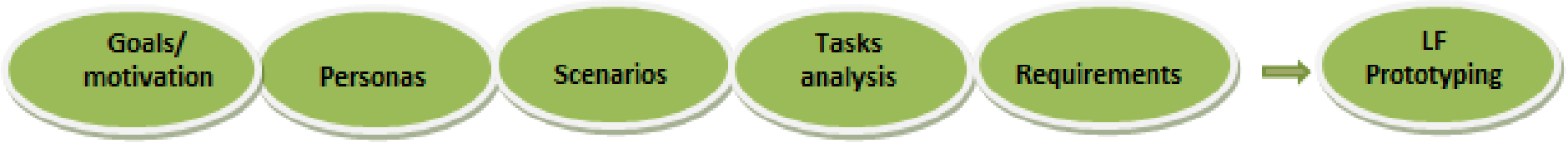
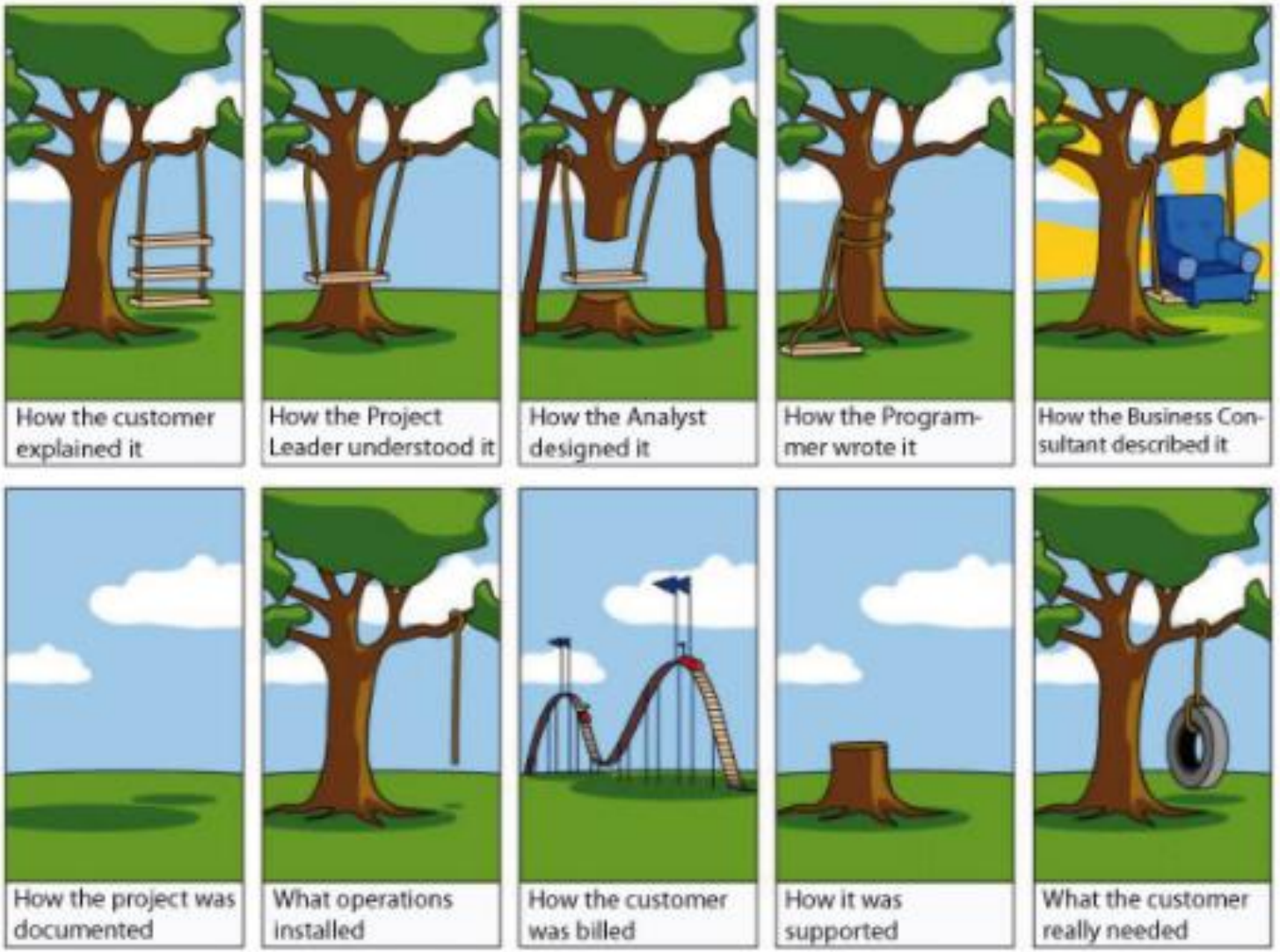
Universidade de Aveiro
Departamento de Electrónica,
Telecomunicações e Informática

