

# USER RESEARCH

**HCI - L.EIC - FEUP - 2025**

# SUMMARY

- Why User Research
- Methods
- Ethnography and observation
- PACT

# INTERACTION DESIGN FOR A (RE)NEW(ED) PRODUCT/SYSTEM...

- Main people involved

- Stakeholders
- Designers
- Users

# USERS

- Those who will ultimately use the product
- Have needs and expectations (often not consciously)
- Their experience with the product will dictate the actual product's success
- Therefore, should be in the center of the process

-> User-Centered Design

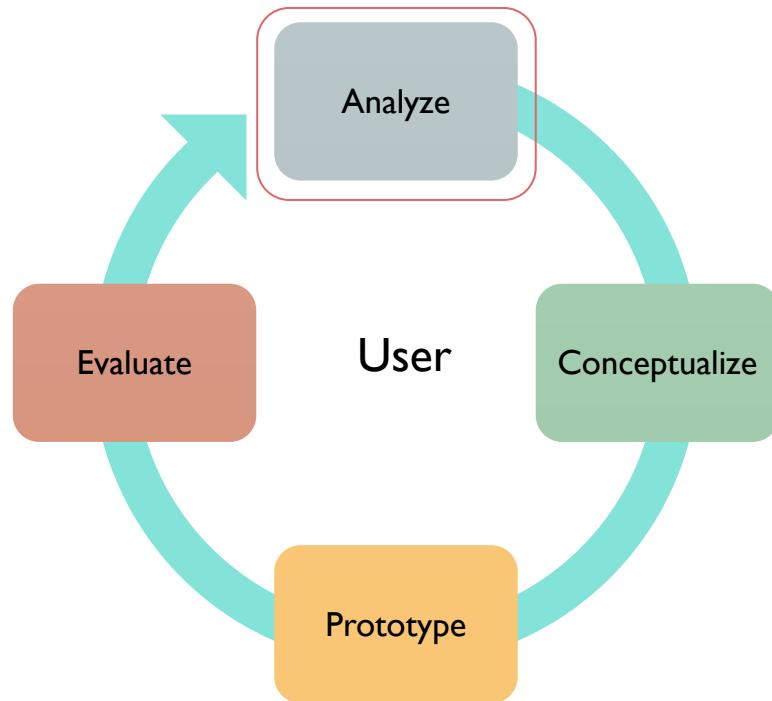
# STAKEHOLDERS

- Define the initial motivations and main goals
- Point to high-level requirements
- May be wrong in their assumptions of the user's needs and expectations

# DESIGNERS

- Research the users, to know their needs and expectations (and more)
- Understand the stakeholders and the product being proposed
- Bridge the gap between both, by designing and interacting over interfaces taking all into consideration

# THE ITERATIVE DESIGN CYCLE



# FOCUS OF THIS CLASS

- The initial steps, before an actual interface proposal
  - Initial briefing
  - **User research**
  - Requirement synthesis

# INITIAL BRIEFING

- Based on the **overall goals** by the stakeholders
- Should **not be too specific or constrained**
- Should **not assume** much about the users or the interface
- Will be detailed/refined with the results of user research

# USER RESEARCH

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Focus on:

- potential **users**
- their **characteristics**
- the tasks they **need/want** to accomplish
- the **context** in which they operate
- their **expectations**

# WHY RESEARCHING USERS?

- To create a **usable and useful interface** for the users
- Because **we are not the users**
- Early understanding **saves time, money and frustration** later

# WHO ARE THE USERS?

- The ones that will **use** the product/system in the end
- Not necessarily who decides to buy the product, or who is creating the product
- A product **may have more than one type** of target users
  - E.g. doctor and nurse
  - May justify different interfaces

# WHAT TO KNOW ABOUT THEM?

- How they are defined
- How they differ individually
- How their expertise evolves during product usage

# HOW ARE THEY DEFINED?

- What they know about the tasks
  - Previously known, recently introduced, new
  - How they have learned them
  - Their level of expertise
- What they know about the tools
  - they currently use
  - How they use them
- What mental models they have
  - How they interpret internally the system
  - What vocabulary they associate with elements and tasks -> conceptual model

# HOW DO THEY DIFFER INDIVIDUALLY?

Within a user population, there are individual differences that may lead to sub-groups of users

