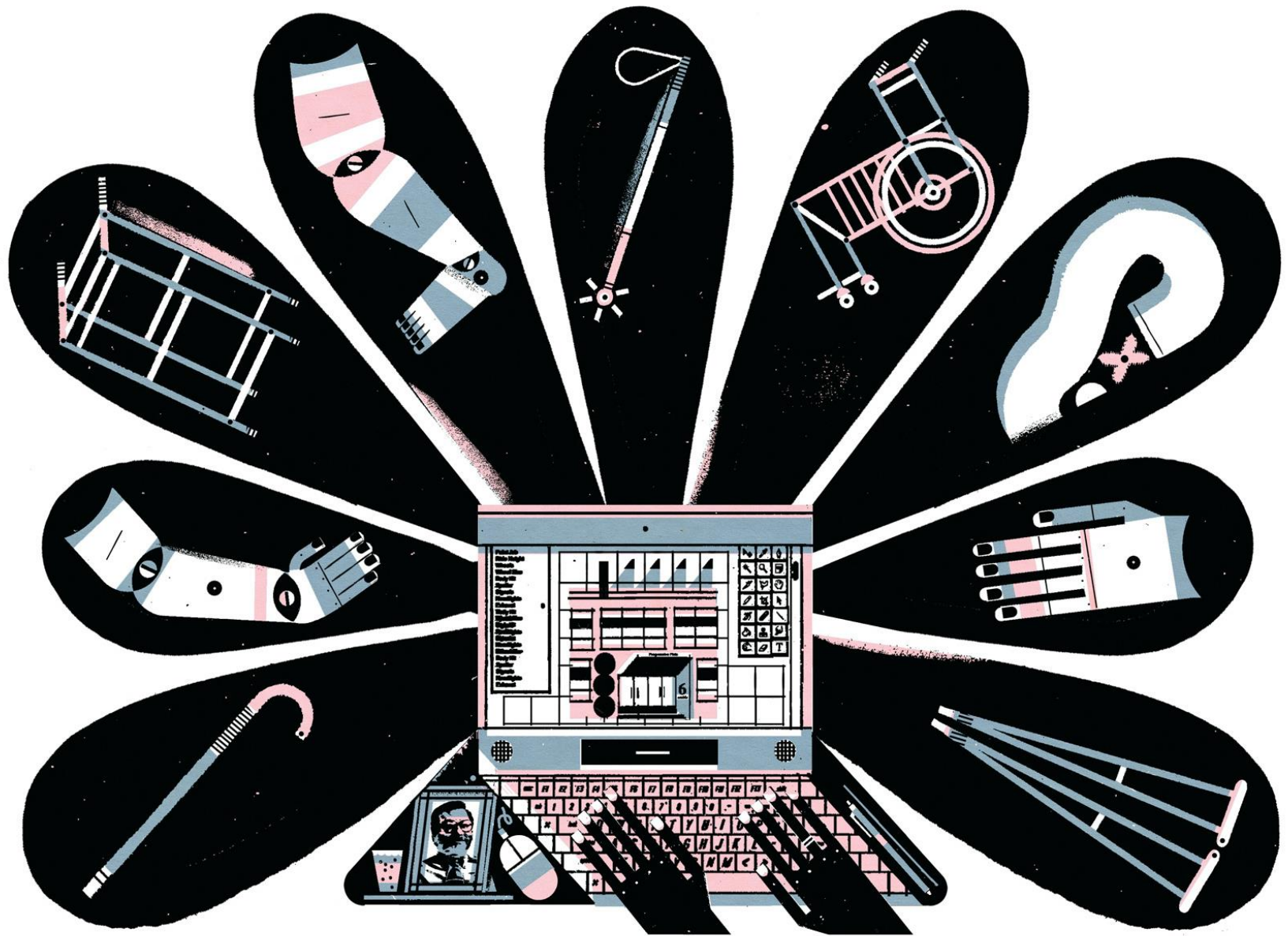The illusion of the average user is one of designers' biggest biases. (Kat Holmes)

Design for All - Universal Design (UD)

Ergonómia és Pszichológia Tanszék

Mark Pulay   14/02/2019

Outline

- Definition of UD,

- Purpose of UD,

- Areas of UD ,

- Why You Should Care,

- Gap theory

- The 7 Principles of UD

- Examples for accessibility

- Business Benefits for a Changing Market

Definition of UD

Universal <u>design</u> is an <u>approach</u> to the design of <u>products</u>, <u>services</u> and <u>environments</u> to be usable by as many people as possible regardless of age, ability or circumstance and has bee[...] And every person!!! <u>governments</u>, <u>business</u> and <u>industry</u>. It links directly to the concept of an <u>inclusive society</u>, especially for people with functional limitations.

Ergonómia és
Pszichológia
Tanszék

Definition of UD

Universal design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

(Ron Mace, 1988.)

Inclusive design
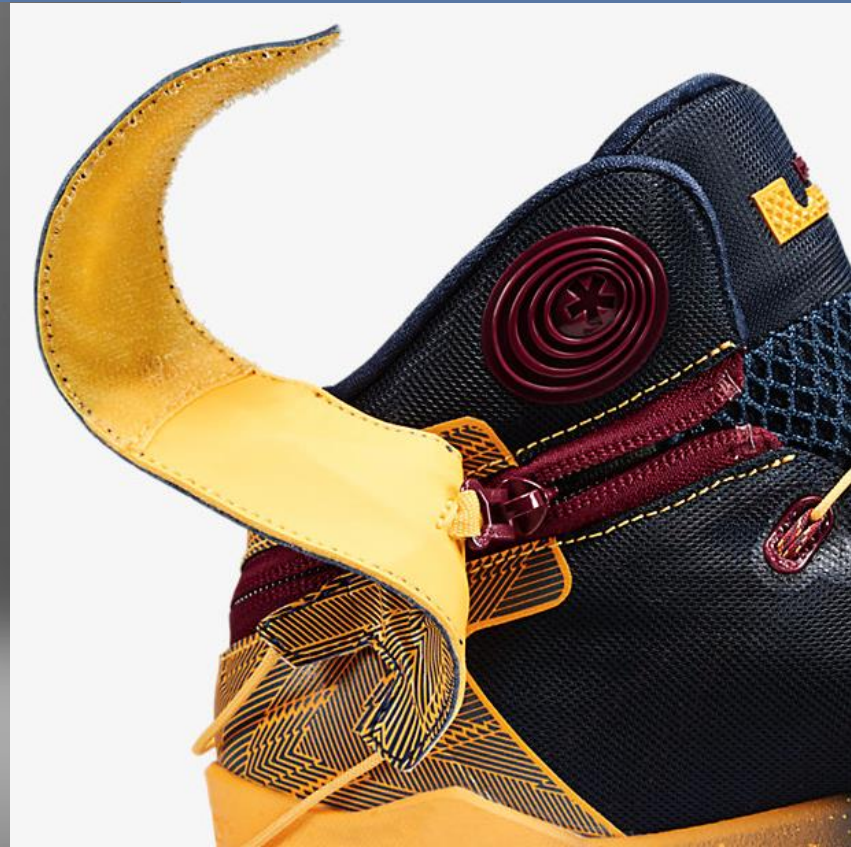
Why do we talk about it?

„...everybody, regardless of gender, capabilities, age, race or beliefs, can have the same equal access to jobs, public healthcare, products and services, it is necessary that these are apt to be used by everyone regardless of their abilities."

(UN Human Rights Declaration and Standard Rules)

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But who is „EVERYBODY"?

An average (???) person:
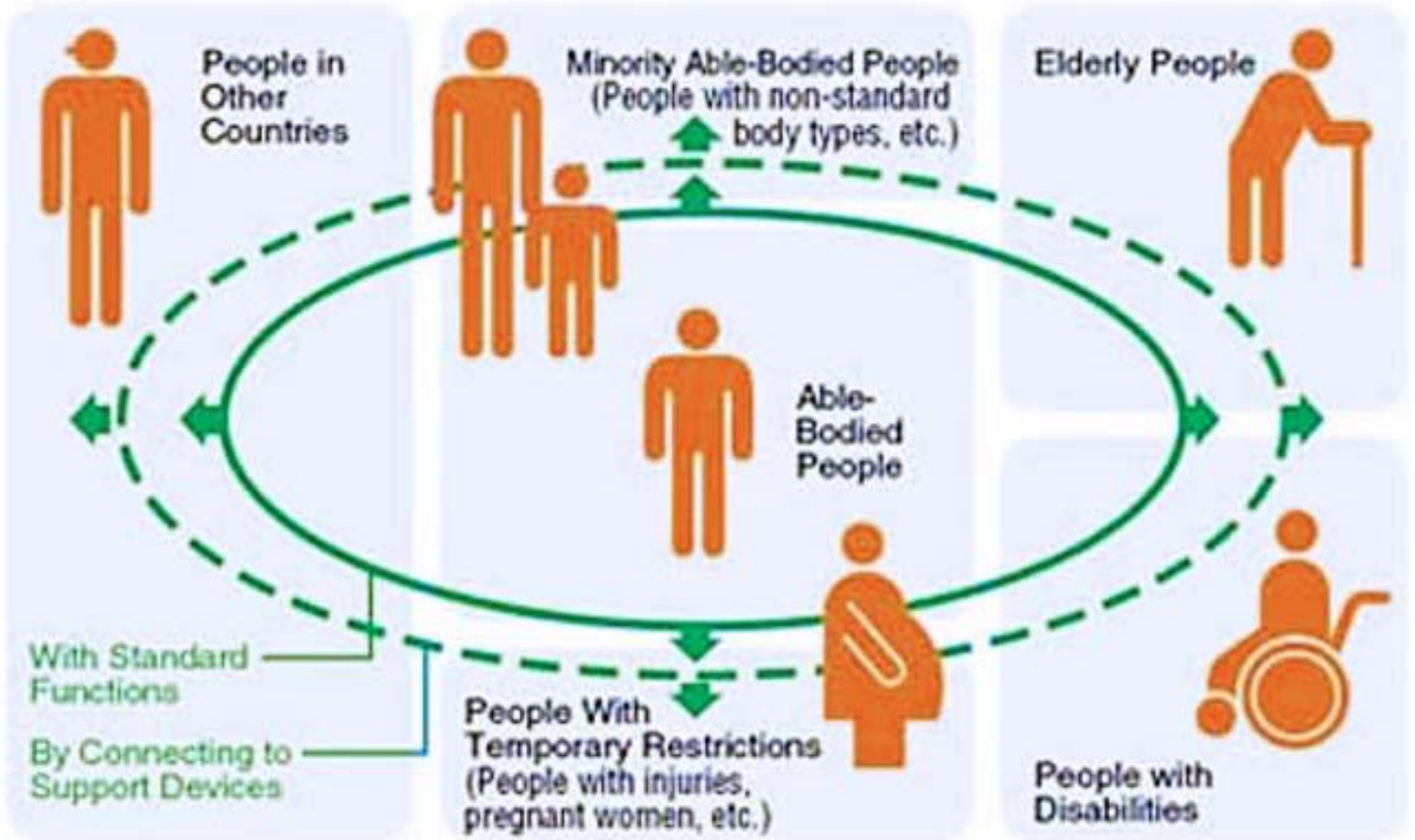
- 18-40 years old, 150-180 cm tall, weights 50-80 kg
- average physical and mental skills
- average IQ
- absolutely healthy

A not average person???

