HCI Bootcamp

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web: *https://ex-situ.lri.fr/workshops/hci-bootcamp-2018*

Wednesday

Morning
- Create paper prototypes
- Ex #18 Shoot video prototype #1
- Start poster

Afternoon
- Evaluation lecture
- Ex #19 Design walkthrough
- Ex #20 Hypotheses (experiment design)
- Ex #21 Improvements
- Redesign principles lecture

Poster

Summary poster

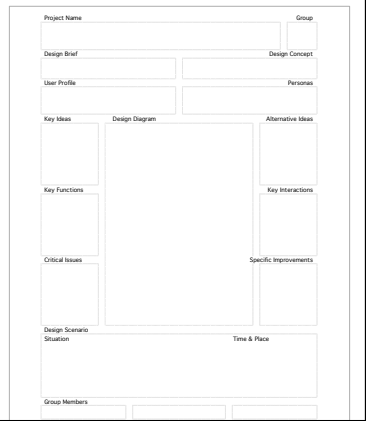
Group	Project title, number, names
Design Concept	What is the new idea?
User information	Who is it for? How is it used?
Storyboard	How do these users interact with it?
Design diagram	How does it work?
Evaluation	Key issues
Redesign	Key improvements, justifications

Summary Poster

Summarize design resources

Shorter is better
limit words
highlight key points

Capture the design
and *redesign* process



Video Prototyping

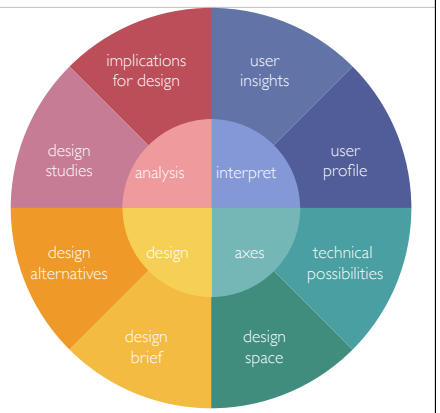
Generative Design

Discovery
Who is the user?

Invention
What is possible?

Design
What should it be?

Evaluation :
Does it work?



Video Prototyping

Not the same as Video Brainstorming!

Video Prototypes

Set up Video Clipper:
- Titlecard: Prototype name, group, date
- Series of titlecards from storyboard
- Final credits: Group number, your names

Find a quiet place … but let us know where you are!!!
- Bring paper prototypes & supplies
- Whiteboards are helpful

Shoot clips into the storyboard
- If you make a mistake, reshoot

Evaluation

Does it work ?

Design Walkthrough

Design Walkthrough

Step-by-step evaluation of sequential material
- Goal: identify as many problems as possible

Similar to brainstorming:
- Do identify maximum quantity of problems

Different from brainstorming:
- Do not defer judgement

Design Walkthrough

Based on Structured Walkthroughs (Yourdon, 1979)

Goal: Find bugs in code
Technique: Systematic step-by-step analysis of a document by a small group

Principles: Line-by-line analysis
Constructive criticism
Limited time

Design Walkthrough

Appropriate for many types of material
- Originally for programmers to evaluate code

However it works well for:
- Text documents:
  - *articles, manuals, specifications, reports*
- Design resources:
  - *design scenarios, storyboards, paper prototypes, video prototypes*

Design Walkthroughs in the real world

Groups:
- peers — not managers
- small — 4-8 works well
- diverse — include diverse perspectives

Participants adopt specific roles:
- technical — error or problem?
- user — hard to perform?
- manager — function necessary?

Apply design rules, principles or perspectives:
- Norman's rules
- Shneidermans' rules

Design Walkthrough Roles

Each group evaluate another group's video prototype
- Review group A evaluates Design group B
- Review group B evaluates Design group C ...

