Interactive Systems

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Doble Grado en Ingeniería Informática y Matemáticas
Universidad de Granada

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Índice general

1. Research Methods for Interactive Systems Design

When designing interactive systems, it is crucial to understand the design space:

- Users: needs and requirements
- Situation: what is the current state of the problem
- Context: location, legislation, culture, etc.

There are different types of research methods:

- Quantitative / Qualitative: Quantitative methods involve collecting and analyzing numerical data, while qualitative methods focus on understanding human behavior and the reasons behind it.
- In situ / In Laboratory: In situ research is conducted in the natural environment of the users, while laboratory research takes place in a controlled setting.
- Unstructured / Structured: Unstructured research allows for more flexibility and exploration, while structured research follows a predefined plan and methodology.

In order to design effective interactive systems, *triangulation* is often used, which involves combining multiple research methods to gain a comprehensive understanding of the design space. During the following sections, we will explore various research methods that can be employed to gather all the needed information.

1.1. Ethnography

Ethnography is a research method that is founded on participation rather than observation, with the goal of not only understanding what people do but also why they do it and how they feel about it. It involves immersing oneself in the users' environment to gain insights into their behaviors, motivations, and experiences.

- It is a qualitative, in situ and unstructured research method that uses induction.

It switches from observing participation to participating observation:

Observing Participation The researcher observes the users' activities and interactions without actively engaging in them.

Participating Observation The researcher is actively involved in the users' activities and interactions, allowing for a deeper understanding of their experiences and perspectives.

Some methods used in ethnography include:

- Field Diary: Personal notes taken by the researcher during their immersion in the field, capturing observations, thoughts, and reflections.
- Cameras: Used to document the environment and interactions, providing visual data for analysis.
- Diary Studies: Participants keep a diary of their activities and experiences.
- People receive package with material for documentation: Participants are given materials to document their experiences, such as cameras or notebooks. After a certain period, the researcher collects the materials and analyzes the data to gain insights into the users' behaviors and experiences.

1.2. Action Research

AR is a research method that is based on the idea of taking action to solve a problem while simultaneously conducting research to understand the problem and its context. As opposed to ethnography (where the researcher is an insider but does not change the environment), in AR the researcher is an insider and changes the environment.

- It is a qualitative, in situ and unstructured research method. It uses induction, but its generalization is difficult because it is context-specific.

AR involves a cyclical process of planning, acting and examining the results, with feedback loops that allow for continuous improvement and adaptation of the interventions. The three main steps of AR are:

1. Planning: The researcher identifies a problem and develops a plan to address it. *"Unfreezing"* the current state of the problem is crucial to allow for change, as it involves breaking down existing habits and behaviors that may be resistant to change.
2. Acting: The researcher implements the plan and takes action to address the problem. This may involve introducing new technologies, processes, or interventions to improve the situation.
3. Examining the results: The researcher evaluates the outcomes of the actions taken and reflects on the effectiveness of the interventions. *"Refreezing"* the new state of the problem is important to ensure that the changes are sustained over time, as it involves reinforcing new habits and behaviors that have been established.

1.3. Research through Design

RtD is a research method that is based on the idea of using design as a means of inquiry and exploration. It involves creating prototypes and artifacts not to solve a specific problem, but to gain insights and understanding about the design space and the users' needs and requirements.

- It is a qualitative, in situ and usually unstructured research method.

It is a cyclical process that involves four main steps:

1. Selecting a problem: The researcher identifies a problem or area of interest to explore through design.
2. Designing a solution: The researcher creates a prototype or artifact that addresses the selected problem or area of interest.
3. Evaluating the solution: The researcher evaluates the prototype or artifact to gain insights into the design space and the users' needs and requirements.
4. Reflecting on the results: The researcher reflects on the insights gained from the evaluation and uses them to inform the next iteration of the design process.

It has several benefits, such as:

- It shows technical opportunities and challenges that engineers may not have thought of.
- Exposes the gaps between the theory and practice of design.
- Changes current practices, therefore opening up new design spaces.
- Reveals designer patterns and assumptions, which can be used to inform future design decisions.

1.4. Field Deployment

Field deployment is a research method that involves deploying a prototype or artifact in the users' natural environment to gain insights into its use and effectiveness. It allows researchers to observe how users interact with the prototype in real-world settings, providing valuable feedback for further design iterations. Testing it in the lab is not enough, as it may not capture the complexities and nuances of real-world use. There are 7 main steps in field deployment:

1. Finding a Setting: There are three different types of settings:
    - Convenience: Deployment within the researcher's own environment. Not representative, and participants may be biased.
    - Semi-Controlled: It involves knwon and unknown participants. It can be more representative, but it may still have some biases.

   - In the Wild: Deployment in the users' natural environment to almost unknown participants. It is the most representative, but needs more robust prototypes.

2. Defining Goals: The fundamental goal is increasing understanding of the prototype that generalizes beyond the specific deployment.

3. Recruiting Participants: They should be representative of the target user population, also taking into account the researcher's group.

4. Designing Data Collection Instruments: Both qualitative (e.g., interviews, observations) and quantitative (e.g., measured time to complete a task, error rates) data collection instruments should be designed to gather comprehensive insights into the users' interactions with the prototype.

5. Conducting the Deployment

6. Ending the Deployment: Taking the prototype away from the users can be a difficult process, as it may have become an integral part of their daily lives. It is important to plan for this transition and provide support to users as they adjust to the change.

7. Analyzing the Data