

Themes, Tasks, and Scenarios

HCI Fundamentals

Luigi De Russis, Alberto Monge Roffarello

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Hall of Fame or Shame?

User Needs Edition

Beware: we are missing the general context here!

- Users need a faster horse
- Users need to have financial help
- Users needs a way to move faster from one place to another
- Users need to have more tools
- Users need to practice more with the appropriate tools
- Users need to be able to run faster

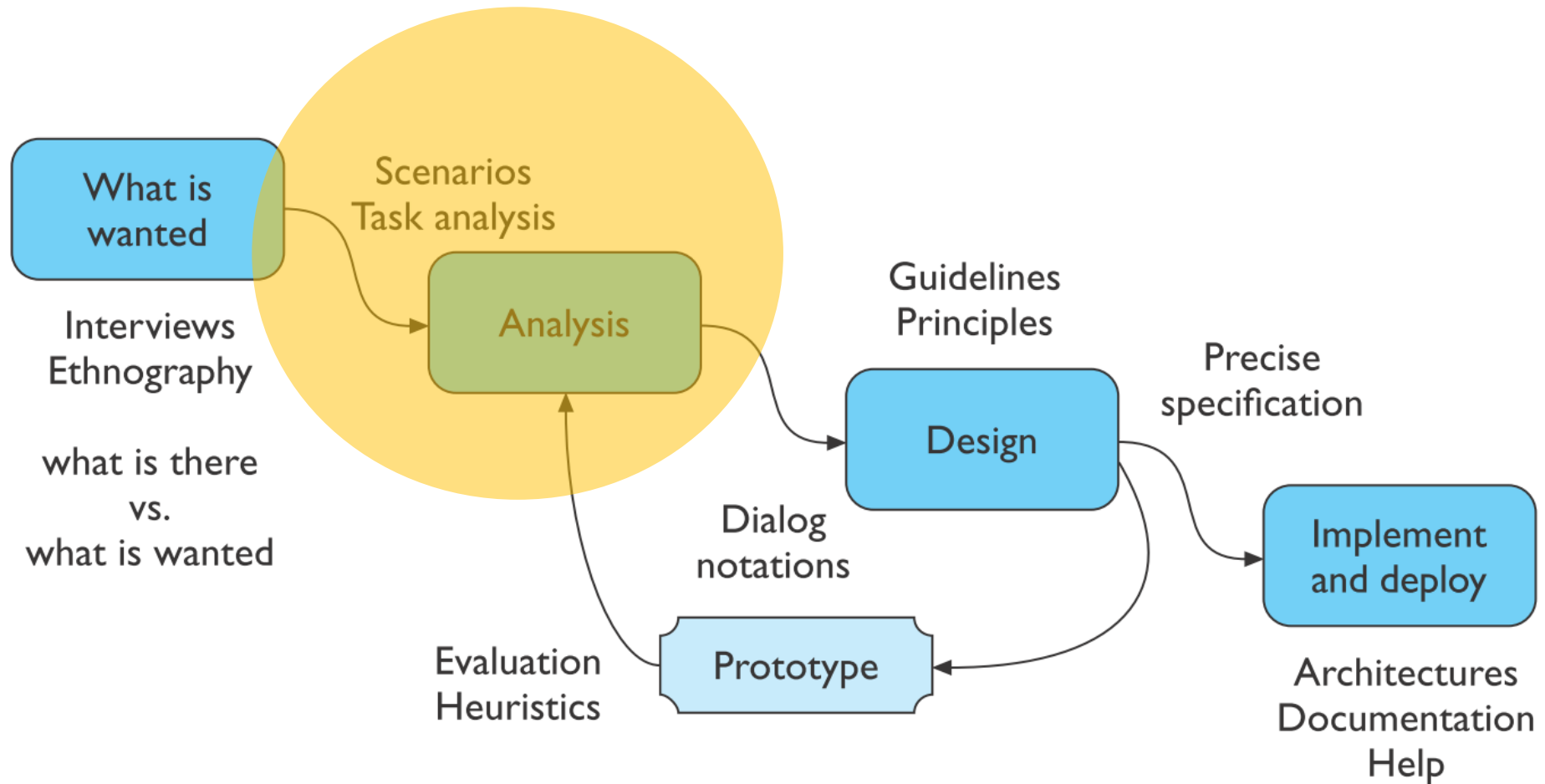
From Assignment 1:

“Needs are human emotional or physical necessities. [...]

