

Introduction to HCI

Chapters 1, 2

Course Elements



Lectures

Basic design & usability concepts
Examples of good & bad designs
Get insights of social dynamics,
privacy, accessibility

Lab sessions

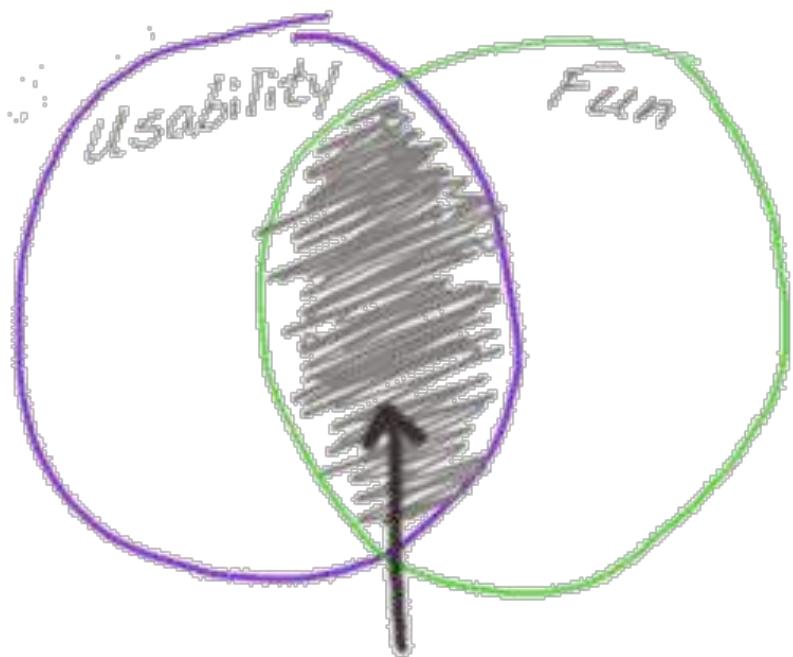
Exercise in practice how to gather
information about users' needs &
how to design and test it

Assignments

Apply your knowledge in a
concrete use case

Challenge your creativity

Which means ...



To be able to DESIGN:

How the user interaction and experience should work and look?

To be able to SELECT:

What user interaction design is best for a given purpose in a context?

To be able to EVALUATE:

How good a specific user interaction is?



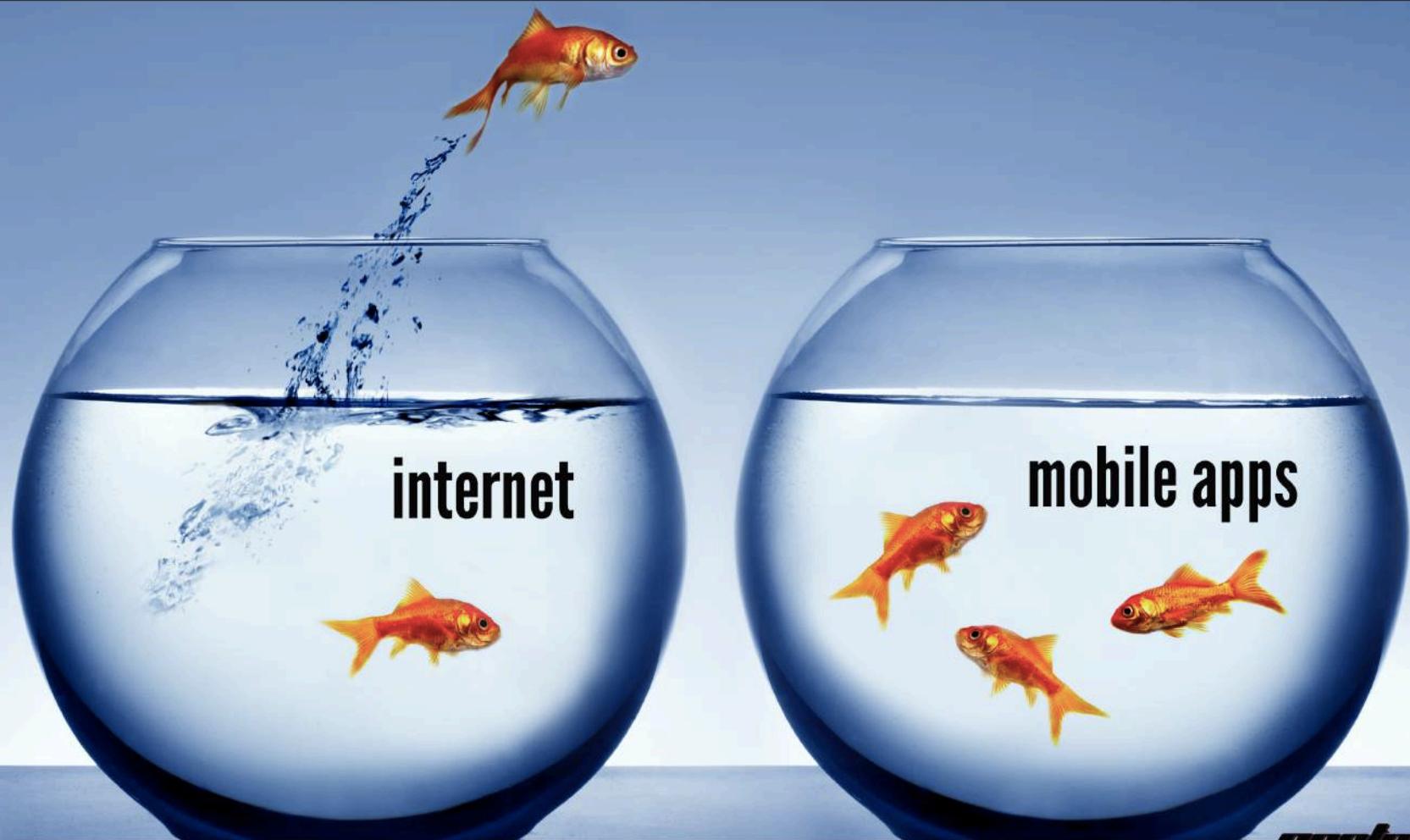
HOW PEOPLE INTERACT WITH COMPUTERS?

Dashboards





EVERYONE IS DOING IT...



