



University of M'sila Faculty of Mathematics and Computer Science Department of Computer Science

INFORMATION GATHERING TECHNIQUES

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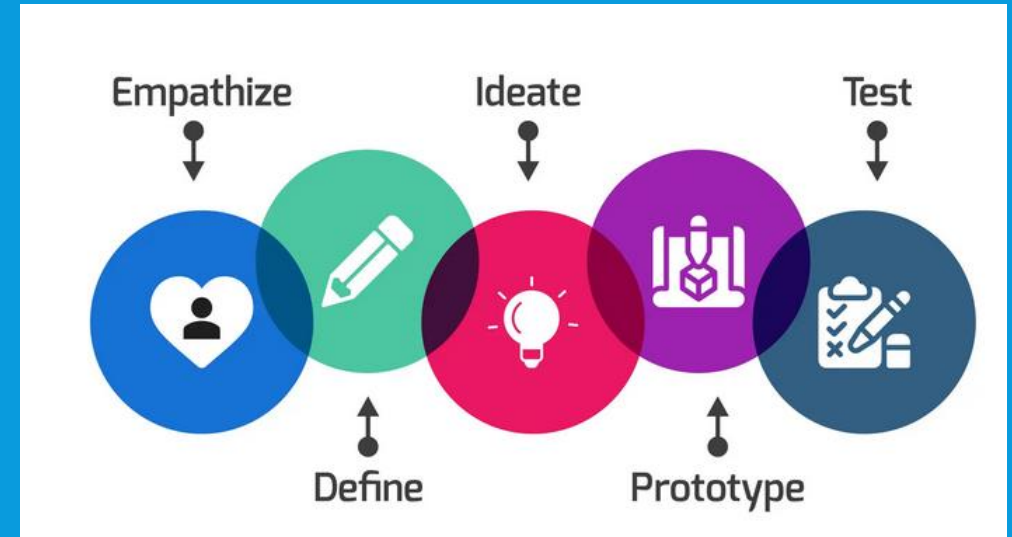
HCI DESIGN METHOD

- An HCI design method is generally divided into three phases:
 - Analysis: identifying the expectations and needs of users, understanding their tasks and the context
 - Development: creating all or part of an interface: wireframe/mock-up/prototype
 - Evaluation: measuring the usability of the created interface, the satisfaction of users in performing tasks with this interface, identifying areas for improvement for the next version, etc.

HCI DESIGN METHOD: DESIGN THINKING

Design thinking is a human-centered approach to innovation . b y deeply understanding customer needs, rapidly prototyping ideas, and iterating based on real-world feedback. Its aim is to develop a product with a design that solves users' problems and meets their needs.

- It is based on 5 stages. For each of these stages, tools are used.



HCI DESIGN METHOD: DESIGN THINKING

- 1/Empathy: aims to understand the client's objectives and especially to grasp the expectations and needs of its users,
 - Tools: Observation, user interviews, analytical data.
- 2/Definition: aims to define the problems and needs of end-users, the tasks they will need to carry out, the budget and the time required.
 - Tools: Personas, scenarios....
- 3/Ideation: aims to generate ideas for innovative solutions, and to select the best ideas,
 - Tools: Brainstorming, scenarios.
- 4/Prototype: the goal is to develop the best ideas by building a prototype
- 5/Test: aims to test the prototype for validation. This stage is an iteration occurring throughout the construction of the solution to adjust it to the users' needs.

HCI DESIGN METHOD: DESIGN THINKING :EMPATHY

- How to gain empathy towards your users.
- To gain empathy in the design thinking process, use a combination of **observation**, **engagement**, and **immersion** to understand users' experiences :

1. Observation

- Watch users in their environment: Observe people as they go about their daily lives and interact with products or services.
- Shadowing: Follow a user's routine, like a student's distance learning schedule, to understand their day-to-day challenges.
- Observe without intruding, taking note of their behaviors, expressions, and context.

HCI DESIGN METHOD: DESIGN THINKING- EMPATHY

- **2. Engagement**

- Conduct empathy interviews: Talk to users directly to understand their beliefs, values, and feelings.
- Ask open-ended questions: Frame questions that can't be answered with a simple "yes" or "no" to encourage deeper conversation. Examples include, "How did that activity make you feel?" or "What would you change about that activity?".
- Listen actively: Pay close attention to both what is said and what is not said, and be prepared to ask "why" to dig deeper into motivations.
- Leave assumptions behind: Adopt a beginner's or child's mindset to stay curious and avoid biasing the conversation with your own assumptions.