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But who is „EVERYBODY"?
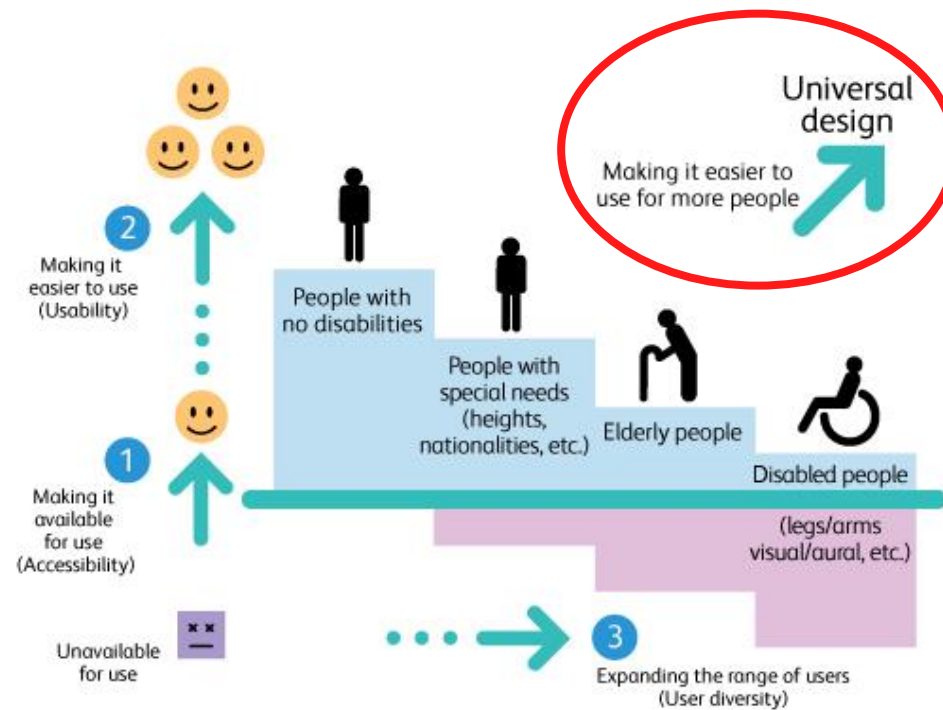
Areas of UD

- Physical environment:
    - Buildings,
    - Furniture,
    - Transport,
    - etc.
- Services:
    - Governmental,
    - Public services; transport,
    - Entertaining,
    - Etc.

Areas of UD

- Workplace
    - Content of the work fits to the abilities
    - Organization: getting about (accepting atmosphere)
- Human-computer interactions
    - Software,
    - Hardware,
    - WEB
- And generally every area of life

Areas of UD

Universal Design: What Is It and Why You Should Care

- **Think of the future of you**. Sure you're healthy now, hiking or diving. But it might not always be that way. Do your future self a favor: audit your house today. What needs to change now? In a few years? How can you do this, you ask?

- **Think of your family.** There are more multi-generational homes than ever before.

- **Think safety**. Everything about UD has safety as an underlying factor.

Ergonómia és Pszichológia Tanszék

Special user groups

- People with disabilities
- Blind and visually impaired
- Deaf and hearing impaired
- Mentally impaired
- Children
- People with temporarily changed ability
  - pregnancy, pram, broken arm/leg, loads of hand luggage
- Older people
- And everyone else – there is specialty in everyone

Ergonómia és
Pszichológia
Tanszék

Special user groups

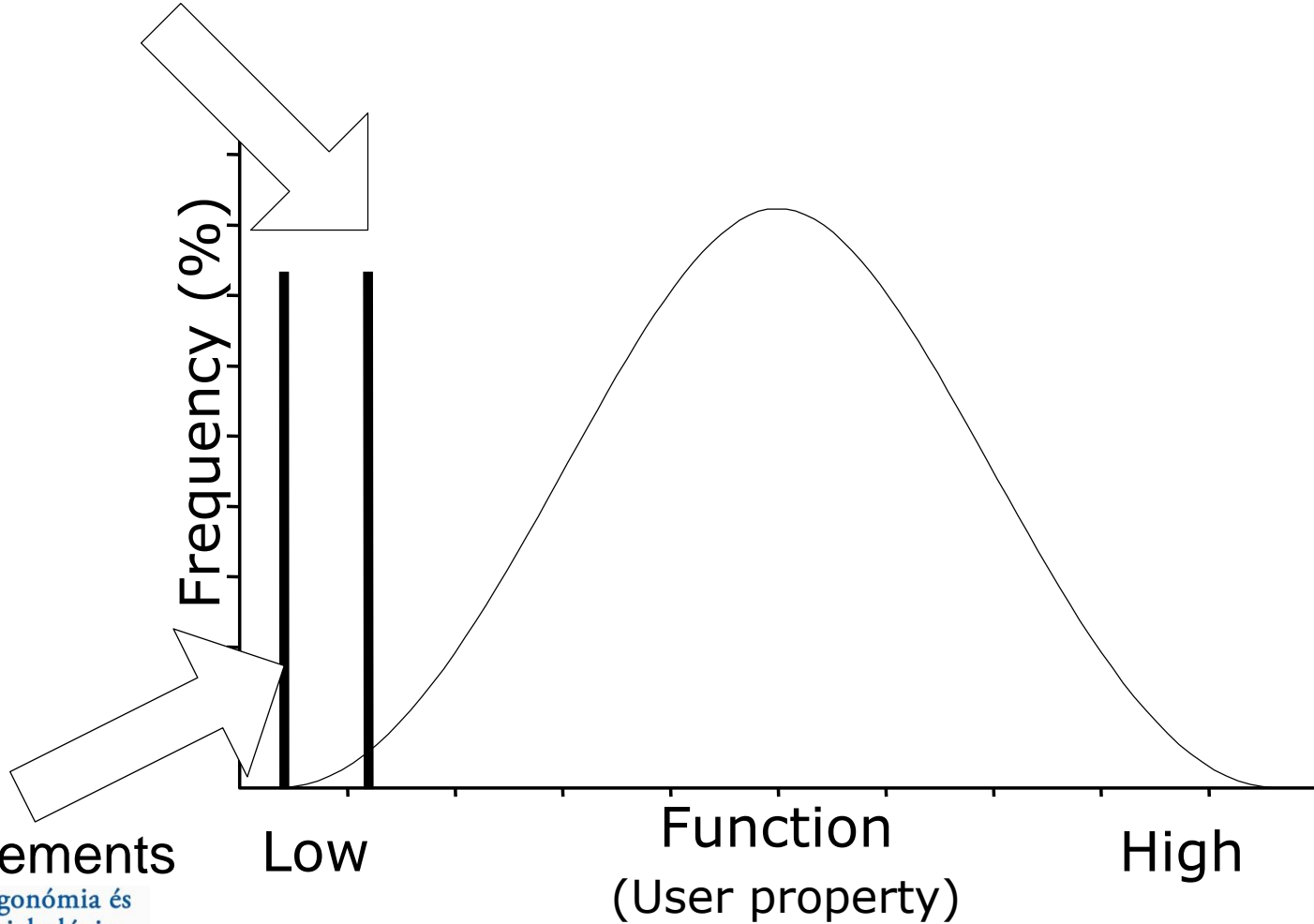| Fogyatékosság típusa (KSH)	Személy (fő)
Mozgássérült	232 206
Látássérült	82 484
Hallássérült	71 585
Siketvak	3 262
Súlyos belszervi fogyatékos; Mentális/pszichés sérült; Értelmi fogyatékos	135 692
Beszédfogyatékos	25 441
Autista	5 120
Egyéb	5 457
Összesen	**561 241 (5,6%)**
Dr. Kutor László adatai (2011)	
Parkinson-betegség	100 00 – 12 000
Sclerosis multiplex	160 000
Alzheimer-betegség	60 000
Cukorbetegség, vesebetegség	535 000
Összesen	**1 346 241 (13,5%)**

Dependency

Changing process in social dynamics
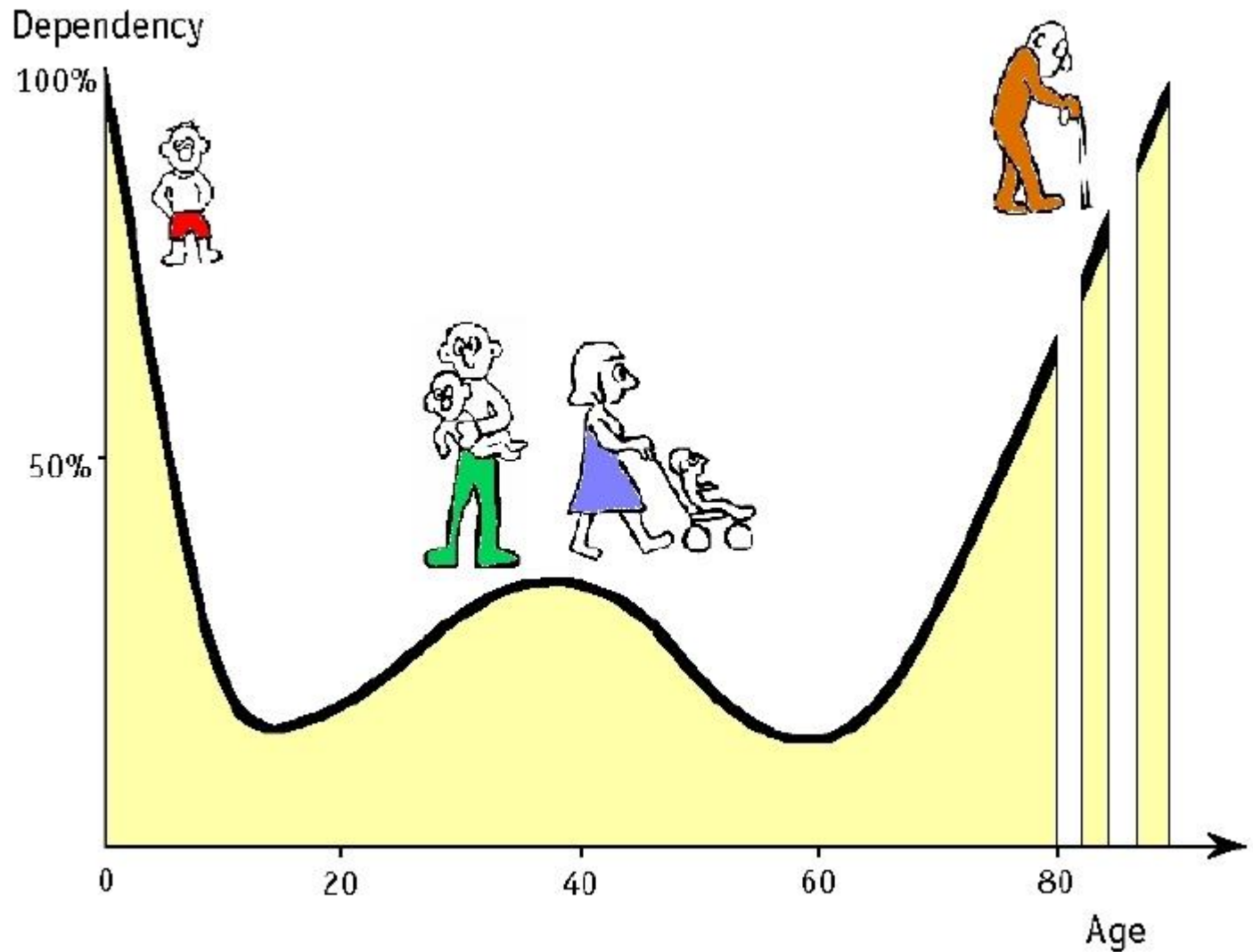
Changing process in social dynamics

Projection for 2050 of Demographic evolution in the EU

Gap theory

Gap theory

Gap theory

High

Function

• Barrier-free design and architecture

• Social sensitivity

Task requirements

Disability

Functional properties of the user

Accessibility!

