Advanced Design of Interactive Systems

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Design Brief

- Identify key problems with an existing system, using: introspection, observation, interviews, questionnaires
- Design and run a participatory design workshop with users to explore new ideas
- Create a novel, principled design that takes advantage of generative design principles, including ***(at least)*** instrumental interaction and co-adaptation
- Create a video prototype video to illustrate the design

Topic:

Help users find, use, create, ...
- local sports facilities
- housing options
- local eating & shopping
- cultural activities
- Paris-Saclay admin

Look for real problems ... how can you make it better?

Informed consent

Informed consent

Give participants enough information to make an informed decision whether or not to participate in the study

Purpose:	What is the study for?
Procedures:	What will they do and for how long?
Risks:	Should be 'none'
Benefits:	Who benefits and how?
Anonymity:	How will their identity be kept secret?
Compensation:	Often voluntary and unpaid
Withdrawal:	User may withdraw at any time without a reason
Approval:	If it has undergone IRB review

Common sense when discussing user results

Protect people's privacy
- Don't put their data out on the web…

Don't make people look foolish
- No Youtube videos

Educate the audience
- Tell them how to view errors

Summarize results fairly
- Don't over-emphasize your favorite issue

Don't change the intended use
- No post-hoc marketing

Ethics … from different perspectives

Each profession has rules to protect someone …
but not always the same person.

Scientists	protect	users / subjects
Journalists		public
Consultants		clients
Corporations		corporation

Institutional Review Board (IRB)
- designed to protect participants in experiments
- Primarily in medical studies,
- but also when using technology

IRB

Institutional
Review
Board

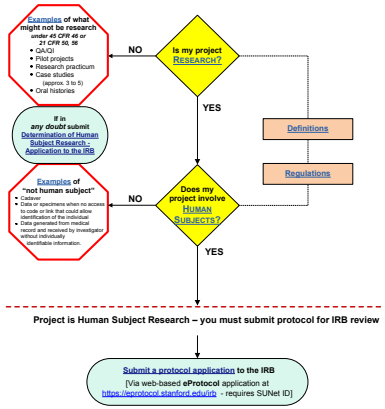
Mandated by
the government

Milgram's 'Obedience to Authority' experiment

Will ordinary people give a stranger a lethal electric shock in the name of science?
"Teachers" administer shocks to "students"
Start with a sample 45v shock
Paired-associate learning task

Does a project need an IRB review?

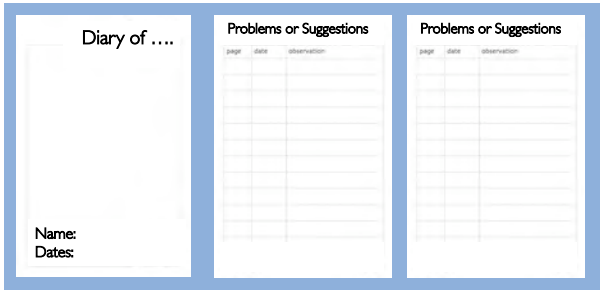
"Human subjects"
are users or participants



Diary study

Diary studies

Ask users to keep a diary as they use the system to keep track of problems, successes, comments and suggestions



Logging study

Logging study - WM Lisa

Why do people abandon windows on their screens?
From reminders to forgotten windows

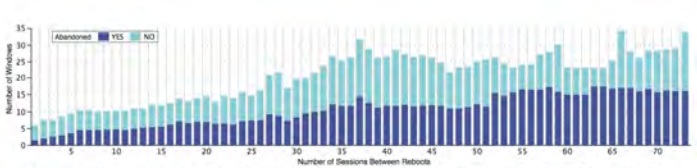
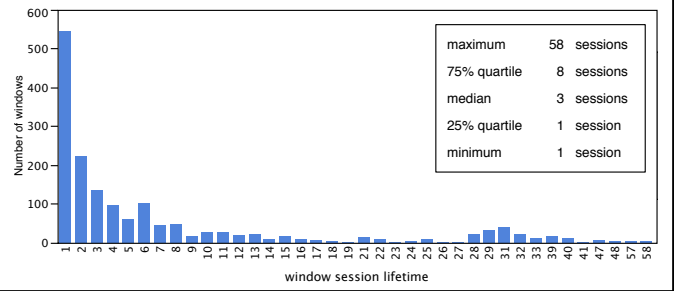


Figure 2. Piling up windows: the number of opened and abandoned windows per session increases with sessions in between reboots.