Design group chooses:

Presenter: Ensure both groups participat
Show video
Halt discussion, keeps to critiques

Scribe: Take notes

Everyone: Contribute feedback

Design Walkthrough

Members of both teams make comments
- Focus on material, not author
- Be constructive not destructive
- Be specific, not general
- Ask for clarificatons first
  - next problems
    - finally suggestions

Examples:
- "The text is too small to read"
- "I can't figure out where change the setting"
- "That task takes four steps"

Design Walkthrough

Authors:
- Listen to the problems,
- Do not defend your design choices!
- Do not discuss solutions!!

The review group is responsible for identifying problems
The design group is responsible for deciding
- if and what to change

Goal: Find as many issues as possible
Don't solve them.

Design Walkthrough

Procedure:
- Choose moderator and scribe
- Show the full video
- Show each interaction point
  - Any critiques?
  - Any suggestions?

When presenting, Remember:
- Do NOT discuss : clarifications only
- Do NOT defend: just note problems

Later, you can decide which feedback to implement

Experiment

Experiment

Goal Choose the best design alternative
by watching users try the prototype

Procedure
- Describe the design objective
- Identify several alternatives
- Choose the independent and dependent variables
- Specify the null hypothesis and make a prediction
- Set up experiment to compare compare
  - Use at least three real users
- Analyse results:: Is one alternative significantly better?

Design a simple experiment

Specify:

Interaction technique:	*How does the user interact?*
Alternative techniques	*What other techniques might work?*
Independent variables	*Which techniques to compare?*
Dependent variables	*What does the user do?*
Tasks to perform	*What does the user do?*
Statistical tests	*Which is better?*
	Is the difference real?

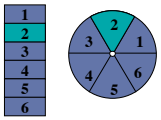
Factors = independent variables

Measures = dependent variables

Operationalize behavior = specify testable actions

Example

Compare linear and circular menus



State the null hypothesis (H_O):

"There is no difference in performance
between users
in terms of time or error
when selecting an item from a linear or a circular menu
regardless of type of menu, number of menu items
or previous experience"

What kind of variable?

Independent variables = factors
chosen independently by the experimenter

Dependent variables = measures
depend upon the user's behavior

Operationalize behavior = specify testable actions

Specify the independent variables (factors)

Independent variables (factors)
are those we want to vary or control
The combinations of variables define the **conditions**

Independent variables:	Values:
Type of menu:	linear, circular
Number of items:	3, 6, 9, 12, 15
Expertise:	expert, novice, intermittent

[2 x 5 x 3] = 30 unique conditions

Specify the dependent variables (measures)

Dependent **variables depend upon the user's behavior**
also called measures because they measure user's behavior

For a reliable statistical test,
you need enough measures per condition

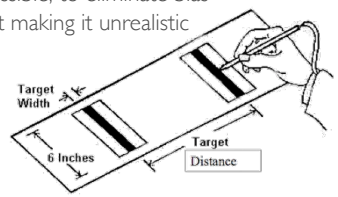
Rule of thumb: ~12 for small-n statistics (student's t)
~30 for normally distributed tests

Dependent variable might include:
Time to select an item
Number of errors
What else?

Operationalize the behavior

Trickiest part of the experimental design
but when it's done well, it seems obvious

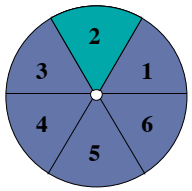
Simplify the task as much as possible, to eliminate bias
and external factors, without making it unrealistic



Example: Fitts' pointing task
- only one dimension
(target = vertical band)
- reciprocal pointing
(back and forth between 2 targets)

Operationalize the behavior

Define the specific menu selection task
Ensure that the conditions are as similar as possible:
Same labels for the menu items
Same location of the menu on the screen (centered)
Highlight the item to select (to avoid searching for it)



Run the experiment

Control any factors that might bias the results:
- All subjects receive the same instructions
- All subjects perform tasks under the same conditions
- All instructions are simple and clear
- Informal contact kept to a minimum

Double blind experiment:
- Neither the experimenter nor the subject
  - know which group receives which treatment

Can our experiment be 'double blind'?

