

Introduction à la Conception Centrée Utilisateur

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Who am I?

James EAGAN

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Research

Human-Computer Interaction

Information Visualization

Multi-surface Interaction



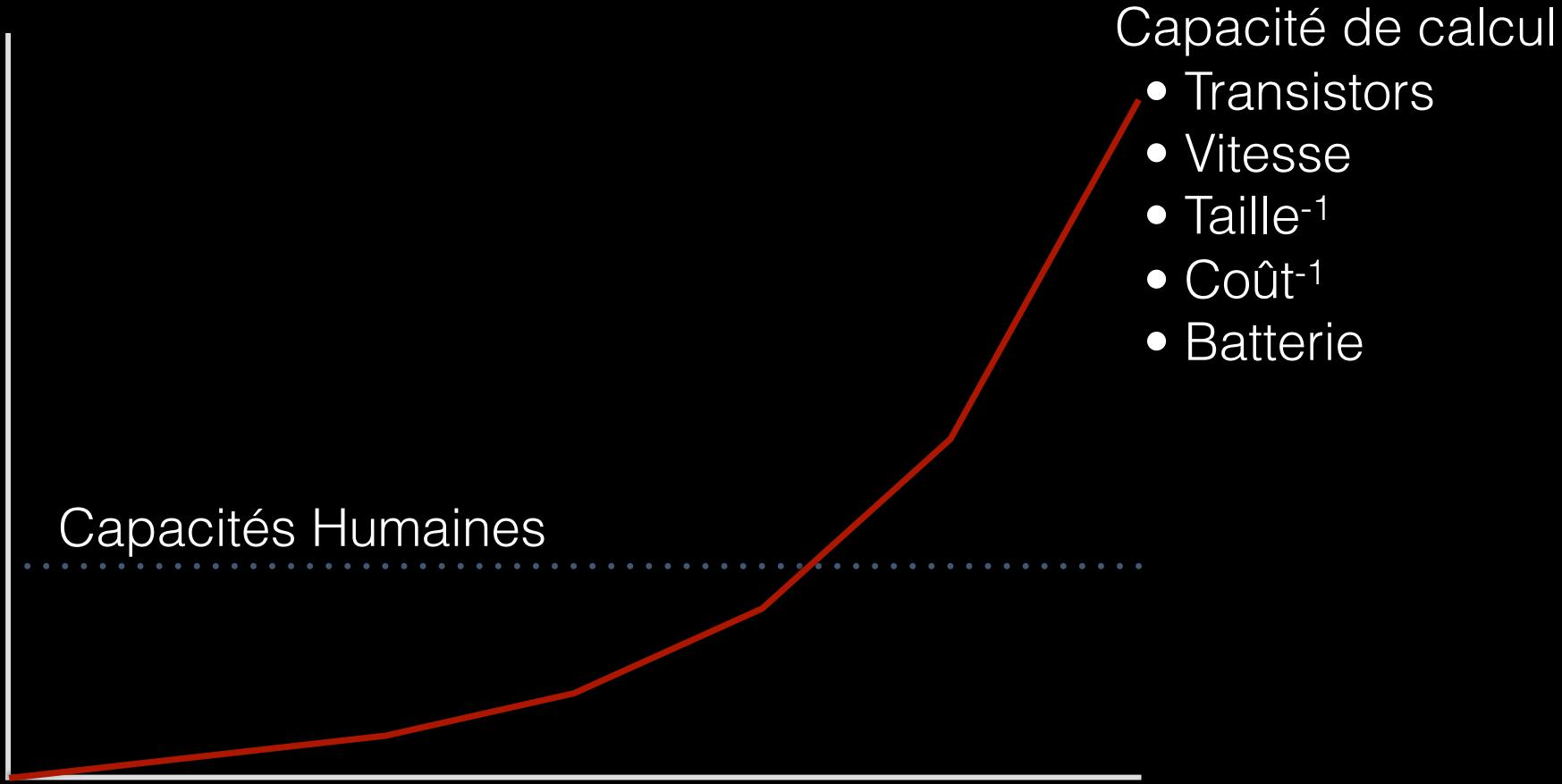




- 1999 : « La fonctionnalité la plus utilisée était ... recherche. Les personnes n'arrivaient pas à naviguer le site. »
 - « La deuxième fonctionnalité était le bouton 'help', car le moteur recherche était si inefficace. »
- Après re-conception du site centrée utilisateur :
 - Utilisation du bouton « help » a baissé 84 %
 - Ventes ont augmenté 400 %

[New York Times, 30 août 1999]

Loi de Moore



Interaction Homme-Machine

Human-Computer Interaction

Human-Computer Interaction

- Human
 - L'utilisateur final du système
 - Autres personnes dans l'organisme
- Computer
 - La machine qui tourne le logiciel
 - Y en a souvent plusieurs
- Interaction
 - L'utilisateur exprime ce qu'il veut
 - L'ordinateur communique les résultats



Pourquoi Suivre une Méthode de Design ?

- 63% de gros projets explosent leur budget
 - 4 raisons principales :
 - Clients ont demandé des améliorations au design
 - Tâches/besoins louées
 - Utilisateurs ne comprenaient pas leurs propres besoins
 - Communication entre développeur et utilisateur insuffisant

L'Utilisabilité = Genie Logiciel !

- ~Deux fois plus chère après déploiement
- Trop facile à commencer un design détaillé qui ... :
 - ... est basé sur des fausses suppositions des besoins
 - ... n'est pas suffisamment flexible
 - ... n'est pas facile à utiliser
 - ... n'a jamais été testé

Principes de Bases pour la Conception d'Interfaces

Overvue

- Introduction au cours et à l'IHM

Comprendre l'utilisateur et ses besoins

- Conception centrée tâche
- Développer des tâches indicatives
- Personae et scénarios utilisateurs

Design avec l'utilisateur

- Conception centrée utilisateur
- Conception participative
- Evaluer l'interface avec l'utilisateur



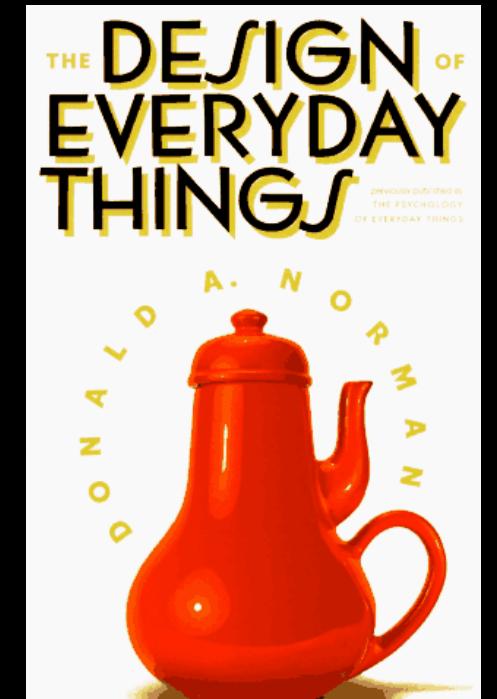
Principes de Bases pour la Conception d'Interfaces

Design d'interfaces visuelles

- Psychologie des choses de la vie quotidienne
- Au-delà du design sur l'écran
 - Représentations et métaphores
- Design graphique
 - Comment mettre en place les éléments graphiques sur l'écran

Principes de design

- Guidelines, heuristiques, etc.
- Comment découvrir des problèmes d'utilisabilité avant développement



Objectifs du Cours

Buts de ce module :

