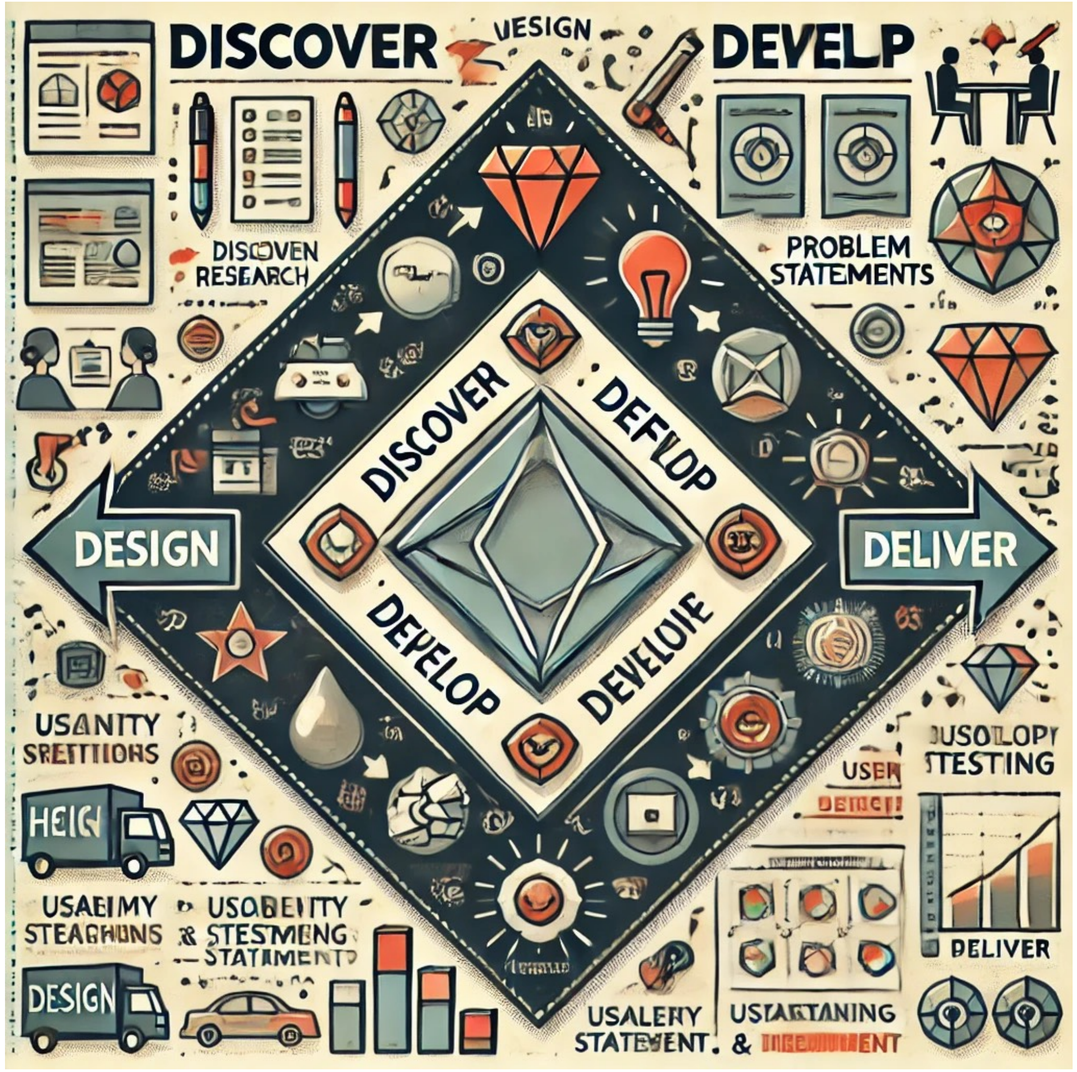
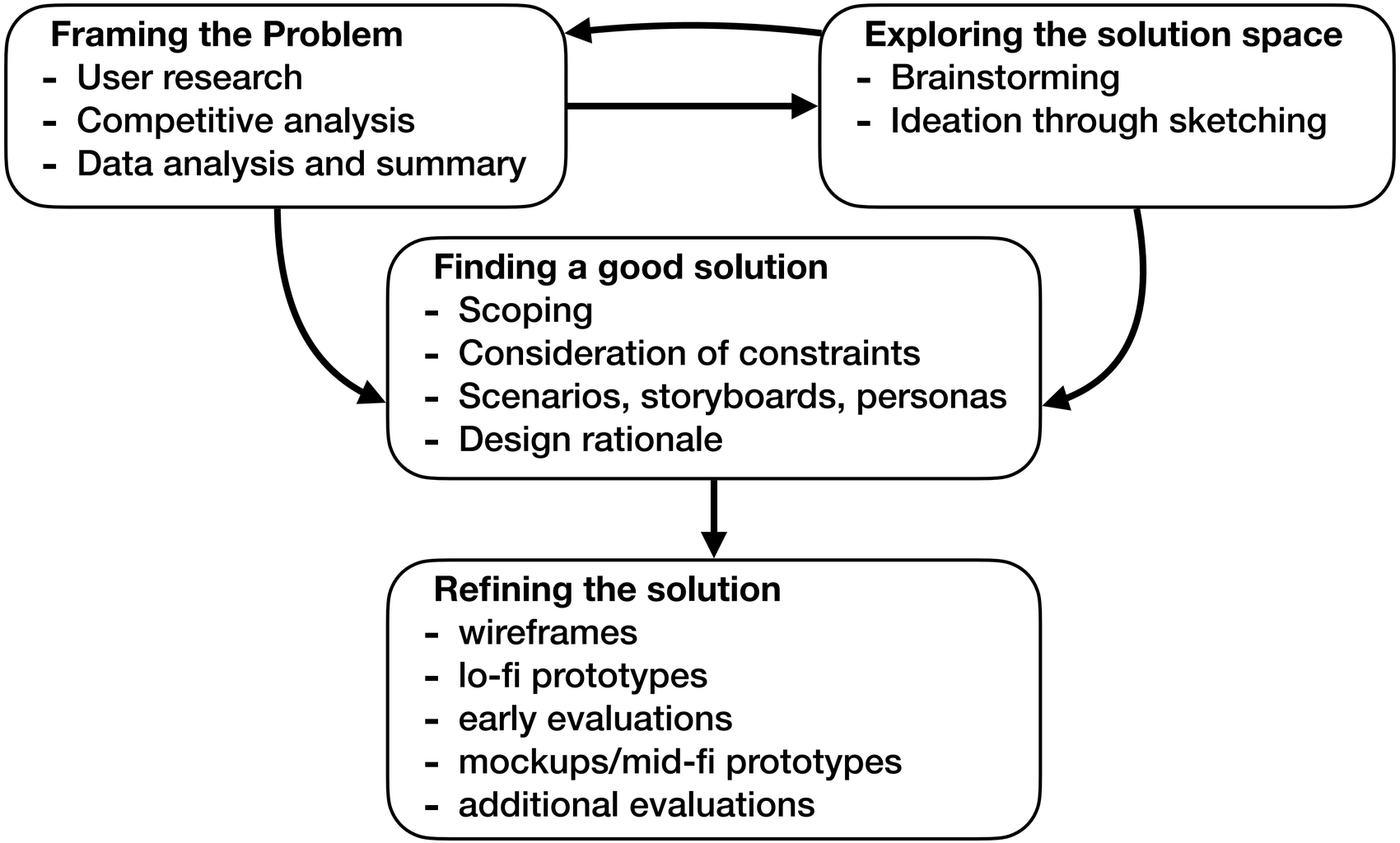
Design Process
&
Design Diamond