HCI DESIGN METHOD: DESIGN THINKING- EMPATHY

- 3. Immersion
 - Step into their shoes: Participate in the activities your users do to gain a firsthand understanding of their experiences.
 - Experience it yourself: Try using the product or service as they would, and reflect on the physical, emotional, and sensual aspects of the experience.

HCI DESIGN METHOD: DESIGN THINKING-EMPATHY

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HCI DESIGN METHOD: DESIGN THINKING- DEFINITION

- The Define step is where you analyze and synthesize the information gathered during the "Empathize" phase to frame a clear, actionable problem statement.
- **Key actions in the Define step**
 - Synthesize information: Bring together all the data collected about users, their behaviors, and their needs from the Empathize phase.
 - Identify core problems: Analyze the synthesized information to find the root causes of user challenges and needs, rather than just symptoms.
 - Frame the problem: Create a clear, specific, and inspiring problem statement or "design challenge" that the team can work from.
 - Set project objectives: Establish clear project goals and delimit the scope of the solution you are trying to create.

HCI DESIGN METHOD: DESIGN THINKING-IDEATE

- The "ideate" step in the design thinking process is the stage for generating a large quantity and variety of ideas to solve a problem.
- This is a judgment-free zone where brainstorming and creative techniques are used to think outside the box, challenge assumptions, and explore unconventional solutions before evaluating them.
- **Key aspects of the ideate phase**
 - Quantity over quality: The initial goal is to produce as many ideas as possible, deferring judgment on feasibility until later.
 - Divergent thinking: It focuses on exploring many possibilities and new angles to find innovative solutions, rather than settling for the first good idea.
 - Judgment-free environment: Participants are encouraged to share ideas without criticism to foster a safe space for wild and unconventional thinking.

HCI DESIGN METHOD: DESIGN THINKING-PROTOTYPE

- The "prototype" step in the design thinking process is when teams create tangible, often low-cost and scaled-down, versions of their ideas to test and refine them.
- **Purpose of the prototype step**
 - Bring ideas to life: Convert abstract ideas into a physical or digital format that can be interacted with.
 - Test and validate: Evaluate the practicability of a design and see how users will react to it.
 - Gather feedback: Collect insights from users and stakeholders to understand what works and what doesn't.
 - Reduce risk: Catch and fix flaws early, saving time and money by avoiding costly mistakes in later development stages.
 - Inspire new solutions: The process of testing a prototype can reveal new problems or lead to new, improved solutions.

HCI DESIGN METHOD: DESIGN THINKING-PROTOTYPE

- How to approach prototyping
 - Start simple: Begin with low-fidelity prototypes like paper sketches, storyboards, or simple wireframes to quickly explore ideas without heavy investment.
 - Build what's needed: Focus on creating a prototype that is "just enough" to test the core ideas and answer your key questions.
 - Vary fidelity: Move to higher-fidelity prototypes (more realistic and interactive models) only when necessary to test specific details of the design.
 - Test with real users: Put the prototype in front of potential users, observe them quietly, and listen to their feedback without over-explaining how it's supposed to work.
 - Learn and iterate: Use the feedback to refine the prototype, or even go back to earlier phases to redefine problems if the prototype reveals a misunderstanding.

HCI DESIGN METHOD: DESIGN THINKING-TEST

- The TEST step is the final phase of the design thinking process where prototypes are put in front of real users to gather feedback and validate solutions.
- **Key activities in the TEST phase**
 - Observing users: Watch how target users interact with the prototype to understand their experience and identify pain points.
 - Gathering feedback: Conduct direct conversations, usability testing, or beta launches to collect feedback on the prototype's usefulness, usability, and overall experience.
 - Identifying flaws: Use the feedback to quickly highlight design flaws that need to be addressed.
 - Refining the solution: Make necessary improvements to the prototype based on user feedback.
 - Iterating: If significant issues are found, the process may loop back to earlier stages like ideation or even empathy to create new solutions or better understand the problem.

