

Advanced Design
of Interactive Systems

Lecture 2: Finding Out About Users

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Multi-Disciplinary Design Methods

| Understand the user | Analyse the user | Invent new ideas | Prototype the system | Evaluate the system | Redesign the system |
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| '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> | Design heuristics <small>HCI</small> | Branching storyboard <small>HCI</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> | Participatory workshop <small>Design/HCI</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> | Improv <small>Comedy</small> |

Multi-disciplinary Design Methods

HCI design techniques are *derived* from diverse disciplines

No individual technique is best nor can it stand alone

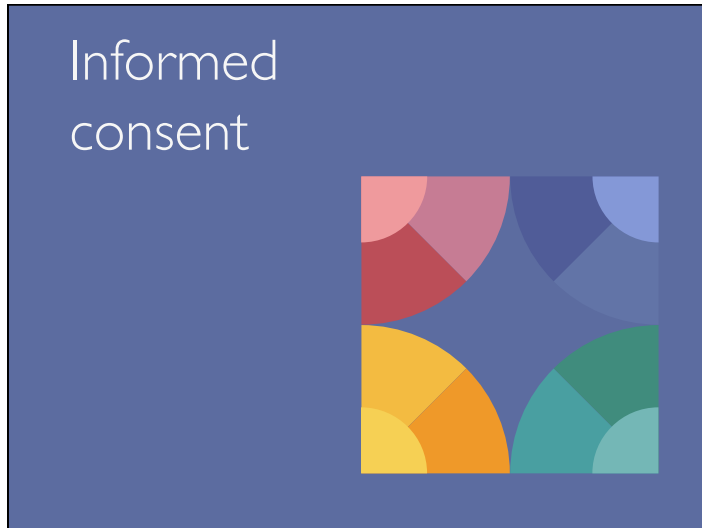
All have advantages and disadvantages, each is influenced by the norms of the parent discipline

We can choose from among these techniques and modify them as needed or create our own

Gathering information about users

More advanced techniques include:

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| Cultural probe | Users try objects that prompt reflection |
| Technology probe | Users use technology to reflect |
| User workshops | Hands-on participatory design with users |
| Prototypes | Users test technology |
| Log study | Record users actions over time |
| Diary study | Users record their own actions |
| Interactive thread | Interact with users at an event |
| Focus group | Ask customers about a product |
| Lab study | Determine cause/effect relationships |



| Informed consent | |
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| 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 |
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| 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 | | |
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| 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 | | |

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| <p>IRB</p> <p>Institutional Review Board</p> <p>Mandated by the government</p> | |
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| <p>Milgram's 'Obedience to Authority' experiment</p> <p>Will ordinary people give a stranger a lethal electric shock in the name of science?</p> <p>"Teachers" administer shocks to "students"</p> <p>Start with a sample 45v shock</p> <p>Paired-associate learning task</p> | |
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| <p>Does a project need an IRB review?</p> <p>"Human subjects" are users or participants</p> | |
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| <p>Diary study</p> | |
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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