Harley Eades

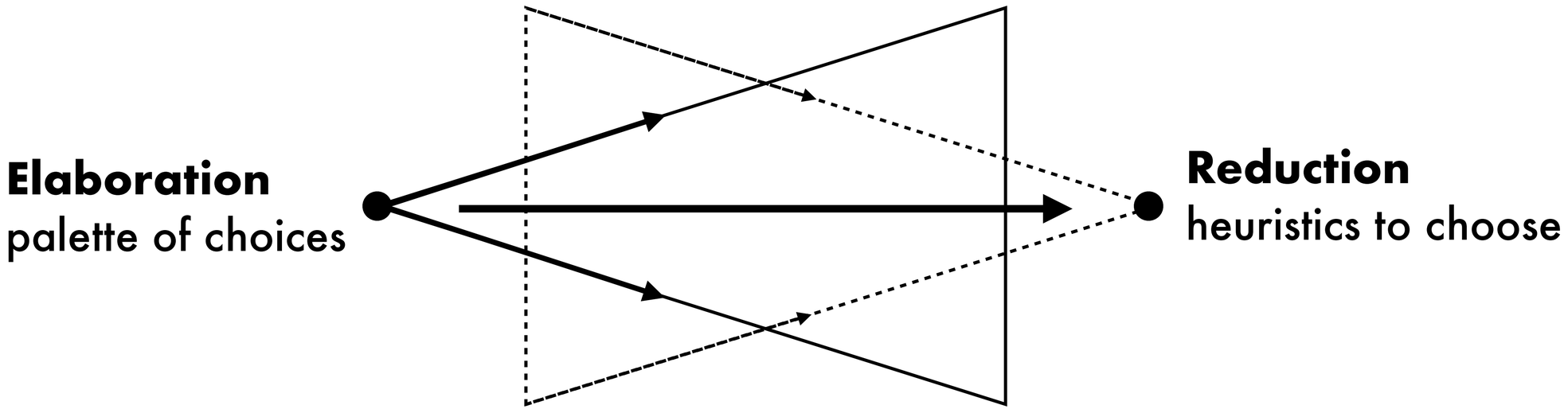


Design Process
&
Design Diamond

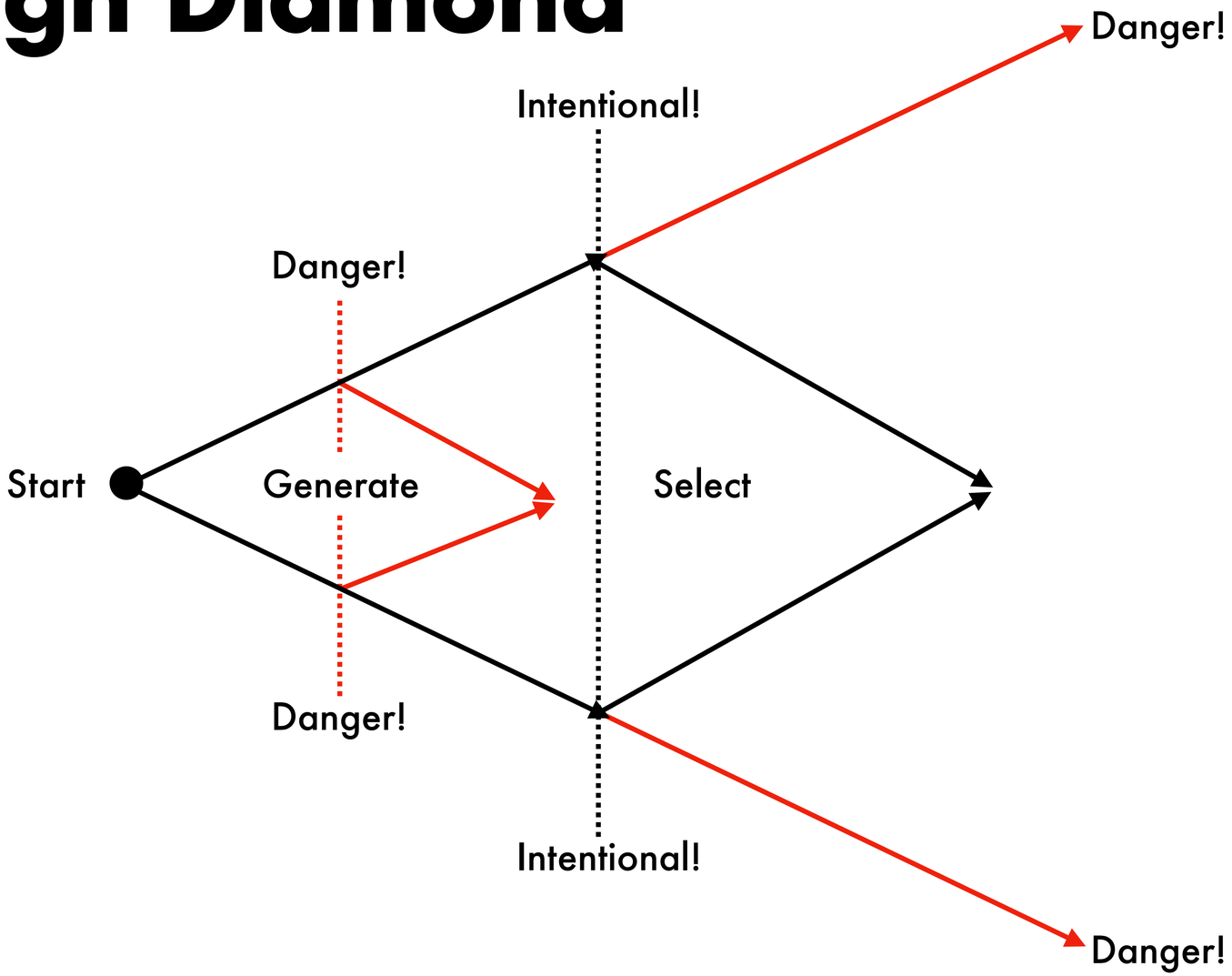
Design Process in a Nutshell



Design as a Choice



The Design Diamond



Critiquing design ideas is important

Ideas are both good and bad

- both are useful in design
- by making clear what is a bad design, we can avoid actually implementing it
- bad ideas help you justify your good ideas

