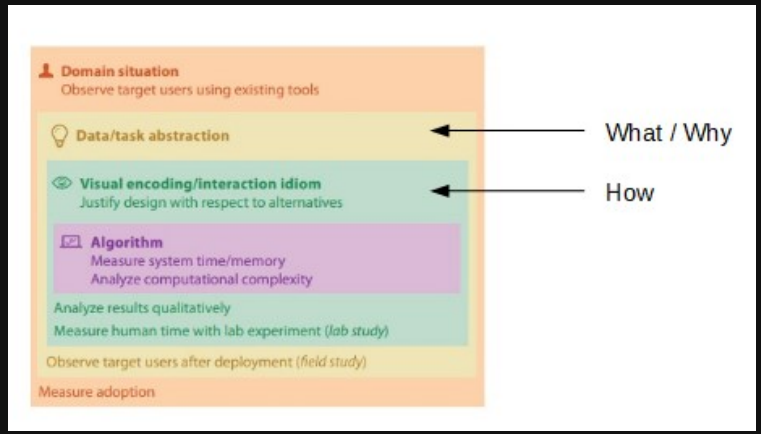
4a: Viz analysis

4 levels of validation

4 levels of validation: A framework



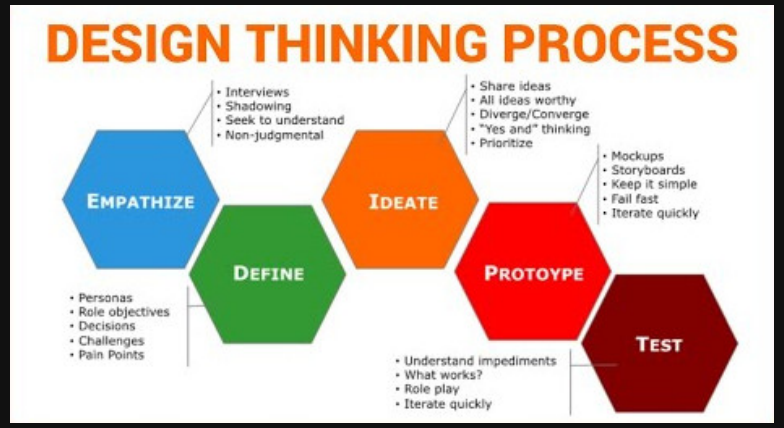
Visualization Analysis and Design, chapter 4, Munzner

Domain

Knowledge of an area that lets you frame problems from a *human-centric interaction (HCI) design* perspective.

This is similar to UX design thinking, especially the needfinding / problem definition portions.

In short, questions to validate why we are tackling the problems from the domain itself (Emphatize and Define).



Standford school of design thinking

UX design thinking tools

Tools to help with user empathy / problem specification / prioritization

- Needfinding tools: Observations, interviews, surveys
- Personas: User audience
- Task analysis: Flowcharts and lists
- Mindmaps: Clustering needs and prioritization

Data / task abstraction

What is the data like? **Why** are we doing the visualization?

Visual encoding / interaction

How are we designing the visualization?

Each of the main dataset types - tabular, networks, spatial (plus hierarchical) lead themselves to certain common visualization types.

We'll pair theory lectures when we go through the labs looking at each main dataset type in D3, so the theory and execution flow together.

Concepts like marks and channels, color theory, view manipulation (interaction), faceting will all be discussed in their own lectures.

Algorithmn / Technology

Execution of the visualization. For this course, it is interactive work using HTML / CSS / JS using the D3.js library.

But even just for the web, how are you executing the piece?

Are you using any 3rd party platform? Frontend stack? Backend stack?

Top-down or bottom up?

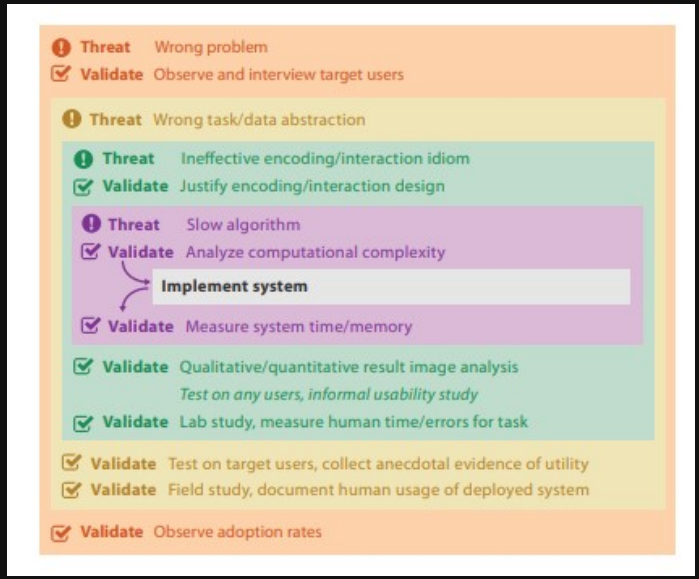
Typically either:

- Designing a viz to solve a problem (top down)
- Refining an existing solution (bottom-up)

Threats to validity

- Wrong problem: You've misunderstood the needs
- Wrong abstraction: You're showing the wrong thing.
- Wrong idiom: The way you show doesn't work
- Wrong algorithm: The code is too slow

Validation approaches



This is similar to the evaluation / testing phase of UX design thinking, where you iterate on a project.

More UX design thinking tools

Tools to help with user evaluation / testing

- "Think aloud" usability evaluation
- Heuristic checklist (e.g. 10 usability heuristics, Jakcob Nielson)
- Shneiderman's Eight Golden Rules

Case studies

Stories and experiences

Case 1
Cybersecurity

Case 2
Fashion start-up

Case 3
Art project

Case 4
Transport rail

Assignment 1b

Carpark utilization viz ideas

Workshop discussion: Viz design

Recall the carpark data set for the 1st assignment.

Based on carpark API data, how would you visualize it beyond a tabular form?

Any other datasets that you might need?

What are the data scales (levels of measurement) - nominal, ordinal, quantitative - for the data you are visualizing?

Workshop discussion: Designing a visualization

Think about this and come up with some ideas to present for this week's Thursday workshop.

You do not have to come up with a visualization at this point. Description is enough, or simple hand-drawn mocks for communication will do.

Assume a use case - exploring the dataset, presentation, etc.

Assume you can mash-up with other datasets, as necessary.

You can use *derived* attributes instead of what was given. E.g. Utilization in the technical challenge above is a *derived* attribute.

Questions?

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