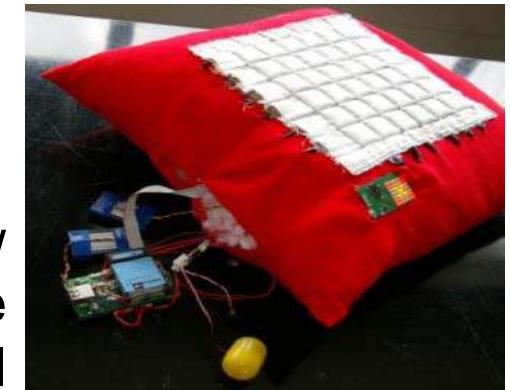
Wearables



Sensing Affect

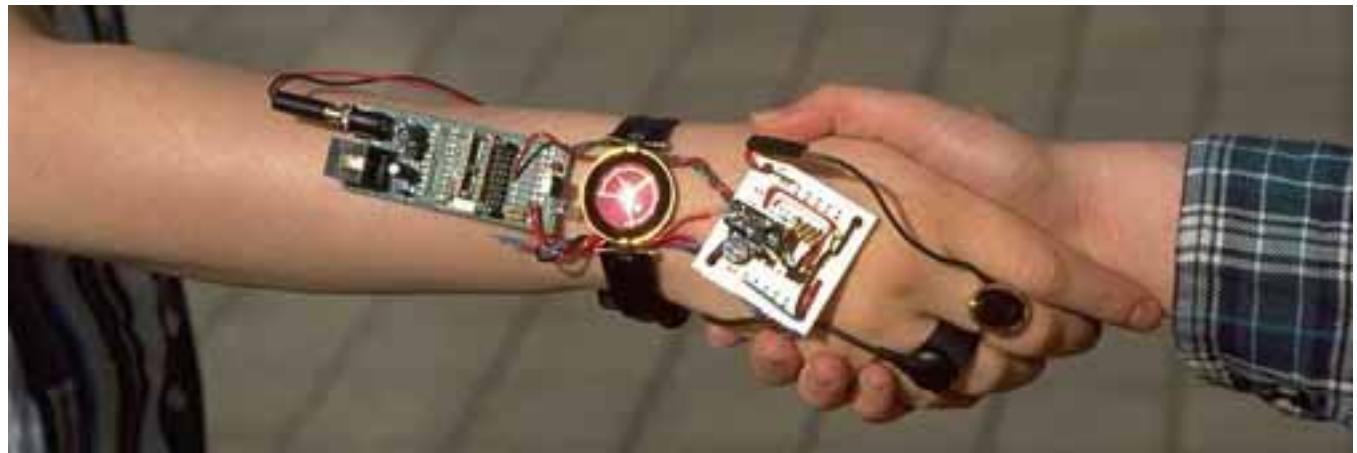


Blood Volume
Pressure (BVP)
earring



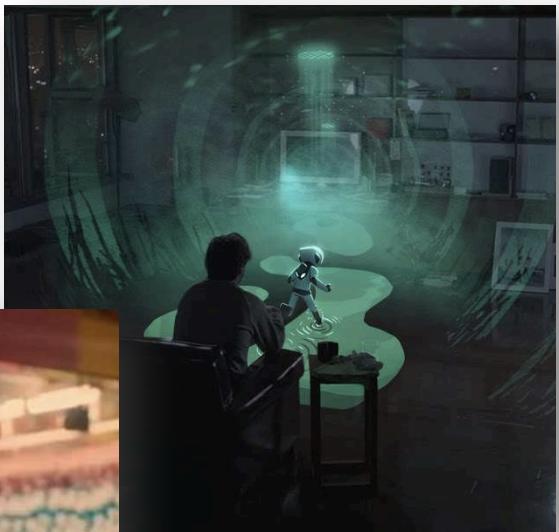
Interactive Pillow
as a TV remote
control

Galvanic Skin
Response
(GSR) rings
and bracelet



Speech, Mobile & Augmented Interaction

“Her” (2014)



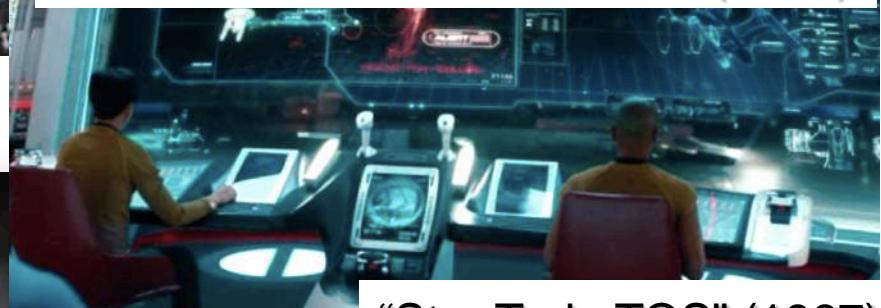
“Avengers” (2012)



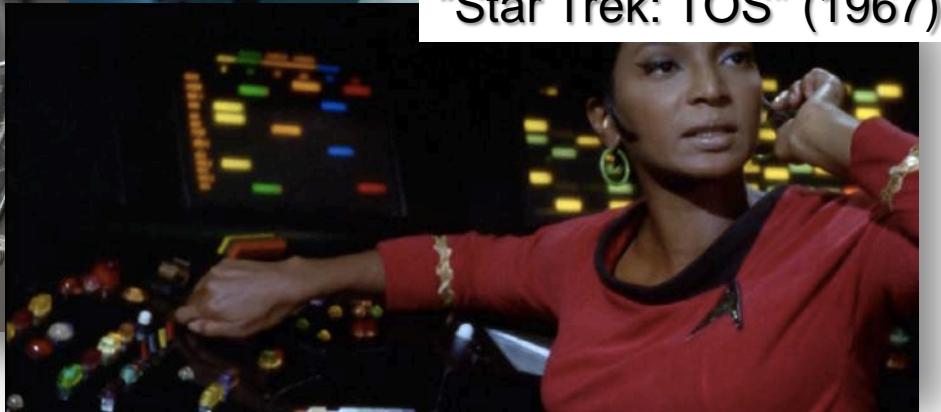
“Minority Report” (2002)



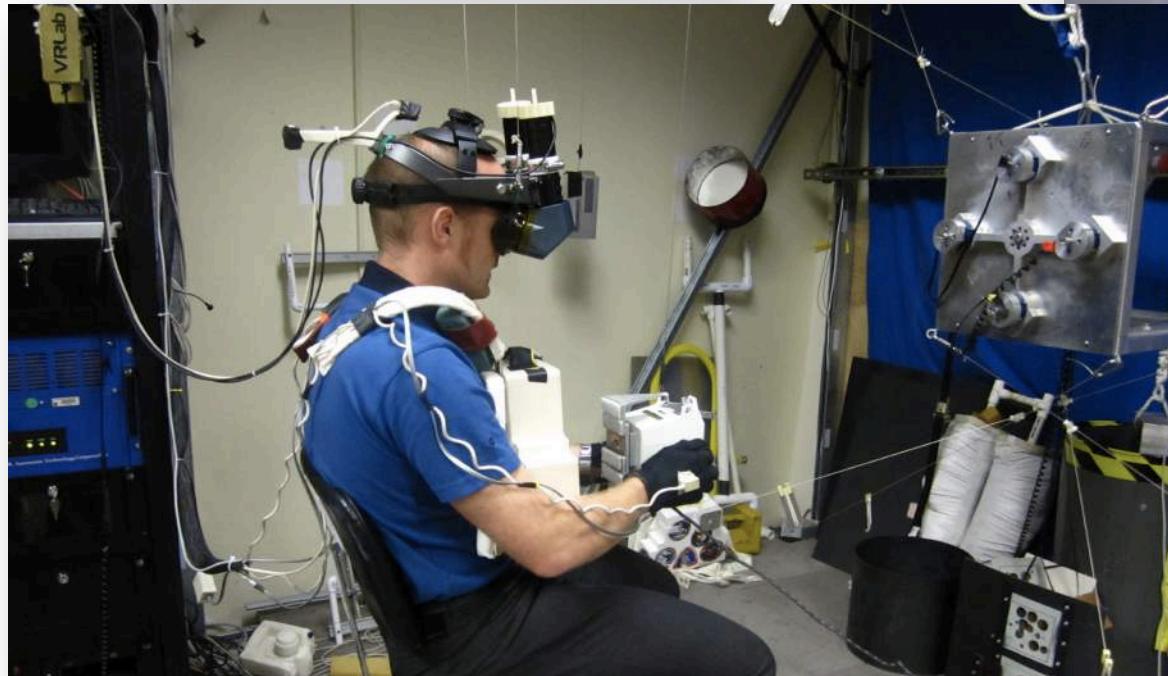
“Star Trek: In to the Darkness” (2013)



“Star Trek: TOS” (1967)