• Medical therapy

• Physiotherapy

• Assisitive technology

Low

Impairment → disability → handicap

Ergonómia és Pszichológia Tanszék

24
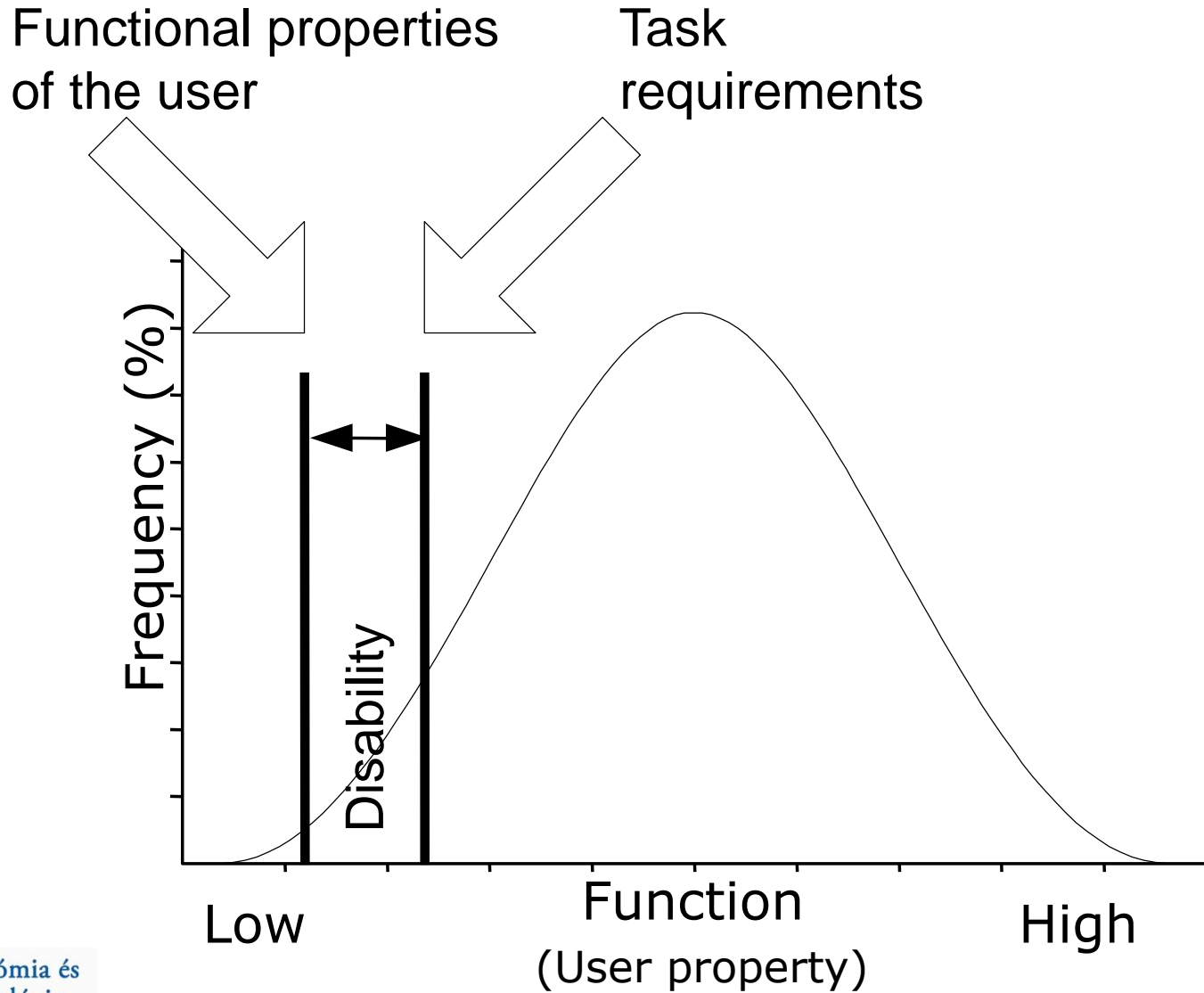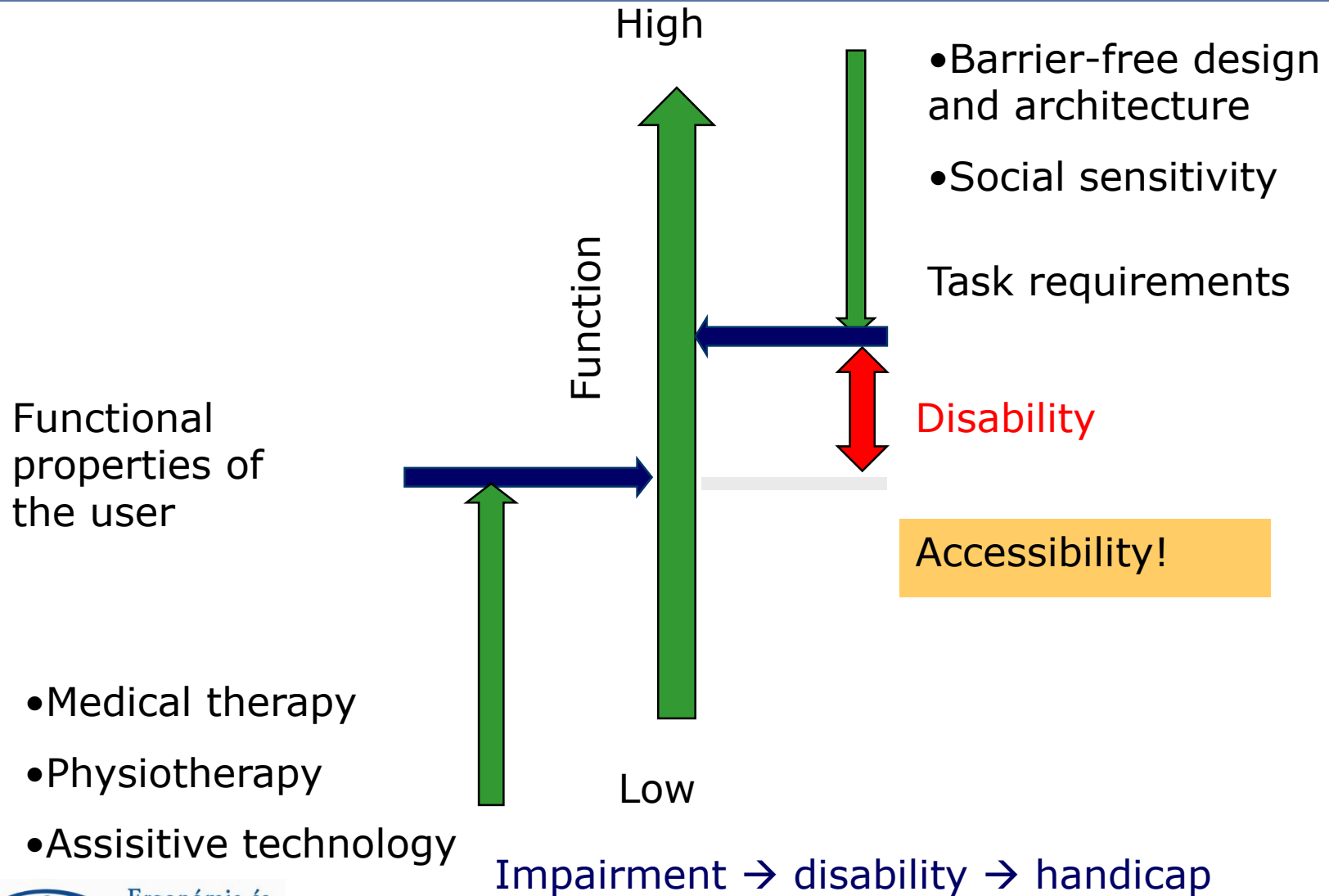
Decreasing Gap

- Adapt the environment to the needs of the majority – compatibility with individual technical aids (AT) must be guaranteed.

- Improve individual human capabilities – create devices that favor the possibilities for people (reading glasses, remote controls, left-handed products, Braille keyboards, access ramps, etc.)

"Aesthetics have become just as important as function itself," (Keira Gwynn)

FORM IS JUST AS VALUABLE AS FUNCTION

- We don't think of glasses as medical assistive devices, but that's what they were–at least until the 1960s or so, when designers got their hands on them.

- Through the force of design, glasses become instruments of self-expression rather than stigmatized objects that connote that the wearer is different.

- Many of today's assistive devices look as medical, hard, and uninviting as the eyeglasses of centuries past.

- The emotional impact of these devices can be the difference between the user feeling empowered or feeling ashamed.

Innovative Walking Aids...

FOLDING ALUMINUM, ADJUSTABLE, ERGONOMIC, OFFSET AND UNUSUAL

„Super-abilities"

The **typewriter**, **audiobooks**, the **remote control** were originally designed <u>for people with disabilities</u>, but they're loved by everyone because they created the *super-abilities we all want*." (Elise Roy)

The 7 Principles of UD

The 7 Principles of Universal Design were developed in 1997 by a working group of architects, product designers, engineers and environmental design researchers, led by the late Ronald Mace in North Carolina State University.

Ergonómia és
Pszichológia
Tanszék

1. Equitable Use

The design is useful and marketable to people with diverse abilities.

1. Equitable Use

- Provide the same means of use for all users.

- Avoid segregating or stigmatizing any users.

- Provisions for privacy, security, and safety should be equally available to all users.

- Make the design appealing to all users.

2. Flexibility in Use

The design accommodates a wide range of individual preferences and abilities.

Ergonómia és Pszichológia Tanszék

A user at a computer table.
The table height can be easily adjusted to suit different user needs.
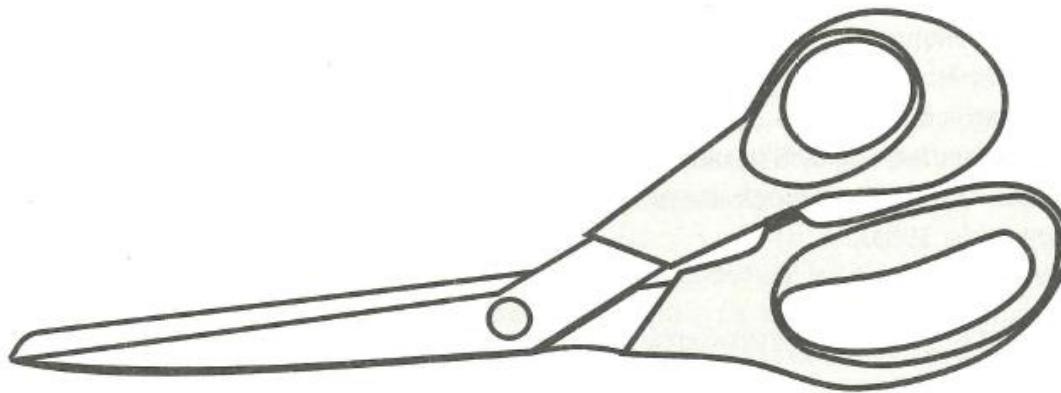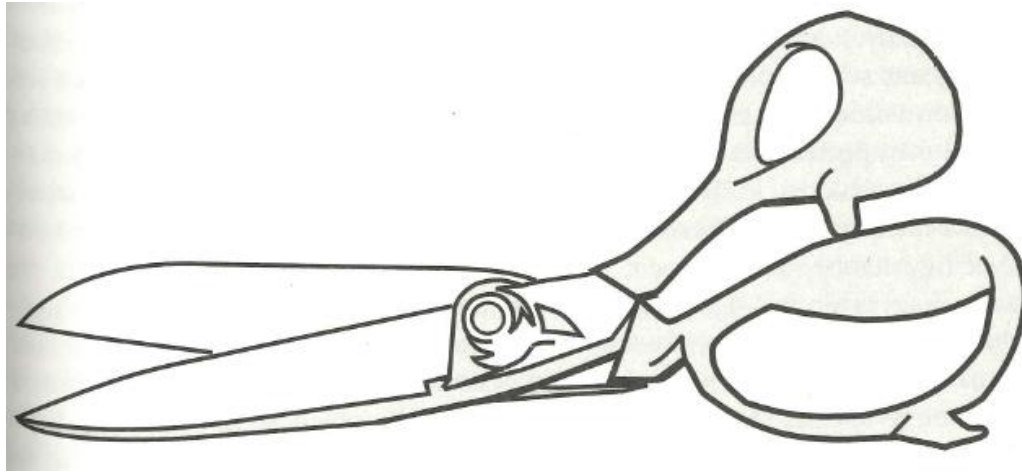
2. Flexibility in Use

- Provide choice in methods of use.

- Accommodate right- or left-handed access and use.