- Personal traits
  - e.g. learning methods or work methods
- Physical differences
  - Visual acuity, hearing, disabilities, age-related features
- Cultural differences
  - LTR vs RTL, expressions, symbols, age-related (e.g. teenager vs adult)
- Motivation and attitude differences
  - Eager for new things vs resistance to change

# HOW THEIR EXPERTISE EVOLVES DURING PRODUCT USAGE

- **Beginner**
  - Doesn't know initially what to do,
  - Afraid to fail
  - Focus on tasks required
  - Previous experience with other systems may help
  - May become advanced beginner in a relatively short period
- **Advanced beginner**
  - Loses fear
  - Knows enough to execute needed tasks, and focuses on that
  - Create an empirical mental model, oriented to their usage
  - 80% of the users don't go over this level
  - This is a level for which to optimize the interface design

# HOW THEIR EXPERTISE EVOLVES DURING PRODUCT USAGE

- **Competent**
  - By longer exposure create a solid mental model
  - Can predict and plan better how to execute a task
  - Can diagnose and solve problems
  - Recognize that and are willing to learn more to do more/better
- **Expert**
  - Highly motivated
  - Uses the product as integral part of their activity
  - Create their own processes, and keep pushing the system
  - Typically are a very small fraction of the user base

# USER TYPES AND THEIR CHARACTERISTICS

Topics	Beginner	Advanced Beginner	Competent	Expert
<b>Fears</b>	Fear of failing and unknown			
<b>Focus</b>	Execute needed work	Execute needed work	Execute more complex tasks	Develop mental model
<b>Learning</b>	Do tasks instead of concepts	Do tasks instead of concepts	Do tasks and learn concepts	Concepts and theories beyond regular use
<b>Mental Model</b>	Rudimentary (if any)	Developed as tasks are executed	Consistent model of the interface as a whole	Broad and consistent
<b>Problem solving</b>			Simple problems	Complex problems

# TASK ANALYSIS APPROACHES

- **Formal**
  - Structured list of tasks, flow diagram
  - Adequate for existing systems, where there are processes already defined
- **Informal**
  - Follow a more exploratory approach to uncover the users needs
  - **Adequate for creating new designs (or redesigning processes) – our case**

# USER RESEARCH METHODS

# HOW CAN WE DO THIS RESEARCH?

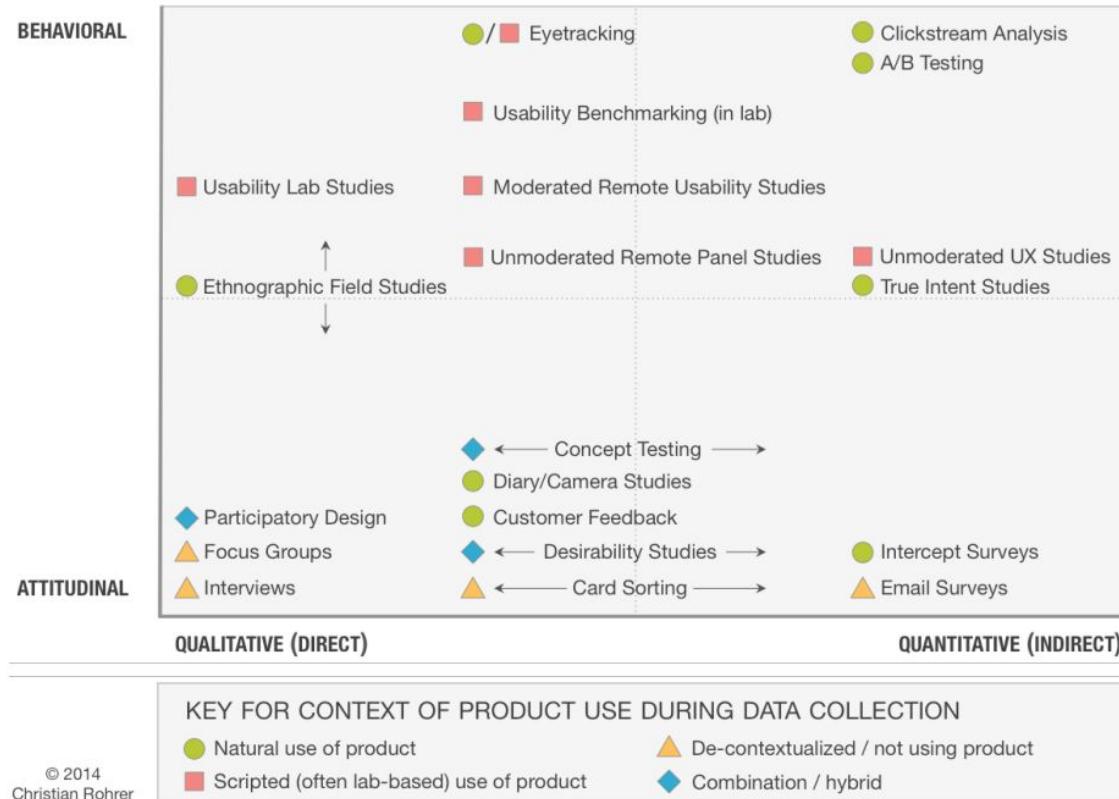
- Attitude vs behavior
- Qualitative vs Quantitative
  - Quantitative:  
numeric and quantifiable information  
e.g. task completion time
  - Qualitative:  
observational and subjective information of the experience  
e.g. questionnaire

