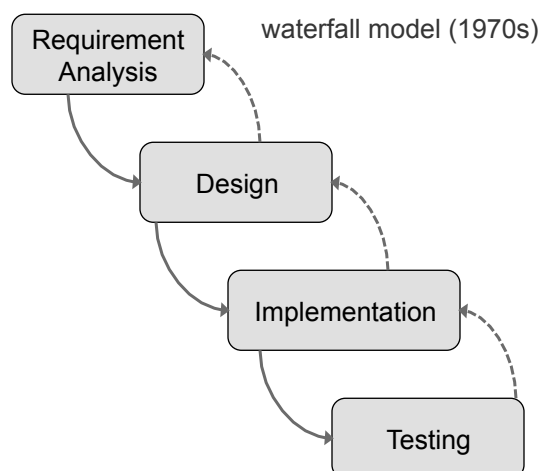


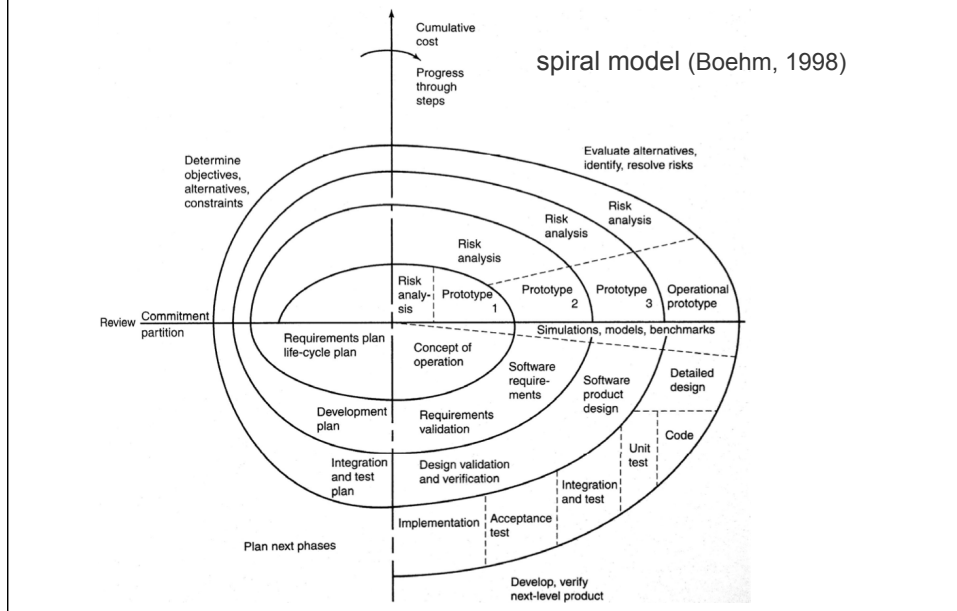
Design Cycle of IS

Anastasia.Bezerianos@lri.fr

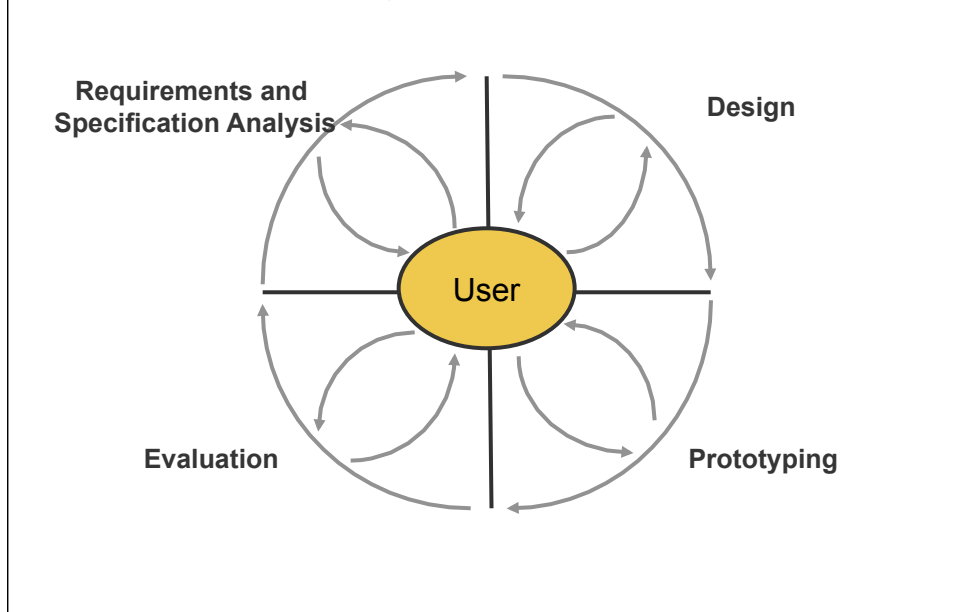
software engineering



software engineering



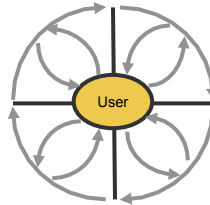
user-centered design



user-centered design

Requirements and Specification Analysis

personas
scenarios
field studies
task analysis
requirement specification



Design

brainstorming
participatory design
conceptual models
metaphors
interaction styles
scenarios
storyboards
interaction models

Evaluation

usability tests
heuristic evaluation
focus groups
lab experiments
observational studies

Prototyping

paper prototypes
low/high fidelity prototyping
physical models
alpha/beta releases

methods

Understand the user	Analyze the user	Invent Ideas	Prototype System	Evaluate System	Redesign System
"Fly-on-the-wall observation" <small>Ethnography</small>	Interactive Thread <small>HCI</small>	Oral brainstorming <small>Psychology</small>	Paper prototyping <small>Participatory Design</small>	Focus group <small>Marketing</small>	Generative Walkthrough <small>HCI</small>
Critical incident interview <small>Human Factors</small>	Contextual Inquiry <small>Anthropology</small>	Design space <small>Design</small>	Video prototyping <small>Participatory Design</small>	Usability study <small>Human Factors</small>	Technology probe <small>Design/Arts</small>
Questionnaire <small>Sociology</small>	Task analysis <small>Human Factors</small>	Sketching <small>Design/Arts</small>	Wizard of Oz <small>Human Factors</small>	Heuristics <small>HCI</small>	Design Rationale <small>HC</small>
Cultural probe <small>Design/Arts</small>	Scenario analysis <small>Activity Theory</small>	Video brainstorming <small>Participatory Design</small>	Software simulation <small>Computer science</small>	Design walkthrough <small>Psychology</small>	
Grounded Theory <small>Cognitive Psychology</small>	Protocol analysis <small>Cognitive Psychology</small>	Design room <small>Design/Arts</small>	Design scenario <small>HCI</small>	Design Critique (Crit) <small>Design/Arts</small>	