Requirement Analysis for the Design of an Interactive System using a human-centered approach to support the mini-project



The problem of interactive systems design…



Human Centered Design of interactive systems

- Also known as User Centered Design (UCD)
- Complementary approaches to the design that should be used:

  Usability principles (technology independent)

  Usability paradigms (more technology dependent)

  Guidelines and standards (more specific)

- **S/W development technologies**
- **Evaluation**

Human-Centered Design Approaches

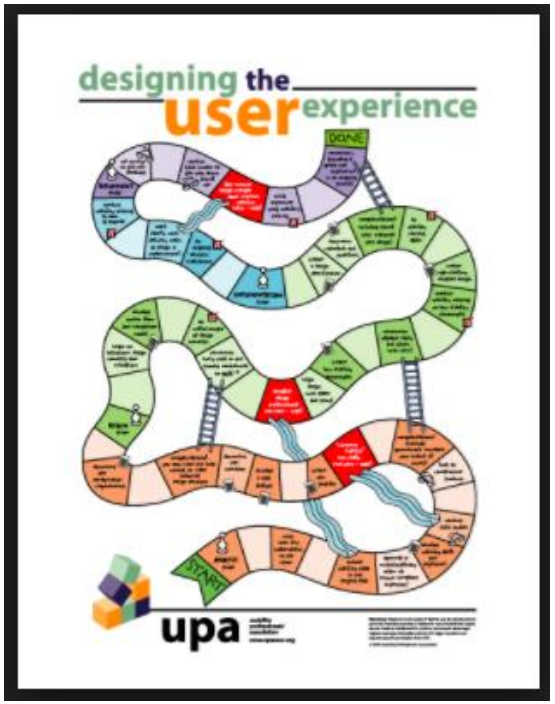
- There are several alternatives
- Are strongly **iterative**
- Involve **usability evaluation** in each cycle

User-Centered Design is another designation

- ISO standard 13407 (1999) - *Human centered design processes for interactive systems*:

"Human-centered design is an approach to interactive system development that focuses specifically on making systems usable. It is a multi-disciplinary activity."

- There are **several proposals of methodologies**
- All are **iterative**
- And **include usability evaluation** in iterations



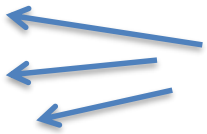
We must consider the situation at hand and ponder which are the best fitting and how to use them

https://uxpa.org/
https://www.w3.org/WAI/redesign/ucd
http://www.usability.gov/how-to-and-tools/methods/user-research/index.html

User Research Methods

There are a lot of methods; we must consider the situation at hand to select and adapt the ones we use:

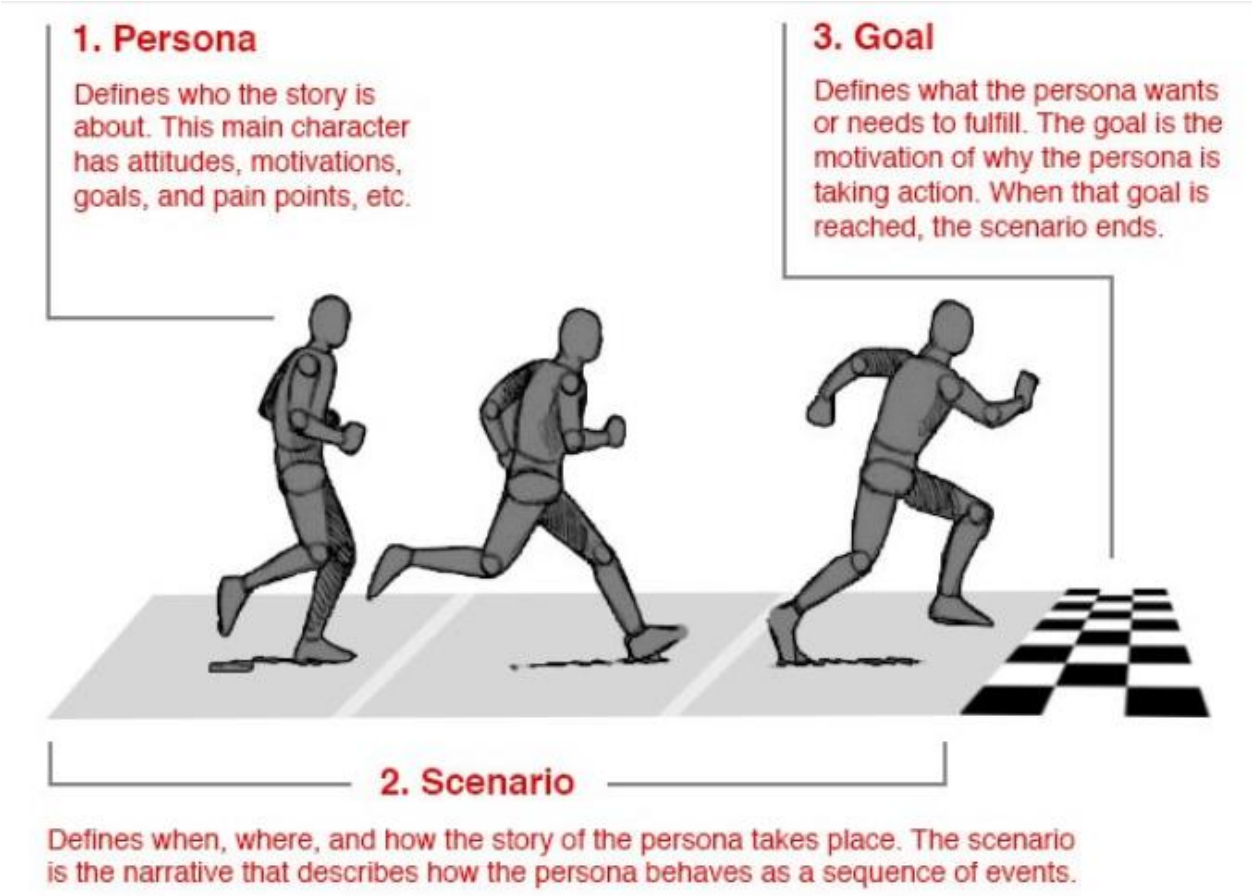
- Context interviews
- Focus groups
- Individual interviews
- On-line surveys
- **Personas**
- **Scenarios**
- **Task analysis**
- Activity analysis
- First click tests
- Usability testing
- …



