

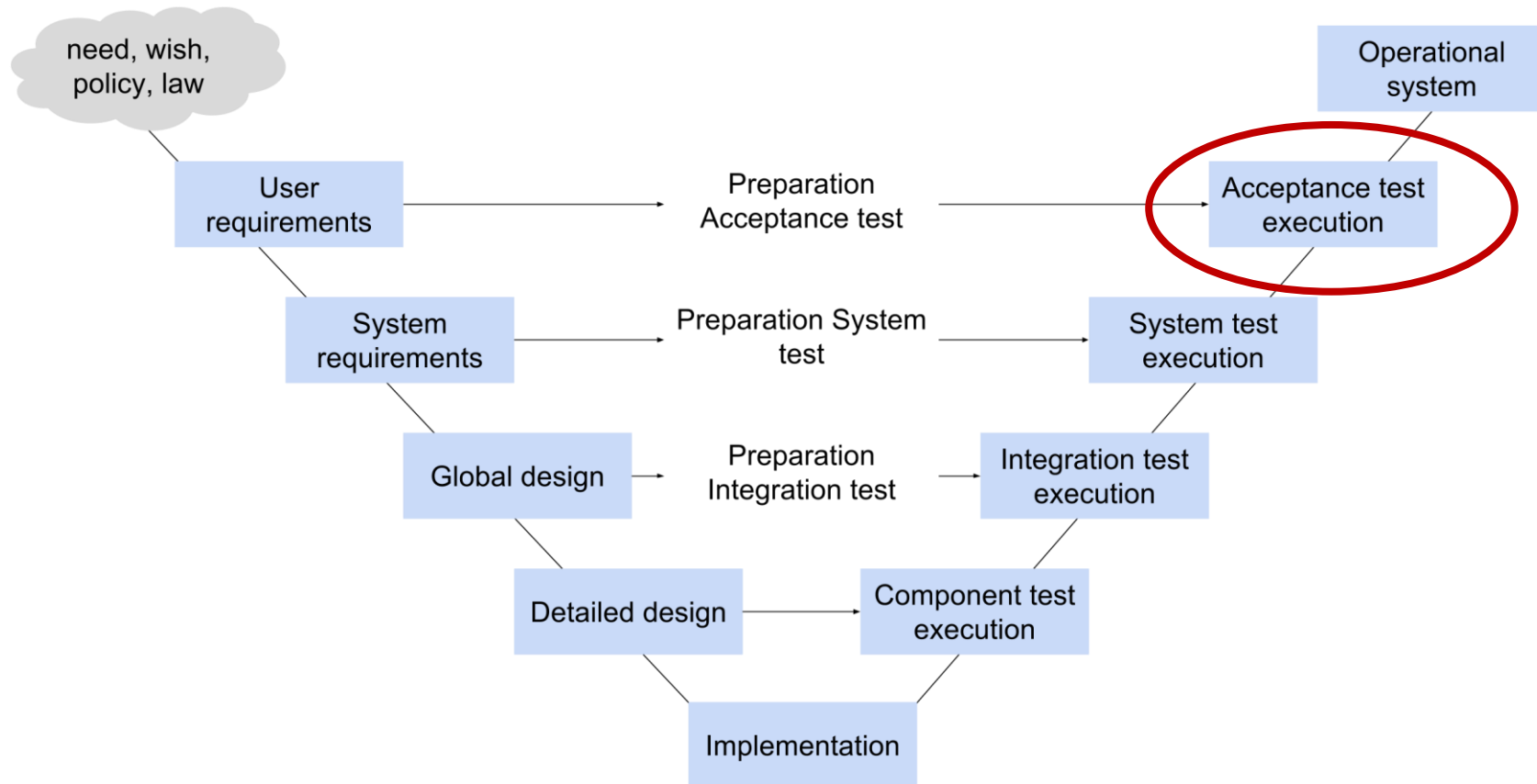
# Usability Testing

- 1. HCI – definition and purpose**
  - 2. HCI framework**
  - 3. User-centric design process**
  - 4. HCI guidelines**
-

# Usability Testing

- ✓ *LO: Recall the different names and the definition of HCI*
  - ✓ *LO: Describe the purpose of HCI with regards to software systems*
-

# Usability Testing



# Diversity of users, situations and devices

## User



**Preference**

**Age / Culture**

**Economy**

**Functional ability**

**Digital competence**



# Diversity of users, situations and devices

## User



**Preference**

**Age / Culture**

**Economy**



**Functional ability**

**Digital competence**



## Device



# Diversity of users, situations and devices

## User



- Preference
- Age / Culture
- Economy
- Functional ability
- Digital competence



## Device



## Situation

Time



Place (work, transportation home, indoors/outdoors)



