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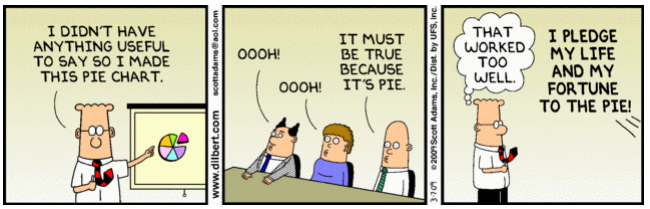
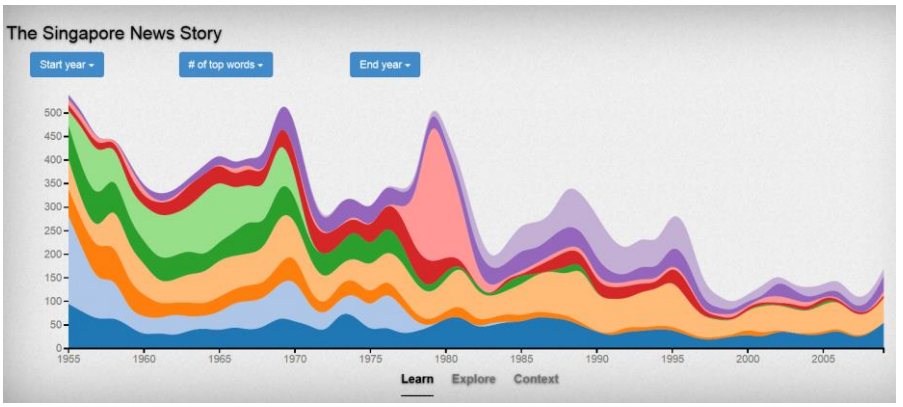
IS428 Visual Analytics for Business Intelligence
Lesson 11: Thinking about Visual Analytics Design



Content

- Visual Analytics design issues
- The information visualisation reference model
- The user-centered design approaches

A Tale of Two Data Visualisation



Source: http://singaporenews.github.io/

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A Tale of Two Data Visualisation

Source: http://www.thiakx.com/educity/?loaded

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Why Visual Analytics (VA) Design?

- Good design process is the key to Visual Analytics applications success
- Good design process will make your VA systems cost-effective.
- Knowing what you want to get out of VA applications is fundamental to the design process

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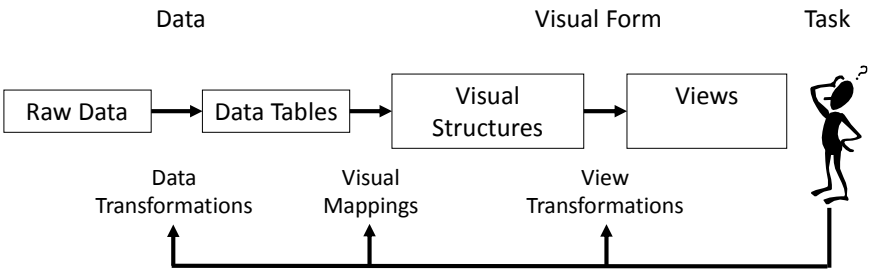
The Information Visualisation Reference Model

Data Management
Select data source
Clean data
Categorise data
Moderate data

Visualisation
Information design
Visual encoding
Interface design

Visual Analytics
Observations
Hypothesis
Evidence (+/-)
Summarise
Communicate



Source: Heer, J. Agrawala, M (2008) Design consideration for collaborative visual analytics. *Informsation Visualization* (7) :49-62