- Savoir comment récolter des besoins utilisateur et faire une analyse de tâches
- Avoir de l'expérience avec la conception centrée utilisateur
- Connaître plusieurs méthodes d'évaluation
 - ... quand les utiliser
 - ... pour quels buts

Déroulement du module

Travaux dirigés :

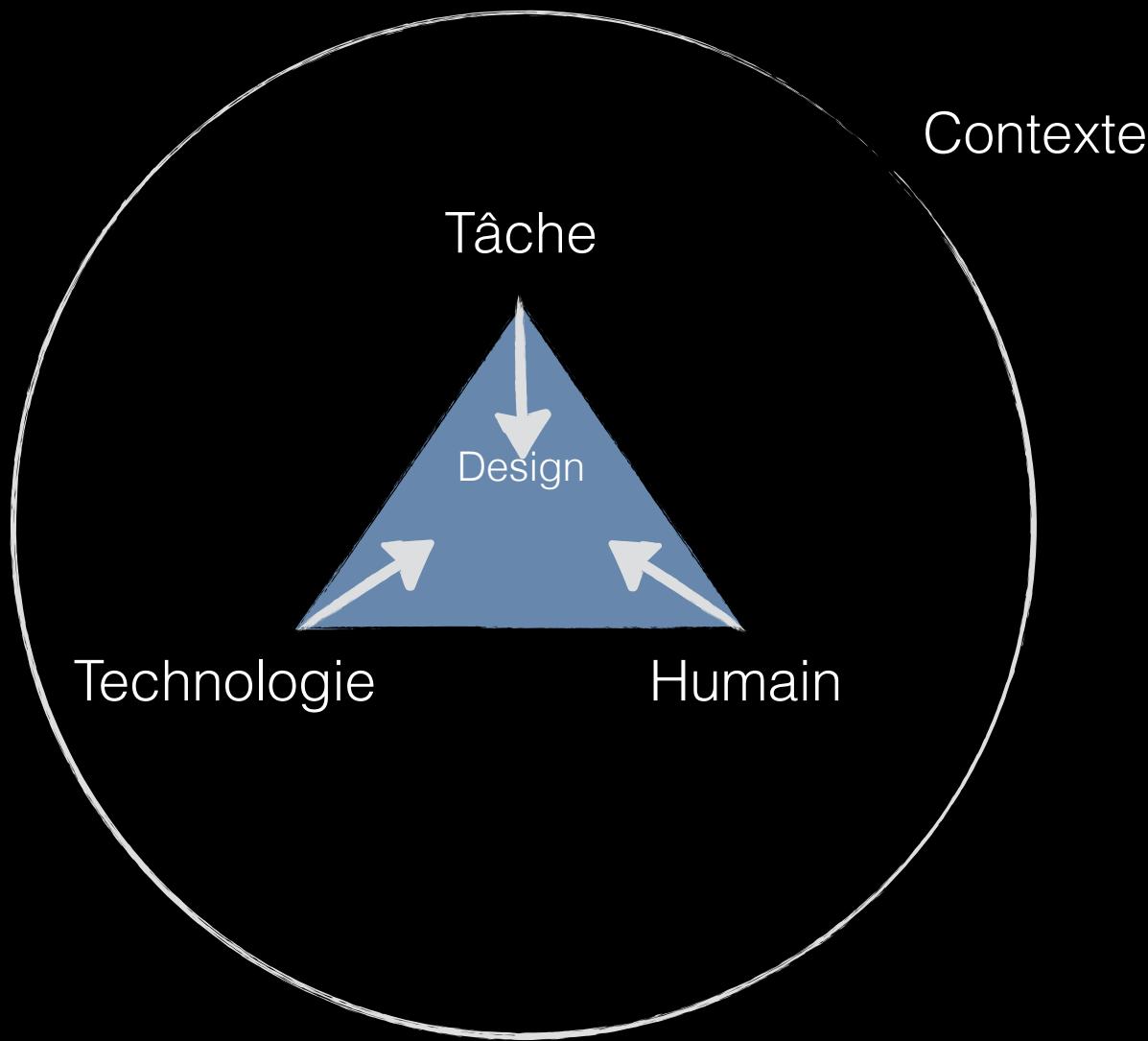
- 1 TH de cours suivie par 1 TH de TD

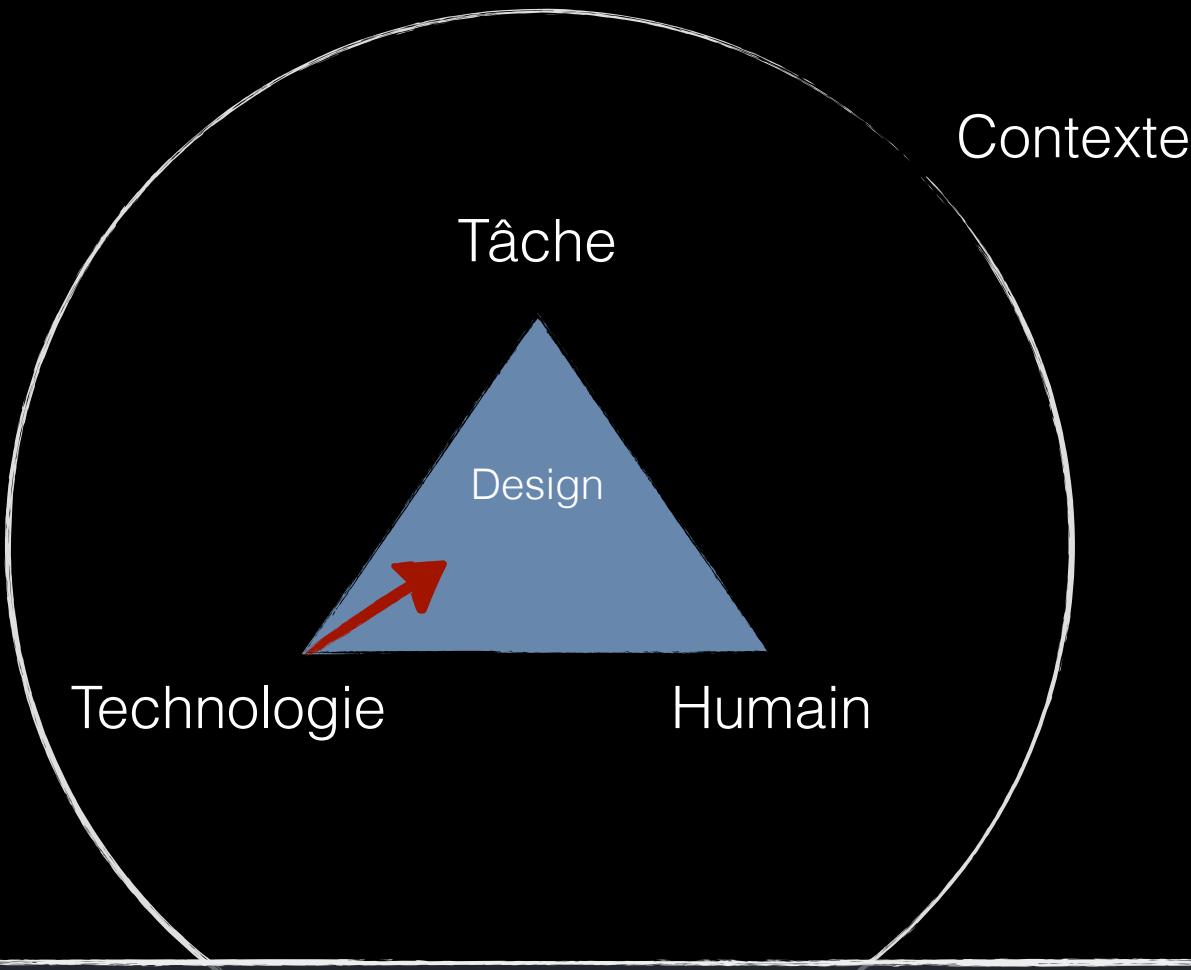
Devoirs à maison :

