

# HCI & Software Ergonomics - Introduction

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# Main goals of this lecture



1. Introduction: „the big picture”

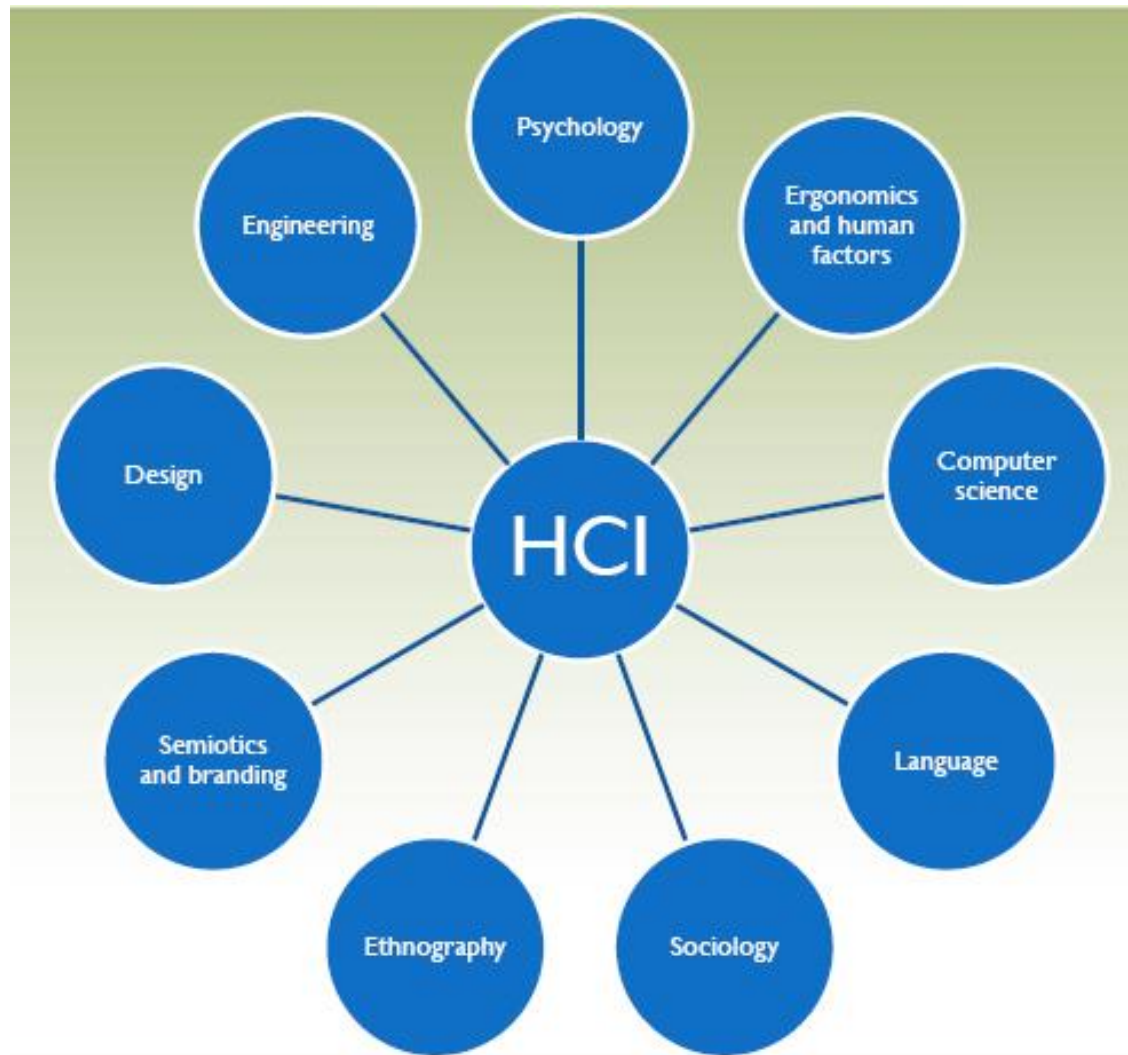
Human Computer Interaction and Software Ergonomics

2. Theory related to user experience and usability

3. Usability evaluation methods

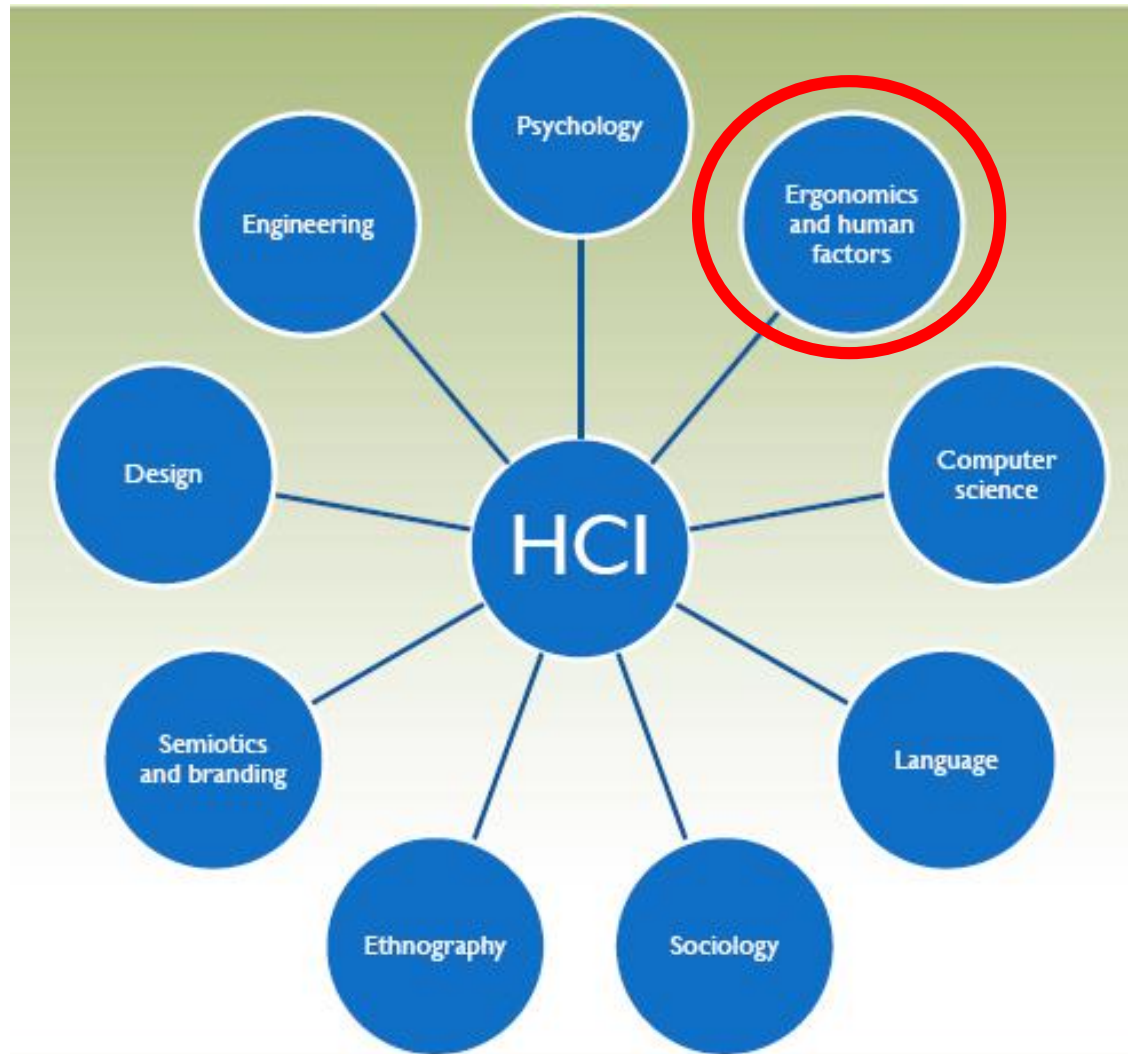
# Human Computer Interaction

Multidisciplinary area focusing on the design of computer technology and especially interaction between the users and the system.

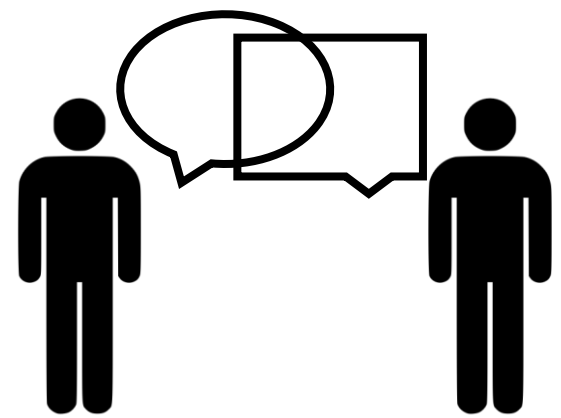


# Software Ergonomics

Software ergonomics research explores user experience and usability of software with the help of related ergonomics principles.



# Discussion



Discuss in pairs:

- What are your favourite apps and why?
- Find common characteristics
  
- 5 min discussion in pairs
- 10 min discussion in the whole group

# What is user experience?

User experience has a wide variety of meanings, from traditional usability to beauty, hedonic, affective or experiential aspects of technology use.