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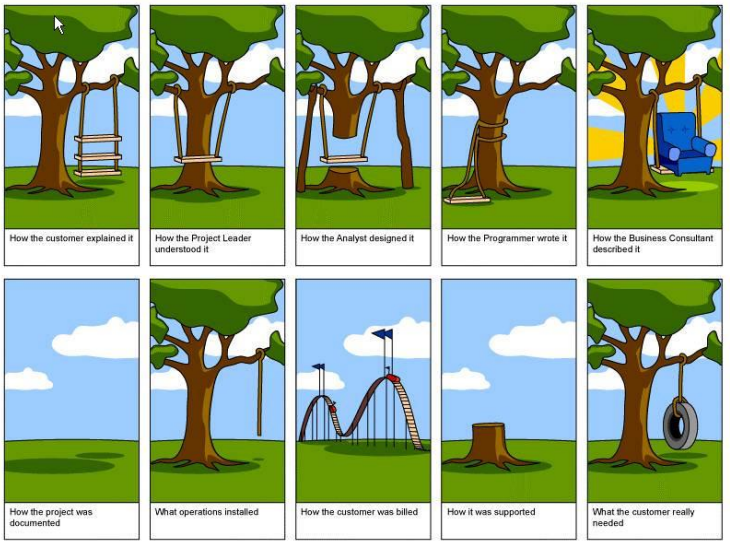
What the user needed……



Source: http://www.datadrivenconsulting.com/2009/12/what-the-customer-needed/

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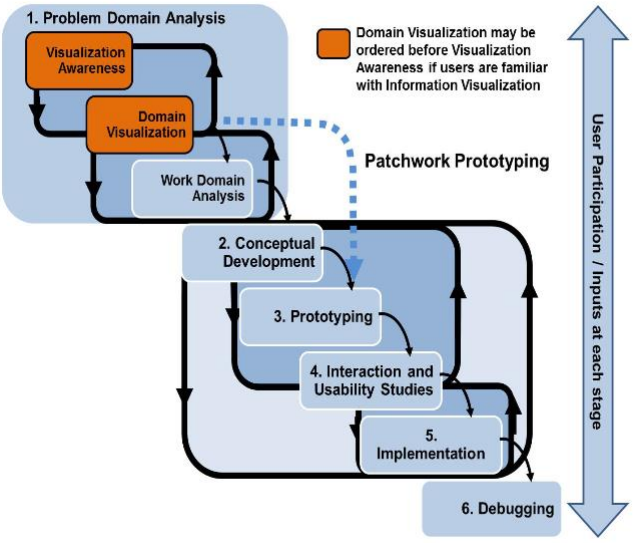
User-centered Design Process – A Practice Approach



Source: Koh, L.C. et. al. (2011) "Developing and Applying a User-Centered Model for the Design and Implementation of Information Visualization Tools", InfoVis 2011, London.

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Exploratory Analytics Audiences

- Provides every analytical display, interaction, and function that might be needed by those who use it for their analytical tasks.
- Grounds the entire analytical experience in a single, central workspace, with all displays, interactions, and functions within easy reach from there.
- Supports efficient, seamless transitions from one step to the next of the analytical process, even though the sequence and nature of those steps cannot be anticipated.
- Doesn't require a lot of fiddling with things to whip them into shape to support your analytical needs.

Customisable Analytics Audiences

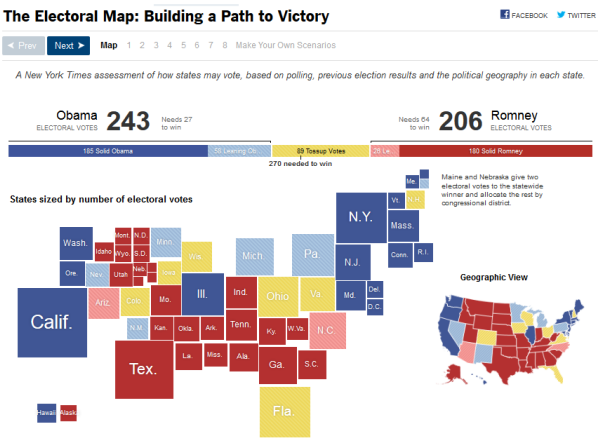
- Provides the means to develop an application that supports precisely what's needed in the most effective way possible. This requires a high degree of programmability, both in terms of power and flexibility.
- Provides ready-made libraries of useful functions that can be easily plugged into the application with much less effort than it would take to build them from scratch.
- Easy and efficient to use by those who develop the applications.
- Provides the means to remove everything from view in the finished application that isn't needed.