- À rendre avant la séance suivante

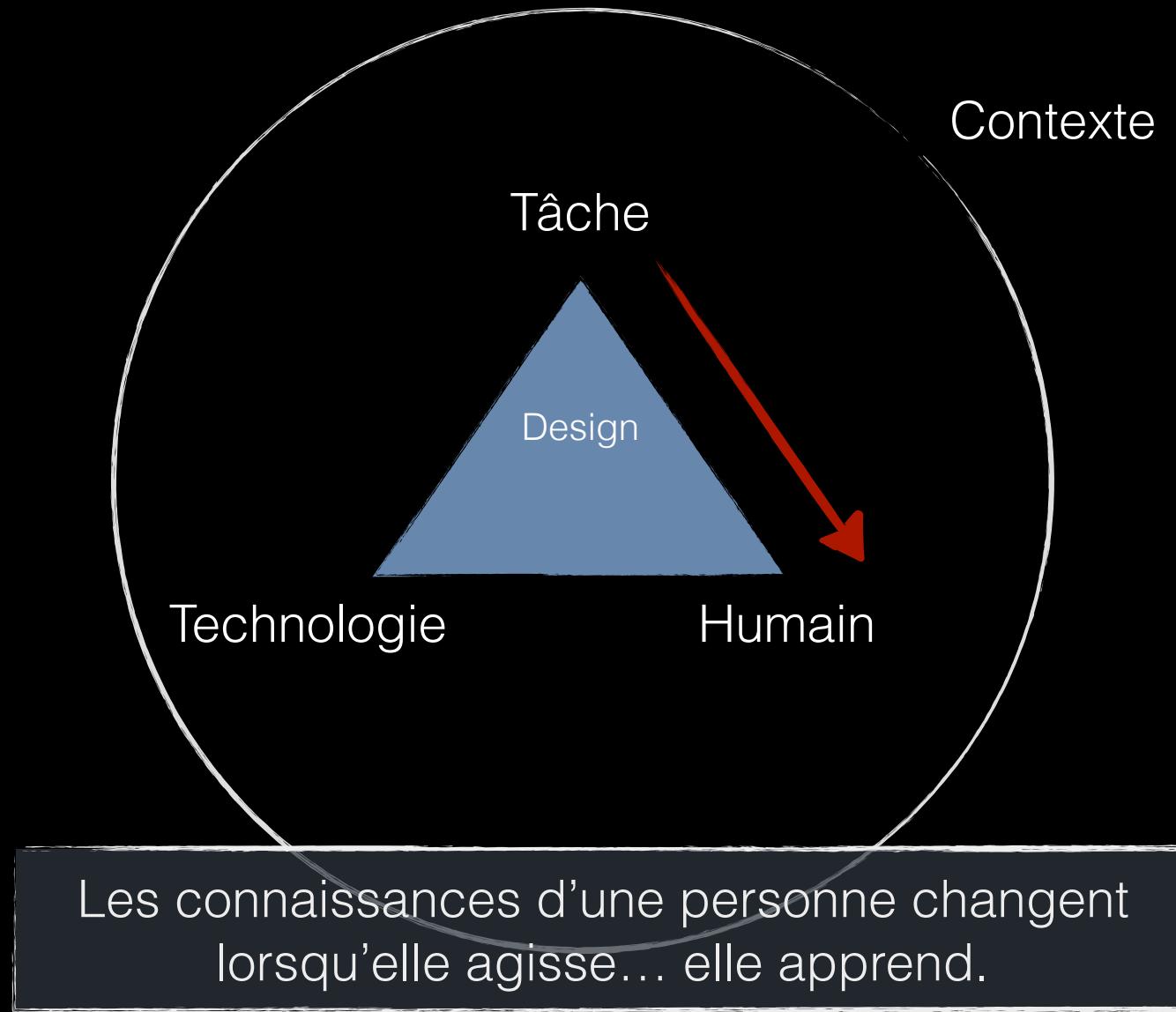
Projet :

- À faire par groupes de 4 ± 1
- Une partie conception, une partie réalisation
- 50 % de la note finale
- Détails à suivre...





Dans un smartphone avec écran tactile, on peut supposer une interaction multi-touch



Interaction Homme-Machine

Un métier qui s'intéresse :

au design,
à l'implementation, et
à l'évaluation



de systèmes informatiques à usage par un être-humain



Conception de Design & Ingénierie de l'Utilisabilité

Buts :

Méthodes :

Produits :

Identifier :

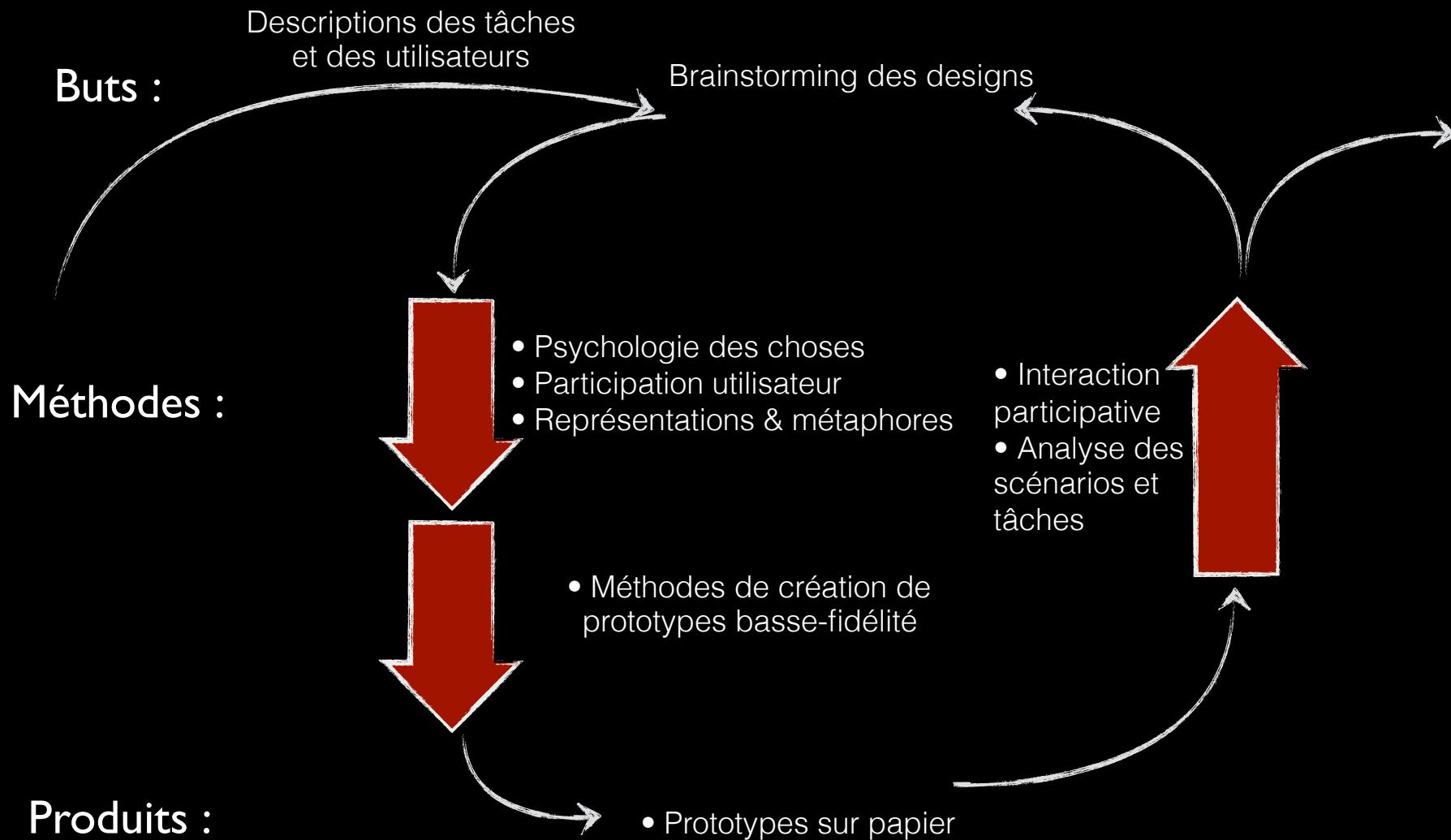
- qui est l'utilisateur
- quelles sont ses tâches principales