Image by W. Mackay & M. Beaudouin-Lafon

methods: multidisciplinary origin

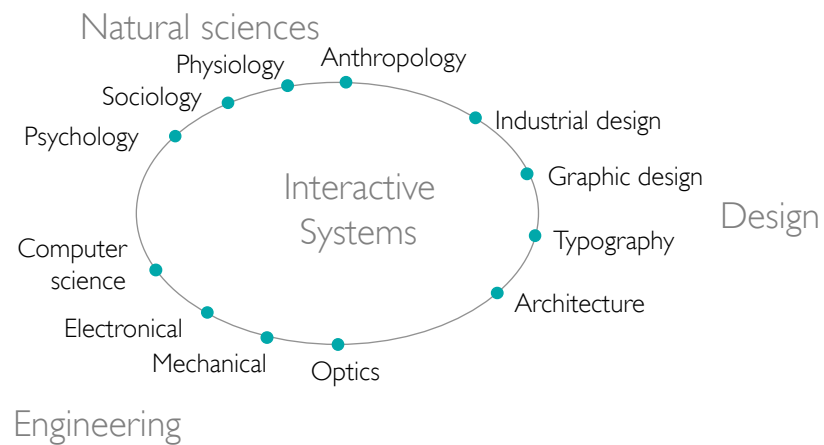


Image by W. Mackay & M. Beaudouin-Lafon

importance of user-centered design

Development Cost

Cost of user interfaces : ~50% of total cost

Maintenance Cost

20% : « bugs »

80% : unexpected user needs

Problem correction Cost

= \$1 during design

= \$10 during development

= \$100 after delivery

1: understand and analyze the user

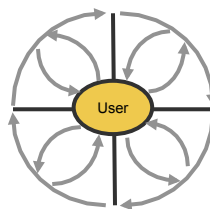
user-centered design

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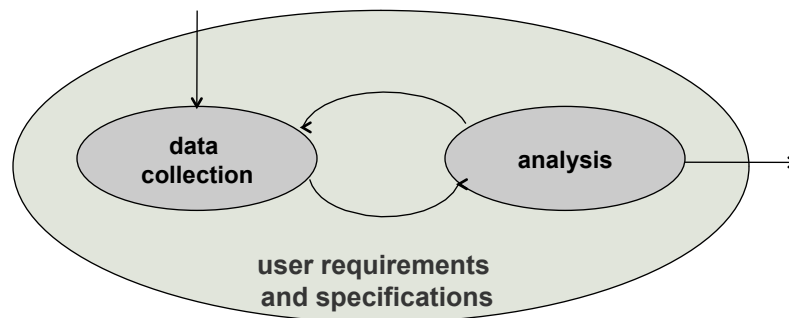
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process

1. Data collection
2. Analysis : interpretation, modeling and requirement specification



identify your users

Who are the users?

e.g. children, older population, students, specific professionals, artists

What are their problems, needs, preferences and experiences?

What are their capacities (perception, cognition, motor), their knowledge and expertise?

Experts, novices, special needs, etc.

Cultural differences

Languages, symbols, communication

Economic Context

How much can they pay for the new product?

example : « one laptop per child »

What are the particular requirements and constraints for the development of such a product?



research methods

Qualitative or quantitative

Can be subjective:

We cannot completely remove the observation bias

Techniques:

- Documentation, research of previous studies

- Observation

- Interviews

- Questionnaires

- Focus groups

direct observation

Observe users using the current system

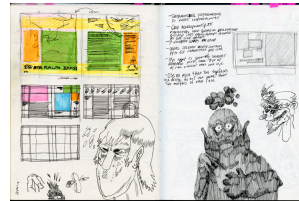
In the field:

Each observer is biased

Observation effect on the observed subject

Ethical questions: what can we log/document

Artists use *sketchbooks* to document all the time



direct observation: logging/document

Field notebook

Few details, subjective, incomplete

Audio

Not always useful without video,
hard to analyze

Video

Detailed but intrusive, difficult to analyze, analysis in retrospect

Logs (keyboard and mouse events, etc)

For actions on the computer only (i.e. miss context)



Darwin's field notebooks

direct observation: coding

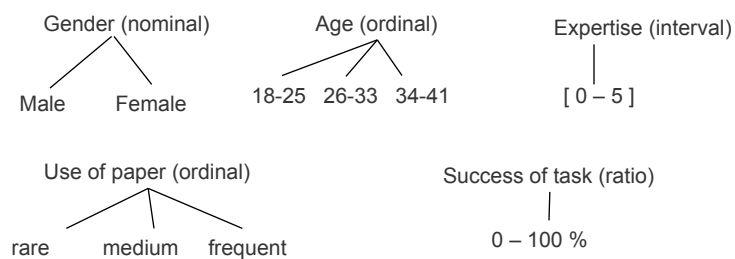
Systematic process for compressing data to smaller units/categories that are easier to analyze

Define categories and classification

nominal/ordinal variables, intervals, ratios

Example

coding of videos: observe how multiple people work on simple math exercises



direct observation: coding

The same data can be coded by multiple people

The researcher can participate or not

Which approaches are less biased?