- Facilitate the user's accuracy and precision.
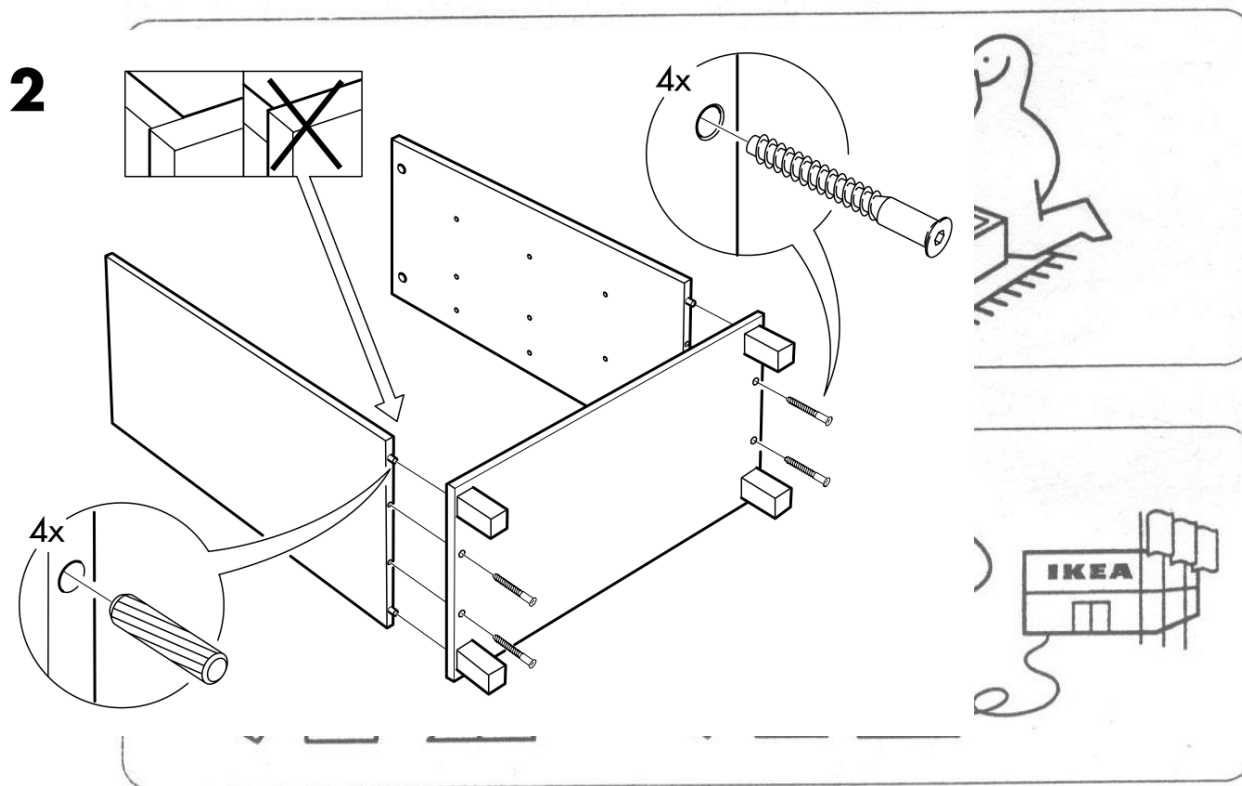
- Provide adaptability to the user's pace.

Ergonómia és Pszichológia Tanszék

3. Simple and Intuitive Use

"The only "intuitive" interface is a nipple. After that, it's all learned."

Bruce Ediger

Use of the design is easy to understand, regardless of the user's <u>experience</u>, <u>knowledge</u>, <u>language</u> skills, or current concentration level.

3. Simple and Intuitive Use

- Eliminate unnecessary complexity.
- Be consistent with user expectations and intuition.
- Accommodate a wide range of literacy and language skills.
- Arrange information consistent with its importance.
- Provide effective prompting feedback during and after task completion.

4. Perceptible Information

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

Ergonómia és
Pszichológia
Tanszék
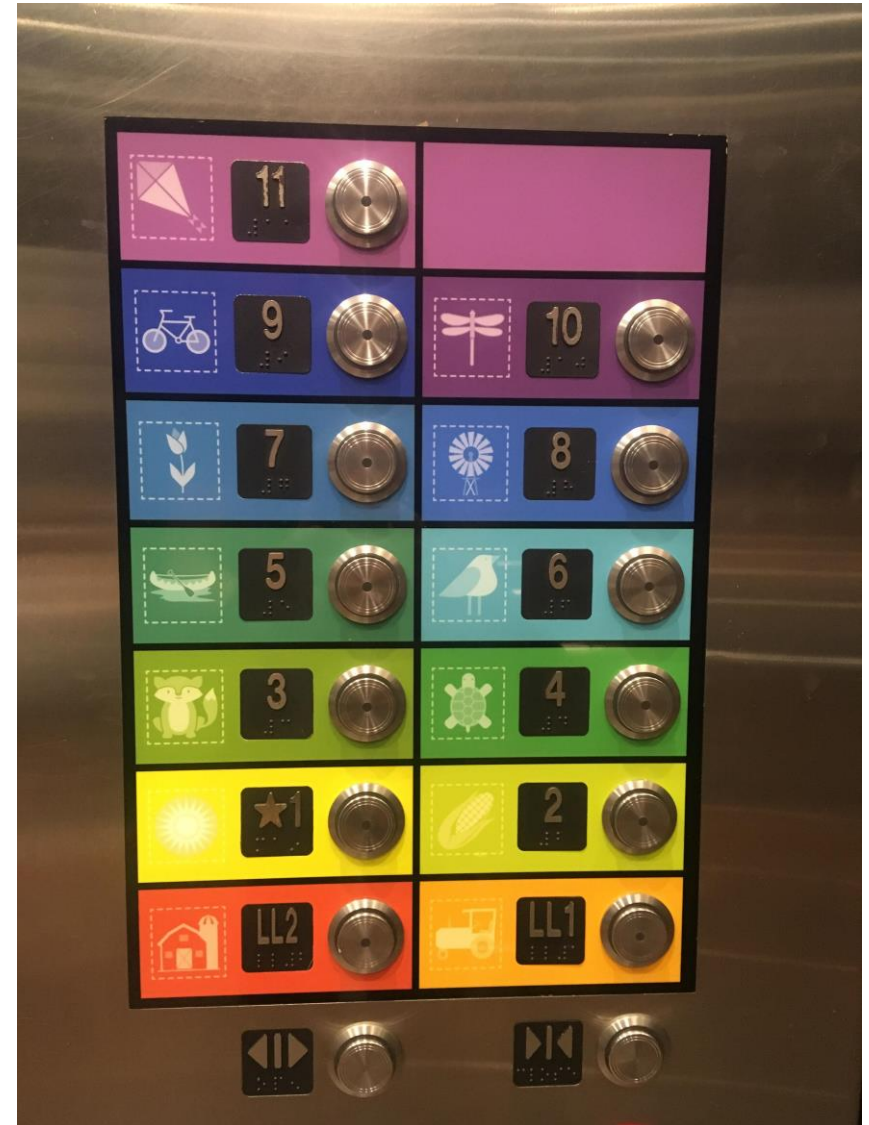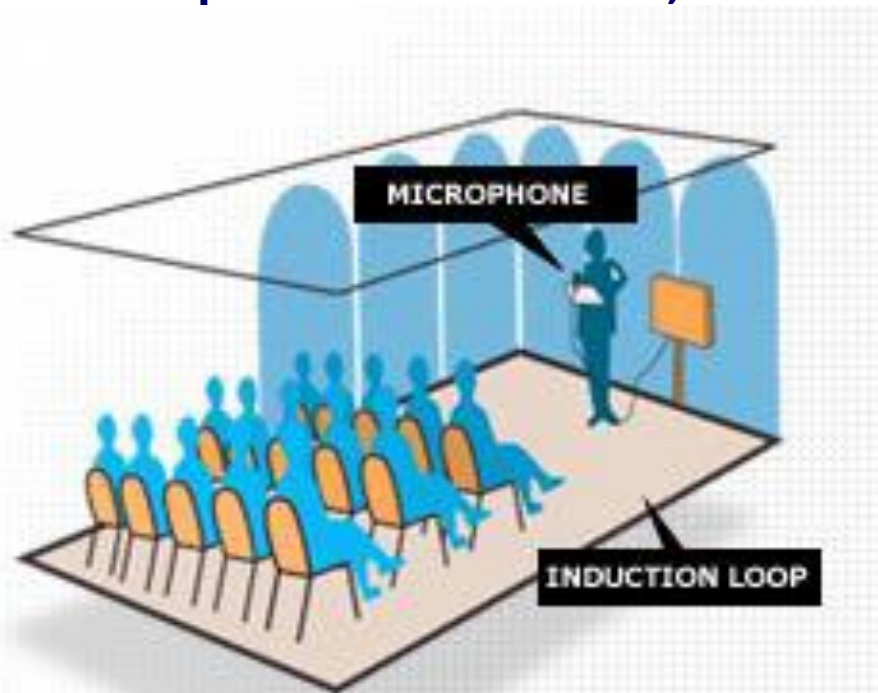
4. Perceptible Information

NanakumaLine, Japan.
Each station is color coded and is identified in English, Japanese, and by its accompanying unique symbol. Symbols generally relate to the station's surroundings.

4. Perceptible Information

- Induction loops in theatres, custom

- Visual g
  low visi

- Big lett
  vision,

- Menu v
  disable

An induction loop system transmits magnetic energy to telecoil-equipped hearing aids through a wire that surrounds an audience.

MICROPHONE

INDUCTION LOOP

T

Ergonómia és
Pszichológia
Tanszék

4. Perceptible Information

- Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.

- Provide adequate contrast between essential information and its surroundings.

- Maximize "legibility" of essential information.

- Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).

- Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

5. Tolerance for Error

The design minimizes hazards and the adverse consequences of accidental or unintended actions.
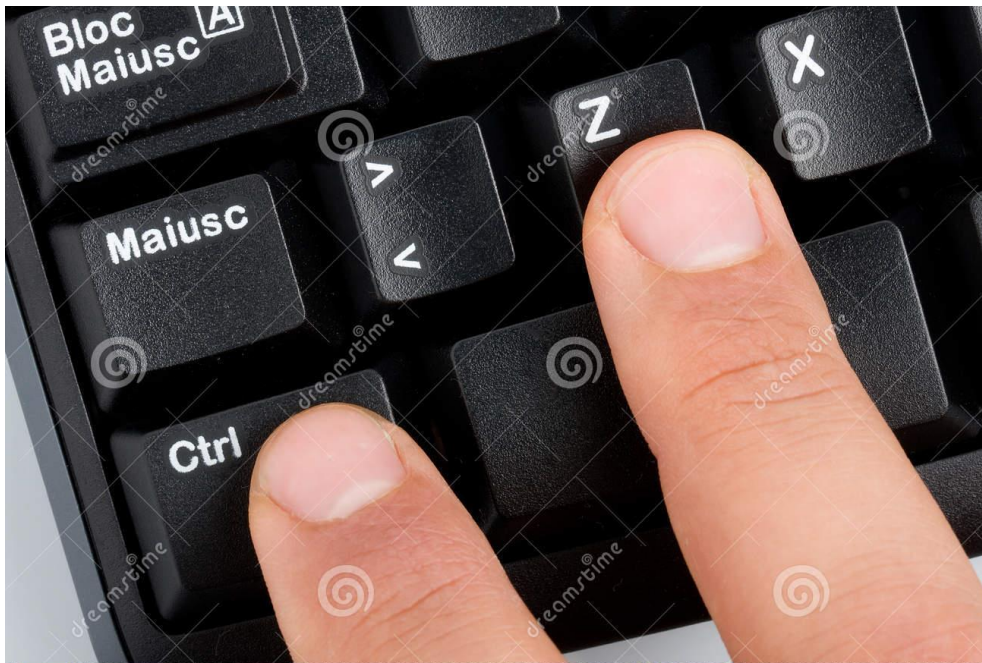
Ergonómia és
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Tanszék

5. Tolerance for Error
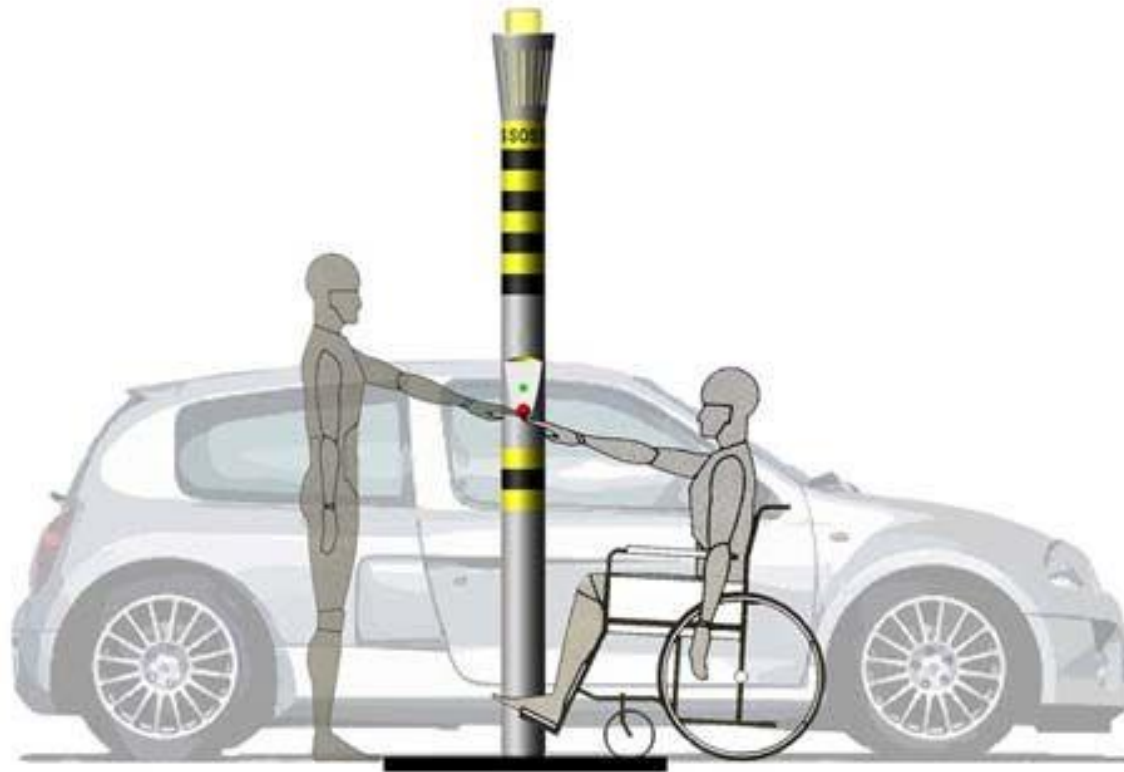
- Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.

- Provide warnings of hazards and errors.