Establishing intent

- When the function is to explain
- When the function is to explore
- When the function is to exhibit data

When the function is to explain

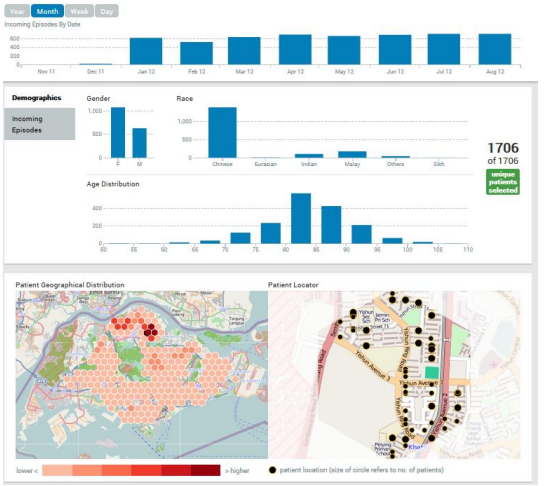
- Explanatory data visualisation is about conveying information to a reader in a way that is based around a specific and focused narrative.



Source: http://elections.nytimes.com/2012/ratings/electoral-map

When the function is to explore

- Exploratory data visualisation seeks to facilitate the familiarisation and reasoning of data through a range of user-driven experiences.



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When the function is to exhibit data

- Data art is more about creating an artifact, an aesthetic representation or perhaps a technical/technique demonstration.

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Source: http://www.nytimes.com/interactive/2012/11/07/us/politics/obamas-diverse-base-of-support.html

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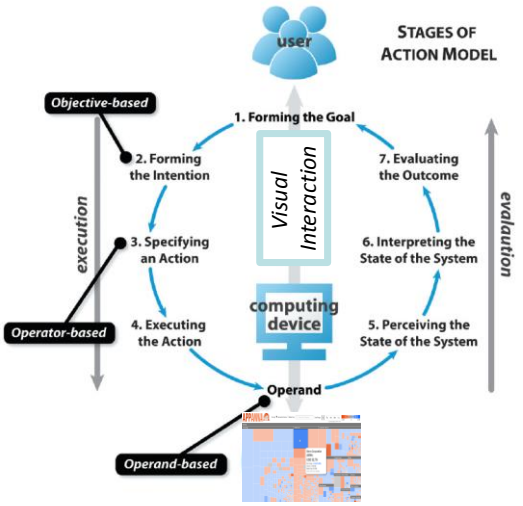
Interactive VA Design Model



Source: Roth, R.E. (2012) "Cartographic Interaction Primitive: Framework and Synthesis". *The Cartographic Journal*, Vol. 49, No. 4 pp. 376-395.

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Visual Analytics Objective Primitives

objectives	visual insight
1. identify	*e.g., ID, locate*
2. compare	*e.g., difference, change*
3. rank	*e.g., anomaly, outlier*
4. associate	*e.g., correlation, trend, cause-effect*
5. delineate	*e.g., cluster, hotspot, spike*

