

PART 5 – USER RESEARCH AND REQUIREMENTS

We Shall Discuss

- User Modeling
 - ▣ Know your user
 - ▣ Personas
 - ▣ Scenarios
 - ▣ Cultural Probes
- Task Analysis
 - ▣ What is task analysis?
 - ▣ General method for task analysis
 - ▣ Differences from other techniques
 - ▣ Approaches to task analysis
 - ▣ Task decomposition
 - ▣ Knowledge-based techniques
 - ▣ Entity/object-based techniques
 - ▣ Purpose of task analysis



User Modeling

Users

- The central message or the core of interaction design is: ***the user***
 - Yes, the user
 - ▣ at the beginning
 - ▣ in the process
 - ▣ at the end
- of the design process - (recall user-centered design)

Users

- **Know your users!**
- Who are they? [e.g., age, background, computer experience, etc.]
- Probably they are not like you! (watch out the temptation to design as if you were the main user)
 - ▣ Talk to them
 - ▣ Watch/observe them
 - ▣ Use your imagination
- Some methods for knowing your users (and also for collecting user requirements):
 - ▣ Personas
 - ▣ Scenarios
 - ▣ Cultural probes
 - ▣ Questionnaires
 - ▣ Interviews, Focus Group Discussions
 - ▣ Direct observation and indirect observations ... etc.

Users

Persona

- A rich picture of an imaginary/fictional/virtual person who represents the core user group
- A description of a user archetype that will be kept in mind when making design decisions

Users

Persona

- Develop a set of personas covering different types of intended users and different roles.
- Define the personas, with details such as:

- ▣ name
- ▣ age
- ▣ job title
- ▣ picture/photo
- ▣ physical characteristics
- ▣ background
- ▣ Goals ... etc.

- Can be narrative or otherwise

Background:

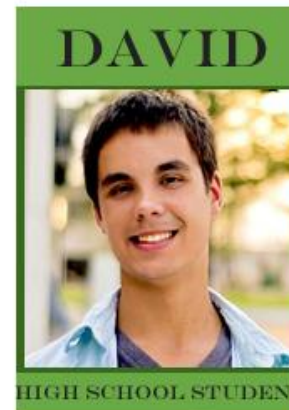
- 17, male
- Liverpool, UK
- High-school student
- Self-confident
- Using technology a lot for games and applications
- Social active
- Irresponsible

Motivations:

- A lot of friends
- Highly communicative
- Emotional
- Up to date with technologies
- Find a good university
- Be ready for fresher year
- Learning biology and physics

Frustrations:

- Choosing university
- Reading books
- Stressful to upset parents
- Spending a lot time at home
- Lack of concentration skills
- Moving away from parents



Lifestyle:

He is a student from Alsop High School in Liverpool. He is planning to study in UCL in London. David still does not know exactly what course he is interested in, but he has a huge passion for biology and physics. He is interested in successful studying in university, because he wants his parents to be proud of him.

David is very social active, he has a profile almost in every social network and has more than 1000 friends there. David usually spends his time with friends going to clubs, cinema and other entertainments. Before moving to London, David tries to find new friends online, especially who is already studying in UCL in biology and physics. He thinks they will help him to understand how to live and study in new university.

David does not like to sit home and read books, he uses Galaxy Note 3 regularly to chat with friends, to play games and use applications. He always wants to surprise his friends with a new record in the game by being in the top of ranking tables.



Users

Scenario / User Story

- A story for design
- A description that envisions a person's interaction with a system

Example:

It is Friday afternoon and Peter is flying out of Rome to Milan. He does not have enough money for a taxi to the airport, and he is running late. He goes to the local ATM and identifies himself. He specifies that he wants 150 Euro from his savings account. He would prefer to have the money in 20 Euro notes so that he can give the taxi driver the correct change. He does not want a printed receipt because he does not bother keeping track of transactions in his savings account.