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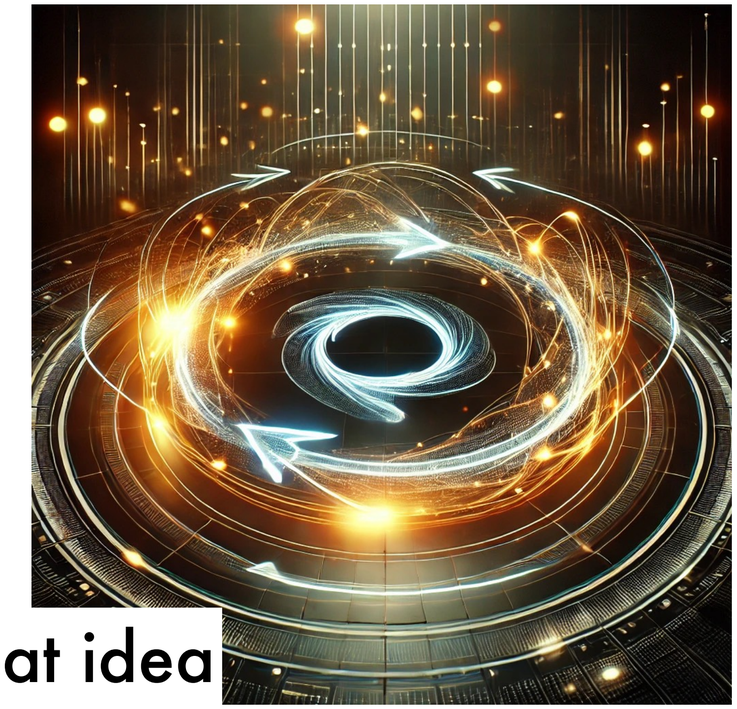
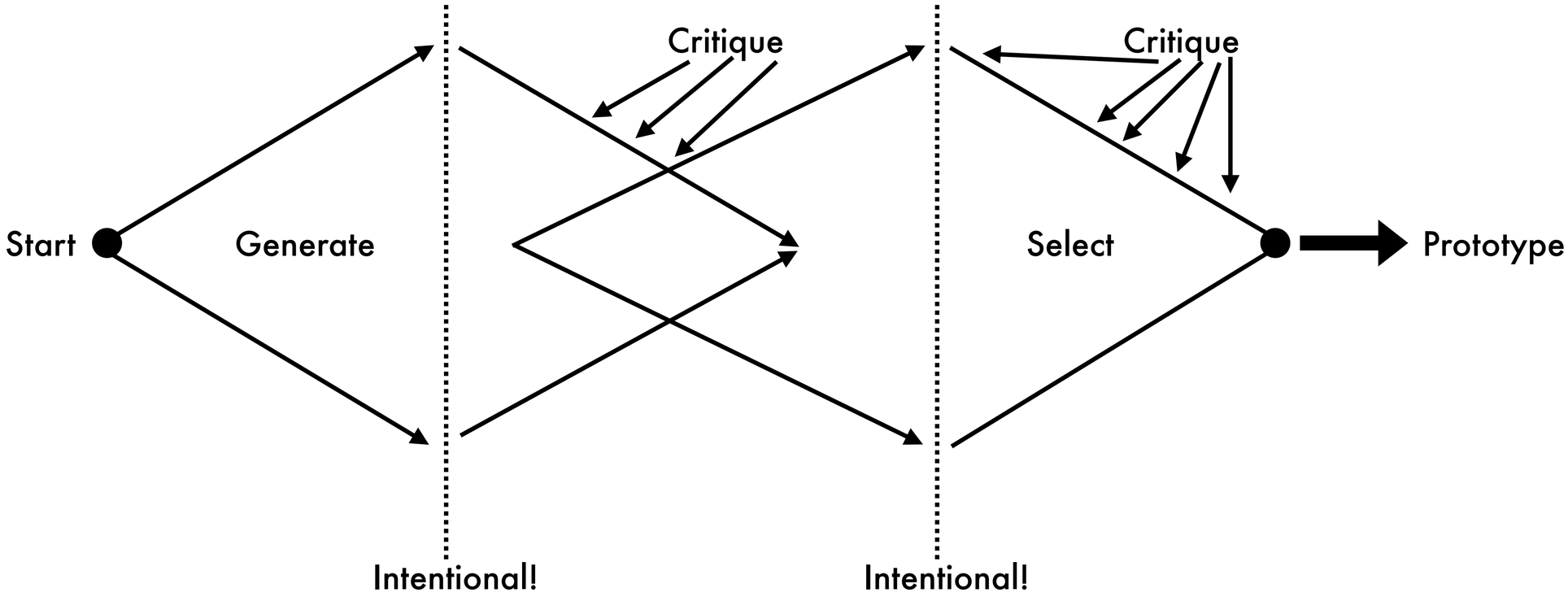
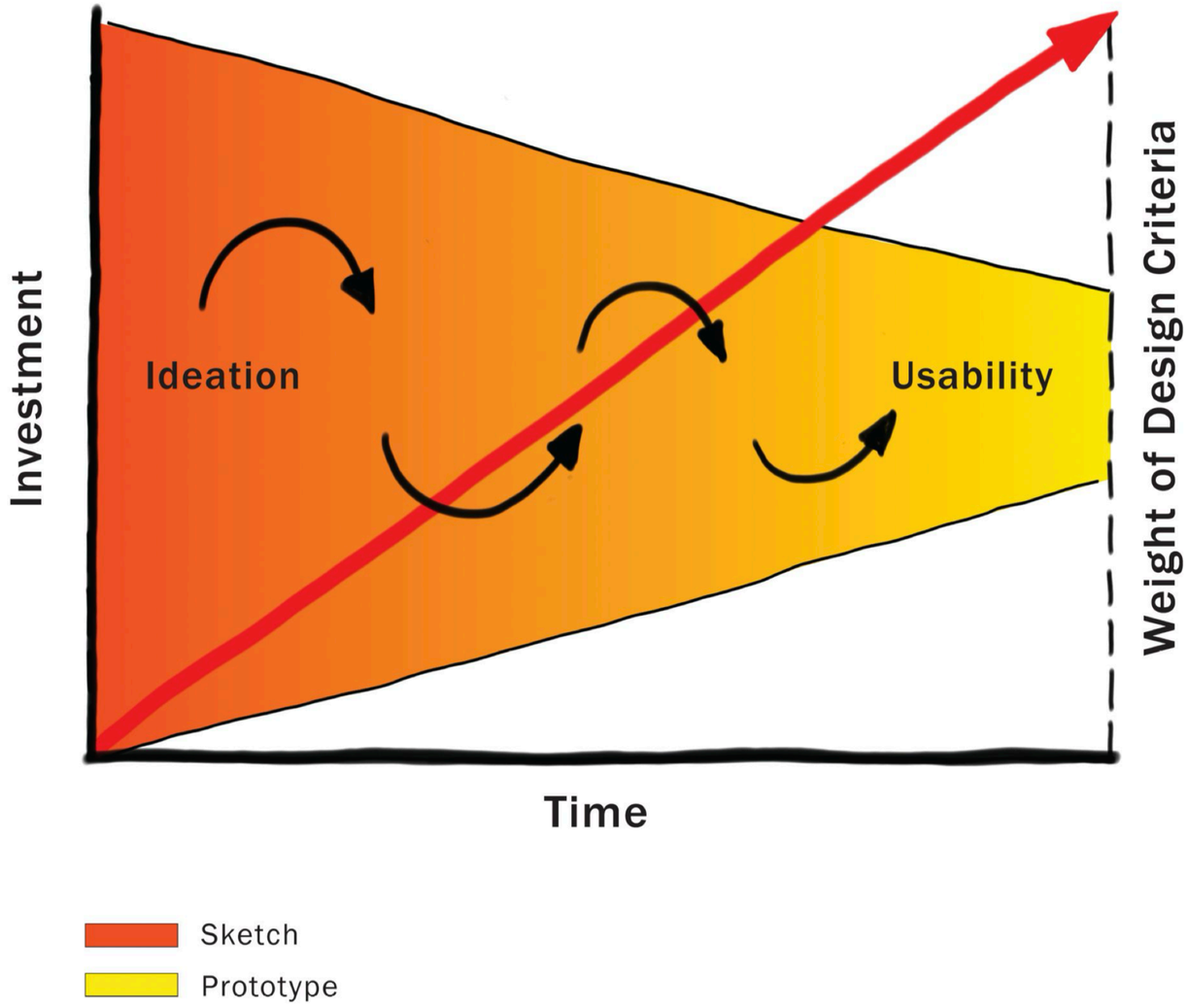