Needs are verbs (activities and desires with which your user could use help), not nouns (solutions). [...]

It can be helpful to use the phrases ‘needs a way to’ or ‘needs to be able to’ in your list of user needs.”

Human-Centered Design Process



Goals

- **Interpret** the data collected during needfinding
- Identify **patterns** across participants
- Formulate *evidence-based* user needs
- Translate needs into **tasks** and **design goals**
 - As an intermediate representation before the user interface design
- **Represent** possible interactions through sketches, scenarios, and storyboards

Thematic Analysis

Putting together needfinding's results

What Is Thematic Analysis?

- A method for **identifying**, **analysing**, and **reporting** patterns (**themes**) within data
- Minimally, it organizes and describes the data set in (rich) detail
 - Frequently, it goes further and interprets various aspects of the research topic
- It searches **across** a data set (e.g., a number of interviews or focus groups) to find **repeated patterns of meaning**
- **Flexible**: not wedded to any pre-existing theoretical framework
- **Accessible**: a foundational method, one of the first qualitative method of analysis to learn

Themes do not “emerge”

The researcher always plays an **active role** in identifying patterns, selecting those of interest, and reporting them

“If themes ‘reside’ anywhere, they reside in our heads from our thinking about our data and creating links as we understand them.”

(Ely et al., 1997)

Some Terminology

Data corpus: all the data collected for a particular research project

Data set: all the data from the corpus that are being used for a particular analysis

Data item: each individual piece of data collected (e.g., one interview)

Data extract: an individual coded chunk of data, identified within and extracted from a data item

Example: a corpus of interviews with surgeons, media items, and websites. For a particular analysis, the data set might be just the interviews; each interview is a data item. Only a selection of the (many) extracts will feature in the final analysis.

What Counts as a Theme?

- A theme “captures something important about the data in relation to the research question, and represents some level of **patterned** response or meaning within the data set”
- **Prevalence:** ideally, a number of instances across the data set...
 - ...but more instances do not necessarily mean the theme is more crucial
 - No hard-and-fast rule: a theme is not such because it is present in 50% of data items
- **Keyness:** does it capture something important in relation to the overall research question?
- Individual **judgement** is necessary: retain some flexibility, and be **consistent** within an analysis

Key themes are not necessarily the most prevalent ones

Decisions To Make

Choices to consider explicitly before analysis (and sometimes even data collection) begins

Scope

Rich description of the data set

Themes reflect the entire data set; some depth and complexity is lost

vs

Detailed account of one aspect

A more nuanced account of a theme or group of themes

Approach

Inductive (“bottom-up”)

Data-driven: themes strongly linked to the data, no pre-existing coding frame

vs

Deductive (“top-down”)

Analyst-driven: guided by the researcher’s theoretical or analytic interest

Level

Semantic themes

Identified within the explicit or surface meanings of the data

vs

Latent themes

Identify underlying ideas, assumptions, and conceptualizations that shape the semantic content

The Process

1 Familiarizing yourself with your data

Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas

2 Generating initial codes

Coding interesting features of the data systematically across the entire data set, collating data relevant to each code

3 Searching for themes

Collating codes into potential themes, gathering all data relevant to each potential theme

4 Reviewing themes

Checking if the themes work in relation to the coded extracts and the entire data set; generating a thematic “map”

5 Defining and naming themes

Refining the specifics of each theme and the overall story; generating clear definitions and names

6 Producing the report

Selecting vivid, compelling extracts; final analysis; relating back to the original questions

Phase 1: Familiarizing Yourself With the Data



- **Immerse** yourself in the data, to become familiar with the depth and breadth of the content
 - Repeated reading, in an *active* way: searching for meanings, patterns, ...
 - Read the entire data set at least once before you begin coding
- Verbal data (e.g., interviews) need to be **transcribed**
 - At a minimum, a rigorous and thorough “verbatim” account of all verbal (and sometimes nonverbal) utterances
- Start taking **notes** and marking ideas for coding, to go back to in the next phases

Do not skip it!