Évaluation

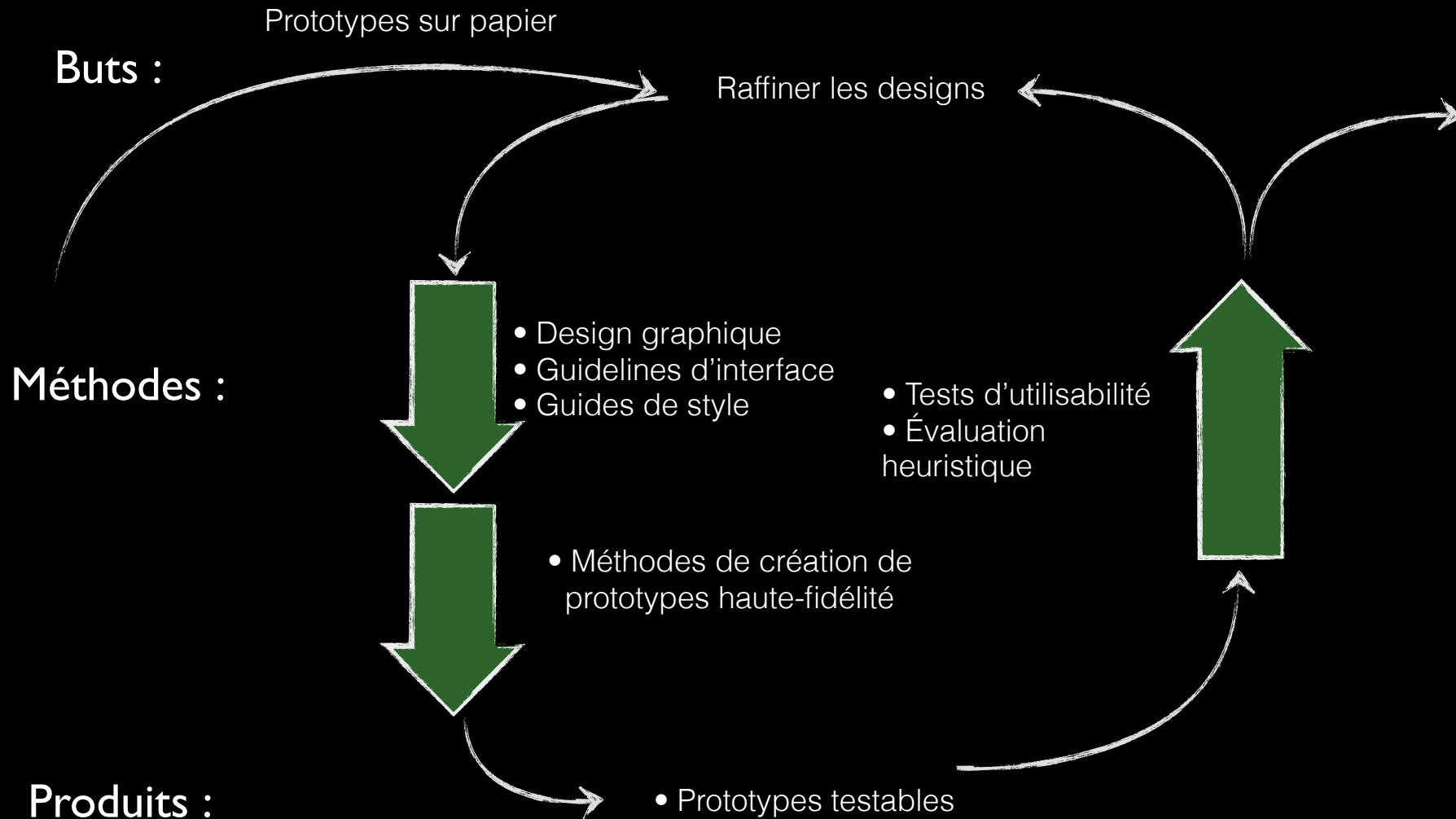
- Conception centrée tâche
- Conception participative
- Conception centrée utilisateur

- Descriptions des tâches et des utilisateurs

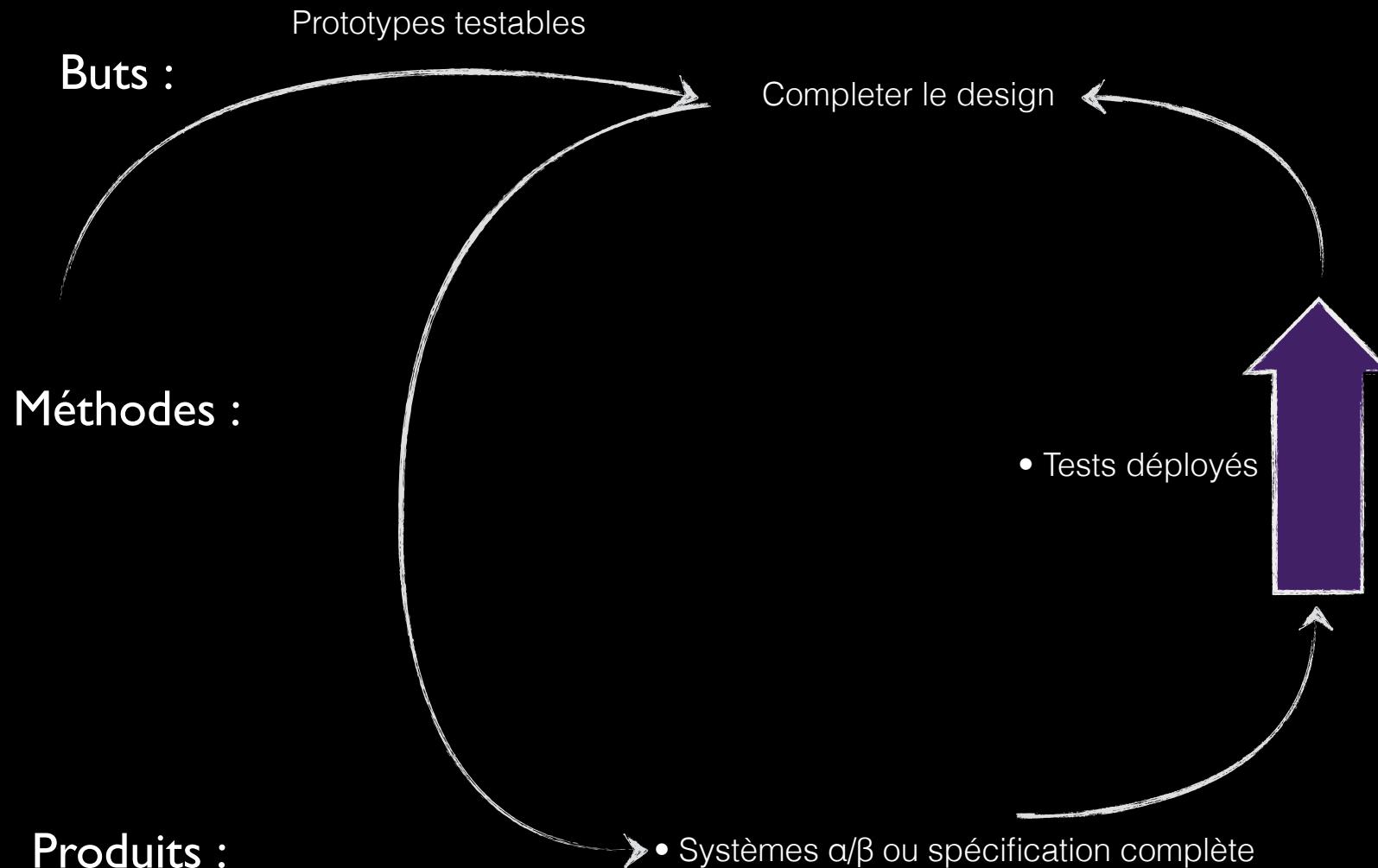
Conception du Design & Ingénierie de l'Utilisabilité