Feedback can turn a good idea into a great idea

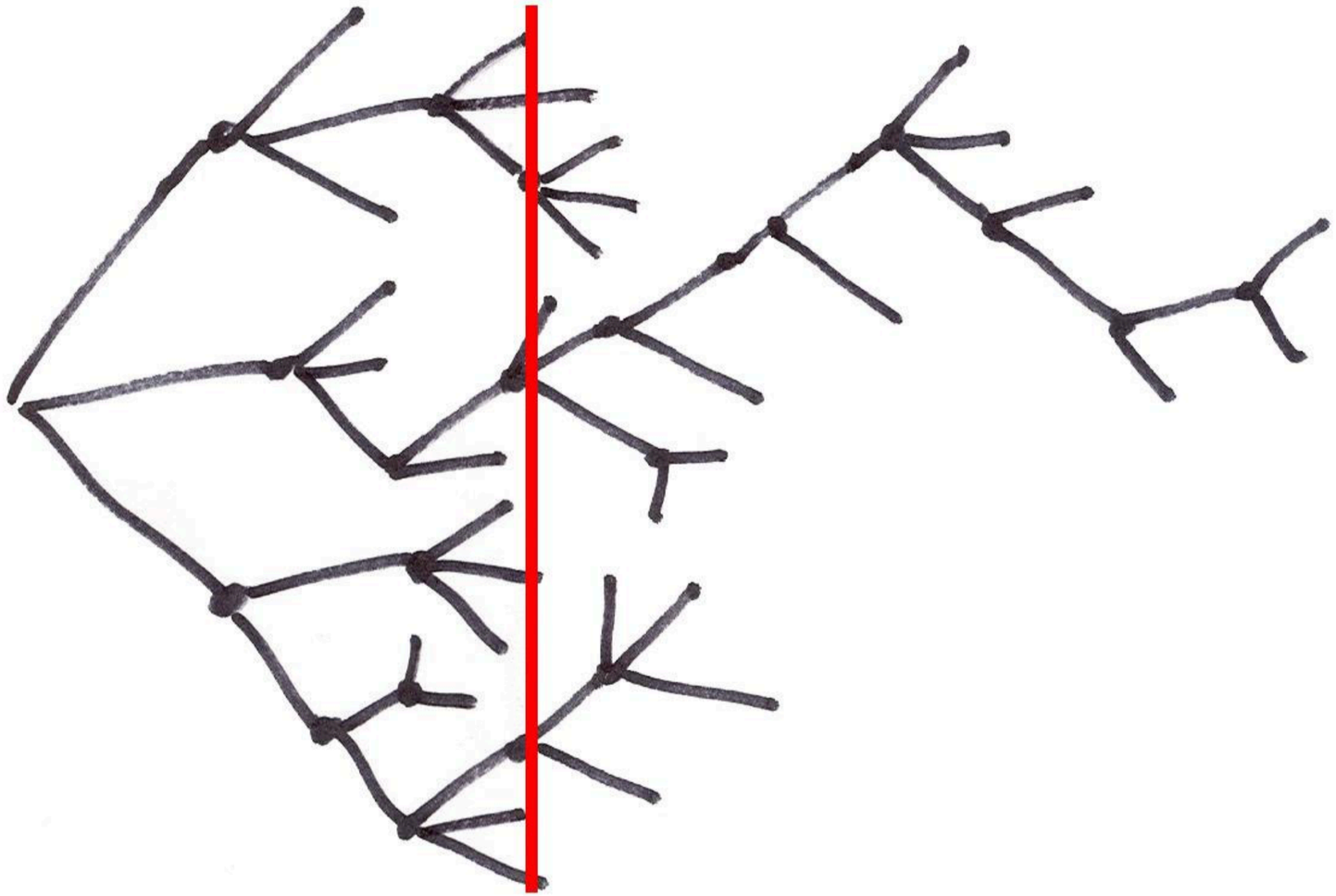
Idea Oscillation



Iteration toward a design

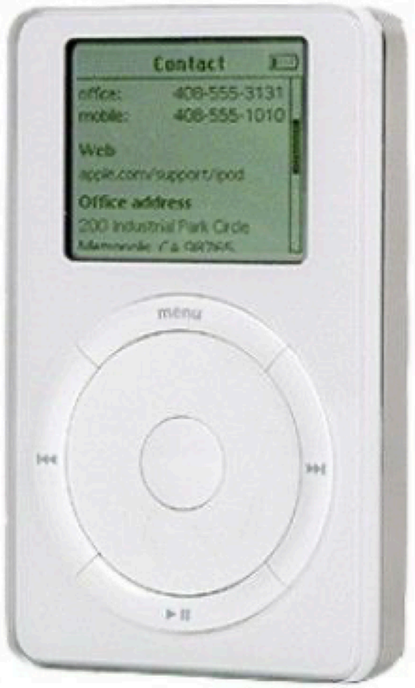


Exploration of alternatives



Let ideas oscillate...

The 4th generation of the iPod was successful



Sketching

Sketching: A way to boot creativity

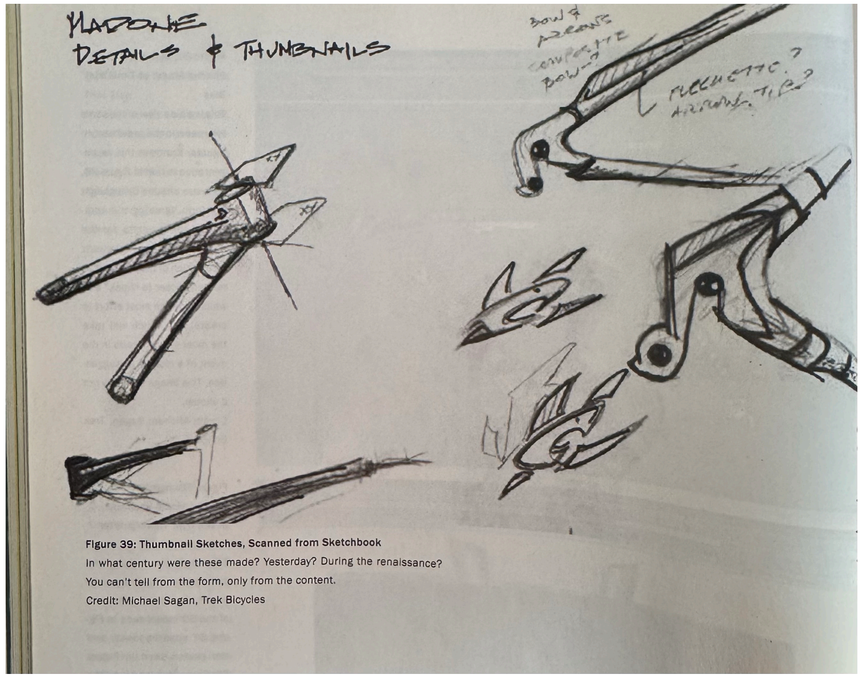


Figure 39: Thumbnail Sketches, Scanned from Sketchbook
In what century were these made? Yesterday? During the renaissance? You can't tell from the form, only from the content.
Credit: Michael Sagan, Trek Bicycles

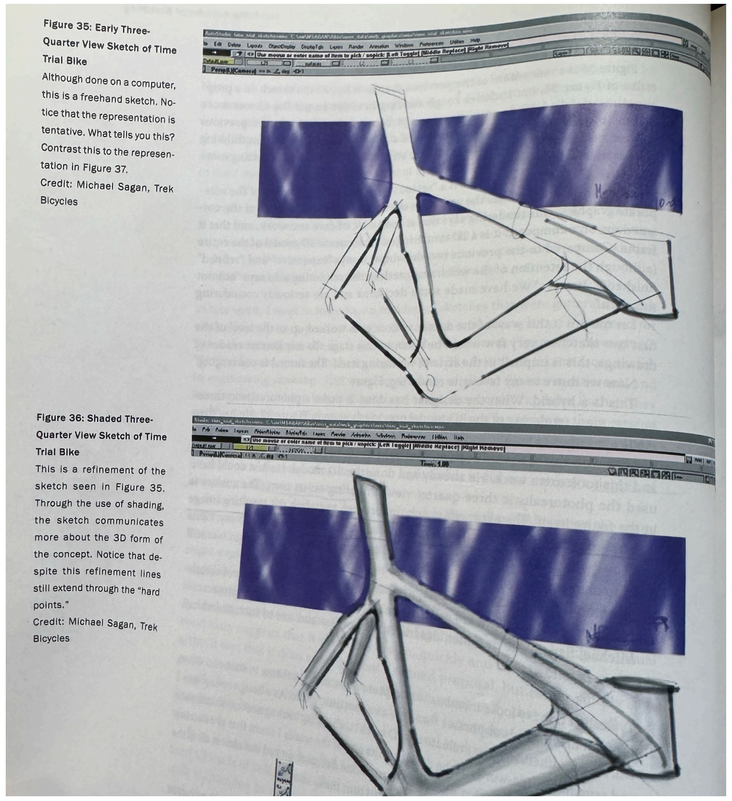
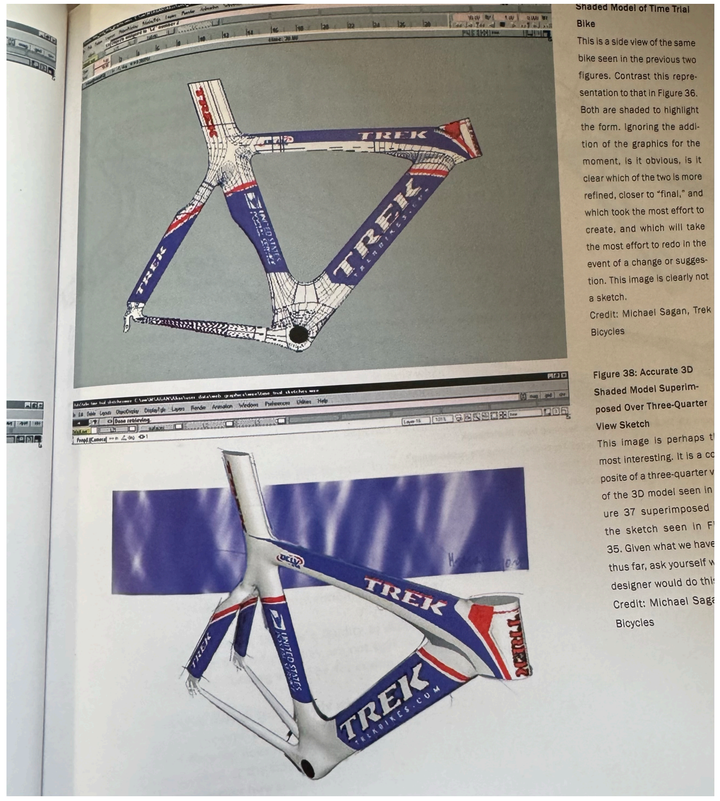