Weather



Situation

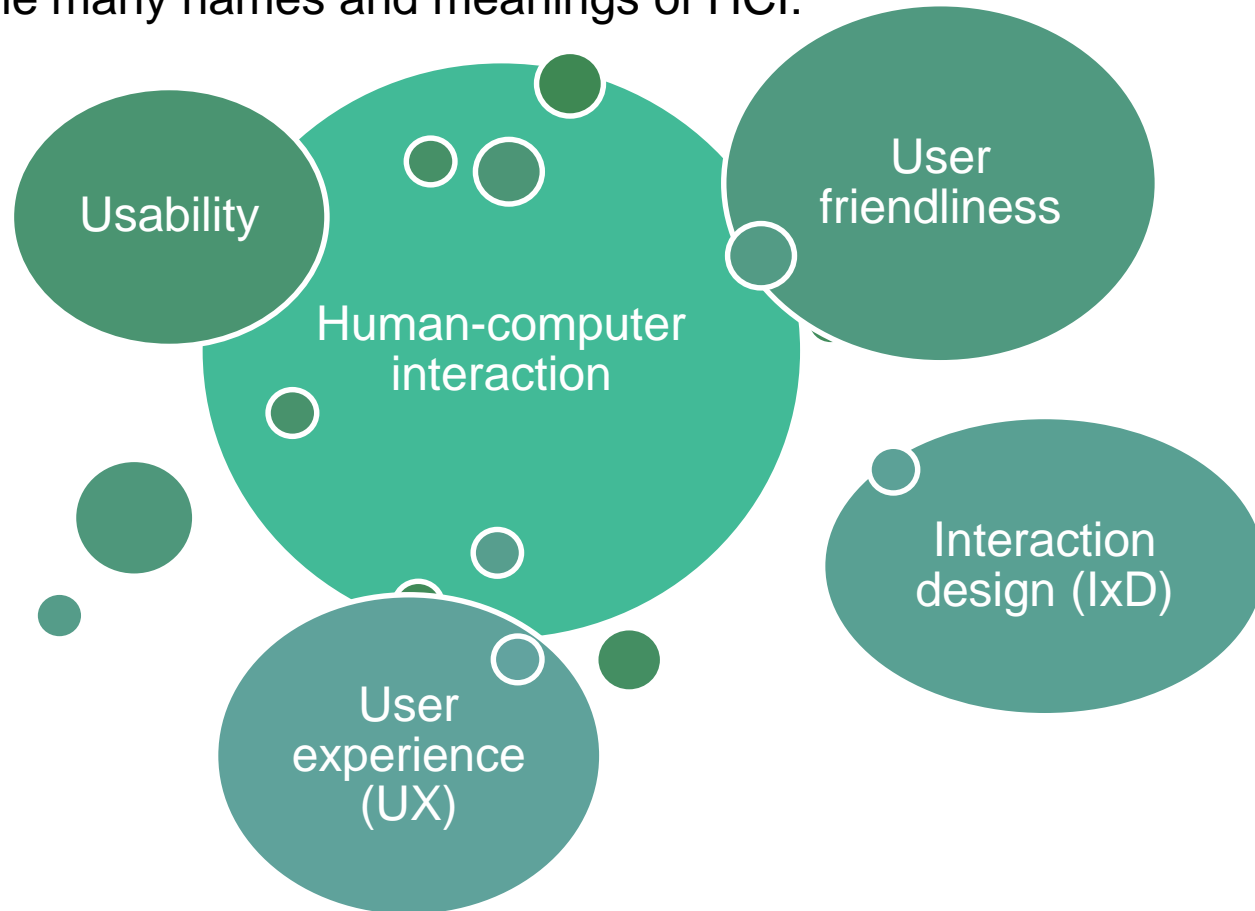


Emotion



# HCI – definition and purpose

The many names and meanings of HCI:



Human Computer Interaction – definition:

*“The **extent** to which a product can be used by **specified users** to achieve **specified goals** with **effectiveness**, **efficiency**, and **satisfaction** in a specified **context** of use.” (ISO 9241-11)*

## 1. HCI – definition and purpose

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- 2.1 Interface standards
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- 2.4 Aesthetics

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- 3.3 Personas
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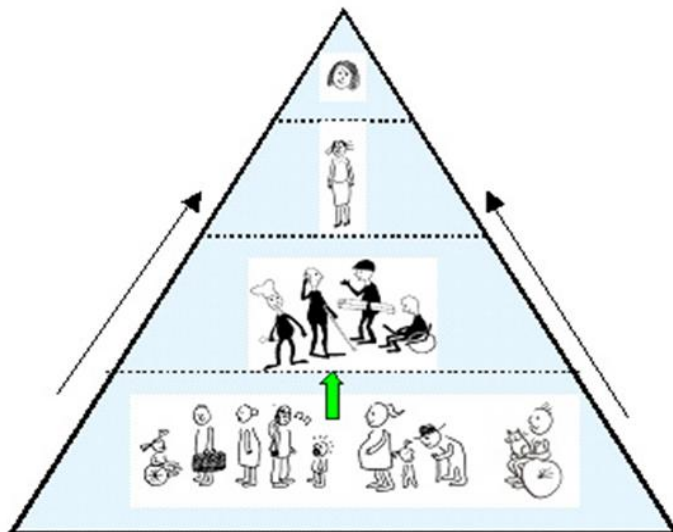
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# The Accessibility Pyramid

**Application domain:**  
Health  
Education  
Transportation  
Emergency  
management

**User:**  
Disabled  
Older  
All



- ← **Level 4: Personal assistance**
- ← **Level 3: Customise for individuals**
- ← **Level 2: Customise for special groups**
- ← **Level 1: Universal design**

**Methodology:**  
Human-centred  
Co-design

**Law, regulation, guideline,  
standard:**  
CRPD  
EU directives  
National



# HCI – definition and purpose

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The **purpose** of HCI testing is to make a software system:



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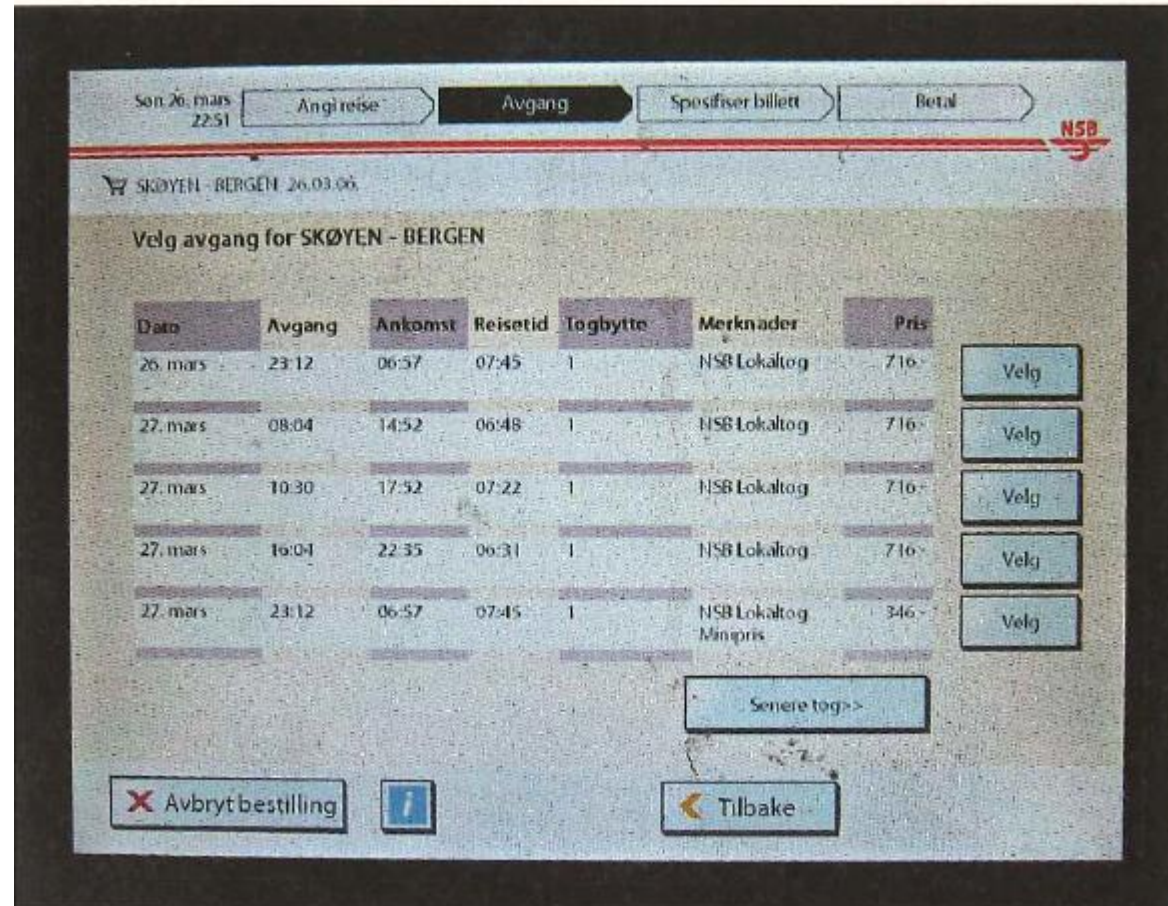
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Example: NSB's ticket machine can be difficult to use.



