

University of M Sili

Faculty of Mathematics and Computer Science

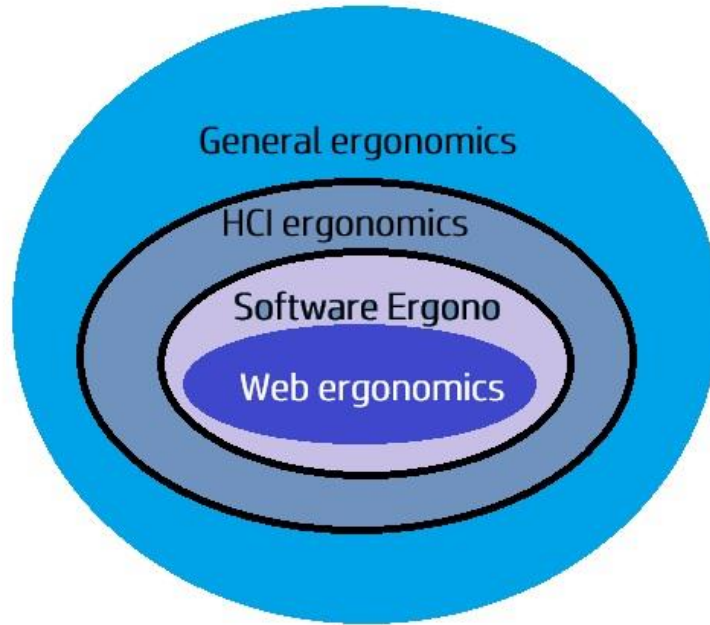
Department of Computer Science

Introduction to web ergonomics

Academic Year 2025-2026

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Introduction to web ergonomics



CONCEPT OF ERGONOMICS

Definition:

The term ergonomics comes from Greek and means the law of work:

ἔργον(ergon): work

νόμος(nomos): law --- → the science of work

Ergonomics of objects / of the workstation

Ergonomics can roughly be defined as the study of people in their working environment. More specifically, an ergonomist (pronounced like economist) designs or modifies the work to fit the worker, not the other way around. The goal is to eliminate discomfort and risk of injury due to work.

aims to understand human/system interactions to adapt workstations to the physiological and psychological characteristics of the person, in order to optimise system performance, and enhancing safety, health, and comfort

Software ergonomics

software ergonomics aims to understand the activity of a human interacting with software to adapt its interface according to human physiological and psychological characteristics

to improve the software, reduce errors, learning time

to design easily usable software

to envision new ergonomic interfaces

Introduction to web ergonomics

- Web ergonomics is the application of ergonomics (human-factors principles) to the design of web user interfaces, in order to optimize **usability**, **efficiency**, **effectiveness**, **comfort**, and user **satisfaction** in the interaction between humans and web systems.

web ergonomics objectives

- **1. Effectiveness**
 - Enable users to successfully complete their tasks
 - Reduce misunderstandings and failures
 - Ensure information is accurate and reachable
- Users can achieve their goals.

web ergonomics objectives

- **2. Efficiency**
 - Minimize time, effort, and steps required
 - Reduce unnecessary actions
 - Improve task speed and flow
- **Users can achieve their goals quickly.**

web ergonomics objectives

- **3. User Satisfaction**
 - Create a pleasant and comfortable experience
 - Build trust and confidence
 - Encourage continued use
- **Users enjoy using the website.**

web ergonomics objectives

- **4. Ease of Use (Learnability)**

- Make the website easy to understand and learn, even for first-time users.
- Users understand how to use the site without training

- **5. Accessibility & Error Tolerance**

- Ensure the website is usable by all users and prevents or minimizes errors, allowing easy recovery.
- Support assistive technologies
- Ensure equal access to information