(Hassenzahl & Tractinsky, 2006)

Video about the broad definition of UX:

- [Don Norman: The term "UX"](#)

# User experience honeycomb

A software with great UX has the following characteristics:



# UX honeycomb

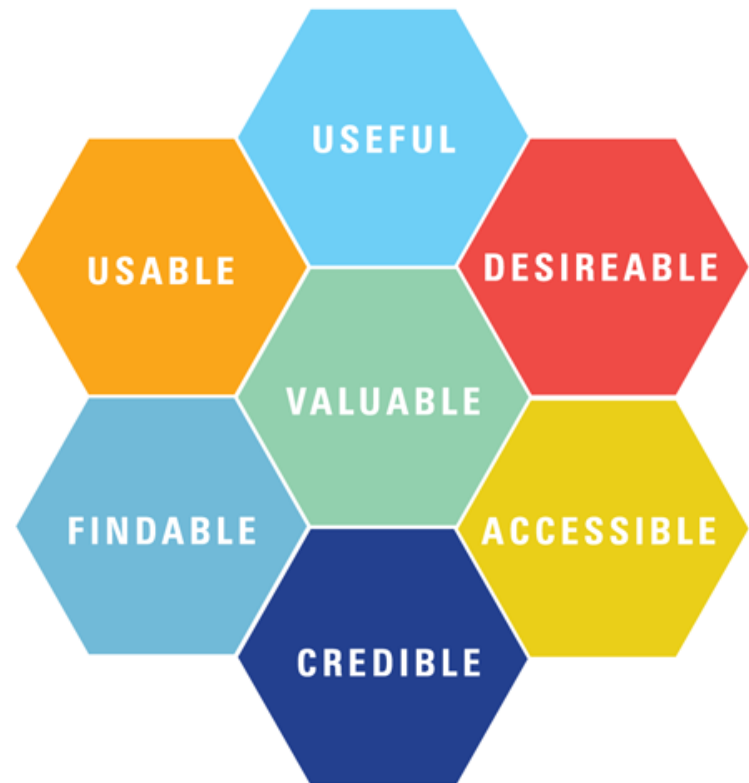
**Valuable:** provides value for users

**Desirable:** design elements, visual aesthetics

**Findable:** information is easy to find (navigable and locatable website)

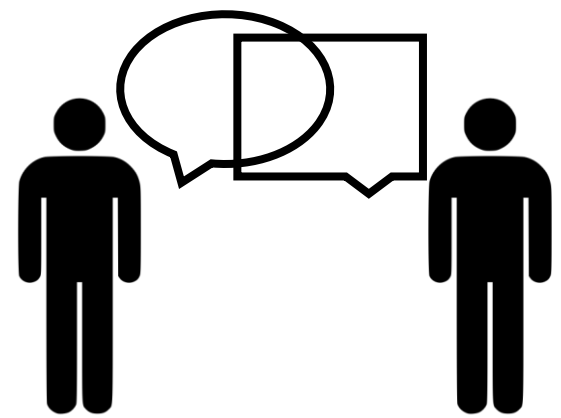
**Accessible:** accessible to people with disabilities

**Credible:** users should trust the product/software





# Discussion about favourite apps

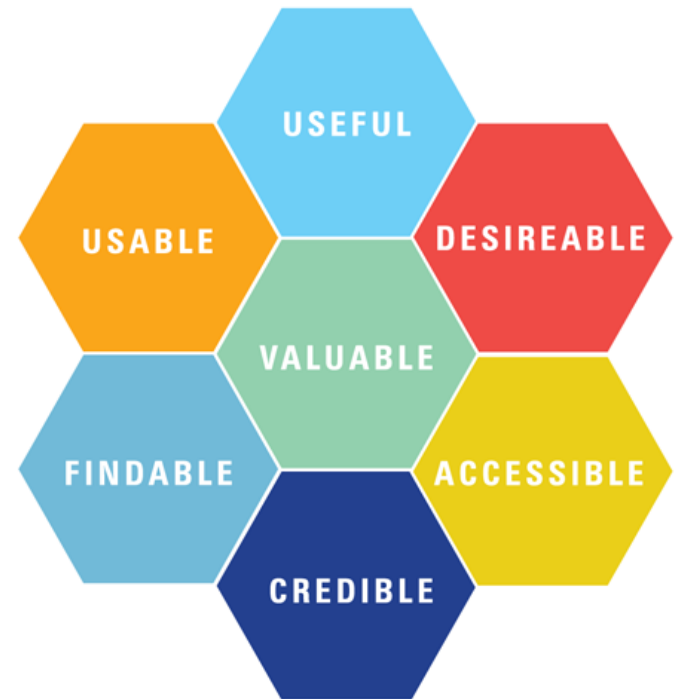


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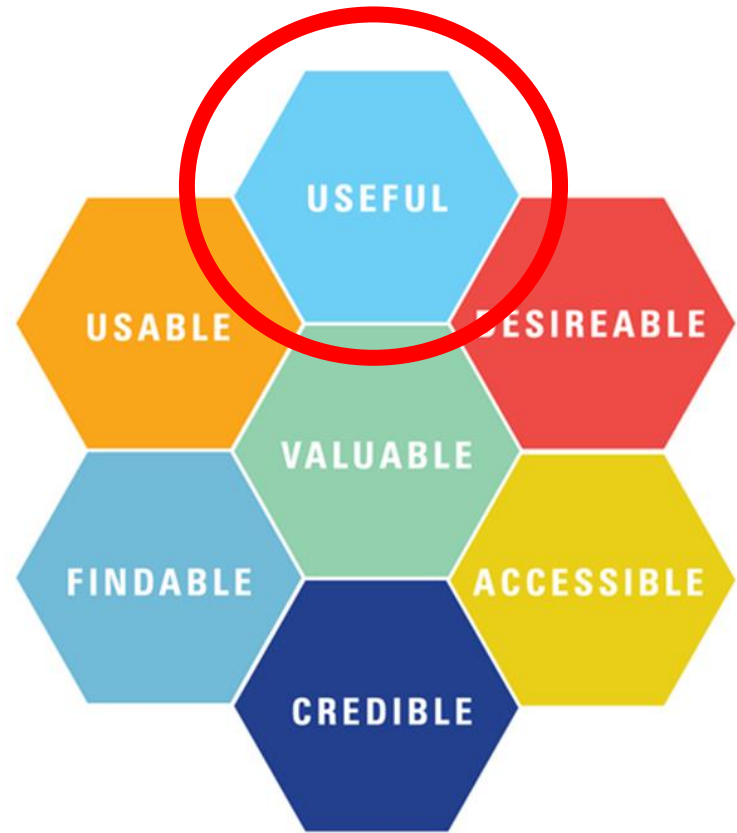
**Credible:** users should trust the product/software



# UX honeycomb - Usefulness

**Useful:** A software is useful if it satisfies the users needs.

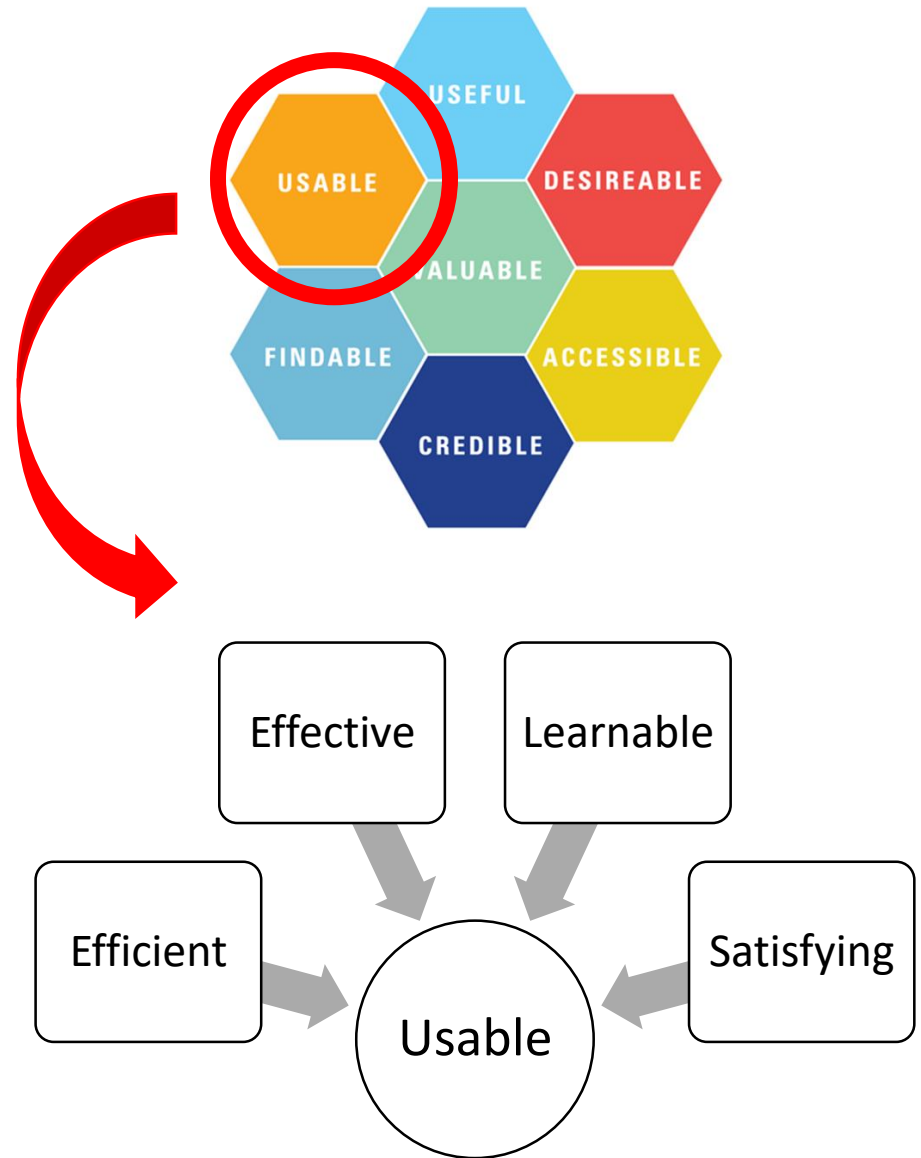
*„If a system is easy to use, easy to learn, and even satisfying to use, but does not achieve the specific goals of a specific user, it will not be used even if it is given away for free.”*