INFORMATION GATHERING TECHNIQUES

- The information to be collected for designing an HCI is:
 - Information about users (e.g., for building personas)
 - Information about users' tasks
 - Information about existing or to-be-designed interfaces

There are several techniques for gathering information; each technique can be used in:

- A context: environment and usage constraints: Leisure (to make the product appealing), industry (to increase productivity), mobile... Technical context: platform, legacy code...
- users: several profiles, varied characteristics
- A design phase:
 - for analysis: to understand the market, the task, the users
 - for evaluation (cf. user testing course)

INFORMATION GATHERING TECHNIQUES BRAINSTORMING

- **Objectives:**
 - to generate a large number of creative ideas to solve a problem
- **Means**
 - the participants (design team) imagine solutions
- **Procedure**
 - bring together a small group with different roles and expertise
 - limit the time (1 hour)
 - describe a specific design problem
 - phase 1: generate a large quantity of ideas, involve everyone, record all ideas without evaluating them
 - phase 2: rank the ideas based on their quality; each person announces the ideas they prefer
 - the ideas are ranked by number of votes
 - start the design based on the highest ranked ideas
 - do not forget unusual ideas

INFORMATION GATHERING TECHNIQUES: OBSERVATION

- Laboratory or field procedure
- choose at least 2 users who will act independently
- decide what you want to measure
- define a specific mission
 - solve a problem,
 - run a scenario...
- ask users to perform the task
 - simple direct observation
 - with thinking aloud explanation (intrusive method)
 - in pairs to observe their interactions (questions, explanations)
- record the interactions, then analyse them

INFORMATION GATHERING TECHNIQUES INTERVIEW/SURVEY

- **Objective:** identify design avenues for the next iterations or problems encountered by users
- **Protocol:**
 - Representative panel of users (in individual mode)
 - Interview the user in their work environment (face to face)
 - Prioritise recording (audio/video) over note-taking (traces and focus on the exchange)
 - Recommended duration of 1 hour
 - Neutrality of the interviewer during the incident

INFORMATION GATHERING TECHNIQUES INTERVIEW/SURVEY

- **Procedure:**

- interview the user in their work environment
- ask them to recall a particular problem experienced in the recent past
- ask them to describe each incident in detail
- ask them what is usual and what is not in the incident
- Ask semi-directive questions during the analysis (degree of freedom)
- Ask more directive questions during the evaluation (e.g., target a specific element)
- Rephrase the answers

INFORMATION GATHERING TECHNIQUES QUESTIONNAIRE

- **Objective:**
 - economically summarise the opinions of many users
- **Protocol:**
 - Representative panel of users (recipients of the questionnaire)
 - Choose methods of dissemination and retrieval (e.g., online application, email, paper version)
 - Choose how to analyse the results (automatically/manually)
 - Use an appropriate type of questions:
 - Open questions,
 - directed, multiple-choice
 - Scale, rankings

INFORMATION GATHERING TECHNIQUES FOCUS GROUP (COLLECTIVE INTERVIEW)

- **Objective**

- understand the market, the task, the users

- **Means**

- gather users (4-7, max. 10) representative of the target audience
- post-its, boards, paper, pencil
- facilitator + observed/filmed session

- **Procedure**

- start with an ice-breaker activity
- informal directed exchanges on the subject studied, through supporting activities
- synthesis of expressed ideas

INFORMATION GATHERING TECHNIQUES CARD SORTING

Objective

- work on the organisation of the application's features
- the information architecture

