User-Centered Design

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• design is based upon a user's
– abilities and real needs
– context
– work
– tasks
– need for a usable and useful product

User-Centered System Design

• is an iterative process that focuses on an understanding of the users and their context in all stages of design and development.
• is based on understanding the domain of work or play in which people are engaged and in which they interact with computers.

assumptions:
– the result of a good design is a satisfied customer.
– the process of design is a collaboration between designers and customers.
– the design evolves and adapts to the user's changing concerns, and the process produces a specification as an important byproduct.
– the customer and designer are in constant communication during the entire process.

Participatory Design

The end user should be involved in the design to help the designer understand the requirements and make the design better.

Q: Name at least two advantages and two disadvantages of participatory design.
A:
Advantages :
– users excellent at reacting to suggested system designs
  • designs must be concrete and visible
– users bring in important "folk" knowledge of work context
  • knowledge may otherwise be inaccessible to design team
– greater buy-in for the system often results

Disadvantages:
– hard to get a good pool of end users (to participate)
  • expensive, reluctance, etc.
– users are not expert designers
  • don't expect them to come up with design ideas from scratch
– the user is not always right
  • don't expect them to know what they want

User Involvement

Q: List four ways of involving the user when employing a user-centered focus to system design.
A:
• at the very least, talk to users
it is surprising how many designers don't …

• contextual interviews & on-site visits
– interview users in their workplace, as they are doing their job
– discover the user's culture, requirements, expectations, …

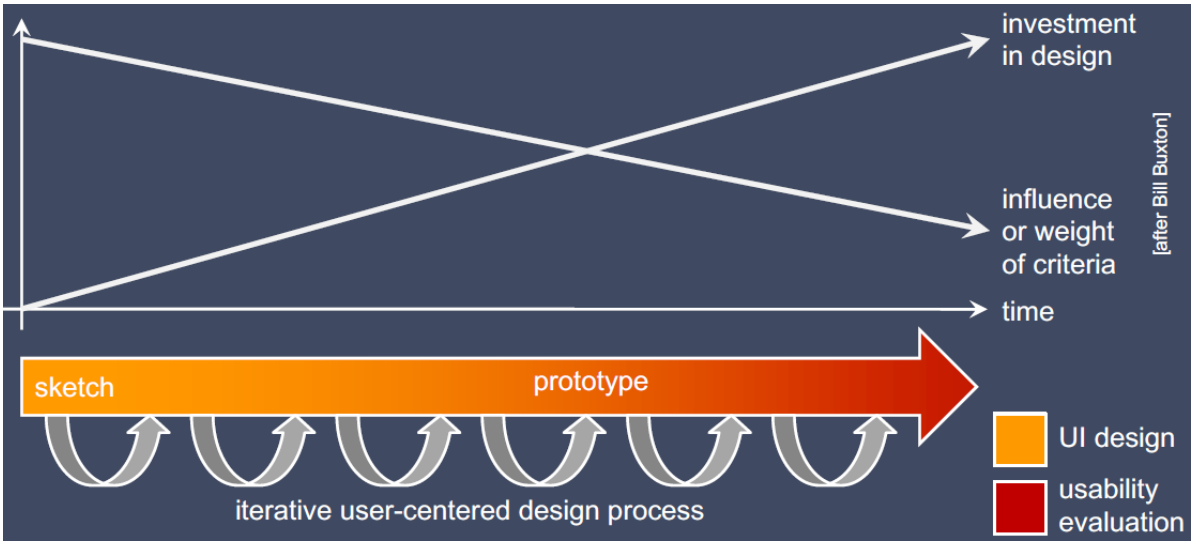
• explain your designs
– describe what you are going to do
– get input at all design stages
– all designs are subject to revision by users

