

# **Human-Centered Design**

**Interface Pessoa-Máquina - 25/26 - LEI / UM**

**Hugo Pacheco**

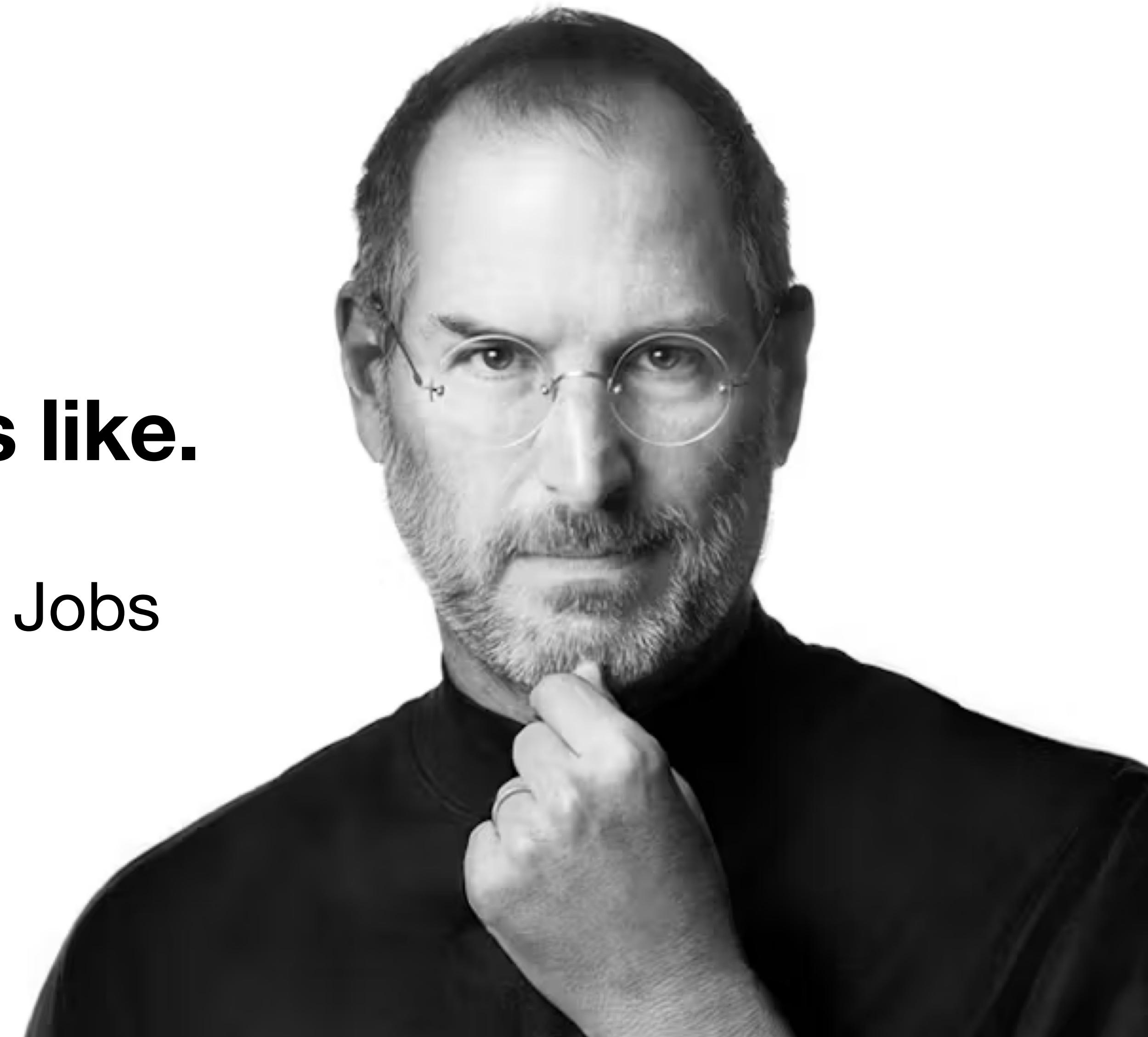
**hpacheco@di.uminho.pt**

# Como desenhar interfaces?

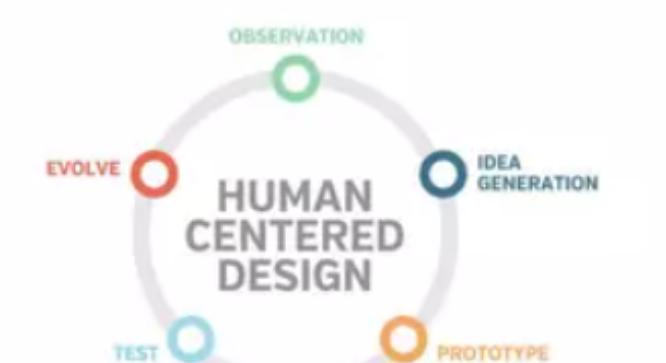
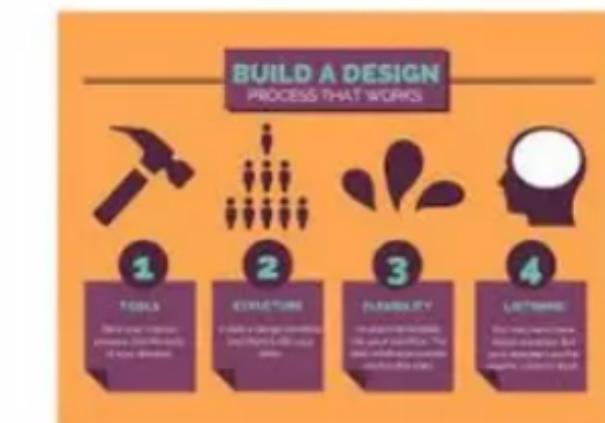
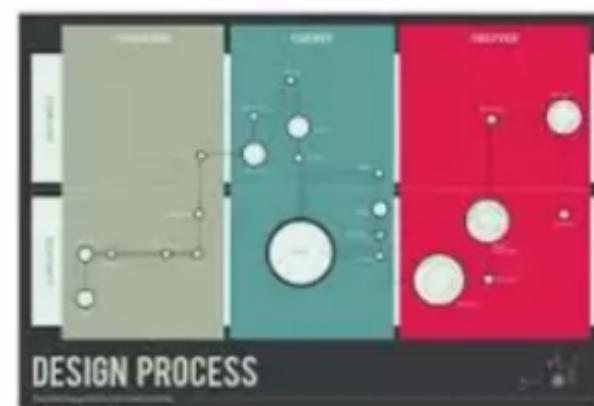
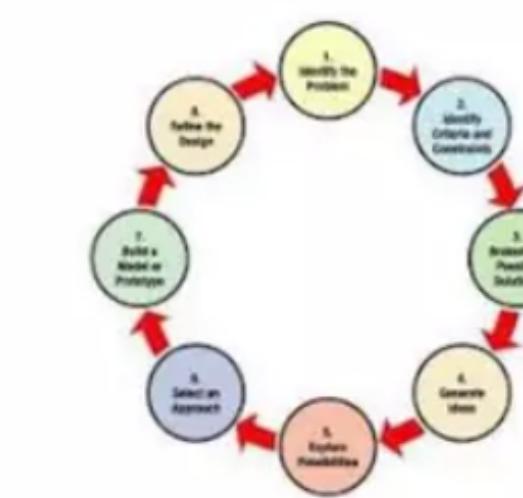
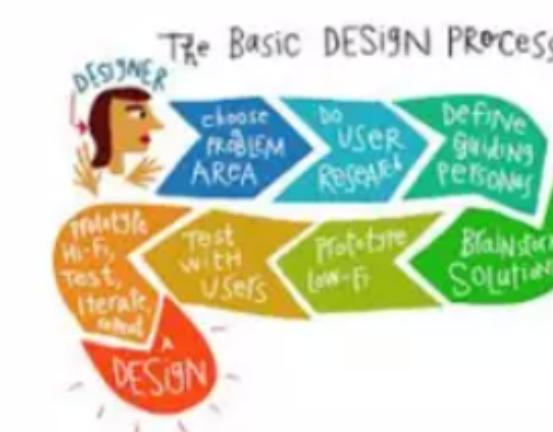
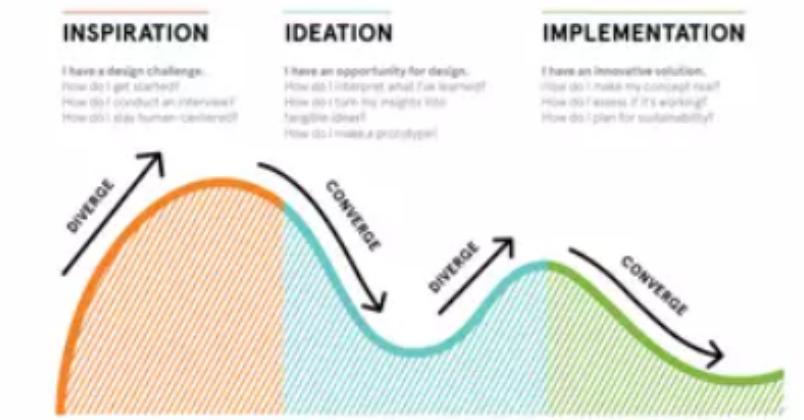
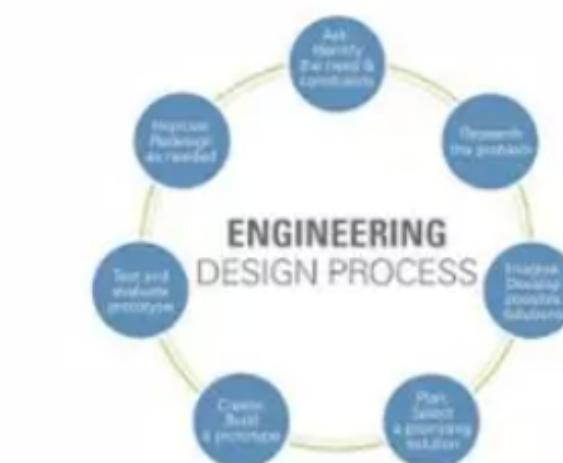
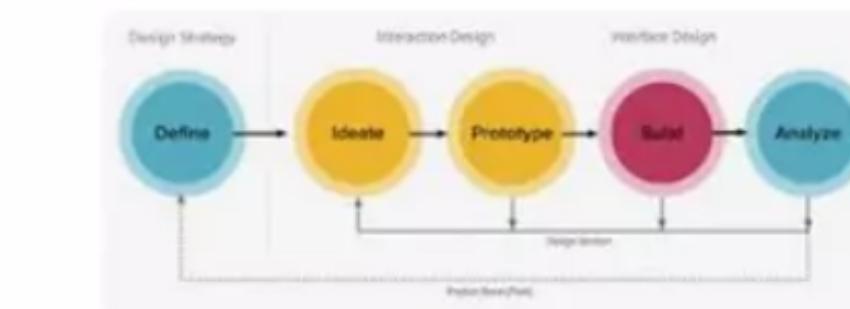
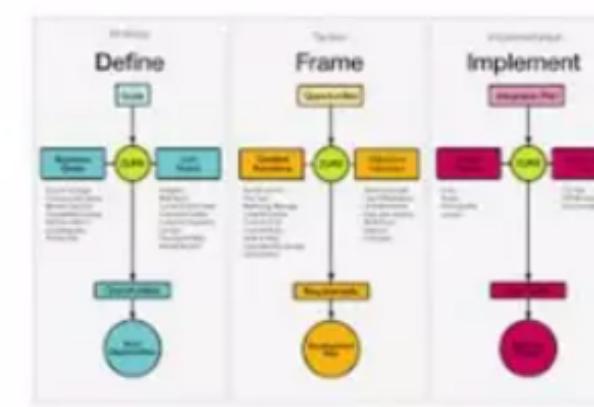
- User Interface: “all components of an interactive system (software or hardware) that provide information and controls for the user to accomplish specific tasks with the interactive system”
- Usability: “extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use”
- User Experience: “user’s perceptions and responses that result from the use and/or anticipated use of a system, product or service”
- **Human-Centred Design (ISO 9241-210)**: “approach to systems design and development that aims to make interactive systems more usable by **focusing on the use** of the system and applying **human factors/ergonomics and usability** knowledge and techniques”

