Needfinding

Human Computer Interaction

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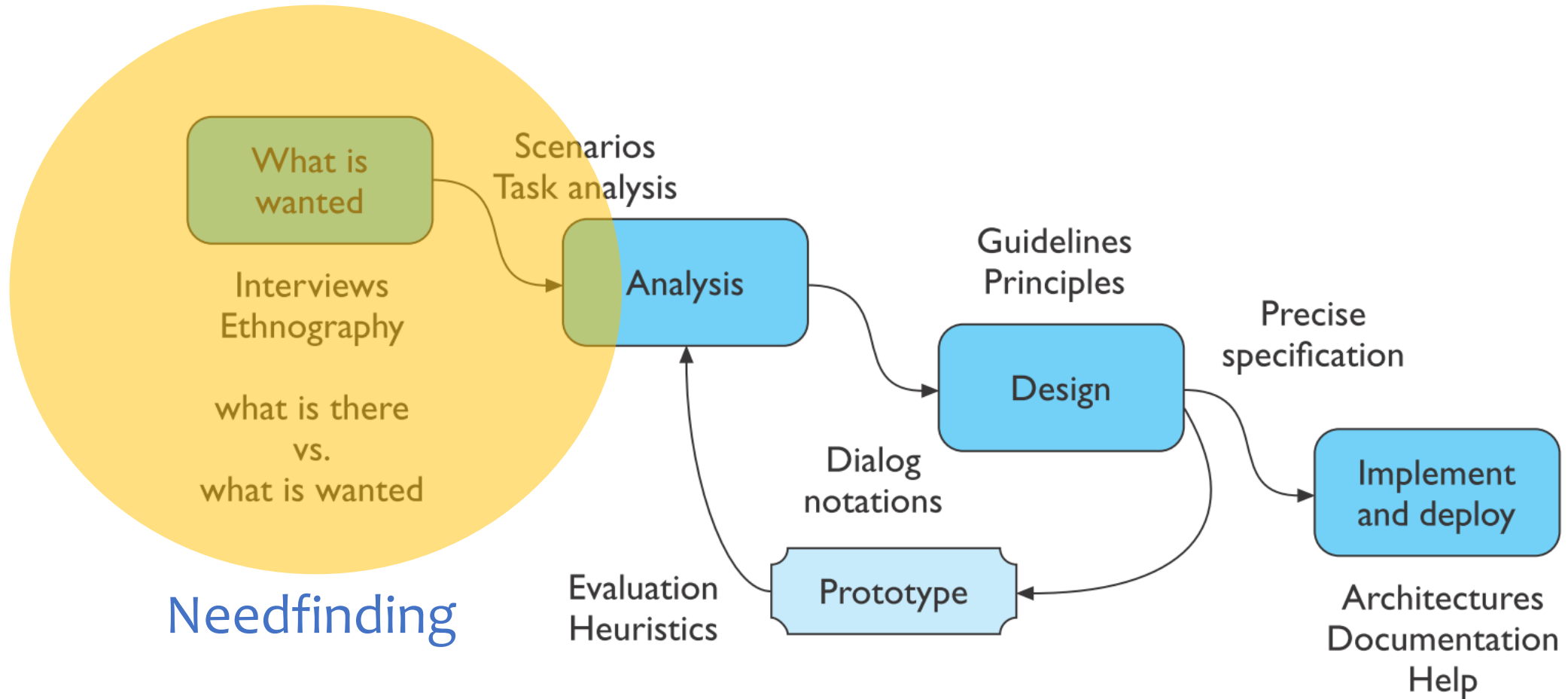
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Goals

- Understanding the system requirements and user needs
  - "Needfinding"

- Knowing tools and instruments for Needfinding

Human-Centered Design Process

What is wanted

Scenarios
Task analysis

Interviews
Ethnography

what is there
vs.
what is wanted

Needfinding

Analysis

Guidelines
Principles

Design

Precise
specification

Dialog
notations

Implement
and deploy

Evaluation
Heuristics

Prototype

Architectures
Documentation
Help

Main Needfinding questions

- Needfinding = **Finding Potential User Needs**
  - What do users need?
  - What do users want?

- That also requires
  - Who are the users?
  - How are they doing it, now?
  - What is the context in which they are doing it?
  - Can't we just ask them?