Methods to use in the mini-project

http://www.usability.gov/how-to-and-tools/methods/user-research/index.html

Personas and scenarios



https://www.interaction-design.org/literature/article/personas-why-and-how-you-should-use-them

Personas

- **Fictional characters based upon user research** to represent the different user types that might use a service/product in a similar way

- make the design task less complex,
  and guide the ideation process

- help:
  - understand users' needs, experiences, behaviors and goals
  - step out of oneself and recognize that different people have different needs and expectations
  - uncovering universal features and functionality
  - create a good user experience for your target users

Types of Personas

- Several types (most based on previous user research):

  - **Goal-directed** Personas (Cooper, 2007)

  - **Role-based** Personas (goals + behavior)

  - **Engaging** Personas (goals + behavior + backgrounds)

  - **Fictional** Personas (based on assumptions, not user research)

- **Fictional personas can only be used as an initial sketch of user needs**

https://www.interaction-design.org/literature/article/personas-why-and-how-you-should-use-them

Best Practices for Developing Personas

- Create 3-4 personas of the product/service main audiences

- Conduct user research:
  - Who are the users
  - Why are they using the system?
  - What behaviors, assumptions, and expectations?

- Develop the appropriate descriptions of each persona's: background, motivations, and expectations

- Do not include too personal information
- Be relevant and serious

Elements of a persona

- Persona Group (i.e. web manager)
- Fictional name
- Job titles and major responsibilities
- Demographics such as age, and education
- The goals and tasks they are trying to complete using the product
- Their physical, social, and technological environment

Personas have no value in themselves, until they become part of a scenario they do not have real value!

Example of a Persona

Persona:	USDA Senior Manager Gatekeeper
Photo:	
Fictional name:	Matthew Johnson
Job title/ major responsibilities:	Program Staff Director, USDA
Demographics:	• 51 years old • Has a Ph.D. in Agricultural Economics.
Goals and tasks:	Spends his work time: • Requesting and reviewing research reports, • preparing memos and briefs for agency heads, and • supervising staff efforts in food safety and inspection.
Environment:	He is comfortable using a computer and refers to himself as an intermediate Internet user. He is connected via a T1 connection at work and dial-up at home. He uses email extensively and uses the web about 1.5 hours during his work day.