**“Design is not what it looks like.  
Design is how it works”**

Steve Jobs



# Human-Centered Design?



# HCD: Vantagens

- “Using HCD has substantial economic and social benefits for users, employers and suppliers. Highly usable systems and products tend to be more successful both technically and commercially.”
  - Maior produtividade e eficiência de utilizadores e organizações
  - Melhor experiência dos utilizadores
  - Mais satisfação e conforto de utilizadores, com um conjunto diversificado de capacidades
  - Custos de treino mais reduzidos
  - Uma vantagem competitiva

Ergonomics of human-system interaction —

Part 210:  
Human-centred design for interactive systems

Ergonomie de l'interaction homme-système —

Partie 210: Conception centrée sur l'opérateur humain pour les systèmes interactifs



# HCD: Princípios

## 1. The design is based upon an explicit understanding of users, tasks and environments

- custom-made vs generic products. balanced function between users and technology

## 2. Users are involved throughout design and development

- valuable source of knowledge about the context of use, the tasks, and how users are likely to interact

## 3. The design is driven and refined by user-centred evaluation

- feedback from users becomes a critical source of information

## 4. The process is iterative

- preliminary design solutions tested against “real world” scenarios, and the results fed back into progressively refined solutions

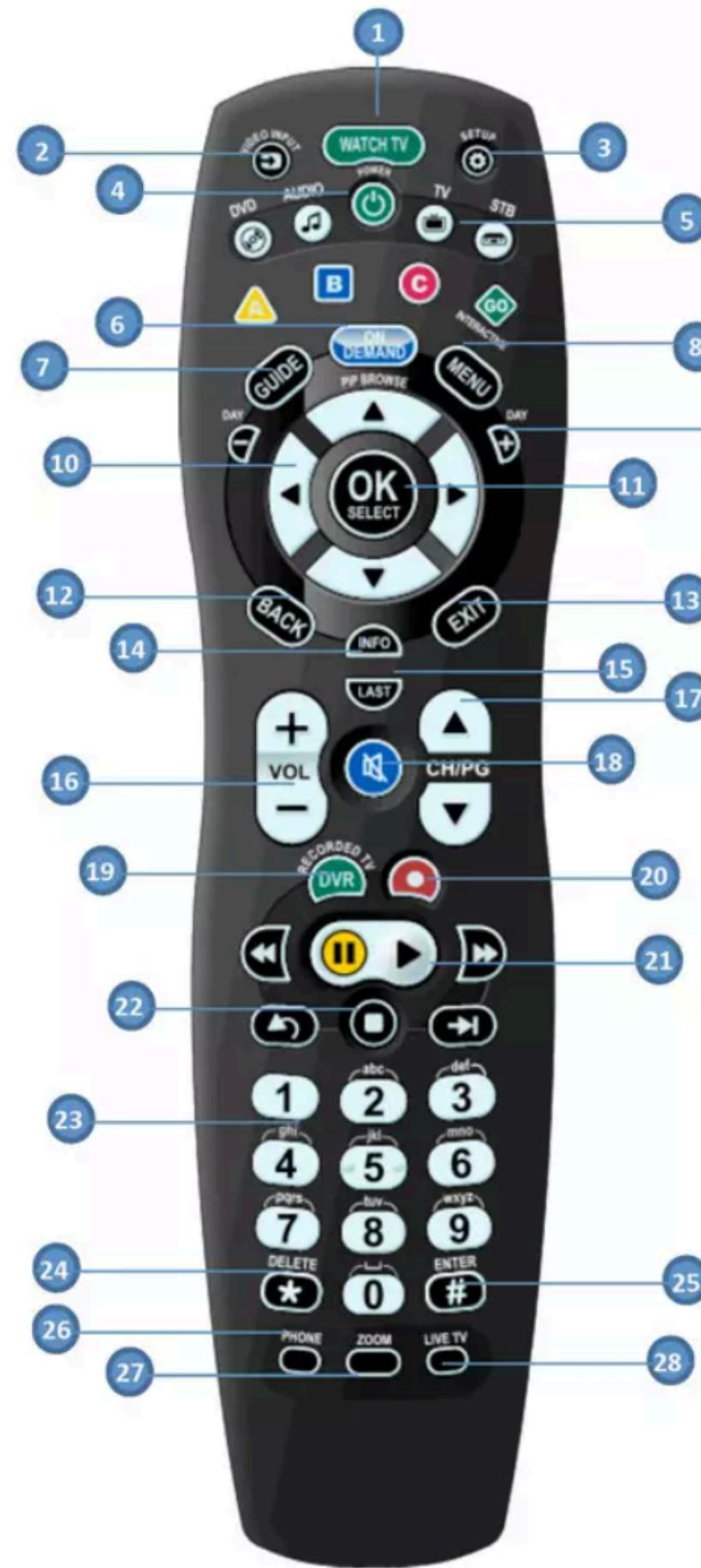
## 5. The design addresses the whole user experience