Figure 35: Early Three-Quarter View Sketch of Time Trial Bike
Although done on a computer, this is a freehand sketch. Notice that the representation is tentative. What tells you this? Contrast this to the representation in Figure 37.
Credit: Michael Sagan, Trek Bicycles

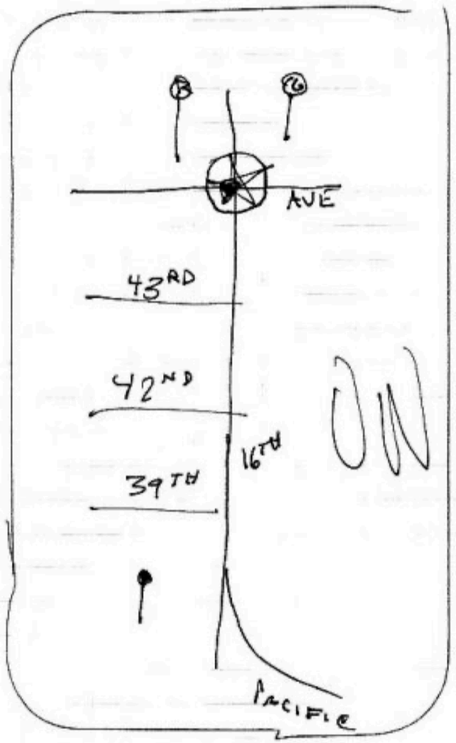
Figure 36: Shaded Three-Quarter View Sketch of Time Trial Bike
This is a refinement of the sketch seen in Figure 35. Through the use of shading, the sketch communicates more about the 3D form of the concept. Notice that despite this refinement lines still extend through the "hard points."
Credit: Michael Sagan, Trek Bicycles



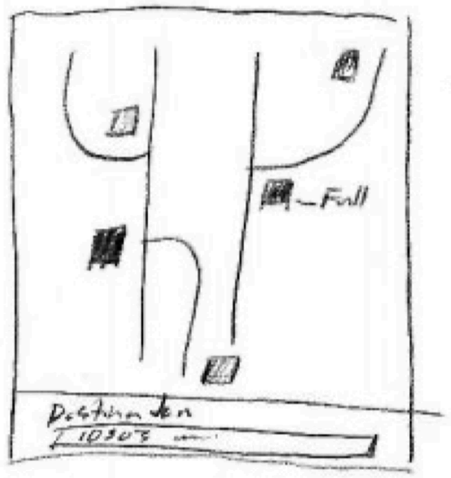
Shaded Model of Time Trial Bike
This is a side view of the same bike seen in the previous two figures. Contrast this representation to that in Figure 36. Both are shaded to highlight the form. Ignoring the addition of the graphics for the moment, is it obvious, is it clear which of the two is more refined, closer to "final," and which took the most effort to create, and which will take the most effort to redo in the event of a change or suggestion. This image is clearly not a sketch.
Credit: Michael Sagan, Trek Bicycles

Figure 38: Accurate 3D Shaded Model Superimposed Over Three-Quarter View Sketch
This image is perhaps t most interesting. It is a co posite of a three-quarter v of the 3D model seen in ure 37 superimposed the sketch seen in F 35. Given what we have thus far, ask yourself w designer would do thi
Credit: Michael Saga Bicycles

Sketching: A way to boot creativity



MAP SHOWING PARKING AVAILIBILITY BASED ON INPUTTED DATA, INPUTTED ON MAP



- Different colors
- highlights availability
-

Sketching: A way to boot creativity

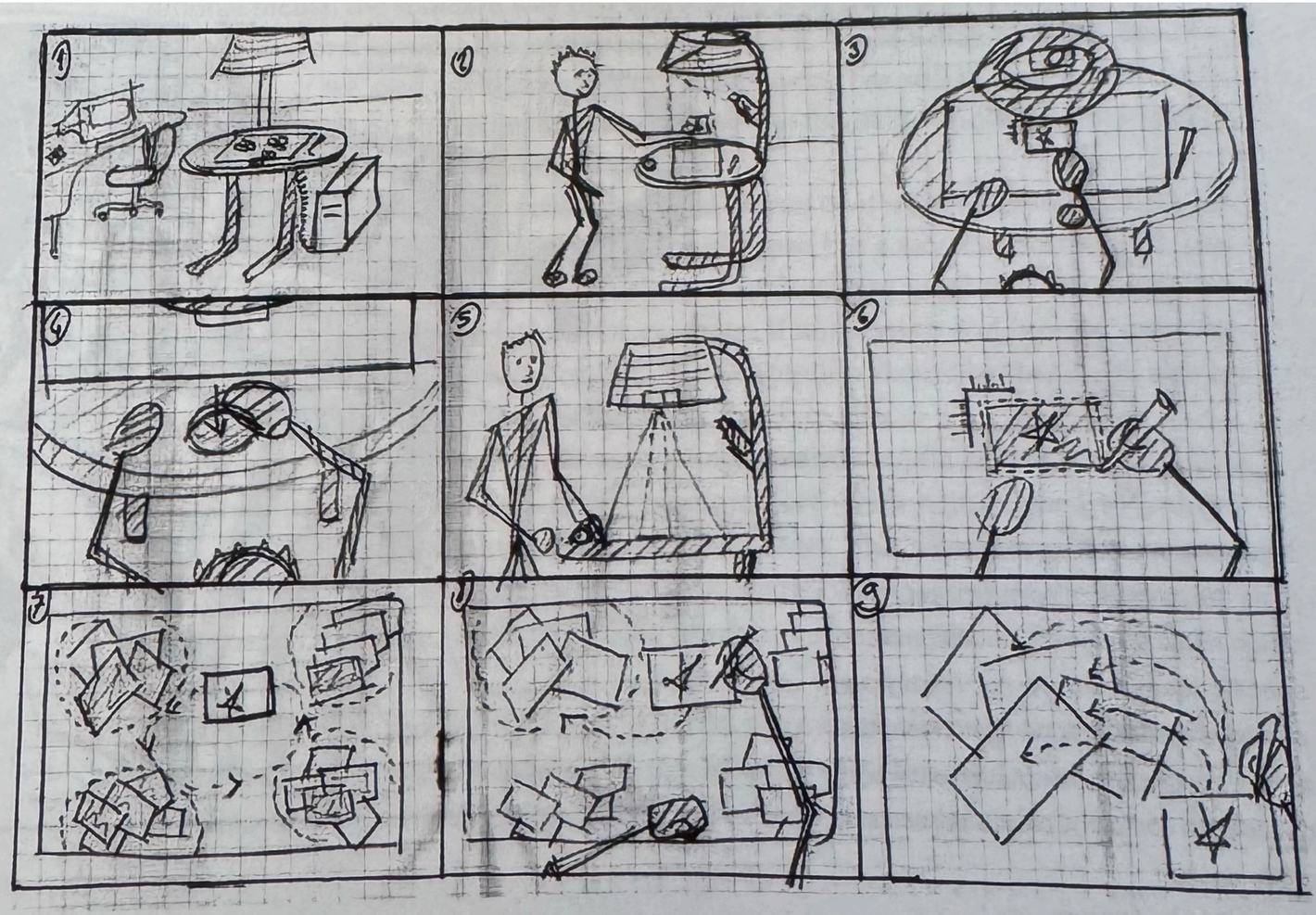


Figure 63a (Left):
Cabinet
A form of telepresence that supports collaboration around shared objects.
Credit: Ianus Keller