Reading and re-reading is time-consuming, but this phase provides the **bedrock** for the rest of the analysis

Phase 2: Generating Initial Codes



- **Codes** identify a feature of the data (semantic or latent) that appears interesting to the analyst
 - “The most basic segment, or element, of the raw data or information that can be assessed in a meaningful way regarding the phenomenon” (Boyatzis, 1998)
- Coding **organizes** the data into meaningful groups
 - Codes are not themes: themes are (often) broader, and are where the interpretative analysis occurs
- It depends on whether themes are more “data-driven” or “theory-driven”
- Manually (notes, highlighters, post-it notes) or with a software

Key advice

Work systematically through the **entire** data set, giving full and **equal** attention to each data item

Code for as many potential themes/patterns as possible

Code extracts inclusively: keep a little of the surrounding data, to not lose the context

An extract may be uncoded, coded once, or coded many times

Retain accounts that depart from the dominant story

Coding: An Example

Data extract	Coded for
it's too much like hard work I mean how much paper have you got to sign to change a flippin' name no I I mean no I no we we have thought about it ((inaudible)) half heartedly and thought no no I jus- I can't be bothered, it's too much like hard work. (Kate F07a)	1. Talked about with partner 2. Too much hassle to change name

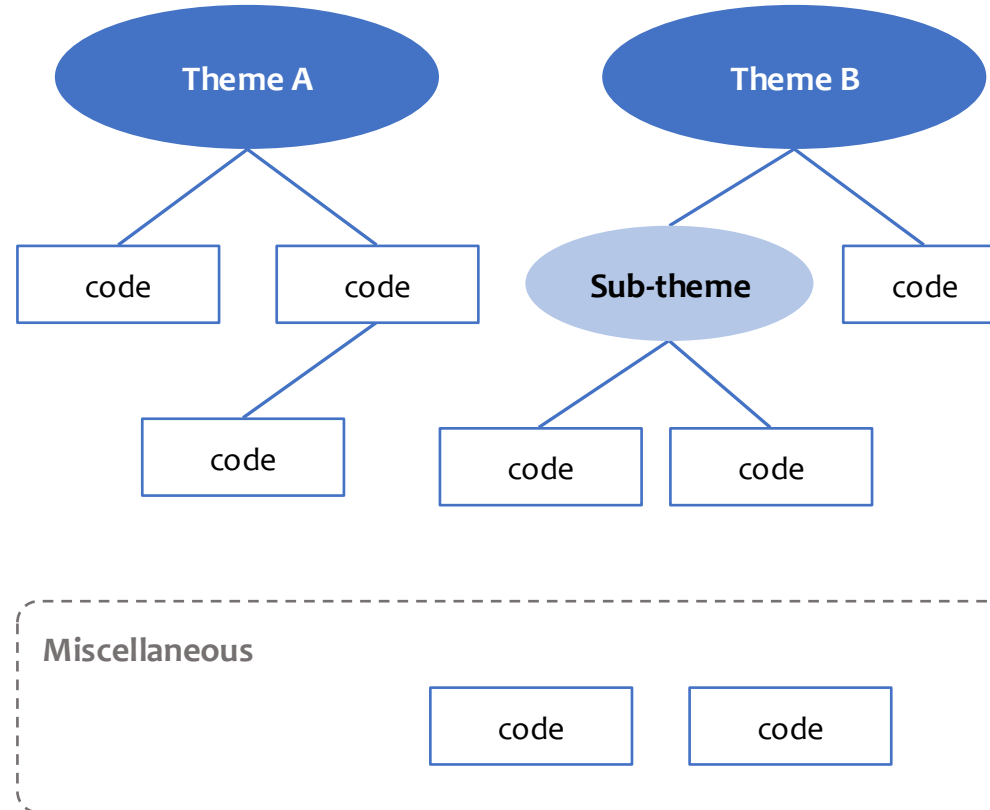
The same extract is coded for **two different features**: code individual extracts in as many different “themes” as they fit into