- bringing users into the design process to ensure a specific user experience

## 6. The design team includes multidisciplinary skills and perspectives

- teams do not have to be large but should be sufficiently diverse to make appropriate design trade-off decisions

# Human-Centered Design?



1	POWER	Switches the power on/off for TV and Set Top Box
2	INPUT	Changes the current A/V input of the selected device
3	SETUP	Setup remote (see reverse side of remote)
4	POWER	Turn selected device on or off
5	DEVICE CONTROL	Send commands to DVD, Audio, TV or Set top box
6	ON DEMAND	For future use. Currently unassigned
7	GUIDE	Displays the on-screen program guide
8	MENU	Displays on-screen menu
9	DAY - / DAY +	These two buttons are currently unavailable. You can move forward or backwards a day in the guide using the REW and FF buttons
10	ARROW KEYS	Navigates up, down, left and right within the on-screen guide or menus
11	OK	Enter a choice you have made
12	BACK	Goes back to the previous screen
13	EXIT	Exits the current menu item
14	INFO	Displays on-screen information about the current TV / DVR program.
15	LAST	Changes channel to the most recently viewed channel
16	VOL +/-	Increases or decreases volume of the currently selected device
17	CH/PG	Changes channel up/down or goes page up/down on-screen program guide
18	MUTE	Turns the volume of the currently selected device on/off
19	DVR	Opens DVR recordings screen
20	RECORD	Starts recording current program
21	PLAYBACK CONTROL BUTTONS	Controls video for LIVE TV/ DVR REPLAY: Plays back a few seconds REW: Rewinds video FF: Fast forwards video SKIP: Skips ahead in 30 second increments PAUSE: Pauses video PLAY: Plays video or resumes from pause STOP: Stops playback of video
22	STOP	This will stop a recording or close the emergency test sequence.
23	NUMBER KEYS	Allows direct access to specific channels and menu items
24	DELETE / *	For future use. Currently unassigned
25	ENTER / #	For future use. Currently unassigned
26	PHONE	For future use. Currently unassigned
27	ZOOM	Currently unassigned
28	LIVE TV	Returns programming to Live TV

	Record*		Series-Record*
	Closed Captioned		Series Record Episode Skipped*

\*Record and Series Record only appear if your set top box supports DVR recording.



# Human-Centered Design?

**Saldos e Movimentos**

Escolha a Conta \*  Conta Ordem

Período     a    dd/mm/aaaa

Tipo Movimentos \*  Todos

Canal Operações \*  Todos

Cancelar  Consultar

Saldos e Movimentos			Saldo Contabilístico	Saldo Disponível	Saldo Autorizado
Data Operação	Data Valor	Descrição	Montante	Saldo Contabilístico	Saldo Contabilístico
19-03-2013	19-03-2013		EUR	EUR	EUR
19-03-2013	19-03-2013		EUR	EUR	EUR
19-03-2013	19-03-2013		EUR	EUR	EUR
22-03-2013	22-03-2013		EUR	EUR	EUR
22-03-2013	22-03-2013		EUR	EUR	EUR
25-03-2013	25-03-2013		EUR	EUR	EUR
27-03-2013	27-03-2013		EUR	EUR	EUR
27-03-2013	27-03-2013		EUR	EUR	EUR
28-03-2013	28-03-2013		EUR	EUR	EUR
28-03-2013	28-03-2013		EUR	EUR	EUR

# Human-Centered Design?

**Saldos e Movimentos**

Escolha a Conta \*

Nº Movimentos  ou Indique Período  
   a    dd/mm/aaaa

Tipo Movimentos \*

Canal Operações \*

Saldo Contabilístico  Saldo Disponível  Saldo Autorizado

**Movimentos de 1 a 10**

Data Operação	Data Valor	Descrição	Montante	Saldo Contabilístico
19-03-2013	19-03-2013		EUR	EUR
19-03-2013	19-03-2013		EUR	EUR
19-03-2013	19-03-2013		EUR	EUR
22-03-2013	22-03-2013		EUR	EUR
22-03-2013	22-03-2013		EUR	EUR
25-03-2013	25-03-2013		EUR	EUR
27-03-2013	27-03-2013		EUR	EUR
27-03-2013	27-03-2013		EUR	EUR
28-03-2013	28-03-2013		EUR	EUR
28-03-2013	28-03-2013		EUR	EUR

Página 1

# Human-Centered Design?

Seleccione uma Conta

Saldo Contabilístico      Saldo Disponível      Saldo Autorizado

**Últimos Movimentos**

Data Operação	Data Valor	Descrição	Montante	Saldo Contabilístico
23-02-2018	23-02-2018		-85,00 EUR	1.083,82 EUR
23-02-2018	23-02-2018		-450,00 EUR	1.168,82 EUR
23-02-2018	23-02-2018		-75,00 EUR	1.618,82 EUR
23-02-2018	23-02-2018		-225,00 EUR	1.693,82 EUR
23-02-2018	23-02-2018		-197,17 EUR	1.918,82 EUR
23-02-2018	23-02-2018		2.114,75 EUR	2.115,99 EUR
19-02-2018	19-02-2018		-50,16 EUR	1,24 EUR
14-02-2018	14-02-2018		-222,63 EUR	51,40 EUR
14-02-2018	14-02-2018		-15,00 EUR	274,03 EUR
09-02-2018	09-02-2018		-45,00 EUR	289,03 EUR

**Mais Movimentos >>**



**Saldos e Movimentos**

Escolha a Conta \*

Nº Movimentos  ou Indique Período  a  dd/mm/aaaa

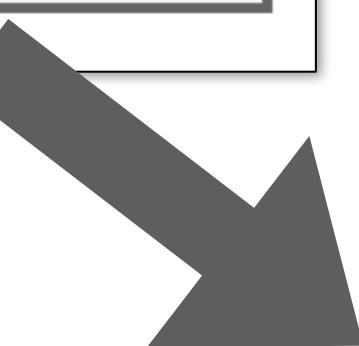
Tipo Movimentos \*

Canal Operações \*

# Human-Centered Design?

Seleccione uma Conta				
Conta Ordem				
		Saldo Contabilístico	Saldo Disponível	Saldo Autorizado
<b>Últimos Movimentos</b>				
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14-02-2018	14-02-2018		-15,00 EUR	274,03 EUR
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**Mais Movimentos >>**



+10, +10, ...

# Conhecer o utilizador?

- Eu (Homer Simpson) sou um utilizador (“average man”)
- Posso desenhar um sistema com base nas minhas experiências?