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## NTB / Aftenposten

17<sup>th</sup> of August 2018:

SAS Norway will receive daily fines of NOK 150,000 if they do not improve the availability of their own websites within 10 days.

Fredag 17. august 2018

Aftenposten



### INNENRIKS Kan få tvangsmulkt for dårlig nettside

SAS Norge vil få dagbøter på 150.000 kroner dersom de ikke forbedrer tilgjengeligheten på egne nettsider innen ti dager.

Direktoratet for forvaltning og IKT (Difi) varsler tvangsmulkten fordi flyselskapet ikke har utbedret nettsiden etter en kontroll i fjor høst.

I en pressemelding skriver direktoratet at SAS bryter likestillings- og diskrimineringsloven og ikke sikrer at nettsiden for billettbestilling er tilgjengelig for alle. I juni var en tredjedel av feilene ikke rettet, og nesten 20 prosent var fortsatt ikke rettet for en uke siden. (NTB)

# HCI - framework

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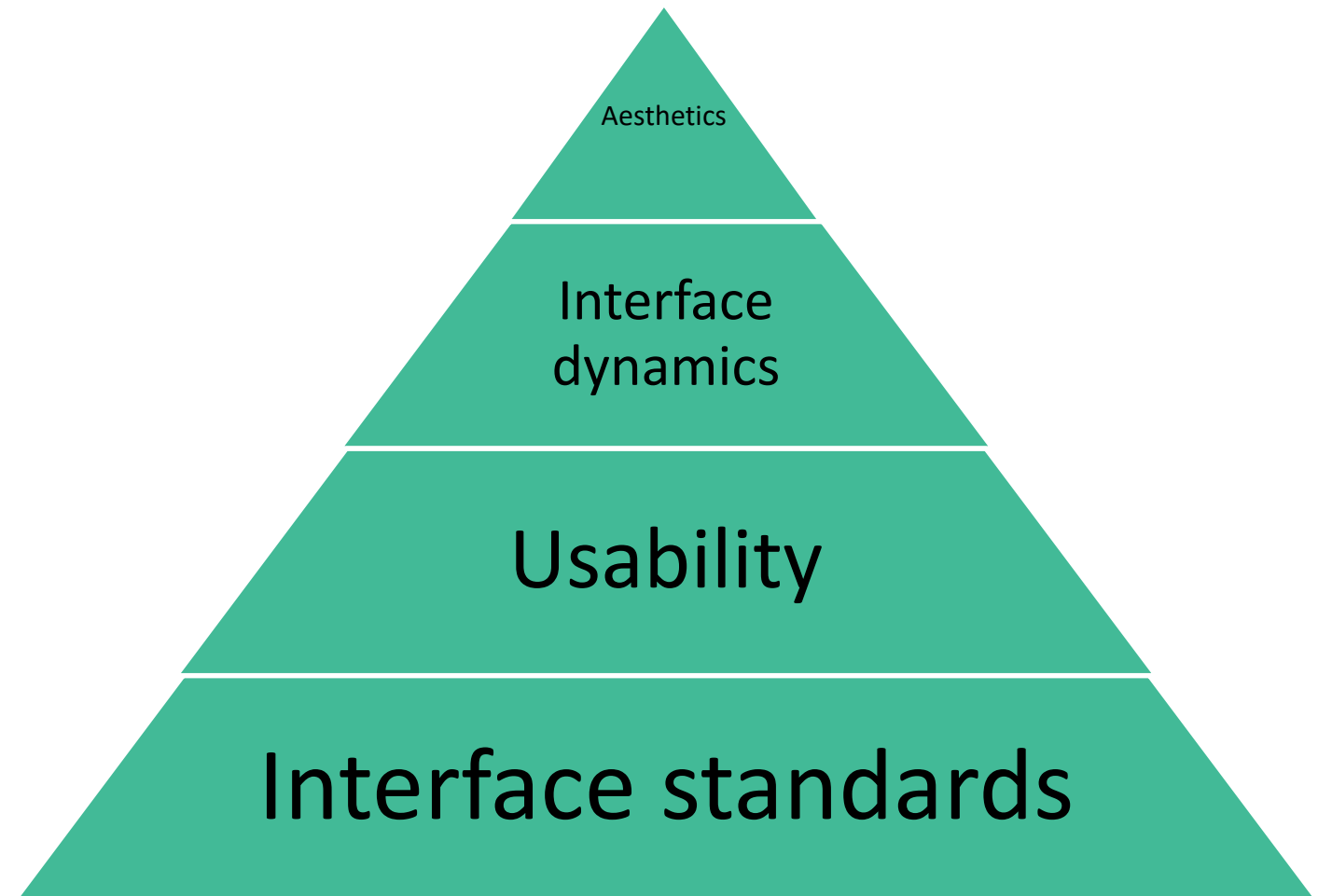
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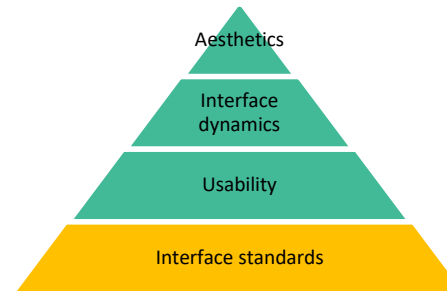
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# Interface standards



**Interface standards** are constituted by:

- **Best practices**
- **Consistent** behavior and design
- **Decrease** work load
- **Faster** development

These standards have to be followed for both **user interfaces** and also **APIs**.