More stories: <https://designmodo.com/user-stories-ux/>

Solution:? A solution should be suggested to solve problem identified in user story - Check single parents case study. NB: The solution is the prototype we design and develop

Users

Role of the Use of Scenarios

- Help us to **identify**:
 - ▣ **characteristics** of the user that may impact the design and tasks and context that the system needs to support.
 - ▣ Scenarios force us to think about the design in detail and notice potential problems before they happen; we can therefore verify whether the design would make sense to the user and whether the proposed implementation architectures would work.
- Be used to **communicate** with others (e.g. designers, clients, users)
 - ▣ it is easy to misunderstand one another whilst discussing abstract and technical ideas; scenarios being concrete/practical are thus easier to share.
- Be used to **validate** other models
 - ▣ a detailed scenario can be 'played' against other models e.g. task and dialog models.
- Be used to express **dynamics**
 - ▣ mere screenshots and pictures primarily give a sense of the appearance of the system; a scenario can give a sense of the behavior of the system.

Users

Cultural Probes

- Cultural probes are (typically small) information gathering packages of items designed to provoke or prompt the user/target group to record what is meaningful to them [user/target group].
- Cultural probes are handed out to the user/target group to take away and to open and to use in their [user's/target group's] own environment.
- Some of the items that a cultural probe may contain include: postcards, maps, camera, photo album, media diary,...



Users

Role and use of cultural probes

- Can be appropriate where direct observation is sometimes hard e.g., at home, with psychiatric patients, etc.
- Cultural probes can be used to: inform interviews, prompt ideas, culture designers.

Users

Interviews

- Props, e.g. sample scenarios of use, prototypes, can be used in interviews
- Good for exploring issues
- But are time consuming and may be infeasible to visit everyone

Focus groups

- Group interviews
- Good at gaining a consensus view and/or highlighting areas of conflict
- But can be dominated by individuals

Users

Questionnaires

- ❑ Often used in conjunction with other
- ❑ techniques
- ❑ Can give quantitative or qualitative data
- ❑ Good for answering specific questions from a large, dispersed group of people

Direct observation

- ❑ Gain insights into stakeholders' tasks
- ❑ Good for understanding the nature and context of the tasks
- ❑ But, it requires time and commitment from a member of the design team, and it can result in a huge amount of data

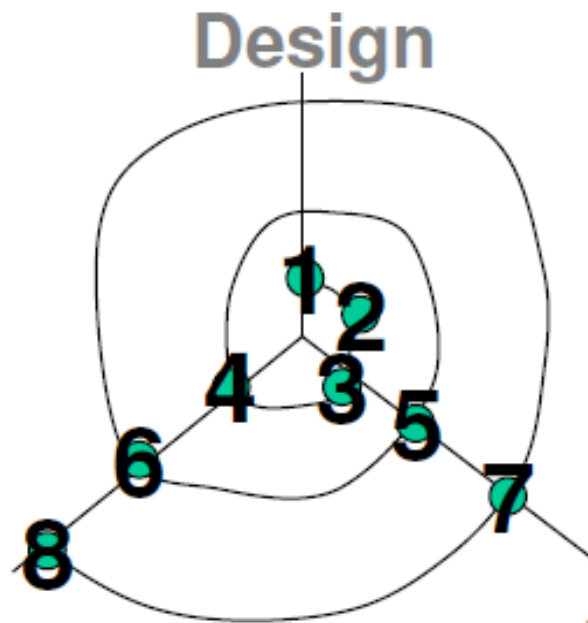
Indirect observation

- ❑ Not often used in requirements activity
- ❑ Good for logging current tasks



Task Analysis

RECAP - User Interface Design With the Iterative Design Model



1. Task analysis
2. Design sketches
3. Paper prototype
4. In-class user testing
5. Computer prototype
6. Heuristic evaluation
7. Implementation
8. User testing

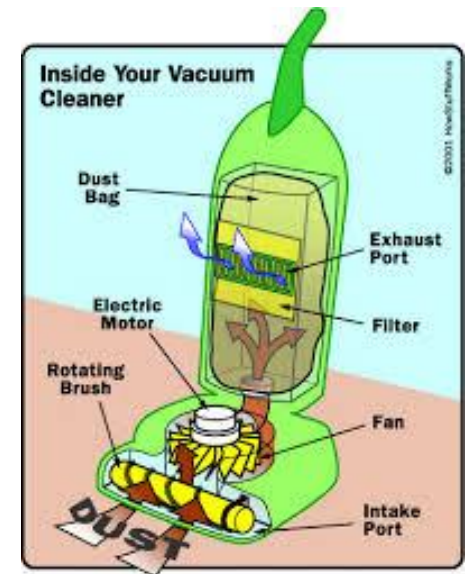
Task Analysis

- **Task** - This is an activity that has to be performed to achieve a goal
- **Task analysis** - It is the process of analyzing the way people perform tasks
- Task analysis refers to techniques that analyze:
 - ▣ what people do
 - ▣ what things they work with
 - ▣ what they must know