W I R E D

**That Disastrous Car Homer Simpson Designed Was Actually Ahead of Its Time**

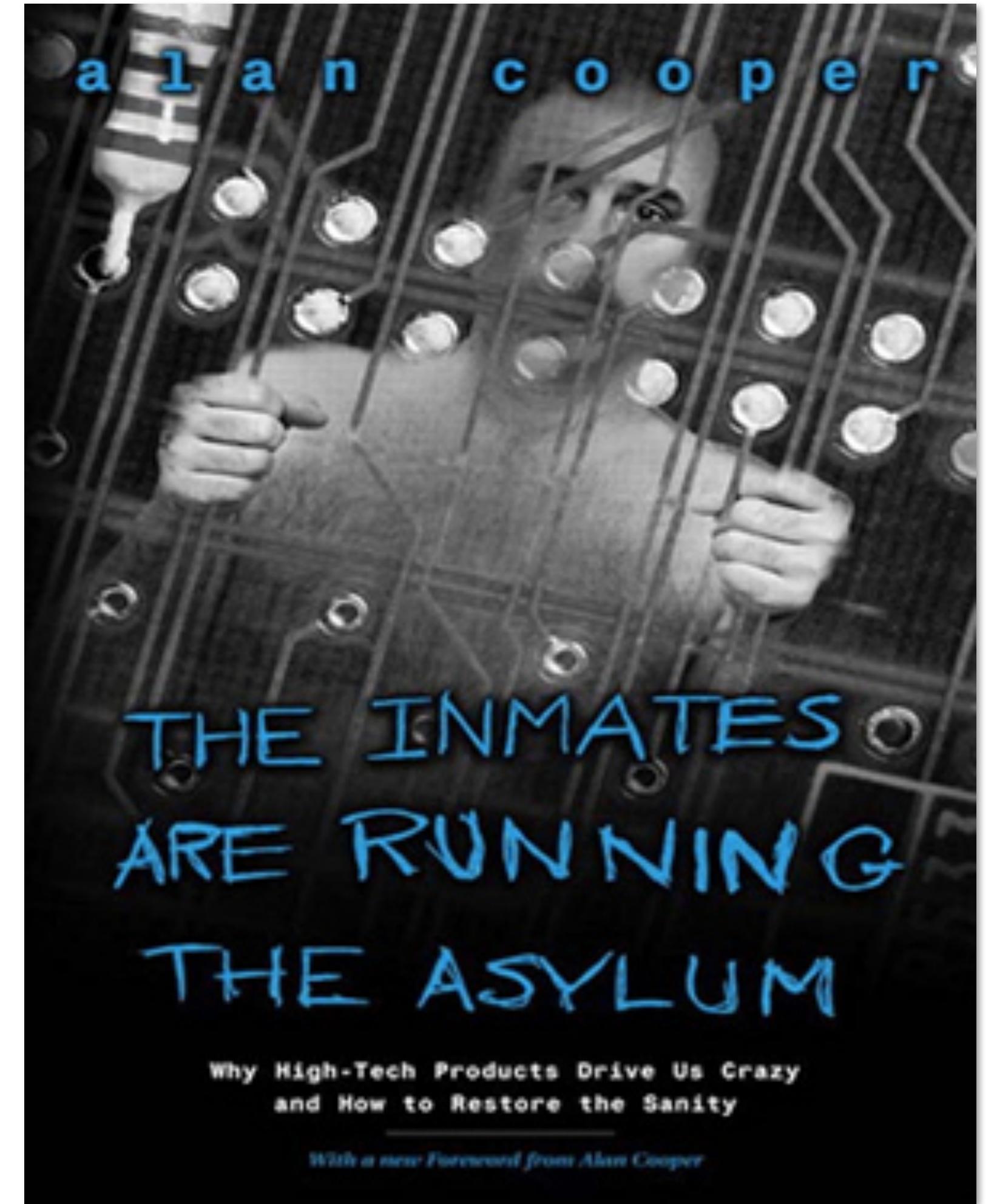


FOX

In *The Simpsons* episode “Oh Brother, Where Art Thou?,” Homer is asked to design a car for the company run by his long-lost brother, and fails so spectacularly he drives him out of business. It’s a brilliant episode because, on top of being hilarious, kind of predicted the automotive future: Some of the features that made Homer’s car so terrible are actually commonplace in 21st century vehicles.

**“Merely being the victim of a particular problem does not automatically bestow on you the power to see its solution”**

Alan Cooper



# Conhecer os utilizadores

- Quem são?
- Provavelmente um grupo heterogéneo...
  - **Não** vale a pena definir o ~~utilizador médio~~
  - **Não** vale a pena utilizar o ~~múltiplo mínimo comum~~
  - **Não** nos podemos basear em ~~nós próprios~~
- Agrupar utilizadores por categorias:
  - Tipos de utilização
  - Características pessoais
  - Níveis de perícia

# Conhecer os utilizadores

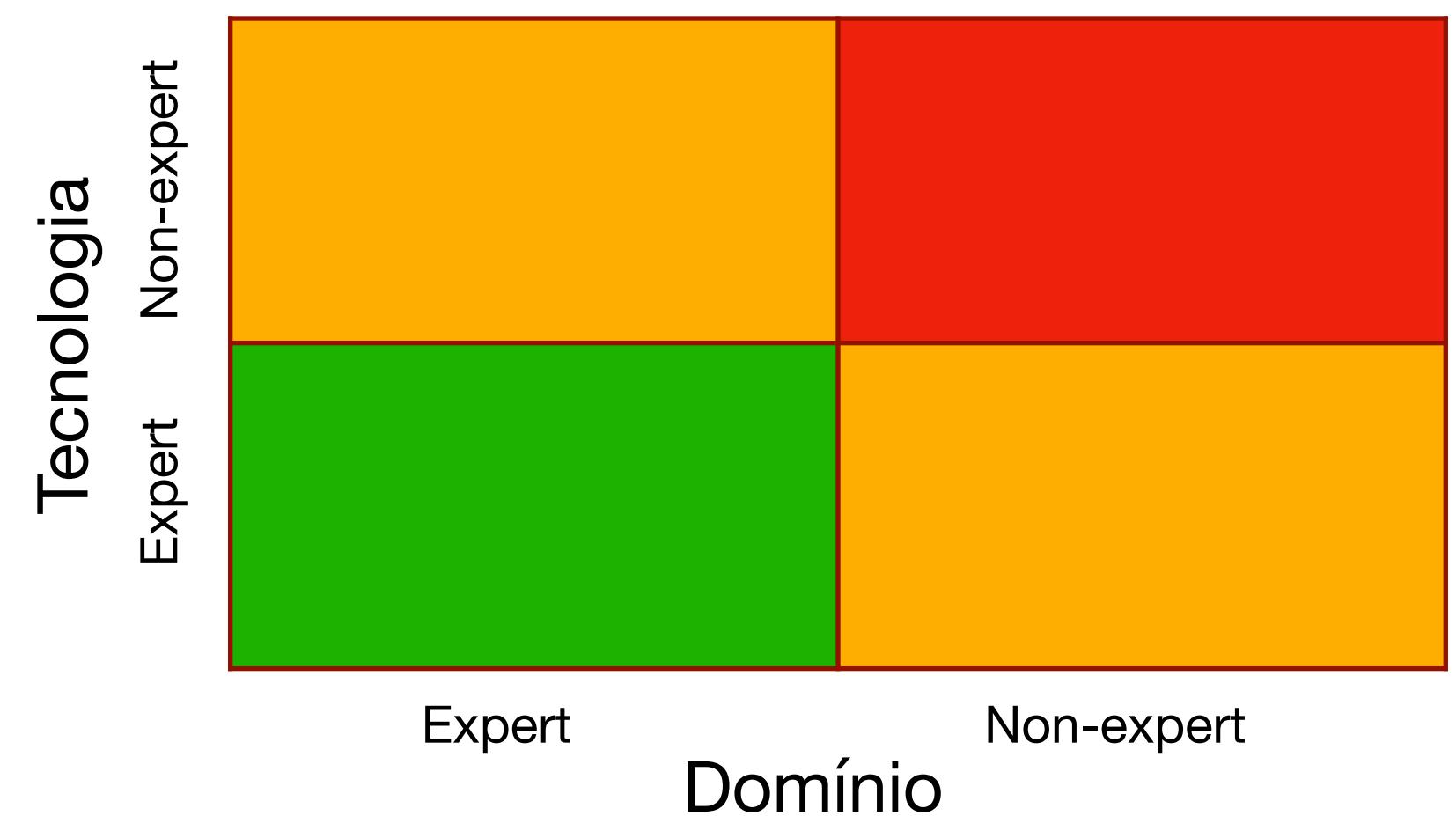
- Tipo de utilização:
  - Utilizadores directos
  - Utilizadores indirectos
  - Utilizadores remotos
  - Utilizadores de suporte
- Obrigados a utilizar o sistema?
- Uso intermitente?

# Conhecer os utilizadores

- Características pessoais:
  - Capacidades cognitivas, de percepção, motoras, etc.
  - Nível de formação
  - Faixa etária
  - Etc.
- Influenciam tipo de interface, linguagem, etc.