https://www.usability.gov/how-to-and-tools/methods/personas.html

Example of using personas in VR

Model the people who will be using the VR application

Help to prevent the design from being driven by design/ engineering convenience

Personas should
- **Not be too detailed**

- be validated in later stages

<table>
<tr>
<td> 
Name</td>
<td>• Job
• Experience
• Activities
• Attitude
• Competencies
• Age</td>
</tr>
<tr>
<td>• Problems
• Pain points
• Needs
• Concerns
• Fears
• Desires</td>
<td>• Knowledge of VR
• Dream VR system
• Vision of VR
• VR hardware access
• Budget for VR
• Activities that fit VR</td>
</tr>
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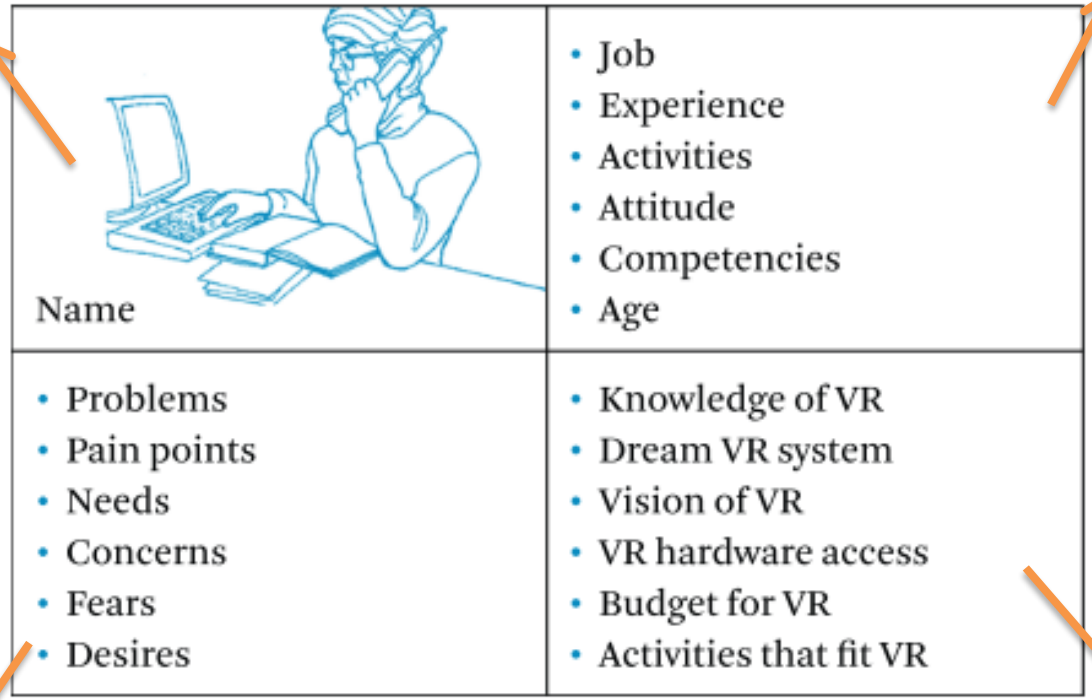
(Jerald, 2016)

Describe 2–4 characters representing the range of targeted users

Sketch/photo and name

Basic description of the person



Challenges the person has

Relation to type of system (VR in this case)

If personas are especially important (e.g., for therapy applications), then data should be carefully collected with interviews and/or questionnaires

More examples of personas from IHC 2020 miniprojects

Anna

Age: 22

Gender: F

Job: Freelancer

Background: During her free time she enjoys watching many TV shows on streaming platforms

Problem: She keeps missing the premieres because she never knows when they are coming out

Needs: Something to tell her when new episodes are coming out

IHC 2020 – Show tracker mini project

Persona	BookAddict user
Fictional Name	José Manuel
Job Title	Lawyer
Goals and Task	• Consulting his wishlist • Track the page of the book being read • Read others opinions about some book
Demographics	• 40 years old • Married • Father
Environment	Using his cellphone while he is on the train after work to know the page he was reading a determined book. He is an active reader and internet user.

IHC 2020 – BookAddict mini project

Personas: The Take Away

- **Personas are fictional characters based on user research to help understand**:
  - users' needs,
  - experiences,
  - behaviors
  - goals.

- Make the design task at hand less complex

- Guide the ideation processes, and help to achieve the goal of creating a good user experience for the target user group

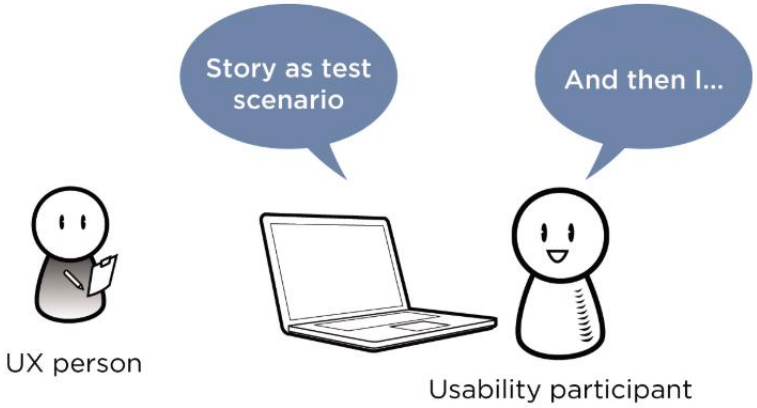
- The 10-step process covers the entire process from the preliminary data collection, through active use, to continued development of personas. https://www.interaction-design.org/literature/article/personas-why-and-how-you-should-use-them

Scenarios

- **Stories and contexts about how the user groups use a future product/service**

- Note the goals and questions to be achieved and sometimes define the possibilities of how the user(s) can achieve them on the product/service