Know Your Users (1)

- Who are the users of the system?
  - Uniform, or different categories/groups?
  - Young/old? Novice/experienced?
  - Do not think of "generic" users, split the categories

- ***You*** are not a [representative] user
  - Designers and developers' skills, knowledge, attitude, background, interests, … are totally unlike those of your users
  - Except by chance (e.g., you are also students, developers, …)

- The **client** is not a [representative] user
  - Bosses, managers, directors, … believe they know their employees and their jobs. Actually, they don't
  - Always seek the actual users that will use the system

Know Your Users (2)

- Talking to users
  - Surveys
  - Interviews
  - Direct involvement (participatory design)
  - Bypass corporate policies
  - Understand real current behavior, pain points, workarounds, …

- Watching users
  - Observation sessions
  - Video recording (and analysis)
  - Diaries
  - Analyze their work (artifact, processes, action sequences)
  - Discuss with users the findings of the observation (may discover the "why")

Know Your Users (3)

- Imagining users
  - When real users are not available
  - Imagine how a real user would behave (very difficult)
  - Building "imaginary" users: *personas*
    - Detailed description of hypothetical persons in a given role
    - Imagine them as they were a real person

Needfinding methods

Techniques adopted in Needfinding and Requirement Analysis

Methods outline

- Observation, ethnographic research

- Surveys

- Interviews

- Focus groups

- Diaries

Observation

"You can observe a lot, just by watching" – Yogi Berra

Ethnographic observation

- Embed in the users' environment, culture, behavior

- Goal: to obtain the necessary data to influence interface (re)design

- Learn the language of users and their environment

- Listen and observe carefully
  - Sometimes ask questions and clarifications

- Audio-Video Record / Take Notes

- Risks:
  - Misinterpret observations
  - Disrupting normal practice
  - Overlooking important information

What should learn by observation? (1)

1. What do people do now?

2. What values and goals do people have?

3. How are these activities embedded in a larger ecology?

4. Similarities and differences across people

5. Other types of context, like time of day

Especially tacit (unspoken) knowledge

What should learn by observation? (2)

- Process vs Practice

- Process: how things are officially supposed to happen, and are officially part of the training

- Practice: set of workarounds, practical tricks, information learnt from the field and from experience, etc., that are part of daily activities

Types of observation (1)

- **Controlled Observation**
  - Within a Lab environment

- **Easy to reproduce.** If you use a quantitative approach –easy to get similar results by repeating

- **Easy to analyze.** Quantitative data requires less effort to analyze than qualitative data.

- **Quick to conduct.** Recruitment may take a little time, the controlled observation is fairly fast to run.

- **The Hawthorne Effect.** The act of observation of how someone does something can change their approach to carrying out the task.

How to Conduct User Observations
https://www.interaction-design.org/literature/article/how-to-conduct-user-observations

14

Types of observation (2)

- **Naturalistic Observation**
  - Studying the user "in the wild", Less structured

- **More reliable.** When people use a product in real life – they are much more likely to encounter the frustrations (and benefits) of real life use than they are in a lab following a set of instructions.

- **More useful for ideation.** Qualitative research can generate lots of ideas for product improvement as it opens up possibilities that aren't found in quantitative research.

- **Difficult to include a representative sample.** More expensive and time consuming to conduct, limits the reach of the research. Use this kind of research to create ideas and then test those ideas with other forms of research.

- **Difficult to make them replicable.** Problem with sample sizes and dependence on the observer.

- **Hard to manipulate external variables.** For example, if it's raining when you observe your users working on a smartphone – their behavior is likely to be different to when it's sunny. You have no control over the weather "in the wild".

Blending in

- **Becoming part of the wall** (Complete Observer)

- Avoid being intrusive or modifying behaviors
  - Avoid video-recording or interruptions

- Schedule time for discussing your observations

- **Becoming "one of them"**, like an apprentice (Complete Participant)

- Undergo training process
  - Official information
  - Matter-of-fact information shared by co-workers

- Observe all the practices

- Validate your observations with the users

Data collection

Subjective

- Impressions

- Ranking/ratings by users on different questions

- Written summary report

- Artifacts and "hints" in the workplace

Objective

- Anecdotes

- Critical incidents

- Observed errors

- Observed workarounds

Diaries

Move the observation to the daily routine, with the help of the users

Diaries for Longer observation periods

- Observing users for long periods of time in many locations ("in the wild") is not possible by an observer

- Diaries are tools (paper-based or computer-based) that require users to take note of their actions
  - When they perform a specific action
  - At predefined time intervals

- Stronger motivation should be ensured (incentives?)

- Analysis of the diaries may be done off-line (by researchers) or in the context of an interview

Example

Source: Alberto Monge Roffarello

Interviewing

Asking users about their needs and desires…

…what could possibly go wrong?