Run the experiment

Obtain informed consent from the subjects

Ensure that subjects remain anonymous
- Associate a number with each subject
- Choose conditions based on those numbers

Gather experimental data
- Test that they are reliable and valid
- Minimize data treatment and preserve raw data

Prediction ≠ Null nypothesis

Always record you subjective predictions
- before looking at the results

Null hypothesis example:
- *"Circular and linear menus perform equally well under all conditions"*

Prediction example:
- *"I think that circular menus will be faster than linear menus regardless of experience and the number of menu items"*

Other possible predictions:
- Linear menu performance will decrease with more items
- Circular menu performance will drop as more items are added

Collect data

Ensure that the data log is human-readable
- yet easy to analyze by both people and machines

```
Start S1 E C-L 3-12-15-9-6 Mon 21 Nov 2012 15:45:54
Condition S1 E C 3 Mon 21 Nov 2012 15:46:35
#  sujet expertise type taille item hit/miss tps(ms)
Trial S1 E C 3 2 Hit 1254
Trial S1 E C 3 1 Miss 885
...
Condition S1 E C 12 Mon 21 Nov 2012 15:54:22
Trial
...
End S1 E C-L 3-12-15-9-6 Mon 21 Nov 2012 16:23:55
```

Create a data table

Every column has to contain all the measures
for each condition

Trial	Participant	Condition	Time	Error
1	1	Circular	40	No
2	1	Linear	48	No
3	2	Linear	45	No
4	2	Circular	57	Yes
5	3	Circular	42	No

Exercise: Plan an Experiment

Goal: Choose the best interaction technique
among several alternatives

Procedure

Identify the key independent variables (factors)
Identify the key dependent variables (measures)
Operationalize the behavior and define test conditions
Run the experiment with at least 3 subjects
Analyze the data: are they significant?

Exercise: Design a simple experiment

Choose a single interaction point
Identify at least two additional alternative forms of interaction

Specify:
- Independent variables
- Dependent variables
- Null Hypothesis
- Prediction

Generative Design … is REDESIGN!

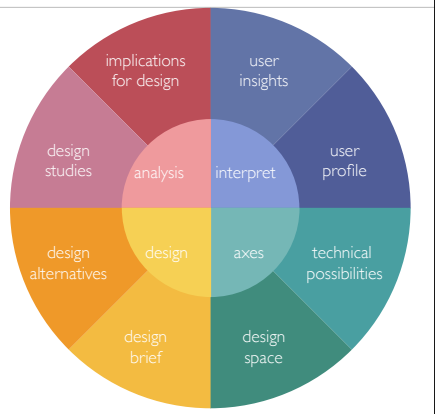
Discovery
Who is the user?

Invention
What is possible?

Design
What should it be?

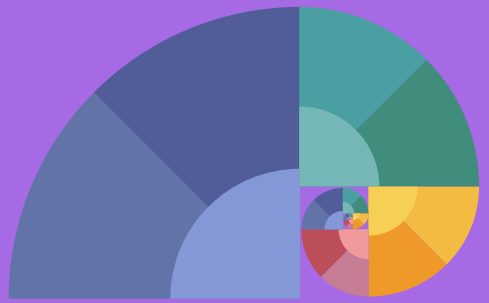
Evaluation
Does it work?

Redesign
How to improve it?



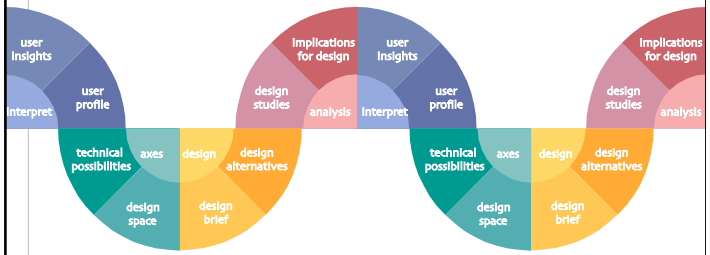
Redesign

How to improve it ?



Remember: Design is an iterative process …

Design artifacts serve as resources for redesign



Redesigning your design

You've created a video prototype … NOW WHAT ?
How can you improve it ?