# Usability

A software is usable, when the user can do what s/he wants to do without questions.

To be usable, a product or service should be learnable, efficient, effective and satisfying.



# Usability - Efficiency and effectiveness

## Efficiency

- How quickly the user can achieve a goal?

## Effectiveness

- Does the system „behave” how the user expects it to behave?
- Measured by user errors

*Task: go to [bikram.hu](http://bikram.hu) and change the language to English*

*Efficiency: How quickly could you perform it?*

*Effectiveness: Was it easy to find that information?*

*How did you find it? Did you go to any „wrong paths”?*

# Usability - Learnability and satisfaction

## Learnability

- At the first time of use:  
How easy is it to operate the system?
- After some time of inactivity, how easy is it to relearn the system?

## Satisfaction

- How pleasant is it to use the design?

(user's perceptions, feelings, and opinions of the product)

*Task: Go to the  
**Ergonomics** course  
page at  
[moodle.appi.bme.hu](http://moodle.appi.bme.hu)*

*Think through your  
experience with the  
moodle page related to  
Learnability and  
Satisfaction.*

# Why do we need usability evaluation?



User experience

Design



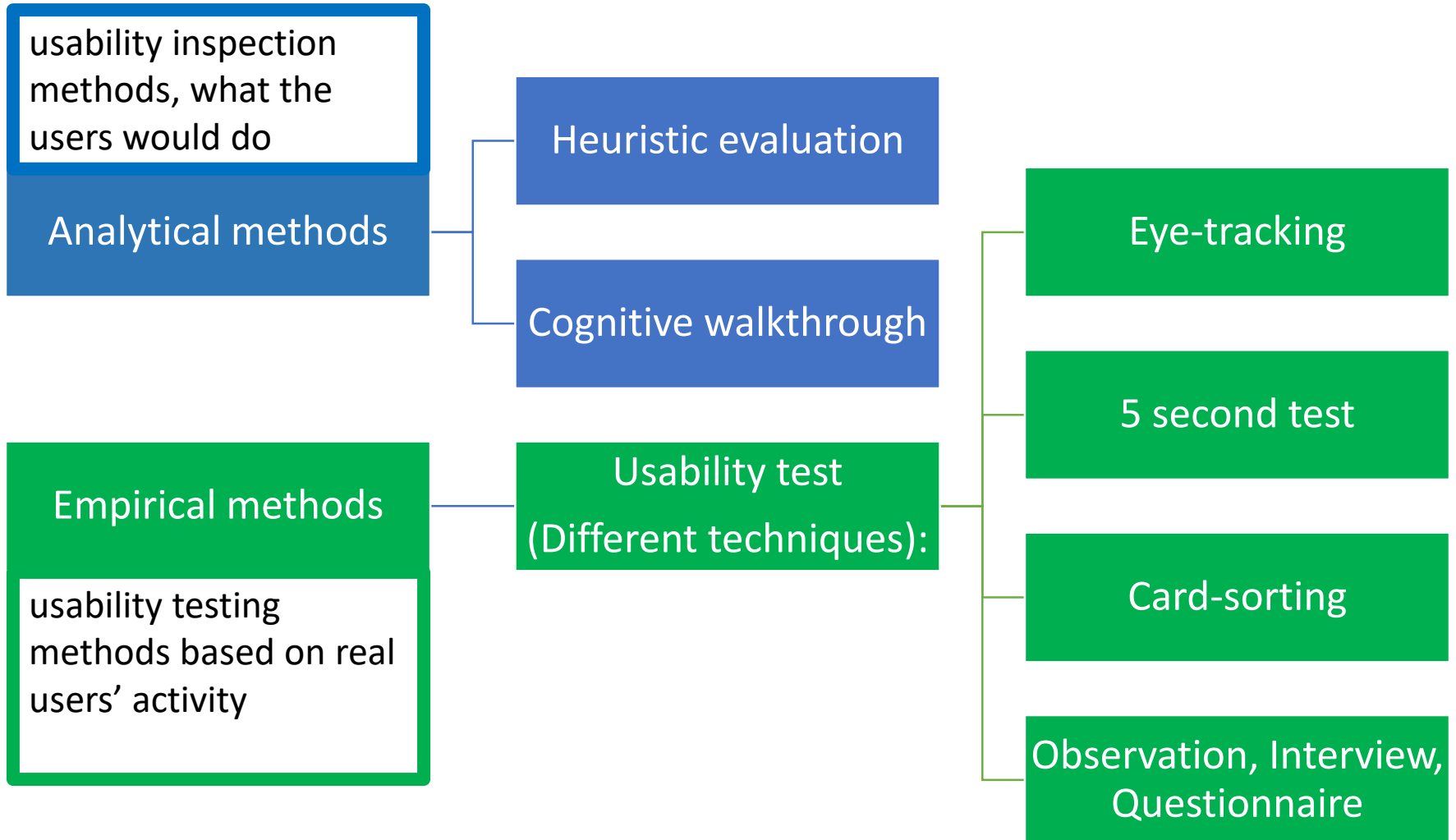
# Why do we need usability evaluation?



**Jumping through hoops.**

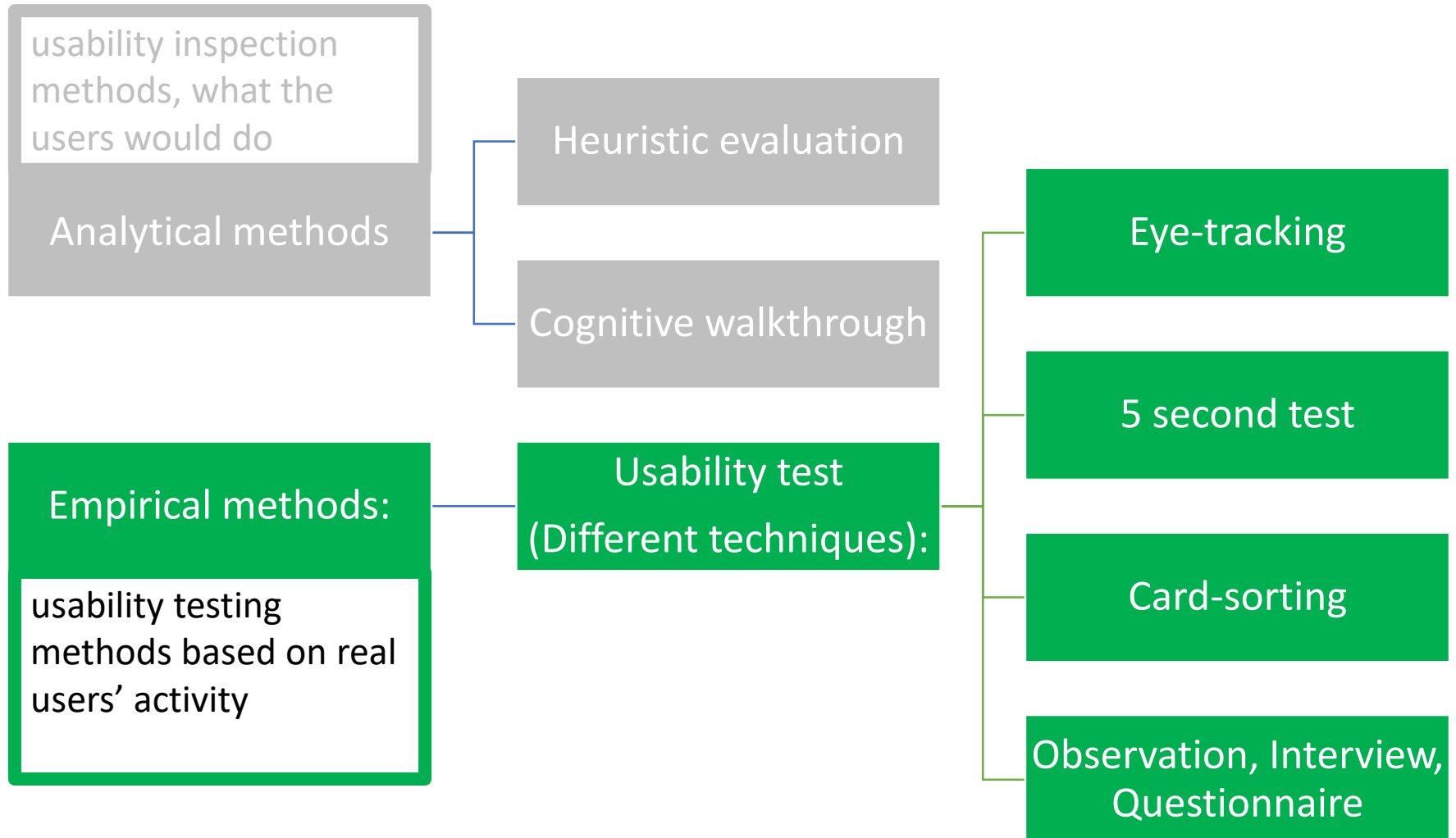
It's not as easy as it looks.