BEHAVIORAL

ATTITUDINAL



# A LANDSCAPE OF METHODS



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## 20 UX Methods in Brief

Here's a short description of the user research methods shown in the above chart:

**Usability-Lab Studies:** participants are brought into a lab, one-on-one with a researcher, and given a set of [scenarios that lead to tasks](#) and usage of specific interest within a product or service.

**Ethnographic Field Studies:** researchers meet with and [study participants in their natural environment](#), where they would most likely encounter the product or service in question.

**Participatory Design:** participants are given design elements or creative materials in order to construct their ideal experience in a concrete way that expresses what matters to them most and why.

**Focus Groups:** groups of 3–12 participants are lead through a discussion about a set of topics, giving verbal and written feedback through discussion and exercises.

**Interviews:** a researcher meets with participants one-on-one to discuss in depth what the participant thinks about the topic in question.

**Eye-tracking:** an eyetracking device is configured to precisely measure where participants look as they

# IMPLICIT VS EXPLICIT

- Implicit
  - Eye/user tracking
  - Observation studies
  - Task and reaction measurements, ...
- Explicit
  - Questionnaires/Surveys
  - Self report
  - Think aloud protocol, ...

# ETHNOGRAPHY AND OBSERVATION

# ETHNOGRAPHY

- Aims to achieve an in-depth understanding of a culture
  - what members do,
  - why they do it,
  - what they experience while doing it, and
  - how their action fits their culture
- do it through long-term engagement and analysis

# ETHNOGRAPHY FOR DESIGN

- Help designers and engineers inform design of systems to support work domains
  - Could not rely solely on their experiences
- Enable people to participate in the development of systems for them
  - Impossible to integrate technology without co-designing it

# CHARACTERISTICS OF ETHNOGRAPHY

- **Contextual**
  - performed where people live, work, act
- **Naturalistic**
  - avoids (intentional) manipulation of existing conditions
- **Longitudinal**
  - sustained engagement with the setting under study
- **Collaborative**
  - research performed together with participants
- **Interpretative**
  - researcher is deeply involved in research and is part of it
- **'Being there'**
  - effort to pursue experiences as community members

# OBSERVATION

Monitoring the behaviour and activities of individuals and communities, to gain in-depth understanding about them

- ‘Basic set’ of focuses:
  - What people do
  - What people say
  - How people do it
  - Why they do it
- ‘Design set’ of focuses:
  - What works well and what doesn’t
  - What tools are involved in actions
  - What knowledge and expertise people mobilize
  - What are the breakdown points
  - What people do when they find breakdowns

# DIFFERENT FORMS OF OBSERVATION

- Direct observation
- Shadowing (follow someone around)
- Diary studies (filled by participants)
- Interviews
- Experience sampling (prompts to solicit data sent at specific times)
- Data logging
- ...

PACT

# PACT ANALYSIS FRAMEWORK

- **People**
  - relevant user characteristics and skills
- **Activities**
  - how is the activity **currently** carried out?
  - Why? What can be improved?
- **Context**
  - the environment of the activity
- **Technologies**
  - what tools are used **now**, and how might new developments be used?