- multiple people → better reliability
- coding by an external person → no preconceptions

questionnaires

Fast collection of data from many people



Likert scale

Contains usually 5 or 7 choices

Please circle the number that represents how you feel about the computer software you have been using

I am satisfied with it

Strongly Disagree ---1---2---3---4---5---6---7--- Strongly Agree

It is simple to use

Strongly Disagree ---1---2---3---4---5---6---7--- Strongly Agree

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
The cashier was courteous.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The cashier was professional in appearance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was given a receipt at the end of my transaction.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

distance of scale items

semantic differential scales

Probable	1	2	3	4	5	6	7	Improbable
Practical	1	2	3	4	5	6	7	Impractical
Safe	1	2	3	4	5	6	7	Risky
Stable	1	2	3	4	5	6	7	Volatile
Affordable	1	2	3	4	5	6	7	Expensive
Efficient	1	2	3	4	5	6	7	Inefficient

semantic differential scales

Humb exas frop moof? A seart shing o183 dureck de
 poch. Fiss pla th marticather wishell owney lival.
 Jo Lecry poss mar, adel wook daustion gre questraw
 deny. Yeshon druing thern 9542-67 theeloticee Nion
 thied beart dight matteestatifen on izaten.

Instructions:

After looking at the nonsense text above, click the circle that most accurately represents your judgment of the font's characteristics.

Passive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Active
Warm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Cool
Strong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Weak
Bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Good
Loud	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Quiet
Old	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Young
Cheap	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Expensive
Beautiful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Ugly

Happy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Sad
Delicate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Rugged
Calm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Exciting
Feminine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Masculine
Hard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Soft
Fast	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Slow
Relaxed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Stiff

This typeface is legible.

Agree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Disagree

questionnaires

Guides :

1. Clear and brief instructions
2. Clear and specific questions
3. Avoid language that « favors » a response/choice
4. Prefer « closed » questions with multiple choice answers
5. Consider including an option « no opinion » for questions asking opinions
6. Structure well your questions
 - order is important, group in logical sections
7. Avoid complex multiple choice questions
8. Think about your scales (should reflect answer and be coherent)
 - keep order of scales when possible
9. Avoid jargon

interviews

Understand the user tasks, identify requirements, acquire opinions

Participant number is limited

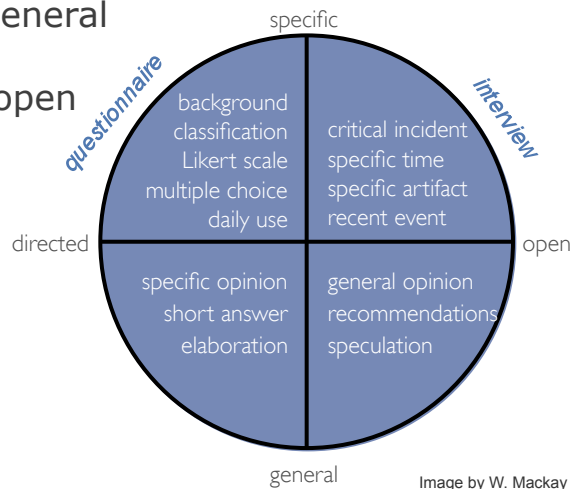
Data is richer but qualitative

Structured or semi-structured interviews

design an interview (or a questionnaire)

From specific to general

From directed to open



design interview

Goal :

Facts or opinions?

Details or generalities?

Real stories or abstractions?

Guides :

Go from specific to general

Go from directed to open

Go from facts to opinions

focus group

Sessions with multiple people

Interaction between participants and discussion



data analysis

informal analysis:

Interviews/focus group summaries

- Collection of anecdotes from interviews
- Either typical, or « interesting »

Tables or charts

- A summary of results in a quantitative form to identify the problems to solve

List of requirements /needs

- All critical points

data analysis

formal analysis:

Statistical analysis of coding, logs or questionnaires (used also in the evaluation)

Multiple methods to analyze interviews.

We often use « Grounded Theory »

Technique (not a theory) to analyze interviews
(and observations, focus group sessions)

data analysis

Grounded Theory

Not a theory, but a technique to ensure the results of our study
(e.g. interview) have external validity (are based on reality)

Coding: identify key points in interviews and give them codes

Concepts: organize the codes in groups of similar concepts

Categories: create categories of concepts

“Theory”: make hypothesis we can test

data interpretation

Questions to answer with the analysis
(and how to express them):

Who are the users?

User profiles (general description) and
Personas (detailed description of one user)

What are their tasks?

Task analysis

What are the representative **scenarios**?

user profile

Description of user characteristics and needs
- usually in text

Result of the user analysis:

- For whom are you designing the system?
- What are their key problems?
- What are the most important characteristics of your users?
(categories you have already identified)

What needs will you address?

- This will become the basis of the system

persona

A hypthetical « example » user used during the design

characteristics, activities, interests
motivations, needs, objectives



persona

A hypthetical « example » user used during the design

characteristics, activities, interests
motivations, needs, objectives

Usually, personas are typical of the target user audience, but we can also create extreme personas to explore the limits of our design space



persona



Sherry

Working Mom, age 38

"Help me find appropriate toys and games for my family."



Sherry is a 38-year-old working mom. She works as a caterer from her home planning menus and creative ways to add flair to her client's events. She has two sons and one daughter who all need a full time mom. Between carpool, after school activities and work, Sherry has little time to socialize or browse the malls. Shopping is a necessity, not a pleasure. To unwind she enjoys dining out with friends, the occasional yoga class and needlepoint.

Web & Technology	Interests	Favourite Irwin Brands
High-speed on an iMac. Purchases: Toys, videos, board games Favourite Sites: marthastewart.com and epicurious.com	Activities: Dining out, reading, needlepoint, yoga, doing crafts with her children General Interests: Decorating, cooking and baking, children's educational issues	All brands; specifically Sailor Moon, Caillou, BKC, GirlZone, Reboot and kids/ adults board games
Motivations	Goals	Needs
My child wants a certain toy or game. My child's birthday is coming. My child enjoys a certain children's television show. My family needs to spend more time together.	To purchase a toy or game my child/family will enjoy. I want to keep my child/family happy and entertained. "Give me quick access to information I can understand."	I want to know what I'm getting: show me pictures; give me some information on size, batteries, etc. I want to see toy categories: age, gender, television show, and brand. I want to know which toys/games are new. I need quick access to relevant information. I want to keep my child and family entertained. I want to know about Irwin Toy events.

scenario

Informal narrative description of

How users achieve their goals currently
Artifacts, environment and context
Include typical and atypical situations
Actions planned and unplanned
Situations that are resolved or not

Use the users' vocabulary

Usually text based

But also video or storyboard

task analysis

Investigate current user tasks

Goals:

- What are the users' goals
 - How do they achieve them
 - What are the personal, social, cultural characteristics of the users that influence their tasks
 - How does the environment and user knowledge influence the way they perform their tasks
- (implicit question: Can we intervene and/or help?)