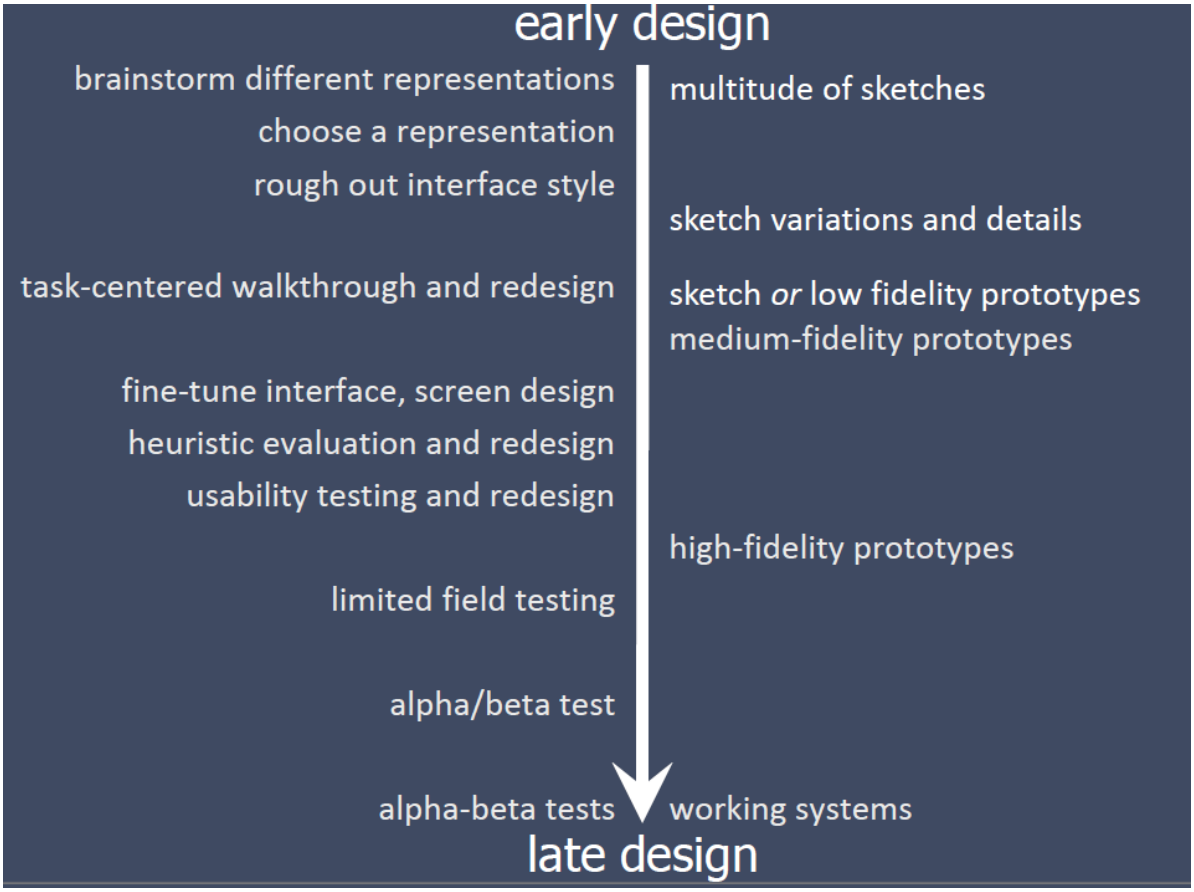
• have visuals and/or demos
– people react far differently compared to verbal explanations
– thus, prototypes are critical
– type of prototype matters: sketchy for early design phases later more pronounced/developed/precise

Sketching and Prototyping

1. sketches
   – initial ideas, very fast, very low cost, no interactivity, many different variants can be explored
2. low fidelity prototypes
   – fewer variants explored further, still fast and low cost, some interactivity can be simulated
3. medium fidelity prototypes
   – more functionality is simulated to test refined concepts
4. high fidelity prototypes
   – field testing of the refined designs, more expensive
5. final design

• from design to evaluation
– interface design (idea generation) progresses to usability testing (idea debugging and refinement)





Sketches

Paper mock-up of the interface's functionality, look, and feel → quick & cheap to prepare and modify
– drawing of the outward appearance of intended system
– crudity means people concentrate on high-level concepts
– deliberately ambiguous & abstract, leaving "holes" for imagination
– harder to envision a dialog's progression

• purpose
– brainstorm competing representations
– elicit user reactions
– elicit user modifications/suggestions

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

• Sketches should include annotations:
Annotations explain what is going on in each part of sketch & how.