# Analytical vs. empirical methods





# Empirical methods



# Why empirical methods are important?



What people say, what people do,  
and what they say they do are  
entirely different things.

— *Margaret Mead* —

AZ QUOTES

# 5 second test

- It simulates the first time someone visits a new webpage/app.
- Can a new visitor understand the page/app in 5 seconds?
- First emotional impressions



# The All-in-one project management tool for teams

START USING FOR FREE



## Outstanding UX

Enjoy the advanced functionality paired with a neat user experience and a beautifully designed interface.



[CES Awards 2016 winner](#)  
[in Best User Experience](#)

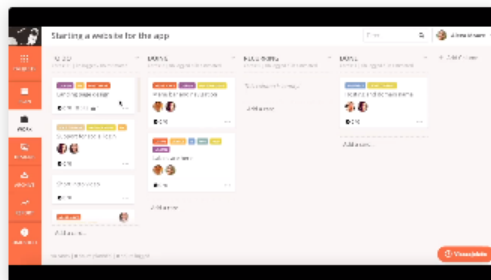
## Focused workspace

Use one tool only. Plan your tasks, manage implementations, log your hours, collaborate in design workflow and report the results.

## Time management

Plan, log and overview your hours easily with our built in timesheet- and accessible task related time log feature.

## Organise your tasks quickly and easily



Get instant clarity, improve team collaboration and optimise the flow of your work with our intuitive Kanban Board.



# 5 second test demonstration

- What are your first impressions?
- What is this website for?

# Card-sorting

- How to organize content
- Findability of content or functionality
- User input about content organization or labeling
- Video: [OptimalSort: Card sorting](#)

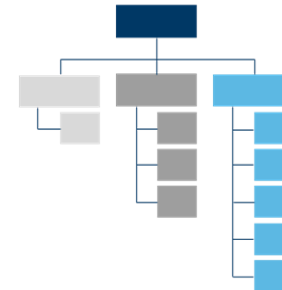
**Define**



**Group**



**Structure**



# Closed Card Sort

1



Participant gets a stack of cards

2



Participant sorts cards into groups the researchers have created

# Open Card Sorting



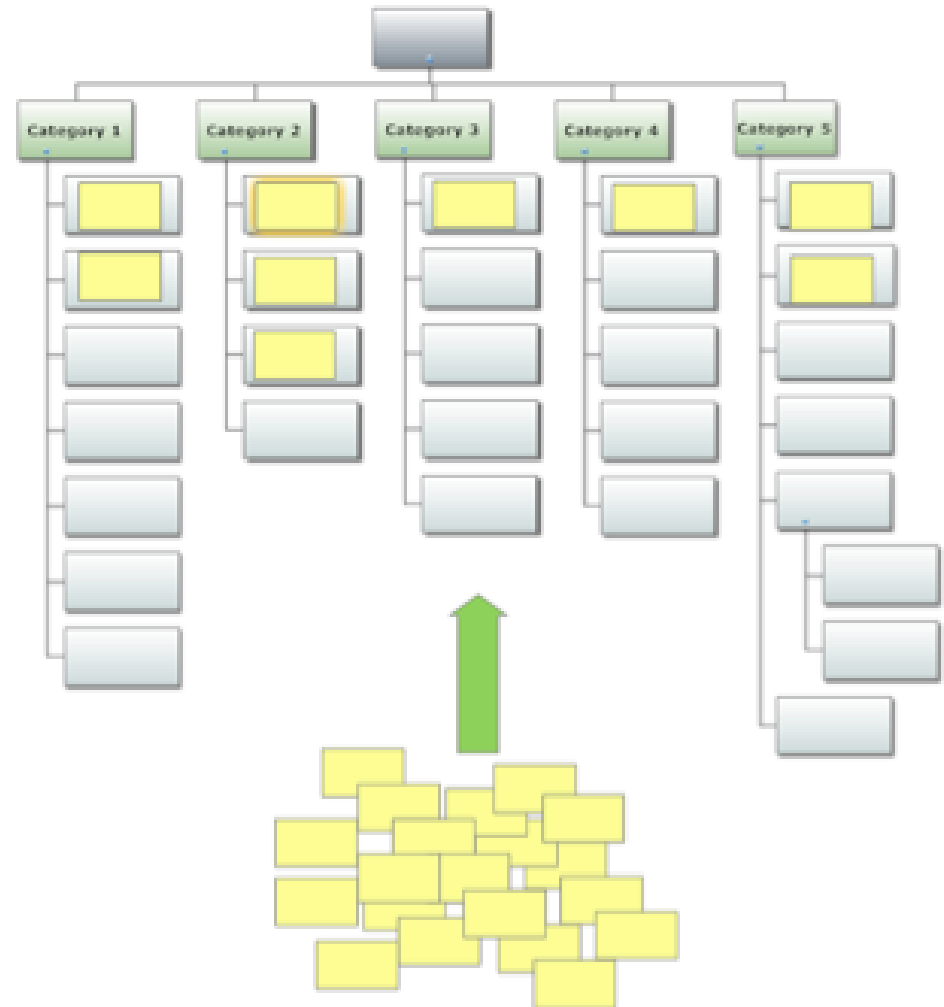
**First, participants create the categories, then categorize the different items.**



# Reverse card sorting

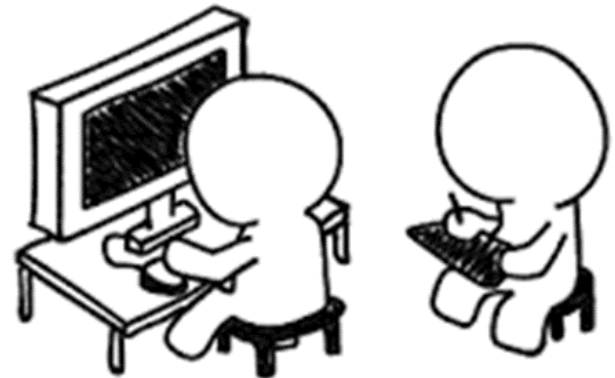
Its main goal is to check the structure.

The categories and the number of items related to each category is given by the researchers.