# PEOPLE

- **Physical attributes**
  - (age, gender, size, reach, visual angles, etc...)
- **Perceptual abilities**
  - (hearing, vision, heat sensitivity...)
- **Cognitive abilities**
  - (memory span, reading level, musical training, math...)
- **Personality and social traits**
  - (likes, dislikes, preferences, patience...)
- **Cultural and international diversity**
  - (languages, dialog box flow, symbols...)
- **Special populations, (dis)abilities**

# PEOPLE - EXAMPLES OF CAPABILITIES

- **Size of hands**
  - may affect the size and positioning of input buttons
- **Motor abilities**
  - may affect the suitability of certain input and output devices
- **Height**
  - if designing a physical kiosk
- **Strength**
  - a child's toy requires little strength to operate, but greater strength to change batteries
- **Disabilities**
  - (e.g. sight, hearing, dexterity)

# ACTIVITIES (CURRENT)

- **Regular or unusual, weekly? Yearly?**
  - frequent tasks should be easy to do;
  - infrequent tasks should be easy to learn or remember
- **Well-defined or vague**
- **Continuous or interrupted**
  - user may need to 'find their place' again
- **Current task practices**
- **Individual vs co-operative work**
- **Multi-tasking vs serial tasks**
- **Passive vs active, Quality vs quantity trade-off**
- **Data input requirements**
- **Length of time on tasks**
  - peaks and troughs of working, need for fast response
- **Coping with errors**
  - presentation of error messages,
  - how to deal with them,
  - how the system accommodates them,
  - significance of errors,
  - safety-critical errors

# TASKS AND ACTIVITIES VS GOALS

- **Understand the user goals**
  - Understand WHY they are performing a particular activity or task.
  - Tasks and activities are intermediate steps that help someone to reach the goals.
- **Approaches**
  - Goal-Oriented Design (Alan Cooper, “About Face 3”)
  - Activity-Centered Design (Don Norman, “Emotional Design”)
- **Focuses**
  - User job is focused on tasks
  - Designer job is to look beyond the task to identify who the users are and determine what are their goals and why.
- **Task and activity analysis is useful at the detail level, but only after user goals have been analysed.**

# ACTIVITIES

- **Users**

- rarely know what is possible
- can't tell you what they 'need' to help them achieve their goals

- **Designers**

- Try to understand their goals and
- Look their activities and tasks:
  - their context
  - what information do they require?
  - who collaborates to achieve the task?
  - why is the task achieved the way it is?

# ACTIVITIES

## Basic guidelines

- Talk to and observe users doing what they do in their ACTIVITIES
- List each GOAL
- List each and every TASK
- Break tasks down into STEPS
- ABSTRACT into standard tasks
  - monitor, diagnose, predict, control, inspect, transmit, receive, decide, calculate, store, choose, operate, etc.

# CONTEXT

- **Physical environments**
  - noisy, cold, wet, dirty, stressful, uses dangerous materials, sunny
- **Social environments**
  - channels of communication, structure, centralization vs decentralization, home, mobile, training materials
- **Organizational context**
  - relationships with customers, other staff, effect on work practices and job content, role, job loss, shift in power
- **Circumstances under which activities happen**
  - time, place, pressure of work/time
- **Amount and type of support for activities**
  - tuition, manuals, demonstrations, new knowledge, new skills

# TECHNOLOGIES

- **Input**
  - Getting data in; getting commands; security
- **Output**
  - Characteristics of different displays (e.g. video vs. photographs; speech vs. screen)
- **Communications**
  - Between people, between devices, speed, etc.
  - What is connected to what?
- **Size of screen**
- **GUI, touch, command?**
- **Sound?**
- **Networked or stand alone**
- **Online or offline?**
- **Real-time systems**
- **Safety critical systems**
- **Walk-up-and-use systems / Office systems / Website**

# REMEMBER...

It is an analysis, so it should first be approached considering the CURRENT state of affairs...

# PERSONAS

# WHAT ARE PERSONAS?

“A Persona is a user archetype you can use to help guide decisions about product features, navigation, interactions, and even visual design”

(Perfecting Your Personas by Kim Goodwin)

“Personas provide us with a precise way of thinking and communicating about how users behave, how they think, what they wish to accomplish, and why.”

“Personas help a team avoid designing for themselves.”

(Alan Cooper)

# WHAT THEY ARE NOT

“A Persona is Not...

- Based on demographics or market segments
- Drawn from gut feelings about your audience
- User profiles or stereotypes”

(From Adaptive Path’s Case Study on PayCycle)

# HOW TO CREATE?

While interviewing potential users, although many are very different, patterns begin to emerge putting the users into distinct group sets.