# Conhecer os utilizadores

- Níveis de perícia:
  - Inexperientes
  - Intermédios
  - Peritos
- Influenciam o tipo de sistema, suporte e treino
- Mais que uma dimensão (tecnologia vs. domínio)
- Quão perito é um perito? (especialização)



# Conhecer os utilizadores: níveis de perícia

Inexperientes	Peritos
Podem recuar utilizar o sistema	Sentem-se mais confiantes na sua interacção com o sistema
Necessitam de <i>feedback</i> frequente	São capazes de procurar informação quando necessitam
Preferem ser 'guiados' na interacção	Preferem <i>short-cuts</i> e comandos abreviados Preferem interfaces que possam configurar
Têm de se sentir seguros que não vão 'estragar' o sistema	Gostam de sentir que detêm o controlo da interacção

# Conhecer os utilizadores: perfis

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Informação  
sobre o  
utilizador

Grupo etário  
Formação académica  
Competências  
Tipo de utilizador/Experiência

---

Utilização  
do sistema

Opcional ou obrigatória

---

---

Informação  
sobre  
trabalho

Classe de utilizador  
Descrição do trabalho  
Tarefas principais  
Responsabilidades

---

# Conhecer os utilizadores: pessoas

- Utilizadores imaginários
  - Caracterizam grupos específicos de utilizadores
  - Baseadas em dados reais
  - Facilitam visão comum
  - Evitar estereótipos!

## Who

- age
- gender
- education

## Context

- when
- where
- type of computer

## What

- purpose
- expectations

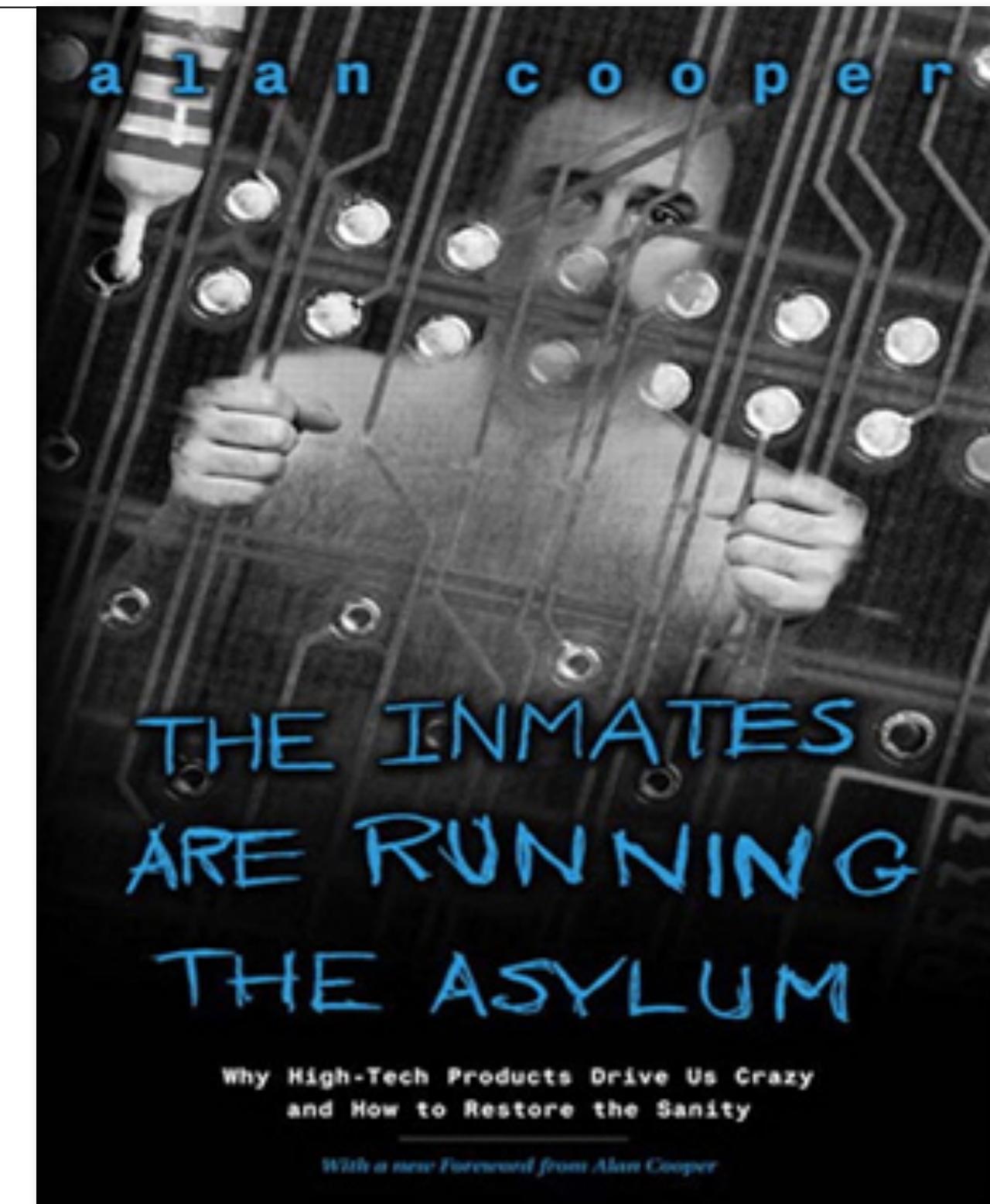
## Motivation

- urgency
- desires

## Robustness

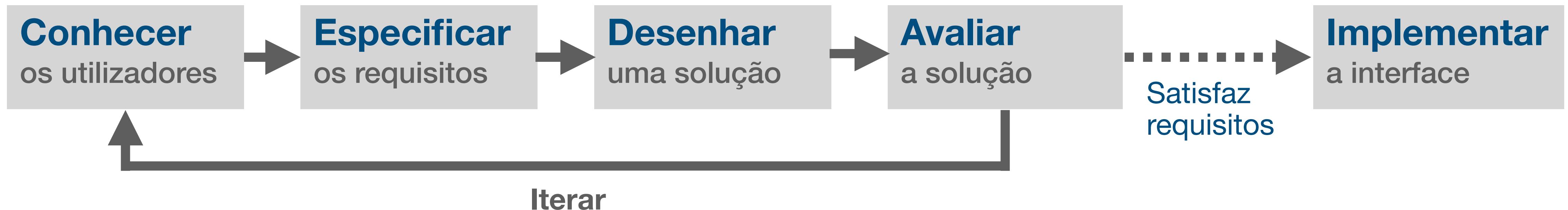
- timid -- aggressive
- cautious -- bold

## Name and possible nickname

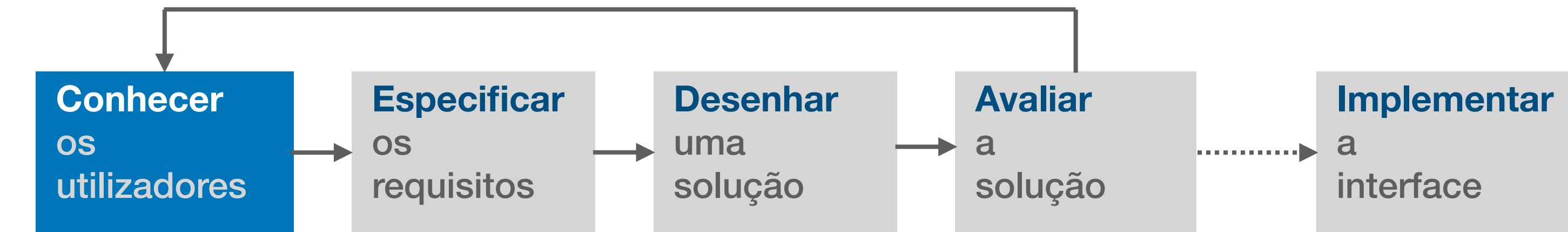


# HCD: Fases

- Uma abordagem que tenta construir sistemas **usáveis** e **úteis**, focando-se nos **utilizadores**, nas suas necessidades e nos seus requisitos.
- Objetivo: Compreender e resolver os problemas dos utilizadores