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# Interface standards

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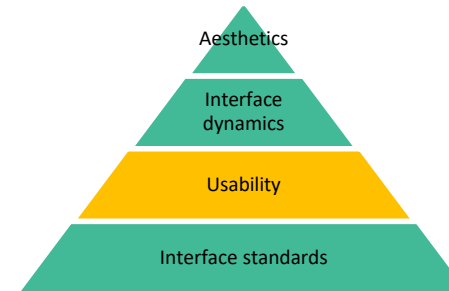
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# Usability



## Usability means:

- Effectiveness
- Efficiency
- Satisfaction

Note: The key is to **understand** the **target users** and their needs and create a user-centric design.

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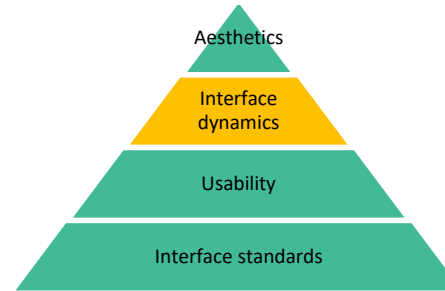
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# Interface dynamics



**An interface** (whether visual or API) has to be designed in such way that it is:

- **Responsive** and fast
- **Adaptable** to the users needs and context
- Empowering the user
- **Captivating**

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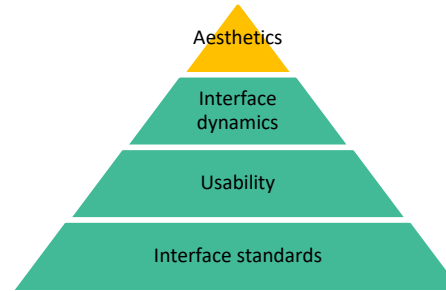
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# Aesthetics



## Aesthetics

- Responsible for the **first impression**
- Modern, fresh, **appealing design**
- **Recognition** of a company's applications
- A company's **graphical profile**

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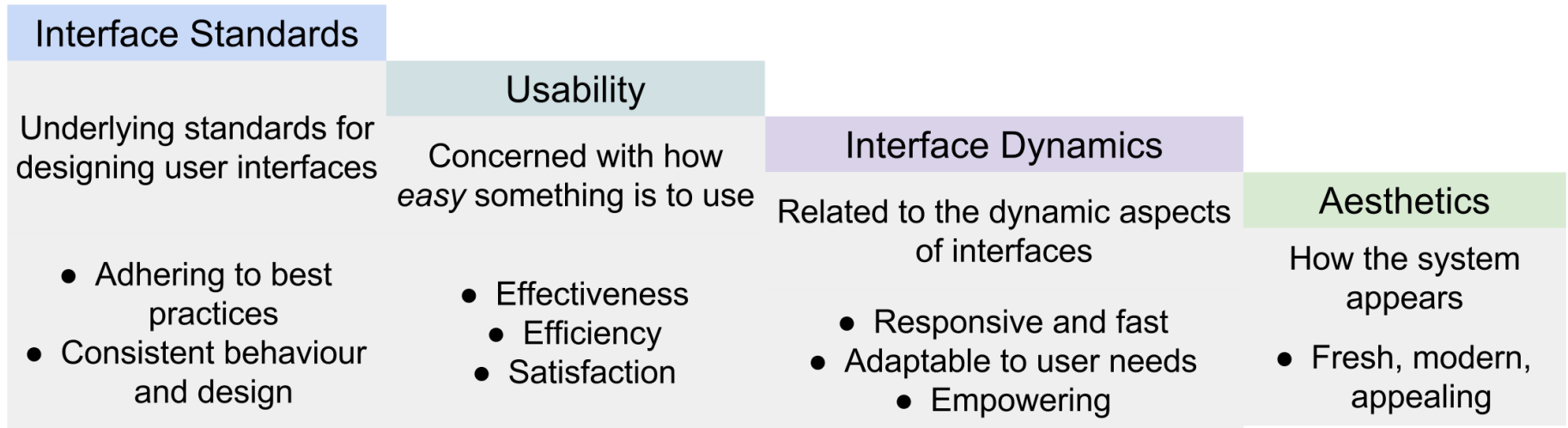
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# HCI Framework

## Considerations for HCI

Left to right, from most to least important



# User-centric design process

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✓ *LO: Enumerate and explain the steps in the user-centric design process*

✓ *LO: Describe with examples the user-centric design process of a software system*