▪ Means

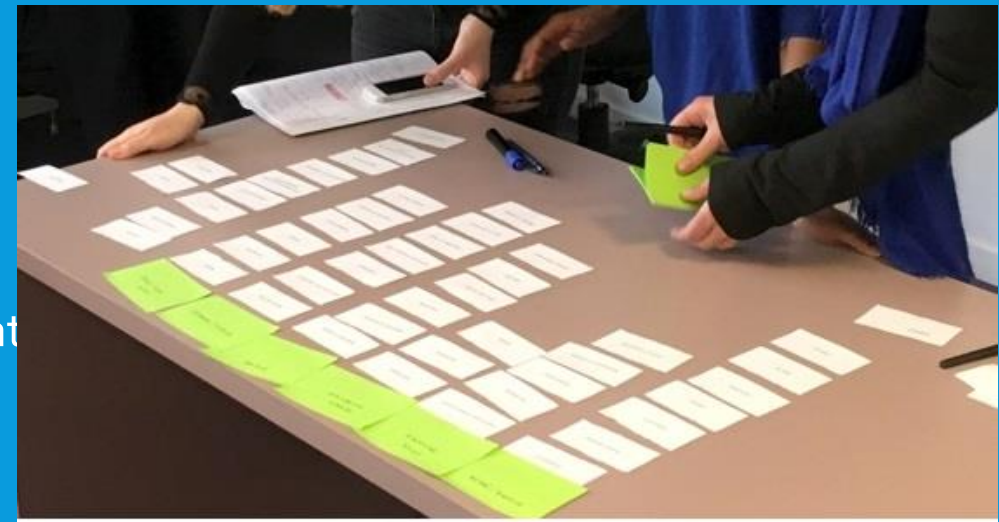
- gather representative users of the target audience
- represent each feature with a card

▪ Procedure

- 1 card = 1 feature of the application or 1 piece of information
- users group the cards that go together
- then name the groups (menus)

▪ Variants

- open card sorting: unconstrained groups
- closed card sorting: the groups are already defined

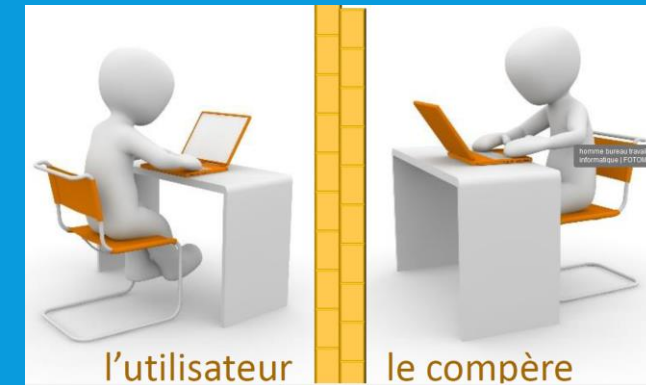


INFORMATION GATHERING TECHNIQUES PARALLEL DESIGN

- **Objectives**
 - work on the screens
 - have design ideas, identify the strong points
- **Means**
 - gather representative users of the target audience
- **Procedure**
 - each user (or pair...) sketches/creates an interface
 - comparison of interfaces, discussion
 - the best ideas are retained

INFORMATION GATHERING TECHNIQUES WIZARD OF OZ

- **Objective:**
 - to obtain information about a non-existent or partially developed system by simulating the absent functionalities.
- **Protocol:**
 - Adapted for heavy systems, difficult to develop
 - A confederate (wizard) carries out the actions instead of the system
- **Procedure:**
 - the user has the impression of using a real system
 - the confederate interprets and processes the actions/inputs of the user
 - they fill in the gaps and control the behaviour of the system