- Scenarios are critical for
  - designing
  - usability testing



https://www.usability.gov/how-to-and-tools/methods/scenarios.html

https://www.interaction-design.org/literature/topics/user-scenarios

- Scenarios should be used in the ideation phase of a project
- Scenarios need to be based on research with users
- Do ***not*** represent ***all*** possible users
- Typically account for the ***most common*** users or user motivations
- Are commonly based on personas
- Can be used to determine the most important areas to test during usability testing, and to provide guidance to the test

https://www.interaction-design.org/literature/topics/user-scenarios

What to Consider When Writing Scenarios

- Good scenarios are concise but answer the following questions:

  - Who is the user? Use the personas

  - Why does the user uses the product? Note what motivates the user and their expectations, if any

  - What goals does s/he have? Use task analysis

  - How can the user achieve their goals with the product?

https://www.usability.gov/how-to-and-tools/methods/scenarios.html

Examples of scenarios from IHC 2020 mini-projects

Play a song on bluetooth device

IHC 2020 – Car dashboard mini project

Sean is tired of the car radio and wants to listen to the music on his phone

He connects his phone through bluetooth using the dashboard's settings menu

He goes to the audio menu and plays "Club Tropicana" through bluetooth

José is going home by train after a day of work. He wants to continue reading the book he was reading. He wants to know where he left his reading. To achieve his goal, he goes into the **application page tracker** and checks the current page.

1. Óscar went to the Aveiro é Nosso shop to purchase the general ticket for this year's Enterro and he wants to register the expense in the Leisure category
2. Óscar wants to show his parents the last month's expense distribution by category, to find out which one he spent most in

IHC 2020 – MoneyWiz mini project

New Episode Alert

- A few days before a new episode of a show comes out, the app sends a notification.

- The user can alter the time the notification comes, and can see a calendar with all upcoming episodes.

for Anna

Scenarios: The Take Away

- User scenarios are a **great way of communicating the key tasks a user** will perform with a system

- They can also help define the usability testing regime

- To create user scenarios is a simple process and should be used for developing and iterating interactive products

https://www.interaction-design.org/literature/topics/user-scenarios

Task Analysis

- The process of **learning about ordinary users** by observing them in action to understand in detail **how they perform their tasks** and **achieve** their intended **goals**.

- Helps identify the tasks that product/service must support

- Helps support other aspects of the user-centered design process

- It is important to perform a task analysis early in your process, in particular prior to design work

https://www.usability.gov/how-to-and-tools/methods/task-analysis.html

- **It is also useful for** understanding:

  - Users' goals and what they are trying to achieve
  - The steps that users currently take to achieve their goals
  - The personal, social and cultural experiences that users bring to the tasks
  - The influence of the physical environment on the users while attempting to meet a goal

https://www.interaction-design.org/literature/article/task-analysis-a-ux-designer-s-best-friend

- **Task analysis may be performed**:

  - in a more formal way (e.g. Hierarchical Task Analysis)

  or

  - in a **more informal way**:

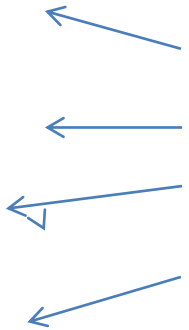
  - using several different methods

- First **use the 11 questions (at least 1, 2, 3 and 5)**

- Then **decompose the main tasks**

Standard/Informal Questions to be answered

1. **Who is going to use the system?**
2. **What tasks do they now perform?**
3. **What new tasks are desired?**
4. How are the tasks learned?
5. **Where are the tasks performed?**
6. What is the relationship between customer and data?
7. What other tools does the user have?
8. How do users communicate with each other?
9. How often are the tasks performed?
10. What are the time constraints on the task?
11. What happens when things go wrong?



Minimum set of questions to be answered

1. Who is going to use the system?

- Use **all the information obtained previously about the users** (e.g. to develop the personas), concerning:

  age, needs, motivations, background, experience, technology literacy, physical characteristics…

2. What tasks do they now perform?

- Identify the **tasks that users perform currently**, without using the system under development, including:

  relative importance, frequency of performing the tasks, if they are performed by one or more users, …

3. What new tasks are desired?

- Identify new tasks that might empower the users taking advantage of the new way of performing the tasks
- Be careful and prioritize the new tasks to support …

5. Where are the tasks performed?

- Observe the environment where users currently perform the tasks
- Identify other activities, the type of space (office, shop floor, hospital, class room, shopping mall, …), noise, light and dust conditions, stress level, …