Figure 63b (Right):
Schematic Drawings of Cabinet
Credit: Ianus Keller

Sketching: A way to boot creativity

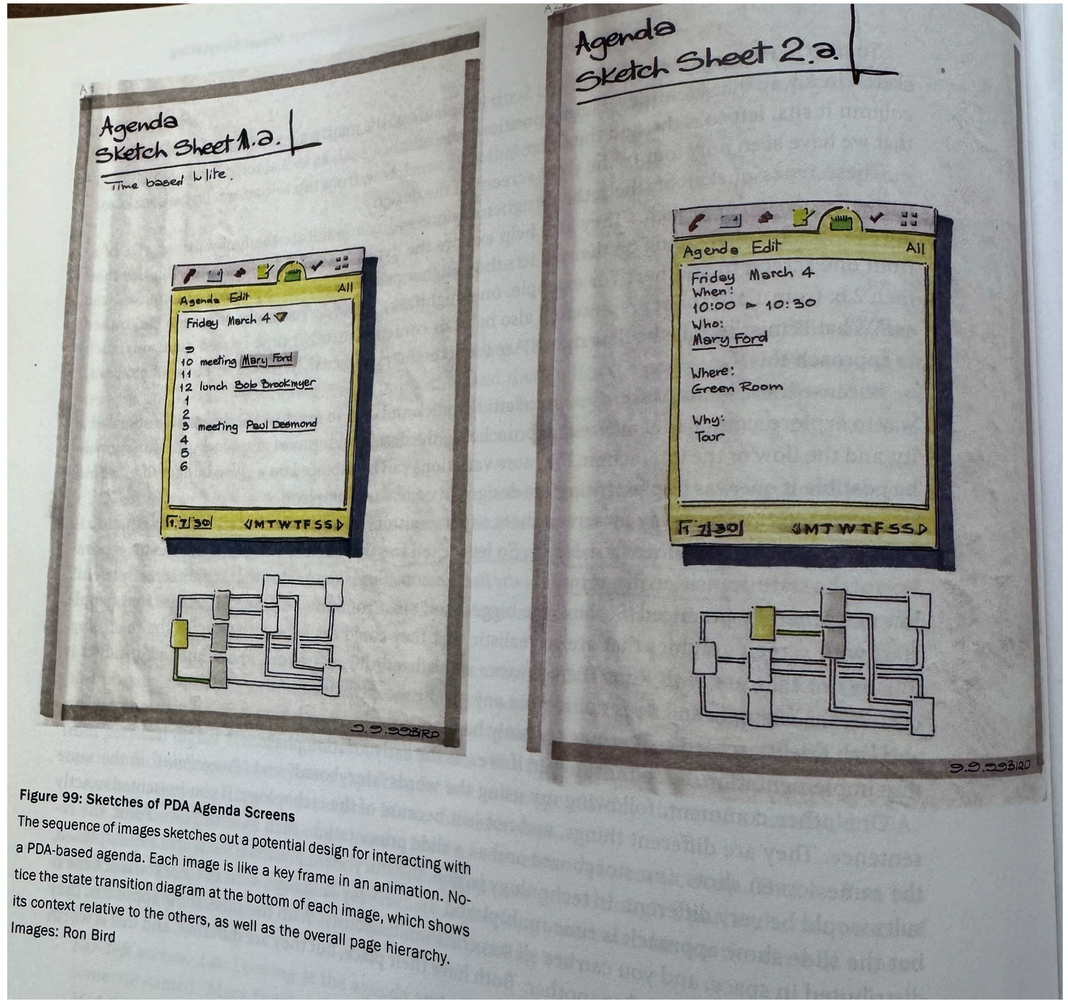
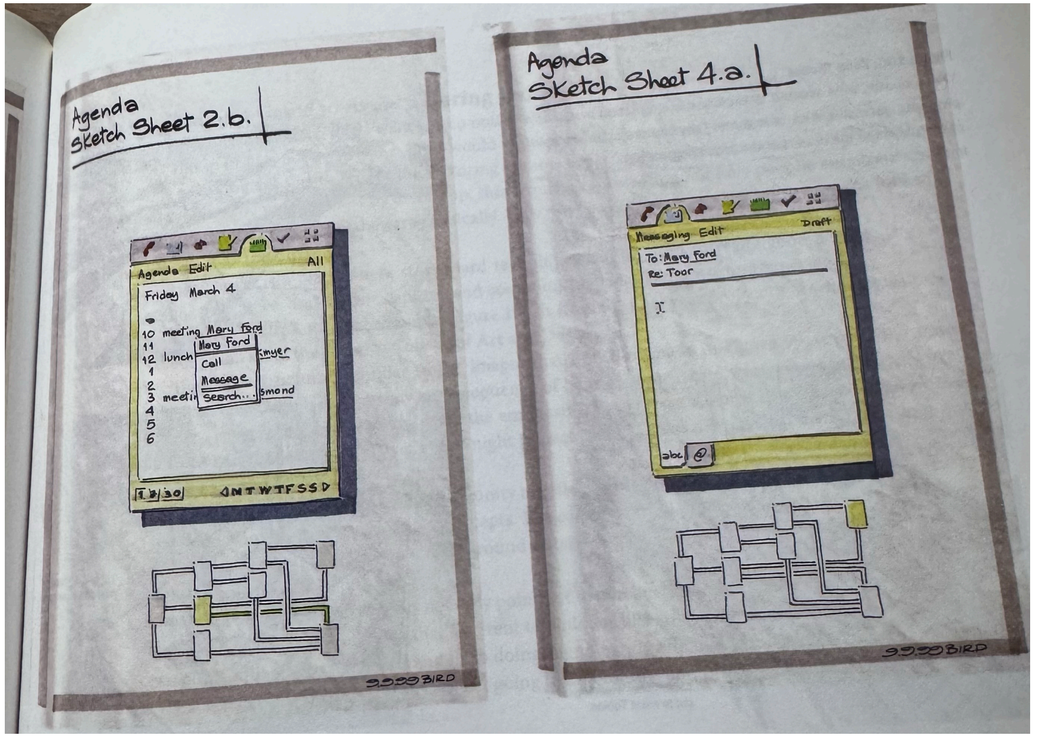


Figure 99: Sketches of PDA Agenda Screens

The sequence of images sketches out a potential design for interacting with a PDA-based agenda. Each image is like a key frame in an animation. Notice the state transition diagram at the bottom of each image, which shows its context relative to the others, as well as the overall page hierarchy.