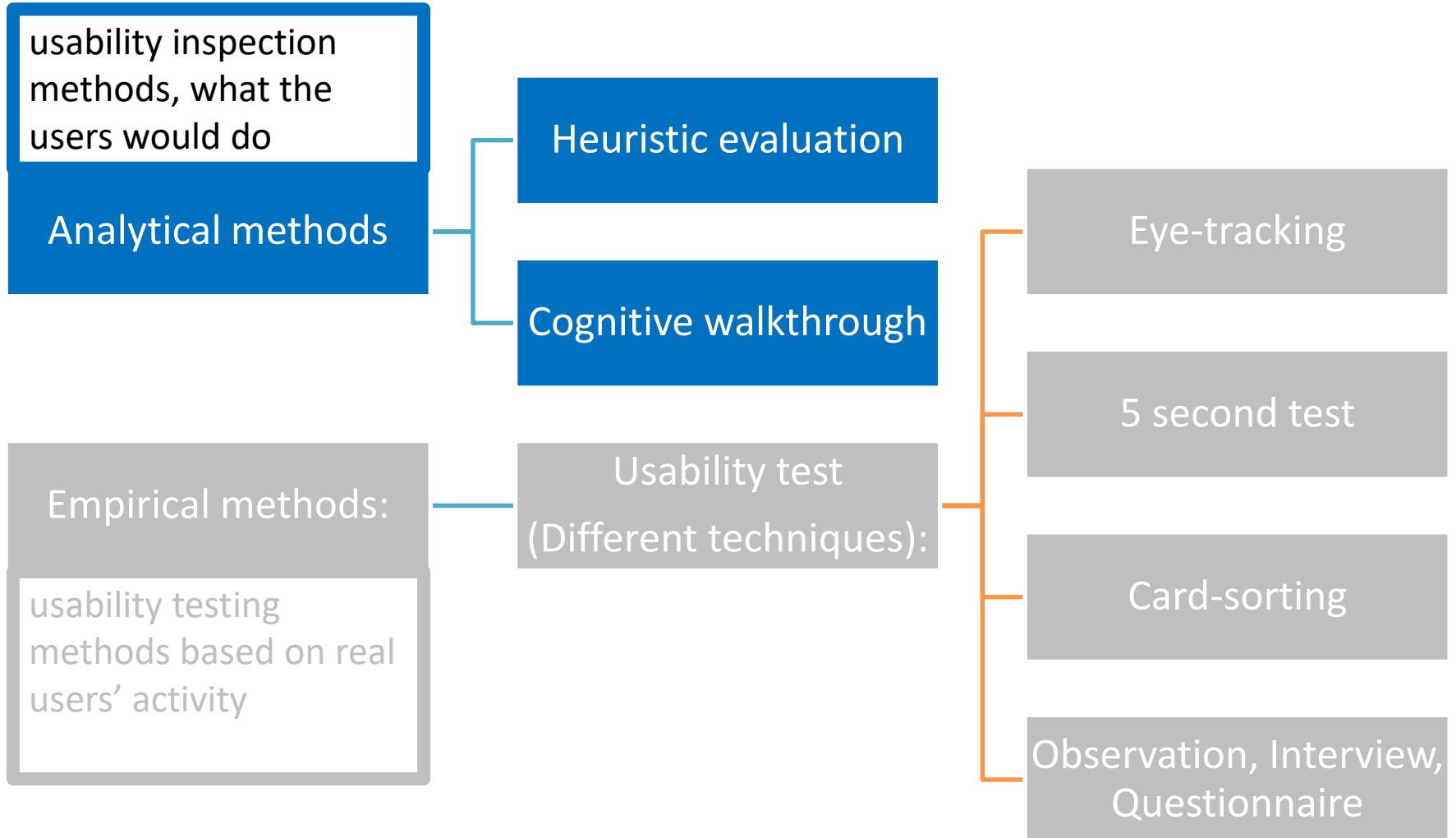
# Formal usability test

- 1) Test scenario, including specific tasks and related research questions
- 2) Organize the test sessions
- 3) Conducting the test
- 4) Evaluation of the data
- 5) Usability report related to the research question



[Video: Usability testing](#)

# Analytical methods



# Cognitive Walkthrough

The analysis is based on imagining a first time user and the interaction

How the user would use the product?  
Envisioning the user's route

Best for inspecting products that are usually *explored* by the users; not too much previous knowledge

Can be done by either an expert or the developers themselves

# Cognitive Walkthrough

## Defining a goal

- The evaluator creates a broadly defined goal.
- (e.g. „I want to reconfigure my privacy setting”)

## Exploration

- The evaluator explores the system using the UI, searching for options that will help in fulfilling the goal.

## Execution

- The evaluator performs the action that seems the most promising.

## Evaluation

- Once the goal is achieved the actions leading to it have to be evaluated: Were they simple? Were they easy to perform? What about alternatives?



# Heuristic evaluation

Review of a  
product/system

Usually done by 4-6  
experts based on their  
experience and design  
heuristics

Inspection is performed  
independently at first

After all are done, a  
unified problem list is  
talked through together;  
identifying errors and  
assessing their severity

A simple method that  
(might be) cheap and  
very effective but it is  
also very subjective and  
difficult to reproduce

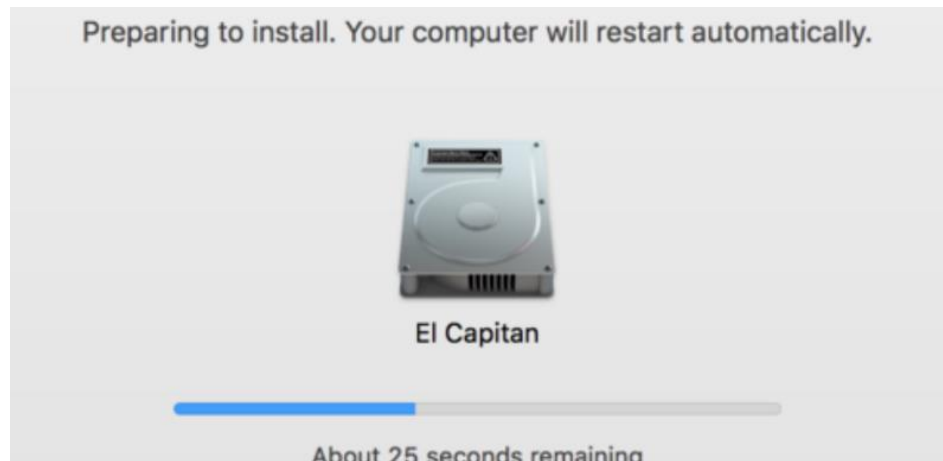
# Usability – 10 heuristics of interface design

1. Visibility of system status
2. Match between system and the real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognize, diagnose, and recover from errors
10. Help and documentation



# 1. Visibility of system status

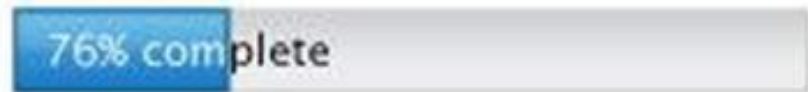
The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.



loading...



76% complete

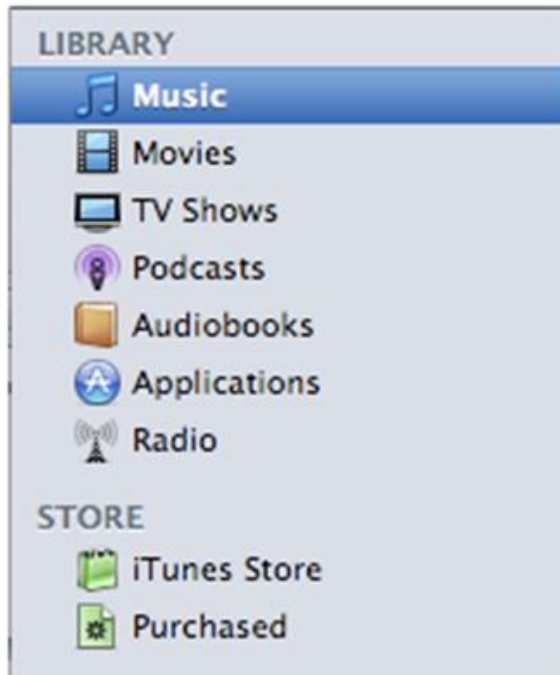




## 2. Match between system and the real world

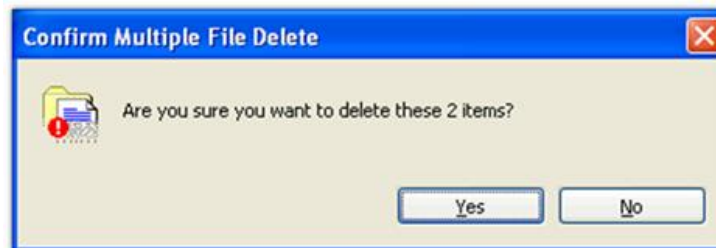
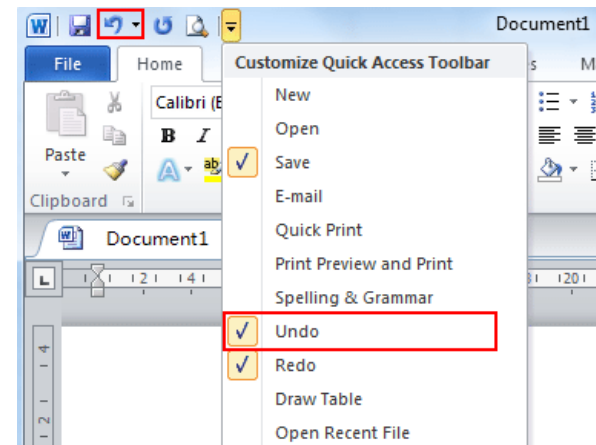
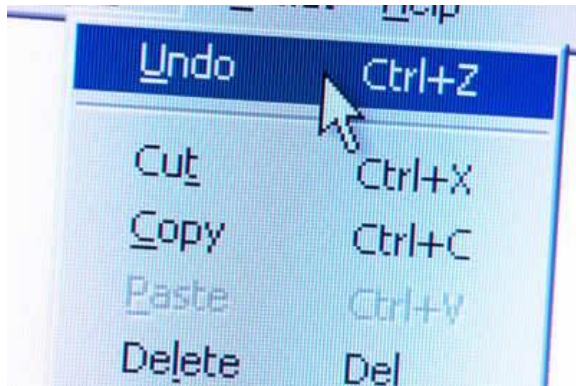
The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms.

Follow real-world conventions, making information appear in a natural and logical order.