Key Dimensions of Web Ergonomics

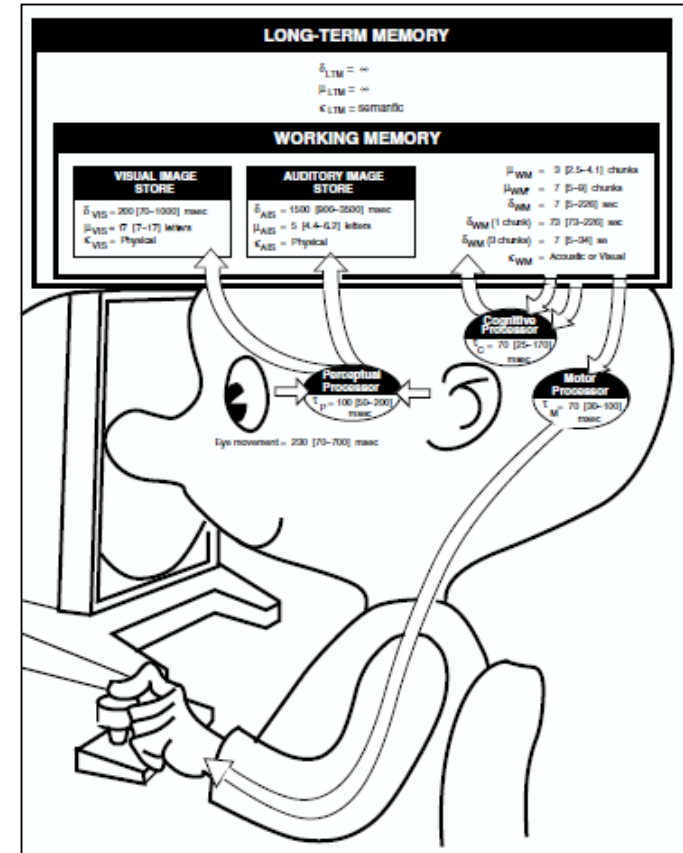
- **Cognitive ergonomics:** comprehension, memory, attention
- **Physical ergonomics:** interaction methods, device constraints
- **Contextual ergonomics:** environment, mobility, usage conditions
- **Accessibility ergonomics:** inclusive design for all users

Cognitive ergonomics:

This system is composed of three independent subsystems:

- **The sensory system** is responsible for perception.
- **The cognitive system** is responsible for reasoning and decision-making.
- **The motor system** is responsible for movement.

Each subsystem includes:
a processor; and a memory.



Physical ergonomics:

Readable layouts reduce eye strain

Proper font size, good contrast, and sufficient line spacing help users avoid squinting and eye fatigue

Reduced mouse and keyboard strain

Web designs that minimize excessive clicking, scrolling, or precise mouse movements

Comfortable interaction time

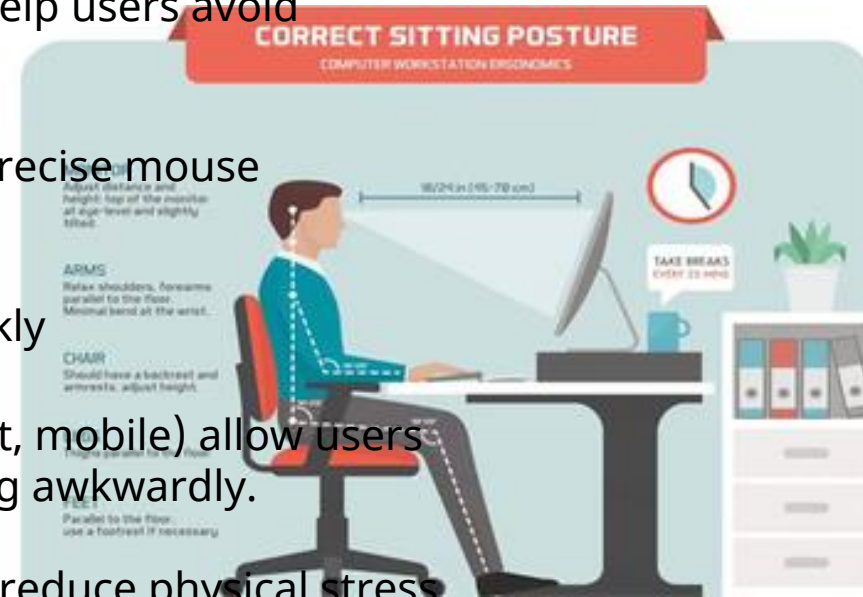
Well-structured content allows users to complete tasks quickly

Responsive design

Websites that adapt to different screen sizes (desktop, tablet, mobile) allow users to maintain healthier postures instead of bending or twisting awkwardly.

Avoiding physical stress

Dark mode options, adjustable text size, and simple layouts reduce physical stress on eyes and neck.