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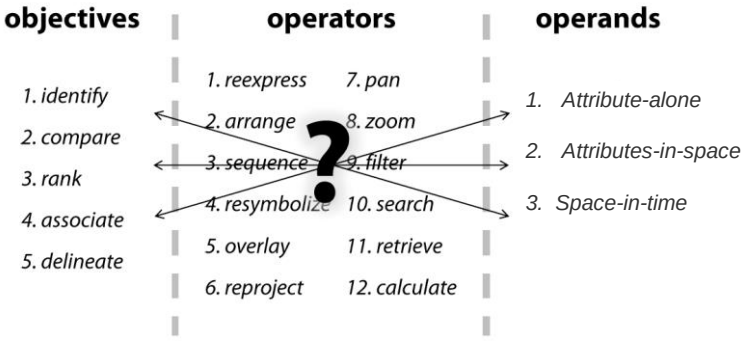
Interactive Analytics Operator Primitives

operators

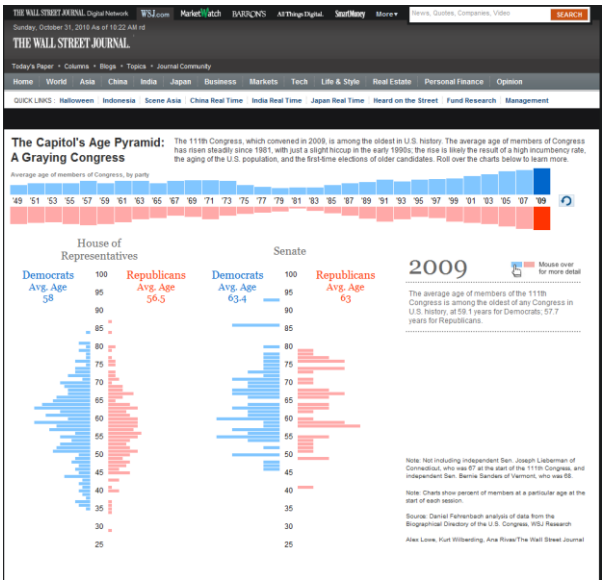
1. reexpress	***7. pan***
2. arrange	***8. zoom***
3. sequence	***9. filter***
4. resymbolize	***10. search***
5. overlay	***11. retrieve***
6. reproject	*12. calculate*

Visual Analytics Design

- The syntactic of interaction primitives



What can we learn from this example



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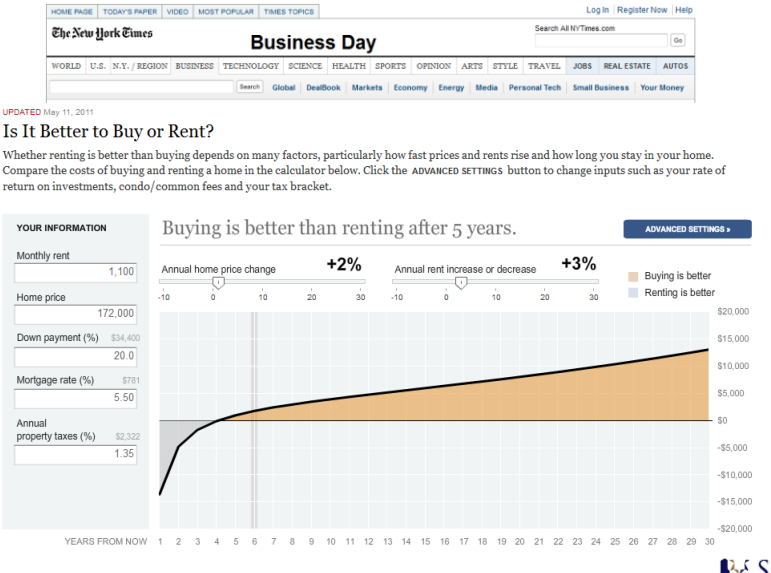
What can we learn from this example