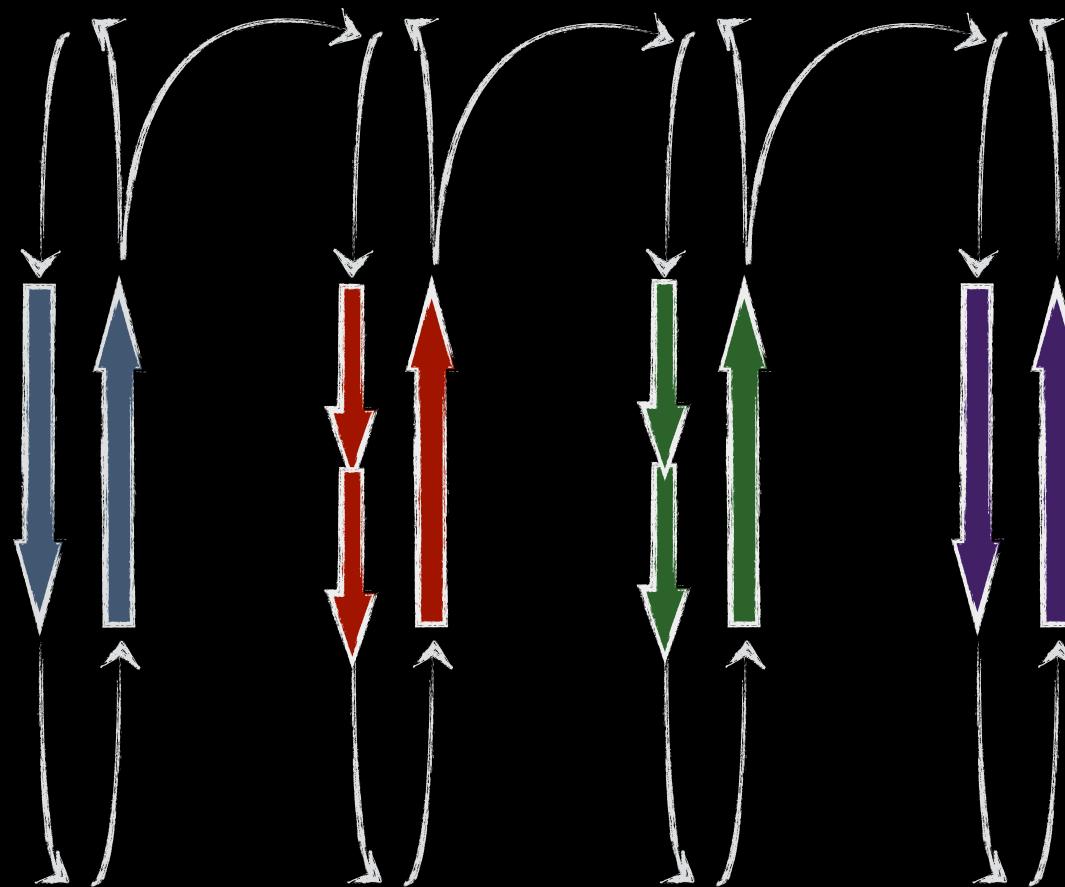
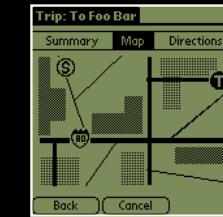
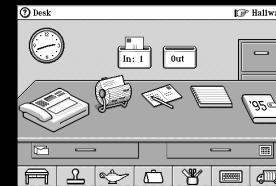
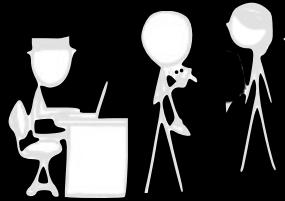


Conception de Design & Ingénierie de l'Utilisabilité

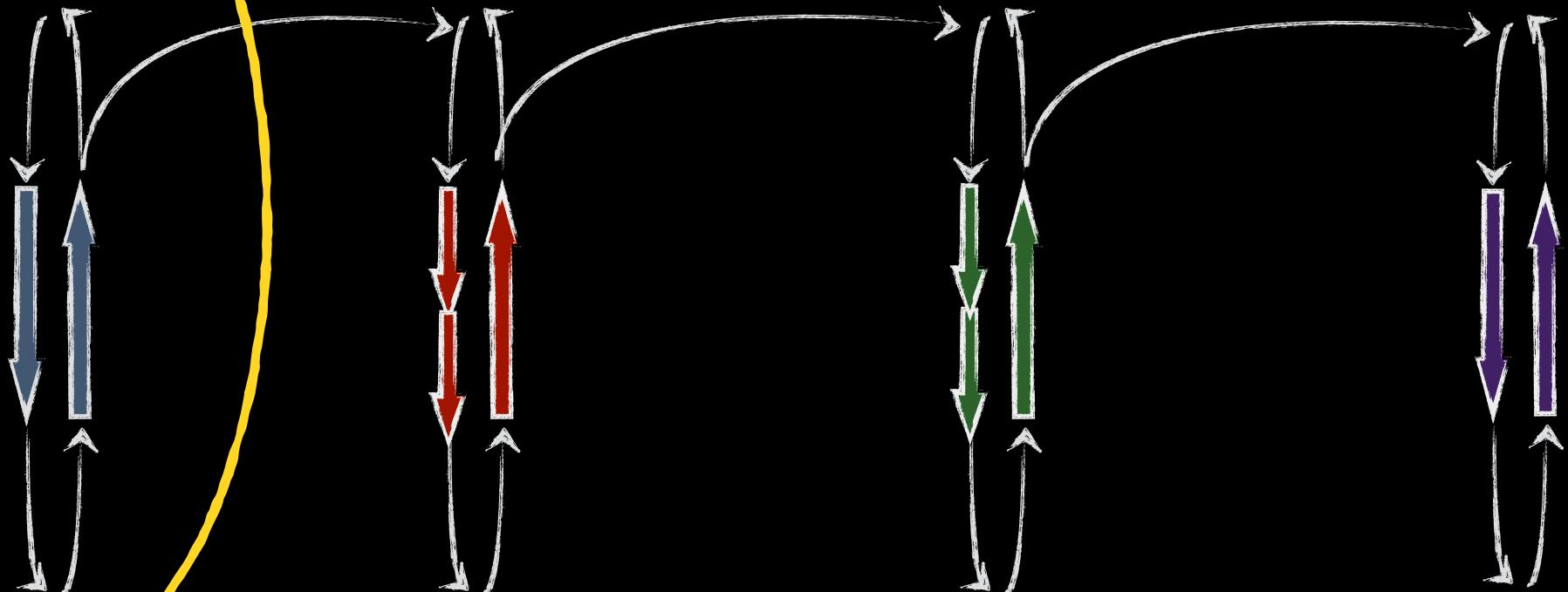
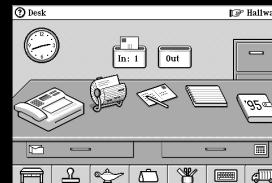
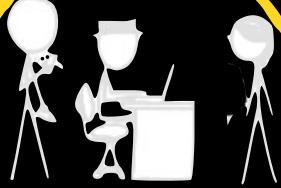