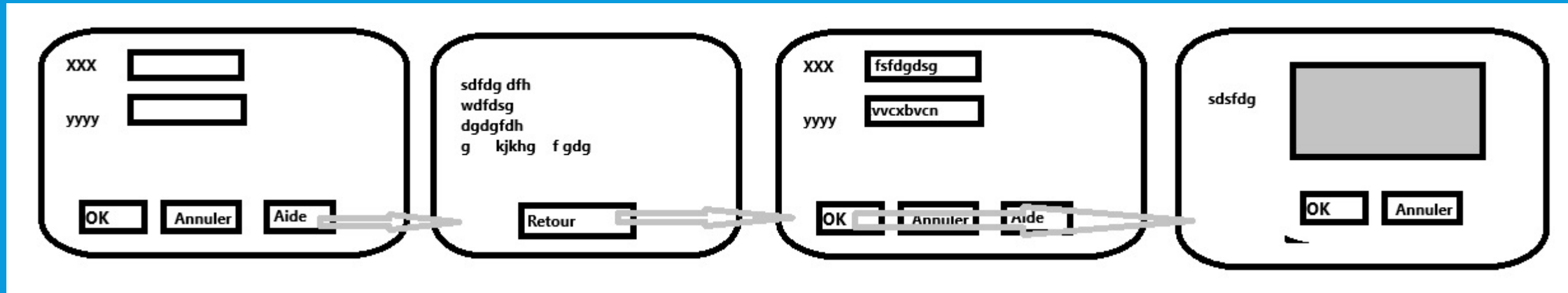


INFORMATION GATHERING TECHNIQUES STORYBOARD

- A storyboard is a sequence of sketches that describe part of the interaction
- **Objective:**
 - to create a realistic description of the use of the system
- **Protocol:**
 - Use film storyboards for an overview of interactions to solve a task
- **Procedure:**
 - Identify existing tasks (typical and unusual)
 - Create working scenarios by generalising the stories
 - mix events from different sources
 - incorporate unusual situations into typical activities
 - include situations that succeed and others that do not

INFORMATION GATHERING TECHNIQUES STORYBOARD

- A storyboard is a sequence of sketches that describes part of the interaction
- **Objective:**
 - to create a realistic description of how the system is used



A/B TESTING INFORMATION GATHERING TECHNIQUES

Objective:

to evaluate the performance of two design alternatives for a component

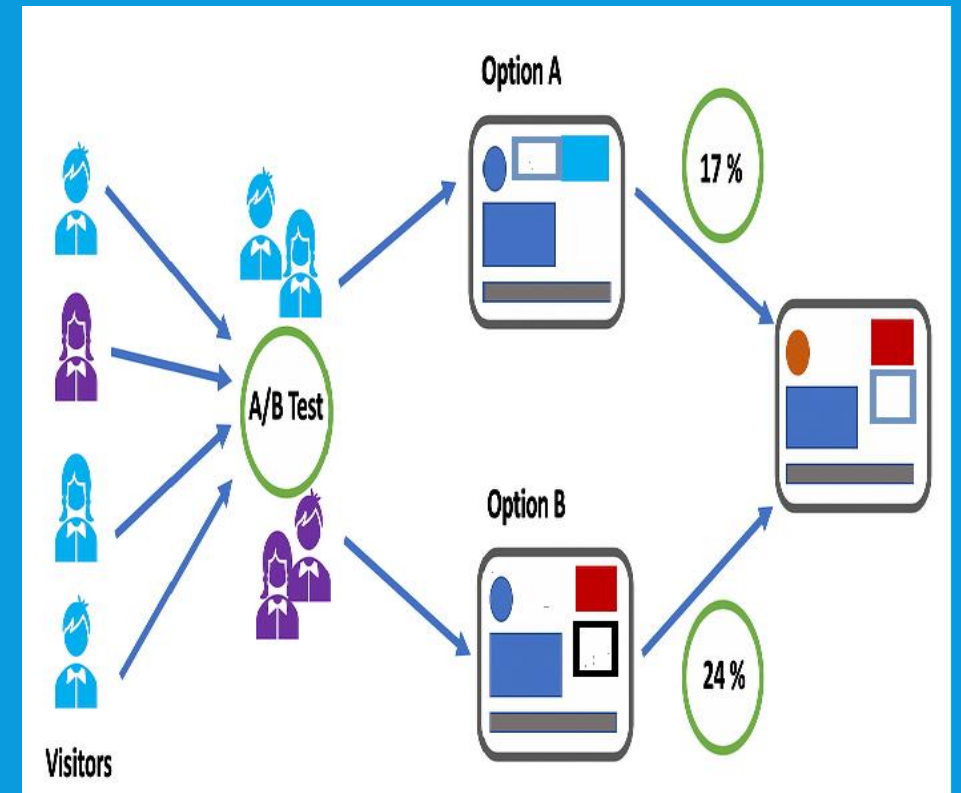
Protocol:

- Two versions of the same interface, each with a variant of the component to test (e.g., the color of a button)
- Define a goal (e.g., a click on the tested button, a sale)
- Choose a metric to quantify interest in each version (e.g., the number of clicks on the button divided by the number of views)
- Extensions to test more than two versions or more than two components (A/Z tests, multivariate)

A/B TESTING INFORMATION GATHERING TECHNIQUES

Procedure:

- When a user arrives on the interface, randomly offer one of the two versions
- Calculate the number of goals achieved for each version



INFORMATION GATHERING TECHNIQUES

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