Images: Ron Bird



Sketching is...

a process that enables you to think through ideas and convey design ideas to others very early in the design phase

Sketching is the quintessential activity of design

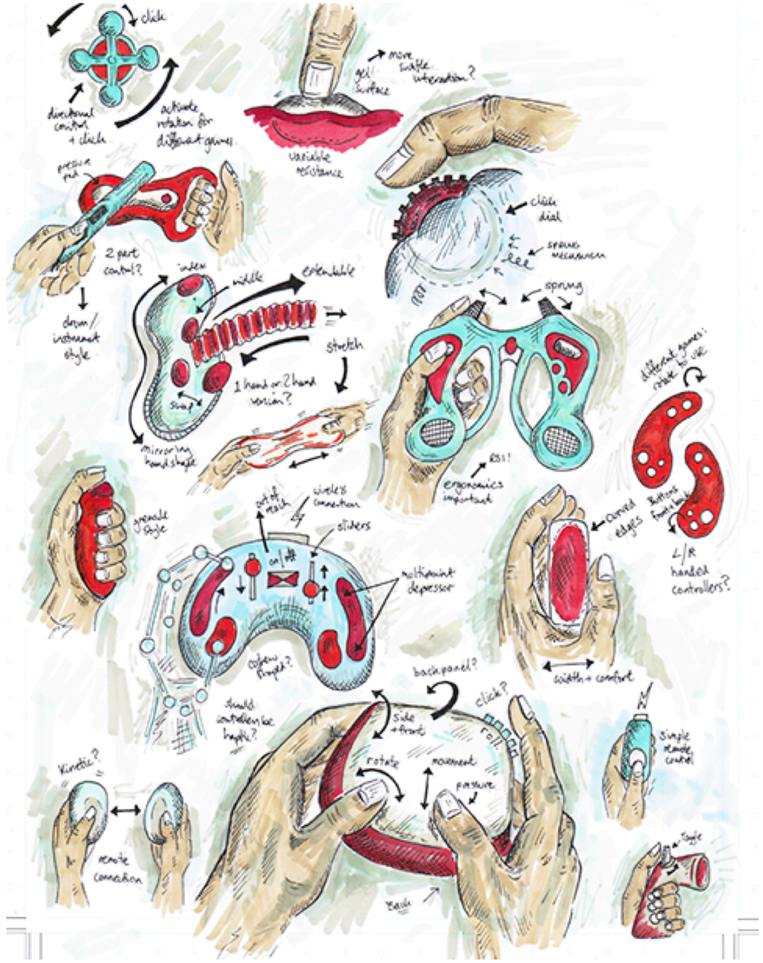


Figure 1: An example of subjective sketching and ideation of prototypes for a console game controller. The initial sketch (bottom middle) serves as a springboard for further iterations and tangents. The final image is coloured to highlight different areas and interactions. By keeping all images on the same sheet quick comparisons can be made and the story of design followed.

From: Sketching in HCI: Research Practice & Publication (Advanced)

(click to read)

Properties of Sketches

- Quick
- Timely
- Inexpensive
- Disposable
- Plentiful
- Clear Vocabulary
- Distinct Gesture
- Minimal Detail
- Appropriate
- Refinement
- Suggest and Explore
- Ambiguous

Properties of Sketches

Quick

A sketch is quick to make, or at least gives that impression.

Properties of Sketches

Timely

A sketch can be provided when needed.

Properties of Sketches

Inexpensive

A sketch is cheap. Cost must not inhibit the ability to explore a concept, especially early in the design process.

Properties of Sketches

Disposable

If you can’t afford to throw it away when done, it is probably not a sketch. The investment with a sketch is in the concept, not the execution. By the way, this doesn’t mean that they have no value, or that you always dispose of them. Rather, their value largely depends on their disposability.

Properties of Sketches

Plentiful

Sketches tend not to exist in isolation. Their meaning or relevance is generally in the context of a collection or series, not as an isolated rendering.

Properties of Sketches

Clear vocabulary

The style in which a sketch is rendered follows certain conventions that distinguish it from other types of renderings. The style, or form, signals that it is a sketch. The way that lines extend through endpoints is an example of such a convention, or style.

Properties of Sketches

Distinct Gesture

There is a fluidity to sketches that gives them a sense of openness and freedom. They are not tight and precise, in the sense that an engineering drawing would be, for example.

Properties of Sketches

Distinct Gesture

There is a fluidity to sketches that gives them a sense of openness and freedom. They are not tight and precise, in the sense that an engineering drawing would be, for example.

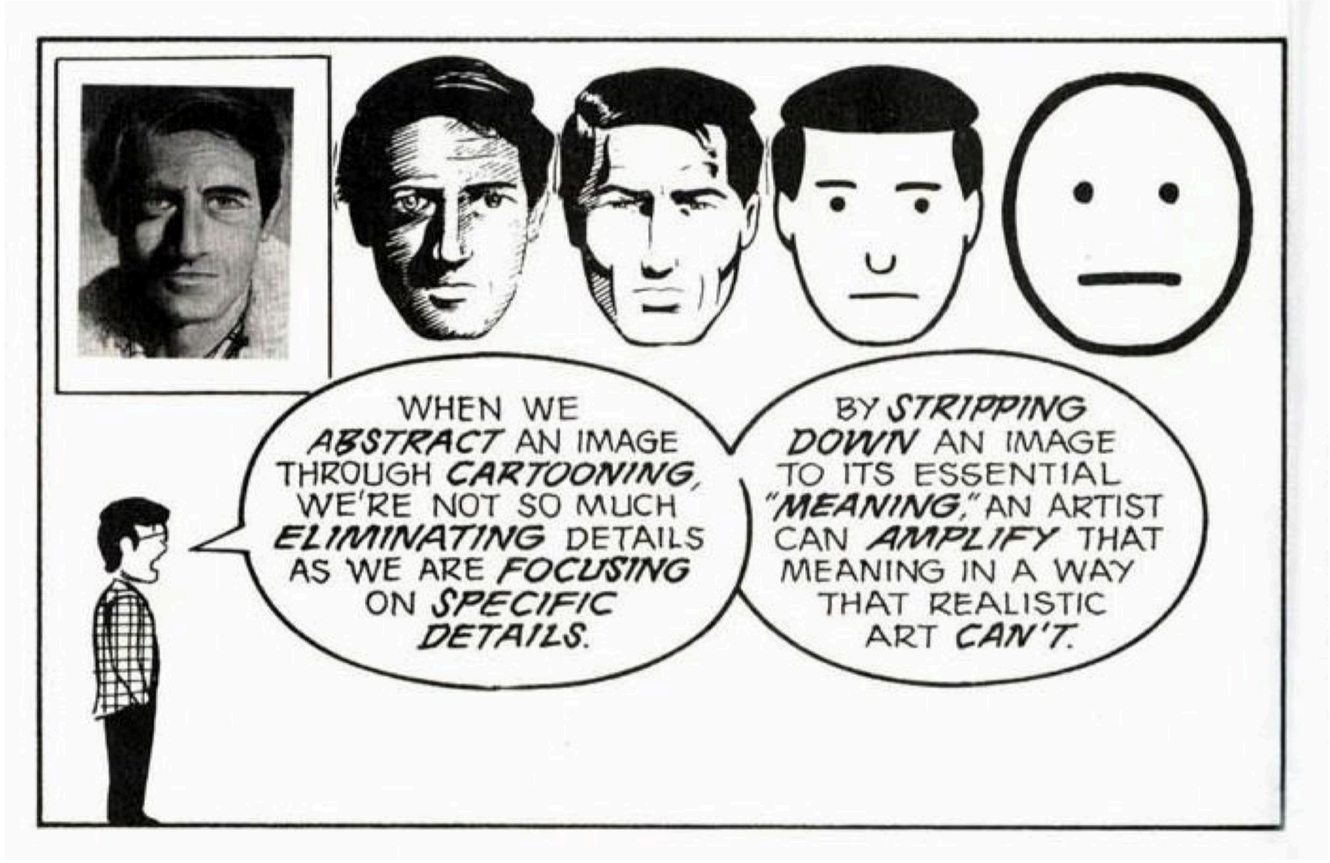
Properties of Sketches

Minimal Detail

Include only what is required to render the intended purpose or concept. Lawson (1997, p. 242) puts it this way, " ... it is usually helpful if the drawing does not show or suggest answers to questions which are not being asked at the time."
Superfluous detail is almost always distracting, at best, no matter how attractive or well rendered. Going beyond "good enough" is a negative, not a positive.

Properties of Sketches

Minimal Detail



Properties of Sketches

Appropriate Degree of Refinement

By its resolution or style, a sketch should not suggest a level of refinement beyond that of the project being depicted. As Lawson expresses it, " … it seems helpful if the drawing suggests only a level of precision which corresponds to the level of certainty in the designer's mind at the time."