Conception de Design & Ingénierie de l'Utilisabilité





Aujourd'hui



La Théorie de Grande Unification

- Qui est {l'utilisateur, le client, le sujet, ...} ?
 - Astuce : Il y en a probablement plusieurs
- Qu'est-ce qu'il ou elle essaye de faire ?
- Comment peut-on l'aider à le faire ? (Et gagner quelques €/\$// en le faisant.)
- L'interface, réussit-elle ces buts ?

Know Thy User

- You are not your user
- Who are your stakeholders?
 - Travel system: employee, manager, auditor
- What is the user's goal?
 - How is success defined?
 - What are the constraints? Real-world, technical, political?
- User characteristics

Real-World Constraints

- Time to market
- Cost/effort to design & implement
- Size/footprint/weight/price/power
- Computer power/memory
- Consistency with product line/brand image
- Backward compatibility
- Differentiation from competitive products

How to Understand the User

- Gather data
 - Interviews, observation, surveys & questionnaires, documentation, immersion
- Organize data
 - Notes, cards, affinity diagrams, computer tools
- Represent data
 - Lists, outlines, matrices
 - Personae, Narratives, Scenarios, Use cases
 - Hierarchies, Networks, Flow Charts

How to Understand the User

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Data Gathering

Objectives

- Understand the user
 - What are his or her goals & values?
 - Individual's or group's interactions within a culture
 - Make tacit domain knowledge explicit
 - Be unbiased
 - For UI designers: improve system by finding existing problems

Focus on Observable Behaviors

- What are the practices, methods, steps, objects, ..., used?
- Learn what users do, why they do it, how, they do it, when they do it, with what tools or people they do it
 - Your new system may change some of this, especially how
 - Understanding the how and the why is what leads to deeper knowledge and insights

What to Gather

- Three key components in how people work
 - Activities
 - Artifacts
 - Relations
- Not just computer system oriented!
- The context matters!
 - Office: papers, whiteboards, ...
 - Phone calls: address book, note pad, dialer, ...

Who, What, Where, When, Why

Some Data Gathering Methods

- Observation & Think-aloud
- Cooperative Evaluation
- Interviews
- Questionnaires & Surveys
- Focus Groups
- Study Documentation
- Competitive Product Analysis
- Ethnography

Data Gathering

- Tasks & Subtasks
 - Physical
 - Cognitive
 - Communication
- Conditions under which these are done
- Results/outcomes of tasks

Techniques

- In-person observation
 - Audio/video recording
 - Log analysis
 - Interviews
-
- “Wallow in the data”

Techniques

- In-person observation
- Audio/video recording
- Log analysis
- Interviews
- “Wallow in the data”

Observation is Key

- Carefully observe everything about the users and their environment
- Think of describing it to someone who has never seen this activity before
- What users say is important, but also non-verbal details

Observations

- Things of interest to the evaluator
 - Structure & language used in work (domain vocabulary)
 - Individual & group actions
 - Work culture
 - Explicit & implicit aspects of work
- Example: Office environment
 - Business practices, rooms, artifacts, work standards, relationships between workers, managers, ...

Interviews

Interviews

- Participants
- Recruitment
- Questions

Interviews

- Have a question plan, but keep interview open
- Be specific
- Create interpretations together with users
 - Be sure to use their terminology
- At the end, ask if there's anything else you should have asked
- Record interviews

Steps

- 1. Preparation
 - Understand the organizational context
 - Familiarize yourself with system and its history
 - Set initial goals and prepare questions
 - Gain access and permission to observe & interview

During Interviews

- Establish rapport with users
- Observe/interview users in workplace and collect all different forms of data
- Follow any leads that emerge from visits
- Record the visits

Interviews

- Structured — “Just the facts”
 - Efficient
 - Training: interview process
- Unstructured — A conversation
 - Inefficient
 - Training: process + domain knowledge

Semi-Structured Interviews

- Start with focused questions, move to open-ended discussion
 - Good balance, often appropriate
 - Training: process + domain knowledge

Semi-structured Interview Questions

- Pre-determine data of interest — know why you are asking questions, don't waste time
- Plan for effective question types
 - How do you perform task x?
 - Why do you perform task x?
 - Under what conditions do you perform task x?
 - What do you do before you perform...?
 - What information do you need to...?
 - Whom do you need to communicate with ...?
 - What do you use to...?
 - What happens after you...?
 - What is the result or consequence of...?
 - What is the result or consequence of NOT...?
- See Gordon & Gill, 1992; Graesser, Lang, & Elofson, 1987

Typical Open-ended Questions

- Why do you do this (whatever the task is you are studying)?
- How do you do this?
 - Gets at task-subtask structure
 - Then ask about each subtask
- Why do you do it this way rather than some other way?
 - Attempts to get user to explain method and rationale so you can assess importance of the particular way of doing task (onion)

More Open-ended Questions

- What has to be done before you can do this?
 - To get at sequencing issues
- Please show me the results of doing this
- Do errors ever occur when doing this?
- How do you discover the errors, and how do you correct them? (Adapted from Nielsen et al., CHI '86).
- Encourage digressions; ask for elaborations
- What else should I have asked you?