How to conduct a Task Analysis

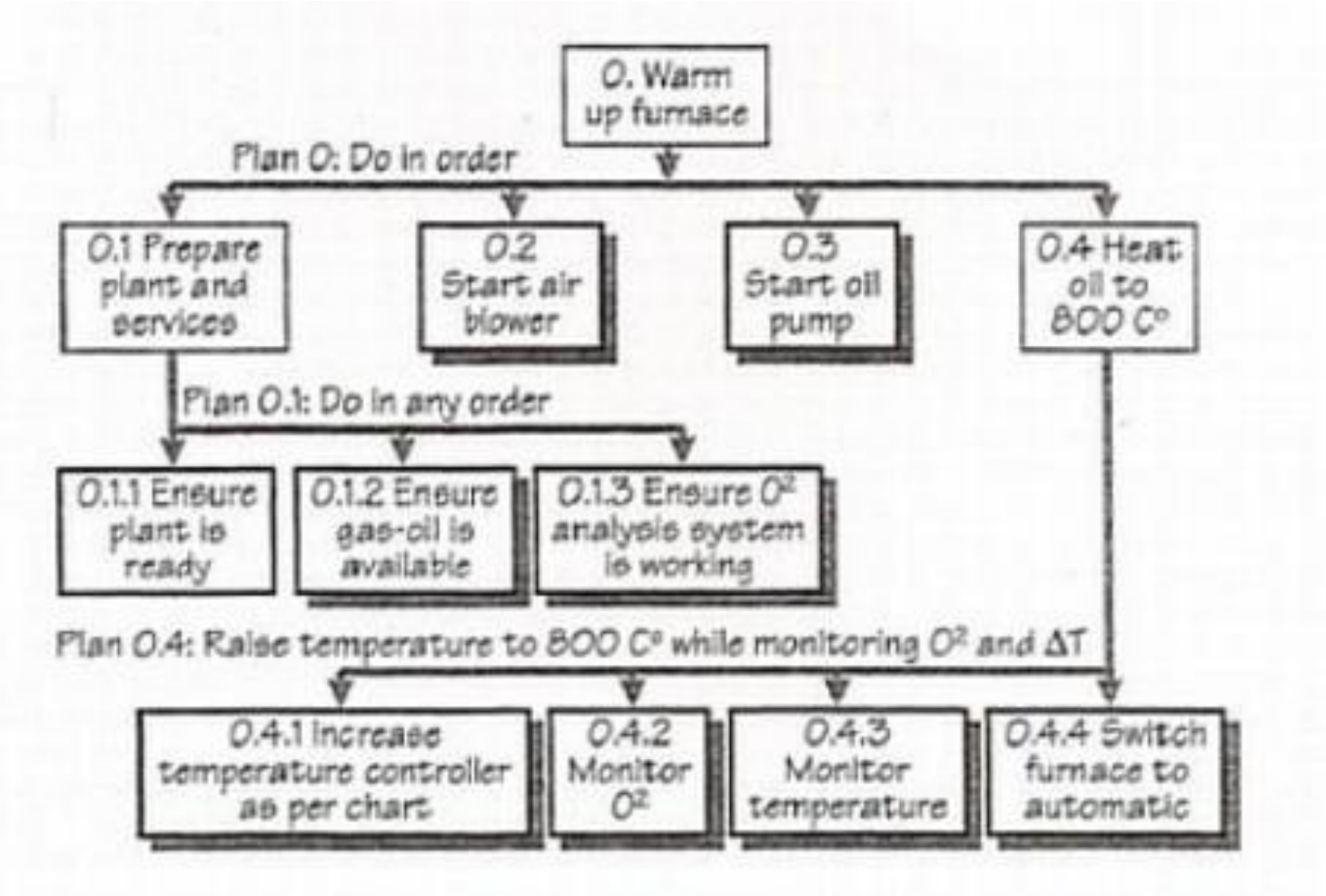
- Decompose a high-level task into the following steps:
  - Identify the task to be analyzed
  - Break this high-level task down into 4 to 8 subtasks
  - Draw a layered task diagram of each subtasks
  - Produce a written account as well
  - Present the analysis to someone else who knows the tasks