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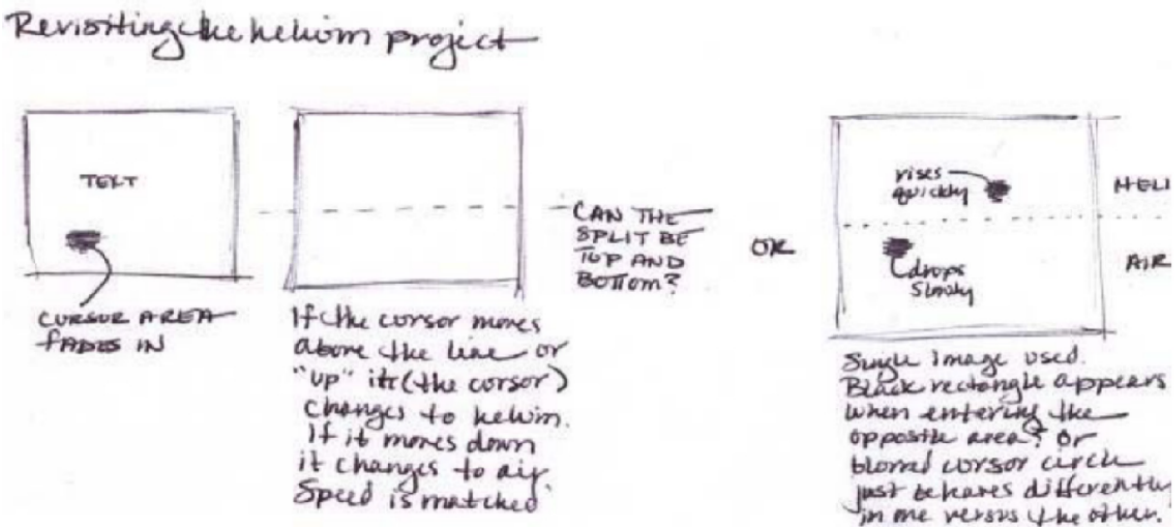