Virtual Reality Reality



Mimio



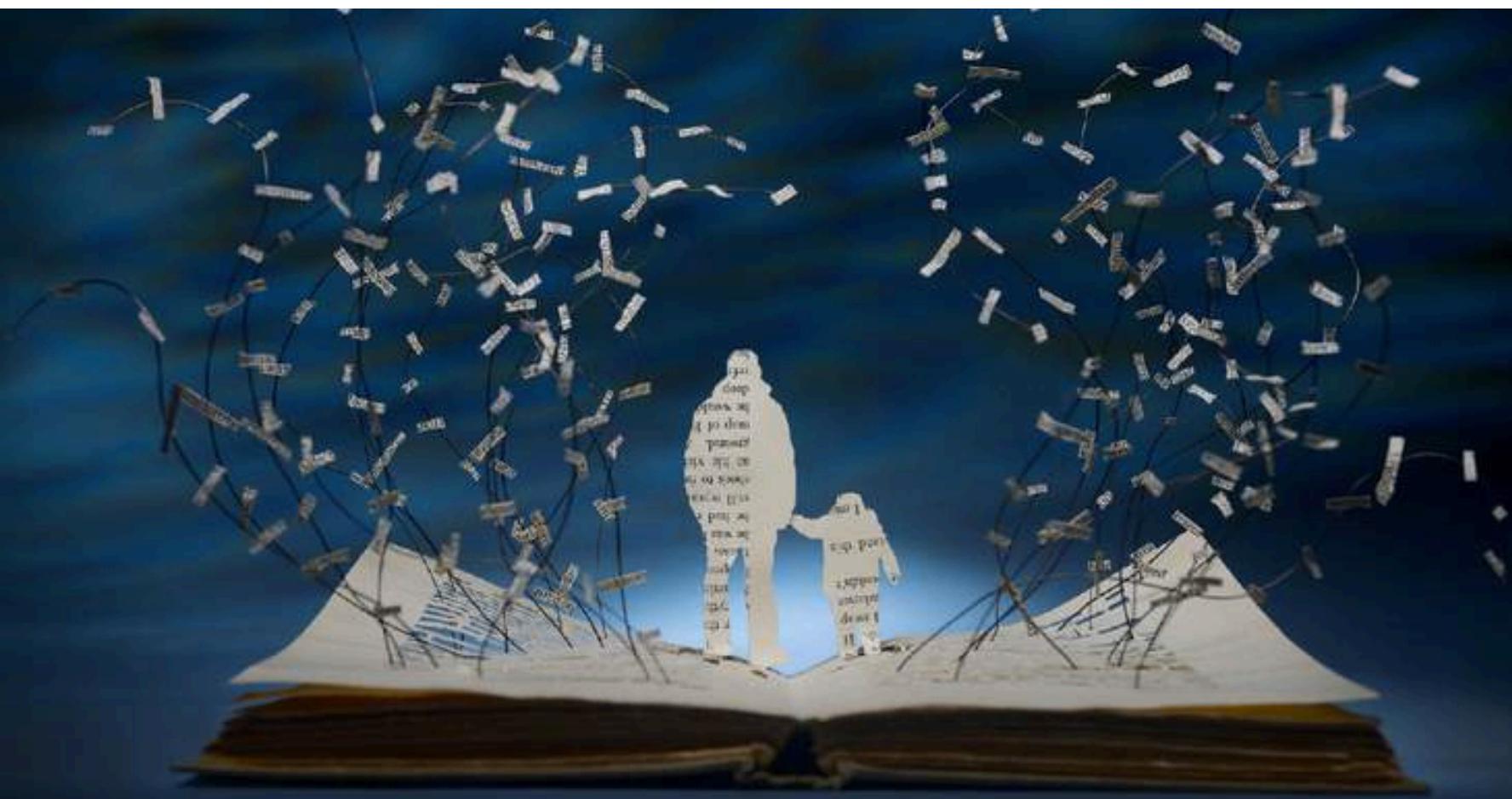
Interactive Workspaces

Stanford Interactive Workspaces Project



BendDesk





WHY HCI?



<http://www.youtube.com/watch?v=keMmM3P4BRM>



<http://video.google.com/videoplay?docid=5184957822303751144>

Typical Frustrations

Can't figure out how to do simple things

Many *not frequent use* functions

Many *hidden* functions

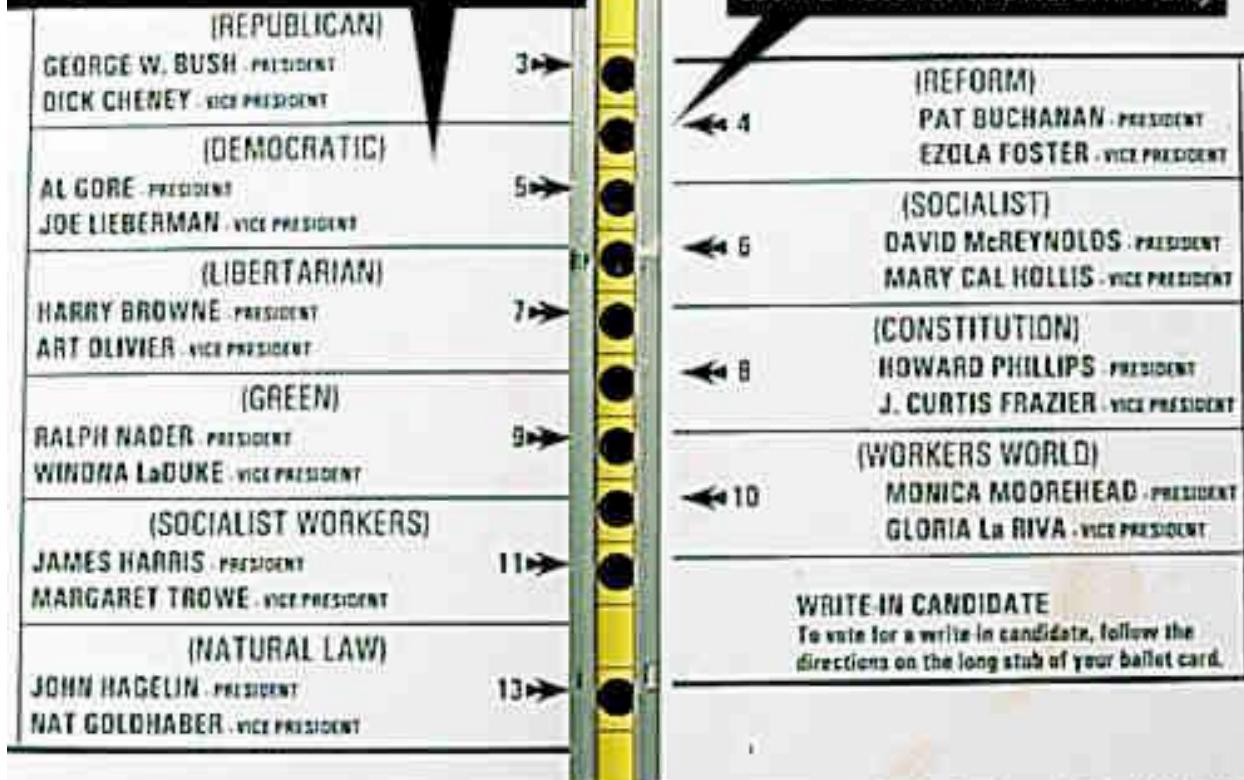
Operations *outcome not visible*

Can't remember combinations of digits * #
how do we know whether it worked
how can we remember that this option is ON

Confusion over Palm Beach County ballot

... elections

Although the Democrats are listed second in the column on the left, they are the third hole on the ballot.

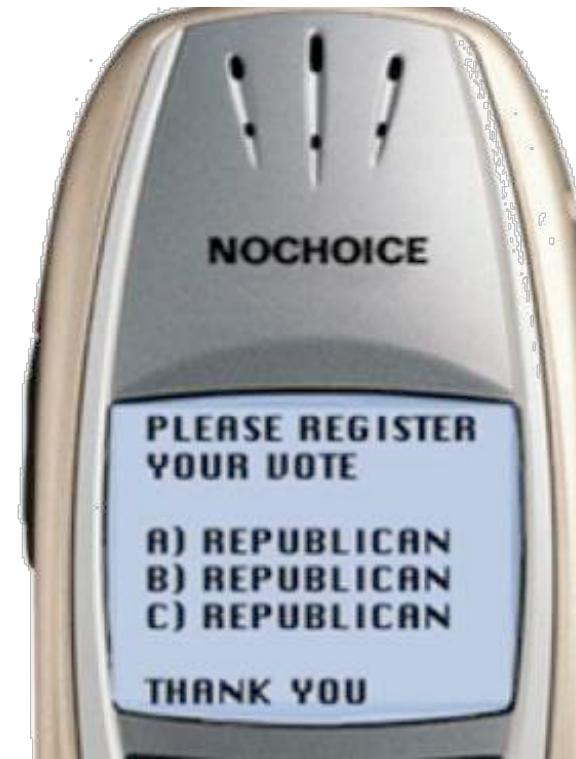


Sun-Sentinel graphic/Daniel Niblock

The sample ballot looked different

... Additional Context Limitations

- People vote infrequently
- Rushed, uncomfortable circumstances
- Elderly



Good UI Design is Important

- Examples of bad UI are easy
 - Try to find examples of good UI
- Good UI (*very subjective*):
 - Easy, natural & engaging interaction
 - Users can carry out their required tasks
 - Accounts for human limitations
- Usefulness is often context-dependent!