- The decomposition level of detail should be coherent across subtasks

http://www.usabilitybok.org/task-analysis

Example of a Hierarchical Task Analysis

Diagram for the goal: warm up a furnace



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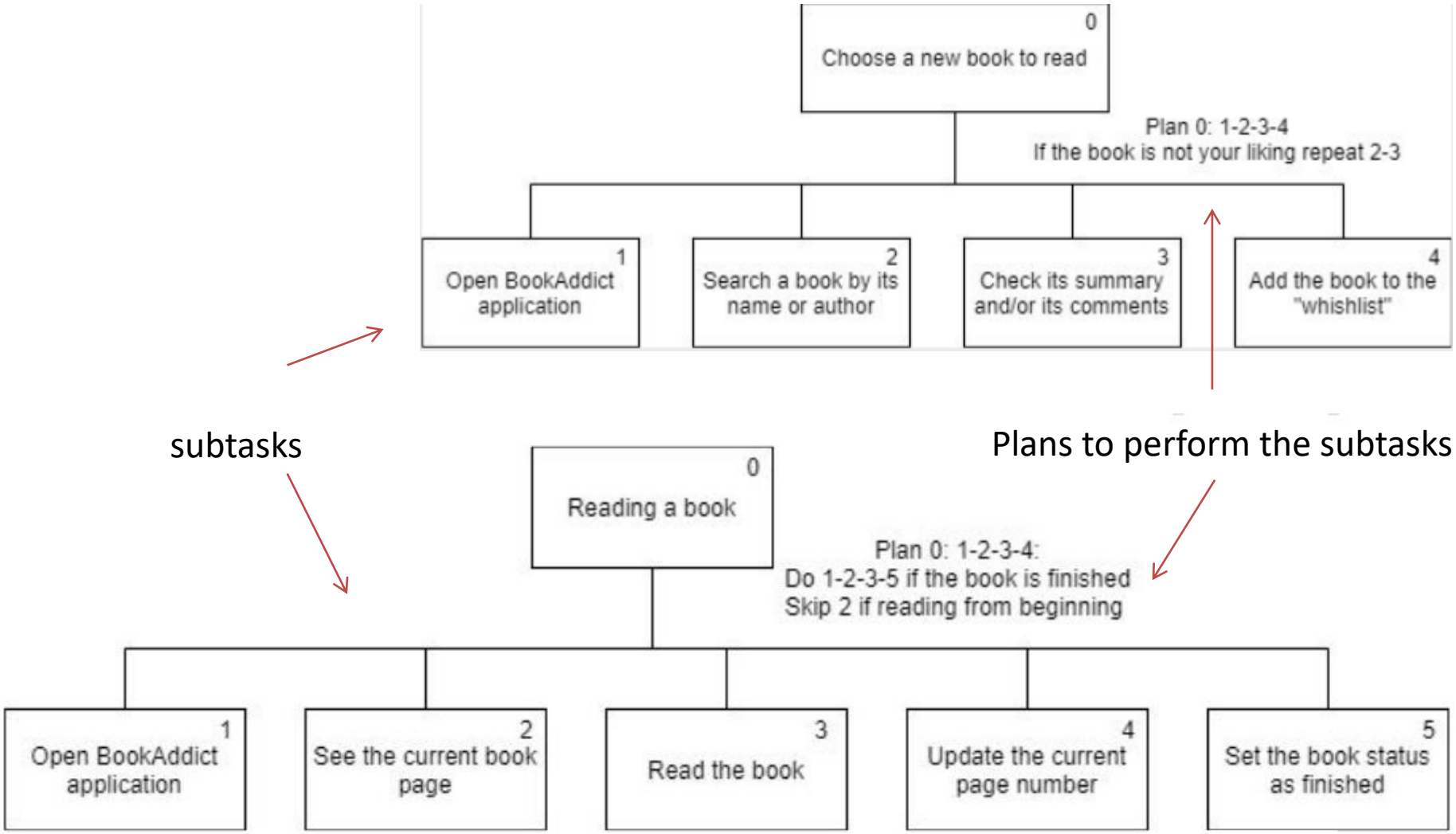
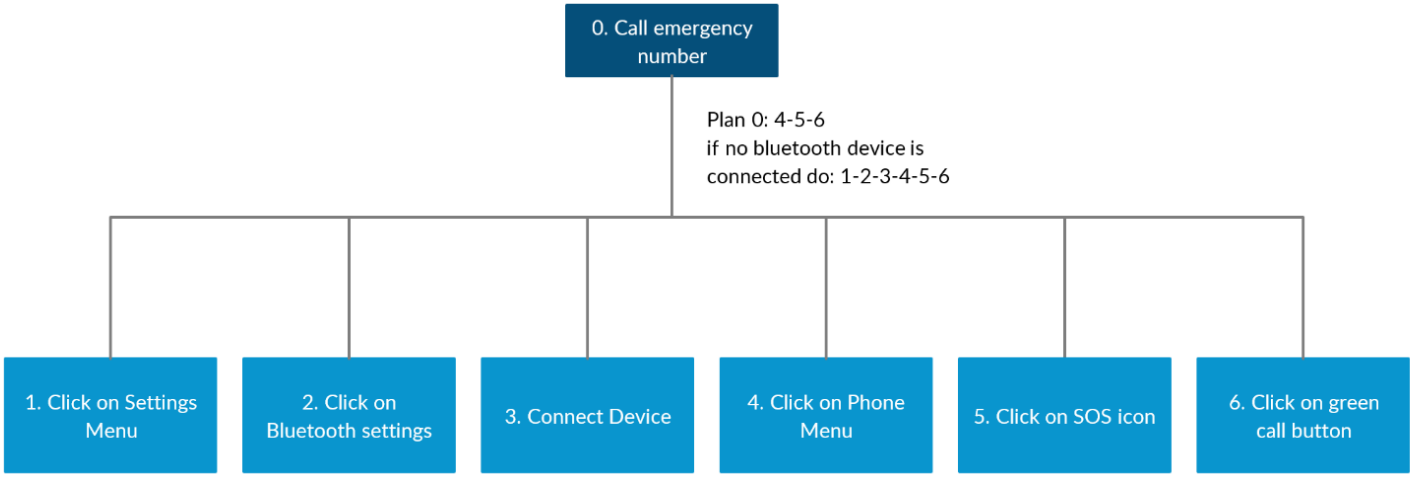
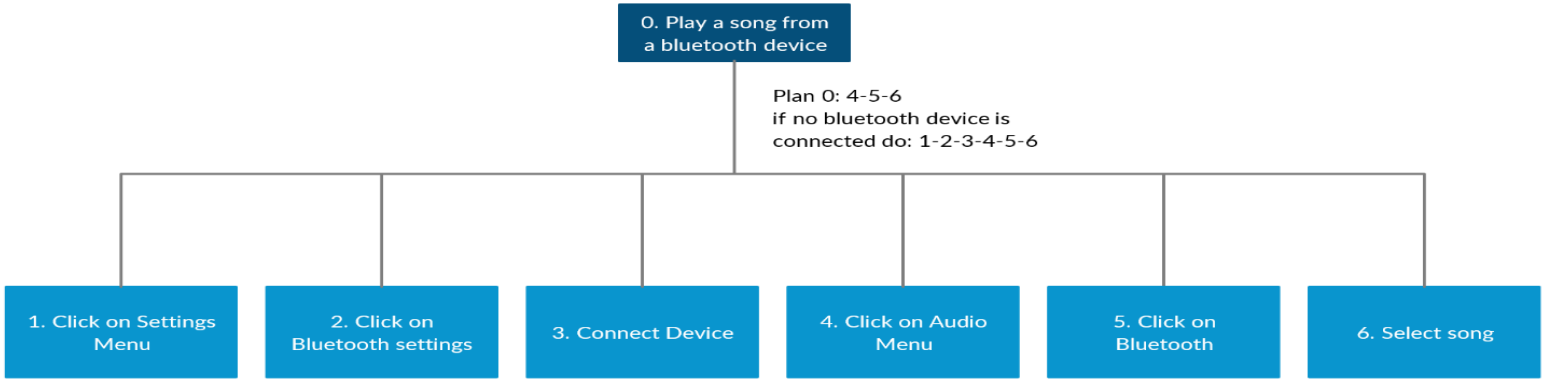
Examples of a task analysis using HTA from IHC 2020 mini-projects