✓ *LO: Explain the notion and purpose of low-fidelity prototyping*

✓ *LO: Give reasons why we use personas in the user-centric design process*

✓ *LO: Describe how to make user observations*

✓ *LO: Describe how to evaluate a design concept (user testing)*

# User-centric design process

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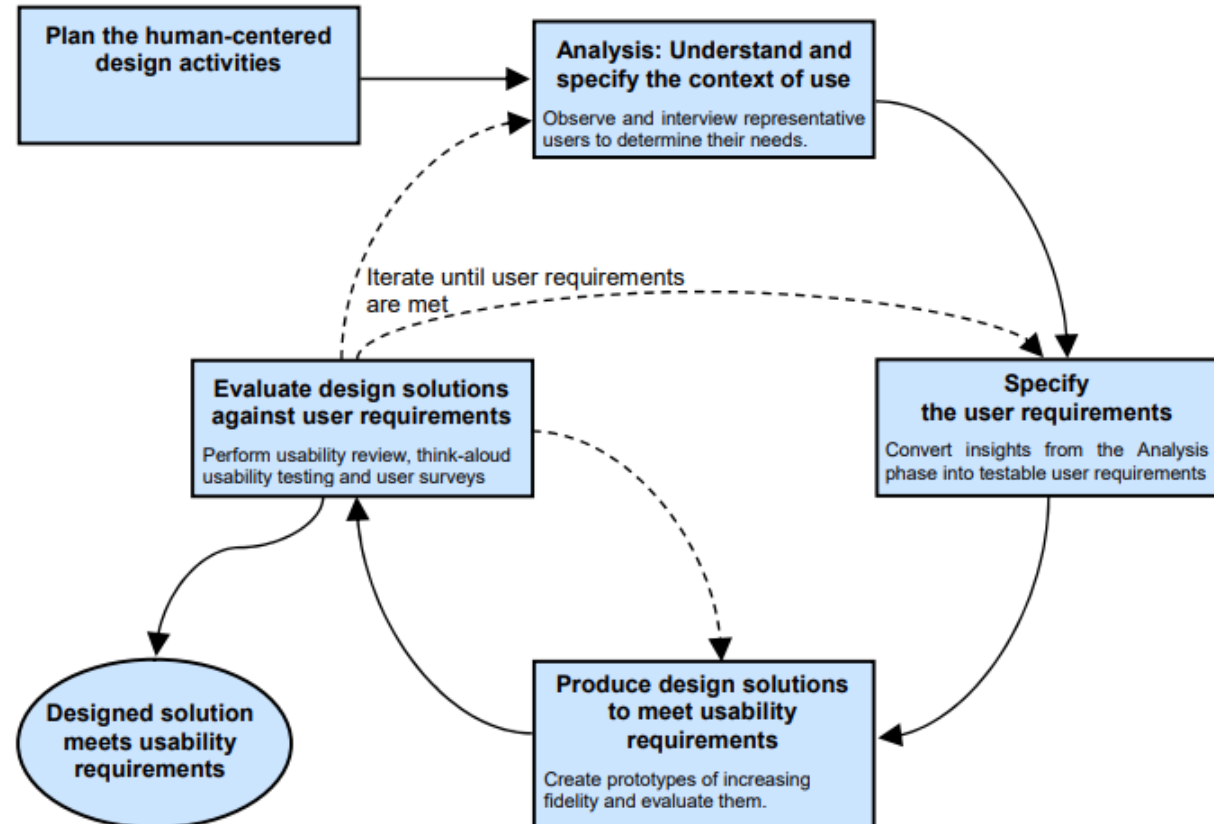
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# Synopsis

## When designing a **user-centric** software systems, one has to:

- Understand how the **users think** and **behave**
- **Gather fact** and data instead of rely on opinion or speculation
- Perform studies, design and test **on users before** implementation
- **Iterate!**

There are many different methods available to help in the process.

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# User-centric design process

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## 1 Understand user context

- Interview
- Survey
- **User observation**
- Analysis
- Expert evaluation
- Domain knowledge / experience
- Support statistics

## 2 Specify demands

- **Personas**
- User scenarios and cases

## 3 Develop concept

- **Low-fidelity prototyping**
- High-fidelity prototyping

## 4 Evaluate concept

- **User tests**
- Expert evaluation
- Comparative tests

# User observation

## Important to understand the **user context**

- **Who** are the users?
- In what **environment/situation** do they use the product?
- What **goals** shall the product help the user to achieve?
- What **demands** must the application fulfil to satisfy the user?

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# Purpose of user observation

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## User observations study **user behavior**

Possible to **identify** 60-80% of **usability problems** with 3-5 users.

**Note:** Just **observe** what are they doing  
– do **not** tell them what to do



# How to perform user observation

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**It's hard** to convince the users to participate in an observation. Therefore, the user needs to **feel safe**, not criticized.

## **Prior to the observation:**

- Contact the user
  - Ex: email, phone. Express **the intent** of the observation, what would be the user's role, what would be your role
- Send out **background questions** about the user
  - Ex: what are your daily tasks? Which of your tasks do you perform in the <analyzed software>?
  - How often do you use the <analyzed software>?
  - How long have you used the <analyzed software>?
  - Do you have background education on how to use the software?
- Prepare **observation guide**, focus areas
  - Login
  - Do you find everything you are looking for in the <analyzed software>?
  - Ask the user to find a specific item.
  - Ask the user to add / remove a specific item
  - Design a workflow that you would like the user to go through (searches, filters, approvals, rollbacks)

# How to perform user observation

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## During the observation:

- Visit **user's workplace**
- Use **think-aloud** techniques (ask the user to describe what he is trying to do)
- **Document** with notes and video recorders

# User observation tools

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## Silverback(Mac)

## Techsmith Morae(Windows)

### • Recorder

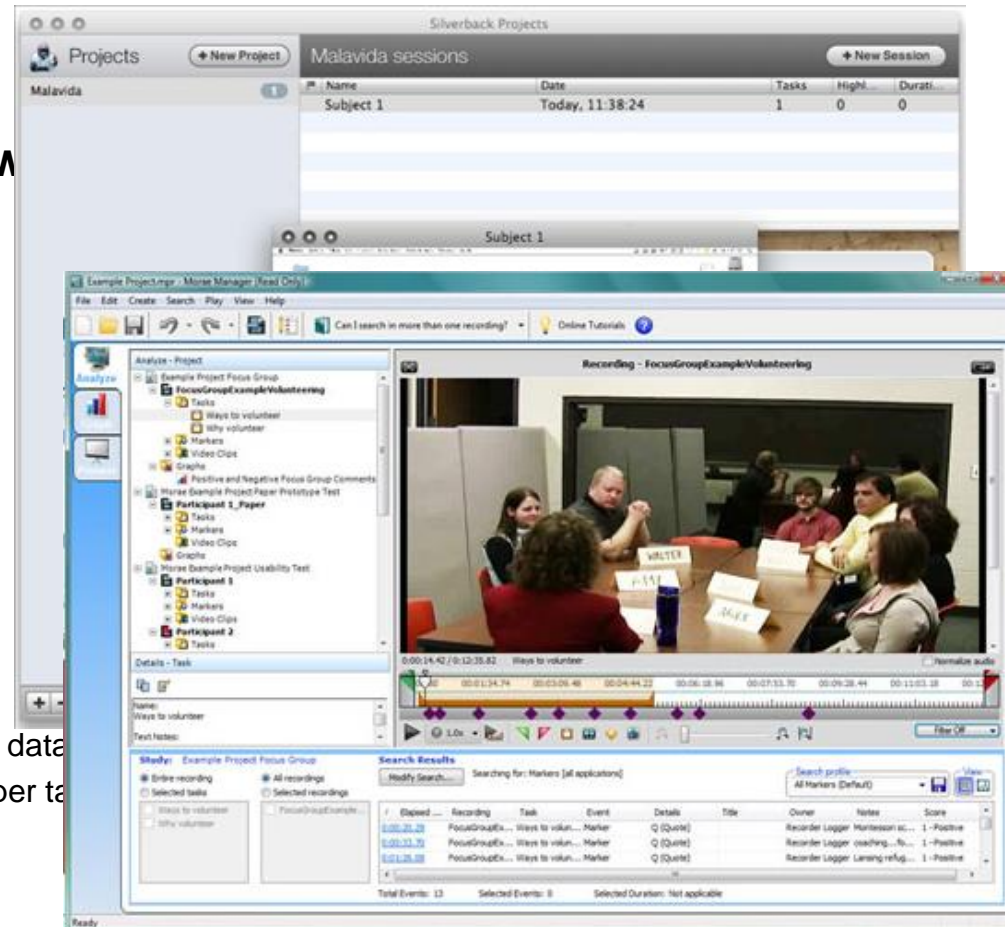
- Displays tasks in screen
- Records screen interaction
- Records user video and audio
- Mouse clicks