Logging study - WM Lisa

What is the lifetime of a window on the screen?
Log state of every window over two weeks
Critical incident-style pop-up questions



Logging study - upgrades

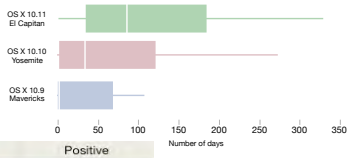
How do people react to system upgrades?
Log user's reactions over four weeks
Daily critical incident-style pop-up questions

Valence	P1	P2	P3	P4	P5	P6	P7	P9	P10	P11	P12	P13	P14
Negative	3	1		11	10	6	5	5	3		5	9	4
Neutral	4	3	1		1	8	3		4	3	1	1	5
Positive	3		1	6	4	1		1	7	3		1	2

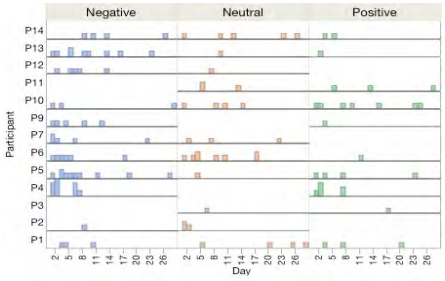
Count of change valence 1 11

Logging study - upgrades

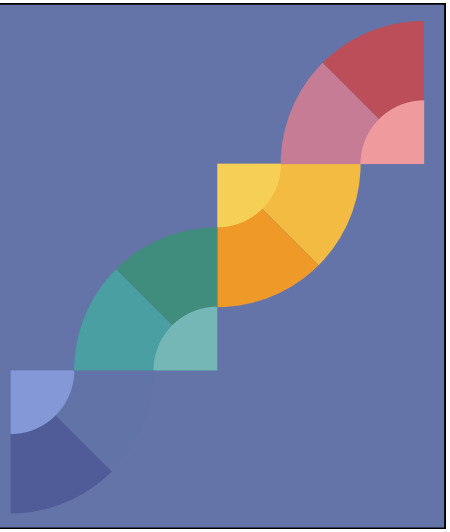
Delays get longer over time:



Fewer positive reactions:



Field Studies



Field experiments

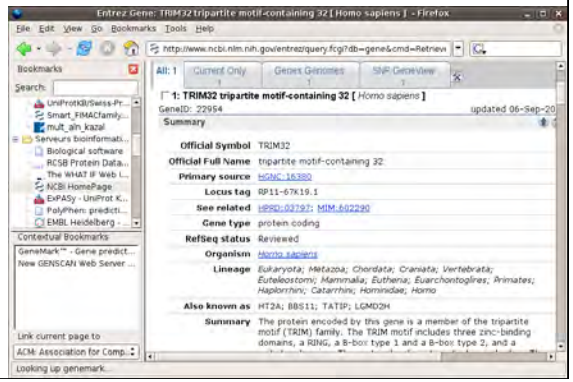
Dan Russell (Google) creates huge controlled field experiments with a million subjects per condition

Example:
- Does the background color affect liklihood of buying? (Yes! 20% more with certain colors)

Obama's campaign:
- Send different ads to randomly selected people
- Follow up calls: Which work best and on whom?
  - Discovered Republican women who were affected by national healthcare proposal

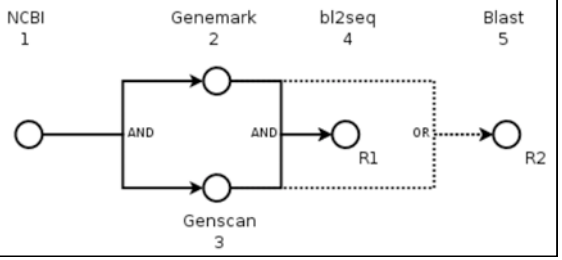
Controlled field study: PageLinker

Contextual bookmarks

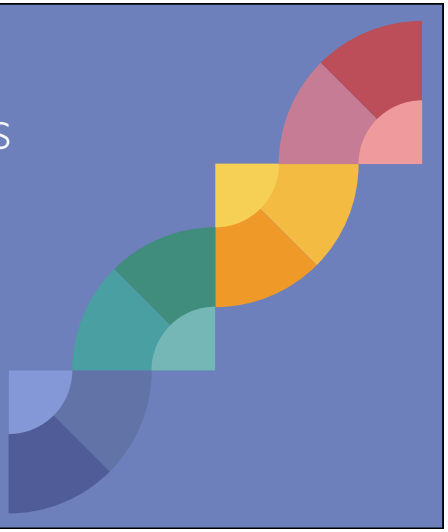


Field experiment: PageLinker

4-week field experiment: ABAB within-subjects design
Scenarios with 5 search tasks:
Peform task 1, then 2 or 3, then 4 when tasks 1-3 complete.
Task 5 is independent of tasks 1-4.