Sketch Attributes

• quick
– to make

• timely
– provided when needed

• disposable
– investment in concept, not in execution

• plentiful
– allow to create a series or collection of ideas

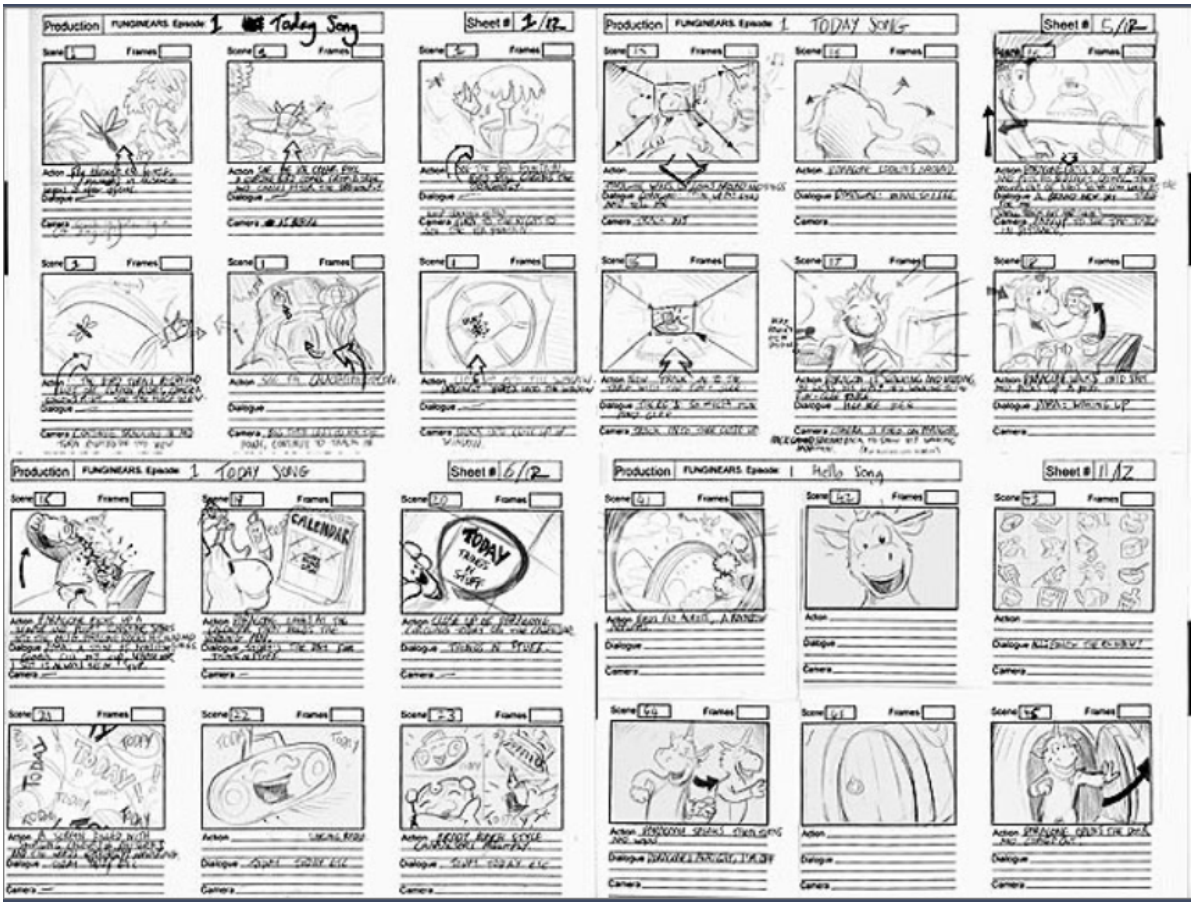
• clear vocabulary
– rendering and style indicate that it's a sketch, and not an implementation

• constrained resolution
– doesn't inhibit concept exploration

• consistency with state
– refinement of rendering matches the actual state of development of the concept

• suggest & explore rather than confirm
– value lies in suggesting & provoking what could be; i.e., they are the catalyst to conversation and interaction

Storyboarding



• series of key frames as sketches
– originally from film; used to get the idea of a scene
– would be talked through

• in interaction (HCI) design:
– a series of (usually) hand-drawn sketches of the interface
– snapshots of the interface at particular points in the interaction
– (can/should) contain annotations of what happens

• Purpose of storyboards in HCI
– to pitch ideas for a user interface to developers or possible users
– users can evaluate quickly the direction in which the interface is heading
– they can serve as a reference for the development

Low / Medium / High fidelity prototypes

Low fidelity prototype

• Low fidelity prototype with paper mockups
• Goal: get feedback from users early with very low cost interactive prototype of envisioned interaction design

Paper prototyping

Use paper or sticky notes to simulate interactions.
Paper prototyping is a example of low fidelity prototype.

Low-Fidelity Prototypes: Advantages and Problems

Q: a), what are examples for low-fidelity prototypes (>= two)?

b), what are the advantages of low-fidelity prototypes?

c), what are the disadvantages of low fidelity prototypes?