These groups are defined by:

- Motivations
- Needs
- Frustrations / “Pain-Points”

(Cooper, About Face 3: The essentials of Interaction Design)

# PERSONA EXAMPLES

## Melissa



“ It's not about me.  
it's about my girls. ”

### AT A GLANCE

AGE — 41

LOCATION — Chicago, IL

LIFE STAGE — Divorced with two kids

JOB — Corporate procurement manager

### MOTIVATORS

**FAMILY** — Doing what's right for her kids and looking after her parents are the most important things in her life.

**BEING HELPFUL & APPRECIATED FOR IT** — She gets a lot of pride from being productive, effective, and helpful. Being thanked and acknowledged for it is the motivation that keeps her going.

**FEELING HAPPY & GRATEFUL** — Melissa gets frustrated and frazzled because she's always running, but really she values being happy and tries to appreciate all the good things in her life, particularly after a difficult divorce.

### BEHAVIORS

**TIGHTLY SCHEDULES THE DAY** — The morning routine to get the kids off to school and herself off to work is locked in. She's busy at work all day and tends to spend the majority of her day in meetings. The evening routine is equally structured. When her ex has the girls, she goes out with a friend for dinner or catches up on the phone.

**VOLUNTEERS** — At kids' school and church.

**SPENDS TIME WITH EXTENDED FAMILY** — Parents live and sister's family live nearby. Most weekends she visits their house or they visit hers.

**TALKING ON THE PHONE AND "CATCHING" UP VIA FACEBOOK** — Likes to talk on the phone with girls friends and her sister. Late at night after work she hops on FaceBook to achieve the same sense of connection.

### NEEDS

- Social connection
- Would like to start dating again
- Exercise and "me" time
- Would like to just sit and unwind, but feels like she's usually so amped up from her schedule that simply resting feels wrong

# PERSONAS

- Rich description of one of a set of typical users
  - Name, photograph, some personal details regarding e.g. leisure times and occupations
  - user's skills, attitudes, tasks and environment
  - described specifically ("has a dog named Billy" instead of "has a dog")
- not a real person, but a realistic one, that can be related to
  - should not be based on or use data of someone you know

# PERSONA EXAMPLES



Julia's Cafe / Ideal User Persona

## Janelle Robinson

Age: 26

Status: Undergraduate

**Customer Profile:** A busy PhD Student who needs a quiet place to study and read without distractions. She spends a lot of time on campus, refuels often and is a major coffee lover. She is the ideal customer for Julia's Cafe. She wants to receive quick and professional service; order online from her smartphone to avoid lineups, and not deal with over-conversational staff members.

### Motivations

- High quality, strong coffee.
- Quiet atmosphere for studying.
- On or close to the college campus.

### Frustrations

- Hates waiting too long for her coffee.
- Doesn't want to be bothered by the staff while studying.
- Actually relies on strong coffee to help her concentrate later in the day.

### Goals

- She needs information on the type of coffee a cafe serves, in order to determine the quality.
- She wants to find the menu and the daily specials as quickly and easily as possible.
- She wants to order with her smartphone, avoid the usual line-up, and experience minimal distractions.

### Favorite Coffee Beans

- Ethiopian Yirgacheffe Coffee
- Sumatra Mandheling Coffee
- Ethiopia Charbanta Natural

# 10 RULES TO CREATE PERSONAS

- Keep them simple and memorable
- They should be separated by goals, not behavior
- Focus on satisfying the widest audience, not the sales audience
- Add a little personal detail, but not so much they appear phony
- Focus on 3 or 4 goals per persona
- Create personas in context of a specific project
- Personas represent behavior patterns not job/role descriptions
- Keep your persona set small
- There is not a direct correlation between market segments and personas
- Focus on goals, not tasks. Tasks are things we do to achieve goals

# CONTEXT/ACTIVITY SCENARIOS

- Personas should be complemented with a series of context/activity scenarios
- A description – story – of a **context** in which an **activity** is carried out through our product/system – **but without UI details!**
- Example:
  - Paulo wants to know quickly how much one of his employees spent on food and travel expenses last week. He accesses the company's employees section, selects the person in question and consults the history of the last recorded expenses.

# USER RESEARCH

**HCI – L.EIC – FEUP – 2025**

Slides by Rui Rodrigues

Parts based on Bruno Giesteira's slides (FBAUP) and Teresa Galvão (FEUP)