Main forms of interviews

- Surveys
  - Fast, more superficial
  - Sets of questions with predefined possible answers
  - Paper-based or on-line

- In-person interviews
  - Time-demanding, in-depth knowledge
  - Structured vs Unstructured
  - One-to-one vs Focus groups

Beware!

- Users <u>don't know</u> what they want

  - ○ Maybe subconsciously, but not rationally
  - ○ They will tell what they think you like to hear
  - ○ Especially for "new" products or "disruptive" technologies
  - ○ They lack the creativity or the technical expertise to understand the new product
  - ○ They take the current context for granted (e.g., required workarounds "because, yes")

Stop Asking Users What They Want
https://uxplanet.org/stop-asking-users-what-they-want-21e9ba646bce

Choosing participants for interviews

- Representative of target users
  - [All] Stakeholders

- May be current users of a similar system

- Might also be the non-users (for a new product)

- Approximate, if necessary (with similar users)

- Incentives, motivations, small gifts

Executing interviews

- Schedule time&place comfortable for users

- Introduce yourself, explain your purpose
  - You are not testing them; they are helping you

- Begin with open-ended, unbiased, non-leading questions

- Ask the question and let them answer
  - Give enough time. The 2nd reply is often more interesting than the 1st.

- Follow-up with related questions. Deep dive into interesting points

Interview
http://dlrtoolkit.com/interview/

Guidelines for questions

- Structured questions are easier to process, unstructured questions solicit more comments

- Open-ended questions, with follow-up discussion

- For quantitative questions (e.g., rate in a scale 1 to 5, such as Likert), always ask what they mean by "4"

- Aim at direct, concrete, specific questions that ask for detailed answers

- Use the language of the user

- Always try the question with a smaller (trusted) group, for debugging

Examples of open-ended questions

- 'Tell me about your typical day.'

- Tell me three good things about. .. '

- 'and three bad things.'

- 'What has gone wrong with the application recently? How did you cope?'

- 'What else should we have asked about?'

Bad questions – to avoid

- Is feature [x] important to you?
  - 'Leading' question

- What would you like in a tool?
  - User are experts in their domain, not expert in design

- What do you like in [x]?
  - Assuming question. Maybe he doesn't like it

- What would you do in a hypothetical situation?
  - Users cannot imagine the complete environment or an unusual situation

- How often do you do [x]?
  - Humans are very bad at estimating (and biased in the answers)
  - May obtain by log analysis (if an application already exists)

- Binary questions (yes/no)
  - Don't yield motivation
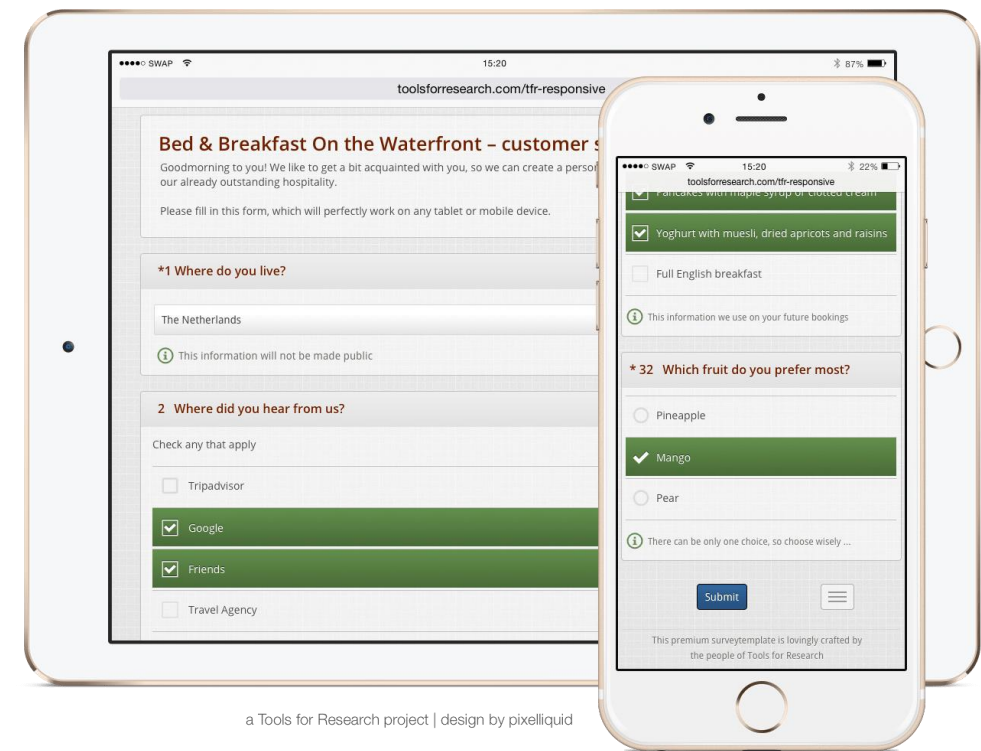
Surveys