User interface design methods

- **Characteristics:**

- **User-centred**
- **Prototyped**
- **Early evaluation**
- **progressive**

the foundations of ergonomics

- **Characteristics:**

- User-centred
- Prototyped
- Early evaluation
- Progressive

- **Understanding your users is key.**

Since the goal of web ergonomics is to adapt a website to its users, the first step is to understand and define them as clearly as possible.

User model: Human aspects

The role of the user model is to identify the characteristics of typical users and guide design choices.

It aims to:

- reduce execution and interpretation distances
- identify users' semantic and syntactic needs.

User-centred design method

Principle

study of the user, their task and interaction from the analysis phase

- **Adapted**

when there is already a solution in place

- **Role of users**

user observed in task resolution

questioned about their expectations

interrogated about the designed software

User Interface Design Characteristics: Persona

- A **persona** consists of personal information, such as:
 - User type: age, gender, occupation, socio-professional category, etc.
 - Their needs or motivation regarding the application.
 - How they use the application.
 - Domain expertise.
 - Frustrations: provides insight into the problems encountered by the personas to suggest improvements,

User Interface Design Characteristics: Persona

- **Persona:**
- "A persona is a user archetype, to which a name and face have been given, and which is described with care, in terms of needs, goals, and tasks" (Blomquist & Arvola)
- "Personas are fictional characters based on real data, which describe the target user populations." (John Pruitt & Jonathan Grudin)
- persona is established based on:
- ***Sociodemographic data:*** gender, age, occupation, ethnic origin, education level, place of residence, salary, family situation, etc.;
- ***Psychographic data:*** personality, tastes, interests, beliefs, motivations, values, lifestyle, and consumption habits;

User Interface Design Characteristics: Persona

How to create a persona:

Step 1: Decide the purpose: Decide the purpose(s) of the use of personas.

Step 2: Gather data: Conduct interviews, focus groups, surveys, and analyze existing data like customer support logs and web analytics to understand your target audience's mindsets, behaviors, and motivations

Step 3: Analyze the data: Analyze the collected data to identify trends,

Step 4: Identify archetype users: Look for trends, common behaviors, and shared characteristics in the research data you've collected.

Step 5: Create persona profiles: Enhance personas with name, picture, topics of interest, quotes, etc.

User Interface Design Characteristics: Persona

- Example

User Persona Name

Age: **1-100**
Work: **Job Title**
Family: **Married, kids, etc.**
Location: **City, State**
Character: **Archetype**

Goals

- A task that needs to be completed.
- A life goal to be reached.
- Or an experience to be felt.

Frustrations

- The challenges this user would like to avoid.
- An obstacle that prevents this user from achieving their goals.
- Problems with the available solutions.

Bio

The bio should be a short paragraph to describe the user's journey. It should include some of their history leading up to a current use case. It may be helpful to incorporate information listed across the template and add pertinent details that may have been left out. Highlight factors of the user's personal and professional life that make this user an ideal customer of your product.

Remember - you may modify this template, remove any of the modules or add new ones for your own purpose.

Personality

Introvert ☐ Extrovert
Thinking ☐ Feeling
Sensing ☐ Intuition
Judging ☐ Perceiving

Motivation

Incentive ☐
Fear ☐
Growth ☐
Power ☐
Social ☐

Brands & Influencers

Preferred Channels

Traditional Ads ☐
Online & Social Media ☐
Referral ☐
Guerilla Efforts & PR ☐

User Interface Design Characteristics: Primary & secondary Persona

Primary Persona: this is the inevitable target user for designing the interface.

Secondary Persona: important users who share some needs with primary users but have additional needs.

- **Example:**
- for a GPS navigation system, two personas have been identified:
- *Tourists* to guide them to their destinations
- *The professional delivery driver*, who uses it for their work.
- The primary persona here is the delivery driver because if the interface is tailored to their profile (daily use), it will also be usable by visitors (occasional use).

User Interface Design Characteristics: Scenario

A scenario is a narrative text description of the path a specific user takes to accomplish one or more tasks.

The goal of the scenarios is to visualise the interactions with the system to meet the personas' needs,

User Interface Design Characteristics: Scenario

Persona: Ahmed, 35, Busy Project Manager

Scenario: It's 7:15 PM Ahmed just finished his job and needs to get dinner for himself and his partner. His goal is to get a satisfying, reliable meal delivered as quickly as possible .