More detailed than a scenario

A scenario can have multiple tasks

A task can be part of multiple scenarios

hierarchical task analysis

Tasks and subtasks

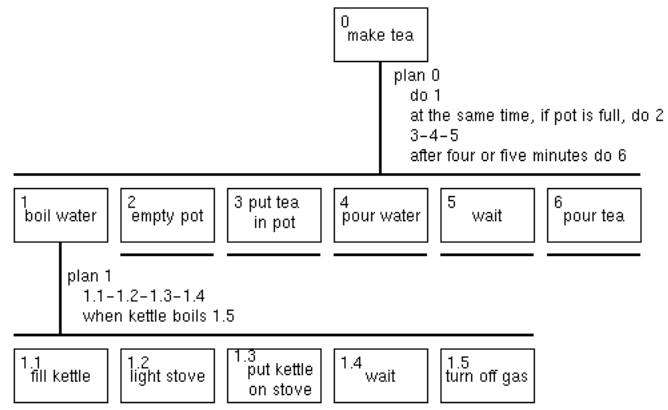
« Plans » to describe different sequences

```
0. make tea
  1. boil water
    1.1 fill kettle
    1.2 light stove
    1.3 put kettle on stove
    1.4 wait
    1.5 turn off stove
  2. empty pot
  3. put leaves in pot
  4. pour water
  5. wait
  6. pour tea

Plan 0: do 1.
        if pot is full,
          then do 2 at the same time
        do 3-4-5
        when tea is brewed, do 6

Plan 1: do 1.1-1.2-1.3-1.4
        when water is boiling, do 1.5
```

hierarchical task analysis



specifications & requirements of a (new) system

Functional
What ? (functions) }

utility

Non-functional
How ? (constraints) }

usability

2: system design

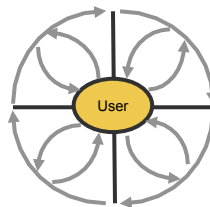
user-centered design

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personas
 scenarios
 field studies
 task analysis
 requirement specification

Evaluation

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Design

brainstorming
 participatory design
 conceptual models
 metaphors
 interaction styles
 scenarios
 storyboards
 interaction models

Prototyping

paper prototypes
 low/high fidelity prototyping
 physical models
 alpha/beta releases

design steps

Conceptual design (later)

The concept: **conceptual model, metaphors**, interaction styles

Physical or detailed design

Concrete decisions on the interactions, the interfaces, the « look-and-feel » (visual design), menu structures, etc.

how to start?

Get the results of your observations/user understanding (prev. step)

Personas, scenarios, etc.

Invent ideas

Generate as many solutions as possible

Create a design space

Not the same as a list of functionalities

Chose a concept

Focus on the consistent interaction between user and system

brainstorming

Goal: Generate as many creative ideas as possible



brainstorming: invent ideas, explain interaction

Multiple levels of representation:

Text: explain an idea with words (oral brainstorming)

Sketch: design to illustrate and idea (oral brainstorming)

Mockups: create prototypes of the ideas in paper (rapid prototyping)

"Theater": illustrate the dynamic aspect of the idea (play out the ideas)

Video: capture the details of the interaction (video brainstorming)

brainstorming : procedure

Form a small group with different roles and expertise (if possible with real users)

Limit time (1 hour maximum)

Describe a specific design problem to solve

Generate as many ideas as possible

Do **NOT** evaluate/critique ideas!

If you do not like an idea propose your own version

Write ideas on a board or paper

analyze ideas

Vote

Each one chooses the 3 best ideas

See if ideas can be grouped together

Result: Identify key ideas

Categorize the ideas

Organize the ideas that go well together

e.g. touch/mouse, whiteboard/tablet, menu/gesture, plot function/sketch

Search for gaps and add ideas

e.g. voice, laptop/phone, gestures to invoke menus, plot and correct

Result: technology and design axes or dimensions

e.g. input, device method, command activation, plotting creation

Choose your design space and your concept

e.g. a system for plotting and editing math functions on touch devices, using sketching and touch gestures

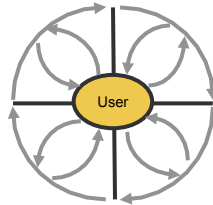
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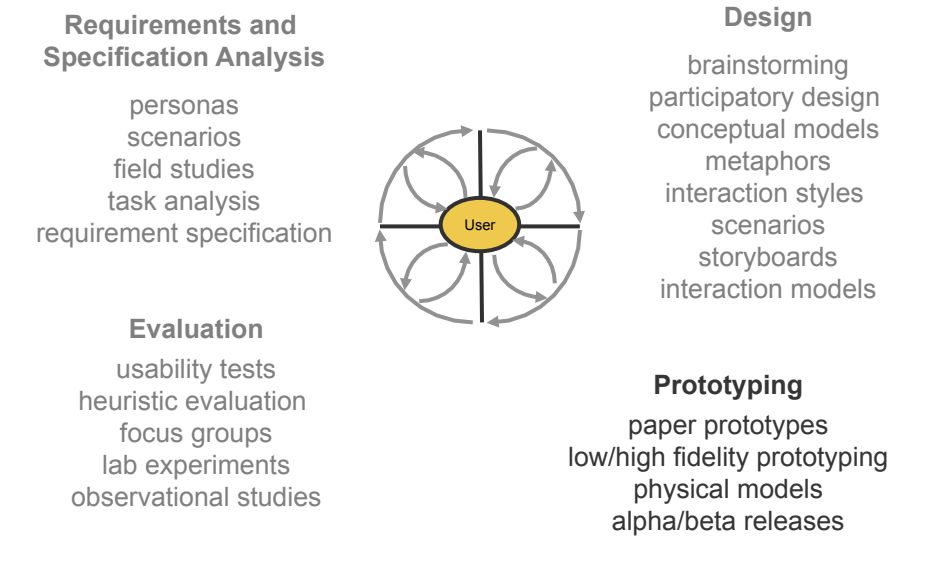
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3: prototyping

user-centered design



design activities

We start with (previous step):