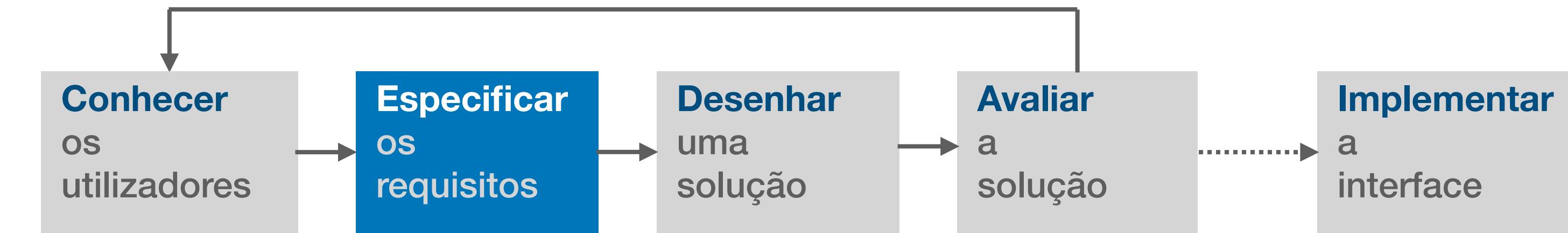


# HCD: Fases



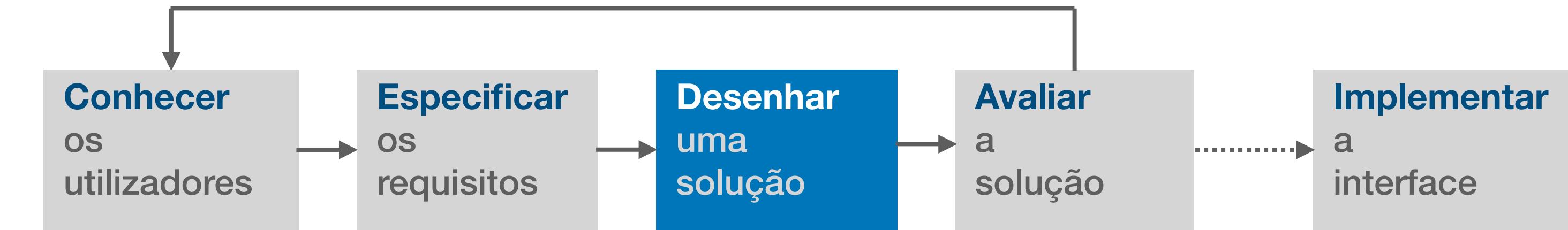
- “Understand and specify the context of use”
  - Quais são os utilizadores, tarefas, equipamento, e ambiente físico e social?
  - Quais são os seus objetivos e necessidades?
  - Que problemas podem ser resolvidos?
- Deve:
  - Ser derivado de fontes adequadas
  - Ser confirmado pelos utilizadores
  - Ser disponibilizado à equipa de design

# HCD: Fases



- “Specify the user and organisational requirements”
  - Complementa a especificação dos requisitos funcionais
  - Deve:
    - Definir claramente os objetivos e as prioridades de design
    - Definir a *alocação de função* (dividir tarefas entre humanos e tecnologia)
    - Ser confirmado pelos utilizadores
    - Considerar requisitos legais

# HCD: Fases

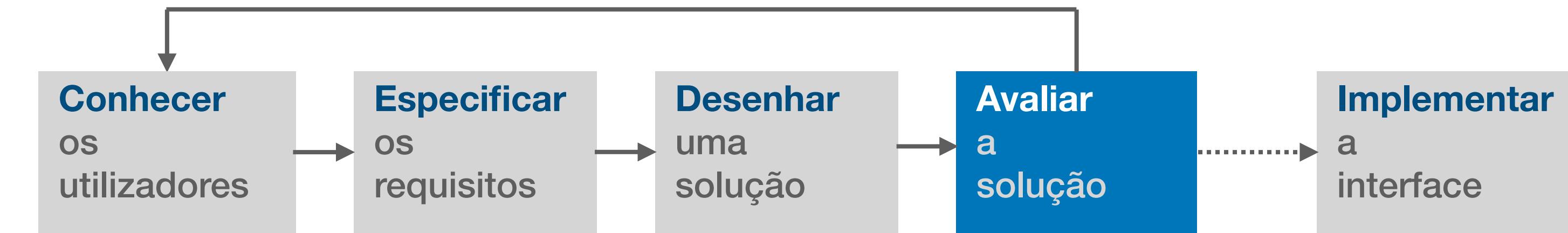


- “**Produce design solutions**”

- Testar ideias (mais rápido de executar e fácil de adaptar)
- Tornar a comunicação com os utilizadores mais eficaz
- Deve:
  - Utilizar conhecimento existente para desenvolver propostas de design (seguir guidelines, standards, produtos similares, ...)
  - Tornar as soluções mais concretas utilizando protótipos (*simulations, mockups, ...*)
  - Adaptar iterativamente o design em resposta ao *feedback* dos utilizadores, até cumprir os objetivos

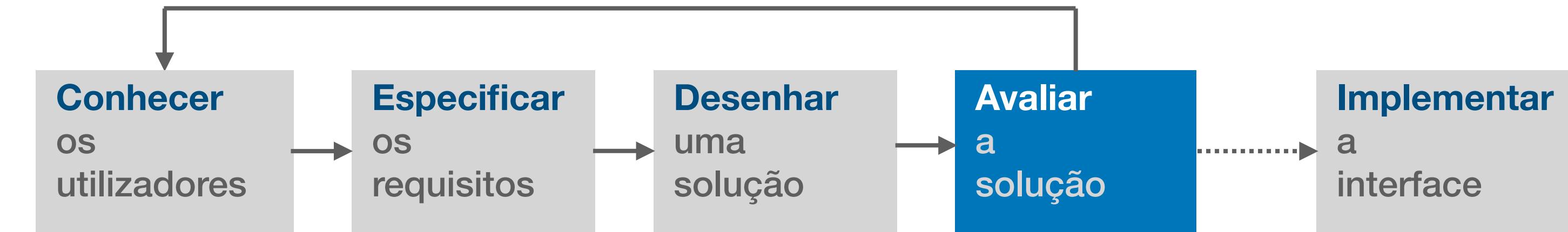
Figma

# HCD: Fases



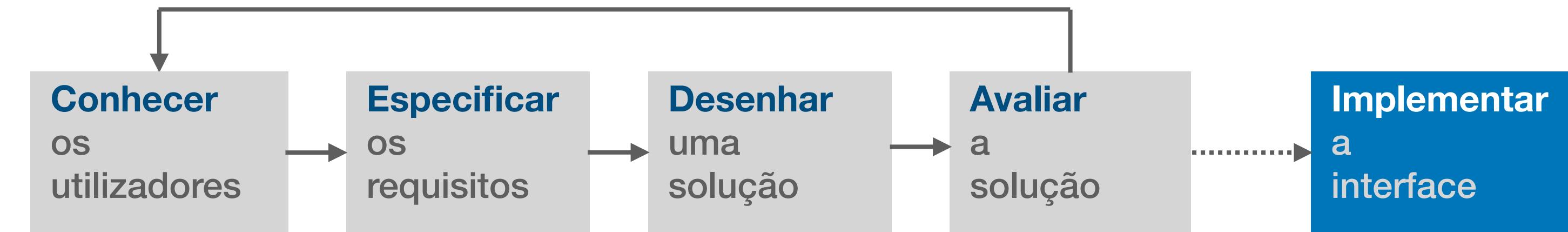
- “Evaluate designs”
  - Quais designs são fáceis de usar?
  - Quais designs respondem às necessidades dos utilizadores?
  - Quais objetivos foram cumpridos?
  - Foram identificados novos problemas e requisitos ou pormenores a melhorar?
  - Está conforme com standards?
- ! Alguns efeitos podem depender de fatores externos, ou só ser identificados se o sistema estiver a ser utilizado durante um longo período