Phase 3: Searching for Themes



- Re-focus the analysis at the broader level of **themes**
 - Sort the different codes into potential themes
 - Collate all the relevant coded extracts within the identified themes
- Consider how different codes may **combine** to form an overarching theme
 - Relationships between codes, between themes, and between levels of themes (main themes and **sub-themes**)
- Visual representations may help: tables, mind-maps, “theme-piles”
 - see next slide for an example
- Codes that do not seem to belong anywhere?
 - A (temporary) “miscellaneous” theme
- Outcome: **candidate themes** and sub-themes. Do not abandon anything yet!

Phase 3: Example of Visual Representation



Phase 4: Reviewing Themes



- **Refine** the candidate themes: some are not really themes (not enough data, or data too diverse), some collapse into each other, others need to be broken down
- Dual criteria: **internal homogeneity** (data within a theme cohere meaningfully) and **external heterogeneity** (clear distinctions between themes)

Level 1: The coded data extracts

Read all the collated extracts for each theme: do they form a coherent pattern? If not, rework the theme, create a new one, or move/discard the extracts that do not fit



Level 2: The entire data set

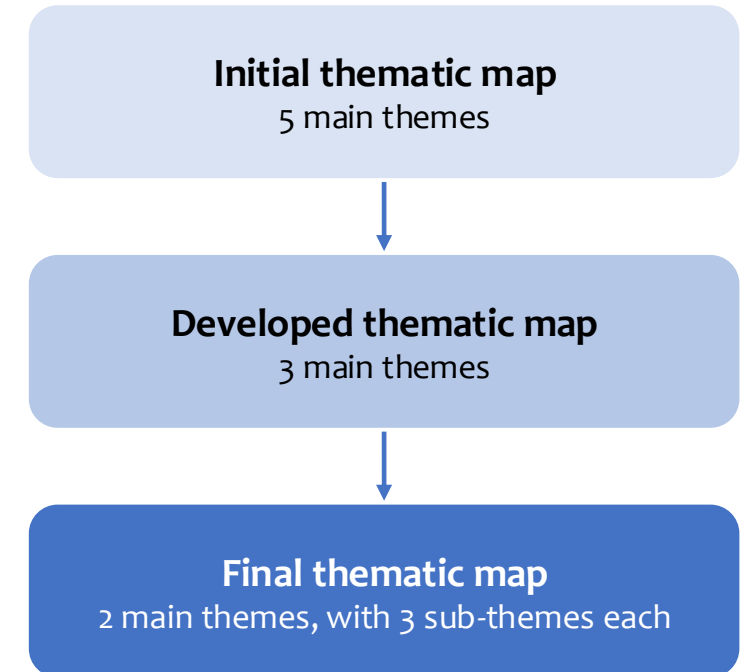
Re-read the entire data set: do the themes “work” in relation to it? Does the thematic map reflect the meanings in the data set as a whole? Code any additional data missed earlier

Refinements are not adding anything substantial? **Stop!** You should now know what your themes are, how they fit together, and the overall story they tell about the data.

Phase 5: Defining and Naming Themes



- **Define and refine:** identify the “essence” of what each theme is about, and what aspect of the data it captures
 - Do not try to get a theme to do too much, or to be too diverse and complex
- For each theme, write a **detailed analysis**
 - What is the “story” it tells? How does it fit into the broader overall story about the data?
 - Does it contain **sub-themes** (themes-within-a-theme)?
- Test: can you describe the scope and content of each theme in a **couple of sentences**?
- **Names:** concise, punchy, and immediately giving a sense of what the theme is about



Phase 6: Producing the Report



- Tell the complicated **story** of your data in a way that convinces the reader of the merit and validity of your analysis
 - A concise, coherent, logical, non-repetitive, and interesting account, within and across themes
- Provide sufficient **evidence**: enough data extracts to demonstrate the prevalence of the theme
 - Choose particularly vivid examples, capturing the essence of the point you are demonstrating
- Go **beyond description**
 - Embed extracts within an analytic narrative
 - Make an argument in relation to your questions

Questions to guide the analysis

“What does this theme mean?”