Class exercises



Peer introspection

Peer introspection exercise

Interview a colleague from the other topic:

What was the last [travel challenge] you experienced?
What software did you use?
Were you able to reuse anything from a previous trip?

Describe in detail, step-by-step, what you did.
If possible, demonstrate usingthe system.

What problems did you experience?

Take notes!

Interviewers:
- Describe what happened,
- emphasize problems and surprises
- Summarize the key opportunities for design

Interviewees:
- Identify the three* most important problems
- Mail them to your interviewer

* You may add more if you like

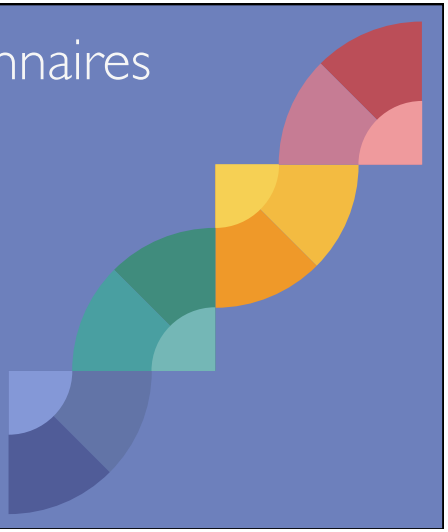
Comments

Do not look for solutions yet …
- Focus on identifying 3-5 key problems

Focus on the actual problem from the user's perspective
- not the tool or the platform

"Good" problems:
- Frustrate users
- Occur across platforms

Questionnaires



Interviews vs. questionnaires

The same question types work for both
- but the goals are different
- and the analysis is different

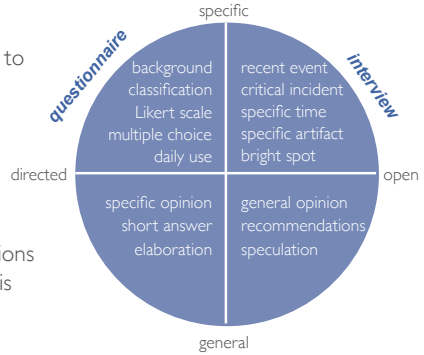
Advantages of interviews:
- easier to get in-context information
- easier to get real-world stories
- easier to probe deeply into an interesting situation

Avantages of questionnaires:
- can ask lots of people
- simple questions are easy to tabulate
- often used for opinions

Interviews vs. questionnaires

Interviews
- Few answers
- Can delve deeper to find out more
- Analyze by hand

Questionnaires
- Many answers
- Difficult to ask follow-on questions
- Automated analysis possible



Questionnaires

Goal: Obtain data from a large number of users

Careful:
- Users are less likely to respond honestly
- Questions may not really address the questions you think they are (external validity problem)

Design a questionnaire

What information are you seeking?
- Ask only what is necessary
- Frame the questions correctly

Who is the audience?
- 50 - 1000 users … or more?

How will you send your survey?
- Most often with a survey web app
- But sometimes paper is better

How will you analyze your results?
- Consider the statistical analysis first

Question styles

Background
- Age, profession, years in the job

General information
- How many years have you used this email system?

Directed questions
- How many messages did you receive yesterday?

Multiple choice
- I move messages to project folders
  - o never o rarely o often o always

Question styles

Scalaire

I can easily manage my email

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
-2	-1	0	1	2

Ranking

Rank the following functions in order of usefulness

___ Blind copy
___ Automatic copy to a distribution list
___ Automatique to myself

Open questions

Describe how you use electronic mail.

Principles for designing questions

Use parallel structure for sentences

Keep the order coherent, e.g. positive to negative

Zero can mean two things:
neutral, middle response
or "I do not know"

Consider adding a degree of confidence
Avoid asking 'obvious' questions

Ask the same question in two different ways
to see if you get the same result

One more reminder

Directed, specific questions
are easist to code
belong at the beginning of the questionnaire
provide the fewest interesting results

Open, general questions
are very difficult to code and analyze
may provide very interesting responses
but also risk giving stereotypical responses

Design vs. Marketing questionnaires

Designers need facts to inform the design
examples of problems, stories about events,
data about use

Marketing wants opinions
what people like and do not like,
what they think they want

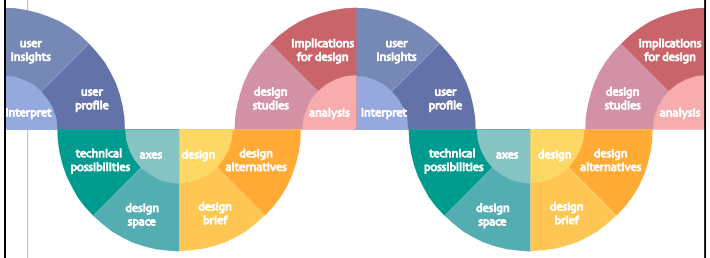
Emphasize facts first, then opinions
Directed questions (specific or open-ended) often elicit facts
General questions (specific or open-ended) often lead to opinions