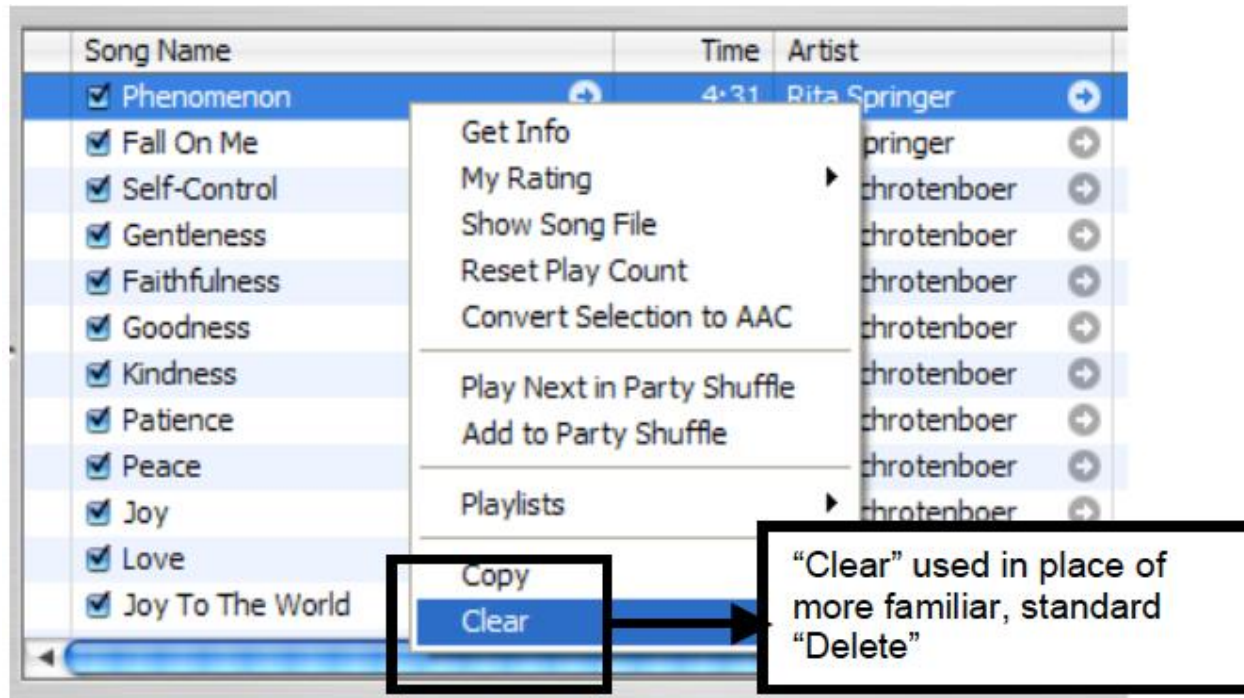
# 3. User control and freedom

Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

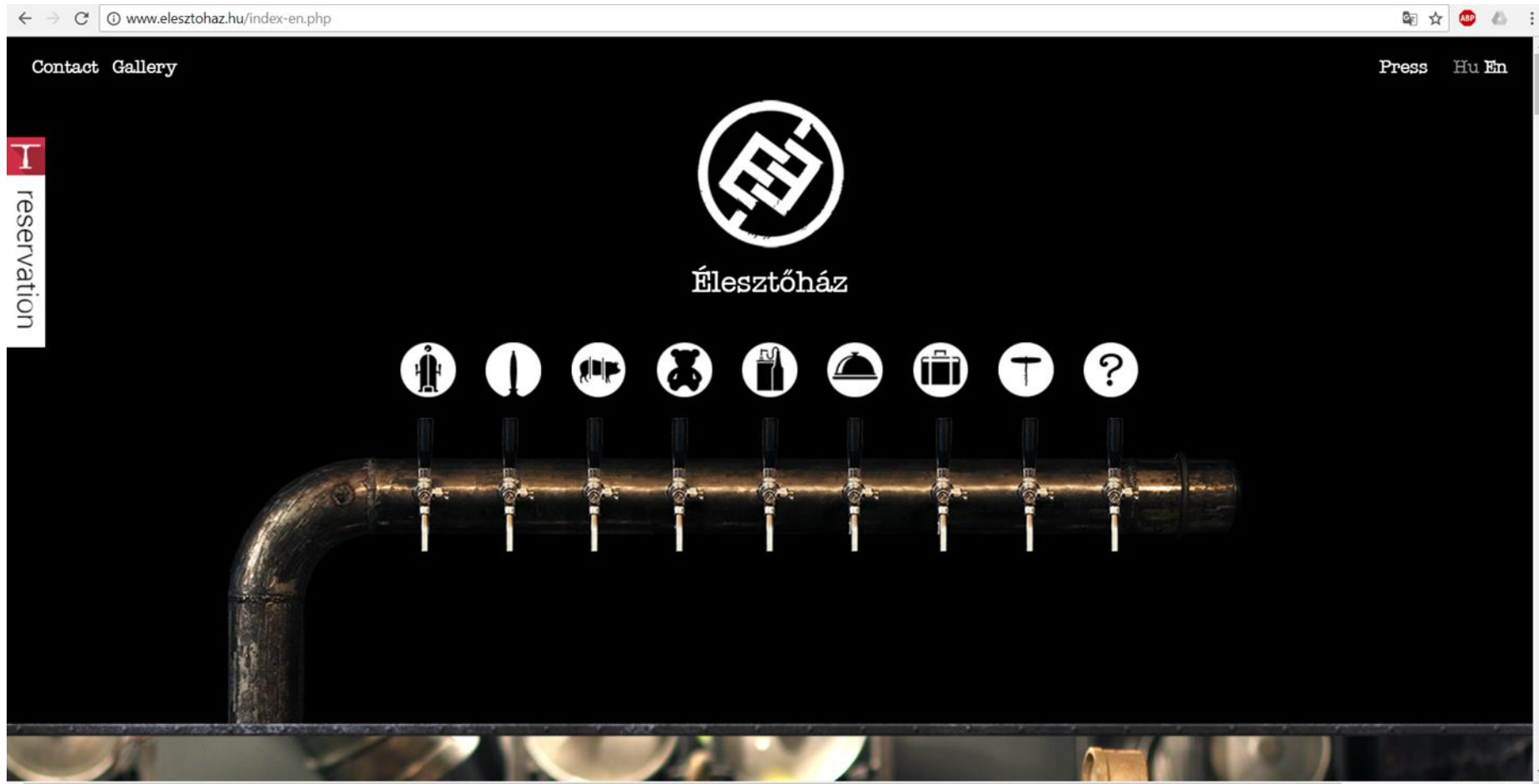


# 4. Consistency and standards

Users should not have to wonder whether different words, situations, or actions mean the same thing.