Task Analysis

For Example:

- In order to clean the house, One needs to do the following:
 - ▣ 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
- One works with things such as:
 - ▣ vacuum cleaner, the attachments, dust bags, etc.
- One must know about:
 - ▣ vacuum cleaners, their attachments, dust bags, rooms, etc.



General Method for Task Analysis

- The general method for task analysis entails:
 - ▣ observing the user's behaviour
 - ▣ collecting unstructured lists of words and actions
 - ▣ organizing using notation or diagrams
- Note that in task analysis, one should focus on
 - ▣ the user's objective observable behaviour (external actions)
- and not on
 - ▣ the user's internal mental model
- Assignment: Read on Mental Models
- <https://www.nngroup.com/articles/mental-models/>
- <https://www.interaction-design.org/literature/book/the-glossary-of-human-computer-interaction/mental-models>

Differences from Other Techniques

Task analysis **vs.**
the user - focus -

Systems analysis
system design

Task analysis **vs.**
external actions - focus -

Cognitive modeling
internal mental state

Purpose of Task Analysis

1. Requirement capture and system design
 - ▣ lift focus from system to use
 - ▣ suggest candidates for automation
 - ▣ facilitate presentation and discussion in an interdisciplinary team
 - ▣ improve understanding of the application domain
 - ▣ uncover user's conceptual model
2. User interface design
 - ▣ taxonomies suggest menu layout
 - ▣ object/action lists suggest user interface objects
 - ▣ task frequency guides default choices
 - ▣ task sequences guide dialogue design
3. Supporting evaluation of the system
4. Documentation and training/teaching

Approaches to Task Analysis

1. Task decomposition

- ▣ Splitting task into (ordered) subtasks

2. Knowledge based techniques

- ▣ What the user knows about the task and how it is organized
- ▣ The focus is on objects and actions
- ▣ Taxonomies are created to represent levels of abstraction

3. Entity/object based analysis

- ▣ relationships between objects, actions and the people who perform them

Task Decomposition

- Aims
 - ▣ Describe the actions people do
 - ▣ Structure them within task subtask hierarchy
 - ▣ Describe order of subtasks
- There are several variants:
 - ▣ Hierarchical Task Analysis (HTA): the most common
 - ▣ ConcurTaskTrees (CTT), by Fabio Paternò (Pisa): uses temporal operators
- The most popular is Hierarchical Task Analysis (HTA)

Hierarchical Task Analysis

- Hierarchical Task Analysis (HTA) is a task decomposition technique
 - It has Hierarchy + Plans
 - ▣ Hierarchy - hierarchy of tasks and subtasks
 - ▣ Plans - the order of subtasks and the conditions under which they are performed (note that only the plans denote the order)
 - Start with a user goal which is examined and the main tasks for achieving it are identified
- (see next four slides for illustration)

Textual HTA - Example 1

□ Hierarchy

0. in order to clean the house

1. get the vacuum cleaner out

2. get the appropriate attachment

3. clean the rooms

3.1. clean the hall

3.2. clean the living rooms

3.3. clean the bedrooms

4. empty the dust bag

5. put vacuum cleaner and attachments away

□ Plans

Plan 0: do 1 - 2 - 3 - 5 in that order. when the dust bag gets full do 4

Plan 3: do any of 3.1, 3.2 or 3.3 in any order depending on which rooms need cleaning