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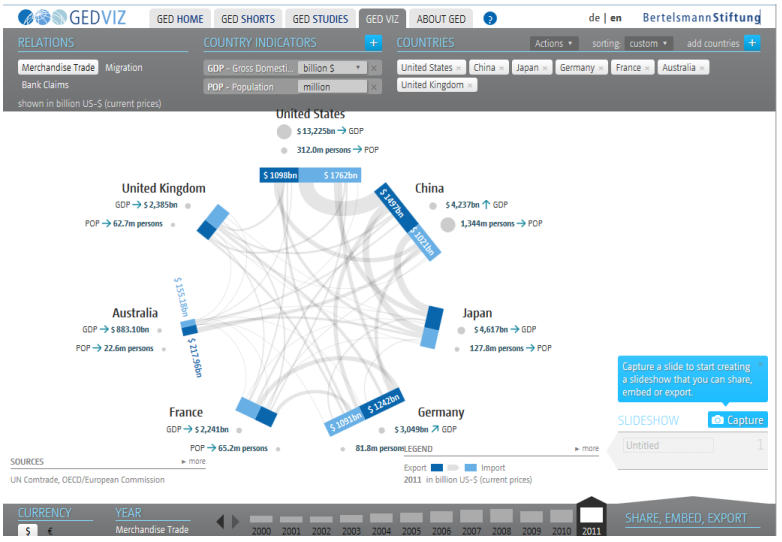
What can we learn from this example



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Learning from the past project

Source: http://xumx.me/va/project/

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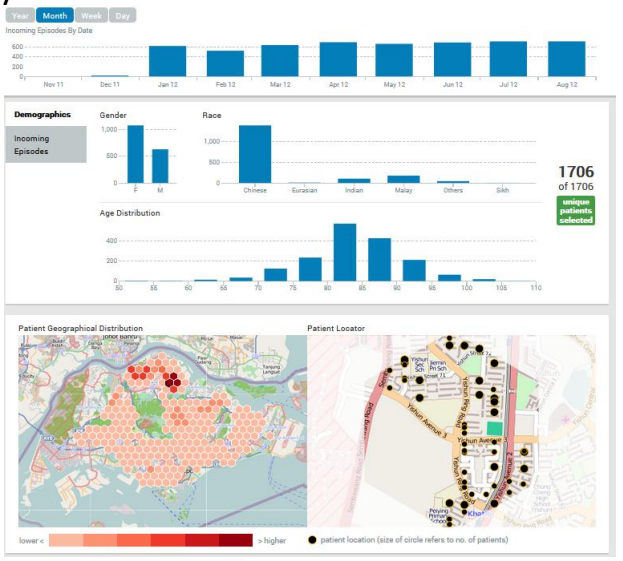
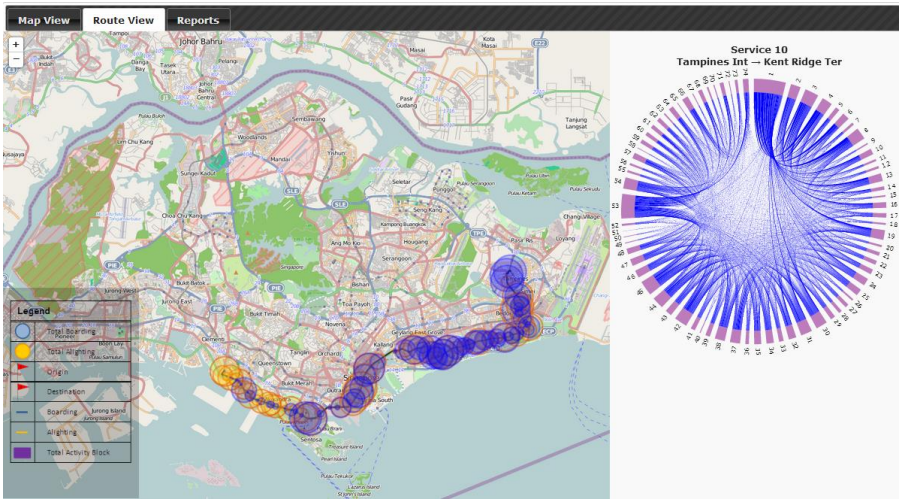
Learning from the past project

- Visually-driven Patient Record Dashboard



Learning from the past project



Source: http://10.0.106.64:8080/TPAS/