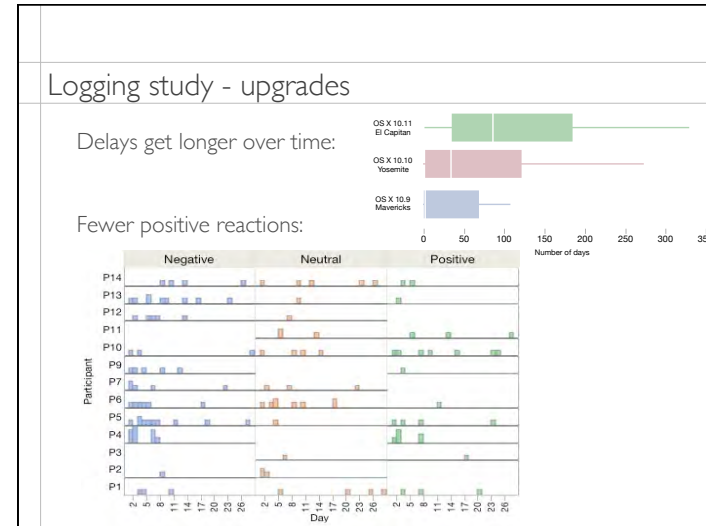
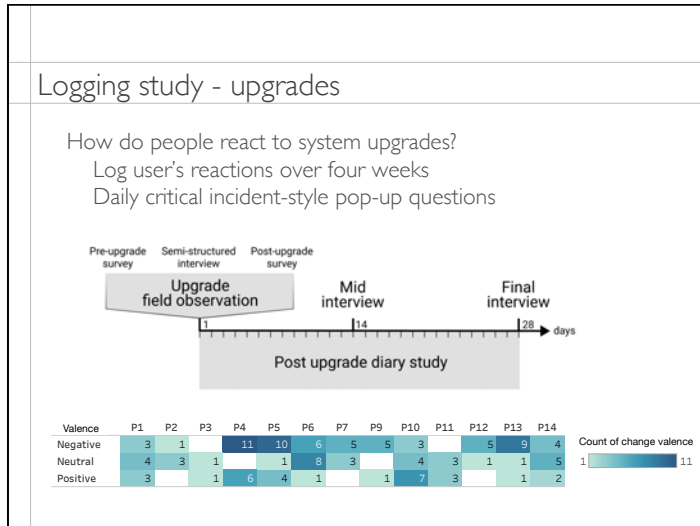
Why do people abandon windows on their screens?
From reminders to forgotten windows

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

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| maximum | 58 sessions |
| 75% quartile | 8 sessions |
| median | 3 sessions |
| 25% quartile | 1 session |
| minimum | 1 session |



Field experiments

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

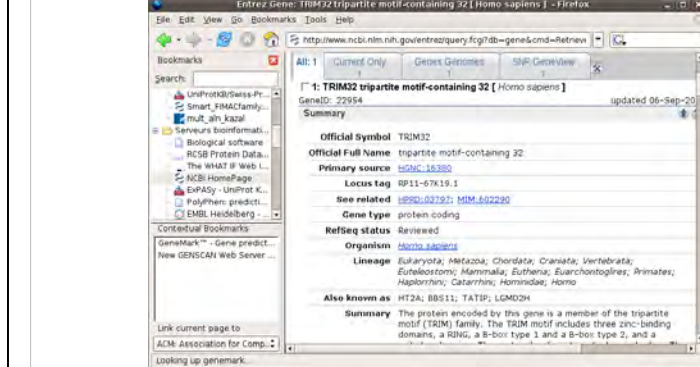
Example:
 Does the background color affect likelihood of buying?
 (Yes! 20% more with certain colors)

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

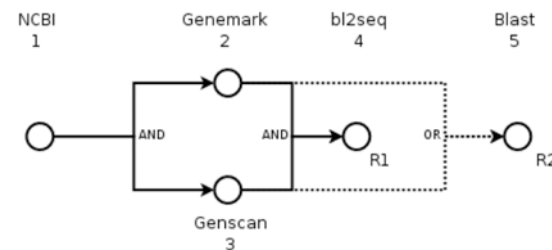
Controlled field study: PageLinker

Contextual bookmarks



Field experiment: PageLinker

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



Peer introspection exercise

- Interview each other about the topic
 - Capture a story with critical incident or object questions
- Describe in detail, step-by-step, what you did.
 - If possible, demonstrate using the system.
- What breakdowns or problems did you experience?
 - How did you fix them?
 - Did you come up with successful workarounds?

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| Take notes! |
| <p>Interviewers: Describe what happened, emphasize problems and surprises Summarize the key opportunities for design</p> <p>Interviewees: Identify the threemost important problems</p> |



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| Interviews vs. questionnaires |
| <p>The same question types work for both but the goals are different and the analysis is different</p> <p>Advantages of interviews: easier to get in-context information easier to get real-world stories easier to probe deeply into an interesting situation</p> <p>Advantages of questionnaires: can ask lots of people simple questions are easy to tabulate often used for opinions</p> |

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| Interviews vs. questionnaires |
| <p>Interviews Few answers Can delve deeper to find out more Analyze by hand</p> <p>Questionnaires Many answers Difficult to ask follow-on questions Automated analysis possible</p> |