A: a) Paper prototypes, Sketch.

b)

• takes between only minutes to just a few hours
• does not require “real implementation”
• no expensive equipment needed
• can test multiple alternatives, fast iterations
• almost all interaction can be faked

c)

• human-simulated “computer” inherently buggy
• slow interaction compared to real application; timings not accurate
• difficult to implements some interaction (e.g., pull-downs, feedback, dragging, visualization, etc.)
• looks different from final product; elements sometimes difficult to recognize
• end-users cannot use it by themselves: not in the context of the user’s work environment

Medium-Fidelity Prototypes

prototyping with a computer:
– simulate some but not all features of the interface
– engaging for end users

purpose:
– provides sophisticated but limited scenario for the end user to try
– can test more subtle design issues

dangers:
– users’ reactions often “in the small”
– users reluctant to challenge designers
– users reluctant to touch the design
– management may think it is real!

High-Fidelity Prototypes

prototyping with (still simple) computer programs, (complex) scripted simulations, interface builders, physical interface builders.

Q: a), what are examples for high-fidelity prototypes (>= two)?

b), what are the advantages of high-fidelity prototypes?

c), what are the disadvantages of high-fidelity prototypes?

A: a) Computer programs, Interface builders.

b)

– more the final look-and-feel
– more functionality
– can test things in detail, engaging for end users

c)

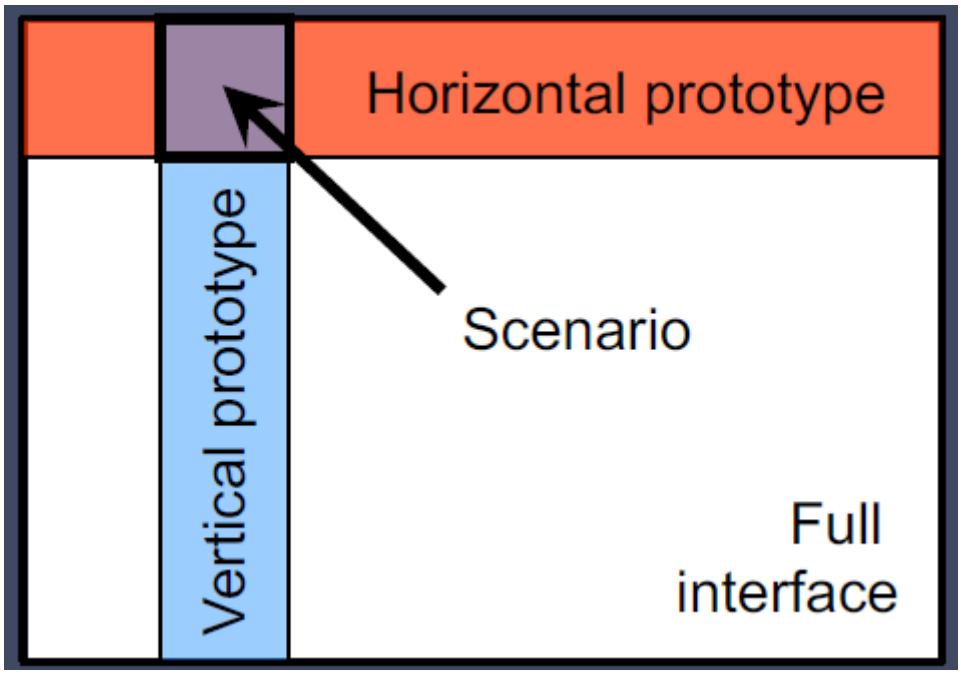
– more effort
– less likely to get major changes
– constrained to selected (programming) tools

Limiting Prototype Functionality

• vertical prototypes
– include in-depth functionality for a few selected features
– common design ideas can be tested in-depth

• horizontal prototypes
– the entire surface interface without underlying functionality
– a simulation; no real work can be performed

• scenario
– scripts of particular fixed uses of the system



Integrating Prototypes and Final Products

• throw-away
– prototype only serves to elicit user reaction
– prototype creation must be rapid, otherwise will be too expensive

• incremental
– product built as separate components (modules)
– each component prototyped and tested, then added to the final system

• evolutionary
– prototype altered to incorporate design changes
– prototype eventually becomes the final product

Approaches: Scripted Simulations and Wizard of Oz

Wizard of Oz:
let human simulates the system's response.