# HCD: Fases

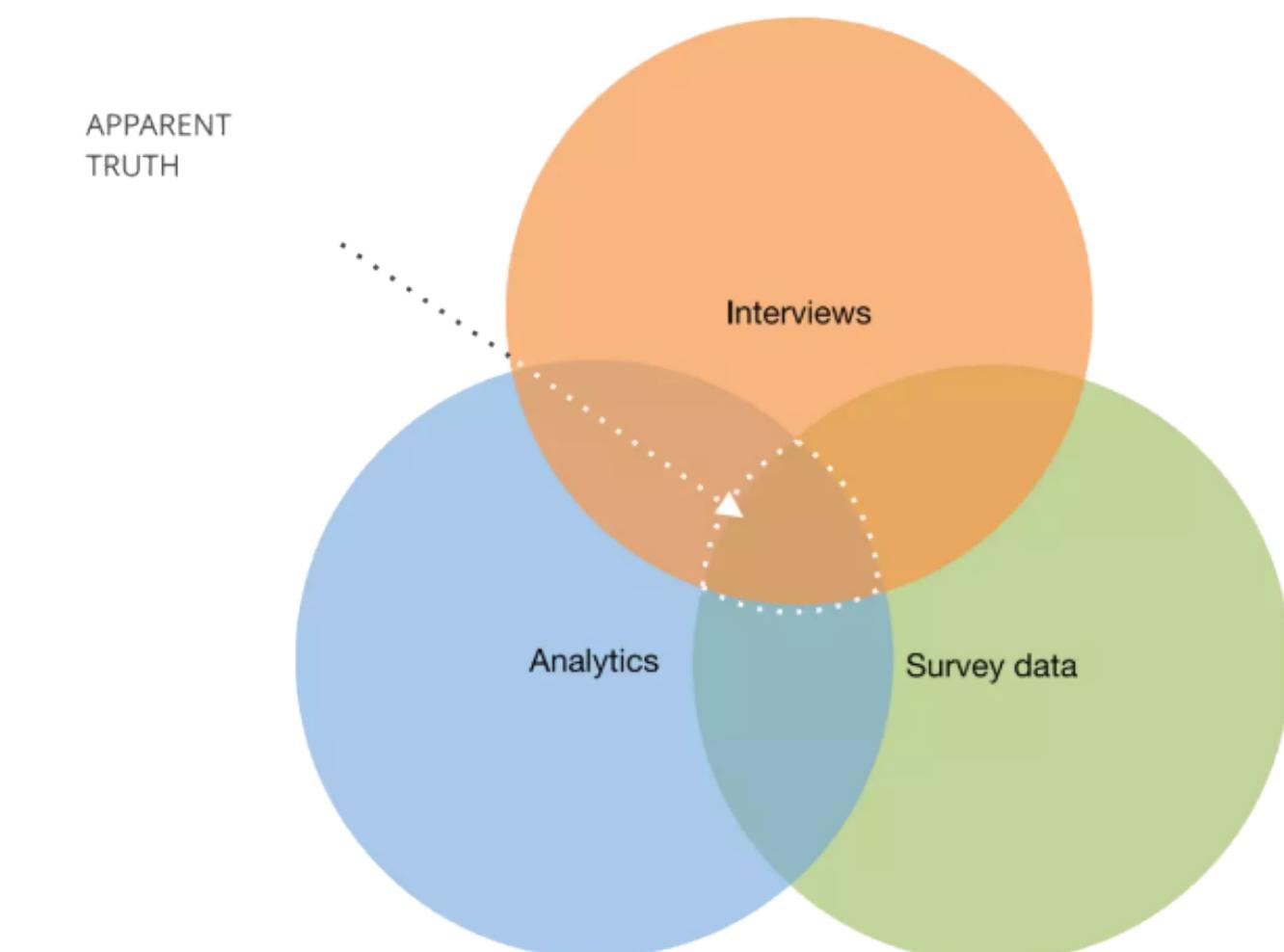
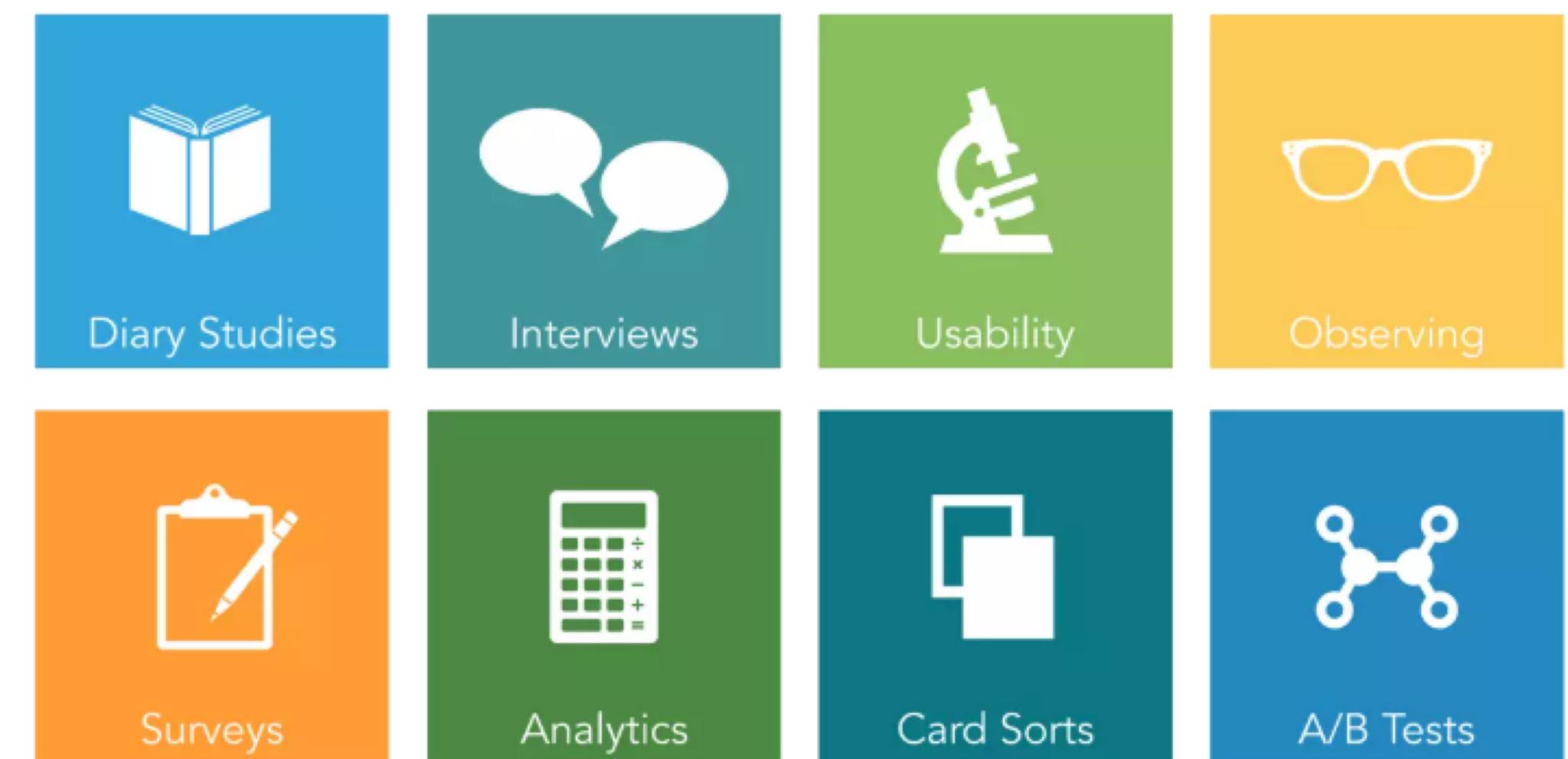


- “Evaluate designs”
- Deve:
  - Considerar experts e utilizadores comuns
  - Guiar o design
  - Apresentar soluções de design e permitir executar (ou simular) tarefas
  - Começar o mais cedo possível (quanto mais tarde, mais caro será corrigir), e durante as várias fases (ciclos curtos)
  - Monitorizar uso prolongado do sistema

# HCD: Fases



- **Release to users and measure**
  - O produto tem sucesso no mundo real, com os utilizadores finais?
  - Continuar o processo de avaliação
  - Em todas as fases, existem vários métodos de avaliação
    - Combinar vários métodos



# Construir uma interface de sucesso

- Objetivo último é satisfazer os utilizadores
- Mas eles sabem o que querem?

Thursday, November 09, 2006

## Marissa Mayer at Web 2.0

Google VP Marissa Mayer just spoke at the Web 2.0 Conference and offered tidbits on what Google has learned about speed, the user experience, and user satisfaction.

Marissa started with a story about a user test they did. They asked a group of Google searchers how many search results they wanted to see. Users asked for more, more than the ten results Google normally shows. More is more, they said.