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| Questionnaires |
| <p>Goal: Obtain data from a large number of users</p> <p>Careful:</p> <ul style="list-style-type: none"> Users are less likely to respond honestly Questions may not really address the questions you think they are (external validity problem) |

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| Design a questionnaire |
| <p>What information are you seeking?</p> <ul style="list-style-type: none"> Ask only what is necessary Frame the questions correctly <p>Who is the audience?</p> <ul style="list-style-type: none"> 50 - 1000 users ... or more? <p>How will you send your survey?</p> <ul style="list-style-type: none"> Most often with a survey web app But sometimes paper is better <p>How will you analyze your results?</p> <ul style="list-style-type: none"> Consider the statistical analysis first |

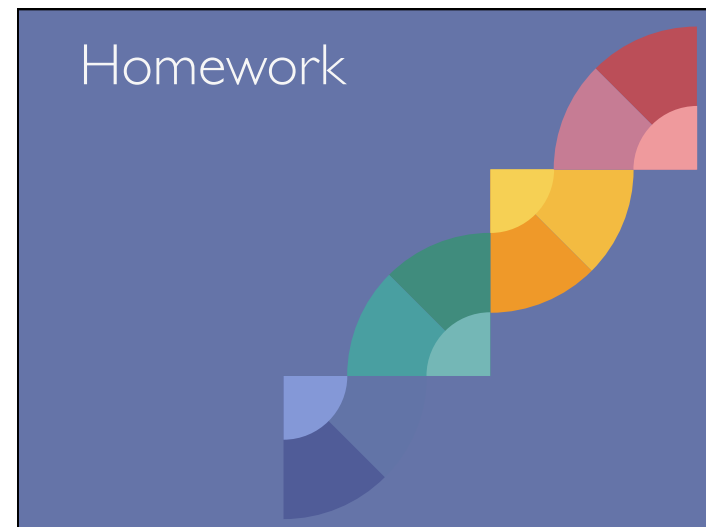
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| Question styles |
| <p>Background</p> <ul style="list-style-type: none"> Age, profession, years in the job <p>General information</p> <ul style="list-style-type: none"> How many years have you used this email system? <p>Directed questions</p> <ul style="list-style-type: none"> How many messages did you receive yesterday? <p>Multiple choice</p> <ul style="list-style-type: none"> I move messages to project folders <input type="radio"/> never <input type="radio"/> rarely <input type="radio"/> often <input type="radio"/> always |

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|---|----------|---------|-------|----------|----------|----------|----------|---------|-------|-------|----|----|---|---|---|
| Question styles | | | | | | | | | | | | | | | |
| <p>Scalaire</p> <p>I can easily manage my email</p> <table style="width: 100%; text-align: center;"> <tr> <td>Strongly</td> <td></td> <td></td> <td></td> <td>Strongly</td> </tr> <tr> <td>Disagree</td> <td>Disagree</td> <td>Neutral</td> <td>Agree</td> <td>Agree</td> </tr> <tr> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> </tr> </table> <p>Ranking</p> <p>Rank the following functions in order of usefulness</p> <ul style="list-style-type: none"> <input type="checkbox"/> Blind copy <input type="checkbox"/> Automatic copy to a distribution list <input type="checkbox"/> Automatique to myself <p>Open questions</p> <p>Describe how you use electronic mail.</p> | Strongly | | | | Strongly | Disagree | Disagree | Neutral | Agree | Agree | -2 | -1 | 0 | 1 | 2 |
| Strongly | | | | Strongly | | | | | | | | | | | |
| Disagree | Disagree | Neutral | Agree | Agree | | | | | | | | | | | |
| -2 | -1 | 0 | 1 | 2 | | | | | | | | | | | |

| Principles for designing questions |
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| 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 |
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| Directed, specific questions are easiest 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 |
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| 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 |



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| For Monday, 10 February |
| <p>Each group should have:</p> <ul style="list-style-type: none">• Set up your group's Web page• Conducted (at least) 8 story interviews*• Collect other types of user information, either from your 'client' groups or other users• Come up with initial ideas for your project <p>* Interviews are graded individually</p> |