### • Observer

- Connect observers
- Possibility to make notes
- Chat between observers

### • Manager: Analysis

- Gathers recorder and observer data
- Measures time, mouse clicks per task



# User observation tips

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- Start looking for users quite **long in advance**.
- Be **realistic** about **how many** observations you have time for.
- Give the user **enough time** to perform the task. Do **not interrupt** or show them how to do something.
- Make it a **positive experience** for the user: you are not testing users, you are just **discovering problems** in the software, with the **users help**.
- Collect **general impressions** at the end.

# Specify demands

## Most important steps of this process:

- Document the problems
- Summarize, analyze and compare the results
- Create a basis for the conceptualizing step

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# Personas

## Personas:

- Are a **design** and **specification tool**.
- A description of **a representative user** (a pretended person who represents our user).
- Tell us **who** are the users, their **goals, activities, motivations** to use our products.
- Helps us **define** how can we make **their work routines** more effectively.

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# Personas

## Personas =

- Informed **based on research**
- Check and **validate** your assumptions.

## User profiles =

- What **we believe** is true about our users

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# How to identify personas

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Find **patterns** and identify personas, based on:

- **statistics**
- **workshops, interviews and user studies**
- **surveys**



# How to create personas

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### Background

- Name
- Age
- Job title
- Education
- Experience

### Characteristics

- What type of person is he/she? Detailed, casual...

### Skills

- Technical, analytical, worked online...

### Goals/ Motivations

- Why does he/she need this product?  
Savings, accurate accounting...

### Pains

- What are the key things the usability engineer needs to consider?

### Tasks

- What are he/she main work tasks?

# Specify demands – example of personas

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### PERSONA 1



NAME: ADA

- SELF-EMPLOYED JEWELLERY AND METAL DESIGNER.
- GRADUATED FROM COLLEGE HALF A YEAR AGO.
- SET UP A NEW INDEPENDENT DESIGN STUDIO
- CHAT WITH CLIENTS IN STUDIO.
- INVITE OTHER DESIGNERS TO STUDIO TO STUDIO SUPPORT HER WORK.
- MAKE PROTOTYPES IN STUDIO.
- FEELS FRUSTRATED AS THE SPACE IS SMALL AND THE LIMITATION OF FINANCES.

# Specify demands – example of personas

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## Shen – “The follower”



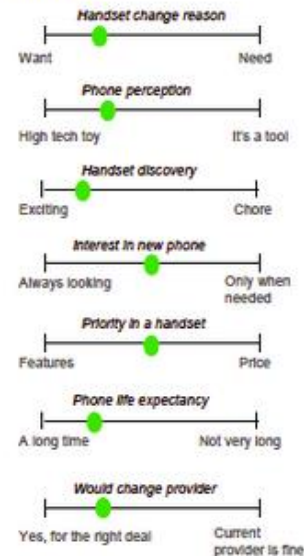
*“I never get ‘the’ phone, I’m always one or two steps behind”*

Shen uses his phone primarily to keep in contact with his family and enjoys using it to take photos of his children. Although he would like to own a smart phone so he can use it for emails and the internet, they are currently too expensive for his budget.

Shen tries to keep his phone until he’s eligible for a discounted upgrade, although, if given the option, he would upgrade more often for the novelty of having a new phone.

Constantly surprised at how quickly technology is changing, he is always interested to see new the newest phones on the market.

### Behaviours



### Key Characteristics

- Age 35-45
- Shops around before renewing his phone
- Is price conscious; thinks twice before buying
- Is tempted by new phones
- Would consider upgrading if a life event called for a new phone
- Needs a good reason to spend money on a phone e.g. more megapixels on a camera
- Does not want to be embarrassed to pull out his phone in public

### Goals

- Get to the end of his contract so that he can get a cheaper upgrade
- Get the best deal that he can, taking into account the rate plan and the handset
- Purchase a high-end phone when he can justify the the extra cost

# How to use the personas

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- Make them **visible** throughout the **development** and **marketing teams**.
- **Ask stakeholders** to **communicate the user's needs** through personas.
- **Refer** to the personas when **creating** and **testing requirements**, specifications and stating assumptions. (How would Hanna use it?)
- When creating a new functionality, test if it's **in line with the persona's needs**.

# Develop concept

This is the **creative step** of the process:

- **Explore** new ideas
- Two types of **prototyping**
  - **Low-fidelity**
  - High-fidelity

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## 3. User-centric design process

- 3.1 Synopsis
- 3.2 Users observations
- 3.3 Personas
- **3.4 Prototyping**
- 3.5 User tests

## 4. HCI guidelines

- 4.1 Purpose of the guidelines
- 4.2 Usability elements
- 4.3 System messages

# Low-fidelity prototyping – why?

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## Low-fi prototyping is:

- **Fast** (quick progress on requirements specification and testing)
- **Easy** (anyone can do this)
- **Cheap** (it takes a pen and a paper)
- **Sketchy**
- **Relevant**

Note: Low-fidelity prototypes are also called **wireframes** or **mock-ups**

# Low-fidelity prototyping

## How to apply it?

- Always start on paper – **paper prototyping**
- Focus on **structure** and **function**, no details
- Do **not** apply any **design**
- Create **multiple concepts**
- **Evaluate, refine** and **narrow down**

Note: it's not supposed to be pretty!