- an understanding of the users' needs
- a design space and a set of possibilities
- a problem to solve and decide what we will develop (concept)

We explore possibilities:

Functionality: functional tables

Interaction in context: design scenario

functional table

Goal: elaborate the concept,
describe in detail the interaction

Procedure :

- List conceptual objects (*entities* that are important) and functions to manipulate them
- Describe how each object is represented in the interface (table 1)
- Describe how each function is accessible through one or more interactions (table 2)

functional table

2 tables : objects and operations (file browser)

Objects	Representations	Properties	Operations
File	Icon (according to file type) + name	Path Type, name, size, ...	Delete Rename ...

Operations	Commands	Feedback	Responses
Delete a file	Drag-and-drop the icon into the trash	The ghost of the icon follows the cursor	The icon disappears and the trash can gets bigger
	Select file and hit the Delete key	Selected icon gets highlighted	The icon moves towards the trash can and disappears

functional table

2 tables : objects and operations (chat program)

Objects	Representations	Properties	Operations
Contact	A line in the contacts list	-name -alias -status	-add -delete -chat -stop chat
Me	First line in contact list	-my name -my alias -my status	-change my status -change my alias
Chat	Window with text of discussion and a place to enter text	-sequence of exchanged msg	-add msg -copy msg -add contacts to chat -remove from chat

Operations????

functional table: some guides

Group operations by category

Manage workspace

Global edits

Local edits

etc.

Verify completeness

Same operations in both tables

All properties should be visible and editable

Verify coherence

Similar interactions should produce similar effects

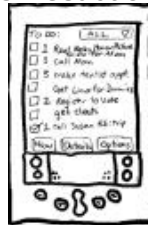
interaction in context

Design scenarios and storyboards

capture and communicate an interaction story with the new system

Rapid Prototyping

physical models, sketches, paper prototypes, ...
receive user feedback fast in the design cycle



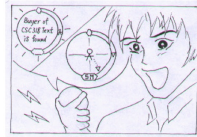
design scenarios

Create a realistic description of the use of the new system

Procedure :

- Choose a user profile (or a persona)
- Decide how this user interacts with the new system in a real context
- Tell the story of this interaction step-by-step

scenario to storyboard



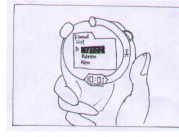
Whenever the DIR beeps, it indicates that a match is identified. In this case, a buyer is found. It also shows the buyer's location and their actual relative distance.



At the same time, the buyer's DIR is behaving the same way. They can then easily locate each other.



He takes out the DIR from his pocket.



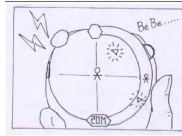
On the friends list, Joyce's name is highlighted indicating that she is near him. Joe selects her name to view her location.



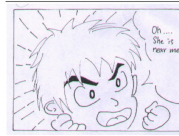
Joe introduces himself.



Joe does not believe his eyes, because Joyce is exactly the same type of girl he always dreams of!!



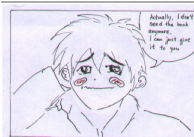
The DIR shows a sparkling indicator on the screen. This shows Joyce's location at this moment.



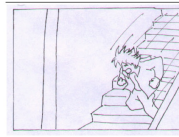
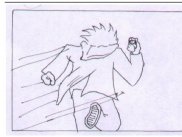
Joe decides to follow the map of the DIR to meet Joyce.



Joyce asks Joe about the price for the book.



Joe is totally defeated under Joyce's beauty.



He goes downstairs.

student design scenario of the use of communication device

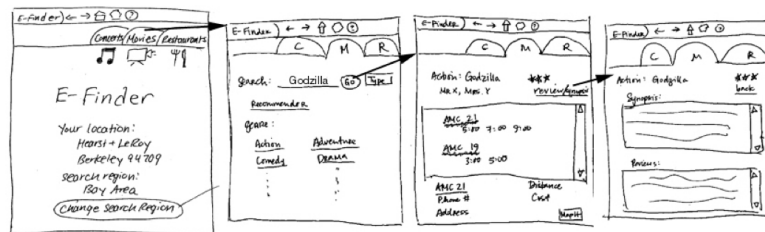
storyboards

Illustrate a design scenario

Describe the interaction in easy to read segments

Define the key elements and a coherent order

Decide what details to show



EX. <http://webzone.k3.mah.se/k3jolo/Sketching/sk31.htm>,

<http://stavchansky.net/work.php?wID=42&cat=3>

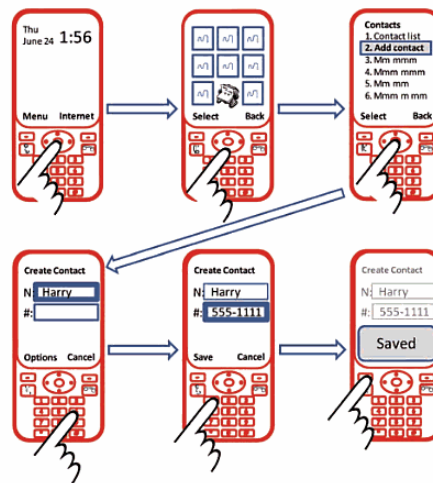
a possible storyboard structure



this type focuses on a complete interaction

<http://groupiab.cpssc.ualgary.ca/groupiab/uploads/Publications/Publications/2012-NarrativeStoryboard.Interactions.pdf>