Properties of Sketches

Suggest and explore rather than confirm

More on this later, but sketches don't "tell," they "suggest." Their value lies not in the artifact of the sketch itself, but in its ability to provide a catalyst to the desired and appropriate behaviours, conversations, and interactions.

Properties of Sketches

Ambiguity

Sketches are intentionally ambiguous, and much of their value derives from their being able to be interpreted in different ways, and new relationships seen within them, even by the person who drew them.

Properties of Sketches

… a sketch is incomplete, somewhat vague, a low-fidelity representation. The degree of fidelity needs to match its purpose, a sketch should have “just enough” fidelity for the current stage in argument building…. Too little fidelity and the argument is unclear. Too much fidelity and the argument appears to be over—done; decided; completely worked out….

(Hugh Dubberly of Dubberly Design Office; private communication)

Properties of Sketches

> Some of the most serious problems occur if various parties—managers and/or customers and/or marketing—begin to view the early prototypes [read sketches] they see as the final product.
>
> (Hix and Hartson 1993; p. 260)

In class activity….

Pick two core activities of a user using your project.
Sketch each idea as a series of three sketches.
In the end, you should have six sketches.

Sketch vs Prototype

Sketch	Prototype
Invite	Attend
Suggest	Describe
Explore	Refine
Question	Answer
Propose	Test
Provoke	Resolve
Tentative, non-committal	Specific Depiction

The primary differences are in the intent

Beyond sketches on paper….

Beyond sketches on paper….

Beyond sketches on paper….

Beyond sketches on paper….

Beyond sketches on paper….

Creativity

Design Ideation

People become **fixated** in their design ideas.

Examples can lead to reinterpretation and recombination of ideas

Defining the solution space increases people's creativity.

Quantity vs Quality

Pottery study:
One class was told they will be graded on quality, another one on quantity

Quantity vs Quality

The quantity class produces better pots. Why?

Quantity vs Quality

The quantity class produces better pots. Why?

> "While the quantity group was busily churning out piles of work—and learning from their mistakes—the quality group had sat theorizing about perfection, and in the end had little more to show for their efforts than grandiose theories and a pile of dead clay"

Parallel vs Serial Prototyping

- Iteration is central to learning and motivation in design
- Can blind designers to other alternatives, steering them to local, rather than global, optimal designs
- Creating multiple alternatives in parallel encourages people to:
  - more effectively discover unseen constraints and opportunities
  - enumerate more diverse solutions, and
  - obtain more authentic and diverse feedback from potential users

Dow, S. P., Glassco, A., Kass, J., Schwarz, M., Schwartz, D. L., and Klemmer, S. R. 2010. Parallel prototyping leads to better design results, more divergence, and increased self-efficacy. ACM Trans. Comput.-Hum. Interact. 17, 4, Article 18 (December 2010), 24 pages.

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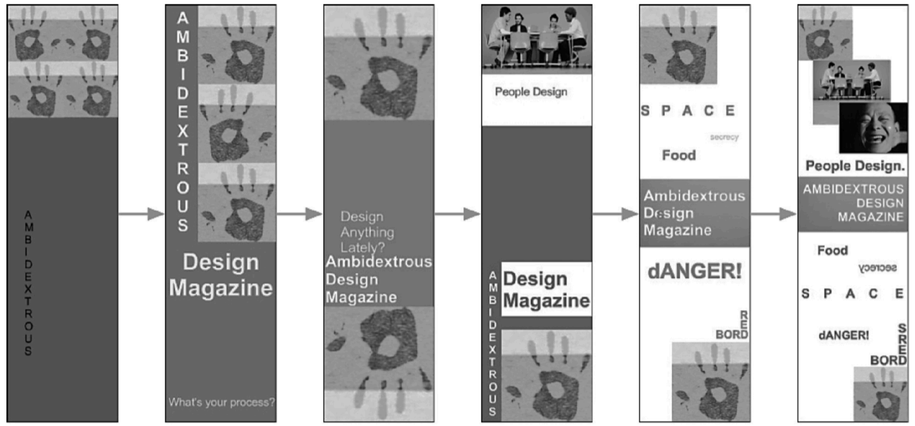
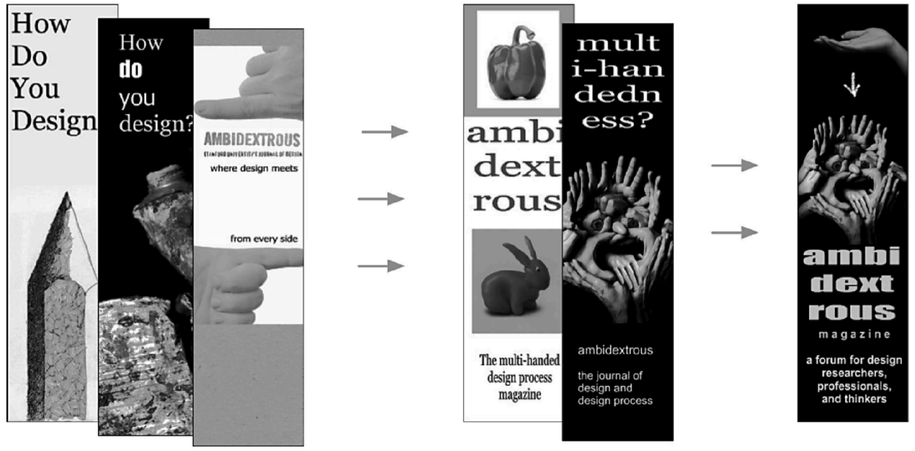
Parallel vs Serial Prototyping

Serial



Feedback after each prototype

Parallel



Feedback after creating 3, then feedback on 2, then feedback on final

Fig. 1. The experiment manipulates when participants receive feedback during a design process: in serial after each design (top) versus in parallel on three, then two (bottom).

Dow, S. P., Glassco, A., Kass, J., Schwarz, M., Schwartz, D. L., and Klemmer, S. R. 2010. Parallel prototyping leads to better design results, more divergence, and increased self-efficacy. ACM Trans. Comput.-Hum. Interact. 17, 4, Article 18 (December 2010), 24 pages.

Parallel vs Serial Prototyping

- Parallel participants outperformed serial participants by all performance measures
  - click-through rates
  - time spent on the target client Web site
  - ratings by the clients and ad professionals
- Greater diversity from parallel
- "Parallel participants reported a significant gain in self-efficacy, a measure of task-oriented confidence. Serial participants did not. In post-task interviews, nearly half of serial participants reported negative reactions to critique of their prototypes, while no parallel participants reported this."

Dow, S. P., Glassco, A., Kass, J., Schwarz, M., Schwartz, D. L., and Klemmer, S. R. 2010. Parallel prototyping leads to better design results, more divergence, and increased self-efficacy. ACM Trans. Comput.-Hum. Interact. 17, 4, Article 18 (December 2010), 24 pages.

Parallel vs Serial Prototyping

"…potential users of interactive systems withhold harsh critique when presented with a single prototype; the users were concerned about offending the designer. More importantly, Tohidi et al. showed that the presence of multiple alternative concepts gave users license to be more critical with their comments."

Dow, S. P., Glassco, A., Kass, J., Schwarz, M., Schwartz, D. L., and Klemmer, S. R. 2010. Parallel prototyping leads to better design results, more divergence, and increased self-efficacy. ACM Trans. Comput.-Hum. Interact. 17, 4, Article 18 (December 2010), 24 pages.

Parallel vs Serial Prototyping

when people create multiple alternatives in parallel, they:

- produce higher-quality work
- more-diverse work
- experience a greater increase in self-efficacy

Dow, S. P., Glassco, A., Kass, J., Schwarz, M., Schwartz, D. L., and Klemmer, S. R. 2010. Parallel prototyping leads to better design results, more divergence, and increased self-efficacy. ACM Trans. Comput.-Hum. Interact. 17, 4, Article 18 (December 2010), 24 pages.

Parallel vs Serial Prototyping

The Deep Dive: IDEO Reimagines the Shopping Cart with Design Thinking

Any questions?