Examples of task analysis using HTA from previous mini-projects





Task Analysis: The Take Away

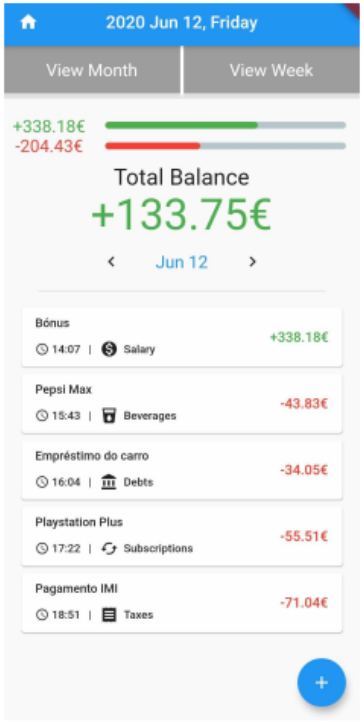
- Is one of the **most powerful tools in UX design**
- It is not hard to get to know how to do it
- The difficult part is remembering to keep the user's perspective
- It is useless when it is not backed by rigorous user research
- is not a one-off process; can repeated later in the process
- It requires time, resources, people and budget. Be sure to have a sufficient amount of all
- Like any other activity in UX design!

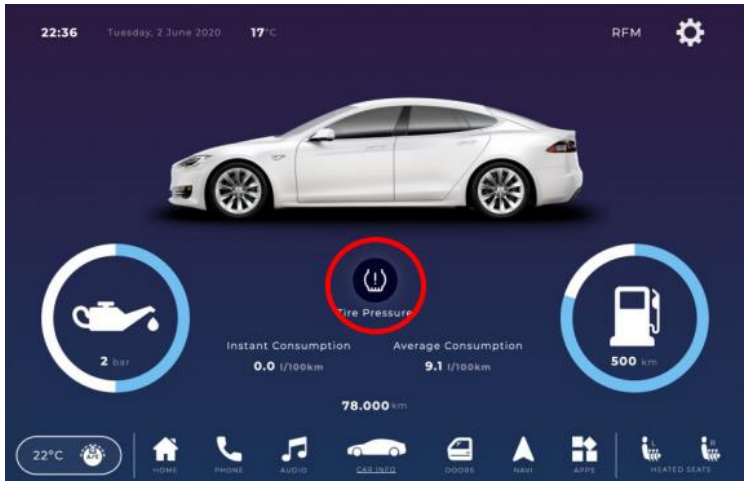
https://www.interaction-design.org/literature/article/task-analysis-a-ux-designer-s-best-friend

Acknowledgments:

To the authors of the recent years mini-projects:

- *BookAddict*
- *Car Dashboard*
- *MoneyWiz*
- *Showtracker*





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