Good idea / Bad idea

- « Is the news-of-the-day an important feature to you? »
- Better : « How do you use the news-of-the-day feature? »
- Even better : « The log shows you don't read the news-of-the-day. Why? »

Good idea / Bad idea

- « What would you like in a tool? »
- Better : « What are you trying to do? »

Good idea / Bad idea

- « How often do you read your mail? »
- « How often do you read your mail in a typical day? »
- « How often did you read your mail *today*? »
- Measure

Sense-making

Analysis

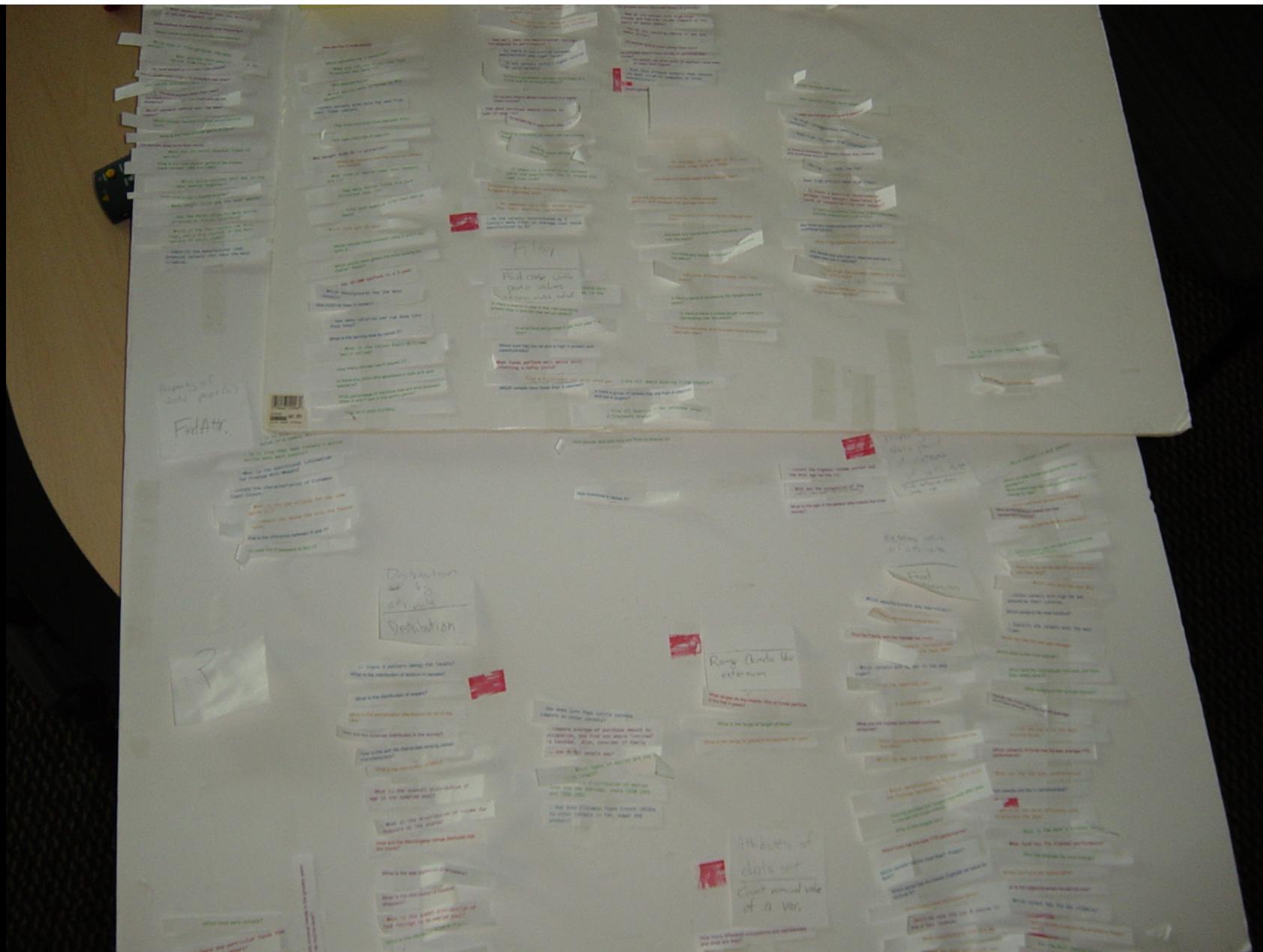
- Compile the data in numerical, textual, and multimedia databases
- Quantify data and compile statistics
- Reduce and interpret data
- Refine goals and process used

Reporting

- Consider different audiences and goals
- Prepare a report and present findings

Affinity Diagram

- Useful technique for qualitative data analysis
- Write each observation/quote on a slip of paper
- Put it on a board/wall
- Coalesce items that have affinity
- Give names/colors to groups
- Continue making subgroups
- May yield a hierarchy of groups



Ranges kinda like
extremum

What ranges do the middle 75% of funds perform
in the first 3 years?

What is the range of length of films?

What is the range of possible horsepower for cars?

Extreme value
of attribute

Find
extremum

- Which manufacturers are healthiest?
Do the heaviest cars have the worst MPG?

Find the Fidelity with the highest net asset

Japanese, European and
Asian have the best MPG?

- Which cereals are lowest in fat and
sugar?

- Find the heaviest car.

> 5 accelerating cars.

What are the highest and lowest purchase
amounts?

Which cars have the highest horsepower and the
best MPG?

- Which car has the biggest engine?

- Which manufacturer have the cars with
the highest horsepower?

Find the shortest and longest film made after year
X that are not music videos.

What is the longest film?

Which is the
movie with the
longest run time?

What is the car
and lower weight?

- Who

- Locate cereals
determine their

Which cereal is the

- Identify the car
fiber.

Which car has the best

Which actor is the most popular?

What were the most popular
they mostly recent?

What category of

Identify the chain with the highest average
purchase amount.

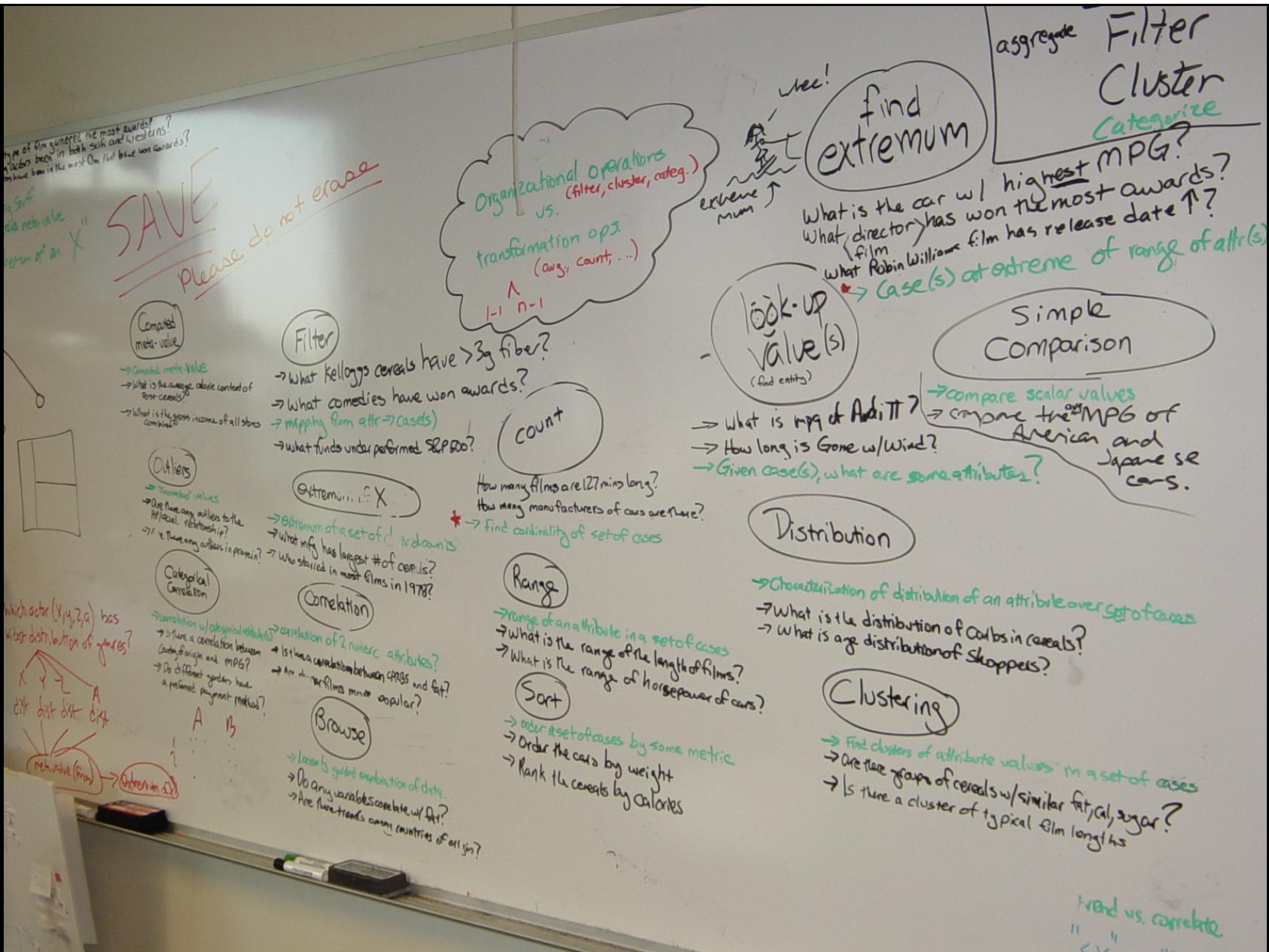
- Find the car with
the best acceleration.