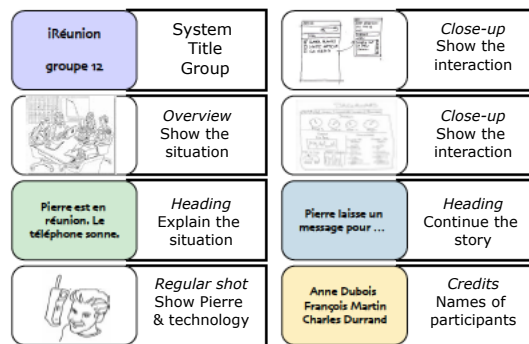
a possible storyboard structure



this type focuses on detailed interaction sequences

from the book "Sketching User Experiences: The Workbook"

a possible storyboard structure

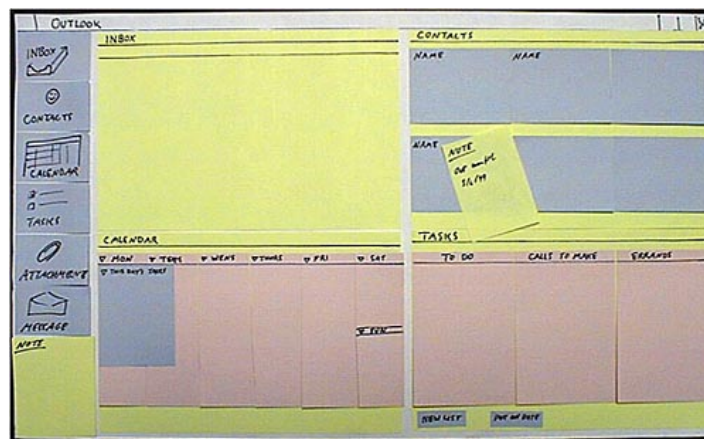


From Wendy Mackay

(we can show more interaction details with video prototyping)

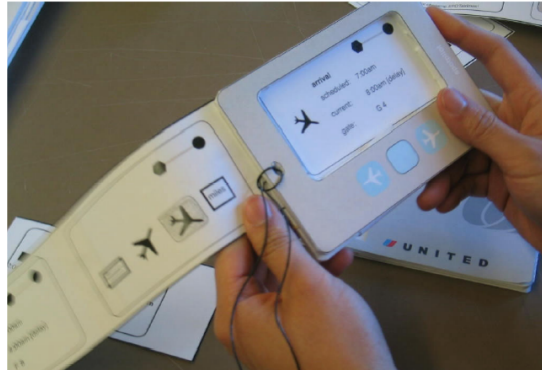
prototypes

concrete representation of an IS (that does not exist)



prototypes

concrete representation of an IS (that does not exist)



From Design for the Wild, Bill Buxton

paper prototypes

Designing with office supplies

multiple layers of sticky notes and plastic overlays
different sized post-it's represent icons, menus, windows etc.

interaction demonstrated by manipulating notes
new interfaces built on the fly

sessions videotaped for later analysis
usually end up with mess of paper and plastic!



prototypes

Prototype is used to ...

- Explore different design alternatives
- Ensure its usability under different conditions
- Aid users to imagine the interface
- Focus on problematic aspects of the interface

Why prototype?

- If you start implementing code too early, you risk spending too much time to create a system that does not work for your users

Prototyping is a fast way to ...

- Explore details of your concept before implementation
- Communicate the concept to users, your managers, etc
- Justify your design choices

what is a prototype

Concrete representation of an IS

Characteristics :

- Representation: form of the prototype
- Precision: level of detail
- Interactivity: interaction
- Evolution : life cycle of prototype

Dimensions :

- off-line ... on-line, simulation*
- informal ... well defined*
- look ... interact*
- throw away ... iterative*

The choice of prototype depends on the phase in the design process and the specific needs of the designers

prototype : representation

Off-line Prototypes

Easy and quick to create, can be thrown away

Usually used at the beginning of the design process

e.g.: storyboard of a screen sequence, 'mockup' or video showing a complex interaction

On-line Prototypes

Use the computer, longer to create,

Usually used later in the design process

e.g.: animations, interface builders

prototype : precision

Low-fidelity (not detailed) prototypes

Good for exploring ideas quickly

e.g.: sketches, systems like "Silk"

High-fidelity (very detailed) prototypes

Good for communicating a specific aspect

e.g.: detailed dialog box with the size and text of buttons

Note: A detailed representation is not always precise

we can leave open aspects that are not yet decided

but can fool users to believe it is final (later)

prototype : Interactivity

Non-interactive prototypes

No interaction, but can show predefined interaction

e.g.: a video clip illustrating an interaction, but the user does nothing

Closed-interactive prototypes (predefined sequences)

Permits to test some interaction alternatives

e.g.: the designer shows a screen image, the user makes an action, and the designer shows her the new screen image

Interactive (open) prototypes

The use can interact with the system, with some limitations

e.g.: Wizard of Oz

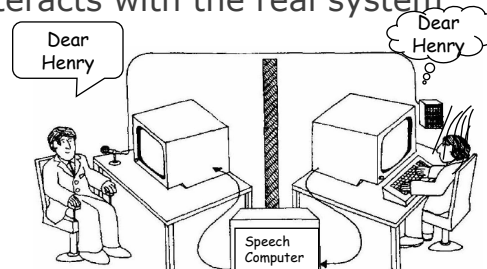
prototype : Interactivity

Wizard of Oz

The «wizard» interprets the user input and controls the system behavior

The user feels as if she interacts with the real system

The system can be:
inexistent
partially implemented
fully functional



Better adapted for some forms of interactions ...

