The power of the unaided mind is highly overrated. Without external aids, memory thought, and reasoning are all constrained. But human intelligence is highly flexible and adaptive, superb at inventing procedures and objects that overcome its own limits. The real powers come from devising external aids that enhance cognitive abilities.

(Norman, 1993, p. 43)
Benefits of Infovis

• expand human working memory
  • offload cognitive resources to visual system
• improve search
  • large amount of data in small space
• enhance patterns recognition
  • making patterns visual explicit
• aids monitoring of incoming events
• manipulable medium supports exploration

Benefits of Infovis

• recording information
  • tables, blueprints, satellite images
• processing information
  • needs feedback and interaction
• discussing information
  • share, collaborate, revise
  • for oneself, one’s peers, and to teach
• seeing the unseen
Sketching is about design

Sketching is not about drawing
It is about design.

Sketching is a tool to help you:
- express
- develop, and
- communicate design ideas

Sketching is part of a process:
- idea generation,
- design elaboration
- design choices,
- engineering
Why Sketch?

- Create
  - early ideation
  - think openly about ideas
  - think through ideas
  - force you to visualize how things come together
  - brainstorming: generate abundant ideas without worrying about quality
  - invent and explore concepts

- Record
  - ideas you develop
  - ideas that you come across
  - archive ideas for later reflection

- Reflect, share, critique, decide
  - communicate ideas to others
  - invite responses, criticisms, and alternatives;
  - choose ideas worth pursuing

---

**SKETCH**

- evocative
- suggest
- explore
- question
- propose
- provoke
- tentative
- noncommittal

**PROTOTYPE**

- didactic
- describe
- refine
- answer
- test
- resolve
- specific
- depiction

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excessive instruction
If you want to get the most out of a sketch…

…you need to leave big enough holes for the imagination to fit in

Getting the Design Right

Generate an idea

Iterate and develop it
Getting the Design Right

Generate an idea

Iterate and develop it

But is it the best idea?

Slide contributed by Bill Buxton
Exploring an idea

Getting the Design Right

The Problem

fixates on first idea
local hill climbing issue

did you reach local vs. global maxima?

Example: Cell phone design

Iterative design
Exploring an idea

Example: Cell phone design

How do we get here with only iterative improvements?

Exploring alternatives

Getting the Right Design\(^1\)

... a designer that pitched three ideas would probably be fired. I'd say 5 is an entry point for an early formal review (distilled from 100's) ... if you are pushing one you will be found out, and also fired ... it is about open mindedness, humility, discovery, and learning. If you aren't authentically dedicated to that approach you are just doing it wrong!

Alistair Hamilton
VP Design
Symbol Technologies

\(^1\)Bill Buxton coined the expression ‘Getting the Design Right vs. Getting the Right Design’
Exploring alternatives

Getting the Right Design

- generate many ideas and variations
- reflect on all ideas
- choose the ones that look most promising
- develop them in parallel
- add new ideas as they come up
- then iterate your final choice

Elaboration and Reduction

- Elaborate - generate solutions. These are the opportunities
- Reduce - decide on the ones worth pursuing
- Repeat - elaborate and reduce again on those solutions

Elaboration and Reduction

Design is choice.

Places where there is room for creativity

1. creativity you bring to generating meaningfully distinct options
2. creativity you bring to defining the criteria, or heuristics, according to which you make your choices
3. creativity you bring to recognizing a good idea or choice


The Design Funnel

The Product View: Statis Quo

- product ideas judged at start
- given red light (stop) or green light (go ahead)
- product built, but may be deficient due to lack of design evolution

Product View: Integrating Design

- many designs considered in parallel
- reduction filters and eliminates design until convergence
- one or more designs can be considered for green light
The Product View: No Silos

Actually an interplay between many different players

You now know

1. Sketching is about design, not just drawing
2. The design process
   - get the right design
   - then get that design right
3. The design funnel is
   - an interplay between elaboration and reduction
   - generate and elaborate designs
   - choose and reduce between designs
4. Design in product development
   - use the design funnel to develop ideas with
     the best ones considered for green/red light appraisal
### Traffic accident victims France 1958

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>pedestrians</td>
<td>28,951</td>
<td>15.7%</td>
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<tr>
<td>bicycles</td>
<td>17,247</td>
<td>09.4%</td>
</tr>
<tr>
<td>motorcycles</td>
<td>74,887</td>
<td>40.7%</td>
</tr>
<tr>
<td>4 wheel vehicles</td>
<td>63,071</td>
<td>34.2%</td>
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