- Provide fail safe features.

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Tanszék

The design can be used efficiently and comfortably and with a minimum of fatigue.

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Tanszék

6. Low Physical Effort

6. Low Physical Effort

- Allow user to maintain a neutral body position.
- Use reasonable operating forces.
- Minimize repetitive actions.
- Minimize sustained physical effort.

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Pszichológia
Tanszék

7. Size and Space for Approach and Use

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

7. Size and Space for Approach and Use

- Provide a clear line of sight to important elements for any seated or standing user.

- Make reach to all components comfortable for any seated or standing user.

- Accommodate variations in hand and grip size.

- Provide adequate space for the use of assistive devices or personal assistance.

The 7 Principles of UD

1: Equitable Use

2: Flexibility in Use

3: Simple and Intuitive Use

4: Perceptible Information

5: Tolerance for Error

6: Low Physical Effort

7: Size and Space for Approach and Use

Special needs – obstacles

Human subsystem		**Technical subsystem**
Motivational and emotional characteristics	⬌	Motivational and emotional requirements
Cognitive characteristics: Memory, thinking, etc.	⬌	Cognitive requirements: Memory, thinking, etc.
Perceptual characteristics: Vision, hearing, touch, etc.	⬌	Perceptual requirements: Vision, hearing, touch, etc.
Physiological characteristics: Muscle power	⬌	Physiological requirements: Muscle power etc.
Body dimensions: Arm, trunk, leg, head, etc.	⬌	Control sizes, distances: Handle, pedal, buttons, etc.

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User Interface

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Tanszék

Levels of accessibility

- complex accessibility
  - all possible user needs
  - in all public service institutions
- reasonable adaption
  - agreement between employer and employee
  - appropriate work conditions to the changed working capacities.
- special solutions
  - individual needs at home
- Attitude!!!

information can be
- seen
- heard
- touched
- understandable
= accessible for all

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Pszichológia
Tanszék

| UNIVERSAL	ACCESSIBLE
A universally designed home plan costs the same as any other plan to build that anyone can purchase	A custom designed home based on an existing plan but requires additional costs for the redesign and custom construction details
Home improvement services that incorporate universal design as a basic service	Home modifications services by a contractor who charges more for her specialized knowledge of design for disability and aging
Automobile instruments and controls customizable to accommodate differences in perceptual abilities, stature, motor abilities, and preferences	Assistive technology used to adapt an automobile display for people with special needs
A no step building entry that everyone can use easily and together	A building entry with a ramp at the side that is out of the way for all visitors but is accessible by code
A hotel that has 100% universally designed rooms in a variety of types	A hotel that has only the code-required percentage of accessible rooms

(Steinfeld and Maisel, 2012, p. 69)

"The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect."
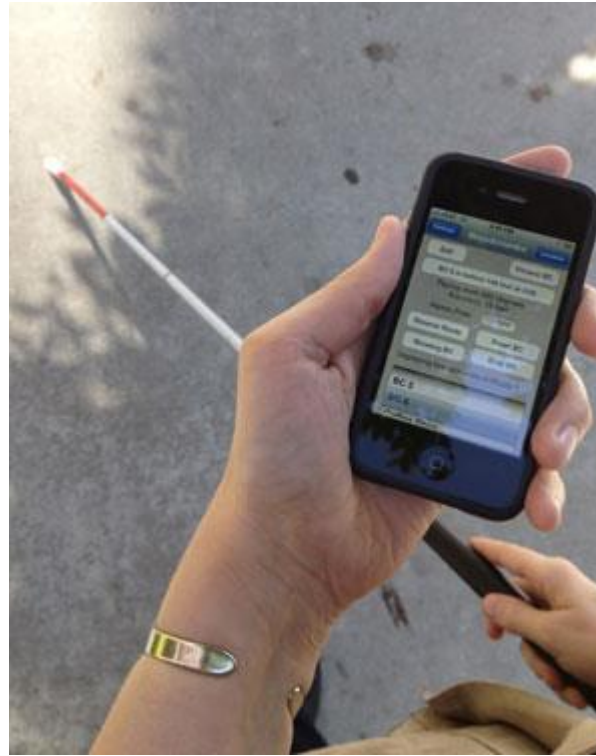
Tim Berners-Lee
the creator of the World Wide Web
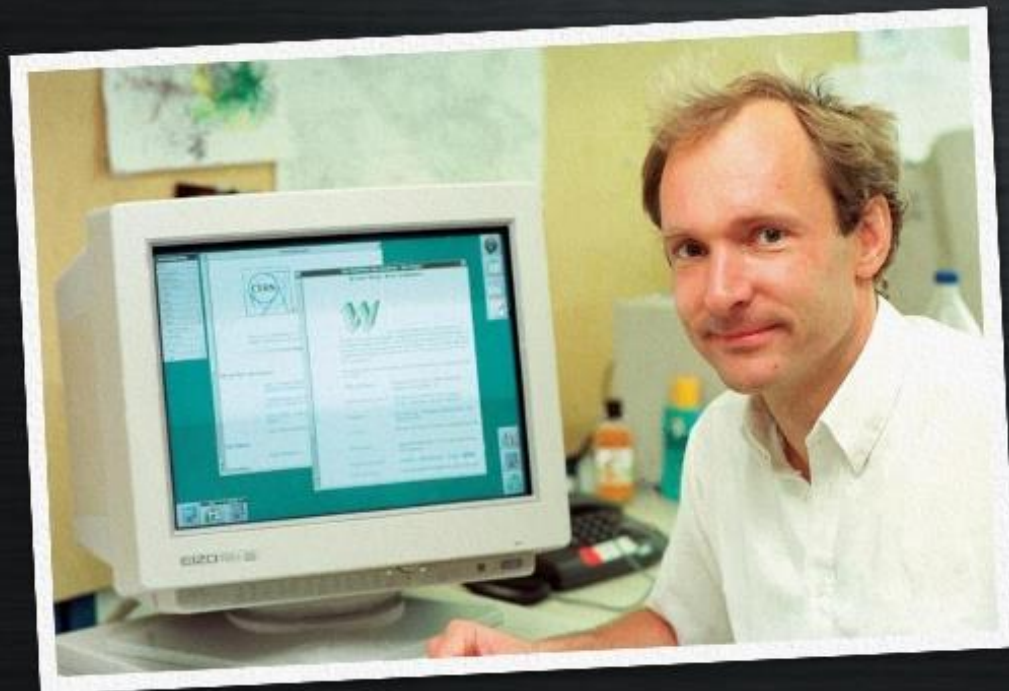
Make your websites more accessible
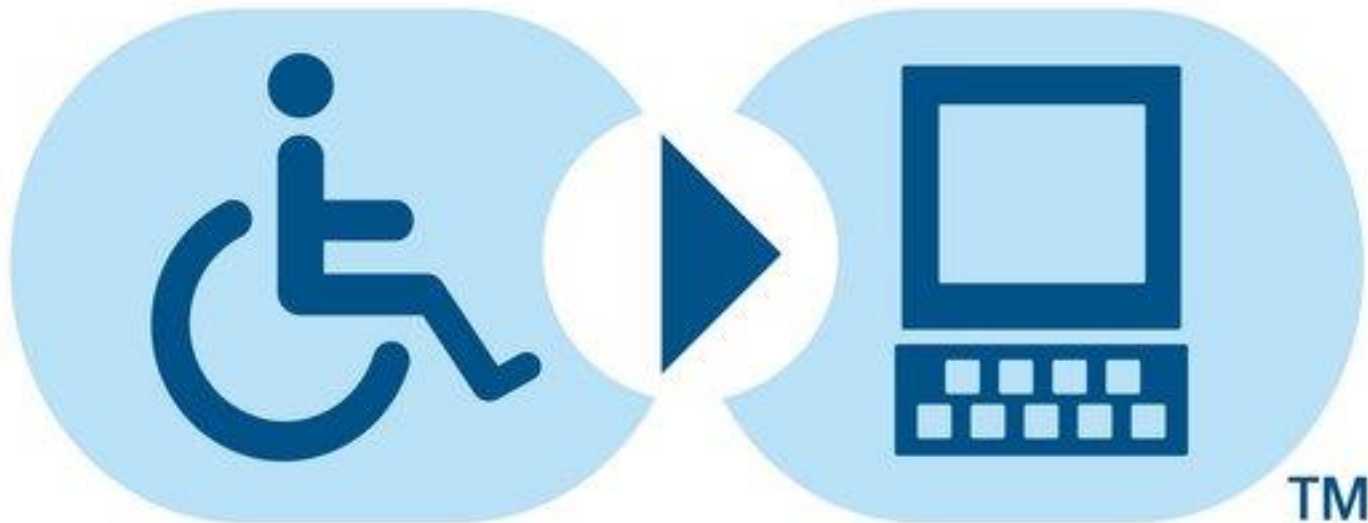
World Wide Web Consortium
www.w3.org

Ergonómia és
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Touch screen for blind people or for people with disabilities

