhibition-images/cat300r2_49e
http://www.strangehorizons.com/2002/20020610/medieval_maps.shtml

See also Anatomy and function; Escaping geography; A movement network genealogy; Map or diagram?

Another student project, like the map on the opposite page, illustrates two phases of a U.S. government housing program awarded to cities—the Neighborhood Stabilization Program. Phase 1 grants (right) were awarded on a system based on need. Phase 2 grants (far right) were awarded competitively. The area of each square is proportional to the size of the grant; the colors of the squares relate to 20 additional graphs in the project; and the distribution of the squares locates the cities geographically in the United States.



Described by Edward R. Tufte as “the best statistical graphic ever drawn,” Minard’s map has long been the subject of discussion, analysis, and attempts to improve it. Some of these are shown in Section 6 of this book.



The table below was retrofitted from the data in the Minard map and other sources.

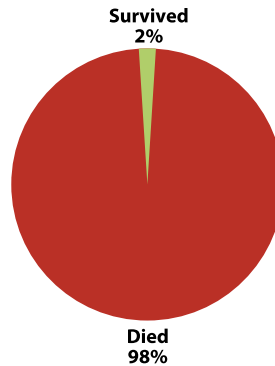
Although it is possible to order the table by date (as it is), by troop numbers, by geography, or by temperature (for the return), the table remains columns of numbers—code.

Napoleon's Russian Campaign
Kovno-Moscow-Kovno, October-December 1812
Data mapped by Charles Joseph Minard 1869

Day	Date	Number of troops	Location	Temperature °C °F °R	Notes
0	23 June	422,000	Kowno		River Nieman
		400,000			Macdonald separates
		340,000	Vilna		Oudinot separates
		175,000	Witebsk		
		145,000	Smolensk		
		145,000	Dorogobouge		
		127,000	Chjat		
		100,000	Mojaisk		Maskown River
	18 October	100,000	Moscou	0 32 0	
		100,000	Tarantino		
	24 October	100,000	Malo-jarosewli	0 32 0	Rain
		96,000	Mojaisk		
		87,000	Wizna		
	09 November	55,000	Dorogobouge	-13 9 -9	
	14 November	37,000	Smolensk	-26 -13 -21	
		24,000	Orscha	-23 -9 -18	River Dneiper
	21 November	20,000	Botr	-14 7 -11	
		50,000			Joined by Oudinot
	28 November	50,000	Studienska	-25 -13 -20	River Berezina
	01 December	25,000	Minsk	-30 -22 -24	
	6 December	12,000	Moloderno	-38 -34 -30	
		14,000	Smorgoni		
	7 December	8,000	Vilna	-33 -27 -26	
		4,000			
		10,000			Joined by Macdonald
174	14 December	10,000	Kovno		River Nieman

Time and number:
date and temperature

Events:
battle and river crossings



A re-creation of the “executive summary” of Minard’s diagram.

This [the Minard map above] is one of the worst graphs ever made. [Tufte’s] very happy because it shows five different pieces of information on three axes and if you study it for fifteen minutes it really is worth a thousand words. I don’t think that’s what graphs are for. I think they try to make a point in two seconds for people who are too lazy to read the forty words underneath. And to make me spend fifteen minutes studying it doesn’t make sense....

Seth Godin
Quoted by Jorge Camoes on 21 January 2008
<http://www.excelcharts.com/blog/minard-tufte-kosslyn-godin-Napoleon/>

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