# 4. Consistency and standards

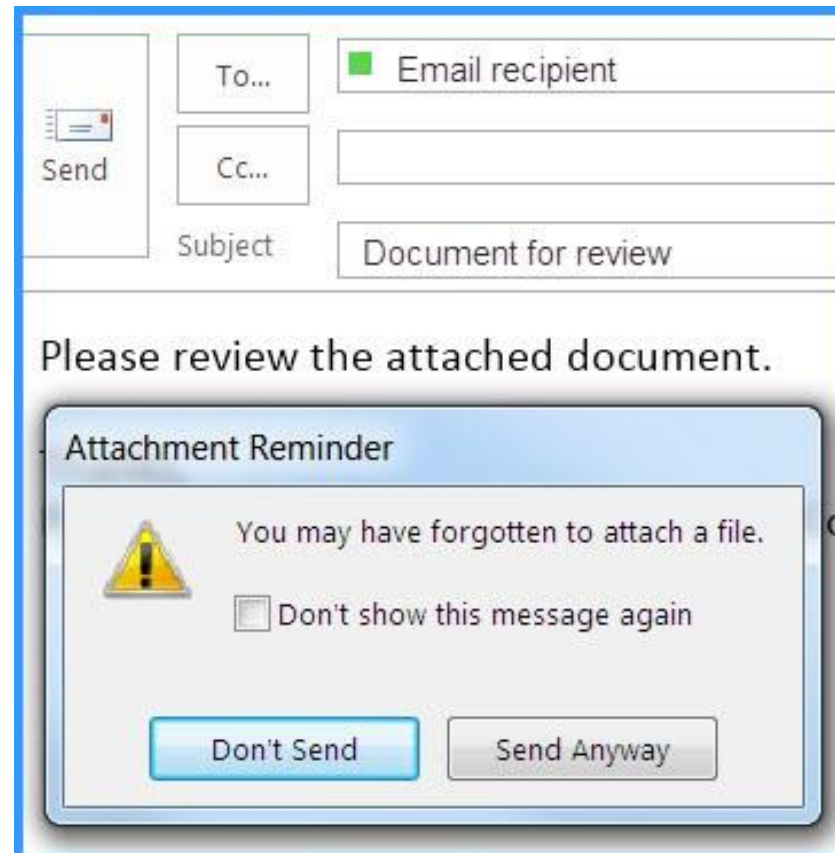


## 4. Consistency and standards



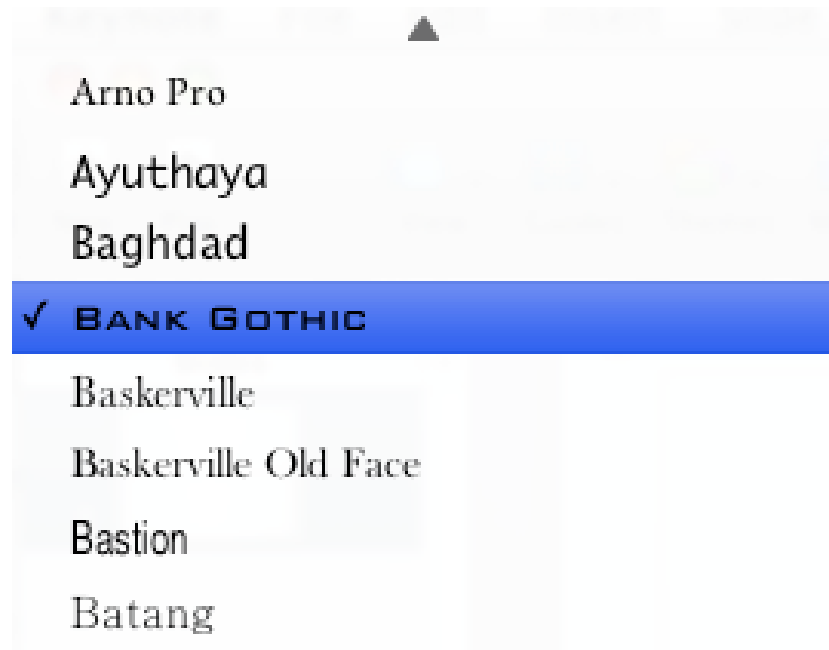
# 5. Error prevention

Even better than good error messages is a careful design which prevents a problem from occurring in the first place.



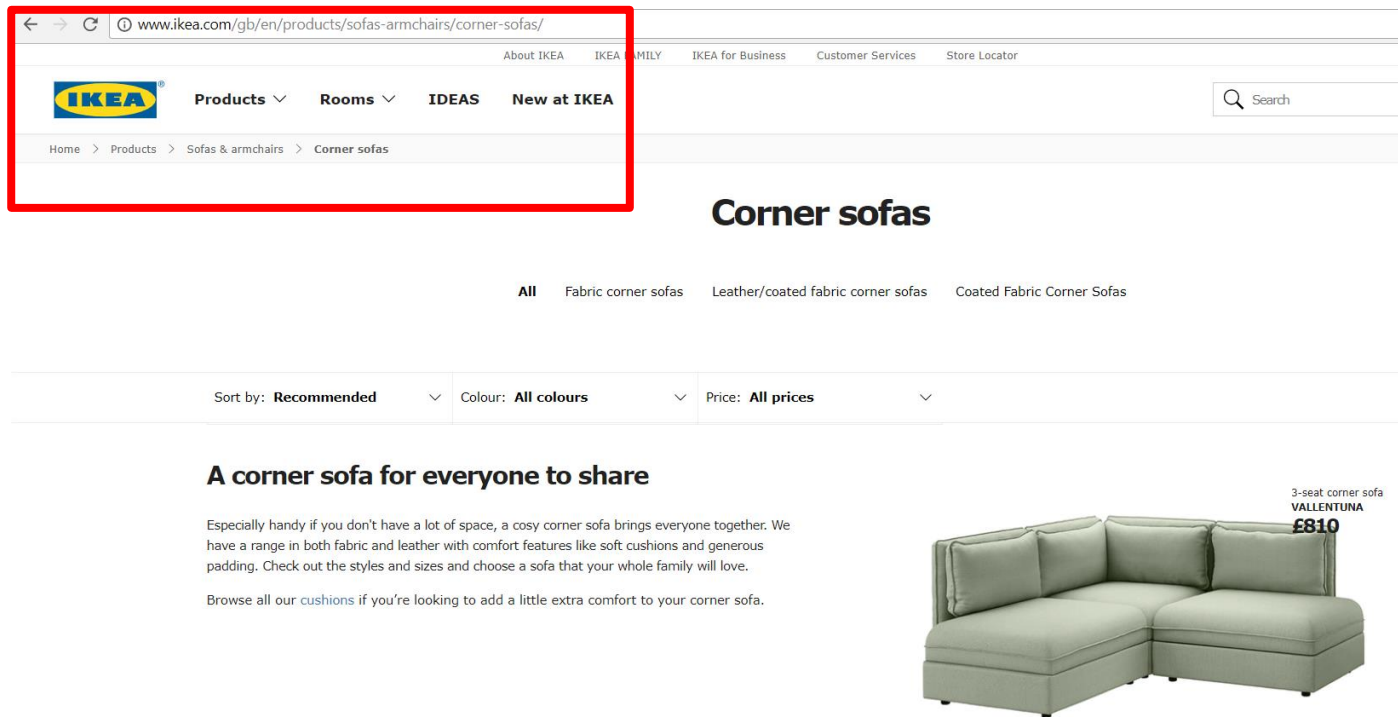
# 6. Recognition rather than recall

Minimize the user's memory load by making objects, actions, and options visible.





# 6. Recognition rather than recall



The screenshot shows the IKEA website's navigation menu, which is highlighted with a red box. The URL in the browser is [www.ikea.com/gb/en/products/sofas-armchairs/corner-sofas/](http://www.ikea.com/gb/en/products/sofas-armchairs/corner-sofas/). The navigation menu includes the IKEA logo, "Products", "Rooms", "IDEAS", and "New at IKEA". Below the navigation menu, the breadcrumb trail reads "Home > Products > Sofas & armchairs > Corner sofas".

## Corner sofas

**All** Fabric corner sofas Leather/coated fabric corner sofas Coated Fabric Corner Sofas


Sort by: **Recommended** Colour: **All colours** Price: **All prices**

### A corner sofa for everyone to share

Especially handy if you don't have a lot of space, a cosy corner sofa brings everyone together. We have a range in both fabric and leather with comfort features like soft cushions and generous padding. Check out the styles and sizes and choose a sofa that your whole family will love.

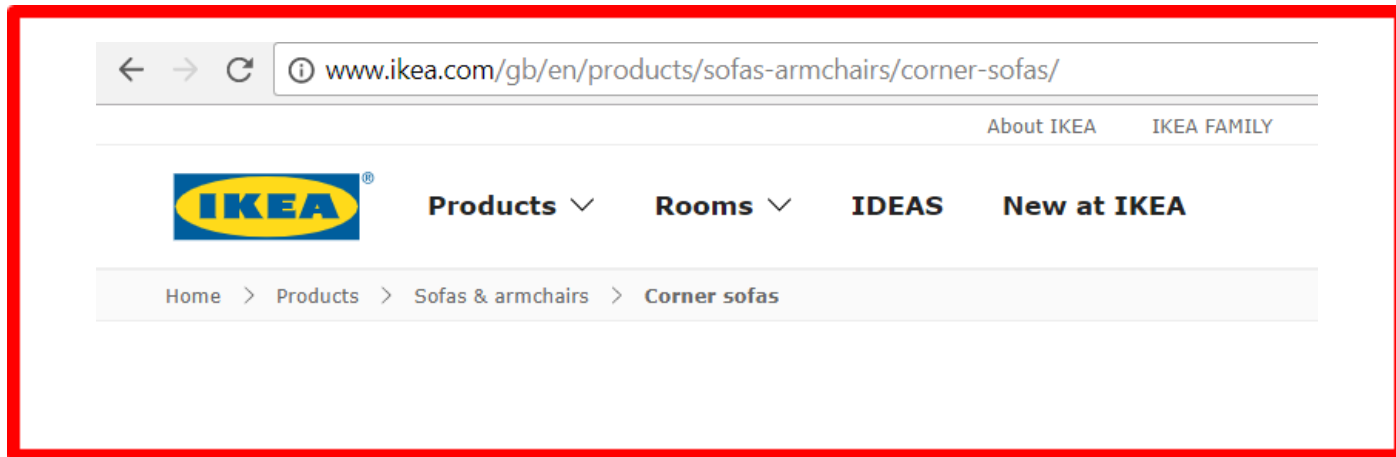
Browse all our [cushions](#) if you're looking to add a little extra comfort to your corner sofa.

3-seat corner sofa  
**VALLENTUNA**  
**£810**





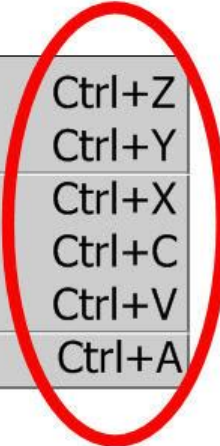
## 6. Recognition rather than recall



# 7. Flexibility and efficiency of use

Allow shortcuts for experienced users.

<u>E</u> dit	
<u>U</u> ndo	Ctrl+Z
<u>R</u> edo	Ctrl+Y
<u>Cu</u> t	Ctrl+X
<u>C</u> opy	Ctrl+C
<u>P</u> aste	Ctrl+V
Select <u>A</u> ll	Ctrl+A



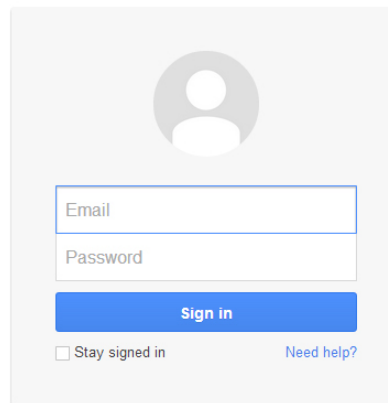
# 8. Aesthetic and minimalist design

Dialogues should not contain information which is irrelevant or rarely needed.