FEATURES OF MODERN HCI

CHAPTER 1

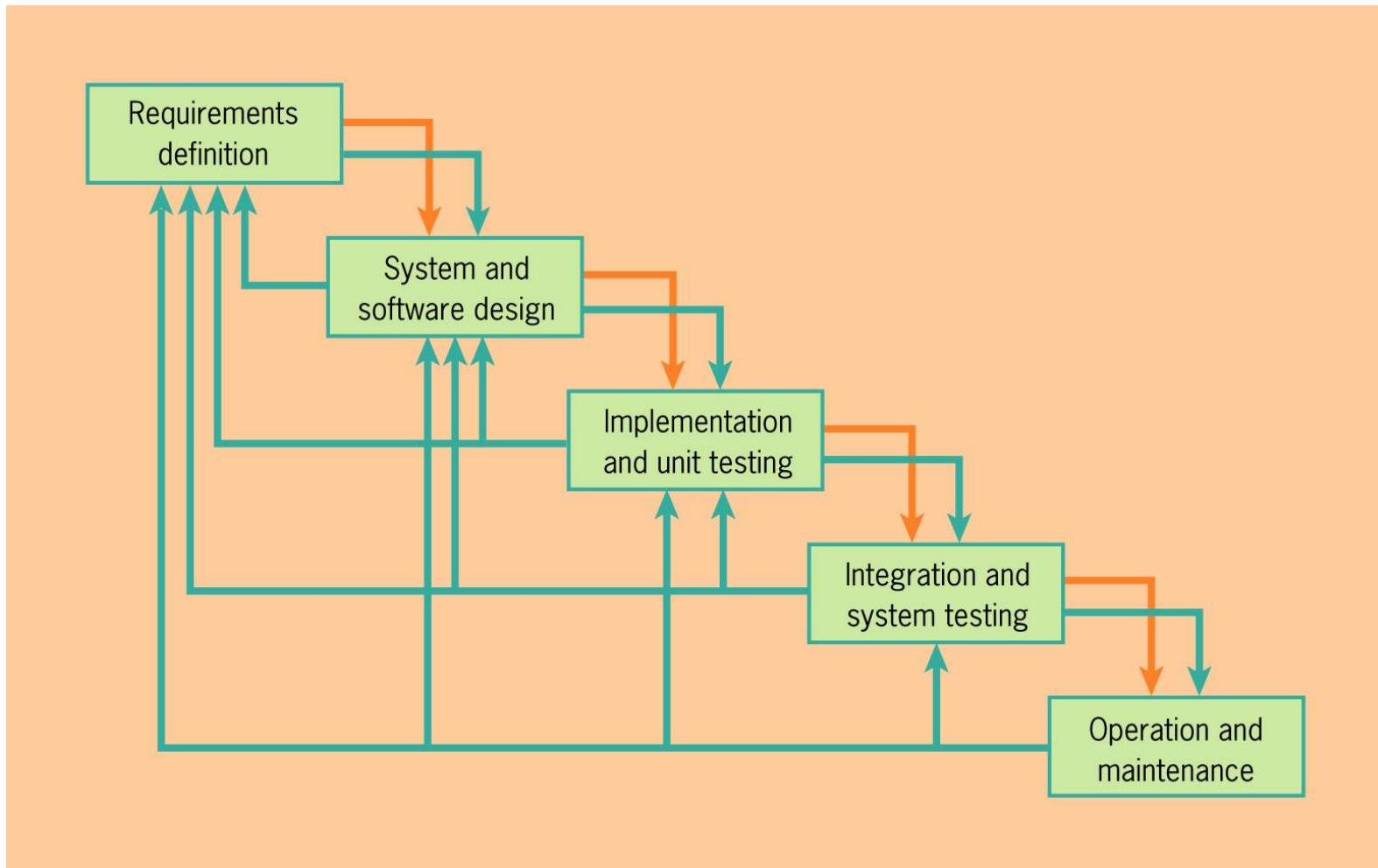
UCD Principles & Activities

- **User involvement** in development stages
- Design **iteration**
- **Multi-disciplinary** design teams
 - psychology, ergonomics, engineering & graphic design
- Understand & specify **context of use**
- Specify user & organization **requirements**
- Produce **prototypes**: design solutions
- **Evaluate** designs with users against requirements

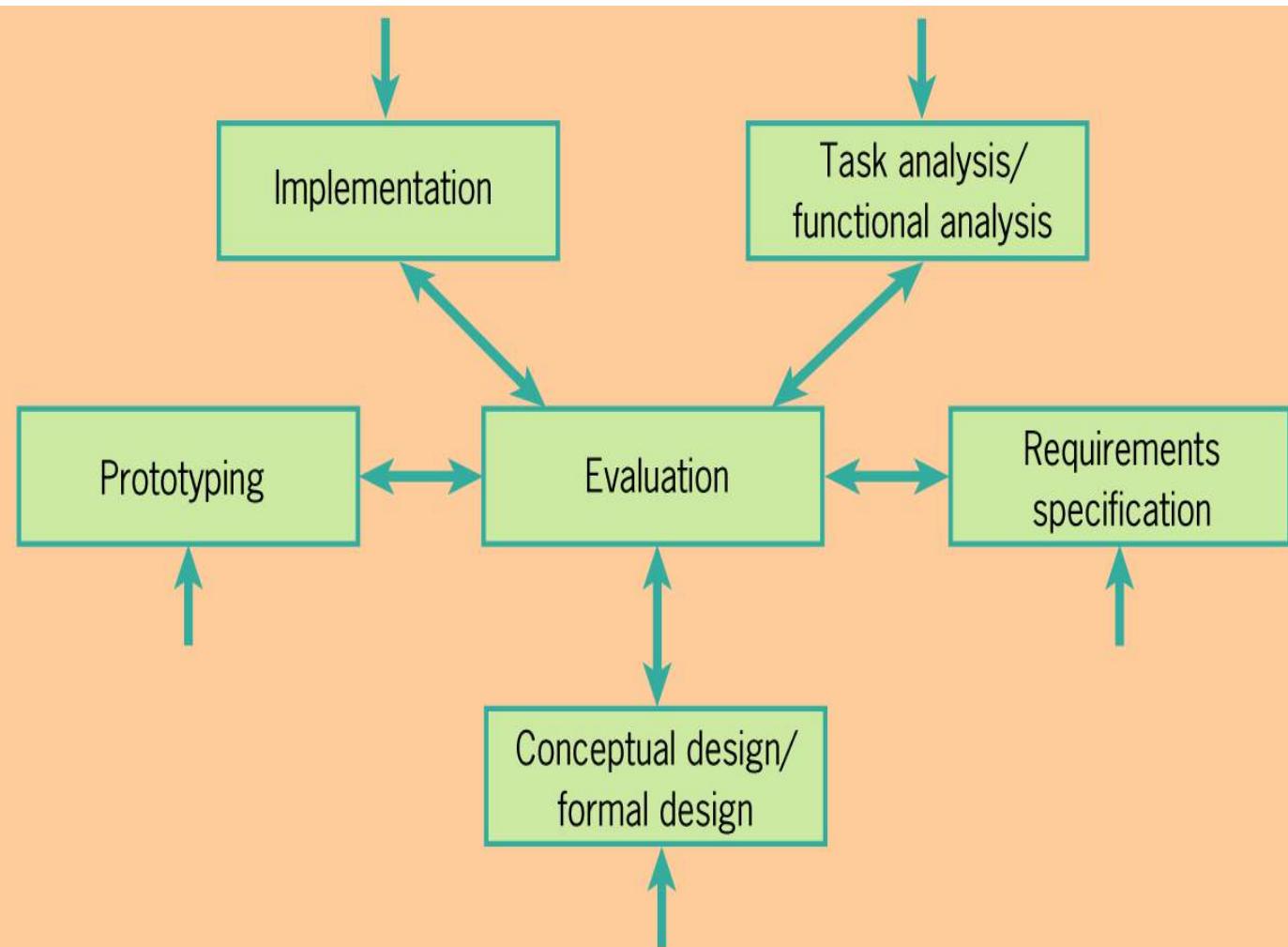
Link to Software Engineering

- Separate but related concerns: systems vs. user
- Some overlap in techniques
 - Use cases
 - Iterative file cycle
- Multi-disciplinary nature of HCI