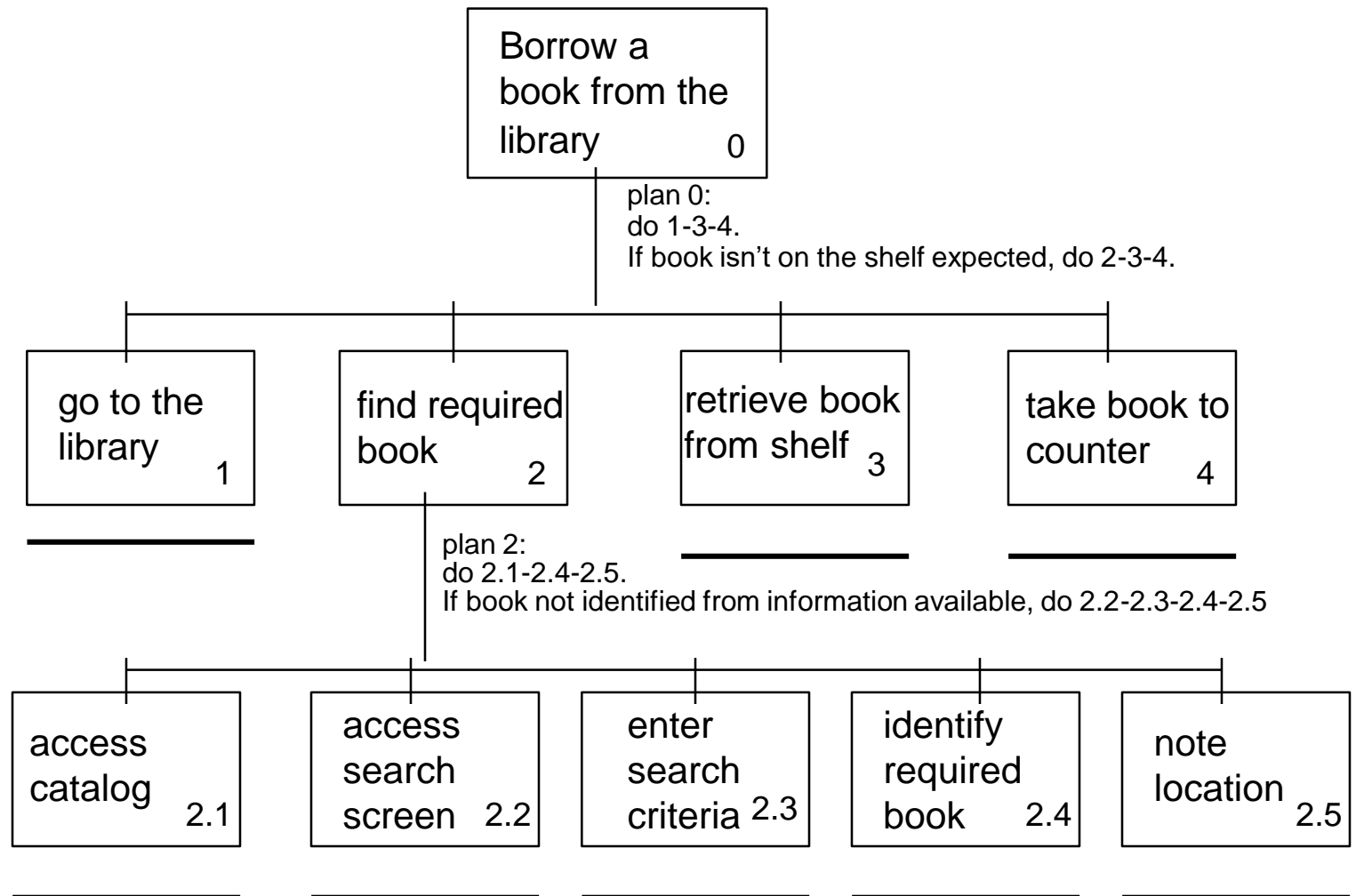
Textual HTA - Example 2

0. In order to borrow a book from the library
 1. go to the library
 2. find the required book
 1. access library catalogue
 2. access the search screen
 3. enter search criteria
 4. identify required book
 5. note location
 3. go to correct shelf and retrieve book
 4. take book to checkout counter