“What are the assumptions underpinning it?”

“What are the implications of this theme?”

“What conditions are likely to have given rise to it?”

“Why do people talk about this thing in this particular way?”

“What is the overall story the different themes reveal about the topic?”

Potential Pitfalls to Avoid

- 1 No actual analysis**

Extracts strung together with little or no analytic narrative, or simply paraphrased
- 2 Interview questions as themes**

The data collection questions are reported as “themes”: no analytic work has been done
- 3 Weak or unconvincing analysis**

Themes do not work, overlap too much, or are not internally coherent; only one or two extracts per theme
- 4 Mismatch between data and claims**

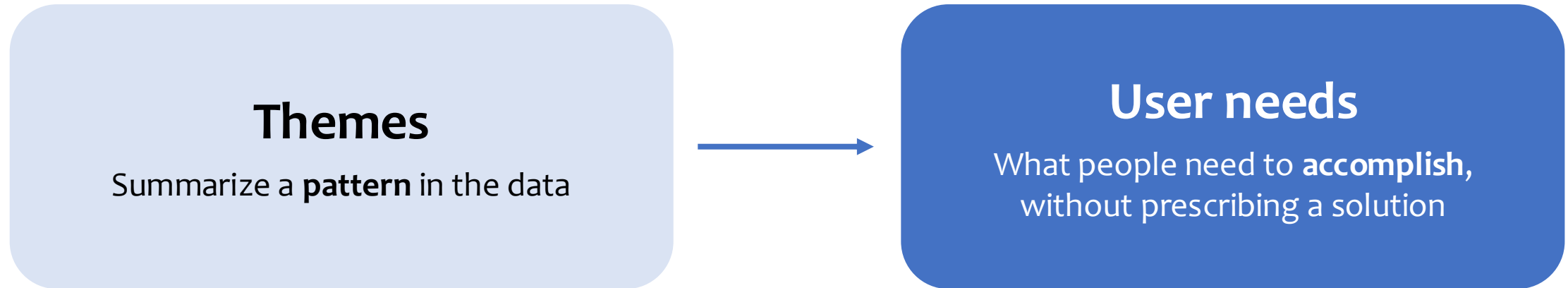
Claims not supported by (or even contradicting) the extracts; alternative readings or variation not considered
- 5 Mismatch between theory and claims**

Interpretations not consistent with the theoretical framework, or assumptions not spelled out

What Makes Good Thematic Analysis?

What	Criteria
Transcription	Data transcribed to an appropriate level of detail; transcripts checked against the recordings
Coding	Equal attention to each data item; thorough, inclusive, and comprehensive coding (not from a few vivid examples); all relevant extracts collated; themes checked against each other and the data set; themes internally coherent, consistent, and distinctive
Analysis	Data interpreted, not just paraphrased or described; extracts illustrate the analytic claims; a convincing and well-organized story; a good balance between analytic narrative and extracts
Overall	Enough time for all phases, without rushing any of them
Written report	Assumptions and approach clearly explicated; described method and reported analysis are consistent; language consistent with the epistemological position; the researcher is active: themes do not just “emerge”

From Themes to User Needs



Remember: needs are verbs (activities and desires), not nouns (solutions)

“Users need a way to...”, “Users need to be able to...”

Tasks

What people want to accomplish

Tasks

- *Needs* describe what people seek to accomplish. *Tasks* make those concrete by placing them in a specific situation.
- Task: the structured **set of activities**/high-level actions required to **achieve** a user goal
 - It says what a person *wants to do*, not how, while describing a *complete* goal
- Often, given a domain, you have a **mix** of tasks with different **complexity**
 - Simple tasks – common or introductory
 - Moderate tasks
 - Complex tasks – infrequent or for power/extreme users

What is a Task?