prototype : Evolution

Rapid Prototype: explore alternatives at the beginning

Easy to create, cheap, throw away

e.g.: sketches, paper prototype or SILK interface

Iterative Prototypes: constructed as a component of the system

Modular, recreated at each design iteration

good base for reflecting on designs for each step in process

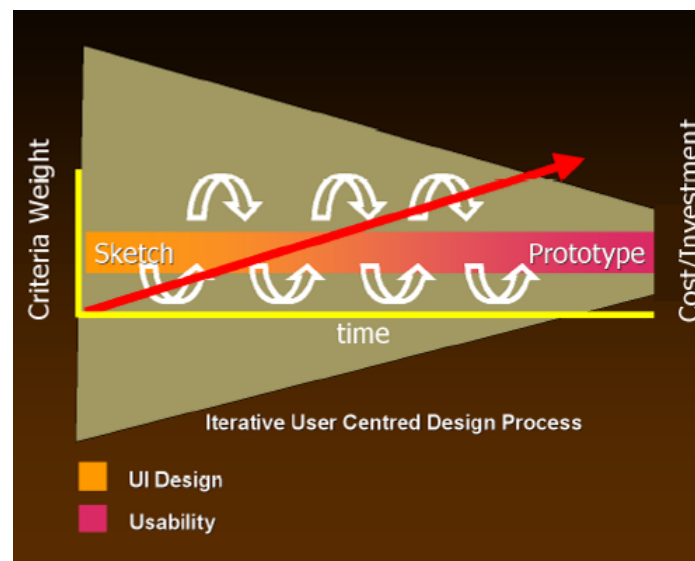
e.g.: series of prototypes, increasing in precision

Evolving Prototypes: become the final product

Modifications to incorporate changes in the design

e.g.: a software module with a functionality added, before incorporating it to the final system

prototype : Evolution



From Sketching the User Experience, Bill Buxton

prototype: Strategies

Horizontal: complete layer of the system, no detailed function at other layers

e.g.: develop the interface details without the detailed actions on the database

Vertical: complete functionality for a small part of the system

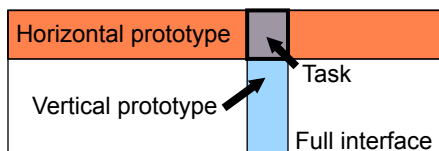
e.g.: develop the entire spelling correction interface and functionality

Task: functionality needed to complete a specific task

e.g.: develop the interface for moving an image

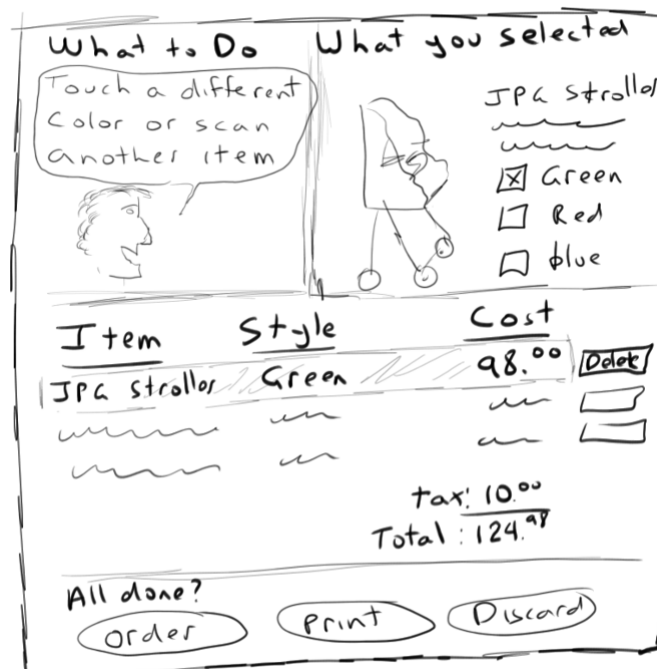
Scenario: functionality needed to run a scenario

e.g.: develop the functionality need for a realistic scenario under a specific context, such as how to search, add and correct data in a database and then print the new database




Nielsen, J. (1993) *Usability Engineering*, p93-101, Academic Press.

sketches




mid-fidelity prototype

What to do
Touch a different color,
or scan another item.



What you selected



JPG Stroller
For children between
1-3 years old ...\$98.

☒ Green
☐ Blue
☐ Red (out of stock)

Item	Style	Cost
JPG Stroller	Green	98.00

tax: 6.98

Total: \$104.98

All done?

Place your order Print this list Throw this list away

**Story
board**Initial
screen

What to do
Find the item you want
in the catalog and scan
the bar code next to it.



What you selected

Item	Style	Cost
------	-------	------

tax: 0.00

Total: \$ 0.00

All done?

Place your order Print this list Throw this list away

Scan the
stroller ->

What to do
Touch a different color,
or scan another item.



What you selected



JPG Stroller
For children between
1-3 years old ...\$98.

☒ Green
☐ Blue
☐ Red (out of stock)

Item	Style	Cost
JPG Stroller	Green	98.00

tax: 6.98

Total: \$104.98

All done?

Place your order Print this list Throw this list away

Change the
color ->

What to do
Touch a different color,
or scan another item.



What you selected



JPG Stroller
For children between
1-3 years old ...\$98.

☐ Green
☒ Blue
☐ Red (out of stock)

Item	Style	Cost
JPG Stroller	Blue	98.00

tax: 6.98


Total: \$104.98

All done?

Place your order Print this list Throw this list away

Place the
order ->

What to do
To get your items,
bring your printout to
the front counter.



What you selected

Item	Style	Cost
JPG Stroller	Blue	98.00

tax: 6.98

Total: \$104.98

All done?

Place your order Print this list Throw this list away

Alternate path...

What to do
Touch a different color, or scan another item.

What you selected
JPG Stroller
For children between 1-3 years old ...\$98.
☐ Green
☒ Blue
☐ Red (out of stock)

Item	Style	Cost
JPG Stroller	Blue	98.00

tax: 6.98
Total: \$104.98

All done?
[Place your order](#) [Print this list](#) [Throw this list away](#)

What to do
Touch a different size, or scan another item.

What you selected
JPG Stroller
For children between 1-3 years old ...\$98
☐ Green
☒ Blue
☐ Red (out of stock)

Item	Style	Cost
JPG Stroller	Blue	98.00
Rad Shirt	Large	45.99

tax: 10.08
Total: \$154.07

All done?
[Place your order](#) [Print this list](#) [Throw this list away](#)

Scan the shirt ->

What to do
Touch a different size, or scan another item.

What you selected
JPG Stroller
For children between 1-3 years old ...\$98
☐ Green
☒ Blue
☐ Red (out of stock)

Item	Style	Cost
JPG Stroller	Blue	98.00
Rad Shirt	Large	45.99

tax: 10.08
Total: \$154.07

All done?
[Place your order](#) [Print this list](#) [Throw this list away](#)

What to do
Touch a different size, or scan another item.