So, Marissa ran an experiment where Google increased the number of search results to thirty. Traffic and revenue from Google searchers in the experimental group dropped by 20%.

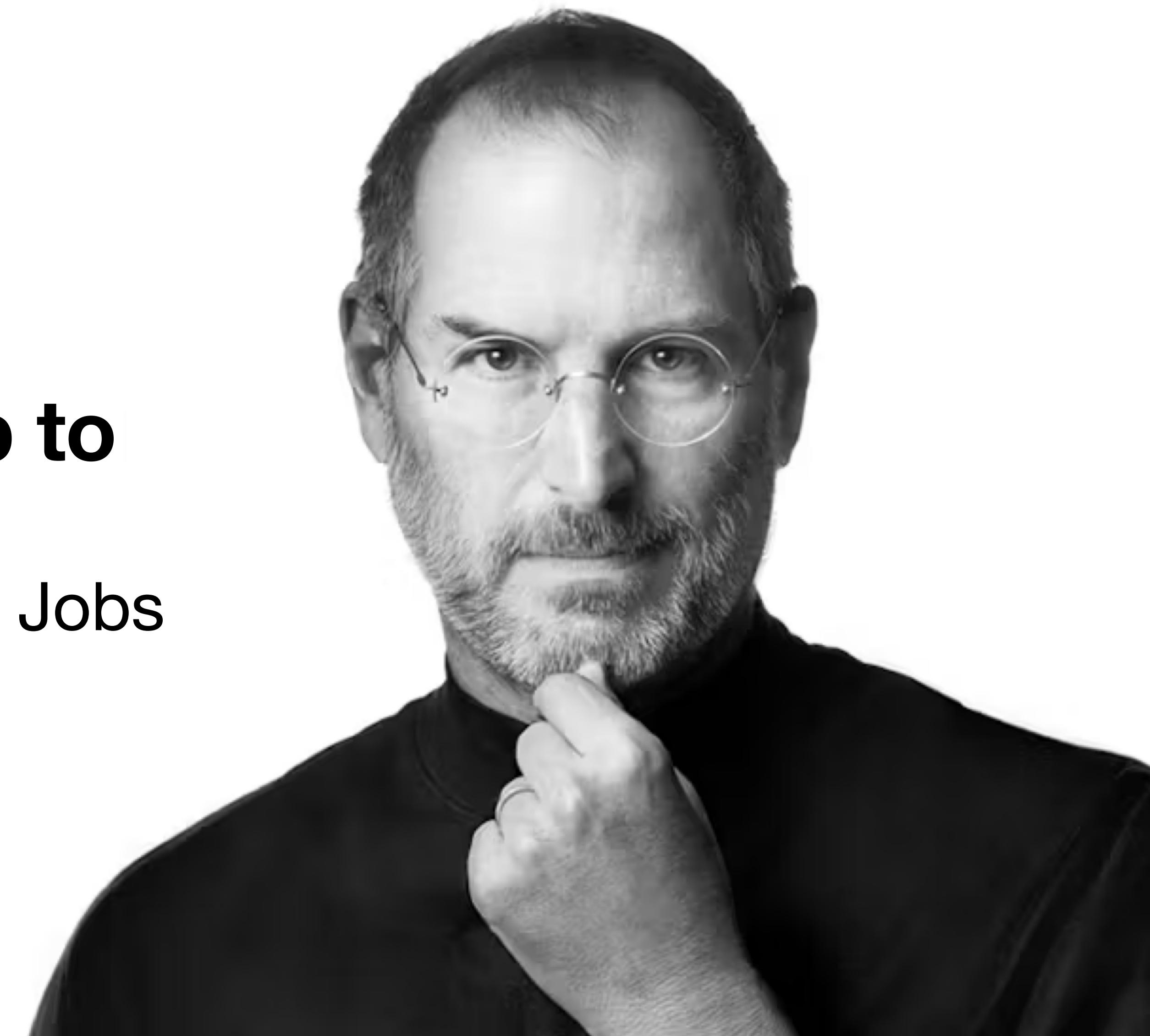
Ouch. Why? Why, when users had asked for this, did they seem to hate it?

After a bit of looking, Marissa explained that they found an uncontrolled variable. The page with 10 results took .4 seconds to generate. The page with 30 results took .9 seconds.



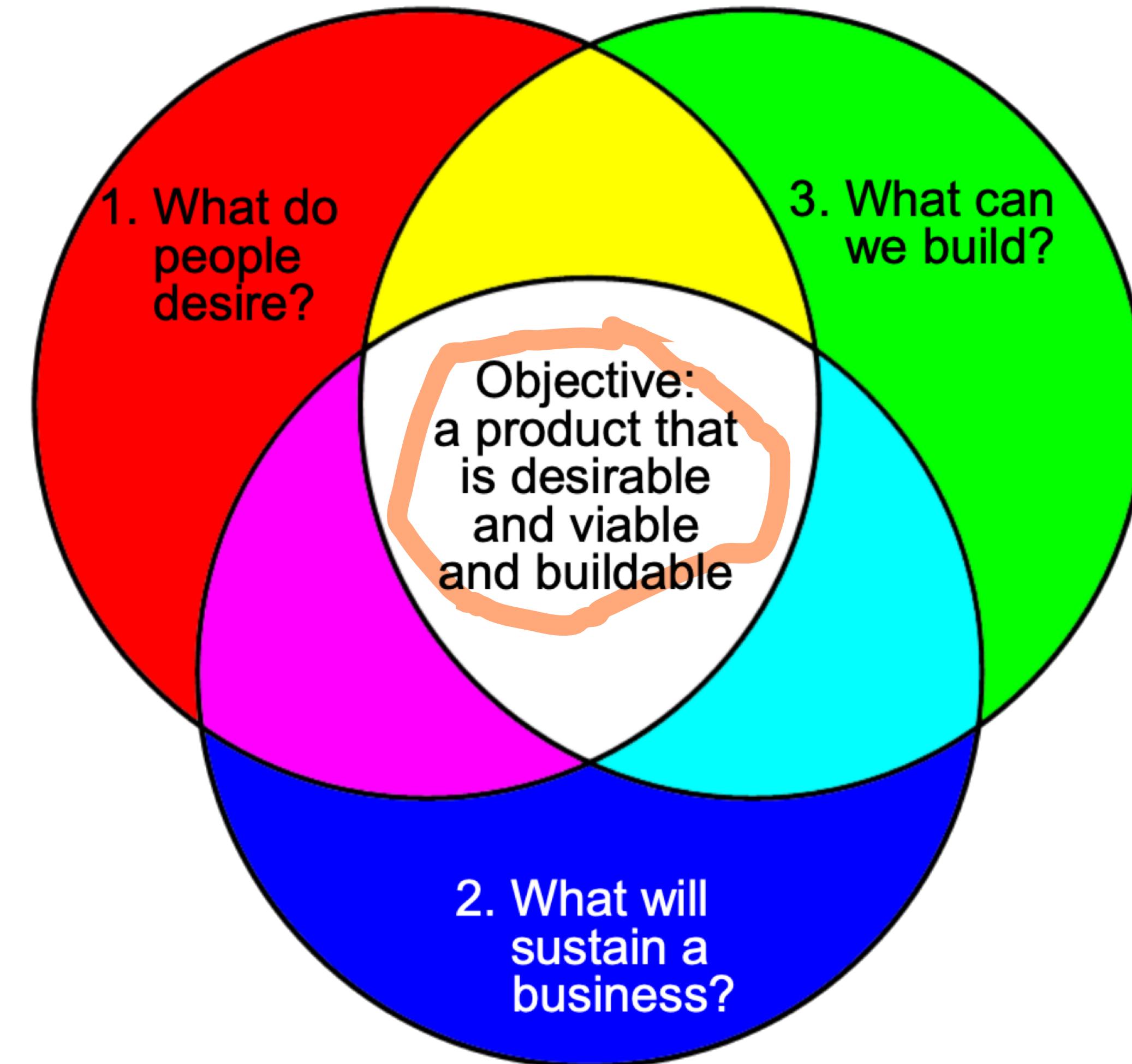
**“It's not the customer's job to  
know what they want”**

Steve Jobs



# Construir uma interface de sucesso

- Sempre um balanço





“If You Think Good Design is  
Expensive, You Should Look At  
The Cost of Bad Design”

Ralf Speth