Use of a computer

- control

Bionic artificial limbs
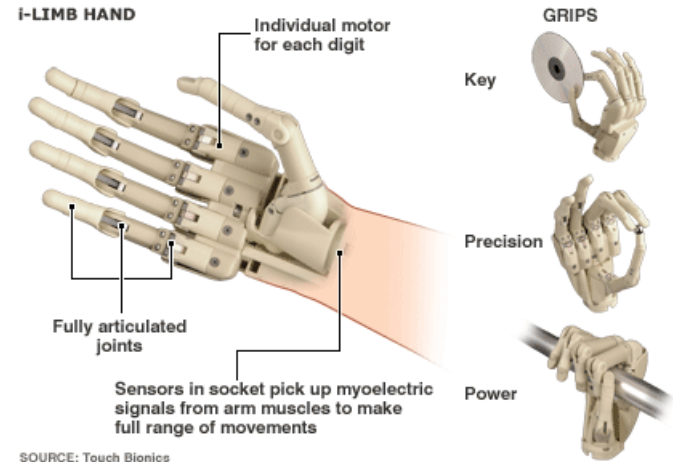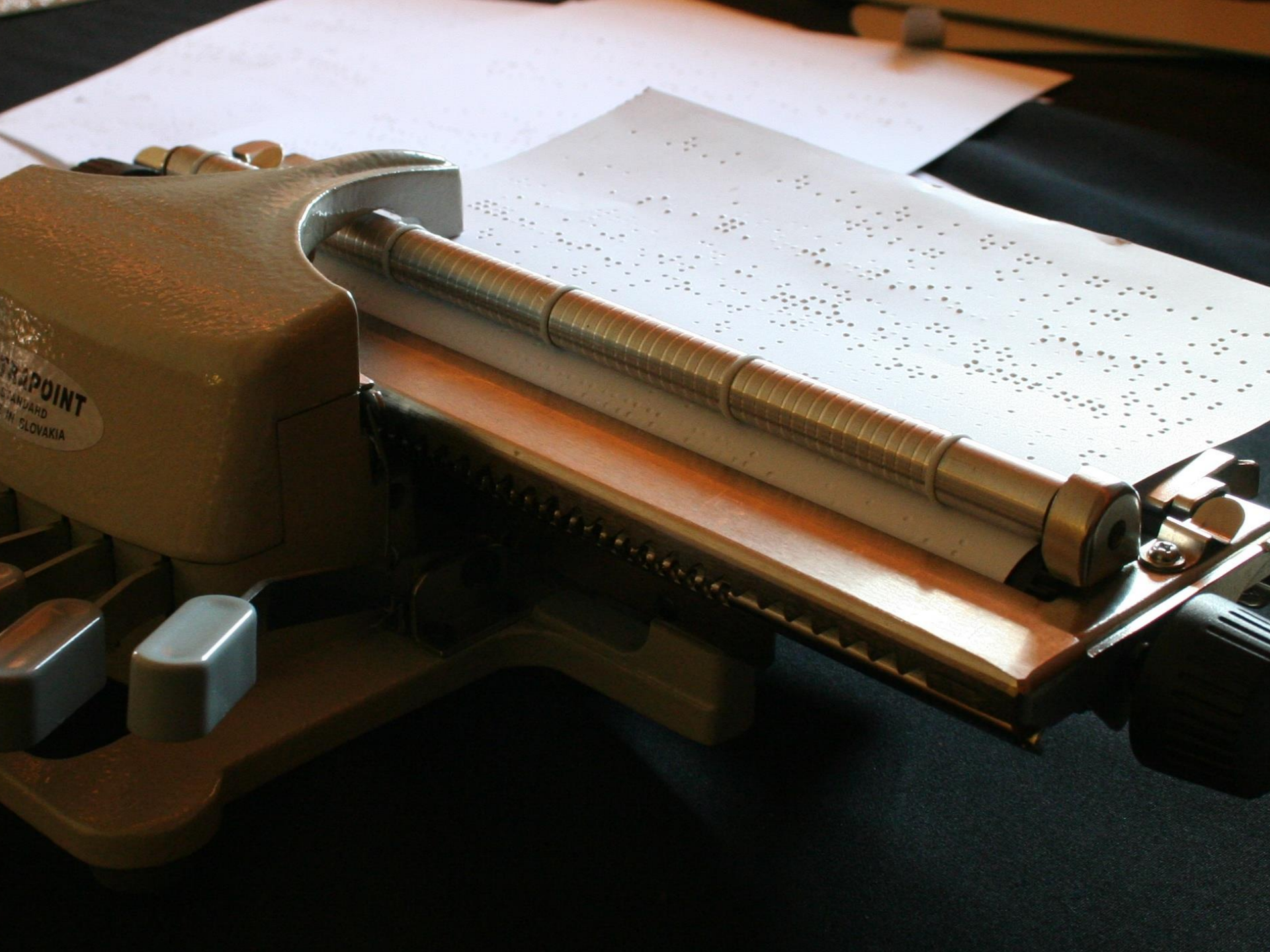
Examples for accessibility in public places

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Pszichológia
Tanszék
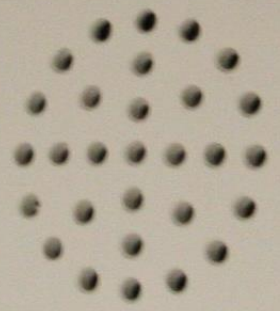
Examples for accessibility in public places

Examples for accessibility in public places

Handrails, alarm

Barrier-free
toilet

Everything in reach,
tilted mirror

Layout for the
cleaning staff

Need of space for a person with a wheelchair
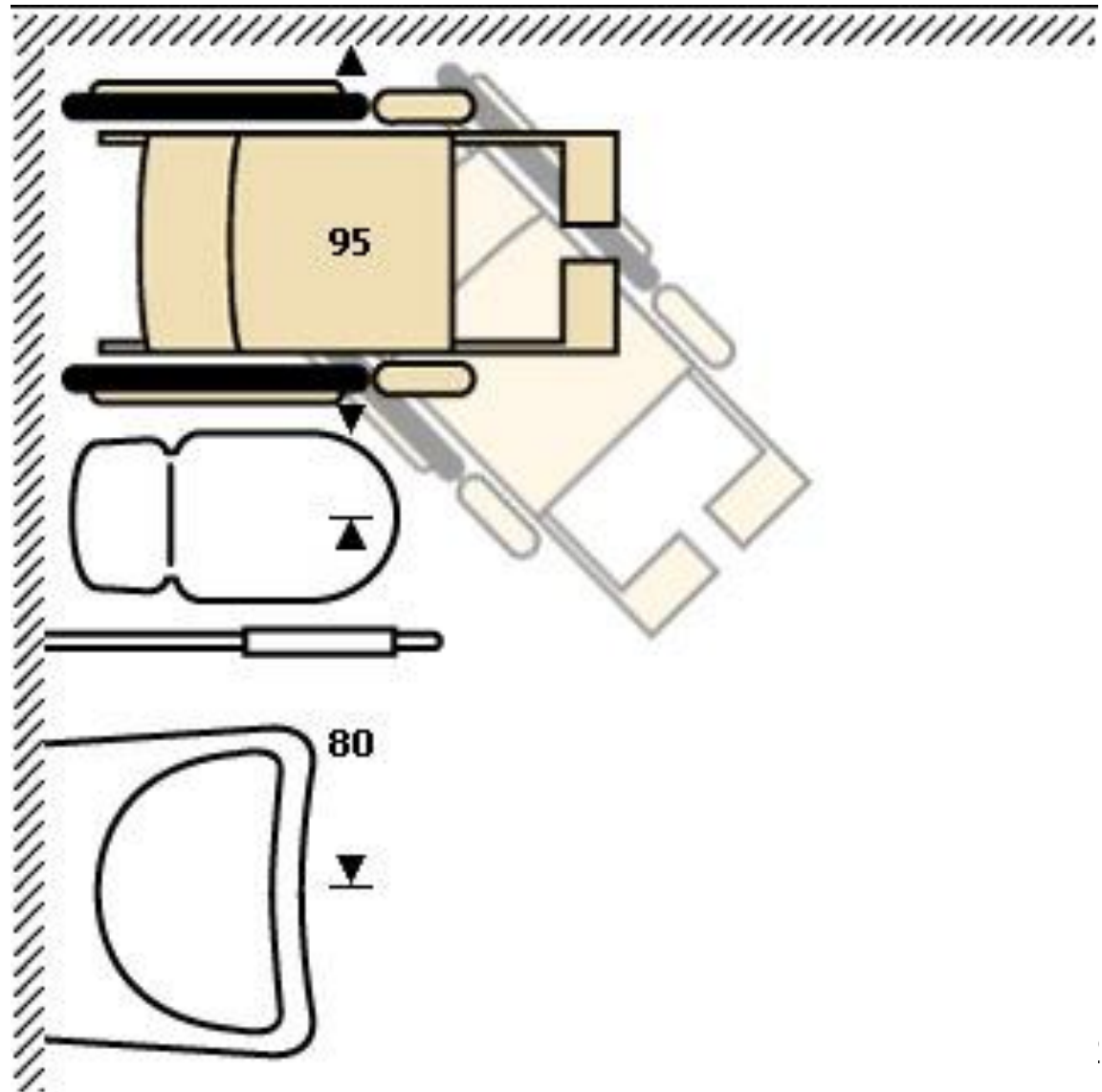
Need of space for a person with a wheelchair
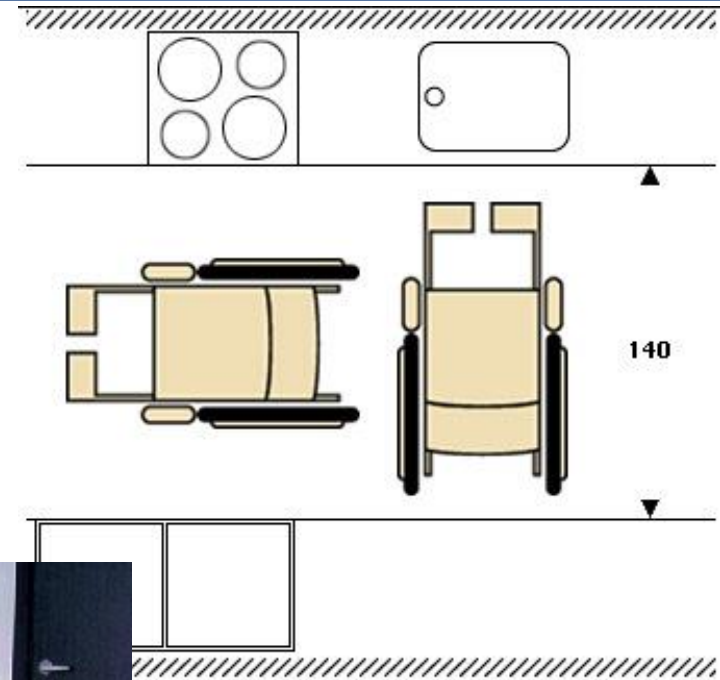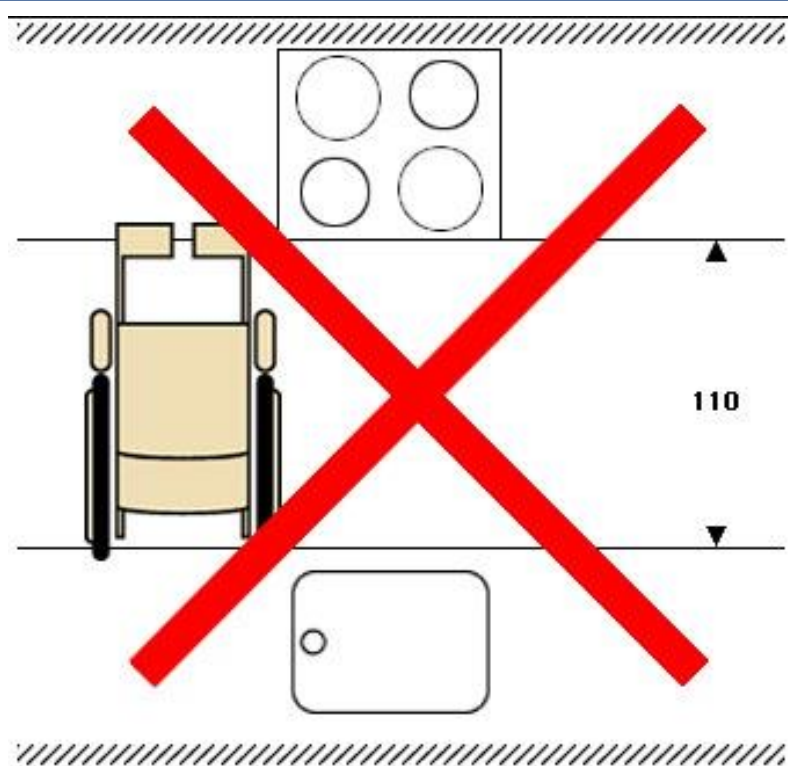
Little attention
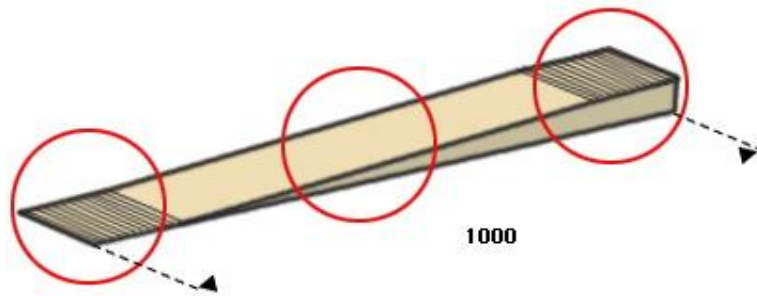
- Elevation ≤ 5 % (1:20)

- + 1,5 m free space in a parking lot

- Possibility to ask for assistance

1000

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Ramp

Problems?
- inclination in more directions
- no handrails
- no resting place
- elevation?