Scenario for a Food Delivery App :

Ahmed opens the app. He bypasses all promotional banners and goes straight to his "Favorites" list. He quickly taps the filter icon, selects "Delivery Time," and sorts by fastest delivery. A reliable burger place he's ordered from before appears at the top with a "25-35 min" estimate. He taps it, scrolls past the menu directly to his previous order , and hits "Re-order." He confirms the address and payment (saved on file) within 15 seconds.

Methods for designing a user interface

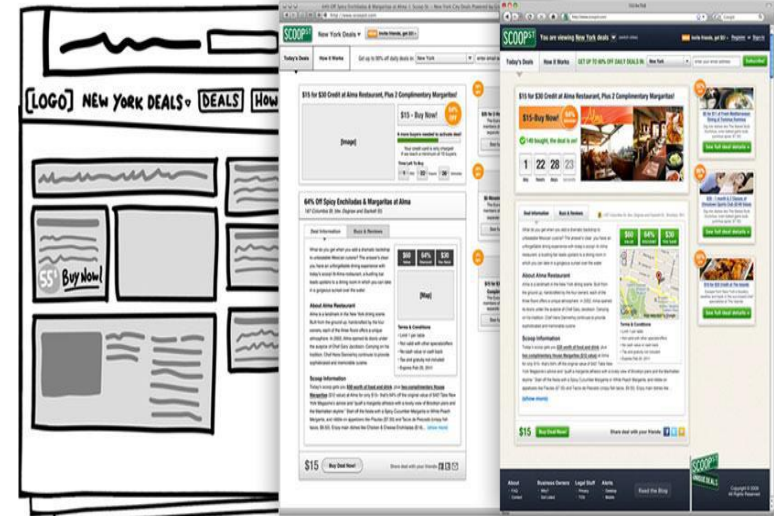
- **Characteristics:**
 - User-centred
 - Prototyped
 - early evaluation
 - progressive

Characteristics of the Prototyped User Interface Design

Zoning?Wireframe?mockup?prototype

Principles

partial representation of a system under develc
allowing certain aspects to be tested with clients/users



Characteristics of the Prototyped User Interface Design: Zoning

Zoning:

Zoning represents the visual segmentation of functionality into several areas of a page based on needs. To give coherence to the interface

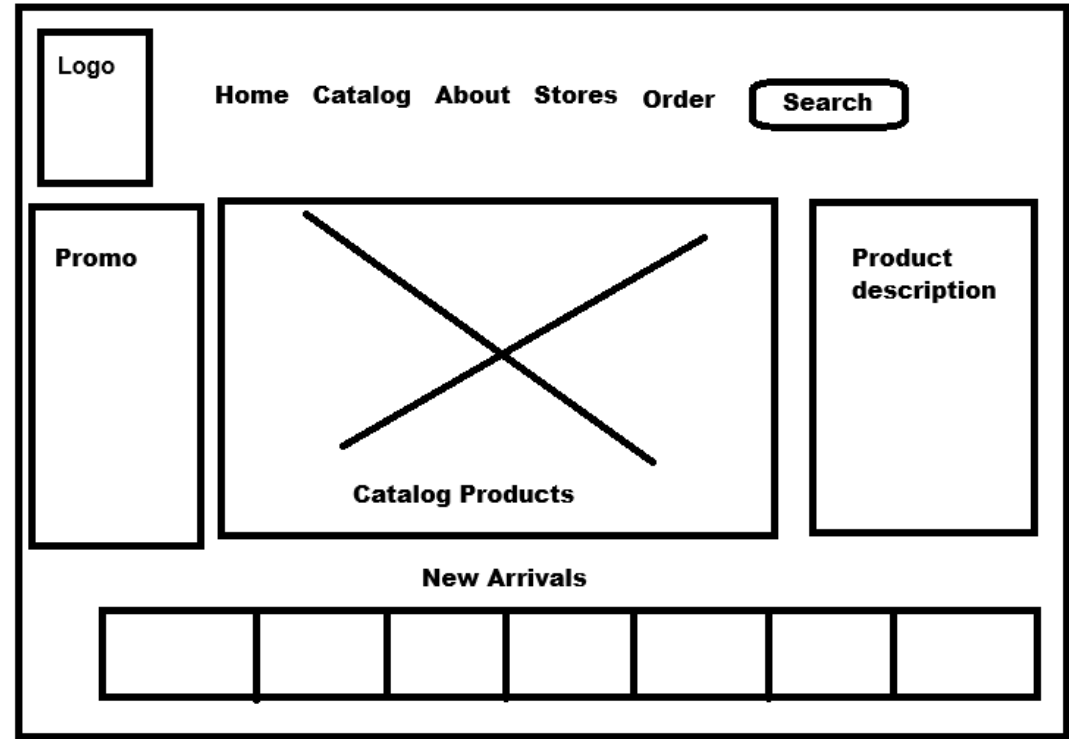
different color code is used to indicate the visual hierarchy among the blocks, namely the most important areas