Traditional Life Cycle



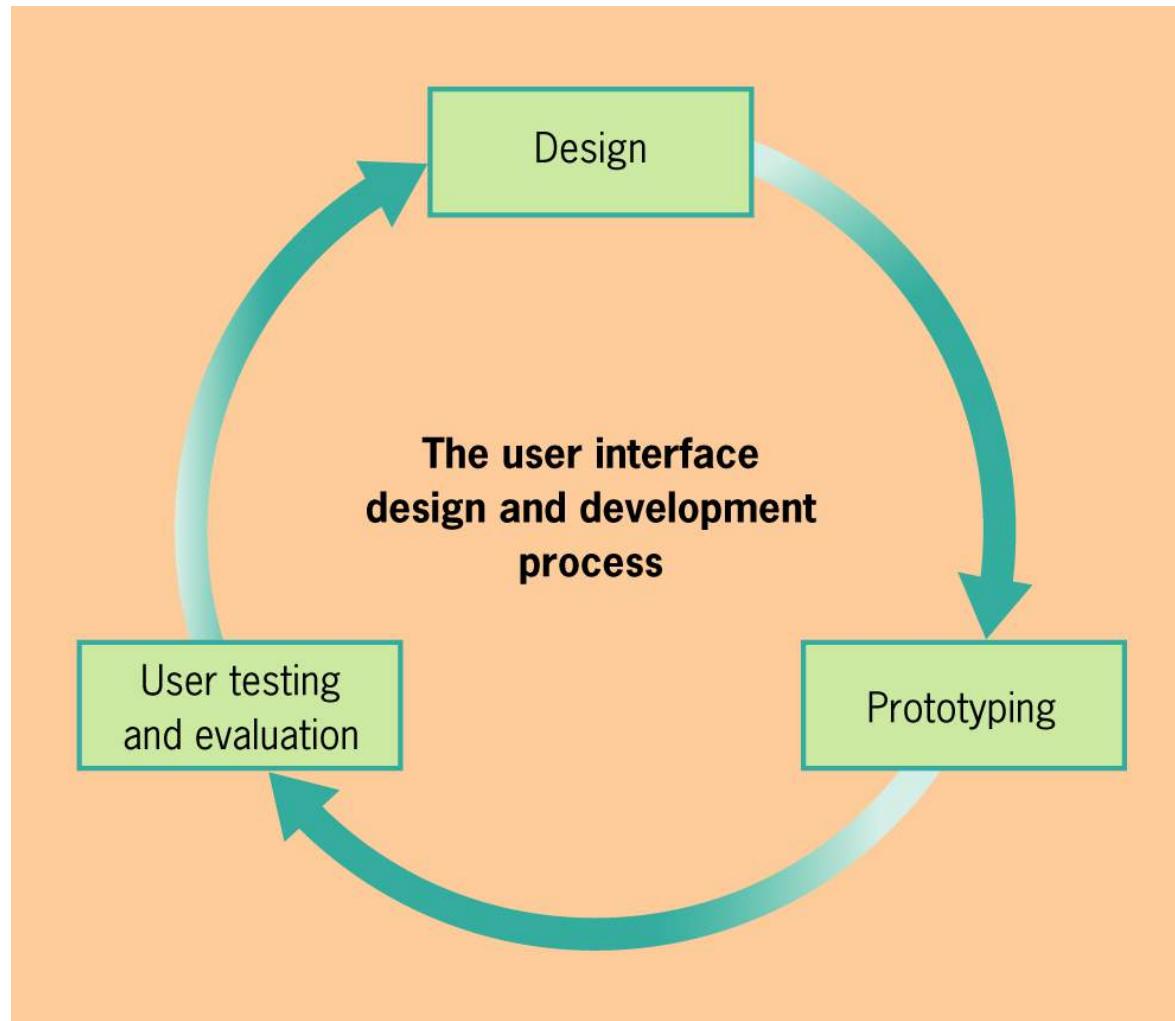
Evaluation-Centered

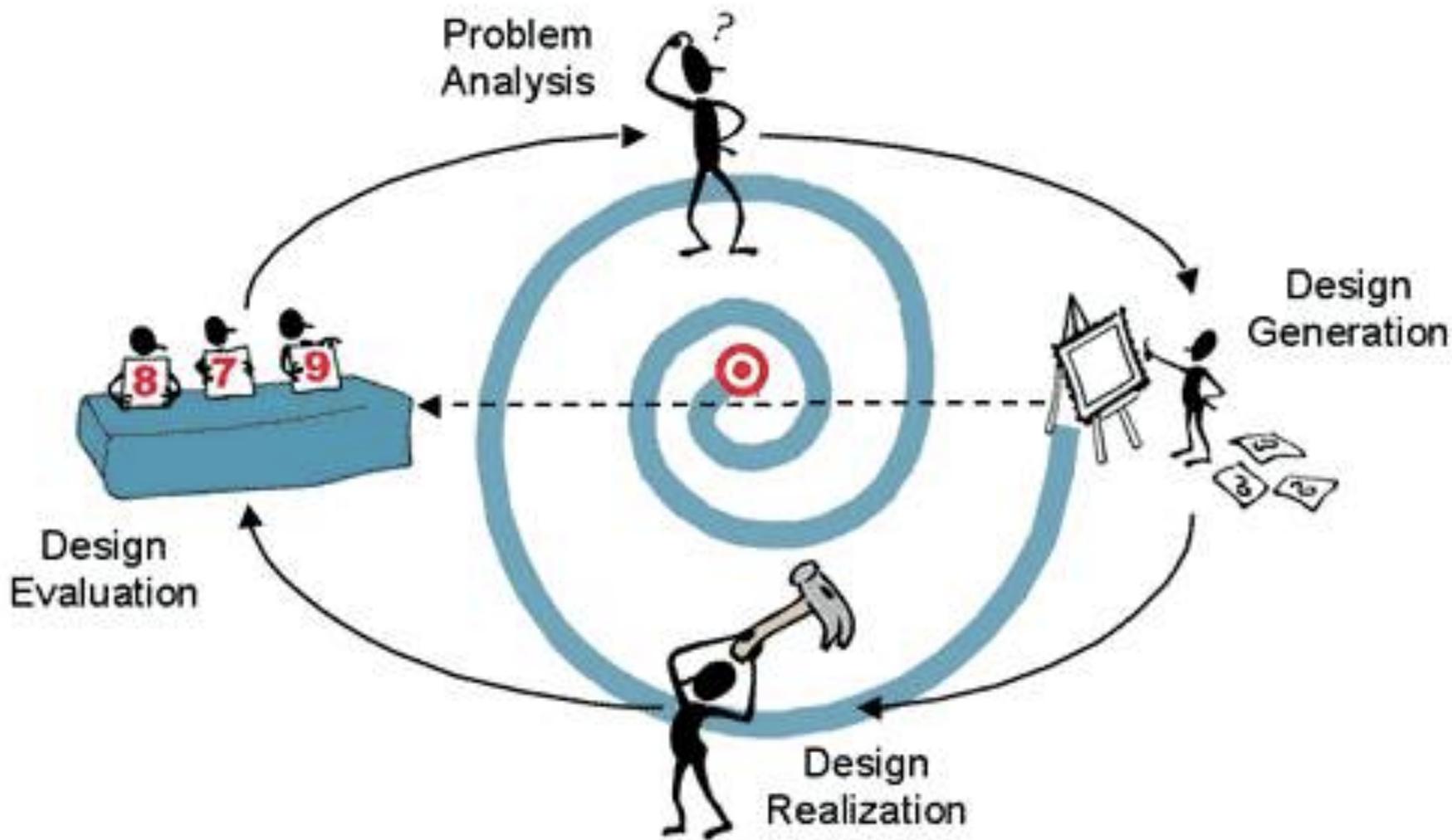


Equally supportive of

- top-down & bottom-up
- inside-out & outside-in development

Simplified Iterative Model







GATHERING INTERACTION REQUIREMENTS CHAPTER 2

Data Gathering Guidelines

- Set clear goals for the data collection
 - Identify stakeholders' needs
- Evaluate cost/benefit for your effort
 - understand the tradeoffs
 - use a combination of techniques
 - balance specific goals and openness
- Run a pilot trial
- Record well – you won't remember it well

Data Gathering Methods

***Complementary combination
to balance strengths & weaknesses
of each method***

- Interviews & Focus groups
- Question-based surveys
- Contextual analysis

Interviews

- Degrees of structuring for different purposes
 - structured - like a guided questionnaire
 - semi-structured - basic script guides the conversation
 - open-ended - still has a goal and focus; good in the initial stages
- Phone/skype, face-to-face
 - one individual at a time
 - avoids biases from other people
- Develop trust
 - explain your goals to the interviewee
 - feedback and results to the interviewee
- Focus groups
 - group of users to discuss a preliminary given issue
 - facilitated
 - interviews with 2 or more

Focus Groups & Interviews

- Both are:
 - appropriate at almost any stage of the design
 - conducting them earlier – better impact
 - conducting them later – gather specific reactions to actual design
 - optimal timing – early with mock-ups
 - collect subjective data
 - help understand the work practices
 - finding out users' tasks, roles, problems
- Focus groups are:
 - difficult for geographically isolated
 - difficult when target population is small
 - alternative – online/phone interviews

Pros & Cons of Focus Groups

- + Ideas of one can trigger ideas in others
- + Time and cost efficient
- + Incorrect facts can be corrected
- + Non-controversial issues – quickly resolved
- + Controversial issues quickly identified
- + Reach a not foreseen level of detail
- Watch out for '*groupthink*' and '*sidetrack*'
- Ensure balance between talkers and shy users
- Sometimes difficult to coordinate

Select and Organize Groups

- 6 to 12 participants - typically around 10
- Breaks with questionnaire or individual activities
- 3 to 5 groups
- **Heterogeneous** groups
 - good mix of people
 - each group – representative sample of target audience
 - watch out for too heterogeneous groups – people who do not have much in common
- **Homogeneous** groups
 - each group is different demographics

Group Facilitation

- One external, professional facilitator
 - Encourage discussion
 - Getting everyone to participate (no viewpoint lost)
 - Get people respond on one another's input
 - Foster arguments (reveal controversial issues)
 - Prevent arguments getting out of hand
- Observation room
- 2 to 3 observers mixed in the group

During a Focus Group Session

- Avoid **suggestive questions**
- **Clarify reason** of question
- Phrase questions in terms of probes
 - e.g, “why ...”
- Pay attention to non-verbal aspects
- Be aware of **personal biases**
- Give summaries in your own words at **intermediate points**

Question-based Surveys

- Good for:
 - demographics
 - evaluation of specific features or properties
- Questionnaires and surveys
 - unambiguous questions
 - gathering more precise information
 - on-line questionnaires
- Question types (closed & open questions)
- Scales (for precision & effort needed to decide on a response)