Requirements:

- 1,5 m resting place per 9 meters

- 70 and 95 cm high rounded handrails

- elevation≤ 5% (1:20)

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Tanszék

Ramp
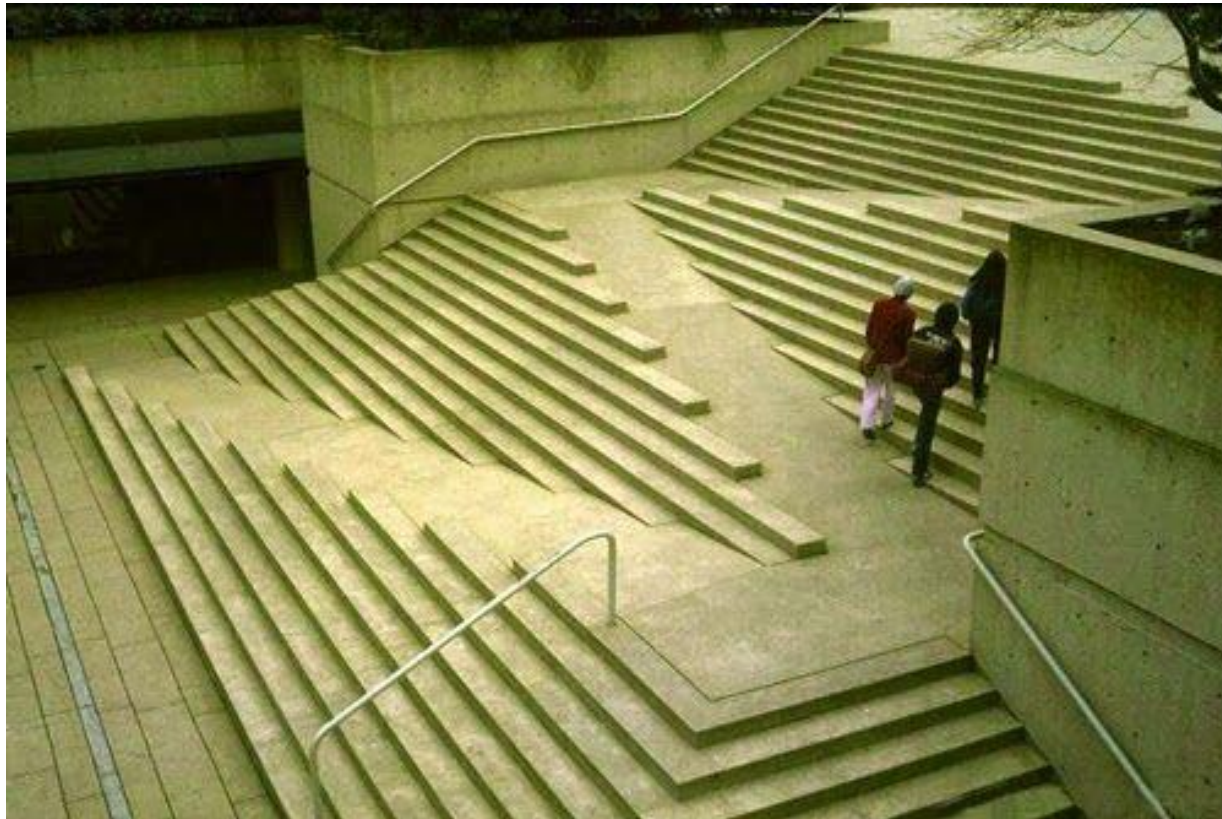
Problematic places

width of the door (min. 90 cm)

(not) rounded handrail

exceeding parts

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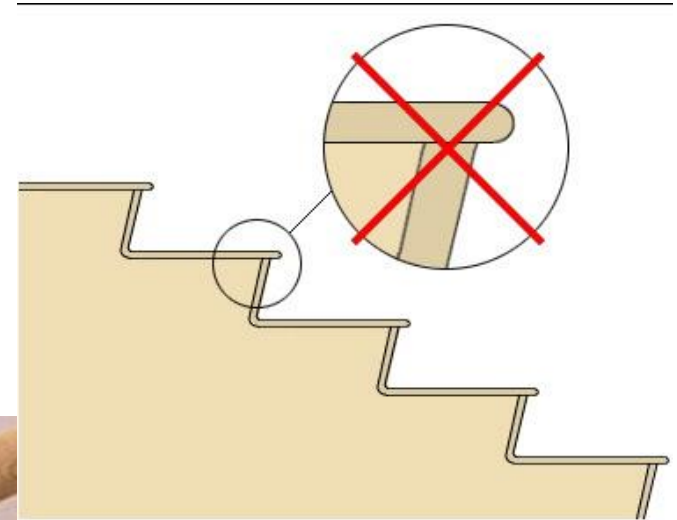
Orientation

Colour codes for people with mentally disabilities

Tactile building
(model of the dome in Aachen)

↓

in Hungary: Matthias Church,
downtown of Eger etc.

Tactile floor guidance

Tactile map

Transportation

Adapted cars

- Help to enter

Design for All

Designing for Special Needs ≠ Design for All

Everybody has Special Needs!

Drinking fountain for All

Examples DfA

Examples DfA

Bagó Ákos, 2003

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Tanszék

http://www.lathatatlan.hu/en/
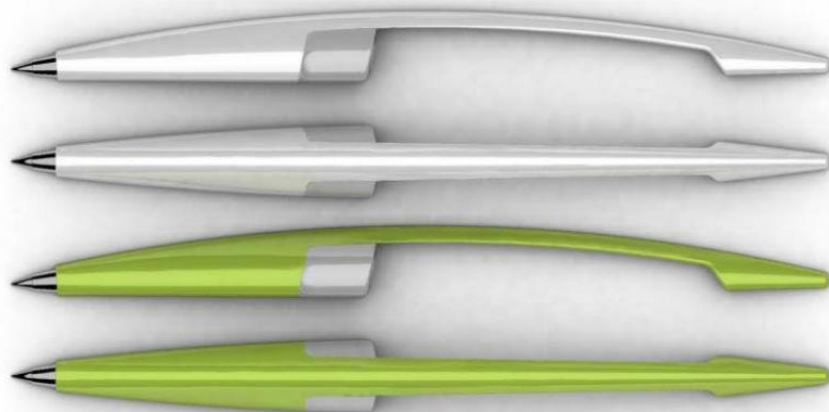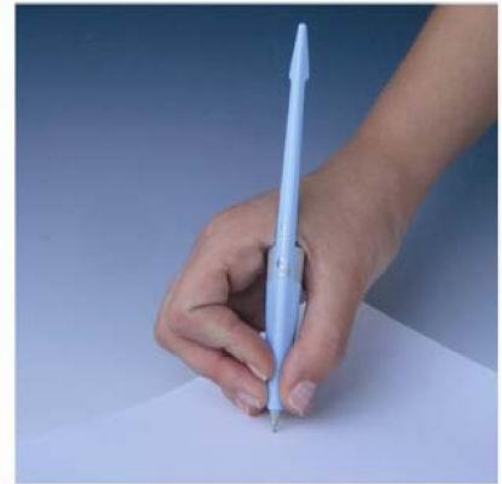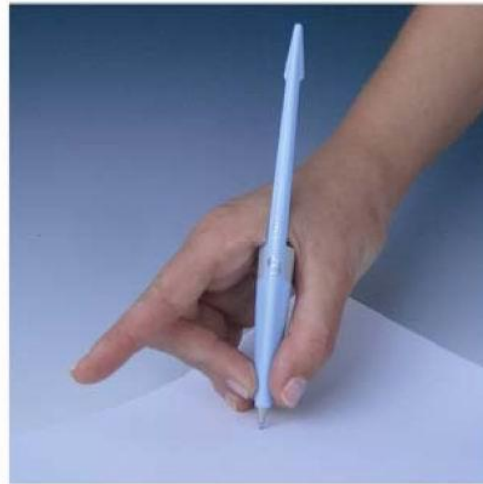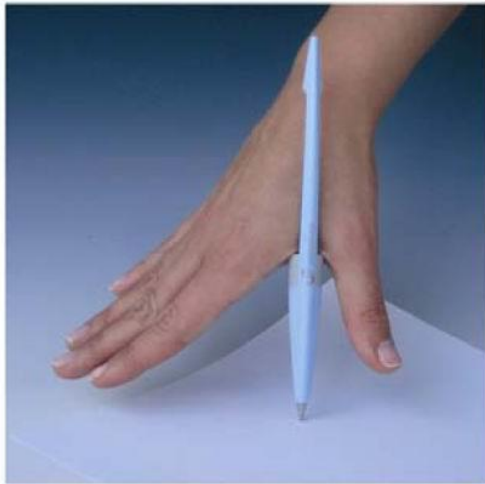
Few things to know about UD

Universal Design is much more than just a new design trend;

- Universal Design is not a design style or trend. Rather, it is an approach to designing that can be applied to any design style or trend. It is an orientation to any design process that starts with considering the needs of the user.

Universal Design does not aim to replace the design of products targeted at specific markets;

- Universal Design does not aim to replace products that are currently available on the market. On the contrary, it could ensure that these products are designed to be as accessible and usable as possible by the target market at which they are aimed.

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Few things to know about UD

Universal Design is not a synonym for compliance with accessible design standards;

- The term Universal Design has been incorrectly used as a synonym for compliance with standards for accessible design.

- Universal Design is not a list of specifications; <u>it is an approach to design that considers the varied abilities of users</u>.

Universal Design benefits more people than older people and people with disabilities;

- However, it should be added that a hypothetical person who does not experience a disability (in the widest definition of the word) during his or her lifetime will also benefit, at the very least from the positive user experience of simple and intuitive design.

Few things to know about UD

Universal Design can be undertaken by any designer, not just the specialists;

- The first step is to adopt a <u>user- or person-centred approach to designing</u>. <u>This requires an awareness and appreciation of the diverse abilities of people.</u>

Universal Design should be integrated throughout the design process;

- Universal Design is not an add-on design approach. It cannot effectively or efficiently be applied at the end of the design process. <u>It should be integrated into the design process from the very beginning</u>.

Few things to know about UD

A Universally Designed product is the goal: Universal Design is the process;

- Universal Design <u>is a process, not an outcome.</u> It is not assumed or expected that a 100% universal solution will be achieved, or is achievable, for any given design.

- Rather Universal Design should be a goal that a designer strives to achieve.

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Business Benefits for a Changing Market

The benefits to business of adopt a universal design approach vary from increases in **potential markets** to increased **customer satisfaction**.

Business Benefits for a Changing Market

Customers 45 to 74 years of age constituted **55% of airline market share** in the USA in 2003

0	20	40	60	80
Children & Youth	Young adults	Adults	Older Adults	Senior citizens
0-18	18-25	25-45	45-60	60-80+

Designers are often focused on this narrow audience

Inclusive design is focused here

Ergonómia és Pszichológia Tanszék
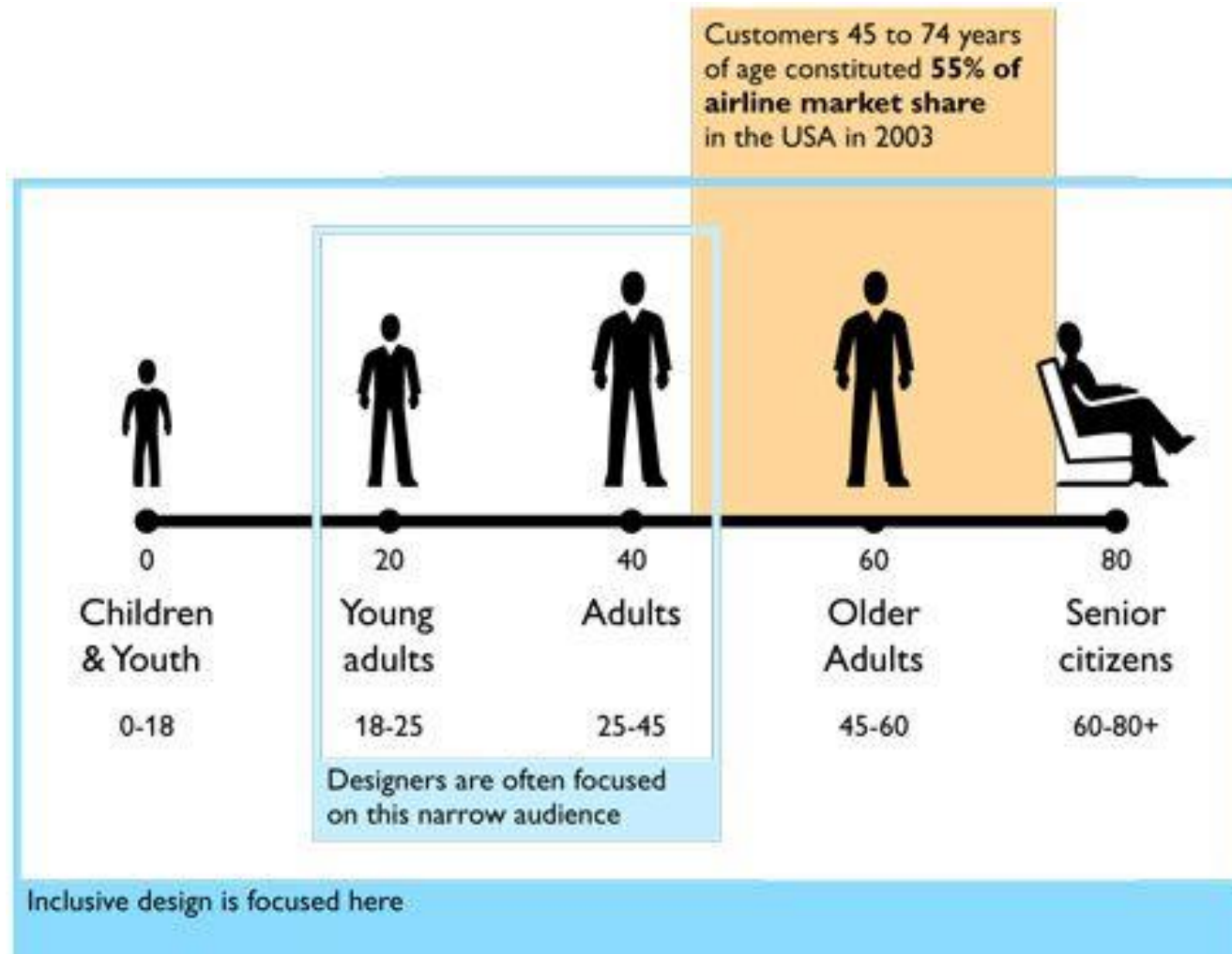
Business Benefits for a Changing Market

Increased Market Reach

Universal Design aims to provide a design which is accessible, usable by and appealing to as many people as possible.