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# Low-fidelity prototyping – tools

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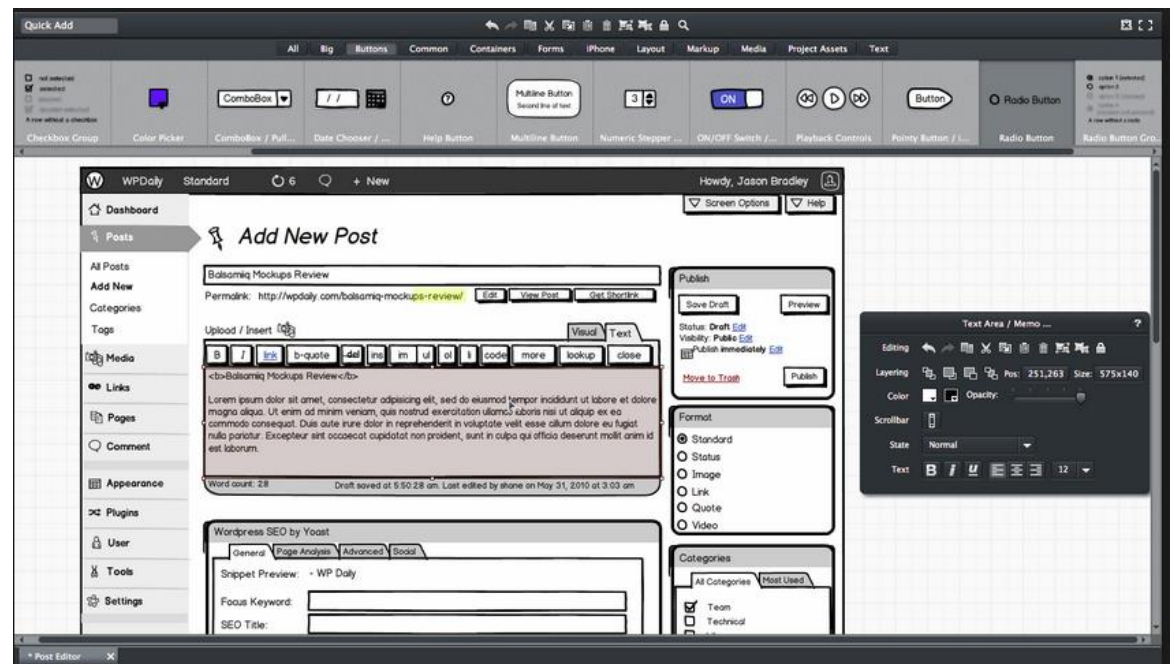
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Examples are:

- Photoshop
- PowerPoint
- Visio
- **Balsamiq**



Note: use the tool you are comfortable with



# Low-fidelity prototyping – example

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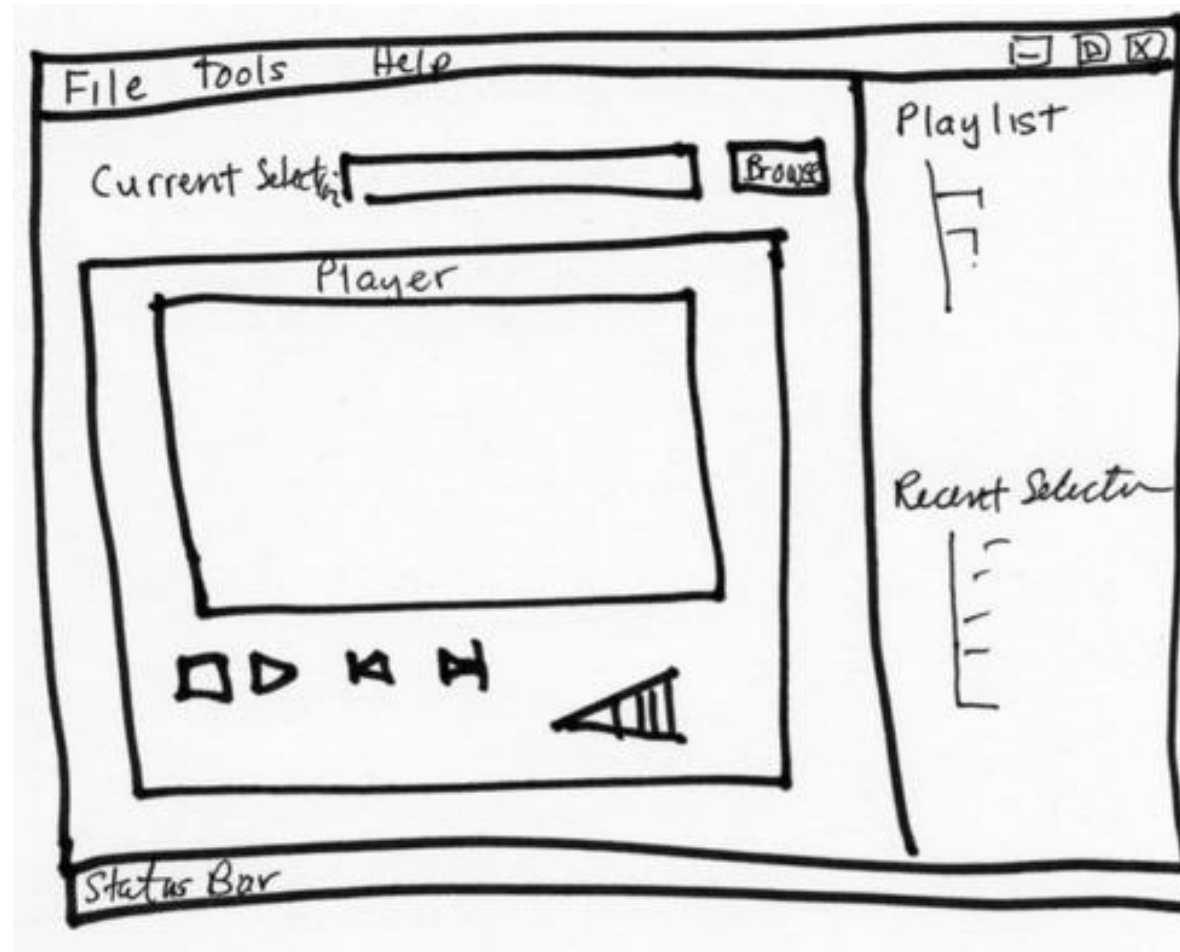
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# Evaluate concept

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- Evaluate against demands
- Find areas of improvement
- Iterate!

# Evaluate concept – user testing

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- The **user testing** is the **evaluation** of a product by the users.
- You will present the product to **real users** with **interactive prototypes**.
- The **goal** is to discover **errors** and **areas of improvement** as **early** as possible.