- Qualitative vs. quantitative data

Questions

- **Closed questions:**
 - select an answer from a set of alternative replies
 - may require just “yes” or “no”
 - some form of a **rating scale** associated
- **Open questions:**
 - typically start with phrases such as:
 - “What do you . . . ,”
 - “How do you . . . ,”
 - “What ways . . . ”
 - provide richer data than closed questions
 - more time consuming to analyze
 - decide on some grouping and classifying

Question Scales (1/2)

Simple rating scale, e.g. checklists - easy to analyze
(count the number of responses in each category)

Can you use the following text editing commands?			
	Yes	No	Don't know
COPY			
PASTE			

Complex rating scales - a multipoint rating scale
semantic differential (users select a point along a scale)

Rate the usefulness of the COPY command on the following scale.

Very useful  Of no use

Question Scales (2/2)

- Semantic differentials
 - with seven points, five-point or three-point scales
 - best results if the two end points are very opposed
- Likert scale (attitudinal scale)
 - a set statements with semantic differential
 - measure user's attitude, preferences, and subjective reactions
 - measure the strength of users opinion - by counting the number of responses at each point in the scale
 - typically 5-point scale: **strongly disagree** \leftrightarrow **strongly agree**
 - calculating a numeric value (adding '+' and '-' scores divided by the number of users) - can be misleading

Semantic Differential & Likert scale

How easy was the system to use?



The system was easy to use



Questionnaire Tips

- Avoid complicated questions
- Clear and **unambiguous** questions
- Avoid **negative** questions
- **Alternate** open and closed questions
- As few questions as possible (~ 2 A4)
- Additional info, e.g. “any other comments” option
- Pilot the questionnaire before giving it to users
 - test whether the questions gather the need info
 - decide on statistics to apply before finalizing the questionnaire
 - balanced mix of closed and open questions
 - balance positive and negative questions

Examples of Questions

Do you think this is a **good** interface?

fair, good, valuable, useful

Do you use **mouse or keyboard** more?

1 2 3 4 5

Yes No

When you used **the second interface** was it responding **good** to you?

Which of the following **is not a problem** in using the system?

Which of the following you are least likely to consider a favorite: **drop-down menus, adaptive menus, scrolling?**

How **many times** a week do you use Internet?

How often do you use internet?

Do you use internet? If yes, how often?



IN SUMMARY

Message 1:



Many of the *human error* and *machine misuse* are *design errors*

Designers help things work with good *conceptual model*

Designers decide on a *range of users* as the design audience

Design is difficult!

Because users usually



- have lousy memory
- don't always see everything
- get confused of too many things
- get tired and bored
- don't pay attention always
- get easily distracted

Designers need to take all this into account

... and machines will always offer more

new form factor	larger memories / faster systems miniaturization ↓ power requirements
deeply connected	new display & input technologies embedding of computation into appliances
pervasive	specialize computer hardware → new functions ↑ networked + distribute computing
broadened user base	↑ adopting of computers & access by those currently denied

Message 2:

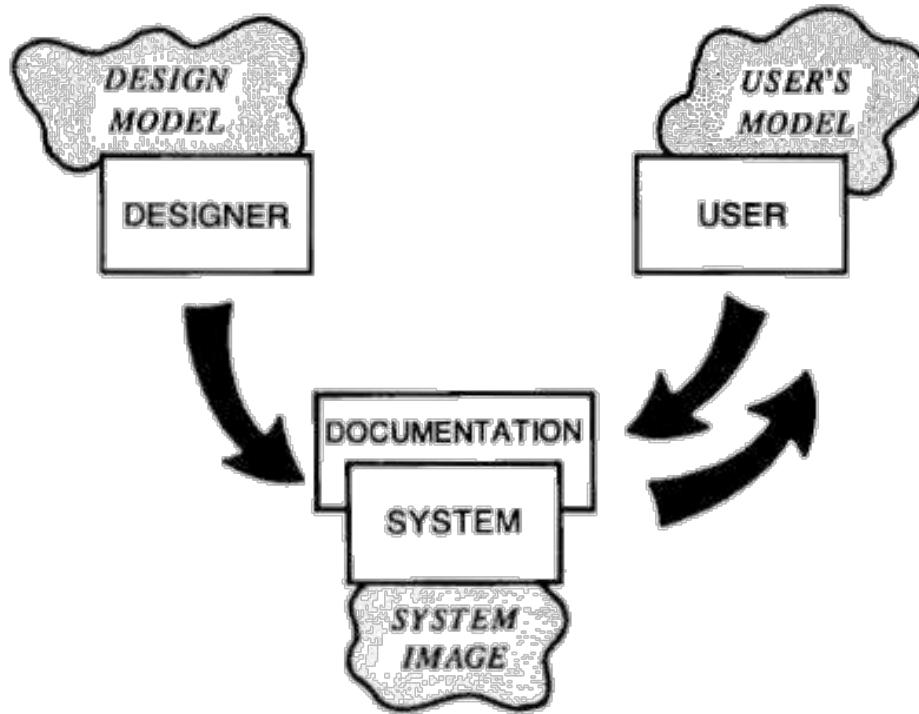


You are NOT the
USER if you are
DESIGNER



*and you always
need different
glasses*

Message 3:



- Design model
 - *conceptual model* on which the design of the system is based
- User's model
 - *model that the user develops on the basis of experience with the system*
- System image
 - *all aspects of the system that the user experiences*



COURSE ORGANIZATION

Rules of the game



Electronic communication

Discussion Board: questions & discussions on course content

hci-org@few.vu.nl: admin

[Before sending email check rules on BB](#)

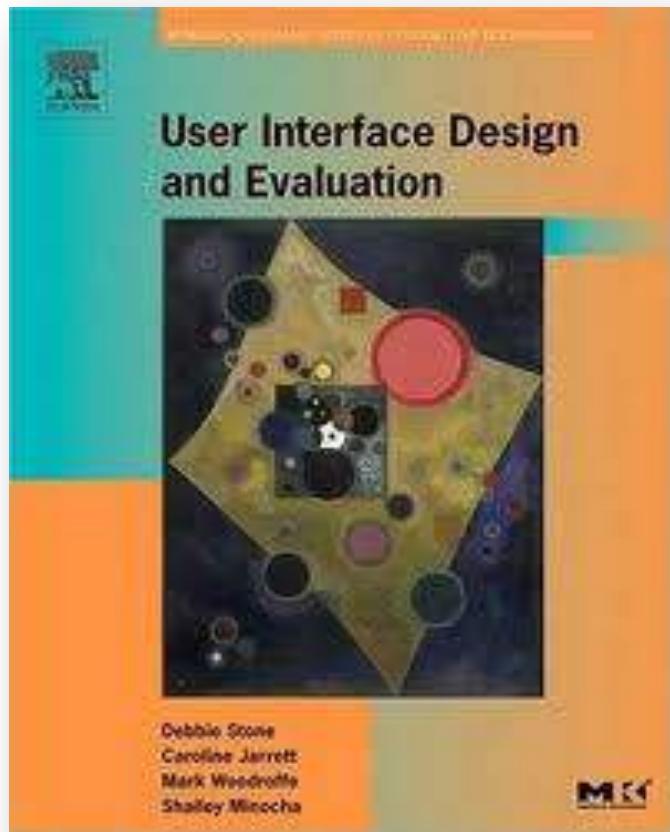
Work in groups of 4

Attend Lab sessions: [rules on BB](#)

Submit Assignments: [see schedule](#)

Submit Lab exercises: [end of day](#)

Book (required)



User Interface Design & Evaluation

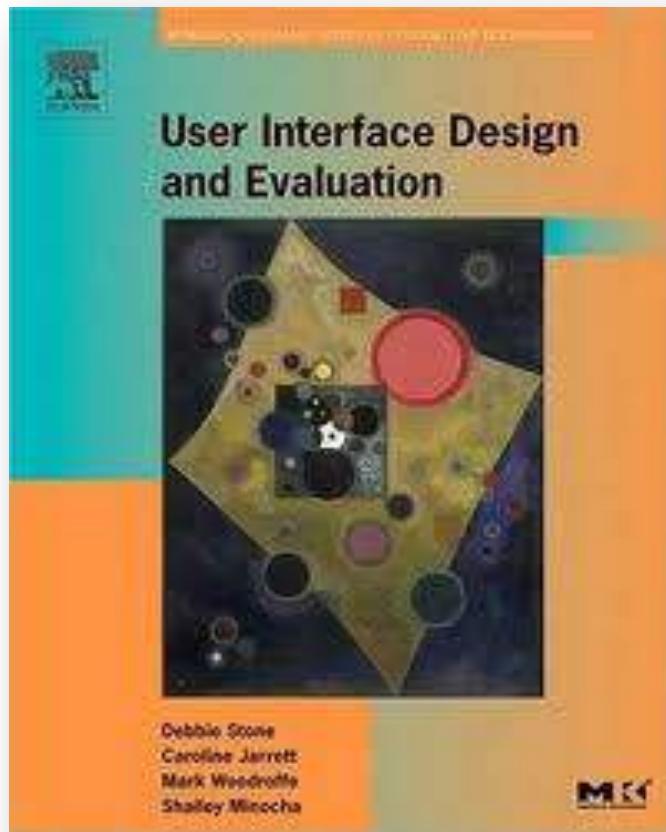
Debbie Stone, Caroline Jarrett, Mark Woodroffe, Shailey Minocha

Morgan Kaufmann, 2005. ISBN
978-0-12-088436-0

Parts available @ Google Books:

http://books.google.com/books?id=VvSoyqPBPbMC&printsec=frontcover&source=gbs_slider_thumb#v=onepage&q=&f=false

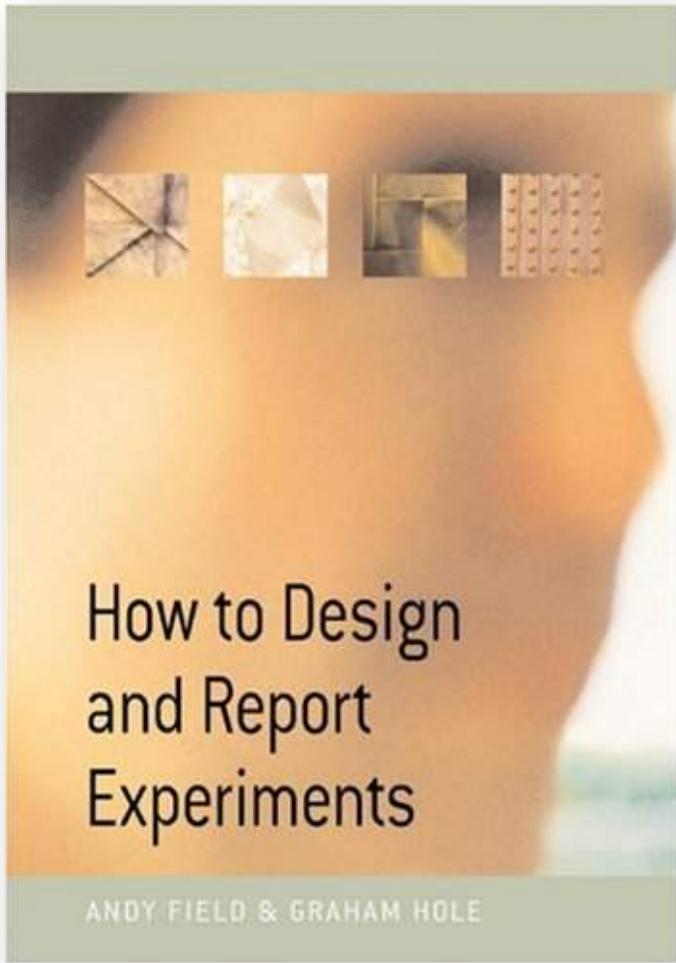
HCI book structure



- Part 2: requirements
- Part 3: design
- Part 4: evaluation

Sequence is an artefact!