One implication of this is an increase in the market reach.

Not only could a product, service or environment become available to a higher number of potential customers, but also to a <u>wider range of potential customers as well</u>.

Ergonómia és Pszichológia Tanszék

Enhanced Customer Satisfaction

A satisfied customer will tell other people about the product, service or environment, increasing awareness and potentially creating new custom.

Business Benefits for a Changing Market

Market Crossover Success

Products that are aimed at a specific target group can sometimes **generate interest and demand from unforeseen markets.**

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Positive Public Image

A business that positively contributes to society by incorporating a universal design approach is likely to receive a reputation for having a high level of corporate social responsibility.

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Tanszék

The Bradley – watch for all

http://designforall.hu/the-bradley-karora-mindenkinek/

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Business Benefits for a Changing Market

Increased Consumer Expectations

Universal Design enables companies to design products and services and environments that more closely match consumer expectations and needs.

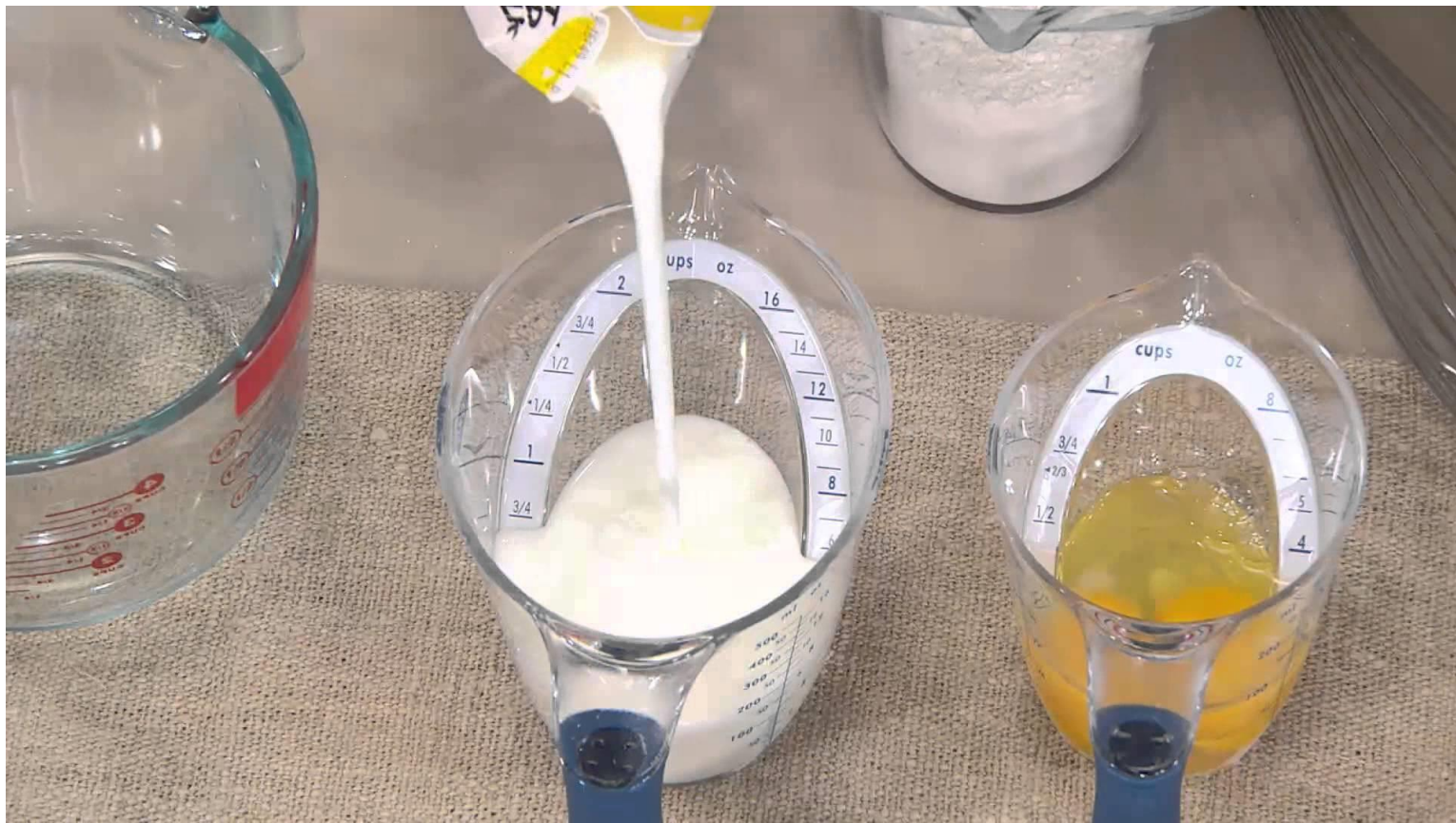# Business Benefits for a Changing Market

Example

The OXO good grips range is a well cited case study of how a specialized product design (designed with older people with arthritis) can generate widespread demand.

BMEMUN (18-20 March, 2019)

What is BMEMUN? www.mun.bme.hu

- BME Model **United Nations** or BMEMUN is a 3 Day international relations simulation of the United Nations for high school and University students.

OUR MISSION:

- To build relationships beyond courtrooms, facilitate learning and to develop intercultural dialogue.

- To make students understand the world around them, that their contribution as a global citizen is a must for a greater tomorrow.

- To provide an interactive educational experience that teaches in an interesting and enjoyable way about the United Nations.

- To make students realize the power of Dialogue in solving global issues.

Ergonómia és
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Welcome

About

Conference Information

Registration

Committees and Agenda

Budapest

Partners

Delegate Resources

Conference Schedule

WELCOME

Dear Delegates, Advisors, and Parents,

It is our distinct honor and privilege to invite you to the second session of the BME Model United Nations Conference, here at the Budapest University of Technology and Economics, Budapest, Hungary between 18-20 March, 2019.

The BMEMUN 2019 Secretariat has worked tirelessly to afford delegates the most intriguing and competitive committee experience on the circuit; we are confident that the committee's collective diversity in topic and size will both fascinate and challenge each and every delegate.

At the heart of Europe, Budapest serves as an ideal setting to discuss the solution to real-world problems promising a rewarding and innovative educational experience. Our capital is a city of outstanding geographical location with great traditions, wonderful historical places, as well as plenty of prestigious hotels within walking distance to the venue and to downtown Budapest.

Additionally, part of what makes the 6 committees of BMEMUN so incredible is the dedication of the conference's Secretariat, the superb quality of its 50+ BME student staffers, and the immense amount of preparation that goes into the conference.

Having said that, I encourage all interested delegates, faculty advisors, and friends to peruse our website for more information.

Register Today

Conference Dates

18 -20 March 2019

Conference Venue

Q – Building, Budapest University of Technology and Economics, Budapest, Hungary
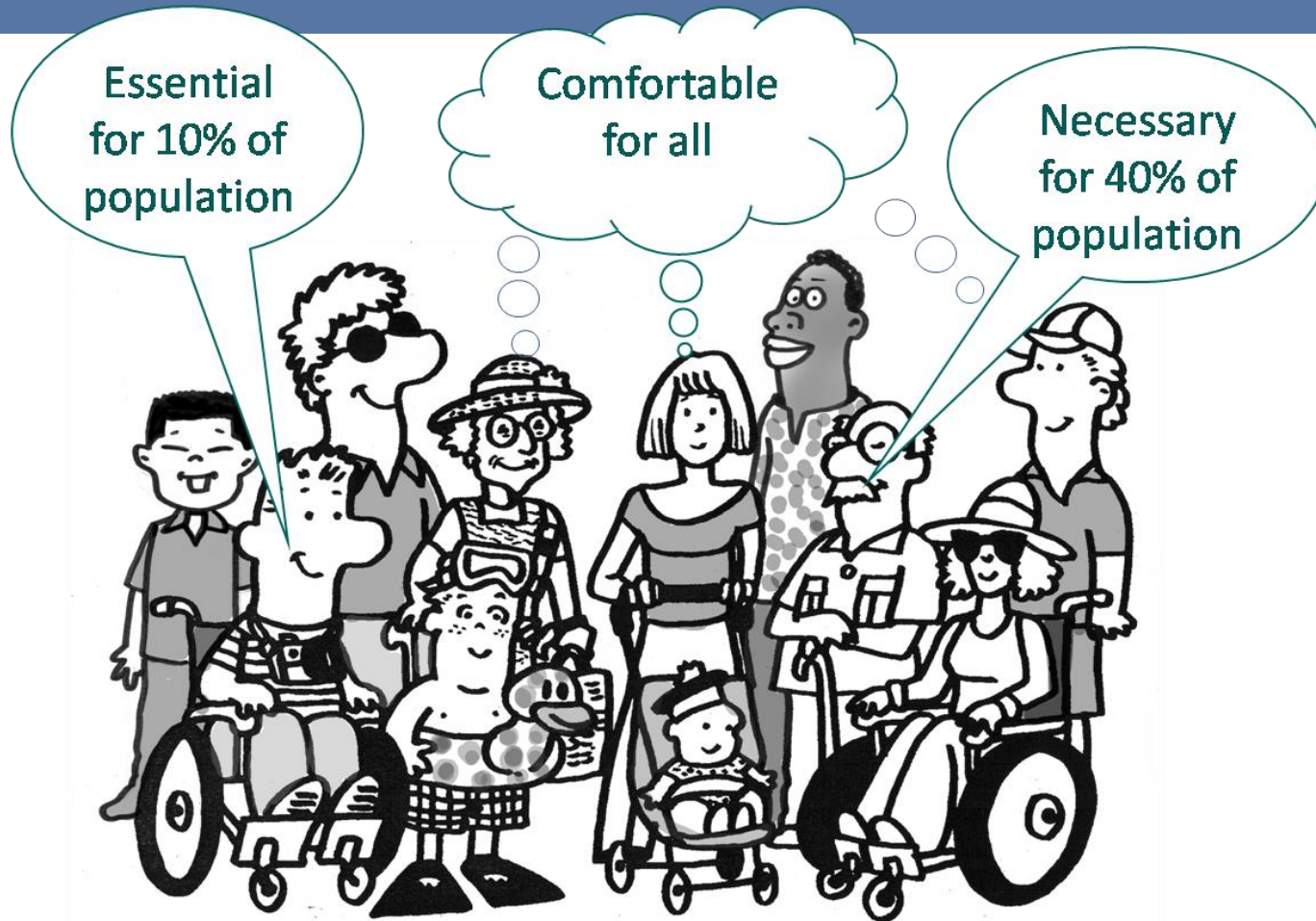
Key Information

- **Location:** Budapest, Hungary
- **Delegates:** 250
- **Fee:** EUR 15
- **Committees:** UN: Security Council, UN: Human Rights Council, UN: Environment Assembly, UN: Economic and Financial Committee and UN: General Assembly.

Open for both University and High School Students.

Ergonómia és Pszichológia Tanszék

Thank you for your attention!

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pulaymark@erg.bme.hu

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