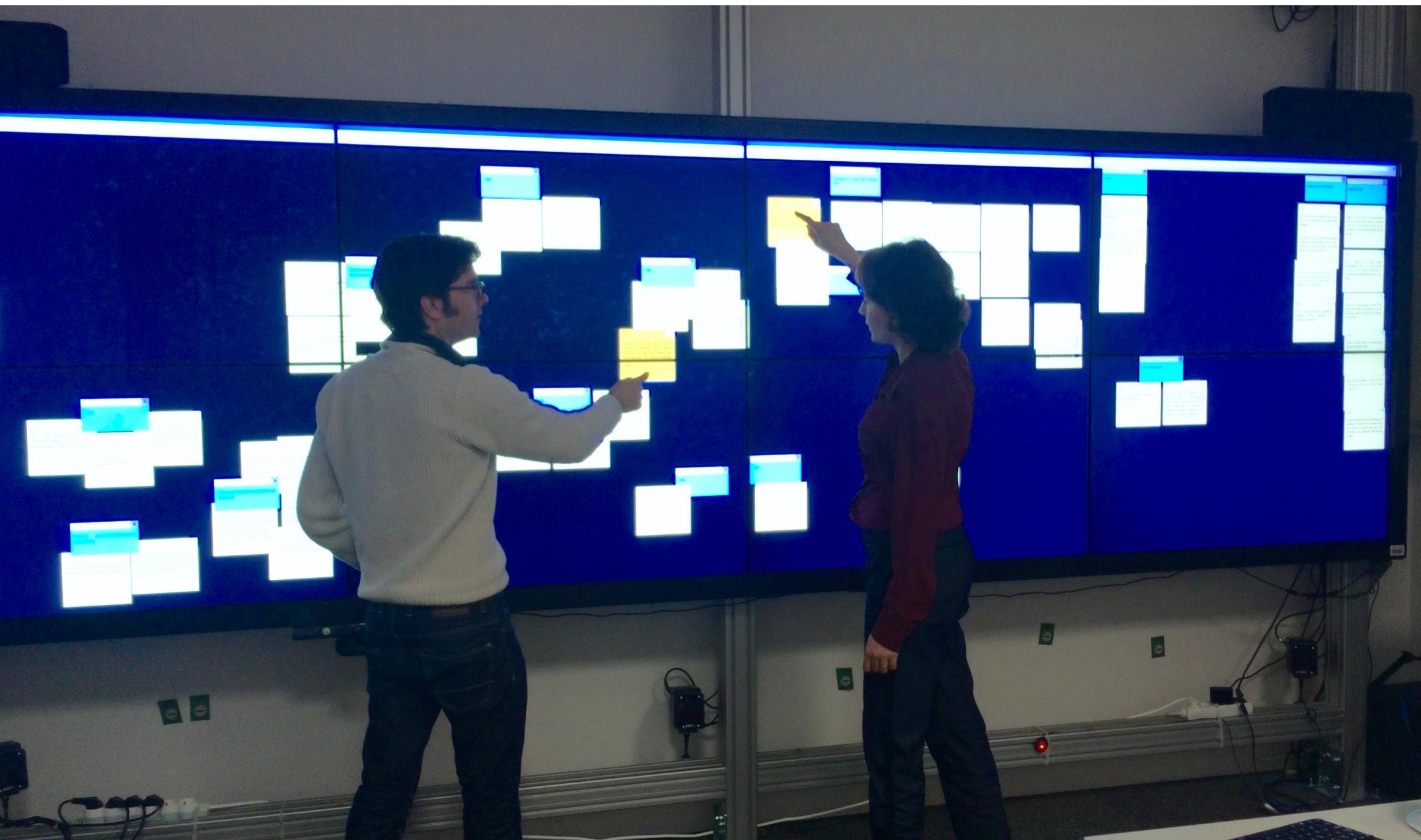
Which category of funds has the best
performance?

- What car has the best acceleration?

Which cereals are low in carbohydrates?

Which of the more efficient
accelerate the best?





Why is this Useful?

- Can help gain a rich and true assessment of user needs
 - Helps to define requirements
 - Uncovers true nature of user's needs
 - Discover things that are outside job description, documentation
 - Allows you to put yourself in the role of an end-user
 - Open-ended and unbiased nature promotes discovery

Types of Findings

- Qualitative
 - Observe trends, habits, patterns, ...
- Quantitative
 - How often was something done, what percent of the time did something occur, how many errors, ...

Drawbacks

- Takes a lot of time
- Scale : small numbers
- Qualitative results are subjective and difficult to generalize
- Acquired skill
 - Identifying and extracting meaningful and “interesting” things is challenging

Organizing Observations

- Organizing the observations serves two purposes
 - Understand the data
 - Helps present the data

Now What?

- You have piles of notes, hours of video, surveys up to here...
- How can you digest and represent the data, to turn it into information?

Representing Data

- Essential use cases
- User characteristics + personae
- Task outlines
- Narratives
- Hierarchies & Network Diagrams
- Flow Charts

Essential Use Case (Scenario)

- Description of important or frequent user interactions
- Used to evaluate/walkthrough various design alternatives
- Three elements
 - Name
 - User intention
 - System responsibility
- *Do not make assumptions about the UI design*

Example Scenario

- Jean regularly commutes by métro. He likes to get off a few stops early and finish the trip on a Vélib. As he approaches the métro station Jussieu, he wants to check if any bikes are free. He also wants to see which station near his home has free space to park.
- The system detects his location and shows the status of the Vélib stations near his stop and near his home.

User Characteristics & Persona

- Description of user and what he or she wishes to do
- Be specific/detailed, even give names and picture

User Profiles

- Attributes:
 - attitude, motivation, reading level, typing skill, education, system experience, task experience, computer literacy, frequency of use, training, color-blindness, handedness, gender,...
- Novice, intermediate, expert
- Manager, employee, contractor, ...

Knowledge Navigator

Projet

www.telecom-paristech.fr/~eagan/cours/upmc-ihm/projet