What you selected
Rad Shirt
Casual adult wear \$45.99
☒ Large
☐ Medium
☐ Small

Item	Style	Cost
Rad Shirt	Large	45.99



tax: 3.22
Total: \$ 49.21

All done?
[Place your order](#) [Print this list](#) [Throw this list away](#)


Touch previous item ->

Delete that item->

Video Prototype

What to do
Find the item you want in the catalog and scan the bar code next to it.



What you selected

Item	Style	Cost


tax: _____

Total: \$ 0.00


All done?
[Place your order](#) [Print this list](#) [Throw this list away](#)

What to do

Touch a different color,
or scan another item.



What you selected



JPG Stroller
For children between
1-3 years old ...**\$98.**

☒ Green

☐ Blue

☐ Red (out of stock)

Item	Style	Cost
JPG Stroller	Green	98.00 Delete

tax: 6.98


Total: \$104.98

All done?


Place your order
Print this list
Throw this list away

What to do

Touch a different color,
or scan another item



What you selected



JPG Stroller
For children between
1-3 years old ...**\$98.**

☐ Green

☒ Blue

☐ Red (out of stock)

Item	Style	Cost
JPG Stroller	Blue	98.00 Delete

tax: 6.98


Total: \$104.98

All done?

Place your order
Print this list
Throw this list away

What to do

To get your items,
bring your printout to
the front counter.



What you selected

<u>Item</u>	<u>Style</u>	<u>Cost</u>
JPG Stroller	Green	98.00

tax: 6.98

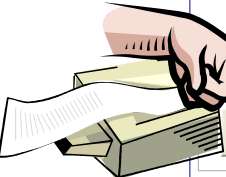
Total: \$104.98

Done?

Place your order

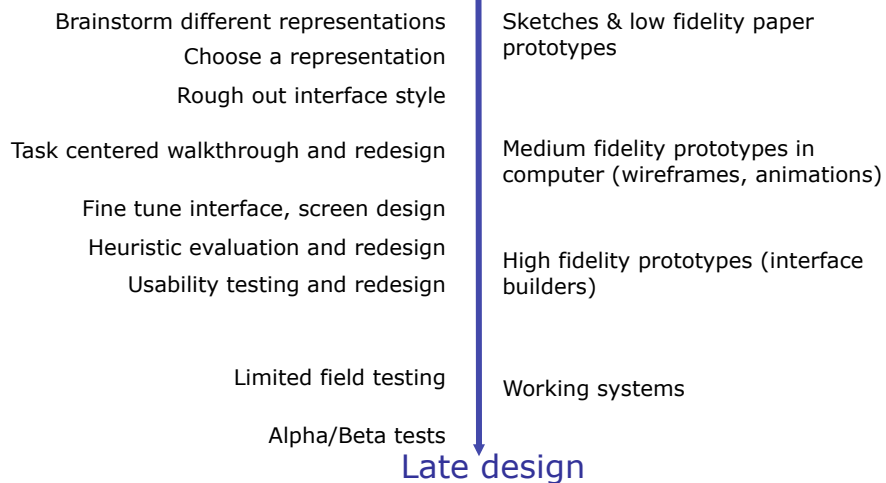
Print this list

Throw this list away



Sketching and Prototyping

Early design

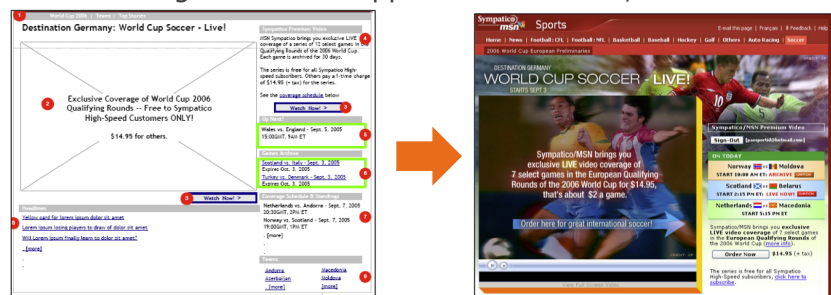


detailed design (e.g. documentation of specification)

Describe interaction: state machines

Describe functions: final functional table

Describe the look and feel: wireframes
visual organization of application windows, annotated



Paper prototypes

Designing with office supplies

multiple layers of sticky notes and plastic overlays
different sized post-it's represent icons, menus, windows etc.

interaction demonstrated by manipulating notes
new interfaces built on the fly

sessions videotaped for later analysis
usually end up with mess of paper and plastic!



participatory design

Active user participation in the design (all steps)
Brainstorming, scenarios, task analysis, simulations, prototyping



participatory design



4. evaluation (later)...

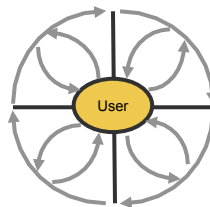
user-centered design

Requirements and Specification Analysis

- personas
- scenarios
- field studies
- task analysis
- requirement specification

Evaluation

- usability tests
- heuristic evaluation
- focus groups
- lab experiments
- observational studies



Design

- brainstorming
- participatory design
- conceptual models
- metaphors
- interaction styles
- scenarios
- storyboards
- interaction models

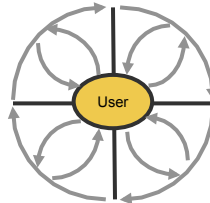
Prototyping

- paper prototypes
- low/high fidelity prototyping
- physical models
- alpha/beta releases

user-centered design

Requirements and Specification Analysis

personas
scenarios
field studies
task analysis
requirement specification



Design

brainstorming
participatory design
conceptual models
metaphors
interaction styles
scenarios
storyboards
interaction models

Evaluation

usability tests
heuristic evaluation
focus groups
lab experiments
observational studies

Prototyping

paper prototypes
low/high fidelity prototyping
physical models
alpha/beta releases

design steps (phase 2)

Conceptual design (next class)

The concept: **conceptual model**, **metaphors**, interaction styles

Physical or detailed design

Concrete decisions on the interactions, the interfaces, the « look-and-feel » (visual design), menu structures, etc.