# Evaluate concept – types of user testing

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- Face to face
- Remote
- Test labs

# Evaluate concept – prepare for user testing

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- Decide what will you **use** in the testing:
  - **Paper** prototypes
  - **Software** prototype
  - **A beta** version of software
- Set **goals** for the user testing:

What do I want **users** to **accomplish**?

(learn, remember the software,  
discover new features etc).

# Evaluate concept – prepare for user testing

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- **Plan** the test tasks based on **real problems** to be solved or workflows to be followed.
- Select **a user group to test at a time**.
- Choose between **alfa-testing** or **beta-testing** (at your company's site or at user's site).

**Note:** it's a good idea that one person leads the test and one person documents the users' answers.

# Evaluate concept – conduct the user test

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- **Welcome** and **introduce** user to the test
- Provide **one** task at the time
- Use **think-aloud** technique
- **Document** with notes and **record** the screen
- Do **not help** the user during the test

- Example:

Q: *“Can I do it like this?”*

A: *“You can do all you want. Try to find out.”*

# HCI - guidelines

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✓ LO: Recall the purpose of the HCI guidelines

✓ LO: List and explain the basic usability elements, as defined by the HCI guidelines

✓ LO: Explain and compare the guidelines provided for the different types of system messages (info, warning, error, question)



# Purpose of guidelines

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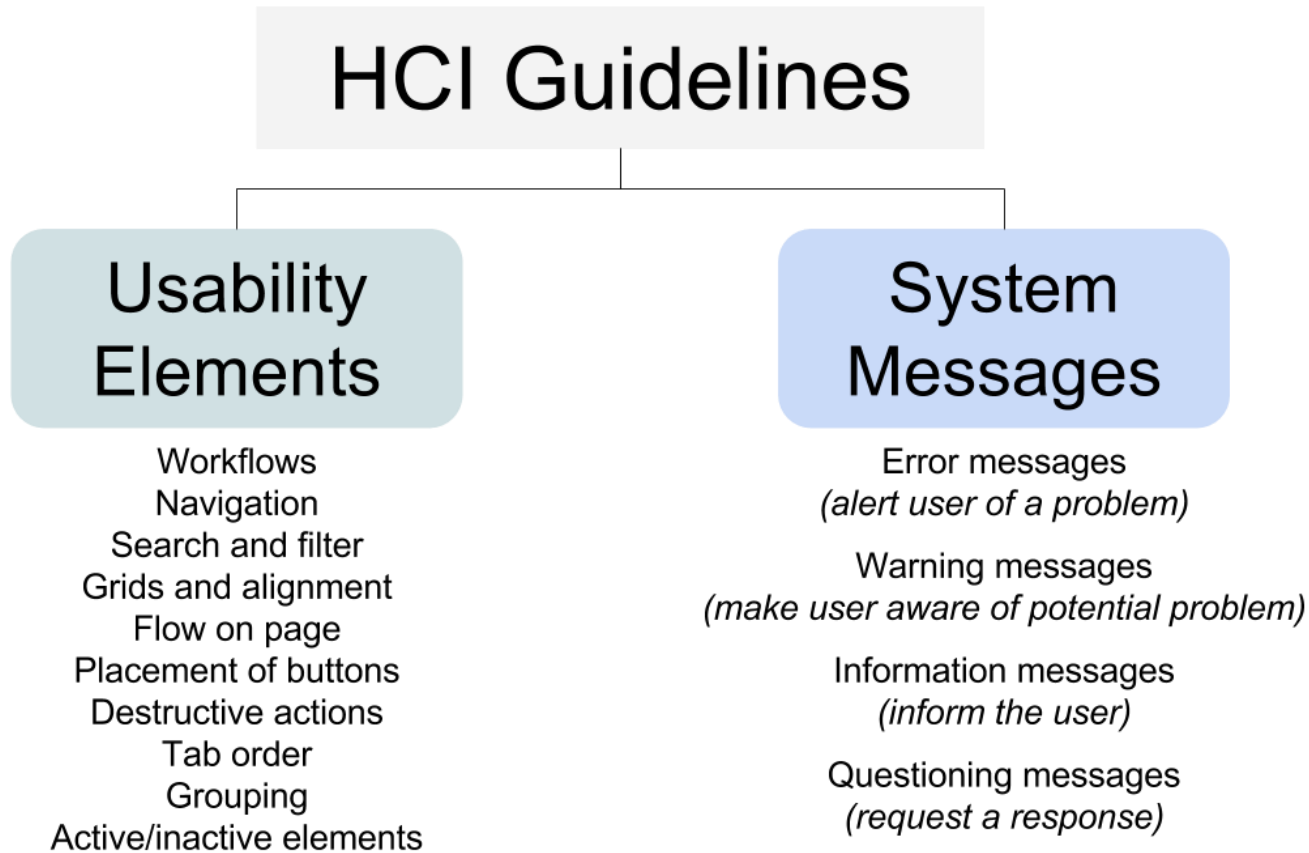
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Gathered **interface standards** (Windows, OS X )and **web guidelines** such as W3C

They give the developers and testers a set of **best practices**, which in their turn provide:

- **Consistent** behavior and design of software
- **Decrease** people's work load
- **Faster** development cycles

# HCI Guidelines



# Guidelines - Usability elements

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The following are the **basic usability elements** that the **guidelines** refer to. The tester has to compare the following elements against the specifications of the provided guidelines:

- Workflows
- Navigation
- Search and filter
- Grids
- Flow on page (top-left to bottom right, in the western cultures)
- Placement of important buttons, like Save and Cancel (Windows / OX standard)
- Tab order (has to follow the reading order; columns over rows; within each group box)
- Alignment
- Grouping (level of boxes, use and overuse)
- Active / inactive elements (the inactive elements must always be disabled)
- Destructive actions (never put Save and Delete next to each others; have confirmation for destructive actions)
- Placement of checkboxes and radio buttons (Win / OX standard)





# System messages

System messages (the way they behave and the way they must be designed and used) are the second category included in the HCI guidelines.

Error and warning messages must explain the (potential) problem and provide a solution:

- Never use error codes, jargon or technical terms – speak the users language
- Never use capital letters or exclamation mark – you scream at the user

• Choosing the right type of message:

-  – Error – alerts the user of a problem that has occurred
-  – Warning – to make the user aware of a potential problem
-  – Information – inform the user
-  – Question – requesting a response from the user

Note:

- Keep the message short, people do not read!
- Use the right action buttons:
  - Errors and warnings are never OK, use Close
  - To have Yes, No and Cancel for a question is confusing

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