- «A **task** is a **goal** together with some ordered set of **actions**.» (Benyon)

Goal

- A state of the application domain that a work system (user+technology) wishes to achieve.
- Specified at particular levels of abstraction.

Task

- A structured set of activities required, used, or believed to be necessary by an agent (human, machine) to achieve a goal.
- The task is broken down into more and more detailed levels of description until it is defined in terms of actions.

Action

- An action is a task that has no problem solving associated with it and which does not include any control structure.
- Actions are 'simple tasks'.

Describing a Task

- About the way people perform their activities
- A task description captures:
 - what they **do** (steps)
 - what things they **use** (artifacts)
 - how well they **succeed** (goals, pain points)

Sample Task: To Clean The House (I)

- **Steps:**

- get the vacuum cleaner out
- fix the appropriate attachments
- clean the rooms
- when the dust bag gets full, empty it
- put the vacuum cleaner and tools away

- **Must know and use different artifacts:**

- vacuum cleaners, their attachments, dust bags
- cupboards, rooms
- ...

Sample Task: To Clean The House (II)

- **Goals:**

- Here your *point of view* comes in
- Removing dust? -> narrow goal
- Tidying up the house after a party?
- Hosting people for the dinner?
- Having a satisfying evening? -> wide goal

Sample Task: To Clean The House (III)

- **Pain points:**

- Narrow version: Why does the dust bag need to be emptied?
- Intermediate version: Why is a vacuum cleaner necessary?
- Broader version: What outcome is the person trying to achieve by cleaning up the house?

What Reasoning About Tasks Reveals

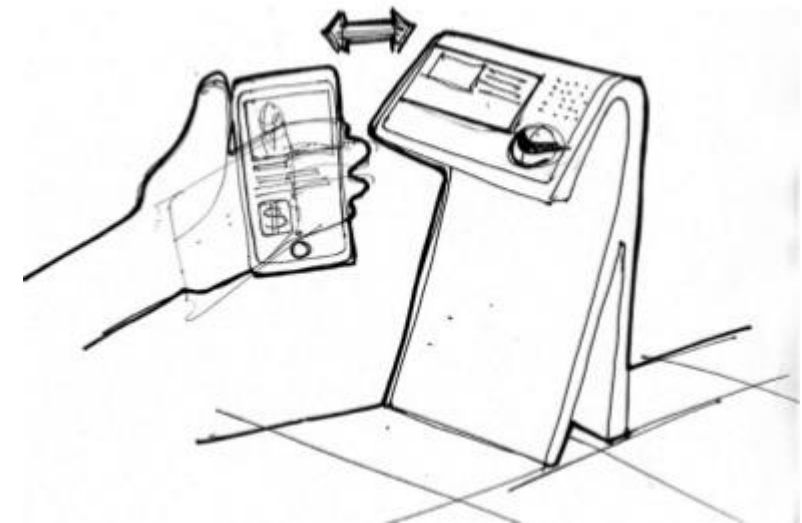
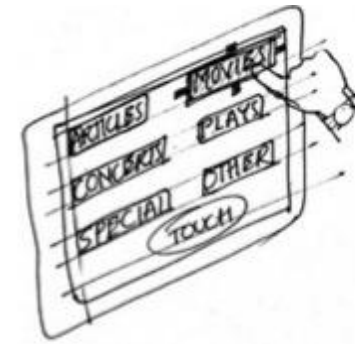
- What your users' goals can be; what they are trying to achieve
- What users actually do to achieve those goals
- What experiences (personal, social, and cultural) users bring to the tasks
- How users are influenced by their physical environment
- How users' previous knowledge and experience influence:
 - How they think about their work
 - The workflow they follow to perform their tasks
 - The pain points they experience to perform the tasks

Sketches

Quick drawings to convey a part of the interface, or a feeling about a device

Sketch

- An individual drawing showing
 - A single user interface screen
 - A drawing of an artifact part of the system
 - The shape of an interaction object
- Gives a static view of a possible interaction
- Helps set the interaction context
- Often, part of a longer representation (e.g., a storyboard)



Scenarios

Possible sequences of actions for reaching user goals

Scenario

- Scenarios are stories for design: rich stories of interaction
- Description of how the user engages the interactive system to complete a specific task
- Formats:
 - Written summary, Use Case
 - Graphical sketches (→ Storyboard)
 - Flowcharts, Transition Diagram...

