2. The Ethics/Aesthetics of Information
Ethics and Information

• A cardinal rule in visualization is to “be true to the data” and tell a “truthful” story through the data. *Raises the question of truthfulness.*

• Why should we think of ethics with data? What does it mean to *be informed*?

*Questions too big to be decided here! But something we should at least consider …*

• For this topic, we consider how our decisions as designers of the visualization are ethical ones. The choice of everything we design makes us responsible for the potential story we tell … and that impacts the audience and the task. Let’s look at some of our work tasks in InfoVis.
Work practices
Work practices

**Interaction Design**
- JavaScript
- CSS
- jQuery

**Data Analysis**
- Exploratory Data Analysis
- R, Stata, SPSS, IBM, etc.

**Interactive Information Visualization**
- bar charts, pie charts, etc.

**Graphic Design**
- Interface Design
- Information graphics
- Poster design

**Commercial art Web design**

**Human-Computer Interaction**

**Statistics & Analysis**
- Python & code libraries

**Back-end data stores**
Impact of computing

With the exception of high-powered modeling tools (such as those used to create CGI effects and architectural or geographic plotting tools), the same computing tools used in graphic design are used in data visualization.

Scientific visualization deals with things in the physical world.

Data/info vis expresses abstract ideas in a visual language.

Impact of computing

Regardless of what our task is we start with data + graphics. The degree of computing power, amount of data, and audience’s task establish parameters of different kinds of “data vis.”
Impact of graphics

Visual languages are powerful ways of suggesting some facts ...

Check out https://www.boredpanda.com/truth-behind-photography-tricks/

Tufte describes this as “the lie factor” and is an issue of graphical integrity. By manipulating some fifteen design features (size, proportion of symbols, changing scale (e.g., from yearly to monthly) mid-graphic, it’s possible to deceive the viewer.
Impact of graphics

“If the area of the dollar is accurately to reflect its purchasing power, then the 1978 dollar should be about twice as big as that shown.”

Tufte's six principles of graphical integrity:

1. The representation of numbers, as physically measured on the surface of the graphic itself, should be directly proportional to the numeric quantities represented.

2. Clear, detailed, and thorough labeling should be used to defeat graphical distortion and ambiguity. Write out explanations of the data on the graphic itself. Label important events in the data.

3. Show data variation, not design variation.

4. In time-series displays of money, deflate and standardized units of monetary measurement are nearly always better than nominal units.

5. The number of information-carrying (variable) dimensions depicted should not exceed the number of dimensions in the data.


Tufte, p. 77
Expanding the model

Traditional mode is [data – information – knowledge]; today, tho, we work with data to learn more, more skills, refine our experiences and choices ... *making sense* means *understanding the data and how we might apply that sensibility*...
Cognition

- What is the *bridge* between the previous models’ progression from data to making sense and applicable?

- *Cognitive models* of human behavior with images begins with questioning the data - exploring them in our mind - to identify patterns, questioning reasons for these patterns, wondering how we might use them for some task and how we might explain to others our choices.

- Does what we gather from the graphic explain truthfully? Or do they deceive? How to decide?

- We hold that the bridge is *communicative* - that alone or with others, people explore data by questioning them, mentally or verbally, until we draw a conclusion about those data.
Starting with “static data”, we question the relationships. Next people *cluster and classify* the data into possible relationships. Finally, we synthesize the clusters based on our own experiences with the topic or potentially or likely patterns.
Why it matters

- Seeing, Aesthetics, and Design are interrelated.

- Some in computing prefer to minimize the end-user’s cognition: “We’re computer science, we tell the users what they want.” [Actual quote from a computer conference!]

- But the role of interpretation of messages makes us ask about (1) being responsible in what people can interpret and (2) how we interpret.

- Compare the issue of message creation & interpretation from other fields: literary criticism, art criticism, hermeneutics, graphic design, education, and more ...

For instance, Berger’s Ways of seeing, Bennett & Royle’s Intro to Literature, criticism and theory, Budd Philosophical framework for library and information science, and others listed on the last slide, References.
Why it matters

• “Data”, “information”, “knowledge” are often treated as synonyms - but they’re not. Reflect on the properties of each and see ... People talk about how much “data” the computer can process but equally say “the amount of information is doubling every year.” [The quote refers actually to how many bits can be processed by the computer, but we’d never know that from the quotes.]

There are issues of

1. intentionality (how we do our work),
2. comprehensibility (we build so others can understand; the audience),
3. have a message or story to be conveyed (otherwise why build the vis?),
4. evidence of suitability for some purpose (the task),
5. suggestions of suitability for other people (hence a claim on universality)
6. reflexivity (the choice of the data for the purpose reflects on the producer and consumer of the graphic)
7. social context (the vis uses symbols bound to cultures)
8. cognition (the viewer must be able to think about the graphic...)

Therefore ...

Our work as “information visualization creators”, we help others transform data into meaningful information.

**Information** is the result of

- a cognitive and communicative engagement
- to establish meaning in otherwise static data or facts or opinions,
- that enable one to operate more effectively, more efficiency in one’s “lifeworld,”
- by actively/consciously accepting the reasoning behind the content in
- an intentionally-created and
- purposively-shared communication,
- regardless of physicality of the data’s expression.
Why it matters

• As professional practice in library & information sciences, we reflect on how “truthful” our use of the data is and whether our website/interface/visualizations are likewise truthful.

• Is there a harmony between the design of the visualization that contributes to interpretation or creates too much visual noise?

• Are the symbols we choose appropriate – design guidelines for computers and guidelines for people as social beings.

• So we need some guidelines to help us work methodically –
  1. theories of aesthetics to help understand the messages we create,
  2. systematic design approaches to compose the message, and
  3. technology to make the visualization possible in a computing environment.
References