Characteristics of the Prototyped User Interface Design: Zoning

Wireframe:

Each block defined during the zoning phase is supplemented with texts, images, videos. They are generally drawn in black and white so as not to influence designers in their choice of elements (colours, buttons, etc.)



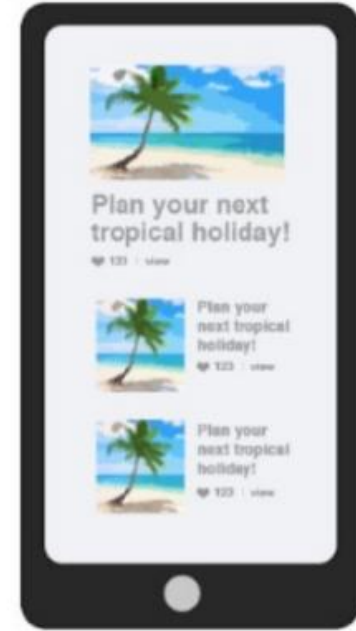
Characteristics of the Prototyped User Interface Design: Mockup

- **Mockup:**

It remains a simple static representation but images, links and text are added. This allows for clearer visualisation of the project.



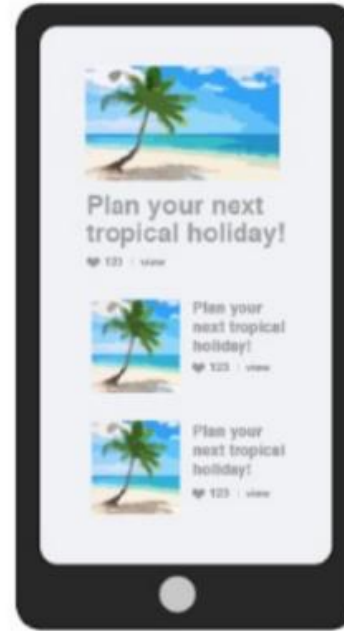
Wireframe



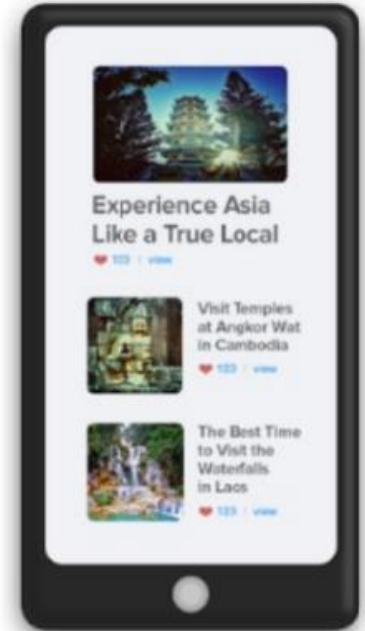
Mockup

Characteristics of the Prototyped User Interface Design: Prototype

- A prototype is a mockup where interactions and animations have been added, representing the final version of a product before its design.



Mockup



Prototype

Methods for designing a user interface

Characteristics:

- User-centred
- Prototyped
 - early evaluation
- progressive

Characteristics of user interface design: early evaluation

- **Why?**
to verify the relevance of design choices as early as possible
to allow for early adjustments
- **How to evaluate the prototype?**
according to a scenario (or several) based on a persona (fictitious user)
based on a use case (way of using the application)
set of tasks that the user must accomplish to achieve their goal
- **Outcome**
success/failure of the scenario
quantitatively/qualitatively
 number of errors, number of steps required, time spent
 feedback, user satisfaction