One account. All of Google.

Sign in to continue to Gmail

A minimalist sign-in dialog box with a light gray background. At the top center is a gray circular icon representing a person. Below it are two stacked text input fields: the top one is labeled "Email" and the bottom one is labeled "Password". Below the fields is a prominent blue button with the text "Sign in" in white. At the bottom left of the dialog is a checkbox labeled "Stay signed in", and at the bottom right is a blue link labeled "Need help?".

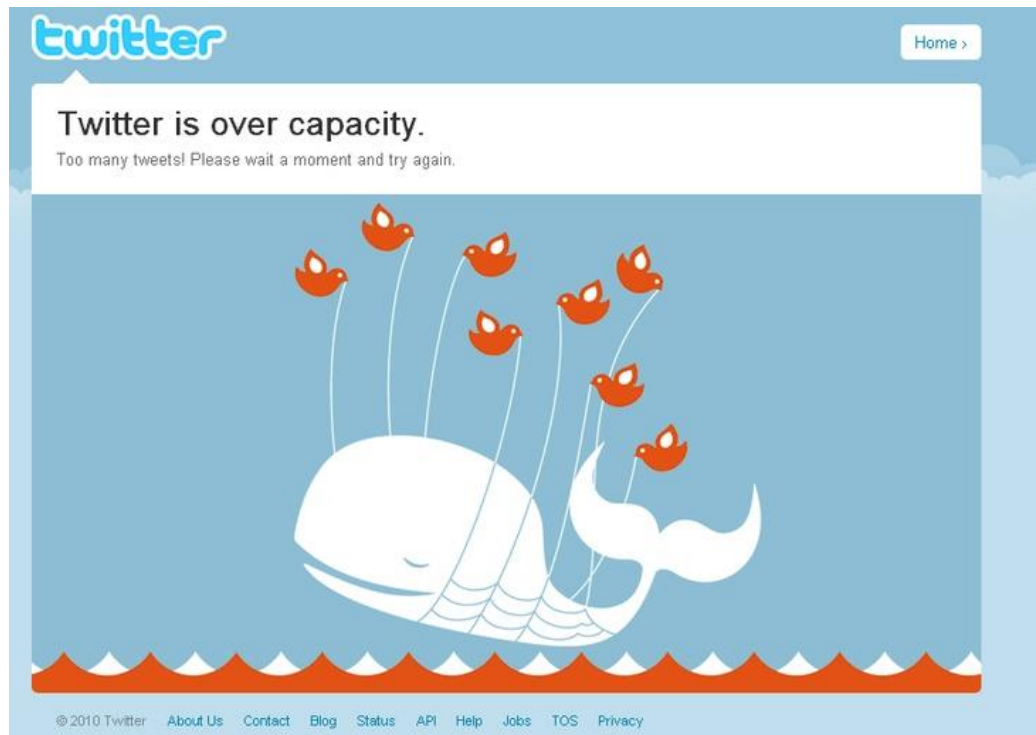
[Create an account](#)

One Google Account for everything Google



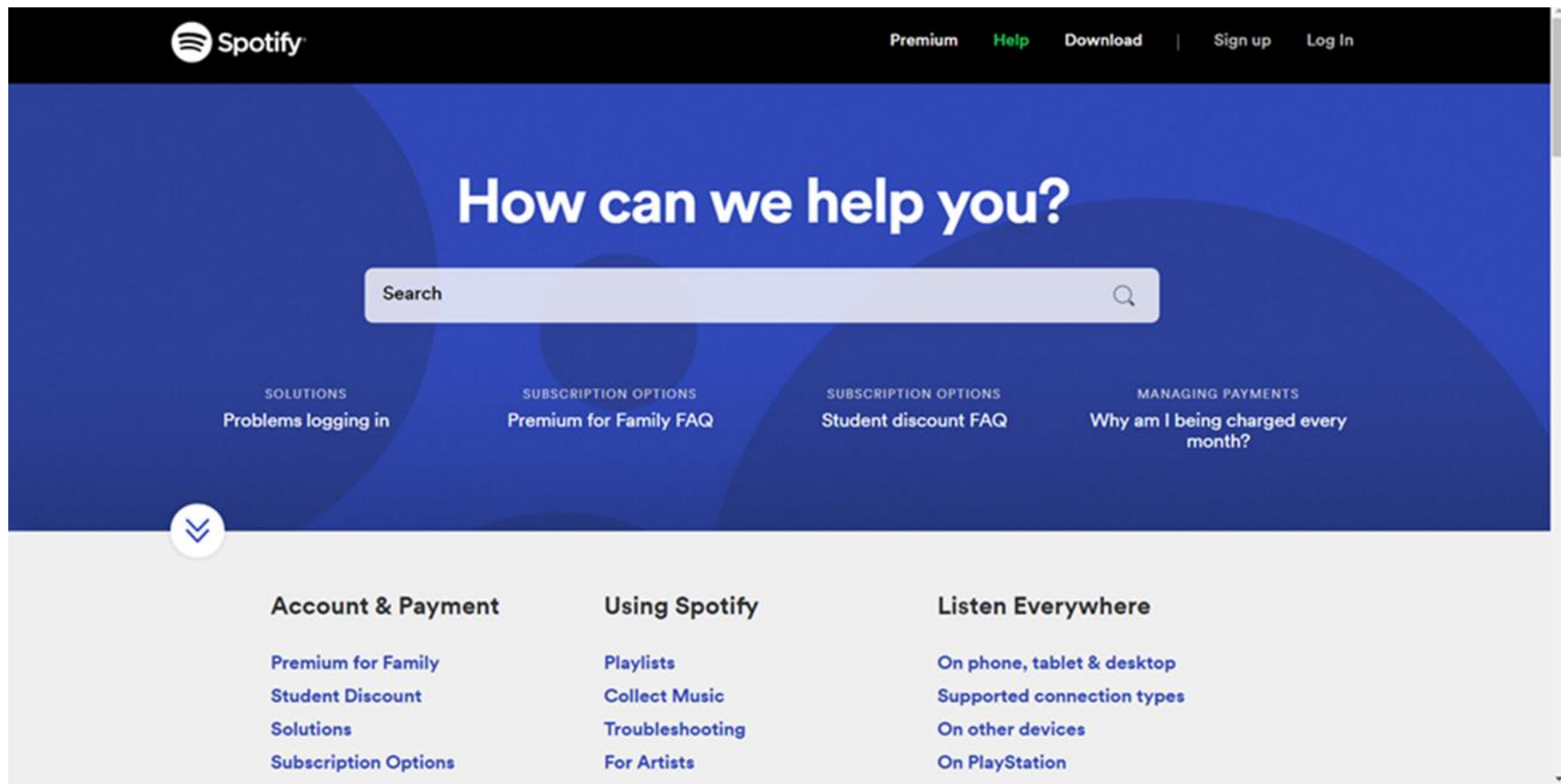
# 9. Help users recognize, diagnose, and recover from errors

Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.



# 10. Help and documentation

Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.



The screenshot shows the Spotify help page. At the top, the Spotify logo is on the left, and navigation links for Premium, Help, Download, Sign up, and Log In are on the right. The main heading is "How can we help you?" with a search bar below it. Below the search bar, there are four categories of help topics: SOLUTIONS (Problems logging in), SUBSCRIPTION OPTIONS (Premium for Family FAQ), SUBSCRIPTION OPTIONS (Student discount FAQ), and MANAGING PAYMENTS (Why am I being charged every month?). At the bottom, there are three columns of links: Account & Payment (Premium for Family, Student Discount, Solutions, Subscription Options), Using Spotify (Playlists, Collect Music, Troubleshooting, For Artists), and Listen Everywhere (On phone, tablet & desktop, Supported connection types, On other devices, On PlayStation).

Spotify

Premium Help Download | Sign up Log In

## How can we help you?

Search

**SOLUTIONS**  
Problems logging in

**SUBSCRIPTION OPTIONS**  
Premium for Family FAQ

**SUBSCRIPTION OPTIONS**  
Student discount FAQ

**MANAGING PAYMENTS**  
Why am I being charged every month?

**Account & Payment**

- Premium for Family
- Student Discount
- Solutions
- Subscription Options

**Using Spotify**

- Playlists
- Collect Music
- Troubleshooting
- For Artists

**Listen Everywhere**

- On phone, tablet & desktop
- Supported connection types
- On other devices
- On PlayStation

Assignment help if you choose:

# Evaluation of a homepage from ergonomic aspects

1) Use the above mentioned 10 heuristics

2) You can rate the severity of usability problems:

<https://www.nngroup.com/articles/how-to-rate-the-severity-of-usability-problems/>

3) Google Chrome extention for heuristic evaluation

(just a possibility, not compulsory to use)

<http://www.uxcheck.co/#>

# Recommended books & other

## **Books**

Steve Krug (2000): Don't make me think

Rubin & Chisnell (2008) [Handbook of usability testing](#)

(available online for free)

## **Facebook & meetup**

[User Experience Budapest Meetup](#)

[UX Budapest facebook group](#)