Participatory Design

Participatory Design

- … focuses on **situated interaction** between users and technology
- … involves **users throughout** the design process
- … is fundamentally **generative** not evaluative
- … values iteration and rapid **redesign**
- … explores **breakdowns** and the unexpected not just perfection

Participatory design is an iterative process …

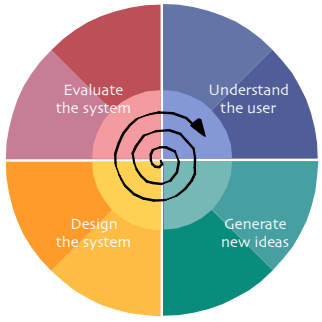


Design activities build upon previously created design resources

Iterative design means redesign

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

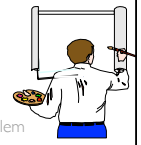
do not just "do it again!"
reflect on your designs in context



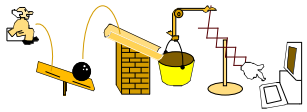
Perspectives on understanding users

Scientific view
- Collect data about users
- 'Objective' analysis
- Inform designers

Design perspective
- Seek design inspiration
- Redefine the design problem
- Generate innovations



Engineering perspective
- Address a given problem
- Make technical trade-offs
- Ensure that it works "in situ"

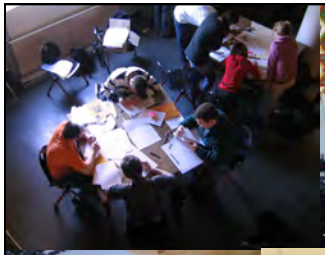


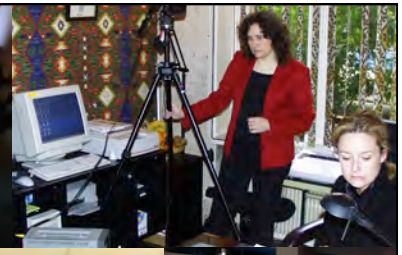
Participatory Design

Include users and designers in collaborative design

Participatory Design

Techniques include regular and video brainstorming, developing scenarios, paper prototyping and video prototyping





Why participatory design?

Asking users ≠ letting them show you

It is hard to figure out what the user experiences…
especially if you are not one of your own users.

Your instincts are not enough and often wrong
… and get worse as you delve deeper into the design.

You will understand the system more
… but the user less.

Examples:

General Motors executives thought GM quality was great.
Every morning, their cars went to the shop
Experts tuned them, cars rarely broke down

Examples:

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Experts tuned them, cars rarely broke down

BUT GM customers had a very different experience
No daily tune-ups – poor reliability

Executives had no clue about what was wrong

Examples:

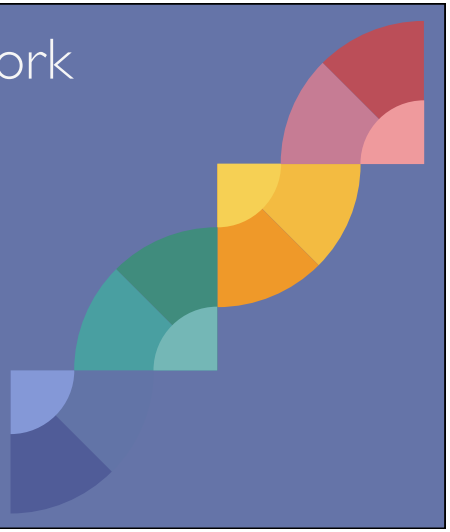
California Department of Motor Vehicles was very, very slow
Executives skipped the lines
All other drivers forced to wait with regular customers

Innovation: New DMV head made everyone wait in same lines
Result: Many innovations and reduced lines

Your design instincts are not good
if you do not have the same experience

Create environments where users expose their real experiences
and you gain design intuitions about them

Homework



For Monday:

Each group should have:
- questionnaire results
  - 5 questions per group questionnaire
  - 30 responsies (if each person sends to 10 friencs)
- 3-4 peer introspections from class
- 6-8 interview stories

Choose your topic today,
come prepared with design ideas on Monday

On Monday:

Based on your user information:
- identify the user profile and 3 personas (1 extreme)
- create a user scenario with 8-10 interaction points
- design concept (first draft)