Level of Detail In Scenarios

■ Stories

- From needfinding
- Used for understanding what people do and what they want

■ Conceptual (abstract) Scenarios

- Used for generating ideas and specifying requirements
- Abstracts tasks from stories
- No reference to technology
- May lead to different concrete scenarios

■ Concrete Scenarios

- Used for envisioning ideas and evaluation
- One possible solution to a Conceptual Scenario (may try many alternatives)
- Shows how technologies are used in the user context
- Key design features are included

■ Use Cases

- Used for specification and implementation (→ software engineering)

Storyboards

Comic-book-like representation of user scenarios, emphasizing how a system supports people in completing a task

Storyboard

- “A graphical depiction of the outward appearance of the intended system, without any accompanying system functionality”
- A hand-drawn comic that features the execution of a task (like a concrete scenario)
- With a few panels (sequence of sketches) it conveys what a person may accomplish
 - Always include people
- They communicate **flow**, showing what happens **at key points** in time
- No artistic skills are required
 - Not about “nice pictures”
 - About communicating ideas



What To Find In a Storyboard

- Illustrate a goal (for the task)
- How a task unfolds (people interacting among themselves and with devices)
 - Repeated for all significant steps
- At the end, how they accomplish their goals (satisfactory outcome)
- Storyboards are **all about tasks**

Example

This storyboard illustrates how the app had already downloaded the daily recipe to the user's smartphone, so he could look it up and check the shopping list while on the underground, before shopping for ingredients and making a healthy meal.



<http://alexmevissen.com/2014/07/16/storyboarding/>

Example

This storyboard illustrates how the app can show the user that a home cooked meal can be quicker than ordering food delivery, using left over ingredients in the fridge.



<http://alexmevissen.com/2014/07/16/storyboarding/>

Storyboards Should Convey...

- Setting
 - People involved
 - Environment
 - Task being accomplished
- Sequence
 - What steps are involved?
 - Not the detailed UI
 - What role the UI plays in helping users achieve their goal?
 - What leads someone to use the system?
 - The “trigger” for the task
 - What task is being illustrated?
- Satisfaction
 - What’s the motivation for the user?
 - The end point to reach after all the steps
 - What’s the end result?
 - What need are you “satisfying”?

Handling Dynamicity In Storyboards

- Traditional storyboarding
 - “Comic book” conventions: actors, speech bubbles, background
 - Notes attached to each scene explaining what is happening
- Scored storyboards
 - When the user interface is highly dynamic, or contains specific media elements
 - Add specific annotations focusing on movement, colors, sounds, ...
- Text-only storyboards
 - When the interaction behavior is too complex to compact into an illustration, use a longer text description

Why Hand-drawn?

- Quick
 - No need to spend time in graphics tools (they would “push” you to focus on details, too)
 - Able to experiment with different scenarios
- Imprecise
 - Users feel free to express more comments and suggestions w.r.t. a more “polished” version
 - Focus on the content (the graphics is obviously ignored)
 - No distraction by fonts, colors, icons, ...

Drawing Sketching People



Stick People



Block People



Blob People



Star People



Triangle People



Use Your
Imagination

Star man versatility



neutral



pointing



ballet

Benefits of Storyboards

- Emphasize how an interface accomplishes a task
- Focus the conversation and feedback on user tasks
- Get everyone on same page about the app's goals
- Avoid nitpicking about user interface details (buttons, etc.)

References

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 - <http://www.inf.ed.ac.uk/teaching/courses/hci/0708/lects/tasks.pdf>
 - https://www.tutorialspoint.com/human_computer_interface/design_process_and_task_analysis.htm
 - <https://www.slideshare.net/alanjohndix/hci-3e-ch-15-task-analysis>
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