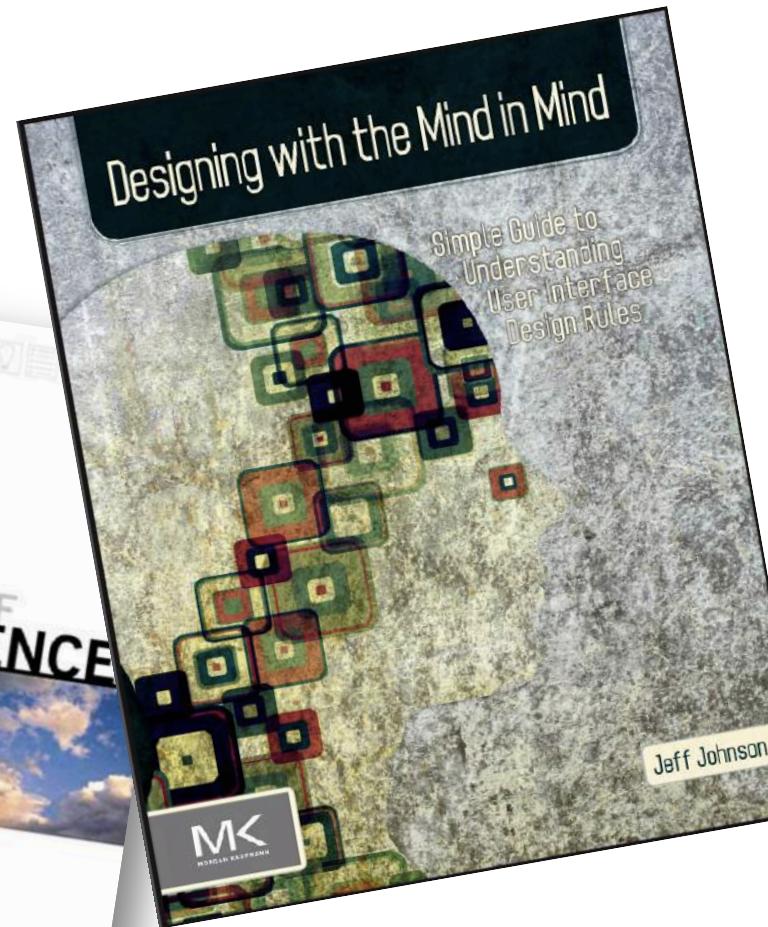
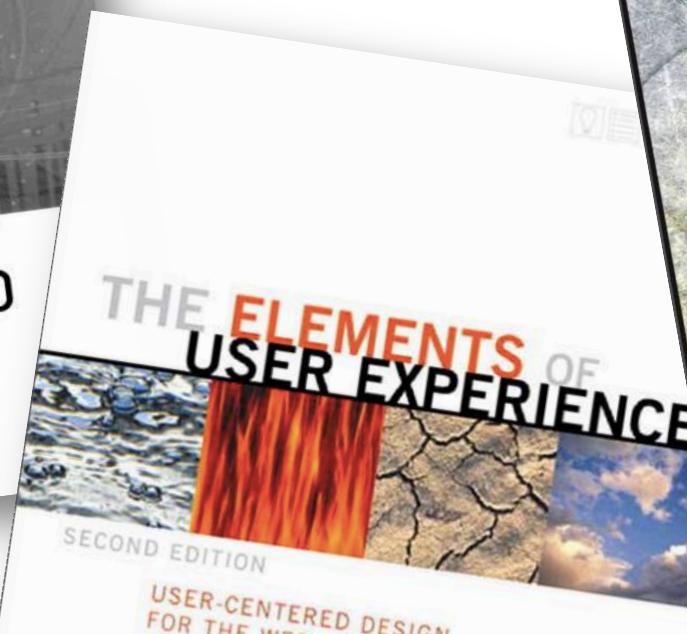
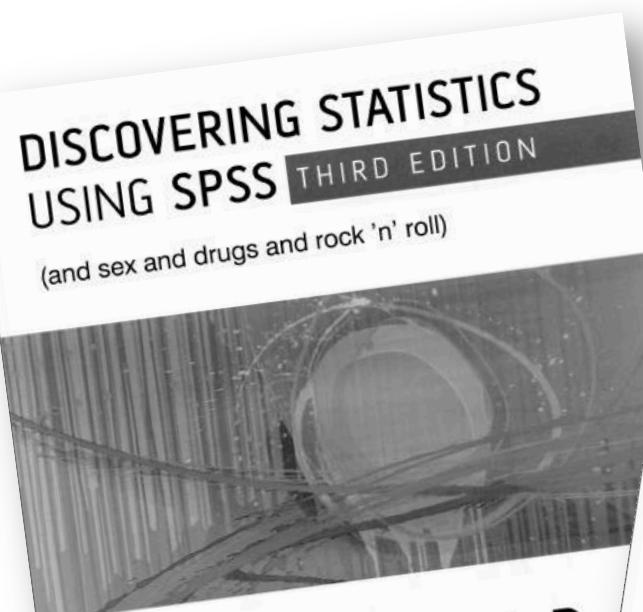
Additional book (optional)



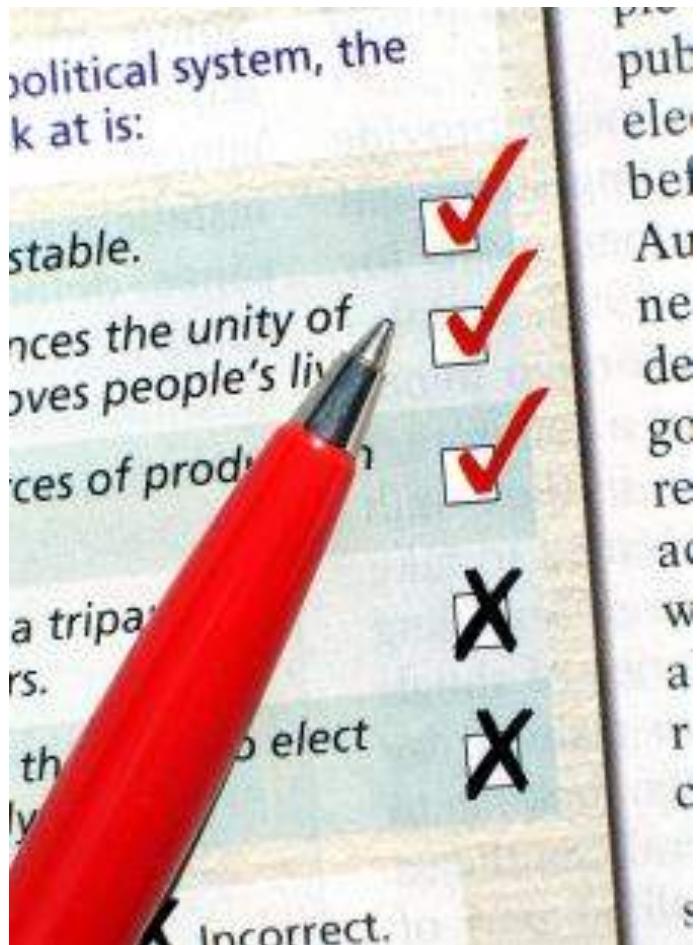
How to design & Report Experiments

by Andy Field and Graham Hole
Published by SAGE, 2003. ISBN
978-0-7619-7382-9

More books (optional)



Grading



- 60%: Assignments
- 30%: Exam
- 10% Lab exercises
 - No grade for Lab exercises. 1.5 points - when the answers show that an appropriate amount of work has been done. 0.75 points - if the work is poor but not altogether bad.
- To pass:
 - submit solutions to all Lab exercises
 - submit all assignments
 - score of written exam => 5.5
 - total weighted grade => 5.5

Schedule



- Schedule covers 3 weeks (!)
- 2 Lectures a week
- 2 Lab sessions a week
- Assignments: choice of predefined domains
- Exam

- Make sure of your (group) planning (ahead)

Enjoy the course!