Requirements gathering through (on-line) surveys and questionnaires

On-line surveys

- Familiar, cost-effective, potentially reaching a very wide audience

- Results can be easily visualized and analyzed with statistical methods

- Should be very careful with setting the goal of the survey
  - First define what statistics and/or charts you need, then design the survey structure and questions

Risks in surveys

- Good for a shallow view over a large base of respondent, but not for a "deep" analysis

- Impossible to ask follow-up questions

- Biased data if questions rely on user's memory or on "sensitive" issues (money, emotions, …)

- Finding a representative target population
  - Stratification

Survey structure

- Declare the purpose of the survey and the expected time

- One or more sections with targeted questions

- Background information about the users
  - Limit "mandatory" fields to a minimum

Background information (examples)

- Background demographics (age, gender, origins, native language, education, income)

- Experience with computers (specific applications or software packages, length of time, depth of knowledge, whether knowledge was acquired through formal training or self-teaching)

- Job responsibilities (decision-making influence, managerial roles, motivation)

- Personality style (introvert versus extrovert, risk taking versus risk averse, early versus late adopter, systematic versus opportunistic)

- Reasons for not using an interface (inadequate services, too complex, too slow, afraid)

- Familiarity with features

Types of Questions

- Open-ended questions
  - Solicit specific motivation, to avoid too generic answers
  - Require methodology for analyzing the responses

- Closed-ended questions
  - Only one possible choice
  - **Ordinal** values: a scale of ordered possibilities (e.g., from 1 to 5)
  - **Nominal** values: alternatives, with no ordering relationships (e.g., city or department)

Measurement scales (1)

- Nominal scale
  - Predefined set of distinct (pairwise disjoint) classes. No ordering.
  - Example: Gender. City of residence. Course of enrollment. Preferred color. Room of your house.
  - Meaningful statistics: Counting. Frequency. Mode.

- Ordinal scale
  - Distinct classes, pre-defined ordering. No defined "distance" across the different values
  - Example: University scores. Preference (Likert). Stars. Thumbs up/down.
  - Meaningful statistics: Ordering. Median. Quartiles. Percentiles. Rank.

Measurement scales (2)

- Interval scale (rarely used)
  - Numerical value, arbitrary zero-value, arbitrary unit of measure
  - Example: Date. Hour. Temperature.
  - Meaningful statistics: Mean (Average). Variance.

- Ratio scale
  - Numerical value, fixed zero-value, arbitrary unit of measure
  - Example: Duration of a task. Length of an object. Age.
  - Meaningful statistics: All (higher-order, geometric mean, …)

- Absolute scale
  - Numerical (integer) value, corresponding to the cardinality of a set
  - Example: Number of employees
  - Meaningful statistics: All

Ordinal scales: Likert scales

- Ask for the level of agreement about a statement

- Extreme values are very rare to be selected

- An even number of levels prevents a "neutral" response

- 4-level: Strongly Disagree / Disagree / Agree / Strongly agree

- 5-level: Strongly Disagree / Disagree / Neither agree nor disagree / Agree / Strongly agree

- Numerical ranges: 1-5, 1-7, 1-9

https://en.wikipedia.org/wiki/Likert_scale
https://www.simplypsychology.org/likert-scale.html

Warnings

- If possible, use two simpler questions instead of one complex one (separate the factors of interest)

- Avoid negative words in the question

- Biased questions solicit biased responses

References

- David Benyon: Designing Interactive Systems, Chapter 7

- Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale: Human Computer Interaction, 3 rd Edition, Chapter 5

- Shneiderman, Plaisant, Cohen, Jacobs, Elmqvist & Diakopoulos: Designing the User Interface: Strategies for Effective Human-Computer Interaction, 6th Edition, Chapter 4, 5.4

- COGS120/CSE170: Human-Computer Interaction Design - http://courses.pgbovine.net/cogs120-cse170/schedule.htm - Week 1

- Lazar, Feng, Hochheiser: Research Methods in HCI, 2010, Chapter 9 (Observation), Chapter 5 (Surveys)
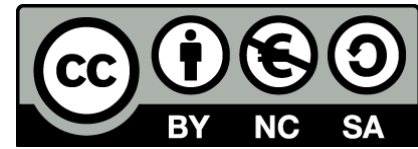
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