Modify the scenario:
- Consider breakdowns, surprises, alternatives

Lengthen the scenario:
- Add interaction points

Create an additional scenario
- Consider new personas, new situations, new designs

Create a branching scenario
- Compare design alternatives in context

Revised design concept

Trade-off between power and simplicity:
Less is More

Find a key object of interest for the user
- Make it persist
- Make it interactive

Example:
- Search for a route
- Create a 'route' object
- Create an interactive route object
  - modify, extend, transform
  - share, compare . . .

Improving your design

Does it empower the user?
- Allows user to express options, save preferences
- choose among useful alternatives, reuse options

Or is it "AI magic"
- User gets 'correct answer' by some magic algorithm

Don't forget:	How does the user:
Set up:	express preferences?
Breakdowns:	know what is wrong?
	fix problems?

Consider repeated actions:
- Is it tedious to repeat similar actions?

Technical improvements

Visual:
- Explanatory intertitle cards
- Use pause for time-lapse effect
- Use transparencies and post-its for dynamic effects
- Zoom in, zoom out, then video while zooming in
- Stabilize the camera (tripod, support, body)
- Stabilize the background (postit notes or tape)
- Include detail: paper prototypes and story

Auditory:
- Limit background sound (find an empty room)
- Consider how much voice-over is needed
- "Three" "Two" " " " " technique

Who is the audience for the video?

Audience:	Emphasis on:
Users	Clarifying design problem
	Identifying design opportunities
	Bottom-up, contextual descriptions
Management	Describing design solutions
	Justifying design solutions
	Top-down, abstract descriptions
Team members	Revealing design problems
	Exploring design solutions
	Both top-down and bottom-up

Exercise: Video prototype 2

Goal:
- Add at least three interaction points
- Add at least one breakdown
- Include at least two design alternatives

Review design resources: what is missing from your scenario?

Breakdown?	Unanticipated behavior?
Repeated activity?	Combining features?
New people?	New situations?
Set up features?	Modification features?

What to avoid

No auditory or haptic alarms:
- Do not create an 'electronic nag'

No "artificial intelligence magic"
- Let the user explore the data
- Don't come up with a magic solution

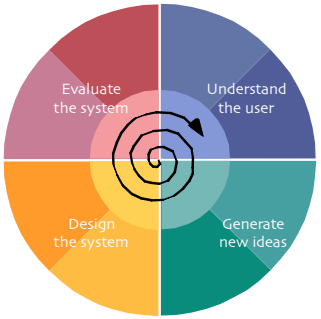
No hardware-only solutions
- Focus on the interaction with the software even if you have innovative hardward

No one-feature systems
- You must have a concept

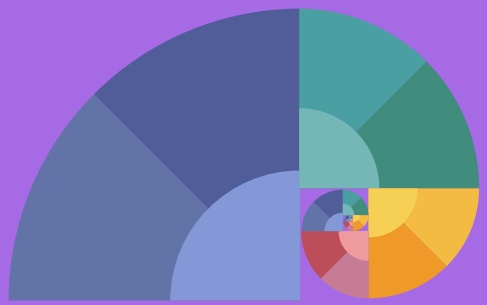
Iterative design means redesign

Within an iterative design process
redesign is more important than initial design

do not just
"do it again!"
reflect on your designs in context



Improvements



Improvements

Users experience technology in the real world
- Never assume everything will be 'perfect'

Consider:
- Technical breakdowns
  - The wireless connection is down
- Situation breakdowns
  - User is distracted while crossing the street
- Extreme breakdowns
  - User cannot physically control the interface

Exercise: Improvements

Consider results of design walkthrough
Reassess your design concept
- Can you create a simpler, more powerful concept?

Explore breakdowns
- Identify at least three possible breakdowns
- How do they affect the design of your system?
- How can you address them?

Modify your design with the revised concept
- Include three new interaction points
- Show how to address breakdowns

Thursday

Morning
- Generative walkthrough
- Revised concept

Afternoon
- Storyboard #2
- Video prototype #2

For Monday
- Final poster
- Final video prototype
- Final presentation slides