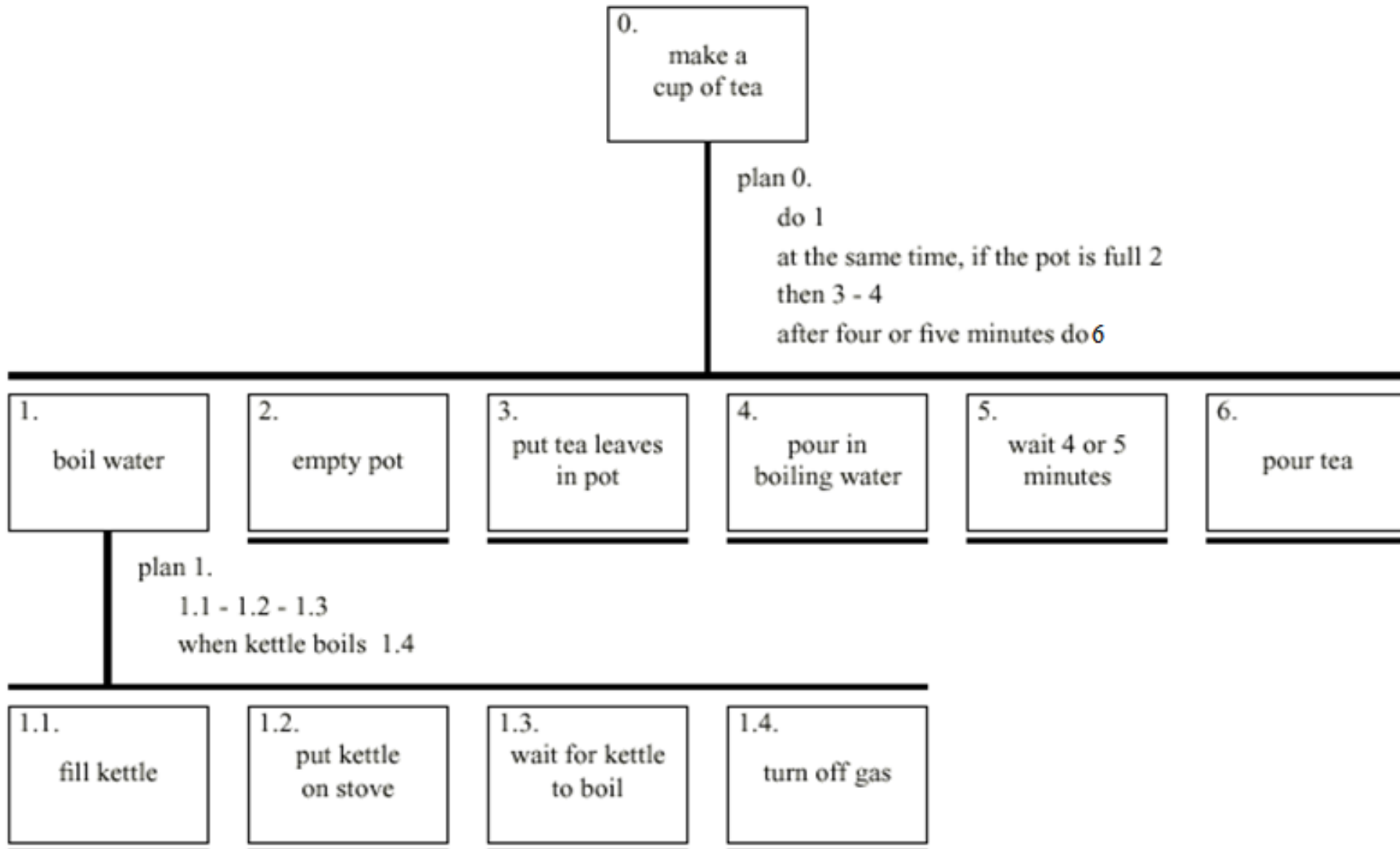
plan 0: do 1-3-4. If book isn't on the shelf expected, do 2-3-4.

plan 2: do 2.1-2.4-2.5. If book not identified do 2.2-2.3-2.4.

Diagrammatic HTA – Example 1



Diagrammatic HTA – Example 2



Reading Assignment:

- ▣ Task Decomposition method:
 - ConcurTaskTrees (CTT) - How do they work?
- ▣ Approaches to Task Analysis:
 - Knowledge-based Techniques - How does this work?
 - Entity/object based analysis - How does this work?